

Cost Shifting to Jails after a Change to Managed Mental Health Care

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Objective. To determine whether managed mental health care for Medicaid enrollees in King County, Washington, has led to indirect cost-shifting to substitute treatments, such as jails and state mental hospitals that are free goods to providers.

Data Sources. Complete service records for 47,300 adults who used at least one of the following systems from 1993 to 1998: King County jail system, Medicaid, or the King County mental health system. Data were also obtained from the Washington State Hospital System.

Study Design. A quasi-experimental analysis that compares the difference in outcomes between the pre- and post-managed care periods for Medicaid enrollees compared to non-Medicaid enrollees. The outcomes—jail costs, state hospital costs, and county outpatient mental health costs—were estimated with two-part difference-in-differences models. The regressions control for person-level fixed effects on up to 66 months of data per person.

Data Collection Methods. Administrative data were collected from the jail, Medicaid, and mental health systems, then merged and cleaned. Additional data on costs were obtained in interviews.

Principal Findings. There is a striking increase in the probability of jail use for persons on Medicaid following the introduction of managed care. There was a significant decrease in expenditures in the county mental health system for outpatient care.

Conclusions. Managed care led to indirect cost-shifting, probably through poor access to services, which may have led to an increased probability of jail detention.

Key Words. Mental health, jail, managed care, Medicaid

The fates of mentally ill persons have always been intertwined with the shifting boundaries between the criminal justice and mental health systems. Just as public mental hospitals once served as the institutions of last resort for the care and confinement of mentally ill persons, jails have become the last secure environment in most communities for the control of mentally ill persons when they are unmanageable and noncompliant. The U.S. Justice Department has reported that nearly 284,000 people with mental illnesses were in jail or prison on any given day—about 16 percent of the incarcerated population and more than four times the resident census in state mental hospitals (Ditton 1999). The

presence of mentally ill persons in jails is not a new problem—it has been around for the 200 years since the beginnings of organized efforts to improve the care of mentally disordered persons in the United States (Grob 1994).

Overlying the jail and public mental health systems is managed care, which has spread rapidly during the past decade throughout the behavioral health care system. Managed care carve-outs may lead to *cost-shifting*, defined as one agency reducing its own expenditures by inducing another agency to pay for similar services (Norton, Lindrooth, and Dickey 1997, 1999). Cost-shifting may happen when two different agencies offer treatments that are substitutes and the treatment is paid for out of different budgets. For example, in a mental health carve-out, the managed care organization may be able to direct patients to receive care in mental hospitals paid for by the state, thereby reducing its own expenditures while increasing expenditures for care not covered through the mental health carve-out. This meaning is distinct from hospitals raising private reimbursement rates in response to lower public reimbursement rates, the traditional definition of cost-shifting in the health care literature (e.g., Sloan, 1983; Sloan, Morrissey, and Valvona 1988; Dranove 1988).

In the context of jails, it is perhaps more precise to call this phenomenon *indirect* cost-shifting from service providers to the jail since neither they nor the managed care organization directly place anyone in jail. However, providers that intentionally or unintentionally underserve selected clients may place these clients in situations where their behavior comes to the attention of police officers through various types of public disturbances—dining and dashing, urinating in public, panhandling too aggressively—increasing the probability of being arrested and booked into jail. While in the community, all mental health services used by these persons are covered by their insurers or providers, but while in jail they are off-budget from the providers' perspective.

We will test for indirect cost-shifting in one county mental health program that was one of the first public programs to switch to managed care. King

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County, Washington, which includes Seattle, shifted to a county-level risk-bearing contract in the Medicaid program in April 1995. The use of managed mental health care in public programs such as Medicaid has grown tremendously since this time. As of 1999, 42 states had used some type of managed behavioral health care in their public mental health systems (Substance Abuse and Mental Health Services Administration 2000). We will test for indirect cost shifting using person-level data on jail, state mental hospital, and outpatient community mental health utilization from 1993 to 1998. The study design is a pre-post quasi-experiment; we estimate difference-in-differences models.

Because jails are a form of institutional setting, evidence of cost-shifting to the jail sector may indicate a movement toward reinstitutionalization, albeit on a much shorter-term scale than the traditional use of this term. This finding would suggest an unintended reversal of deinstitutionalization observed over the past thirty years from state mental hospitals to community-based treatment settings (Mechanic and Rochfort 1990).

BACKGROUND

The care and treatment of mentally ill persons in America has always been closely tied to financing between federal, state, and local governments (Grob 1994). Recently, states have been able to pass many of the costs for mental health services along to the federal government (Frank, Goldman, and Hogan 2003). This opportunity occurred with the passage of the Medicare and Medicaid amendments to the Social Security Act in the late 1960s. The legislation specifically prohibited payments to the states for the care of persons between the ages of 18 and 64 years of age while they resided in a state mental hospital. However, financial incentives were created that led to the release of many thousands of long-stay patients from state mental hospitals to nursing homes and other community settings. While these patients remained in state hospitals, the state funded 100 percent of their costs. Once in the community, federal Medicaid and Medicare largely supported the costs of their mental health care while their housing and income were subsidized by federal Supplemental Security Income (SSI) payments. These incentives fueled rapid deinstitutionalization from state mental hospitals beginning in the early 1970s (Gronfein 1985). In the process, hundreds of thousands of long-stay patients were moved to nursing homes, community care homes, and to the streets where the costs of their care were absorbed by local welfare systems, police, jails, and other criminal justice agencies (Morrissey 1982).

Our study population in King County, Washington, allows us the unique opportunity to examine the effect of a transfer in risk for mental health services from the state to the provider level. Before April 1995, outpatient mental health service providers billed the state on a fee-for-service basis for Medicaid and uninsured individuals. On April 1, 1995, the state put King County at risk for outpatient services and the county responded by immediately shifting the risk to local provider groups through a form of capitated contracts called case-rate payments. Each year, enrollees are assigned to one of several fixed monthly payment amounts depending on their severity of illness. King County also contracted with a private sector insurer to manage and administer the capitated payment system. We will not be able to identify the separate effects of provider capitation and the Administrative Services Only (ASO) contract that occurred simultaneously, but instead treat this as one policy change. We refer to this policy change as *managed care*, since the change in structure gave providers the incentive to manage outpatient care.

At the level of the managed care plan, two types of cost-shifting can be distinguished—within-plan and out-of-plan. *Within-plan cost shifting* reduces costs by substituting less intensive services for more intensive services, for the same payer. One example is if the county switches from expensive inpatient treatment to outpatient treatment, when both types of treatment are paid for by the county. *Out-of-plan cost shifting* happens when utilization shifts away from the managed care plan to other entities. An example is if patients are moved from inpatient care paid by the county to state mental hospitals paid by the state.

Within-plan cost-shifting has been widely documented under various managed care arrangements for Medicaid behavioral health services (Christianson et al. 1995; Callahan et al. 1995; Dickey et al. 1996; Stroup and Dorwart 1995; McFarland, Johnson, and Hornbrook 1996; Popkin et al. 1998; Liu et al. 1999; Warner and Huxley 1998). One of the most consistent findings is that capitation lowers Medicaid costs by decreasing the use of expensive services like hospitalization while promoting less expensive outpatient treatment.

Out-of-plan cost-shifting, however, has been less studied and less is known about its occurrence, structure, or dynamics. Schlesinger, Wynia, and Cummins (2000) explain that there is an unusually large potential for out-of-plan cost-shifting in the treatment of mental illness in comparison to other medical conditions. They point to two systems that managed behavioral health care arrangements can cost shift to. The first is the existence of a well-established system of treatment financed and managed by the state

government (Edmunds et al. 1997). The second is the availability of informal sources of care such as family members who are the primary caregivers for many people with serious mental illness (Arno, Levine, and Memmott 1999; Mueser et al. 1996). Both situations create incentives for capitated providers to make greater use of these extra-plan resources, thereby shortening stays in community hospitals or other covered residential care facilities that significantly reduce plan costs. In the present study, we extend to this set of systems the county jail, which is a “free good” to behavioral health providers.

Earlier work by Norton, Lindrooth, and Dickey (1999) remains among the few studies of out-of-plan cost-shifting in managed behavioral health care. They conducted a study of the change from fee-for-service to managed care for mental health services in the Massachusetts Medicaid program. They tested for cost-shifting by estimating expenditures for five specific services paid by three public agencies. Expenditures on services paid by the managed care vendor decreased, and expenditures paid by Medicaid increased. The effects were generally stronger for the beneficiaries in the highest quartile of expenditures. In another study of cost-shifting, Norton, Lindrooth, and Dickey (1997) found only limited evidence for children, although average annual expenditures on children were only one-third as large, mitigating the possibility of finding cost-shifting. Cuffel, Goldman, and Schlesinger (1999) have studied cost-shifting in the private sector, where a carve-out program provided incentives to shift costs from behavioral care to medical care. They find that the rate of behavioral care use remained the same, while medical care declined. Grazier and Pollack (2000) studied cost-shifting in a mental health carve-out of a major private employer. Overall, they found a slight reduction in costs and utilization, but for persons with high utilization, the financial incentives increased greatly.

HYPOTHESES

We analyze indirect cost-shifting in this study from the perspective of the agencies funding services. Expenditures for nonmental health services and mental health services provided by payers other than those in the managed outpatient system should increase after managed mental health care is implemented because the managed care providers pay nothing for these services, while expenditures for mental health services provided by the capitated providers should decrease.

Both the jail and the state mental hospitals are substitutes for outpatient care and are free goods from the perspective of the managed care providers. Under these circumstances, providers can be expected to decrease use of managed services, resulting in an increase of nonmanaged services. This leads us to the following hypotheses:

Managed mental health care will

1. increase the cost of jails,
2. increase the cost of state mental hospitals, and
3. decrease the cost of outpatient mental health services.

METHODS

We test for indirect cost-shifting onto jails and the state mental hospitals after the introduction of managed care. The hypotheses to be tested are whether managed care leads to an increase in costs of these two kinds of institutions. Because utilization can increase in two ways—either the probability of any use of services or the intensity or amount of use conditional on any use can change—we estimate two-part expenditure models at the person level (Duan 1983; Duan et al. 1984). In the two-part model, the first model predicts the probability of having any costs. The second part predicts the cost conditional on receiving the service. The basic model specification is:

$$\text{Part 1 : } \Pr(y_{it} > 0) = \beta_0 + \beta_{MCM}MC_tM_i + \beta_{MC}MC_t + \beta X_{it} + \mu_i + \varepsilon_{it}$$

$$\text{Part 2 : } E(y_{it}|y_{it} > 0) = \beta_0 + \beta_{MCM}MC_tM_i + \beta_{MC}MC_t + \beta X_{it} + \mu_i + \varepsilon_{it}$$

where y is one of five dependent variables measuring cost, i is the subscript for individuals and t is the subscript for time, the vector MC represents the period during which managed care was implemented, the vector X includes time-varying observable individual characteristics and time trends, β are the parameters to be estimated, μ are time-invariant unobserved individual characteristics, including M , an indicator of Medicaid enrollment, and ε are random error terms. Although we could estimate a binary model such as a logit or probit for the first part, we choose to estimate a linear probability model because this will make the interpretation of the variables with interaction terms easier (Ai and Norton 2003). One problem with linear probability models can be predictions outside the unit interval; fortunately, in our models all predictions were within 0.0016 of the unit interval, except in the county

mental health model, in which all predictions were within 0.0115 of the unit interval.

The study design compares the difference in outcomes between the pre- and post-managed care periods for Medicaid enrollees to the difference in outcomes between the pre- and post-managed care periods for non-Medicaid enrollees. This study design is often called a difference-in-differences model. The non-Medicaid enrollees are the control group, because changes in Medicaid policy should only affect persons enrolled in the Medicaid program, unless these effects spillover to non-Medicaid enrollees. We can think of few plausible arguments for spillover effects of this administrative change to King County residents not enrolled in the Medicaid program; the exceptions being capacity constraints and possible decreases in the amount of resources for the uninsured if Medicaid spending increases (e.g., Frank, Goldman, and Hogan 2003). In fact, we have some preliminary information from related work that King County may have reinvested some of their behavioral health savings from implementing managed care to expand their service basis beyond the Medicaid population. Any unmeasured spillover effects such as these would bias the Medicaid interaction term towards zero, understating the actual results.

We estimated five different two-part models. The first four models measure the extent of cost-shifting at the person level for each of four specific services (nonpsychiatric jail hotel costs, psychiatric jail hotel costs, jail mental health services costs, and state hospital costs); the fifth two-part model estimates the own-cost savings to the county outpatient mental system. In each regression, the variable of primary interest is the interaction between the Medicaid population indicator and the managed care period indicator because it indicates the additional change that the shift to managed care had on the Medicaid population. A positive and significant coefficient for this interaction in the first-part model on jail services would indicate that managed care is associated with a greater likelihood that an individual is in jail in any given month. The same positive coefficient in the second part of the model would indicate that the carve-out is associated with higher jail costs per month, given some use of the jail system. We also test for time trends and allow for a separate time trend after the start of managed care.

There are repeated monthly observations on each person—up to 66 months per person—so we use person-level fixed-effects models to control for person-level unobserved factors that affect utilization. Not controlling for unobserved person-level time-invariant effects may bias the estimated coefficients and standard errors. Fixed-effects models are commonly used in health

economics when the data are longitudinal and have the advantage of not assuming that the time-invariant person-specific effects are uncorrelated with the other covariates. We also run all models using individual characteristics rather than fixed effects (results not reported) and obtain similar findings.

DATA

Sample

The study includes a random sample of all persons who have ever used one of three systems at some point during 1993–1998; these three systems are the jail system in King County, Washington, the Medicaid system, and the King County mental health system. Complete records of all persons with an encounter with at least one of these three systems were obtained from the relevant agencies. These lists were combined to generate a master list of unique individuals (Morrissey et al. 2002). From this list a stratified random sample was drawn independent of the level of service use. Users of certain system combinations (e.g., jail and county mental health or jail and Medicaid) were oversampled. The final sample size has 47,300 unique individuals aged 18–64, with up to 66 monthly observations per person, 21 before the carve-out and 45 after. Because of persons aging in or out of our sample by turning 18 after the beginning of the sample period or turning 65 before the end of the sample period, our final sample has just under 2.6 million person-month observations.

Data on jail utilization, health services provided in jail, state mental hospital utilization, and utilization of county mental health (outpatient) services were obtained from the relevant King County and state authorities. Costs per unit of service were assigned according to the methods described below. All costs are inflated by the overall consumer price index and are expressed in 2001 dollars.

Mental Health Services and Institutions in King County

King County shares a number of features with other geographic areas of the United States that make our results relevant outside this limited geographic area. In 1998, at the end of our sample, Washington State was one of almost three-fourths (72 percent) of states that had managed behavioral health waivers in their Medicaid programs; more than half of Medicaid enrollees nationwide were in managed behavioral health programs in that year (Findlay 1999; Frank, Goldman, and Hogan 2003). As in King County, the vast majority of

publicly funded plans were not full-risk plans (Findlay 1999). King County was the twelfth largest county in the United States in 2001 and had jail detention rates greater than the national average (688–723 versus 564–648 per 100,000 from 1994–1998).

During our study period, there were other sectors and providers involved in the provision of mental health treatment to this population that are not reflected in this analysis. In addition to the two state-funded psychiatric facilities, at least 15 general medical hospitals provided some inpatient behavioral health services in this population (American Hospital Association 1994–2000). Private specialty mental health as well as general primary care providers provided a wide array of mental health treatments not captured in our current data. The number of nonfederal psychiatrists providing patient care in King County was relatively stable over our period, increasing from 335 in 1993 to 347 in 1998 (National Center for Health Workforce Information and Analysis 2001; Office of Research and Planning 1995–2000).

As in most communities, the local law enforcement departments in King County often provide triage services for the mentally ill, affecting the probabilities that persons are referred or diverted from jail for minor infractions. Before July 1997 there were no special mental health initiatives to our knowledge that would affect the probability of going to jail. Beginning July 1997, two new initiatives were implemented that might affect the probability of having one or more jail visits. On this date, the King County Mental Health system established a crisis triage unit to divert mentally ill persons from both psychiatric hospitals and jails to outpatient treatment. Also at this time, the Seattle police department initiated a crisis intervention team consisting of officers trained to work closely with the mental health system to better triage nonviolent mentally ill persons. In addition, a mental health court system was implemented in King County after our study period (1999); future research on a longer data panel will examine the effect of this policy on jail detentions of the mentally ill.

While the probability of receiving jail and specialty mental health services may have changed as a result of these policies, we do not explicitly control for these in our analyses since there is no reason to believe that these policies disproportionately affected either our cases or our control group. Policies such as police triaging procedures in place in King County during our study period were not limited to Medicaid enrollees, and thus should not bias our results. In addition, our models include an overall time trend and a separate time trend for the managed care period, so that gradual changes both before and after the policy change will be captured.

Choice-based Sampling

The data for this study were drawn using choice-based, rather than population-based, sampling. This approach is preferable to population-based sampling because the receipt of mental health and jail services are fairly low-incident events and thus would require a larger, costlier data collection endeavor to obtain a large enough sample of service users. The choice-based sampling approach used here requires the use of an appropriate weighting scheme to obtain consistent maximum likelihood estimates (Manski and Lerman 1977). We modify the approach suggested by Cosslett (1981), by using information from the sample to generate estimates of the population shares for each time period. The weight for each observation is the ratio of the population share of each choice to the sample share. Choice is defined as one of eight possible combinations of the three service systems (jail, county mental health, and Medicaid). The weights are calculated each period.

Although calculating the sample share for each choice is straightforward, we did not have information on the population share in each time period, but only had access to a weighting system for the population of persons who had ever used any of the service systems during the study period. The population share was developed as follows. We obtained an estimate of the number of persons in each system category in each month by multiplying the probability of each choice each time period conditional on ever using each system combination by the number of persons ever in each system combination. We then estimated the number of persons aged 18–64 in King County in each month, from the U.S. Census annual estimates by assuming a constant monthly rate of growth between years, and assuming that this age group comprised exactly 63.1 percent of the county population, as they did for the Washington state population in the 2000 Decennial Census (U.S. Census Bureau 2002). From these two sets of estimates we obtained the population share of each system combination for each time point during our sample.

Jail Costs

We estimate the effect of managed care on monthly average costs to the jail system. Jail costs were split into four categories. We first divide costs into two groups: hotel costs, which refer to all non-health-related costs including housing, feeding, and guarding detainees, and the costs of health care services provided in the jail. This distinction is useful in these data because two separate agencies are at risk for these costs. Jail hotel costs are funded by the King County Department of Adult Corrections while jail health costs are funded by

the King County/Seattle Department of Public Health (DPH), which finances the providers and supplies for services delivered in the jail. Jail costs of both categories were further divided into psychiatric costs and nonpsychiatric costs. Jail hotel psychiatric costs were identified through the use of separate units for detainees that assessed positively for a potential mental illness. Jail psychiatric service costs are identified through the use of any mental health diagnosis on the encounter form generated by DPH staff, regardless of the procedure code indicated. The two most common diagnosis codes used in the data were for schizophrenia (unspecified) and major affective disorder: manic; these two codes were present on over 35 percent of all DPH encounters. Nonpsychiatric health costs are not considered in this study.

Jail hotel costs of both types were quantified through a two-part procedure. First, a booking rate was charged to all new jail admissions in the month during which the admission occurred. Second, the total number of jail days was multiplied by an average cost per day. Separate, higher costs for psychiatric jail days were used to reflect the increased intensity of services provided to detainees in the psychiatric units. Jail authorities in King County have estimated that days in psychiatric units are 3.225 times as expensive as in nonpsychiatric units. We use this figure and the average daily jail costs to calculate the per diem costs for both types of jail stays. Booking rate and average cost per day are often used by King County to charge other counties for the detainment of non-King County residents.

Jail mental health services were assigned the rate commonly received by DPH in other settings. The DPH uses a Current Procedural Terminology (CPT)-based system, and reimbursement strongly resembles rates used for Medicaid reimbursement. In cases where DPH reimbursement rates were missing (69 percent of all encounters), unit costs were assigned by first examining whether there were other nonmissing costs for the same CPT code in the same year (36.6 percent of estimated DPH encounters). When these costs were missing for all observations in a year (58.7 percent of all DPH estimated encounters), unit costs were assigned according to the rates paid by the Washington State Medicaid program in 2001. The remaining (4.7 percent) of encounters with missing costs could not be matched and were set equal to zero; the vast majority of these services are for things that would ordinarily not be reimbursed through a Medicaid system (e.g., consultation with other providers).

The cost to DPH of psychotropic medications for detainees is also included in jail mental health services costs. Because none of our data provided information on the actual users of psychotropic medications, we divided the full amount paid by DPH for psychotropic drugs by the total number of DPH

encounters in each year. This per encounter cost is then added into the cost of each psychiatric encounter thus explicitly distributing psychotropic drug expenditures to higher service users. Actual expenditures were only available for 1998. Psychotropic expenditures for all years prior to 1998 were estimated to have the same real spending as in 1998. While this is a somewhat unrealistic assumption due to the large rate of inflation on drug products, the jail system has been increasingly successful in receiving donated medications, thus balancing out the large increases in spending. The estimated drug cost per encounter ranged from \$16.06 in 1993 to \$33.87 in 1998.

Other Costs

State mental hospital costs were assigned using the annual per diem amounts for the two large state mental hospitals. One hospital provides an assisted living unit; costs for this unit were also included at its separate per diem rate.

Costs to the county mental health system were enumerated as actual expenditures, rather than using a shadow claim procedure. Before managed care, providers were paid on a fee-for-service basis. Therefore, service codes for the pre-period were matched to reimbursement rates for those service codes, or when the rates were not available, translated to CPT codes and linked to the 2001 Washington Medicaid reimbursement rates per procedure. Two kinds of services were given cost values of \$0: services that could not be matched to a service code reimbursement rate or to a CPT code or those that were matched to CPT codes not reimbursed by the Washington Medicaid program. We use actual capitation payments to determine costs after managed care was implemented in April 1995. Monthly payments were made to providers based on an assessment of the severity of illness, the patient's age group (child, adult, or geriatric), and sex. Encounters with capitated providers were not consistently reported so only actual payments are used. In addition, more than 12,000 person-months contained some use of the county mental health system outside of a capitated contract; these visits were very often for persons who were covered under a capitated contract within one month of their visit. Costs were assigned to these cases according to the pre-managed care method described above.

Costs were summed separately for each type of service to the person-month level. That is, each dependent variable described below is the total cost for that type of service per individual per month.

Unweighted averages for each variable are described in Table 1. The first and second columns of the table give the percentage of users and

Table 1: Summary Statistics for the Five Dependent Variables (Unweighted)

<i>Variable</i>	<i>Percentage with Any Use during Sample Period</i>	<i>Average Percentage with Any Use in Month</i>	<i>Monthly Expenditures Conditional on Use in Month (in 2001 Dollars)</i>	
			<i>Mean</i>	<i>Std. Dev.</i>
Jail Hotel Costs				
Nonpsychiatric	42.8	3.40	656.27	651.46
Psychiatric	12.8	0.66	1756.62	1896.25
Jail Mental Health Services Costs	14.6	0.72	156.10	118.86
State Hospital Costs	3.4	0.55	8034.52	3774.52
County Mental Health Costs	50.9	14.85	381.09	649.63

person-months during our sample period that had any positive level of use. The third and fourth columns give the average and standard deviation of the level of use, measured in 2001 dollars, conditional on any use in the month. The five dependent variables used in our regression models are reported in the rows. These variables include the jail hotel costs for psychiatric and nonpsychiatric care, jail mental health services costs, state mental hospital costs, and county outpatient mental health costs. Just over 3 percent of person-months had some nonpsychiatric jail use and less than 1 percent of person-months had any jail psychiatric, jail mental health service, or state mental hospital use. Almost 15 percent of the sample person-months used county outpatient mental health services.

Costs of the psychiatric unit of the jail were substantially higher (\$1,756/month for users) than nonpsychiatric costs (\$670/month for users) as described above. Jail mental health service costs averaged \$156 per month conditional on use. State mental hospital costs averaged over \$8,000 per month with some use, while county mental health users averaged \$381 per month.

Table 2 describes the explanatory variables used in the fixed-effects models. Regressors include an indicator for months after the shift to manage care occurred and a linear time trend. An indicator for persons who were ever enrolled in Medicaid during the study period was included to isolate the effects of the change for the population most likely to be affected. A new jail was opened in King County in the spring of 1997. This occurrence may have reduced capacity constraints, allowing for changes in the rate and level of jail use, so a variable indicating the time period after the new jail opened was included in all jail models. Age, sex, and race variables are also reported,

Table 2: Summary Statistics for Independent Variables (Unweighted)

<i>Variable</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>Minimum</i>	<i>Maximum</i>
<i>Policy</i>				
Managed Care	0.692	0.461	0	1
Managed Care × Medicaid	0.535	0.499	0	1
Medicaid Indicator	0.773	0.419	0	1
Managed Care × Time Trend	30.6	23.1	0	66
Time trend	34.0	19.0	1	66
New Jail	0.328	0.469	0	1
<i>Demographics</i>				
Age	35.3	10.6	18	64
Female	0.485	0.500	0	1
Black	0.173	0.378	0	1
Asian	0.050	0.217	0	1
Native American	0.028	0.165	0	1
Hispanic	0.019	0.135	0	1

although only age appears in the fixed-effects models because the other demographic variables do not change over time.

RESULTS

The key results are the coefficients on the interaction between managed care and Medicaid in Tables 3 and 4. For the linear probability model, a positive coefficient indicates an increase in the probability of use for Medicaid enrollees, after the start of the managed care period, while a positive coefficient in the second continuous part of the model indicates a greater level of service use, measured in dollars, for those who have accessed the relevant service system.

The results show a strong increase in the probability of all kinds of jail use for persons on Medicaid after the introduction of managed care. There does not seem to be a change in the quantity of use, measured in dollars, conditional on using any jail services. The results show a statistically significant increase in the probability of having some psychiatric or nonpsychiatric jail hotel costs and in the probability of receiving jail mental health services. The magnitudes may appear small, generally less than one-tenth of one percentage point, but given that the overall probabilities are also less than one percent, this is a large relative increase. For example, during the managed care period, the probability of any nonpsychiatric jail days increased by 0.19 percentage points for Medicaid enrollees and the overall average in the data was around 3 percent, an increase of over 5 percent.

Table 3: Person Fixed-Effects Linear Probability Model Results to Predict Any Monthly Expenditures

Variable	Cost-Shifting Models				
	<i>Jail Hotel</i>	<i>Jail Hotel</i>	<i>Jail Mental</i>	<i>State</i>	<i>Own-Cost Model</i>
	<i>Costs:</i> <i>Nonpsychiatric</i>	<i>Costs:</i> <i>Psychiatric</i>	<i>Health Services</i> <i>Costs</i>	<i>Hospital</i> <i>Costs</i>	<i>County Outpatient</i> <i>Mental Health Costs</i>
<i>Policy</i>					
MC	-0.00079** (0.00026)	0.000154 (0.000097)	-0.00032** (0.0001)	-0.00011 (0.00024)	0.00335** (0.00011)
MC × Medicaid	0.00185** (0.00015)	0.000353** (0.000059)	0.000429** (0.000062)	0.00030 (0.00018)	0.010465** (0.000076)
MC × Time Trend	-0.000025* (0.000011)	-0.000019** (4.05e-06)	-1.05e-06 (4.37e-06)	7.13e-06 (0.000010)	-0.00022** (6.40 e-06)
Time Trend	0.000034** (0.000013)	0.000015** (4.66e-06)	4.83e-06 (5.07e-06)	-0.000012 (0.000013)	0.00018** (8.00e-06)
New Jail	0.00010 (0.00014)	0.000038 (0.000051)	-0.00019** (0.000052)		
<i>Demographics</i>					
Age	-0.00023* (0.00011)	-0.000054 (0.000038)	-0.0000836* (0.000040)	0.00006 (0.00011)	-3.47e-06 (0.000061)
<i>Observations</i>					
Total	2,587,978	2,587,978	2,587,978	2,587,978	2,587,978
Unique Persons	41,463	41,463	41,463	41,463	41,463

* $p < .05$;

** $p < .01$.

In contrast to the increase in the probability of the three kinds of jail costs for Medicaid enrollees, we find no significant change in the probability of using the state mental hospital by Medicaid enrollees and a decrease in state mental hospital costs for users.

We find a significant increase in the probability of nonzero expenditures for county outpatient services after the implementation of managed care. This result does not necessarily reflect an increase in utilization, but is likely due to an artifact of the payment mechanism. After managed care, the county paid providers a capitated fee even when no services are provided and thus it is likely that payments were made for more individuals than were actually using services in any given month after the carve-out.

Because there are individual-level fixed effects, and Medicaid is a time-invariant variable as defined in our data, the Medicaid dummy variable is not included in the fixed-effects regression. Using a monthly Medicaid enrollment

Table 4: Person Fixed-Effects Model of Monthly Expenditures in 2001 Dollars, Conditional on Use

Variable	Cost-Shifting Models				Own-Cost Models County Outpatient Mental Health Costs
	Jail Hotel Costs: Nonpsychiatric	Jail Hotel Costs: Psychiatric	Jail Mental Health Services Costs	State Hospital Costs	
<i>Policy</i>					
MC	-66** (23)	-387 (207)	-18 (14)	373 (234)	-316** (12)
MC × Medicaid	-3 (14)	53 (143)	1.0 (9.8)	-710** (180)	-203** (11)
MC × Time Trend	2.03* (0.90)	2.7 (8.4)	0.83 (0.58)	-4 (11)	1.39** (0.49)
Time Trend	5.57** (1.04)	14.6 (9.4)	-0.39 (0.64)	3 (13)	-4.51** (0.55)
New Jail	71.0** (13)	128 (121)	-9.0 (7.0)		-20** (2)
<i>Demographics</i>					
Age	11.2 (8.9)	81 (79)	-6.4 (5.1)	-121 (100)	-4 (3)
<i>Observations</i>					
Total	87,768	17,012	18,617	14,056	384,186
Unique Persons	17,729	5,298	6,054	1415	21,117

* $p < .05$;

** $p < .01$.

indicator potentially creates endogeneity problems, because individuals are precluded from Medicaid enrollment during prison or jail sentences. This policy is evidently not always enforced as we found some individuals listed as being on Medicaid when they were in prison or jail. We decided to use an indicator of ever-enrolled in Medicaid to mitigate endogeneity problems. We examined this variable for evidence that more enrollment occurred later in the sample period, which may indicate either strategic enrollment behavior by participating providers possibly in response to managed care incentives or that persons increase in the severity of their illnesses over time and thus are more likely to be eligible for Medicaid services. A trend toward more Medicaid enrollment conditional on ever enrolling did not occur in our data; in fact, the conditional probability of enrollment in a given month was smaller later in our study period over the rate earlier in the sample.

The only individual-level time-varying covariate is age. Older persons tend to have a lower probability of use, and this effect is statistically significant

for nonpsychiatric care and mental health services. The gradual decline in the use of services with age for persons with severe mental illness has been found by others (e.g., Domino and Salkever 2003; Lindrooth, Norton, and Dickey 2002).

The coefficient on the uninteracted managed care term indicates the difference for non-Medicaid persons in the probability of use before and after the start of the managed care contract. This coefficient is statistically significant in the jail and county outpatient cost models (see Table 3). The time trend indicates that the probability of any jail use increased before managed care, and decreased afterward.

In models predicting the amount of jail use, conditional on any use (Table 4), the interaction between Managed Care and Medicaid is never statistically significant in any of the jail models. Therefore, controlling for other factors, the amount of jail use for those who accessed the jail system did not change after the start of the managed care contract. This may indicate that a shift toward more severely ill jail users did not accompany the increase in the likelihood of use or that if it did occur, such persons did not receive more intensive care as measured in dollars while incarcerated in jail.

Payments for county mental health services for service users decreased substantially after managed care, especially for Medicaid enrollees, on the order of a \$300 per month decrease for non-Medicaid enrollees and a \$500 per month decrease for Medicaid enrollees. While this type of result may be the marker of a successful capitation program from the county's perspective, it may also fuel the cost-shifting results found in the probability models.

Combining the results from the two parts on the full sample, we can calculate the predicated effect of managed care on Medicaid enrollees' total costs. We find an overall increase in spending on nonpsychiatric jail hotel costs of \$1.30 per person per month (bias-corrected bootstrapped 95 percent confidence interval of \$0.45 to \$1.81) and on psychiatric jail hotel costs of \$0.73 per person per month (CI \$0.04 to \$1.62). If five percent of the approximately one million persons between ages 18 and 64 in King County during our study period are in the Medicaid program, we estimate a total annual shift of \$1.13 million to the jail sector (CI \$0.58M to \$1.61M), or almost 2 percent of the jail's 1996 adapted budget. We also find an increase in jail mental health service costs of \$0.07 per person per month (CI \$0.01 to \$0.11), less than 1 percent of the Department of Public Health's 1996 adopted budget. We find a decrease in spending on state mental hospital costs of \$1.67 (CI decrease of \$13.38 to an increase of \$7.77), but since the confidence interval includes zero, we cannot rule out the hypothesis of no cost-shifting to the state psychiatric hospital

system. As evidence to fuel a cost-shifting motive, we find an average reduction on county-funded outpatient mental health expenditures of \$7.65 per person per month (CI \$12.48 to \$1.14), translating to a total annual savings of almost \$4.6M (CI \$0.7M to \$7.5M) or 6.3 percent of the county's 1996 outpatient mental health budget.

Robustness Analysis

There is obviously considerable variation in the mental health needs and utilization patterns of Medicaid enrollees, our control group. Because no independent assessment of mental illness was available in our data, we opted to use the full set of individuals enrolled in the Medicaid program, even though doing so understates our results on mental health service users. We reestimated the full set of models on a subset of our sample comprised of users of county mental health services (results not reported). This group is likely more homogenous in their mental health service needs, but it may substantially undercount mental health users, as many may seek mental health services from the primary care sector (Wells et al. 1989). We obtain virtually identical results to those reported here in sign, significance, and magnitude of the results; the one exception is that the managed care–Medicaid interaction became positive and statistically significant in the first part of the state hospital model, indicating an increase in the probability of using state hospital services after the implementation of managed care for this population. We also reran all models on a further subset of county mental health users, those with one or more diagnoses of severe mental illness. As expected, we find similar results from the two-part model in sign and significance, although the magnitude of the coefficients from the linear probability model were 60–187 percent larger. This indicates that the effects of increasing jail use were concentrated in the severely mentally ill population.

Breakpoint Sensitivity Analysis

We conduct a breakpoint analysis, similar to Piehl and colleagues (1999), using the technique of Andrews (1993) to test for the period over which a break in the parameter estimates could be determined. In other words, this procedure allows us to examine whether a significant change occurred in the probability of use of the services we examined above, but perhaps at a time period different than specified in the models (April 1995). We strongly reject the hypothesis that there was no structural break in the parameter estimates for all four sets of two-part cost shifting models during the period surrounding the

actual policy shift on April 1995 using a 10 percent trimming rate, supporting our original findings

CONCLUSIONS

We found evidence of indirect cost-shifting toward the jail and decreasing mental health expenditures in the county outpatient mental health system. We found a statistically significant increase in the probability of jail use, both psychiatric and nonpsychiatric, after the start of managed mental health care for Medicaid enrollees. A series of robustness checks in the full sample and subsamples of mental health users and the severely mentally ill were supportive of these findings.

The implications from our analyses are important for policy. First, our results show that there is a trend away from deinstitutionalization of persons with mental illness. However, instead of reinstitutionalization in mental hospitals, or even general hospitals, the institutionalization is in jails. Second, it is likely that the treatment of mental illness is less effective in jail, even when psychiatric care is provided, than in a hospital specializing in care for the mentally ill. Third, the overall cost of care is likely to be greater, when counting both the short-term and long-term costs. Fourth, this trend, like the deinstitutionalization that started in the 1960s, is driven in large part by economic incentives instead of best treatment considerations.

While the exact mechanism is not explored in this analysis, these results may point to a potentially troubling trend if the provision of mental health services in the jail setting is not as efficient as it is on an outpatient basis due to additional costs of housing, guards, and other features of the jail. The human costs, both intangible and in terms of future labor market participation, are of course outside the scope of our analysis, but no less troubling.

We also find evidence that expenditures on state mental hospitals decreased during the managed care period, even though this system is a free good to the capitated mental health providers. We can think of three possible explanations for this finding. This could be explained by decision making at a level higher than that of the county mental health system (e.g., the state); for example, there may have been policies implemented at the state hospital during the managed care period that disproportionately targeted Medicaid enrollees for reductions in lengths of stay. It is also possible that there was greater capacity in the jail health system rather than the state mental hospital system. A third explanation could be increased access to outpatient treatments

such as psychotropic medication as a result of the change to managed care, perhaps through better oversight, which resulted in shorter stays and therefore lower expenditures to those admitted to state mental hospitals; however, this third explanation does not support the jail results reported here.

Caveats of our results should be noted. First, if other policies were implemented in the Medicaid population on or after April 1995, we are at risk of attributing those effects to the implementation of managed care. We have met with many local personnel in the King County area and have discussed other possibilities, but no credible competing explanation was unearthed. However, we cannot rule out other explanations. Second, we do not examine total Medicaid expenditures for this population in this paper, but leave that to future work. Although some county mental health visits are reimbursed through the Medicaid program, many are not, and these visits are not otherwise captured in our data. Increases in the use of private sector providers may have occurred which could potentially increase the study population's access to mental health care and offset the own-cost reduction that was observed. However, such a finding would not mitigate our finding of considerable cost-shifting to the jail sector. Finally, while we have made every effort to reflect actual expenditures by each of the sectors studied in this analysis, it is possible that the administrative data sets that we have used may misstate agency costs. In addition, we incorporated the best measure of psychotropic medication costs that we could access, but it is likely that this estimate may not accurately reflect medication expenditures during the full study period, although the reliance on donated medications makes the actual expenditures a very small percentage of the public health department budget.

This article provides another example of how changes in mental health financing can have unintended consequences (e.g., Frank, Goldman, and Hogan 2003). In this case, changes in financing for mental health treatment appears to have led to increases in expenditures in a completely different sector. This points to the need for careful consideration when designing changes in the financing of any complex health system.

ACKNOWLEDGEMENTS

This research was supported by a grant from the John D. and Catherine T. MacArthur Foundation Mental Health Policy Research Network and the National Institute of Mental Health Grant MH63883 and MH19117. We are grateful for the comments by Brad Gaynes, Benjamin Brody, Jangho Yoon,

Gary Cuddeback, members of the Network, and participants of the Eleventh Biennial Research Conference on the Economics of Mental Health on earlier versions of this work. Excellent programming and research assistance were provided by Carol Porter and Nicole Heilbron, respectively.

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