Managed Care and Vulnerable Populations Study

Adults with Serious Mental Illness

Core Paper 2:

Claims and Encounter Component

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I. INTRODUCTION

"Managed care" is an umbrella term referring to strategies aimed at controlling health care costs (Moran and Wolfe 1991; Sullivan 2000), and under some definitions it also includes the goal of providing the most appropriate care (Edmunds, Frank et al. 1996; Ellwood and Lundberg 1996; Manderscheid and Henderson 1996; Miller and Luft 1997; Landon 1998; Fossett, Goggin et al. 2000). The rapid diffusion of these methods throughout the country has brought about dramatic changes in the organization of most publicly and privately financed health and behavioral health care systems. In the public sector, managed care has evolved most prominently through Medicaid programs developed under Section 1915(b) "freedom of choice" and Section 1115 "demonstration" waivers. The impact of these policy initiatives on Medicaid services and costs especially for persons with severe mental illness (SMI) are important, but as yet not fully understood.

To provide policy makers and other stakeholders with more substantial, science-based information about the effects of these programs on the most vulnerable populations, the Substance Abuse and Mental Health Services Administration (SAMHSA) sponsored the multi-site Managed Care for Vulnerable Populations Study. The study was designed to obtain information about patterns of service use, service costs, service quality, outcomes and satisfaction with care among four consumer populations: adults with severe mental illness (SMI), adults with chemical dependency, children and adolescents with severe emotional disorders, and adolescents with substance abuse disorders (Coordinating Center for Managed Care and Vulnerable Populations Evaluation Project 1998) This paper is the second of three reports on results of the Adult SMI study.

The Managed Care study comprises three major components: 1) a prospective sample-survey consumer self-report study that relies on survey data involving service use, quality, outcomes, satisfaction and cost; 2) a claims and encounter study that focuses on service use, costs and quality, drawing on claims and encounter data for all Medicaid recipients in the target service areas; and 3) a taxonomy of managed care organizations that examines the strategies and organizational arrangements in each of the study sites. Each of the studies of the four population groups includes these three components. Core Paper 1 presented findings from the analysis of the survey data from the prospective study, for the adults with serious mental illness population. This report, Core Paper 2, presents information from the analysis of claims and encounter data for the same population.

The claims and encounter study compares data from managed care and fee for service programs at three sites, Pennsylvania, Florida and Oregon. The study addresses the question of how managed care affects the utilization, quality and cost-related aspects of a set of mental health services for specified subgroups within the population of persons with serious mental illness in these three sites. The results will inform policy makers and other stakeholders as they make decisions involving managed behavioral health care.

II. POLICY RELEVANCE OF THE MULTI-SITE STUDY

From a policy perspective, Medicaid managed care is the most recent phase in the evolution of systems of care for persons with SMI. Medicaid managed care follows the enrollment of a large proportion of the SMI population into the Medicaid program, an initiative by the states that provided a mechanism for financing the community-based services required to support deinstitutionalization (Hollingsworth 1994). Managed care represents the effort by states to control the utilization and costs of these and other services.

Early Medicaid managed care programs generally focused on the category of Aid to Families with Dependent Children (AFDC), now Temporary Assistance to Needy Families (TANF). Most excluded the category of disabled persons (those with physical disabilities, developmental disabilities or mental illness), because their more extensive and complex health and social service needs presented posed such a challenge for contracting, although though these individuals accounted for a proportionately greater share of expenditures. As of 1998, persons eligible for Medicaid due to disability constituted 17 percent of all beneficiaries, but accounted for 40 percent of Medicaid expenditures. (Kaiser Commission on Medicaid and the Uninsured 2001).

As states gained experience with Medicaid managed care, these programs were gradually broadened (typically through waivers) to include the disabled (User Liaison Program. Agency for Health Care Policy and Research 1997). Once underway, enrollment of the disabled proceeded rapidly: by 1998 about one-fourth of disabled Medicaid recipients received services under managed care, with six states enrolling over three quarters of their disabled (Kaiser Commission on Medicaid and the Uninsured 2001). Disabled recipients constituted 12 percent

of the total Medicaid managed care enrollment (Kaiser Commission on Medicaid and the Uninsured 2001).

Over half (56 percent) of Medicaid beneficiaries are enrolled in managed care programs. A substantial majority--more than 70 percent--of Medicaid beneficiaries are now enrolled in programs consisting of risk-based managed care arrangements covering some or all behavioral health services. Of this number, about thirty percent are enrolled in carve-out (i.e. specialty behavioral health) programs (Kaye 1999).

These decisions involve choices such as integrated versus carve-out models, "make versus buy" approaches to utilization management, for-profit versus non-profit managed care organizations, enrollment of all recipients versus subpopulation eligibility categories, implementation statewide versus locally, and sub-capitation versus fee for service reimbursement for providers.

Studies of public sector managed behavioral health care.

For a significant proportion of the period in which this process occurred, policy makers faced these decisions without the benefit of any substantial empirical evidence regarding the effects of the programs on the vulnerable population of persons receiving publicly financed behavioral health services. More recently, a body of analyses has begun to accumulate. Much of this consists of rich, qualitative findings providing lessons learned from a multitude of case studies [Minden, 1996 #1208; (Substance Abuse and Mental Health Services Administration Center for Mental Health Services 1995). A smaller number of quantitative studies have also been produced. However, these vary considerably in design, study population, type of program, variables examined and consequently, in their findings.

In the course of the managed care study we conducted a systematic review of published studies of public sector managed care programs, published in 1998 and updated in 2000. The review included studies identified through a comprehensive MEDLINE search. The results meeting the inclusion criteria (primarily that the studies involve public sector plans providing mental health services to persons with serious mental illness) consisted of 22 reports from 15 separate studies, involving eight different managed care plans. Reflecting the complexity of these studies, combined with publication timelines, the most recent data in these studies was collected in 1995.

One-third of the studies reviewed employed randomization, with the remaining ten relying on quasi-experimental or pre-experimental designs. The largest number employed claims data (n=9) or other administrative data (n=5). Of the domains assessed, utilization and cost predominated (eleven and nine studies respectively). Two-thirds reported having applied some form of risk adjustment in the data analysis. To the extent that authors reported characteristics of the programs, they demonstrated considerable variability, but much information (e.g. nature and extent of risk sharing) was lacking.

In addition, even the most rigorously science-based of these studies have been limited, at best, to natural experiments with a before and after control group design, examining a single managed care program with a single source of data, such as claims and encounter data. Other limitations of these studies, for policy purposes, are limitations in the quality and comprehensiveness of the data available to researchers (Fossett, Goggin et al. 2000; Buck, 2001) and the rapid growth and evolution in the forms of managed care, especially in the public sector (Kaiser Commission on Medicaid and the Uninsured 2001).

The most consistent finding of quantitative studies is decreased utilization and cost of inpatient services, identified in eight of the 11 studies examining this variable. Fewer studies examined outpatient utilization and/or costs, and for those that did, these findings are more equivocal. Analyses of domains such as access, types and amounts of services, outcomes and satisfaction tend to produce mixed findings that are difficult to summarize because they employ multiple measures (for example, number of rehospitalizations and time to outpatient follow-up visit as measures of quality).

Though a number of studies indicate cost reductions under managed care, this finding is not universal. Dickey and Azeni (Dickey and Azeni 1992), for example, examined two types of managed mental health care programs designed to reduce inappropriate use of hospital services and found that neither was effective in reducing mental health spending. Moreover, findings of cost savings must be carefully weighed. Cost reduction is usually associated with reductions in the utilization of services (primarily inpatient). As discussed in a recent review of the literature, however, Sullivan (Sullivan 2000) observes that few studies have demonstrated a significant impact on overall costs taking into account other factors such as administrative costs, cost shifting, provider discounting and selection effects.

The variability among quantitative studies is a consequence first of the heterogeneity of state Medicaid programs, even prior to managed care. Second, studies differ because of the diversity of the managed care plans resulting from different choices among the policy options described above. As a result of this variability, for purposes of policy making the quantitative studies, like the qualitative ones, serve essentially as case studies. They are valuable in providing an understanding of managed care's impact under a particular set of circumstances; however, it is seldom possible to determine which of these many circumstances accounts for any

particular program impact. This uncertainty limits the usefulness of these studies as guides for developing programs under different circumstances.

The SAMHSA multi-site study described in this report improves upon this situation by comparing multiple fee for service and managed care programs with defined plan and population characteristics, using common data elements and analytic approaches. This uniformity, combined with the capability of statistically controlling for many remaining differences, considerably enhances the policy relevance of the SAMHSA study. Combining the findings of multiple sites representing a diverse set of circumstances and plan characteristics improves the capability of identifying any "active ingredients" of managed care generally.

Site-specific analyses that are expected to follow this report will then be able to assess the impact of particular features of the plans. In addition, these will be able to explore many important policy issues related to the planning, implementation, operation and oversight of managed care programs that are not directly addressed by this study. These will provide an important contribution to the growing knowledge about best practices and mistakes to avoid in the design and implementation of managed care programs.

III. THE MULTI-SITE STUDY DESIGN

As discussed above, most of the more rigorous studies of managed care to date represent natural experiments with a before-and-after control group design. The findings from such studies, however, are almost inevitably contaminated to some degree by two sources of bias. First, the two groups are likely to differ from one another in ways that would affect their use of

services or response to treatment, independent of the effect of managed care. (Random assignment of individuals to either managed care or fee for service programs would eliminate much of this bias, but is seldom feasible.) The second type of bias is due to the fact that such studies consider only one, or at best, two programs which may or may not have many characteristics in common with programs elsewhere, and which may have features unrelated to managed care at all that affect patterns of service utilization, outcomes, etc.

With respect to the latter point, this study assumes that different managed care programs have some essential, underlying similarities, apart from the diversity of features manifested in specific instances, that potentially affect services, costs and consumer outcomes. At least one such similarity is the intention to contain costs. Another might be the goal of delivering the most appropriate care. This report investigates whether there were common effects on service utilization and costs in the multiple sites that can be attributed to a generalized conception of managed care. (Measures of service quality will be addressed in a later paper.) At the same time, we recognize the importance of studying particular features of managed care and anticipate that a variety of such site-specific analyses will be carried out.

The multi-site study was designed to address both limitations described above. By pooling information from individuals in multiple sites with both fee for service and managed care groups and using risk adjustment, the design reduces the overall impact of systematic differences between groups at any one site. By combining the programs, the design reduces the impact of features unique to any single program or site that might not be related to managed care in general.

An important question, but one that is beyond the scope of this report, is the question of the relative heterogeneity of the sites. To the extent that the sites are more heterogeneous, the

impact of a general “managed care effect” becomes less important, in contrast to site-specific characteristics of individual models of managed care. This is one of the questions to be considered for subsequent analyses of the managed care study data.

IV. CONCEPTUAL FRAMEWORK: THE FOUR MANAGED CARE HYPOTHESES

Managed care essentially represents a dynamic relationship between the cost and the quality of health care. We analyzed the impact of managed care within a conceptual framework intended to represent the range of possible variations in this relationship. The framework consists of four "managed care hypotheses," based on a theoretical definition of what managed care programs do and how they do it. We term these the "panacea", the "perverse incentives", the "mixed effects" and the "no difference" hypotheses.

The panacea hypothesis suggests that managed care, compared to fee-for-service payment systems, succeeds in controlling or reducing costs while maintaining or improving quality.

The perverse incentive hypothesis suggests that managed reduces costs but results in poorer quality.

The no difference hypothesis means that managed care has no effect on cost or quality that can be distinguished from those factors in fee for service systems. (This represents only one component of an “equivalence hypothesis,” the other being that fee for service and managed care results would be within a specified proximity of one another) (Stegner, Bostrom et al. 1996; Leff, McFarlane et al. 2001).

The mixed effects hypothesis refers to the possibility that the impact of managed care may vary from one sub-group to another, e.g. persons with different levels of illness severity, or those in different age groups.

The Goals of Managed Care Programs

Cost control: Managed care programs are intended to control costs without negative effects on other aspects of care. Cost reduction may be accomplished in a variety of ways as described below.

Quality of care: Managed care programs are expected to achieve cost reductions without a corresponding decline in the quality of services provided. In some cases they are expected actually to improve the quality of care in ways that are consistent with cost savings, for example by improving access while reducing unnecessary care and the associated risk of harm, by providing more preventive care, and by achieving better integration of services.

The various possible combinations of effects in these two domains, therefore, generate the four managed care hypotheses:

panacea: control costs, maintain quality

perverse incentive: control costs, reduce quality

no difference (equivalent): no effect on cost or quality

mixed effects: control costs and/or maintain(reduce) quality for some groups, but not for others.

How Managed Care Programs Achieve Their Goals

Theoretically, managed care companies may contain costs, as well as affect quality and access, by employing (either individually or in combination) any of a variety of supply-side mechanisms. The most important of these, representing variously the four managed care hypotheses, are the following:

Selective enrollment (avoiding high-cost enrollees)

Selective retention

Reducing the proportion of enrollees receiving any services

Limiting the proportion receiving specific services (e.g. high cost services such as inpatient care)

Limiting the amounts of services provided per episode (e.g. shortening inpatient lengths of stay)

Substituting lower-cost for higher-cost services (e.g. partial hospitalization for inpatient care)

Reducing payment rates (unit payments) to sub-contracted providers (discounting)

Reducing administrative costs

Cost shifting

Whether an impact on service utilization bears out the perverse incentive or the panacea hypothesis will depend on both the appropriateness of service delivery at baseline, i.e. prior to implementation of managed care and the amount of change. For example, a reduction in an excessive (clinically inappropriate) amount of inpatient care would bear out the panacea hypothesis, but a reduction, when the amount previously provided was suited to the need in the population, would demonstrate the perverse incentive hypothesis. Similarly, even when an excessive amount of service was being provided, reducing the amount of service provided beyond a certain point might be clinically inappropriate. This paper focuses on the first six of the above items. The remaining three items, strategies for controlling costs by discounting, reducing administrative costs and cost-shifting, though important, are beyond the scope of the data obtained for this study.

V. METHODS

Data Sources

The data for this investigation were claims and encounter reports, supplied to investigators by state Medicaid agencies. One of the challenges for this study was the autonomy of state Medicaid agencies in establishing policy governing the use of claims and encounter data for research purposes. Policy differences among the states was one factor influencing the scope of cross-site analyses. These issues will be discussed in more detail in a separate paper focusing on the use of Medicaid claims and encounter data in multi-site studies. (Merwin, forthcoming). Generally, however, the claims and encounter data consists of two types of information:

Individual eligibility and demographic information indicating, on a monthly basis for the pre- and post managed care period, the eligibility category (e.g. Disabled, TANF, etc.) and

enrollment in either the managed care or the fee for service systems., as well as gender, ethnicity and diagnosis.

Individual-level claims and encounter data representing units of service (visits for outpatient, days for inpatient) and expenditures for a comprehensive set of inpatient, outpatient and partial hospital services classified according to a common typology across sites.

Sites:

Of the five sites included in the Managed Care Study—Virginia, Pennsylvania, Florida (with two managed care plans), Oregon and Hawaii, only Florida, Pennsylvania, and Oregon supplied data for the claims and encounter study. Virginia submitted data after the project deadline and Hawaii was unable to submit data. The following is a brief description of the three Population Study sites. (See (Leff, McFarlane et al. 2001) for more information about the sites.)

Pennsylvania: The managed care study site is located in the city of Philadelphia, where a mandatory managed care plan had been implemented under a Medicaid waiver. The plan, known as Community Behavioral Health, is a quasi-public not-for-profit carve-out operated by the Philadelphia Department of Health. The comparison site is in Pittsburgh, where Medicaid services continued to be provided on a fee for service basis.

Florida: The study involved two managed care sites, both in the Tampa region. One of these, Florida Health Partners, is a carve-out, with services managed through a primary care case management "gatekeeper" program. The other is an integrated program with services provided through eight HMOs with Medicaid contracts. The fee for service comparison site is a comparable urban setting in Jacksonville.

Oregon: The managed care site consists of 17 counties in rural Eastern Oregon. Services are provided by a private, non-profit carve-out, known as the Greater Oregon Behavioral Health, Inc., operated by community mental health program directors.

Subjects

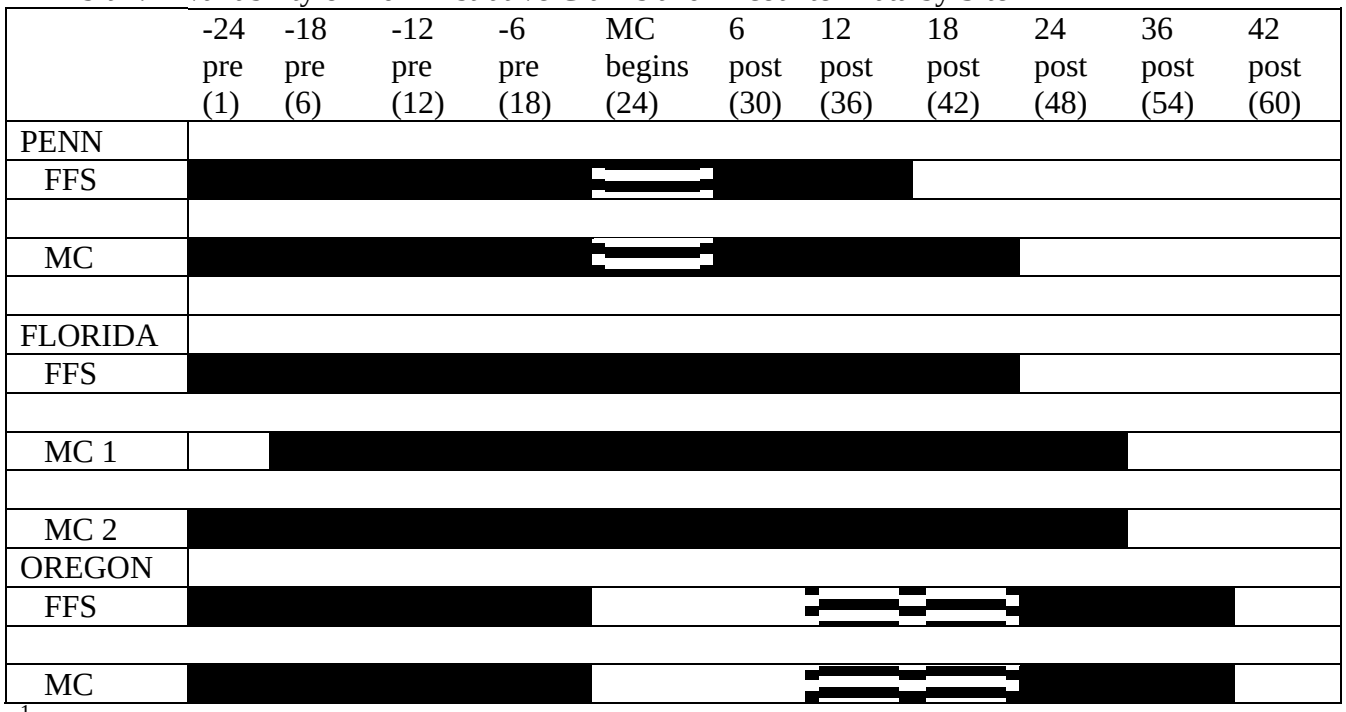
The study population of persons with serious mental illness (SMI) for this component of the Managed Care study consisted of non-elderly adult Medicaid recipients having a claim or encounter with an ICD-9 diagnosis of 295, 296, 297 or 298 during the multi-year period of the study. For each of these individuals, all claims and encounter records during the period of the study were identified. Cases with multiple diagnoses were defined according to the algorithm described below. Demographic characteristics, plan enrollment and dates of eligibility for Medicaid benefits were available from eligibility data sets from each of the states. The number of subjects was considerably greater for one site, Pennsylvania, a fact that should be kept in mind when interpreting the results of overall findings. Table 1 shows the number of subjects, by condition, in each site.

Time Period for Data:

Exhibit 1 presents the availability of data from each site for the period covering two years prior and two years post implementation of managed care The timing of data collection differed among the sites in two respects, however. First, sites vary in the date managed care was implemented; consequently data from the sites do not span the same calendar period. Second, sites vary in the point at which data collection begins and ends relative to the point of implementation. This difference includes varying amounts of lag time before newly-implemented managed care organization began collecting encounter data or before investigators judged the quality of the data being collected to be acceptable for evaluation purposes. To

maximize the time frame for combined site-level data, we began by comparing data on the basis of the number of months before and after implementation, rather than calendar month year, starting at 24 months prior to implementation, and ending at as much as 60 months after. We then adjusted post-managed care periods for the individual sites.

Exhibit 1: Availability of Administrative Claims and Encounter Data by Site[1]



[1]Shaded portions represent adjusted managed care periods

Services and Service Utilization

Claims and encounter data were aggregated at the site level according to 31 service categories as determined by the Managed Care Study Common protocol. For this report, we collapsed the services into four broader categories to increase sample sizes, align our results with revious studies, and focus on service categories of particular interest to mental health system stakeholders. These categories were: inpatient services, partial hospitalization, outpatient medication visits, and all other outpatient services.

Algorithmic definitions

Eligibility: Individuals were determined eligible for the study if they had a Medicaid claim or encounter with an ICD-9 diagnosis in the 295-298 range during any one year.

Diagnosis: Cases with multiple diagnoses on different claims received the diagnosis assigned most frequently in that year, with decision rules for ties. Claims from months when the individual was identified as being in other than the FFS or Managed Care condition under study (for example, voluntary HMO during pre-managed care period) were excluded.

Expenditures: Expenditures for services otherwise classified as outpatient (e.g. individual counseling) that occurred during the period of an inpatient stay were counted as an inpatient expenditure. Units of service and expenditures for claims with dates spanning more than one month were proportionately allocated to each month. We excluded claims from months when individual was identified in the eligibility file as being in other than the FFS or Managed Care condition under study (for example, voluntary HMO during pre-managed care period).

Expenditures/Costs

A specific limitation in this study is that managed care employs a variety of mechanisms for controlling costs, and not all of these are reflected in these data. Notably, the study lacks

information on the extent of provider discounting. Accordingly, the following should properly be regarded as a discussion of expenditures (i.e. costs to the Medicaid program) rather than costs of services provided, some of which may have been passed on to providers or otherwise distributed.

Data quality

Data for the managed care study was subject to all the limitations and potential for error described in the literature on the use of administrative data sets in health services research, compounded by the multi-site design, which required the integration of multiple non-standard state Medicaid data systems (for a comprehensive review of these issues see (Merwin unpublished manuscript) . Data cleaning was conducted by each state individually, using their own data cleaning decision rules regarding duplicate records, out-of-range values and outliers.

No validation studies of any state's eligibility and fee for service claims data were available. Because these systems are well established and used extensively, however, those familiar with them are relatively confident about their reliability. The quality of the encounter data for managed care organizations is of much greater concern. Because these data sets were developed more recently, typically simultaneously with implementation of managed care, they are much more prone to erroneous and missing information, particular during the start-up period, which in some cases may be at least a year. An additional limitation of managed care encounter data sets is that they are typically used for reporting purposes only, and not for reimbursement, and therefore subject to fewer incentives for accuracy and completeness.

States in which two study sites are located, Oregon and Florida, did conduct validation studies of encounter data. Merwin provides details of these analyses, and concludes

that "there is a severe under-reporting of services…[but] the more expensive and more definitive services, like inpatient care, were more likely to be reported" (p. 16).

The quality of utilization data is compromised to some uncertain extent as a result of issues in developing utilization variables. These include the use of procedure codes unique to the states, problems with identifying multiple services submitted on a single claim, difficulties in determining the time period of a service and uncertainty about the validity of procedure codes attached to services.

The quality of expenditure data was considered to be particularly uncertain, according to Merwin (unpublished manuscript). Expenditures were calculated on the basis of amount reimbursed, reported in the claims and encounter data. In the case of managed care encounter data, it is uncertain precisely what is connoted by these figures.

With respect to Florida specifically, the data excludes state hospital stays and therefore does not represent total program expenditures. This still allows for valid comparison of pre versus post managed care expenditures as change rates, assuming a lack of any systematic interaction between state hospital utilization and the managed care condition. This assumption may be incorrect, however, if for example there is significant cost-shifting by managed care in Florida. Further analysis at the individual site level will be necessary to determine whether this is the case; in the meantime, the findings of expenditures should be interpreted cautiously.

Given the limitations of the expenditures data, we would not recommend relying on these findings alone to support policy decision-making. We do believe they are of interest and importance, however, for what they add to other evidence about the impact of managed care, and what they suggest about areas and directions for further evaluation, both at the individual site level for this study and from future evaluation projects.

Method of Analysis

Aggregate Analyses: Claims and encounter data were aggregated and analyzed according to:

Number of people in each category eligible to receive services each month

The number of people receiving each type of service in each month

The number in specific demographic and clinical categories receiving each type of service in each month

Expenditures for each service provided in each month

Service Measures (dependent variables): For purposes of analysis and interpretation, the 31 service types in the Common Protocol were combined into four categories: inpatient, partial day/night, outpatient medication management, and all outpatient services other than medication. The analysis incorporates the following service measures:

Penetration Rate: Number of consumers receiving service divided by number eligible

Utilization Rate: Number of units (visits/days) of service provided divided by number of consumers eligible.

These variables were analyzed as the following:

Rates (percent using the service)

Amounts (mean units of service per user)

Risk Differences (Difference between $MC_{RATE} - FFS_{RATE}$) or (Difference between $MC_{AMT} - FFS_{AMT}$)

Slopes of the rate curves over months 1-24 and >24

Comparison of the y-intercept of the rate curves over months 1-24 and >24

Factors and covariates: Each of the outcome variables is calculated by the following subgroup classifications of the data:

Month: 1 – 24 , pre and 25 – 36, 25 – 42, and 25 – 48 where data is available)

Site: Pennsylvania, Oregon, Florida (two managed care programs),

Condition: Managed care or Fee-for-service

Gender: male/female

Race: white/non-white

Diagnosis: psychosis, affective, both psychosis and affective, dual diagnosis, other psychiatric (DSM-IV), and diagnosis missing

Service Type: inpatient, partial day/night, outpatient medication, any outpatient service other than medication

Statistical Methods

Rates by month for each outcome and classification were computed using a random effects model. Consistent with our theory of underlying similarities in managed care programs, this model assumes that the various managed care and fee for service programs are a representative sample of such programs, and, for this reason, treats program differences like sampling error when aggregating results across programs and estimating confidence intervals. Individual program results were precision weighted to control for group size and variability. The precision weighted data for the aggregated fee for service and managed care groups are presented in the figures, below.

Group I: Fee-for-service pre-implementation (months 1-24) to Fee-for-service post-implementation (beyond month 24)

Group II: Fee-for-service (months 1-24) to Managed Care (months 25-42)

A meta-analysis of the risk difference between Groups I & II by month and by site were analyzed by categories of services, and for selected services (where data are sufficient) for subcategories of gender, ethnicity, and diagnosis. The purpose of this analysis is to identify any statistically significant differences between the two conditions.

Although beyond the scope of this report, meta analysis also provides the means to identify significant heterogeneity between sites and over time. To test for heterogeneity of the sites, the Q-statistic would be used to examine the Site by Condition interaction over the type of service. A significant p-value for this analysis would indicate that the effect of a particular condition (either MC or FFS) differs by site for a particular service type. This analysis should be conducted as part of any further examination of the Managed Care study data.

A meta-regression model was used to examine the effect of site, diagnosis, age, race, and condition in months 1 through 24 on the outcome variables for months post 24. The dependent variable for this analysis includes the risk difference, the slope of the rates pre and post month 24, the standard deviation of the rates pre and post month 24 and the y-intercept of the rates pre and post month 24 if these have been shown to be significant in earlier analyses.

VI. RESULTS

Table 1 presents the number and percent of persons with SMI who are eligible for services under fee for service and managed care in each year, from two years prior to two years post implementation of the managed care program at each site. (The managed care number prior to implementation represents the group that *will be* enrolled in managed care upon implementation of the program.) The largest part of subjects for which data is available are contained in the one year immediately before and after implementation with Pennsylvania contributing approximately 85 percent of the total number of subjects.

Table 1: Number of subjects (% of condition) by site, condition, and year[1]

	Fee for Service				Managed Care				
	FL	**OR**	**PA**	**Total**	**FL HMO**	**FL MBHO[2]**	**OR**	**PA**	**Total**
Pre-Managed Care Period									
2 years	215 (3.0)	327 (4.5)	6720 (92.5)	7262 (100)	836 (6.7)	551 (4.4)	231 (1.8)	10921 (87.0)	12539 (99.9)[3]
1 year	425 (5.8	344 (4.7)	6505 (89.4)	7274 (99.9)[3]	1096 (7.7	1717 (12.0)	267 (1.9)	11216 (78.5)	14296 (100.1)
Post-Managed Care Period									
1 year	1930 (22.5)	426 (5.0)	6206 (72.5)	8562 (100)	1075 (3.5)	2310	228	26421	30034
2 years	2130 (100)	0	0	2130 (100)	1260 (33.9)	2456 (66.0)	0	0	3716 (99.9)[3]

1. Subject totals not unduplicated count of FFS and MC in year
2. Managed Behavioral Health Organization (carve-out)
3. Total does not equal 100 due to rounding.

Table 2 presents demographic characteristics of the managed care and fee for service groups at each site. Although Florida and Pennsylvania sites are relatively similar (with Florida

having a somewhat higher proportion of females in the managed care group), Oregon clearly differs from the other two with a higher proportion of persons with schizophrenia and a much smaller proportion of non-whites.

Table 2: Demographic characteristics of study subjects by site and condition (Fee for Service and Managed Care

	Florida			Oregon		Pennsylvania	
	FFS	**HMO**	**MBHO**[1]	**FFS**	**MC**	**FFS**	**MC**
% Female	66.4%	78.4%	70.1%	51.9%	53.9%	55.9%	53.6%
% Non-White	31.4%	42.7%	37.9%	3.3%	6.9%	28.8%	67.5%
% with Schizophrenia	36.4%	27.9%	29.1%	70.0%	65.6%	38.2%	25.7%

1. Managed Behavioral Health Organization (carve-out)

Service Measures: Penetration and Utilization

The analysis of access, defined as penetration rates, consists of comparing the fee for service and managed care groups on the basis of the percent of eligible persons in each group receiving each of four types of services in each month of the period from 24 months prior to the implementation of managed care through 12 months post. The same analysis was conducted for subgroups of white and non-white persons.

The analysis of service utilization consists of comparing the fee for service and managed care groups on the basis of the average amount of each of four types of services received each month by all persons eligible for the period from 24 months prior to the implementation of managed care through 15 months post. The same analysis was conducted for subgroups of white and non-white persons.

A summary of the results of the access and utilization analyses is presented in Table 3.

Table 3. Summary of rates and trends in penetration and utilization of service types for managed care and fee for service groups before and after implementation of managed care, with significance of condition (managed care versus fee for service) by time by race interaction (race interaction reported only if significant).

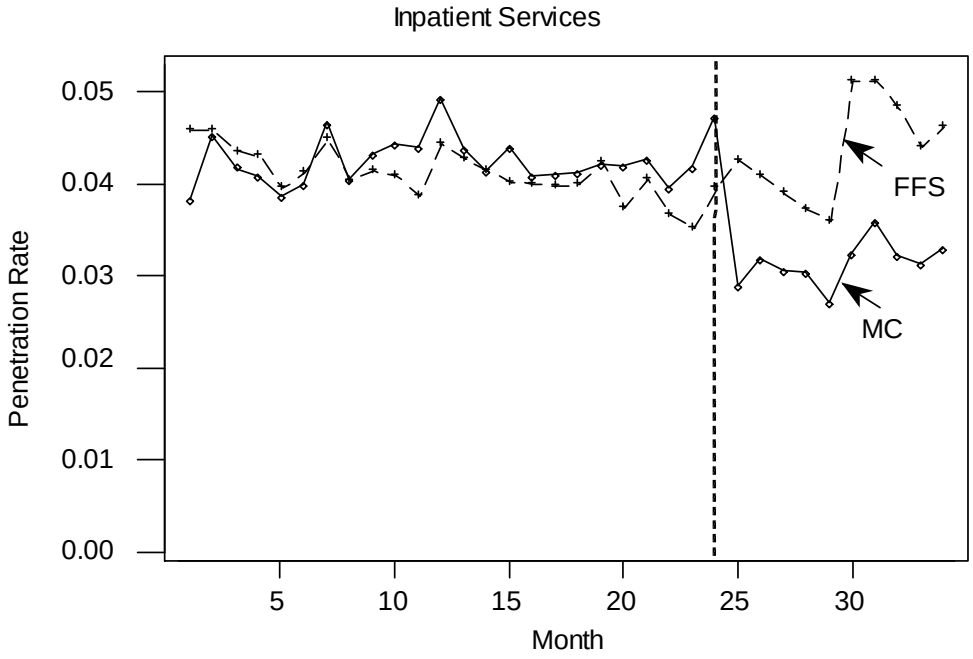
	Penetration			Utilization		
Service	Pre-MC	Post-MC	Sig.	Pre-mc	Post-Mc	Sig.
Inpatient	Comparable, both declining	MC continue decline, FFS increase	p<.03	FFS higher, both level	FFS higher, both continue level	NS
Partial day/night	MC higher, both declining	Comparable and level	P<.001	Comparable and level	FFS increase, MC decline	p<.001
Medication Services	Comparable and level	MC increase, FFS decline	P<.01	MC higher, both decline	Comparable, both level	p<.001 Race: p<.001
Outpatient	Comparable and level	FFS increase, MC level	P<.01	At end, FFS higher and increasing, MC declining	FFS higher, both level	P<.001

The following is a more detailed description and graphic representation of trends for each service type by condition, first for penetration and then for utilization.

Penetration

Inpatient services (Figure 1). Prior to the implementation of managed care, the proportion of people in both groups (those who would remain in fee for service and those who would be enrolled in managed care) was comparable and declining slightly for both throughout the period. Post managed care rates for the managed care group continued to decline, while they increased for the fee for service group. The difference in the respective rate of change for managed care and fee for service (group by time interaction) is significant at the .05 confidence level. There was no difference in rates among racial and gender subgroups.

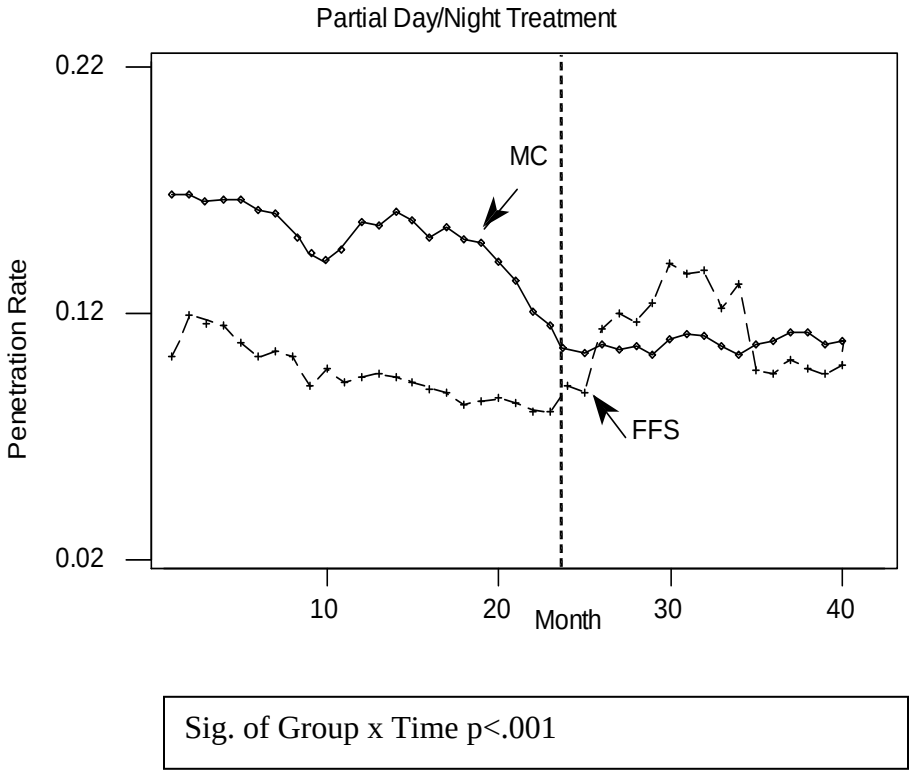
Figure 1: inpatient penetration



Sig. of Group x Time Interaction: p<.03

Partial day/night treatment (Figure 2): At the beginning of the period prior to implementation, rates were notably higher for the group that would be enrolled in managed. They were declining throughout the period for both groups, but more rapidly for the managed care group, such that they had nearly converged by the point of implementation. Post implementation, they leveled off at approximately the same amount, at about 10 percent of each group. The difference in the rate of change for each group is statistically significant. There was no difference among the race and gender subgroups.

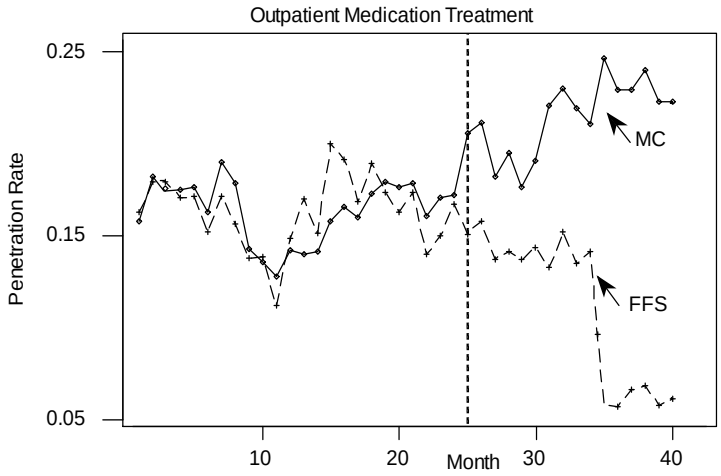
Figure2: Partial day/night penetration



Outpatient medication treatment (Figure 3): Prior to implementation, penetration rates were comparable for the two groups and level through the period. With managed care, medication treatment increased significantly for the managed care group while declining slightly for fee for service consumers. It should be noted, furthermore, that "medication treatment" refers to visits for medication management, which may not correspond perfectly to the number receiving medication. This point is considered in more detail in the following discussion section.

The subgroup analysis of differences for racial groups produced the important finding that during the pre-managed care period, penetration rates for managed care non-whites were lower, whereas post managed care they were higher for managed care non-whites.

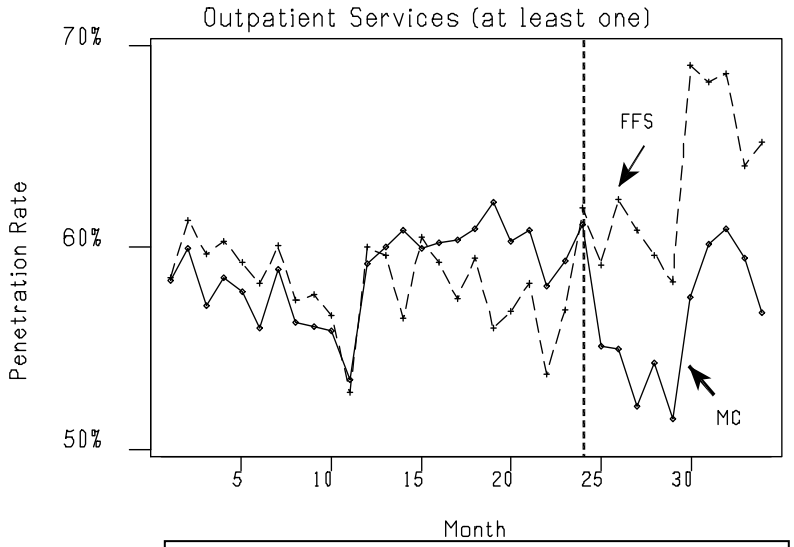
Figure 3: Outpatient medication treatment



Sig of Group x Time interaction: p<.01
Race x Group x Time interaction p<.001
(non-white penetration higher than white under MC, lower than white under FFS)

Outpatient services (Figure 4): The percent of persons using any outpatient service were level and comparable for the two groups prior to managed care. Following implementation, the rate climbed considerably for the fee for service group while, for the managed care group, it declined temporarily then rose to the pre-managed care level.

Figure 4: Outpatient services penetration

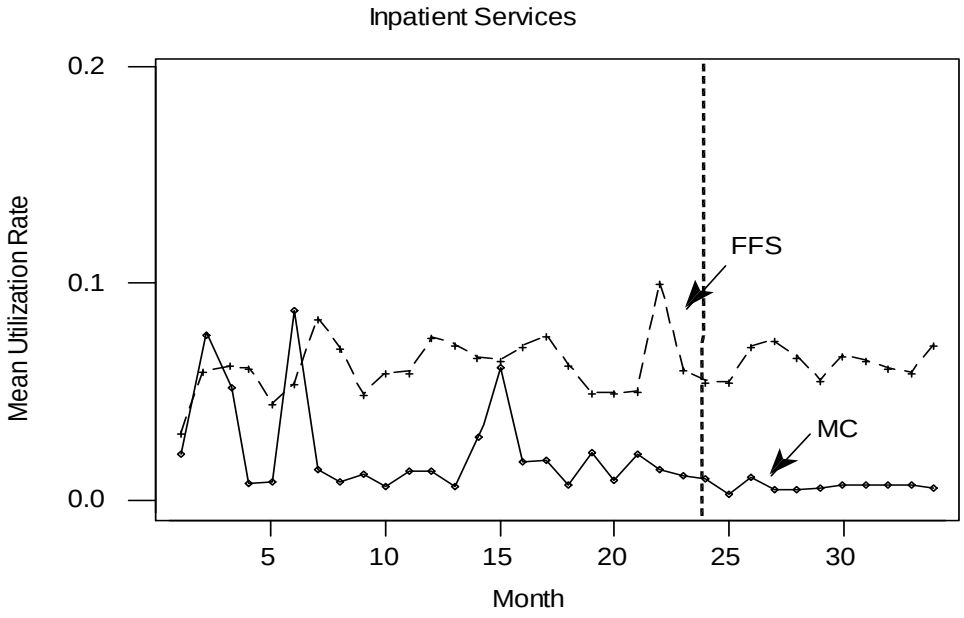


Sig of Group x Time: p<.001

Service Utilization

Inpatient services (Figure 5): As expected given the relatively low penetration rate for this service, the average amount of inpatient service received by individuals in both groups is low, less than one-tenth of a day in any month. The rate is slightly higher for the fee for service group in the pre-implementation period, and it remains level for both across the pre- and post-implementation periods.

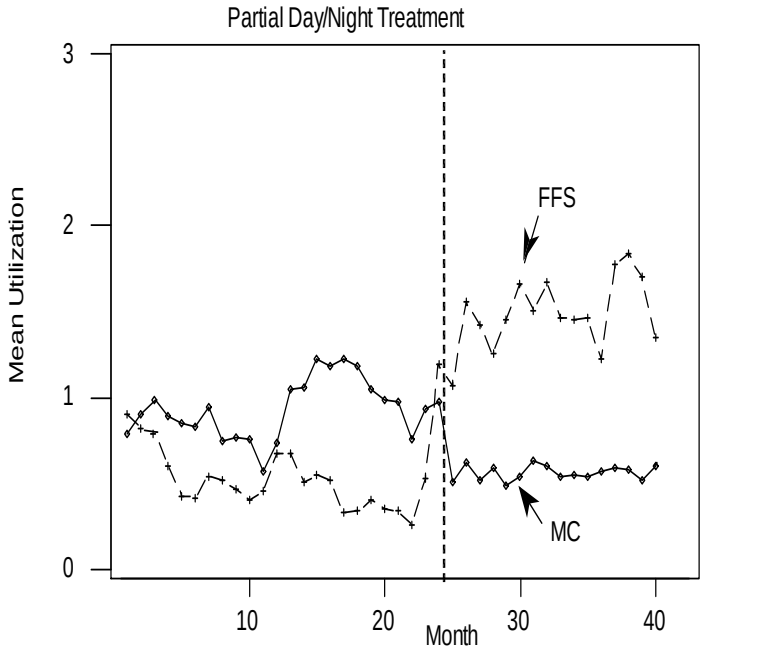
Figure 5: Inpatient services utilization



Sig. of Group x Time Interaction: p<.03

Partial day/night treatment (Figure 6): The average amount of this service received, roughly comparable in the pre-implementation period increased significantly for the fee for service group following implementation and declined slightly for the managed care group over the same period.

Figure 6: Partial day/night treatment utilization

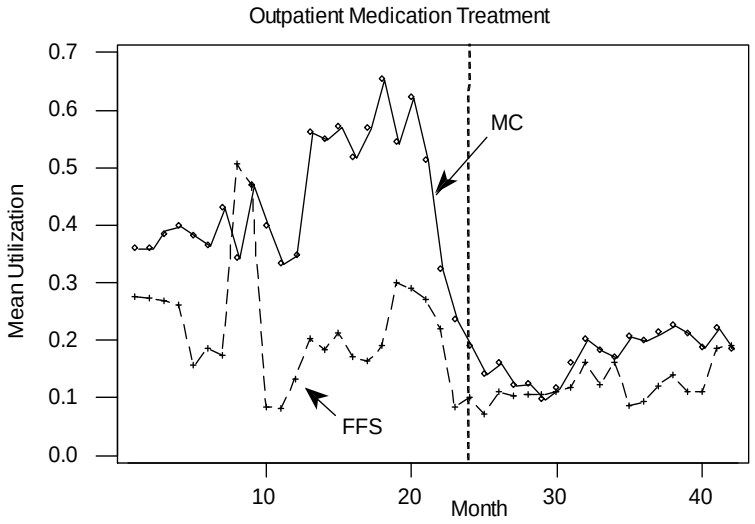


Sig. of Group x Time p<.001

Outpatient Medication Treatment (Figure 7): The pattern of utilization of this service, as average amount received, differs somewhat from penetration rate. Prior to managed care, people in the managed care group, compared to those in fee for service, were receiving more of the service; following managed care, the average amount declined for both, but more for the managed care group. The penetration and utilization patterns combined suggest that managed care was providing medication to proportionately more people, but less intensively, i.e. with fewer and/or briefer visits.

Again, this change differed for racial groups as well, with a greater decline for non-whites after managed care.

Figure 7: Outpatient medication treatment utilization



Sig of Group x Time interaction: p<.01
Race x Group x Time interaction p<.001
(non-white penetration higher than white under MC, lower than white under FFS)

Outpatient services (Figure 8): The pattern for average amount of combined outpatient services is similar to that for the penetration rate: after being level and comparable for the two groups in the fee for service period, following implementation it increased significantly for the fee for service group while declining slightly for the managed care group.

Figure 8: Outpatient service utilization

Sig of Group x Time: p<.001

Service Expenditures

We analyzed expenditures for services, aggregated to monthly totals for the four service categories: inpatient, partial day/night treatment, outpatient medication, and other outpatient services. It is important to note, again, that these findings must be interpreted with caution, and any conclusions drawn on the basis of them should be only provisional. As described above, the

problems and limitations of claims and encounter data for research purposes have been widely discussed, and they are especially prevalent in cost and expenditure data. Despite these limitations, we believe that the following findings merit reporting, on the basis of several assumptions. First, measurement of expenditures is no different from any other measure in social research in that it contains some unavoidable degree of error, which the researcher must reduce where possible, control for and finally acknowledge. Second, the degree of acceptable error varies considerably, depending on the perspective of the stakeholder and the corresponding purpose of the analysis: the chief financial officer of an organization, a policy maker at the county, state or national level, etc. Accordingly the following are presented for what they add to the discussion of penetration and utilization patterns.

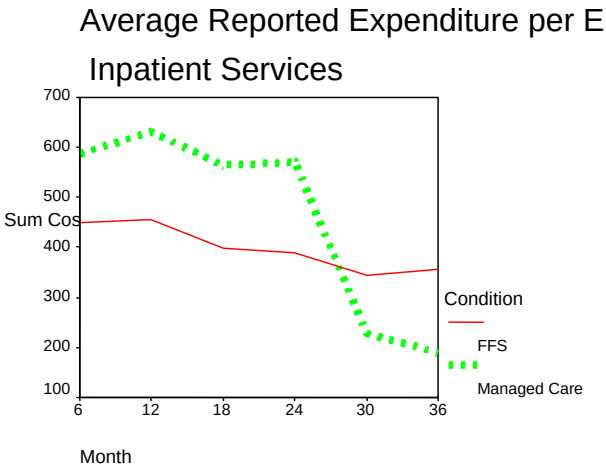
Two aspects of cost saving may be considered on the basis of information from the managed care study. The first is substitution of services (providing a services that is less intensive but, presumably, at least equally appropriate such as partial day/night treatment in the place of a more intensive service such as inpatient). The second is simply change in the monthly aggregate unit costs, which may be a function of changing penetration and utilization rates, provider discounting or other factors.

Substitution: As noted the penetration rate for inpatient care declined for the managed care group following implementation, while it increased slightly for the fee for service group. The utilization rate remained unchanged for both groups. Substitution, therefore, would consist of increased penetration rates for the remaining three service types. As discussed above, this was the case only for medication treatment, suggesting the possibility that managed care succeeded in reducing expenditures for inpatient care by providing medication to more enrollees.

Figures 9-13 present information comparing managed care and fee for service groups on the basis of average monthly expenditures per person for the four service types over a period from 18 months pre— through 12 months post—implementation of managed care.

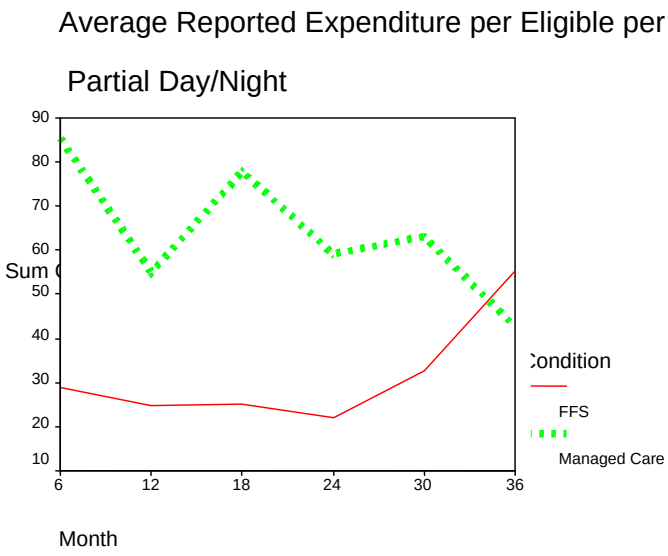
Inpatient (Figure 9): Consistent with other studies of cost saving under managed care (Callahan, Shepard et al. 1995), expenditures for inpatient care were declining for both groups prior to managed care, but with implementation this decline accelerated for persons enrolled in managed care programs

Figure 9:



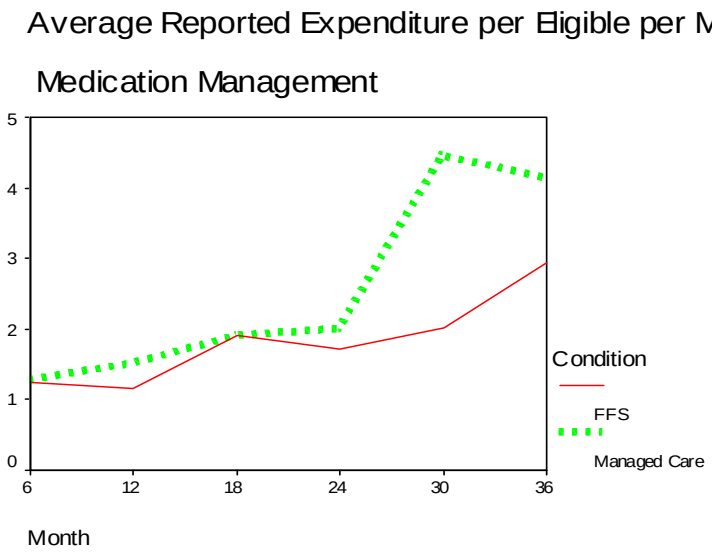
Partial day/night (Figure 10): Expenditures for this service remained essentially unchanged throughout the whole study period, being consistently greater for the managed care group. This supports the penetration and utilization data suggesting that this service did not serve as a substitute for inpatient care.

Figure 10:



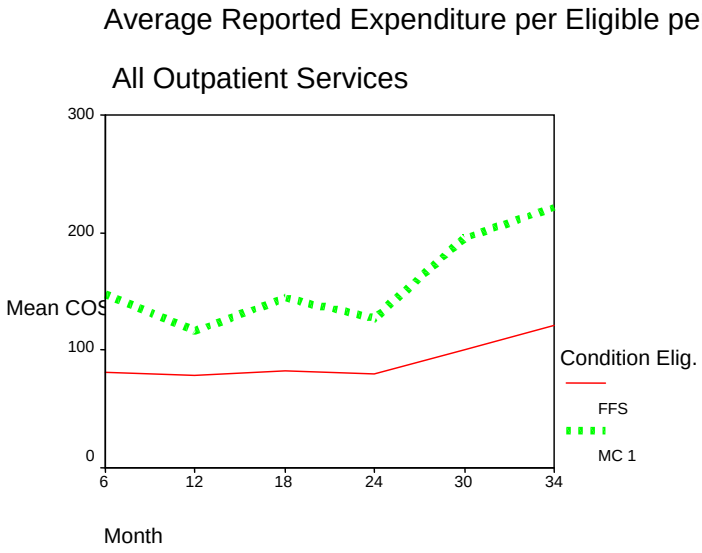
Outpatient medication management (Figure 11): Consistent with penetration and utilization patterns, expenditures for the managed care group, higher to begin with in the pre-implementation period, increased more for the managed care group following implementation. This finding lends additional support to the indication that managed care employed this service as a substitute.

Figure 11:



Outpatient services (Figure 12): Expenditures for this service for the managed care group were higher than those for the fee for service group to begin with, and the gap widened after implementation. This suggests the possibility that managed care responded as intended to the incentives of the financing structure by substituting less intensive but presumably more appropriate services for inpatient care, thereby supporting the panacea hypothesis. This pattern, however, is inconsistent with that of the penetration and utilization data indicating higher rates for the fee for service groups. This apparent anomaly may be a consequence of limitations of the cost data described above. Additional site-specific analyses will be required to explain this inconsistency.

Figure 12:



Total expenditures (Figure 13): indicates changes in total expenditures for each group on a monthly basis before and after implementation of managed care. From this, it appears that costs were higher for the managed care group prior to implementation but declining very gradually for both groups, and that this trend accelerated dramatically for managed care following implementation. It is very likely, however, that at least some of the reduction with managed care is due to under reporting characteristic of capitated programs, especially in the start-up phase. This possibility is supported by reports from the individual sites (Merwin, unpublished manuscript) and also by upward turn for managed care six months after implementation. (Alternatively this upturn could be explained by some complex relationship between various cost-reduction mechanisms, for example some initial reduction resulting from provider discounting, followed by an increase related to utilization.) Additional site-specific studies would be required to understand these relationships.

Figures 9-12 represent the contribution of each service type to the overall trends in total expenditures. This demonstrate how reductions in inpatient expenditures contribute to total reductions, even when offset by higher outpatient expenditures.

VII. DISCUSSION

Managed care and fee for service groups all differed significantly (at the .05 level) in the patterns of penetration rates and utilization with the exception of utilization of inpatient services.

Access and appropriateness: Consistent with other studies, managed care appeared to reduce the number of people using inpatient services. Theoretically, managed care organizations may achieve this reduction by means of simple rationing (perverse incentive) or substitution of less intensive but equally appropriate services (panacea hypothesis).

Of the three service types that might serve as substitutes in this case, only medication management appears to have served this function, with an increase in the number of persons in managed care (relative to those in fee for service) receiving this service. Notably, medication management was the only service where race was a significant factor, with non-white penetration higher than white under MC and lower than white under FFS.

Whether medication management represents an appropriate substitute service is a question that may require some discussion. To the extent that this service consists of actual clinical contact (as opposed to simply prescribing) it may be more a more appropriate substitute than some other types of outpatient services such as psychotherapy, especially for persons with serious mental illness. If the amount and type of medication being prescribed are appropriate, an increase in medication management may also represent improved access to care. This component of our study did not analyze medication claims data. However, we know from the sample survey component of the study that there was no difference between fee for service and managed care in the number of people reporting being denied access to needed medication, but a

significantly greater number of people in fee for service reporting self-payment for medications (Leff, McFarlane et al. 2001).

Understanding the decline in the percent and average amount of partial day/night treatment similarly depends on the nature of this service. To the extent that it functions as a diversion from inpatient care, these results are contrary to expectation about how managed care functions. If they represent relatively expensive and less effective psychosocial rehabilitation programs, however, managed care organizations would be likely to reduce utilization. More detail at the site level would help to answer this question.

Expenditures: To compare expenditures for persons in managed care and fee for service groups, we plotted the average monthly expenditure per eligible for each of the four service types. Consistent with the other research and the penetration and utilization data, managed care reduced expenditures for inpatient care. The increase in expenditures for outpatient services under managed care offers support for the panacea hypothesis, in that the potentially deleterious effect of reducing intensive acute care services is offset by the substitution of community-based services.

In summary, managed care appears to have reduced costs as expected by controlling access to inpatient care. To the extent that this was done appropriately, i.e. by increasing access to less costly but equally effective services is somewhat open to question, depending primarily on the nature of the other services, particularly medication management. In general these findings appear to provide more support for the panacea hypothesis, with the important exception of the racial differences in medication management, which lends support to the mixed-effects hypothesis. These interpretations would benefit from more research and information from the individual sites.

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