Expenditures for Mental Health Services in the Utah Prepaid Mental Health Plan

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This article examines the effect of a mental health carve-out, the Utah Prepaid Mental Health Plan (UPMHP), on expenditures for mental health treatment and utilization of mental health services for Medicaid beneficiaries from July 1991 through December 1994. Three Community Mental Health Centers (CMHCs) provided mental health services to Medicaid beneficiaries in their catchment areas in return for capitated payments. The analysis uses data from Medicaid claims as well as "shadow claims" for UPMHP contracting sites. The analysis is a pre/post comparison of expenditures and utilization rates, with a contemporaneous control group in the Utah catchment areas not in the UPMHP. The results indicate that the UPMHP reduced acute inpatient mental health expenditures and admissions for Medicaid beneficiaries during the first 2½ years of the UPMHP. In contrast, the UPMHP had no statistically significant effect on outpatient mental health expenditures or visits. There was no significant effect of the UPMHP on overall mental health expenditures.

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INTRODUCTION

The reimbursement of mental health care providers using capitation payment rates has been a controversial issue for Medicaid programs. In theory, capitated payment, when accompanied by the risk of financial loss or the potential for financial gain, should reduce the use of expensive inpatient treatment settings and encourage the use of less-costly inpatient settings and outpatient treatment programs. Capitated payment arrangements could generate more efficient delivery of health care, because they assign the responsibility for the financing and delivery of services to a single organizational entity. However, a major issue in the use of capitation reimbursement has been the development of appropriate financial incentives for providers. Capitation arrangements that reward cost containment could lead to the under-provision of services, especially to subgroups of beneficiaries with chronic mental illness. On the other hand, capitation payment arrangements that provide only weak cost-containment incentives could be ineffective at restraining Medicaid expenditures.

Medicaid programs have applied capitation payment methodologies to mental health care by including mental health services under capitation payments received by health maintenance organizations (HMOs) or by breaking out mental health services from other benefits and paying organizations to manage them. This second approach—sometimes called a

"mental health carve-out"—has two variations. Under the first variation, Medicaid contracts on a capitated basis with a single entity that is responsible for the provision of all mental health services to beneficiaries in the State. This is the approach that has been taken by the Massachusetts (Callahan et al., 1995) and Iowa (Micali and Nardini, 1996) Medicaid programs. Under the second variation, Medicaid contracts directly with local mental health entities, such as community mental health centers, that agree to provide services to all beneficiaries in their geographical catchment areas and are reimbursed on a capitated basis. The presumed advantage of this second approach is that the responsibility for the coordination and delivery of mental health care rests with entities that are familiar with local delivery systems and treatment resources (Christianson and Gray, 1994).

UTAH PREPAID MENTAL HEALTH PLAN

The State of Utah established the UPMHP in July 1991, in part with the objective of controlling the costs of inpatient mental health treatment for Medicaid beneficiaries provided in acute care hospitals. One of the stated goals of the UPMHP also was to increase the use of outpatient treatment settings. Prior to the UPMHP, Utah ranked very low among the 50 States in per capita outpatient mental health treatment expenditures. It was hoped that some of the dollars freed up by reduced reliance on inpatient care would be used to expand outpatient treatment programs (Christianson et al., 1995a). However, outpatient expenditures per beneficiary could decrease if better management of mental health care under the UPMHP resulted in improved coordination of service delivery, or if contracting CMHCs did not adequately staff to meet the increase in demand brought about by the requirement that all Medicaid beneficiaries in their service areas were entitled to receive care from them or from providers under contract to them.

In April 1990, HCFA approved a freedom-of-choice waiver request from the State of Utah to operate the UPMHP. Under this waiver, the State solicited proposals from entities within the State to provide mental health services for Medicaid beneficiaries on a capitated basis. To qualify, the bidders had to be able to directly provide, or subcontract to provide, the full range of mental health services covered by Medicaid. Six of the 11 CMHCs in the State submitted bids; three CMHCs withdrew during contract negotiations and the State finalized contracts with the three remaining CMHCs (Christianson et al., 1995a). The catchment areas of these contractors contained about 52 percent of the State's Medicaid eligibles in 1991. In the areas of the State not covered by capitated contracts, Medicaid continued to reimburse providers on a fee-for-service basis. Of the three CMHCs operating under capitation, one was classified as having an urban catchment area (Salt Lake County and Summit County), and 78 percent of the Medicaid beneficiaries who received capitated mental health care lived in this area. There was roughly the same distribution of urban versus rural Medicaid beneficiaries residing in the capitated and non-capitated catchment areas.

Medicaid contracts with CMHCs under the UPMHP initially were divided into inpatient and outpatient portions. During the first 2 years, contractors were to retain any funds allocated for inpatient care that exceeded payments to inpatient providers. Thus, they had an incentive to reduce their inpatient expenditures, because any savings could be spent in any way deemed

appropriate by the CMHC. The intent of the UPMHP was that at least some portion of the inpatient savings could be used to expand outpatient programs. Any shift of funds to outpatient care during the first 2 years would financially benefit the CMHCs, because it would increase the expenditure base on which capitation rates would be set for the third year, when the CMHCs would be at financial risk for losses on both inpatient and outpatient care.

If the CMHCs believed that they had incurred losses on inpatient care during either of the first 2 years, they could petition the State to recalculate their payments. The new payment rate would be based on documented inpatient utilization valued at the State's Medicaid fee-for-service payment rates. While designed to protect the contracting CMHCs from incurring major losses on inpatient care during the first 2 years, this process did not fully insulate them from financial risk. For instance, if the State's recalculation resulted in an estimate that was less than the capitated payment, the contracting CMHC was required to pay the difference to the State. The State's estimate could be less than actual CMHC expenditures if the CMHC paid hospitals higher rates than paid by Medicaid, or if the CMHC expended funds for alternatives to inpatient services that were not covered by traditional Medicaid. In these cases, the contracting CMHC could experience financial losses on inpatient care that would not necessarily be recouped through the reconciliation processes. In fact, no contracting CMHC petitioned the State to recalculate its inpatient payments.

In contrast to inpatient care, during the first 2 years of the UPMHP, the capitated payment for clinic services was accompanied by a required year-end cost settlement based on the shadow claims data. Except for any delays in payment associated with the year-end settlement, this outpatient payment system was essentially a fee-for-service arrangement. During these years, the CMHCs and Medicaid collected data on the costs of outpatient care without placing the CMHCs at financial risk for this care. These data then were to be used to calculate full-risk capitation rates for the third year of the UPMHP, when the contracting CMHCs would assume full risk for both inpatient and clinic services.

The rate formula that was initiated beginning July 1, 1991, was based on fiscal year (FY) 1989 expenditures, and included adjustments for inflation, new early and periodic screening, diagnosis, and treatment (EPSDT) and clinic services, and the State's administrative costs. Medical detoxification was not included in the capitation rate, nor was any emergency room service that was usually billed as an outpatient service, nor services provided to beneficiaries residing in the State Hospital or the State Training School. Participating CMHCs were required to undertake quality assurance activities and to monitor the accessibility of services to Medicaid beneficiaries.

During contract negotiations for the third year, a new risk-sharing arrangement for inpatient care was developed. Each contracting CMHC received a capitated payment from Medicaid for inpatient care. At the end of the year, the actual costs of care, along with adjustments, were submitted to Medicaid. Adjustments were allowed for the costs of conducting precertification review, administrative costs associated with claims processing, and residential treatment costs incurred by patients who otherwise would have been hospitalized. The contracting CMHC was allowed to retain 85 percent of the difference between the capitated payment and the adjusted costs, with the State receiving 15 percent.

During the second program year, a change in Medicaid policy allowed

providers to bill Medicaid for the provision of rehabilitative services to a group of children under the statutory authority of the Department of Human Services. A lack of historical data on the use of Medicaid mental health services by the group made it difficult to construct an appropriate capitated reimbursement rate. The Medicaid program decided to collect data on service use during the first 6 months of the third year of the UPMHP, after which the contracting CMHCs would be required to provide outpatient services to this group, along with all other groups of Medicaid beneficiaries, on a full risk basis (Christianson et al., 1995a). As a consequence, the contracting CMHCs did not begin assuming full financial risk for both inpatient and outpatient care until January 1, 1994, 2½ years after the start of the UPMHP.

ANALYTIC APPROACH

The analysis of expenditures is based on a pre/post comparison of the catchment areas that participated in the UPMHP with a contemporaneous comparison group of areas that remained under traditional fee-for-service Medicaid. Both design features are essential to drawing appropriate inferences about the effects of capitation in the absence of a randomized controlled trial. A major concern in conducting the comparison was that something would be confounded with the presence of the UPMHP that would cause, or be correlated with, expenditures in its own right. For example, if the non-contracting sites had historically different use rates or populations at risk, or if there were secular changes in use, then either a pure pre/post or a pure cross-sectional comparison would generate biased estimates of the impact of the UPMHP. The pre/post aspect of the design controls for historical differences among the CMHCs. Failure to adjust for such differences could lead to a biased assessment of capitation due to selection effects. The use of a contemporaneous control group adjusts for secular trends that may be confounded with trends in treatment in the CMHCs that became capitated. Failure to control for such trends could provide a biased estimate of the effect of the UPMHP. For example, if hospital expenditures declined in the catchment areas of the contracting CMHCs in the 3 pre-capitation years, a simple pre/post comparison involving only the contracting sites could show a significant effect for the UPMHP, when the program, in fact, may have had no effect.

In the simplest case, the effects of secular trends could be estimated using the experience of the comparison group. The estimated trend would be: ("post" period use - "pre" period use for the non-capitated sites). The corresponding "post -pre" measure for the capitated sites includes both the effects of the UPMHP and the time trend. An unbiased estimate of the program effect would be the difference between these two trends ("post" for capitated sites - "pre" for capitated sites) - ("post" for non-capitated sites - "pre" for non-capitated sites). This approach is sometimes known as a "difference in difference" estimator.

The actual analysis is more complicated than this, because of possible site differences and the use of additional explanatory variables. To conduct the analysis, we used a variant of the "fixed effects" model (Greene, 1993), combined with an AR(2) model. The basic "fixed effects" part of the model is:

$$y_{it} = x_{it}\beta + TIME_{it}\eta + CAP_{it}\alpha + \mu_i + \varepsilon_{it}$$

where $y_{i,t}$ is the dependent variable (e.g., expenditure rate) for the i^{th} site in the t^{th}

time period (e.g., PRE, POST); $X_{i,t}$ is a row vector of site characteristics that vary over site and time. CAP is an indicator for a contracting site currently participating in the UPMHP, while TIME is either a time trend variable or a vector of binary variables to capture secular trends and other confounding over time periods (both specifications are used in different versions of the model). Here, μ_i represents a site–specific, time–invariant, but unobserved characteristic, while ε is an i.i.d. error term–that is, it is an error term that is uncorrelated with the other covariates, as well as uncorrelated across time. (A more complicated specification of the model interacts time with the other variables in the analysis.) The estimated coefficient for the CAP variable represents the effect of the UPMHP on the utilization or expenditure measure.

Estimating this equation by ordinary least squares (OLS) would lead to biased estimates if either the μ and ε terms were correlated with capitation, time, or other characteristics; that is, if the error term $(\mu+\varepsilon)$ were correlated with any other included variables. In a quasi-experiment involving a once and for all change (which describes the UPMHP), CAP and TIME are correlated with μ. The fixed effects model can remove the correlation by removing the μ term; for example, we could insert site indicator Z_i to remove the effect of unobserved variables that are stable within sites. The unobserved time effects are captured in the coefficient vector η.

Consider a case with no time variables. For each site i, take the mean of Equation 1 above across t and subtract this mean from (1). Each variable is now taken as a deviation from its site–specific mean; or, equivalently, the model includes site and time indicator variables. The μ_is cancel out. Because the remaining error term is now uncorrelated with time or site, the estimates will be unbiased for CAP. This model is estimable because there is both a pre and post period for both the contracting and non-contracting sites. Thus, even when utilizing the deviations from the site–specific means, there will still exist variance in the CAP variable, because there are pre and post observations on the ever-capitated group. If no explanatory variables other than site, time, and UPMHP participation status are used in the analysis, then the fixed–effects model generates exactly the same pre/post comparison described above.

The use of indicator variables for each site, or for groups of sites, is particularly important in the analysis, given the prominence of the Salt Lake County site, in terms of the high proportion of State Medicaid beneficiaries residing there. One of the unavoidable consequences of the fixed–effects model, which uses indicator variables for sites, is that the effect of specific time-invariant site characteristics cannot be determined. These are perfectly confounded with the unobserved μ_i in the fixed–effects version of Equation 1. Nevertheless, the fixed–effects model does avoid the potential for generating inconsistent coefficient estimates if the μ_i were correlated with other covariates. Given the limited precision permitted with the data used in this study, the use of more precise, but potentially inconsistent, random effects modeling to generate estimates for the effects of time-invariant site characteristics was rejected.

One of the key assumptions that allows this approach to work is that the pre period fully captures the differences between areas, and that the areas share a similar historical experience. If this is the case, then the areas are comparable in terms of their time trends. If they had different time trends and the decisions to participate reflected these historical differences, then

the ability to separate the effect of the UPMHP from historical differences in time trends and levels would be limited. As the figures provided later indicate, the time trends prior to the UPMHP were quite similar. This approach could still generate biased estimates of the effect of UPMHP if Medicaid beneficiaries had relocated to find the kind of mental health care system—traditional Medicaid or UPMHP managed care—that was best suited to them. We have no evidence of such migration occurring as a result of the demonstration.

Another important consideration in the specification of Equation 1 is the level of aggregation for the dependent variable(s). For a population of frequent users of mental health care, interview data on mental health status and sociodemographic characteristics could be used to supplement claims data when investigating differences in utilization between program and comparison groups of Medicaid beneficiaries. However, for the general Medicaid population, it would be prohibitively expensive to interview a sample large enough to detect significant differences in mental health care expenditures or utilization at the individual beneficiary level, because of the relative rarity of mental illness episodes and, especially, inpatient admissions for mental health care. This argues against interviewing a random sample of Medicaid beneficiaries to analyze the impact of the demonstration on expenditures and service utilization, controlling for patient differences in demographic and health status measures.

There are other considerations also suggesting that a beneficiary-level analysis would not be desirable. First, the fragmented eligibility periods for many general Medicaid recipients introduces substantial analytic complexity. This could be addressed by identifying beneficiaries with an unbroken period of Medicaid participation before and during the UPMHP, but these continuous program participants would not necessarily be representative of the general Medicaid population. Second, there is the possibility of conducting a beneficiary-level analysis with the unit of observation being a beneficiary month to capture the experience of all beneficiaries. The results of this approach would not be robust because of the twin problems of a large number of beneficiaries with no mental health use in a particular month, and the very skewed utilization and expenditures among those who do use. The shorter period of time (a month) exacerbates these problems over what would occur with longer time periods (a year). Using annual data from the Health Insurance Experiment (Duan et al., 1983) found that least squares techniques on annual expenditures generated estimates that overfitted the data. Third, many of the robust statistical models for analyzing individual level data (such as the multipart models used in the RAND Health Insurance Experiment) require equal time periods for all observations, a condition that clearly would not be met in the general Medicaid population. Alternative approaches for generating robust estimates using individual level data rely on Poisson or negative binomial distributional assumptions; but these assumptions do not fit patterns of mental health expenditures and utilization in the general population and are extremely sensitive to the long right tail of the distribution (heavy users). The presence of chronically mentally ill beneficiaries in the Medicaid population makes such methods risky for this analysis. Finally, one could conduct a relatively simple analysis of beneficiary data, possibly allowing for differences across major demographic or programmatic groups. Such an analysis would yield

greater precision on differences across subgroups, but would provide little extra precision on overall impact of the UPMHP across areas, because the type of payment system—UPMHP versus traditional Medicaid—would not vary within areas.

For these reasons, the analysis uses a time series of aggregate expenditure and utilization rates to analyze program-level impacts. These rates are developed on a monthly basis for the 3 years prior to the start of the demonstration and the first 3½ years of the UPMHP. The denominator of the rate calculations is the number of Medicaid eligibles residing in the catchment area of the CMHC each month. These catchment areas are defined by county, facilitating the assignment of beneficiaries to catchment areas using the ZIP Code of the beneficiary's residence. Conceptually, 11 expenditure or utilization rates (equal to the number of CMHCs) could be calculated monthly for each category of service, with the numerator equal to expenditures or utilization that month by beneficiaries in a given area. However, in this analysis, service areas are aggregated into four groups because of the low level of inpatient expenditures and admissions observed on a monthly basis in some rural CMHC catchment areas, and the volatility in inpatient expenditure and admission rates in these areas. These four groups are: capitated rural, capitated urban, non-capitated rural, and non-capitated urban. This process generates 48 rates for each measure per year (assuming complete data) over a 6½–year period (July 1988 through December 1994).

To remove the effects of time trends from the analysis, we followed a two–step procedure. First, using the non-contracting (non-UPMHP) sites, we estimated the effect of year-month and Medicaid eligibility group on fee-for-service expenditures and utilization, using weighted least squares with weights equal to the number of Medicaid beneficiaries. For each outcome, we calculated a residual for the contracting (UPMHP) sites, which is equal to their actual rate minus the rate predicted by the non-UPMHP sites' experience over time. These detrended residuals were then used to estimate the effect of the UPMHP on the contracting sites.

In earlier work, we used simple linear and quadratic time trends to capture the fee-for-service experience (Christianson et al. 1995b). However, when we examined data for all 6½ years, we found that the fee-for-service pattern was much more complex than a simple quadratic formulation could capture. As a result, we used indicators for each year and month to capture the time trends in fee for service.

Including variables for eligibility category, time, and month removes the effects of any site or temporal shifts confounded with the CMHC's participation in the UPMHP program. However, the data exhibited non-constant and non-zero correlations across time. To obtain efficient parameter estimates and unbiased inference statistics, an auto-regressive AR(2) error structure (Harvey, 1981) was examined within CMHC site groupings for expenditure and utilization rates, in addition to the fixed-effects approach described earlier. Each observation is weighted by the total number of beneficiaries in that service area during that month to correct for the heteroscedasticity that is inherent when rates are constructed for populations (Greene, 1993).

DATA

We estimated the effect of participation in the UPMHP on three mental health expenditure variables, measured on a monthly per beneficiary basis, with numerators defined as: acute stay inpatient

expenditures, outpatient expenditures, and total mental health care expenditures. The total expenditure rate does not equal the sum of the first two rates because it also includes expenditures on residential treatment and a small number of relatively insignificant services and medications. The expenditures exclude the costs of care provided for residents of the State hospital and State training school, which were not covered by the UPMHP contract. We also estimated the effect of UPMHP participation on inpatient admission and outpatient visit rates.

Medicaid claims are used to calculate mental health expenditures and service use per beneficiary month in the comparison sites. For the 3 years prior to the UPMHP, these measures can be constructed for the contracting sites as well. In the demonstration, the contracting CMHCs were reimbursed on a capitated, rather than fee-for-service, basis so there were no "claims paid" data for beneficiaries in these sites. However, the contracting CMHCs submitted encounter forms which were used in reconciling outpatient reimbursements under the capitation rates during the first 2½ years of the UPMHP and in documenting inpatient rates. This "shadow claims" system also contained per unit reimbursement rates. Thus, for contracting CMHCs, expenditures that would have occurred if the Centers had been paid on a fee-for-service basis can be calculated, permitting a comparative analysis of expenditure rates.

Medicaid claims data provide reasonably accurate gross measures of service utilization when providers are paid on a fee-for-service basis. This is the case for both capitated and comparison sites for the 3 years prior to the demonstration, and for the comparison sites for the first 2½ years of the demonstration. It is the experience of the authors in past studies (Moscovice et al., 1993) that claims for inpatient services are reasonably accurate under capitation payments as well. However, past analyses of the outpatient utilization of Medicaid beneficiaries in HMOs often have confronted under-reporting based on "shadow claims" submitted by capitated plans. The financial incentives for CMHCs in the UPMHP suggest that under-reporting of outpatient utilization is not an issue for the first 2½ years of the program. During this period, the CMHCs had a strong incentive to report all outpatient care, because their final payments depended on documentation of the services they provided. During the last year of the analysis (January 1994-December 1994), when outpatient care costs were not reimbursed on a per unit of service basis, the incentives for the contracting CMHCs to report outpatient claims accurately were not as strong. However, the contracting CMHCs had a financial incentive to file these shadow claims for both inpatient and outpatient care, because future adjustments in capitation rates would be based on these records.

Several steps were involved in moving from the raw data in the Utah Medicaid claims files to the expenditure and service use rates used in the analysis. First, Medicaid claims coding manuals and file structures were reviewed to determine how utilization and expenditure data were organized in the claims files. Second, based on this review, variable specifications were developed that defined how expenditures should be constructed. Third, these specifications were reviewed by programmers from the State and modifications were made based on their suggestions. Fourth, a "test file" was run on a small subset of Medicaid beneficiaries. The purpose of this file was to determine if the variable specifications and programming language produced measures that appeared to have reasonable values. Means, standard deviations, and frequen-

cies for the constructed variables were examined. As a result, several instances were detected where variables needed to be respecified or programming language rewritten. This iterative process continued until an acceptable test file was generated.

The fifth step in the process involved moving from the test file to the construction of a file for each of the years included in the analysis. These included all of the "constructed" outcome measures to be used in the study, as well as the raw data on utilization and expenditures and other beneficiary-level data. Processing of data from the years after implementation of the UPMHP was more complicated because these data were located in two different places: the standard Medicaid claims files for the non-capitated sites and "shadow claims" files for the capitated sites. While the two files were substantially the same in their construction, there were a few major differences that required some programming changes. Also, the availability of the shadow claims files lagged behind the availability of the other data, and this delayed the analysis.

The sixth step involved the aggregation of the individual level outcome measures into expenditure rates. This required a separate programming effort directed at assigning beneficiaries to appropriate CMHC catchment areas, aggregating data within catchment areas, and constructing "denominators" for each catchment area. The aggregated measures then were divided by the denominator counts to obtain the rates that were ultimately used as the dependent variables in the regression analyses.

Before the actual analysis could be conducted, however, a seventh step was necessary; trends in all of the constructed rates were examined for anomalies that could indicate problems in constructing the measures. Problems could occur, for instance, if there were changes in coding procedures for entering claims in the Medicaid claims data set that were missed in constructing the outcome measures. These types of problems might not be detected until the "time series" of rates could be examined for large and abrupt changes in rates from 1 month to the next.

RESULTS

The results of the analysis are contained in two sections. The first section presents descriptive data on trends in expenditure and utilization rates for 36 months prior to the UPMHP and the first 42 months of the UPMHP. For each measure, trends are plotted for the two groups of CMHCs: the sites that became capitated under UPMHP, and the sites that remained under traditional fee-for-service Medicaid arrangements. The CMHCs are aggregated into these groups to avoid volatility in rates that could occur due to the relatively small number of Medicaid beneficiaries and infrequent use of some services in many rural CMHC catchment areas in Utah.

To make the results more accessible, we have plotted the different expenditure and utilization rates for both the capitated and fee-for-service areas for the whole study period. The month-to-month estimates per eligible are quite noisy, due to the influence of individual hospitalizations or large claims cases. We smoothed the data to make the underlying trends in the data more apparent in the figures by aggregating to 2-month periods. (Specifically, using the "smooth" feature in STATA 4.0, we employed a variant based on running medians of spans 3 and 5, repeated twice, with a Hanning option [Statacorp, 1995]).

The second section presents the results of the statistical analyses of the data, using the model and statistical techniques described above. The specification

includes variables to control for rurality and beneficiary composition, and indicators for year-month to control for time trends; see Table 1 for more detail. For the analysis of the detrended data from the contracting sites, the specification allows the contracting sites to have a different time trend from the non-contracting sites and a different response to being rural. It includes two variables that indicate the beginning of partial capitation (July 1991) and full capitation (January 1994). To test the sensitivity of the model to the specification of time trends, we also examined an alternative specification that added two time variables that allow the effect of the UPMHP to change as the program matures during the partial and full capitation periods. The results of this sensitivity analysis are discussed but not presented in tabular form.

For all models, we examine the detrended expenditures and utilization rates for the UPMHP sites. Using data from the non-capitated sites, we estimated coefficients for a weighted least squares model, with weights equal to the population at risk in that site in that year-month. The detrended values for the dependent variables for the UPMHP sites are the differences between their actual rates and those predicted by this non-capitated site model. The equations using these detrended values were estimated using a GLS model based on a version of an AR(2) model with weights equal to the population at risk in that site in that year-month. The estimates of the lag structure for the AR(2) model are based on the detrended data from the UPMHP sites.

Descriptive Data

Figures 1-6 present evidence concerning trends in Medicaid monthly per beneficiary expenditures and utilization for mental health care. Figure 1 indicates that the difference in total expenditures

Table 1
Model Specification

Equation 1[1]
Dependent Variables:
Expenditures and utilization

Independent Variables:
Indicator for each year-month
Indicator for rural area
Proportion of Medicaid population that was blind, aged, or disabled
Proportion of Medicaid population that was medically needy
Proportion of Medicaid population that was SOBRA
Proportion of Medicaid population that was AFDC and a child
Proportion of Medicaid population that was AFDC and an adult male
Proportion of Medicaid population that was AFDC and an adult female (omitted group)

Equation 2[2]
Dependent Variables:
Expenditures and utilization, detrended

Independent Variables:
Indicator for rural
Indicator for partial capitation period (July 1, 1991-December 31, 1993)
Indicator for full capitation period (January 1, 1993-December 31, 1994)
Intercept corresponds to pre-capitation period (July 1, 1988-June 30, 1991) for the UPMHP sites

[1] Equation estimated using non-contracting sites; used to predict values for UPMHP sites for detrending.

[2] Equation 2 estimated for UPMHP sites.

NOTES: SOBRA is a program for pregnant women and children, extending Medicaid coverage. AFDC is Aid to Families with Dependent Children. UPMHP is Utah Prepaid Mental Health Plan.

SOURCES: Stoner, T., Manning, W., Christianson, J., University of Minnesota; Gray, D., University of Utah; and Marriott, S., Research Consulting, 1996.

for beneficiaries in the capitated and non-capitated sites remained relatively constant over the period prior to implementation of the UPMHP. Because the two parts of the State exhibited similar trends before the UPMHP, we can use the experience of the non-capitated sites to control for the time trends that would have occurred in the capitated sites after the implementation of the UPMHP. The mental health utilization and expenditures at the sites that would later be capitated were higher than at the non-capitated sites in the period prior to the UPMHP. Given this historical difference in levels of utilization and expenditure, it is essential that we use a pre/post comparison to eliminate a bias that could occur if we only relied on a cross-sectional comparison of UPMHP and traditional Medicaid in the period after the UPMHP commences.

Figure 2 reveals an apparent effect of the UPMHP on inpatient expenditures for mental health care. Inpatient expenditures in the contracting sites exceeded those in the non-contracting sites prior to the UPMHP. After the UPMHP was implemented, this difference disappeared, with inpatient expenditures averaging slightly higher in the non-capitated sites. Thus, in the raw expenditure rates, there is some indication that the UPMHP reduced expenditures for acute inpatient mental health care, particularly during its first year. This pattern was repeated in Figure 3, which depicts annualized mental health hospitalization rates per 1,000 eligibles per month. Rates were fairly constant throughout the 6-year study period in the non-capitated sites, but declined after implementation of the UPMHP at the capitated sites. Length of stay for psychiatric hospitalization was higher in the contracting sites than in the non-contracting sites prior to the UPMHP (Figure 4). Lengths of stay tended to fall throughout this period, but the difference in length of stay between capitated and non-capitated sites moved erratically.

Figure 5 presents data on outpatient mental health expenditures at capitated and non-capitated sites. In both capitated and non-capitated sites, expenditures on outpatient mental health care were increasing before implementation of the UPMHP. This trend continued after implementation of the UPMHP, with the difference between capitated and non-capitated sites increasing by a small amount. The same pattern is evident with respect to mental health outpatient visits (Figure 6).

Statistical Analysis

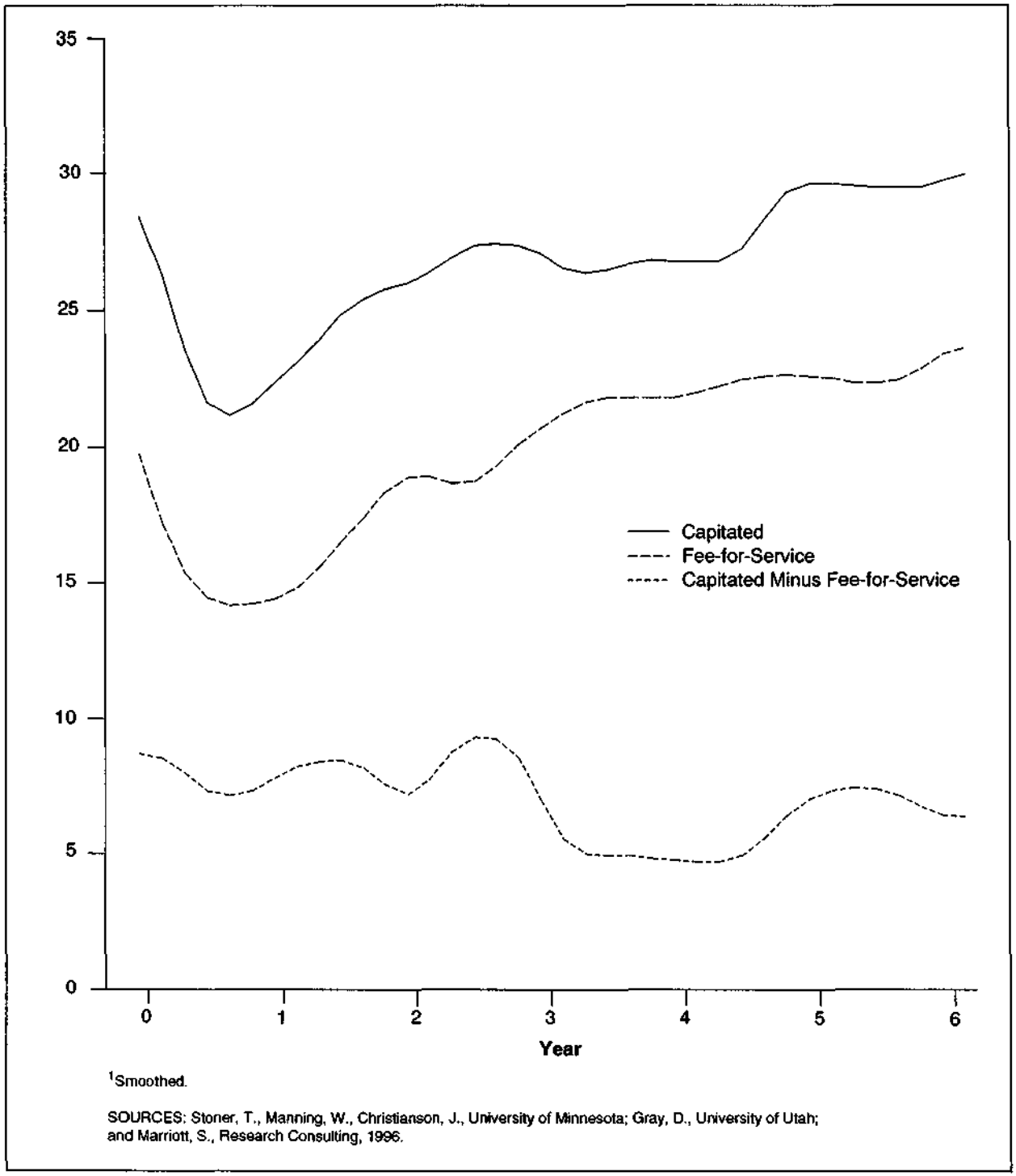
Overall Findings

This section presents results from the general statistical model described earlier. The model looks at the difference between contracting and non-contracting areas of Utah, after removing the time trends observed in the non-contracting (non-UPMHP) areas. Table 2 summarizes the findings related to the effect of participation in the UPMHP on total mental health expenditures per beneficiary per month. The difference between capitated and non-capitated sites increased by $1.01 per beneficiary per month in the middle period and $3.33 during the late period (relative to the precapitated period differences between the two sites). These effects are not statistically significant at the 5-percent level.

While these findings suggest no UPMHP effect on overall mental health expenditures, had the capitated CMHCs been paid on a fee-for-service basis, there do appear to have been significant UPMHP effects on acute inpatient expenditures. Inpatient expenditures were greater in the capitated sites during the preperiod (Figure 2). The difference in inpatient psychiatric expenditures decreased by

Figure 1

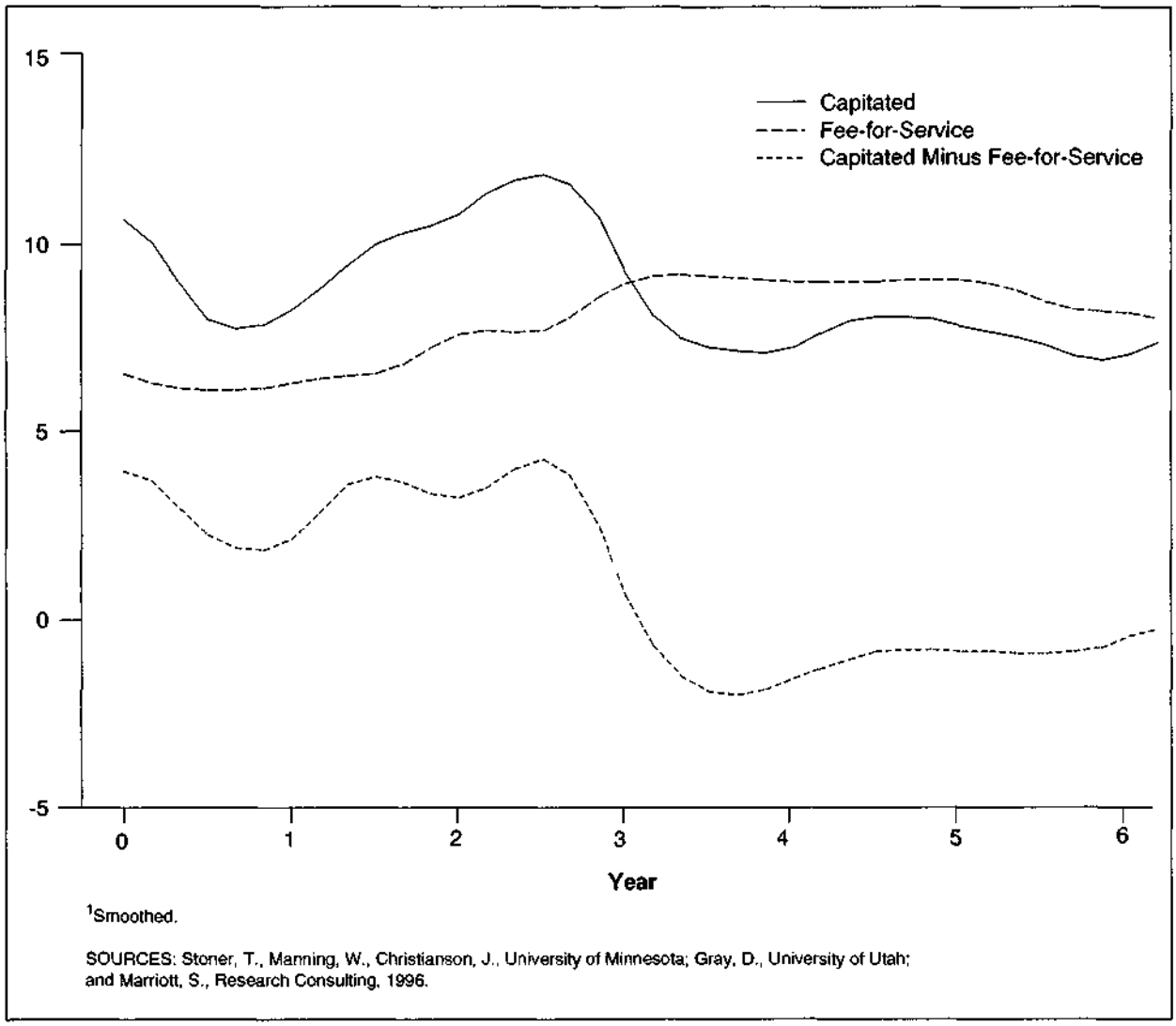
Total Mental Health Expenditures[1] per Capita per Month



[1]Smoothed.

SOURCES: Stoner, T., Manning, W., Christianson, J., University of Minnesota; Gray, D., University of Utah; and Marriott, S., Research Consulting, 1996.

Figure 2
Inpatient Mental Health Expenditures[1] per Capita per Month



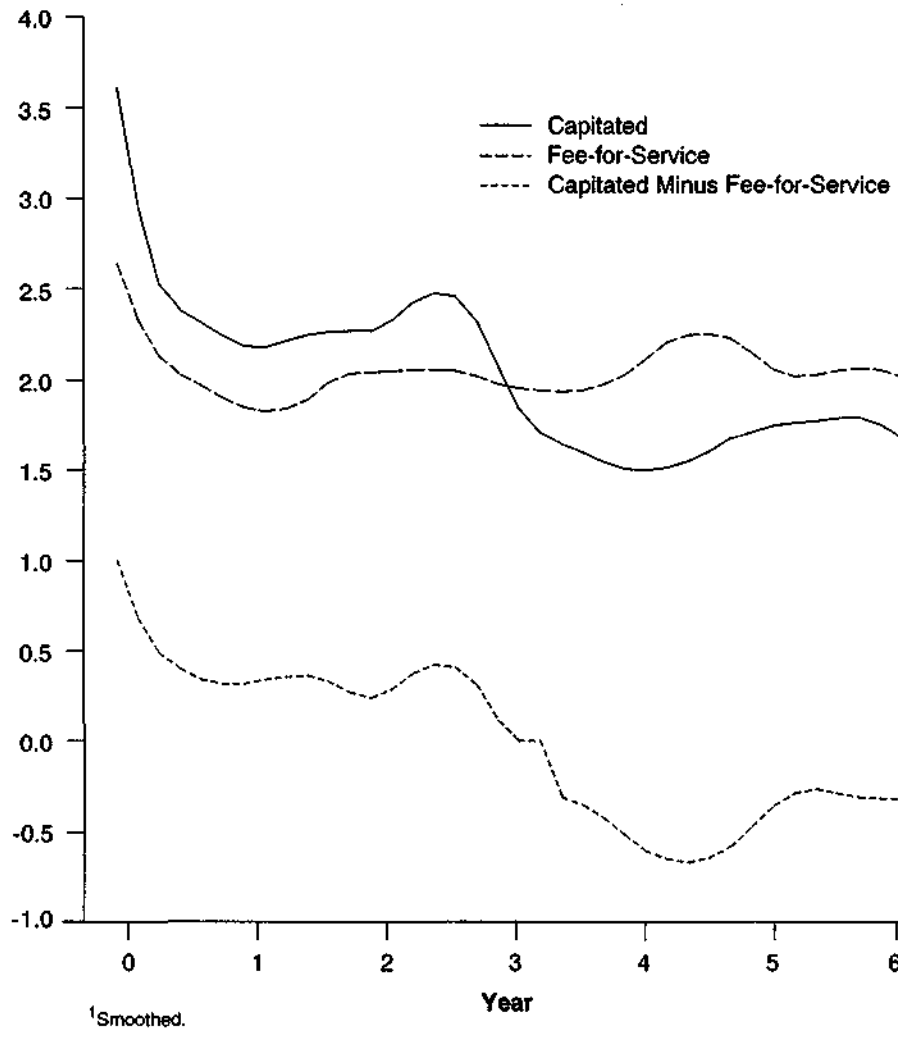
[1]Smoothed.

SOURCES: Stoner, T., Manning, W., Christianson, J., University of Minnesota; Gray, D., University of Utah; and Marriott, S., Research Consulting, 1996.

$3.05 per beneficiary per month in the middle period relative to the preperiod, a significant effect (Table 3). This UPMHP effect was less in the full capitation period, and was not statistically significant at the .05 level. Over both periods, there was a significant UPMHP effect on inpatient expenditures; $F(2, 151) = 11.88$, $p < 0.001$. A similar pattern was observed with respect to hospitalizations for treatment of mental health problems (Table 4). Hospitalizations were higher at the capitated sites in the preperiod (Figure 3), but this difference was reduced by 0.0004 hospitalization per beneficiary per month in the middle period, a statistically significant reduction. The reduction in hospitalizations in the full capitation period was not statistically significant. Over both periods, there was a significant UPMHP effect on hospitalizations; $F(2, 151) = 9.06$, $p < 0.001$.

The length of stay for mental health hospitalizations was longer in the preperiod in the sites that were to be capitated (Figure 4). Adjusting for time trends, the difference in length of stay increased during the middle period of capitation for

Figure 3
Mental Health Hospitalizations[1] per 1,000 Eligibles per Month



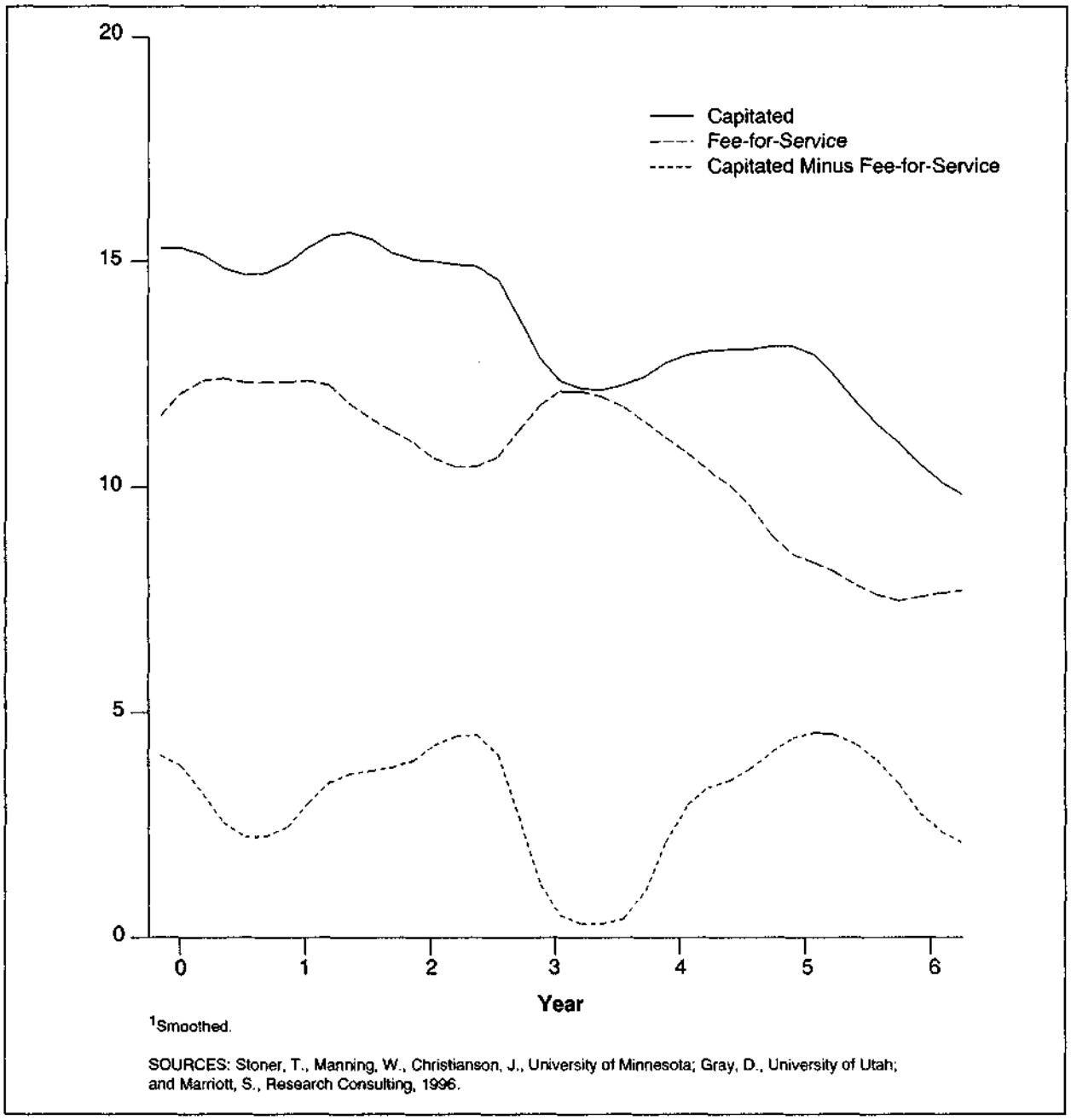
[1]Smoothed.

SOURCES: Stoner, T., Manning, W., Christianson, J., University of Minnesota; Gray, D., University of Utah; and Marriott, S., Research Consulting, 1996.

inpatient care only, but the increase was not statistically significant. The length of stay in the capitated sites increased during the period of full capitation, relative to the historical trend for the capitated sites (Table 5, $p = 0.51$). However, this result is sensitive to how we controlled for time trends. As Figure 4 indicates, length of stay was generally falling in both capitated and non-capitated sites throughout this period, but at rates that varied over time.

Outpatient expenditures in the capitated CMHCs exceeded expenditures in the non-capitated CMHCs prior to the UPMHP (Figure 5). As Table 6 indicates, the magnitude of the UPMHP effect was to increase that difference by $1.99 per beneficiary per month when comparing the middle with the preperiod and by $1.90 when comparing the late with the preperiod. However, over both periods, the UPMHP effect was not significant ($p = 0.26$). This comparability of effects

Figure 4
Psychiatric Length of Stay[1]

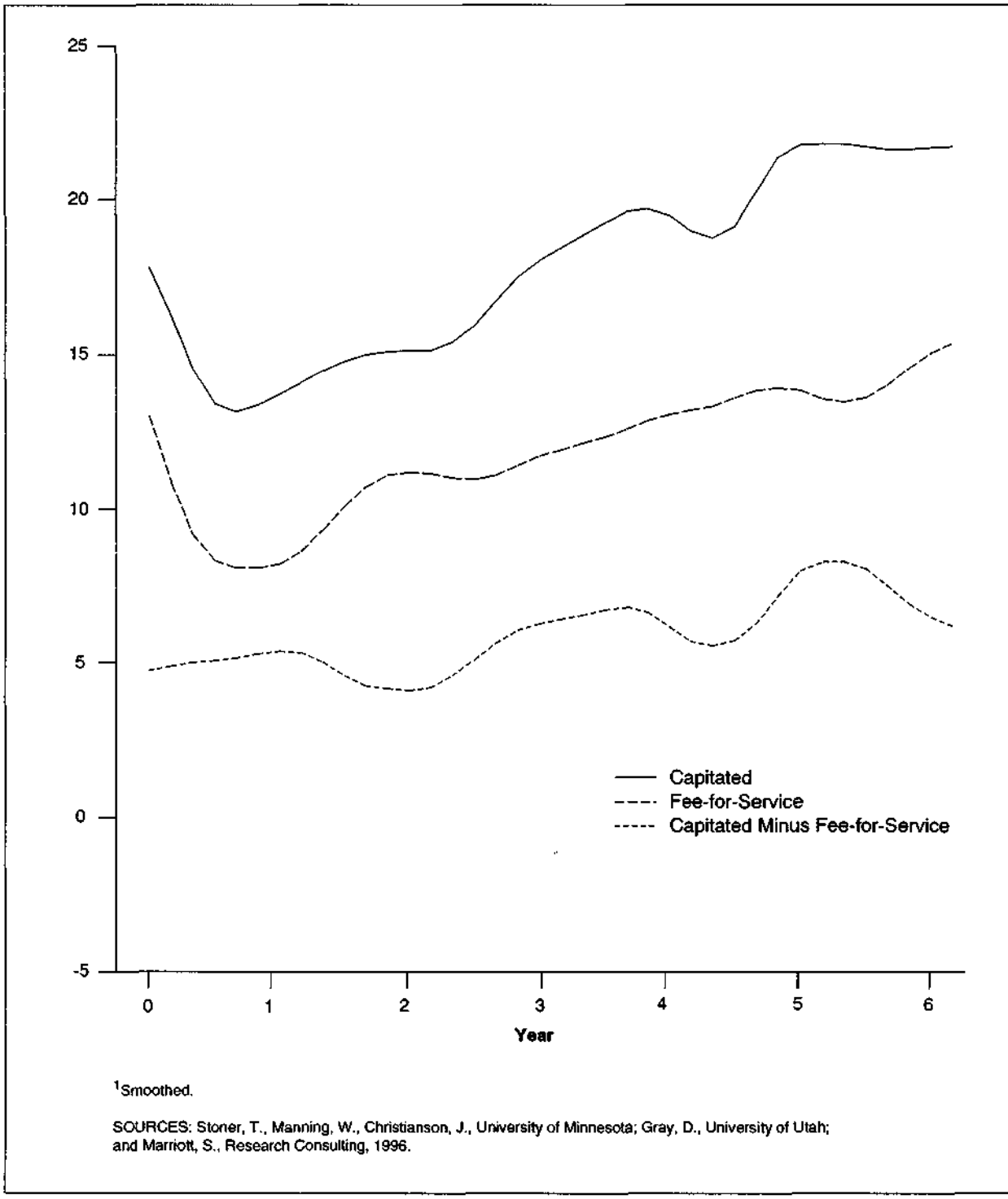


[1]Smoothed.

SOURCES: Stoner, T., Manning, W., Christianson, J., University of Minnesota; Gray, D., University of Utah; and Marriott, S., Research Consulting, 1996.

across the two comparisons is somewhat surprising, given that the capitated sites shifted from no financial risk to full financial risk for outpatient care as they moved from the middle to the late period. It may be that the capitated sites began increasing outpatient services during the middle period in conjunction with reduced use of acute inpatient care and simply continued this pattern into the late period, which was limited to only 1 year in this study. However, this increase was paralleled by an upward trend at the non-capitated sites as well. The analysis of mental health visits also found no significant effect of the UPMHP (Table 7).

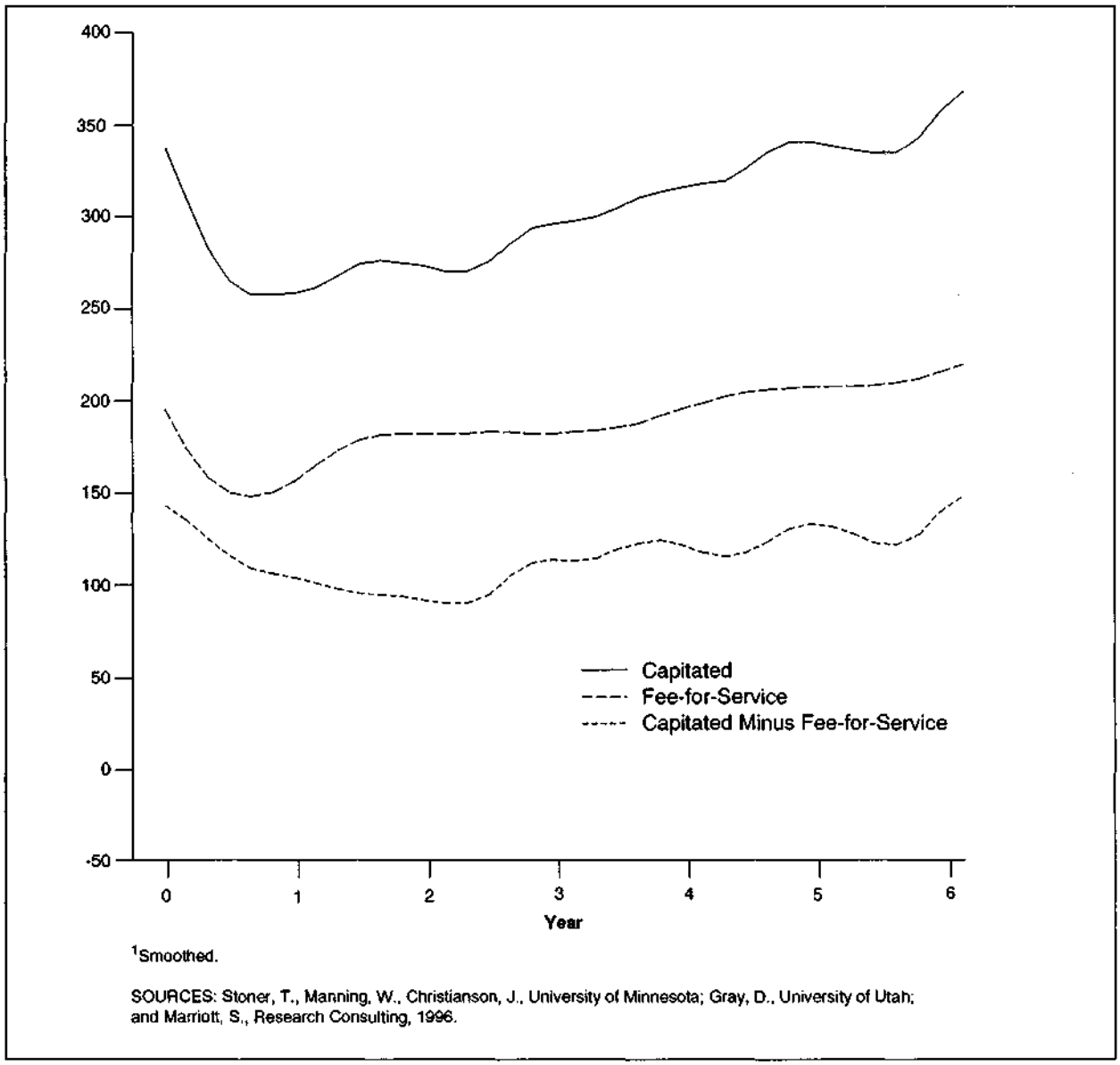
Figure 5
Outpatient Mental Health Expenditures[1] per Capita per Month



[1]Smoothed.

SOURCES: Stoner, T., Manning, W., Christianson, J., University of Minnesota; Gray, D., University of Utah; and Marriott, S., Research Consulting, 1996.

Figure 6
Mental Health Outpatient Visits[1] per 1,000 Eligibles per Month



[1]Smoothed.

SOURCES: Stoner, T., Manning, W., Christianson, J., University of Minnesota; Gray, D., University of Utah; and Marriott, S., Research Consulting, 1996.

Sensitivity Analysis

Under the specification used, the time trend variable was constrained to be the same during the middle and later periods. We also conducted analyses that allowed differences in time trends during the middle and later periods. Using this approach, the estimated effects of the UPMHP on overall mental health expenditures, mental health outpatient expenditures, and mental health visits remained insignificant. With respect to inpatient mental health expenditures and admissions, the estimated effects reported in Tables 3 and 4 remained significant for the first 2½ years of the UPMHP. The only result that was sensitive to the specification of the time trend was the average length of stay, because the length of stay was falling for all of the sites throughout the period; the values for the capitated sites first fell and then rose relative to the non-capitated sites. In any event, the primary source of

Table 2
Effect of the Utah Prepaid Mental Health Plan on Total Mental Health Expenditures: Difference Between Capitated and Non-Capitated Sites (per Beneficiary per Month)

Time Period	Estimated Effect	95-Percent Confidence Interval (Lower/Upper)	Significance
Middle Period Versus Pre-Capitation Period	1.0071	-2.3863/4.4004	.559
Late Period Versus Pre-Capitation Period	3.325	-2.2577/8.9078	.241
Late Period Versus Middle Period	2.318	-1.0588/5.6948	.177
Time Trend	-1.2335	-2.3808/-0.0861	.035

NOTE: Pre-capitation period is July 1, 1988–June 30, 1991; middle (partial capitation) period is July 1, 1991–December 31, 1993; and late (full capitation) period is January 1, 1994–December 31, 1994.

SOURCES: Stoner, T., Manning, W., Christianson, J., University of Minnesota; Gray, D., University of Utah; and Marriott, S.,Research Consulting, 1996.

the UPMHP savings in inpatient expenditures appears to be due to the change in the inpatient admission rate, not any reductions in length of stay.

CONCLUSIONS

The results of the analysis suggest that the UPMHP achieved its goal of reducing expenditures on acute inpatient mental health care by reducing inpatient admissions. Expenditures and visits for outpatient mental health care for Medicaid beneficiaries trended upward at both capitated and non-capitated CMHCs throughout the 6½–year study period, with no significant effects of UPMHP occurring for outpatient care. Thus, there was no evidence supporting the hypothesis that outpatient care would be substituted for reduced inpatient admissions. However, there may have been minor substitution that we lacked the precision to detect.

There are several caveats to these conclusions that pertain to the overall research design as well as limitations in the available data. First, a quasi-experimental research design was employed, with the non-capitated sites functioning as a comparison group. Essentially, the role of the comparison group is to control for secular trends in expenditures, so that observed changes in the capitated sites are not inappropriately attributed to the UPMHP. However, this assumes that the comparison, non-capitated sites are not "contaminated" by the presence of the UPMHP or by Medicaid beneficiaries moving from one area to another to select the type of mental health care system they wanted. These may be problematic assumptions. If the non-capitated sites were anticipating participating in the UPMHP in the future (and most did join the UPMHP after the study period), they may have expanded outpatient treatment

Table 3
Effect of the Utah Prepaid Mental Health Plan on Acute Inpatient Mental Health Expenditures: Difference Between Capitated and Non-Capitated Sites (per Beneficiary per Month)

Time Period	Estimated Effect	95-Percent Confidence Interval (Lower/Upper)	Significance
Middle Period Versus Pre-Capitation Period	-3.0519	-5.2807/-.8231	.008
Late Period Versus Pre-Capitation Period	-1.3704	-4.7799/2.0392	.428
Late Period Versus Middle Period	1.6815	.02504/3.3380	.047
Time Trend	-.3295	-1.0431/.3840	.363

NOTE: Pre-capitation period is July 1, 1988–June 30, 1991; middle (partial capitation) period is July 1, 1991–December 31, 1993; and late (full capitation) period is January 1, 1994–December 31, 1994.

SOURCES: Stoner, T., Manning, W., Christianson, J., University of Minnesota; Gray, D., University of Utah; and Marriott, S.,Research Consulting, 1996.

Table 4
Effect of the Utah Prepaid Mental Health Plan on Mental Health Hospitalizations: Difference Between Capitated and Non-Capitated Sites (per Beneficiary per Month)

Time Period	Estimated Effect	95-Percent Confidence Interval (Lower/Upper)	Significance
Middle Period Versus Pre-Capitation Period	-.00039	-.00068/-.00010	.008
Late Period Versus Pre-Capitation Period	-.00008	-.00055/.00038	.724
Late Period Versus Middle Period	.00031	.00003/.00059	.032
Time Trend	-.00025	-.00036/-.00013	<.001

NOTE: Pre-capitation period is July 1, 1988–June 30, 1991; middle (partial capitation) period is July 1, 1991–December 31, 1993; and late (full capitation) period is January 1, 1994–December 31, 1994.

SOURCES: Stoner, T., Manning, W., Christianson, J., University of Minnesota; Gray, D., University of Utah; and Marriott, S., Research Consulting, 1996.

in order to increase their expenditure base for the calculation of capitated payments. And, they may have increased inpatient utilization for the same reason. Or, inpatient utilization may have been reduced if control mechanisms were put into place early, in order to determine their effectiveness prior to capitation. The utilization trends in Figures 3 and 5 for the non-capitated sites in the last year of the study period provide no strong evidence concerning these questions.

Second, the use of a pre/post comparison may not fully correct for some of the biases that could result from adverse selection into or out of the UPMHP. The pre/post design assumes that the unmeasured differences across areas are unchanging. However, the participating CMHCs may have been those that had more opportunity to change their patterns of utilization to take advantage of the UPMHP. For example, their higher historical mental health admission rate may have afforded more opportunities to reduce inpatient care or to shift treatment to outpatient settings.

Third, the analysis does not take into account the possibility that the capitated CMHCs may have shifted expenditures into areas not covered in their contracts but reimbursed by the State through other means. Two possible areas for cost shifting include emergency room visits and admissions to the State hospital. We examined emergency room use in the first year of the UPMHP and found no difference for Medicaid beneficiaries in capitated and non-capitated sites (Christianson et al., 1995b). We were not able to assess differences in State hospital use due to limitations in the data. However, the number of State hospital beds was constrained during the study period and our interview data did not suggest that capitated CMHCs were able to shift significant numbers of patients to the State hospital. The data did not allow analy-

Table 5
Effect of the Utah Prepaid Mental Health Plan on Psychiatric Length of Stay: Difference Between Capitated and Non-Capitated Sites

Time Period	Estimated Effect	95-Percent Confidence Interval (Lower/Upper)	Significance
Middle Period Versus Pre-Capitation Period	0.7639	-2.0864/3.6142	.597
Late Period Versus Pre-Capitation Period	3.9811	-0.0091/7.9712	.051
Late Period Versus Middle Period	3.2171	1.1579/5.2772	.002
Time Trend	-1.4707	-2.3024/-0.6392	.000

NOTE: Pre-capitation period is July 1, 1988–June 30, 1991; middle (partial capitation) period is July 1, 1991–December 31, 1993; and late (full capitation) period is January 1, 1994–December 31, 1994.

SOURCES: Stoner, T., Manning, W., Christianson, J., University of Minnesota; Gray, D., University of Utah; and Marriott, S., Research Consulting, 1996.

Table 6
Effect of the Utah Prepaid Mental Health Plan on Outpatient Mental Health Expenditures: Difference Between Capitated and Non-Capitated Sites (per Beneficiary per Month)

Time Period	Estimated Effect	95-Percent Confidence Interval (Lower/Upper)	Significance
Middle Period Versus Pre-Capitation Period	1.9946	-.4976/4.4867	.116
Late Period Versus Pre-Capitation Period	1.9014	-1.7789/5.5816	.309
Late Period Versus Middle Period	-.0932	-2.3075/2.1210	.934
Time Trend	-.4046	-1.1798/.3706	.304

NOTE: Pre-capitation period is July 1, 1988–June 30, 1991; middle (partial capitation) period is July 1, 1991–December 31, 1993; and late (full capitation) period is January 1, 1994–December 31, 1994.

SOURCES: Stoner, T., Manning, W., Christianson, J., University of Minnesota; Gray, D., University of Utah; and Marriott, S., Research Consulting, 1996.

sis of possible shifting of patients to nursing homes, nor have we assessed the impact of the UPMHP on expenditures for medications. However, we did estimate models specified as in Tables 2-7, with total physical and mental health care expenditures as the dependent variable (omitting well-child care and maternity care). If major shifting of care from services included under the capitated rate to non-covered services occurred, a positive UPMHP effect would be observed in these regressions. Instead, a negative and significant effect was observed for the first 2½ years of the UPMHP, and a negative but insignificant effect was observed in the fully capitated last year (Table 8).

A fourth limitation in the present analysis does not address whether the Medicaid program reduced its actual payments for care by implementing the UPMHP. This would depend on the level of capitated payments relative to expected expenditures at the capitated sites. The State of Utah reports "cost savings" under the UPMHP, primarily due to reductions in inpatient use in its first year (Utah Prepaid Mental Health Plan, 1996).

While the effect of managed mental health programs on expenditures, and the ability of these programs to generate savings for Medicaid, are important policy topics, policymakers are also concerned about impacts on process of care and the mental health of beneficiaries. These issues are not addressed in this article. However, we are evaluating the experience of a group of Medicaid beneficiaries with schizophrenia, comparing process and outcomes for members of this beneficiary subgroup who reside in capitated and non-capitated catchment areas. This analysis relies on medical records and interview data, rather than the claims data on which the analysis in this article is based (Manning et al., 1996).

Table 7
Effect of the Utah Prepaid Mental Health Plan on Outpatient Mental Health Visits: Difference Between Capitated and Non-Capitated Sites (per Beneficiary per Month)

Time Period	Estimated Effect	95-Percent Confidence Interval (Lower/Upper)	Significance
Middle Period Versus Pre-Capitation Period	.01100	-.00996/.03196	.301
Late Period Versus Pre-Capitation Period	.01226	-.01719/.04171	.412
Late Period Versus Middle Period	.00126	-.01984/.02237	.906
Time Trend	.00503	-.00583/.01508	.325

NOTE: Pre-capitation period is July 1, 1988–June 30, 1991; middle (partial capitation) period is July 1, 1991–December 31, 1993; and late (full capitation) period is January 1, 1994–December 31, 1994.

SOURCES: Stoner, T., Manning, W., Christianson, J., University of Minnesota; Gray, D., University of Utah; and Marriott, S., Research Consulting, 1996.

Table 8
Effect of the Utah Prepaid Mental Health Plan on Physical and Mental Health Expenditures: Difference Between Capitated and Non-Capitated Sites (per Beneficiary per Month)

Time Period	Estimated Effect	95-Percent Confidence Interval (Lower/Upper)	Significance
Middle Period Versus Pre-Capitation Period	-14.431	-26.226 /-2.636	.017
Late Period Versus Pre-Capitation Period	-1.444	-18.799 /15.912	.870
Late Period Versus Middle Period	12.987	4.954 /21.021	.002
Time Trend	1.444	-2.0501/4.939	.415

NOTE: Pre-capitation period is July 1, 1988–June 30, 1991; middle (partial capitation) period is July 1, 1991–December 31, 1993; and late (full capitation) period is January 1, 1994–December 31, 1994.

SOURCES: Stoner, T., Manning, W., Christianson, J., University of Minnesota; Gray, D., University of Utah; and Marriott, S., Research Consulting, 1996.

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