

Washington State Mental Health Services
Cost Offsets and Clients Outcomes

Technical Report

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Management Services Administration
Research and Data Analysis Division

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Summary

The Washington State Mental Health Services Cost Offset and Client Outcome Study examined Medicaid claims, mental health treatment, and mortality data for aged, blind, or disabled clients who had a mental illness diagnosis in their medical records at some point between July 1998 and June 2002. The study examined the effects of publicly funded mental health care on medical costs and mortality.¹

Adult aged, blind, or disabled clients on Medicaid who received publicly funded mental health treatment had **lower subsequent medical costs** and a **reduced risk of death** compared to clients diagnosed with mental illness who did not receive mental health treatment.²

- **Cost for clients receiving outpatient mental health treatment were reduced by about \$105 per member per month (pmpm) in the first follow-up year and \$126 pmpm in the second year**, compared to clients with mental illness who did not receive mental health treatment.³ These savings offset 41 to 50 percent of the cost for providing the outpatient mental health care.
- **Outpatient therapy and psychotropic medication was found to be more effective in reducing medical care costs than medication alone.** Clients receiving both therapy and medication experienced significant cost savings of \$144 and \$176 pmpm in the first and second follow-up years, respectively, compared to clients who received neither outpatient therapy nor psychotropic medication. These savings offset 52 to 64 percent of the cost for providing outpatient mental health care. In contrast, savings were lower and not statistically significant (\$41 and \$75 pmpm) for clients receiving psychotropic medication alone.
- **Clients with psychotic disorders who received inpatient or intensive outpatient mental health treatment had lower subsequent medical costs than clients with psychotic disorders who remained untreated.** Medical costs were reduced by \$135 to \$205 pmpm in the first follow up year for clients diagnosed with psychosis, and were reduced \$216 to \$298 pmpm in the first follow-up year for the subset of psychotic clients who also had another mental illness. The medical savings for this subset of clients offset the costs to provide their mental health treatment by 13 to 19 percent.
- **Medical cost savings varied by the type of mental illness.** The most significant savings were among clients with alcohol or drug-related disorders (\$291 pmpm), psychosis (\$175 pmpm), or bipolar disorders (\$161 pmpm).
- **Clients who received moderate amounts of treatment (between four and 40 hours in a year) experienced the greatest savings: \$138 and \$162 pmpm** in the first and second follow-up years, respectively. Savings in both follow-up years were lower and not

¹ Includes services under the DSHS Mental Health Division.

² Clients on Medicaid exclude those who were simultaneously eligible for Medicare.

³ Medical cost effects were estimated using a regression model comparing the change in medical costs for those who received mental health outpatient treatment to the change in medical costs for clients with similar mental illness diagnoses who did not receive treatment. This is the conditional difference-in-differences approach described in Heckman J, Smith J, Ichimura H, Todd P, 1997, "Characterizing Selection Bias Using Experimental Data," *National Bureau for Economic Research Working Paper No. 6699*.

statistically significant among clients who received less than four hours of treatment in a year (\$83 and \$88 pmpm) or more than 40 hours of treatment in a year (\$52 and \$70 pmpm).

- **The odds of dying were 23 percent lower in a two-year period for Medicaid clients who received outpatient mental health treatment** than the odds for clients with similar mental illnesses who did not get treatment.

Similar positive outcomes were observed for publicly funded mental health treatment provided to clients eligible for medical coverage through the state-funded General Assistance-Unemployable (GA-U) program:

- **GA-U clients who received outpatient mental health treatment had lower medical costs than untreated GA-U clients with mental health disorders.** Medical costs were reduced by \$174 to \$255 pmpm in the first follow-up year. The medical savings offset 97 to 142 percent of the cost of the mental health care for GA-U clients, depending on the year of treatment.
- **The odds of dying were 29 percent lower in a two-year period for GA-U clients who received treatment for their mental illness** than the odds for clients with similar mental illness diagnoses who did not get treatment.

Policy Implications

Providing outpatient mental health treatment to aged, blind, and disabled clients in the Medicaid or GA-U programs reduced their subsequent medical costs, partially offsetting the cost of outpatient mental health therapy. Furthermore, giving clients outpatient mental health treatment produced greater cost savings than providing psychotropic medication alone. Providing inpatient or intensive outpatient mental health care to clients with psychotic disorders resulted in lower medical costs for these clients.

1 Introduction

This report investigates the relationship between mental health treatment and medical costs, mortality, and criminal justice outcomes for adult aged, blind, or disabled medical assistance clients in Washington State. Previous research indicates that mental health treatment may reduce medical costs for some populations.⁴ Mental health treatment provided to aged, blind, and disabled clients has the potential for averting costs because the prevalence of mental illness and chronic physical illness is relatively high within this group. We examine whether medical cost offsets exist for this segment of Washington State's Medicaid population, and whether mental health treatment affects other client outcomes. Specifically, we address the following questions:

- Are medical costs lower for aged, blind, and disabled clients who receive mental health treatment?
- Are mortality rates lower for clients who receive mental health treatment?
- Are arrest and conviction recidivism rates lower for clients who receive mental health treatment?

In this report, mental health treatment refers to inpatient and outpatient services administered through the Mental Health Division of the Washington State Department of Social and Health Services. Inpatient treatment includes stays in a community psychiatric facility or a state mental hospital. Community mental health outpatient treatment includes activities such as group or individual outpatient therapy or psychotropic medication management provided by local mental health providers under contract with fourteen Regional Support Networks.

Methodology

Study Population

This study pertains to adults aged 18 years or older who were eligible for medical assistance in the aged, blind, disabled, presumptively disabled (GA-X), or General Assistance-Unemployable (GA-U) categories between July 1998 and June 2002. These clients were grouped into three categories based on their medical assistance eligibility category and Medicare eligibility status:

- **Medicaid-only** – aged, blind, disabled, or GA-X clients not simultaneously eligible for Medicare
- **Dual eligible** – aged, blind, disabled, or GA-X clients simultaneously eligible for Medicare
- **GA-U** – General Assistance-Unemployable clients

⁴ See *Medical Cost Offsets Associated with Mental Health Care: A Brief Review*, Nancy Anderson, M.D. Washington State Department of Social and Health Services, Research and Data Analysis Division. December 12, 2002.

Medical and mental health services and costs examined in this study are limited to those covered by state funds and Medicaid and do not include costs borne by the wholly federal Medicare program. Medical costs included for the Medicaid-only group tend to be higher than those for either dual eligible or GA-U clients since the array of medical services covered by the state and Medicaid programs is broadest for the Medicaid-only clients. Thus, the costs analyzed for dual eligible clients in this study are limited to services covered by Medicaid, which include prescription drugs and mental health treatment but do not include other medical services such as hospitalizations or treatment by physicians.

Analyses are conducted separately for the Medicaid-only, dual eligible, and GA-U clients because of the different sets of state- and Medicaid-funded medical services and because these groups have different characteristics. Dual eligible clients, for example, are more likely to be age 65 or above, while Medicaid-only clients are more likely to be disabled and under age 65. GA-U clients tend to be younger than the other two groups, are more likely to have substance use disorders, and tend to be eligible for medical assistance more intermittently than the other two groups.

Administrative Data Sources

Records from the following data sources were linked using personal identifiers to construct a longitudinal client-level dataset describing mental health treatment, medical service use, physical and mental illness conditions, mortality, and criminal justice involvement over the July 1998 to June 2002 period.

- Medicaid Management Information System Extended Database (MMIS)
- Client Services Database (CSDB)
- Medical Assistance Eligibility Database
- Washington State Patrol Arrest Records
- Washington State Institute for Public Policy Criminal Recidivism Database
- Department of Health Death Certificate Database

More detail about these data sources is provided in Appendix A.

Definition of Mental Health Treatment

As noted above, mental health treatment in this report refers to mental health services administered and funded through the Mental Health Division.⁵ Mental health services are grouped into three categories: (1) state psychiatric hospitalizations, (2) community psychiatric hospitalizations, and (3) community outpatient services.

State mental hospital and community outpatient treatment services and costs were identified using CSDB data tables that were derived from Mental Health Division Client Information

⁵ Thus, the relatively small volume of Medicaid-paid mental health services not funded through the Mental Health Division is excluded from our definition of mental health treatment.

System (MHDCIS) data. Community psychiatric hospitalizations were identified primarily from Medicaid-paid claims in MMIS.⁶ Costs associated with these hospitalizations include claims for the hospital stays, as well as other services (e.g. psychiatric provider services) associated with these hospital stays. Additional community psychiatric hospitalizations that are included in a category labeled “evaluation and treatment in crisis services” were obtained using CSDB data tables that were derived from MHDCIS data.

Mental health treatment costs for services identified through CSDB were adjusted to constant FY 2002 dollars using FY 2002 service unit rates. This method was needed to avoid possible effects of inflation and to provide estimates of mental health treatment costs in FY 1999 and FY 2000 for which CSDB provided complete information on service use but no estimates of costs. Using FY 2002 rates parallels the constant dollar analysis used with medical cost data obtained from MMIS.

Mental Illness Diagnoses

In a preliminary study that served as background for this report, we found that mental illness diagnoses were recorded in Medicaid-paid claims data for the majority of aged, blind, or disabled clients who received mental health treatment administered through the Mental Health Division, as well as for a number of clients who did not receive such services (Mancuso and Estee, 2003, pp.11-13). As a result of those preliminary descriptive analyses, it appeared feasible to analyze the cost offsets associated with the receipt of mental health treatment among clients with a diagnosis of mental illness in their medical claims records.⁷

Using diagnoses recorded in medical claims data in MMIS over the four-year period from July 1998 to June 2002, a mental illness profile was created for each client in the study population. The seven mental illness diagnosis groups used in this study are shown in Table 1 along with the corresponding codes from the International Classification of Disease, 9th Revision, Clinical Modification (ICD-9-CM). We created a variable for each diagnosis group to indicate the presence of the diagnosis category in the clients’ four-year medical record. Clients with multiple mental illness disorders were **not unduplicated** into a single mental illness category.

Client Profiles

To support subsequent analyses of cost offsets and client outcomes, clients who received different types of mental health treatment were compared to other aged, blind, or disabled clients. These comparisons are based on a number of independent variables that could be used as statistical control variables in later analyses, including mental illness diagnosis, demographic characteristics, and chronic disease conditions predictive of future costs. Although clients served in FY 2000 and 2001 are the focus of analyses of treatment outcomes, characteristics of clients who received services in FY 2002 are described here. The characteristics of these clients and their service use patterns are representative of those served in prior fiscal years.

⁶ The method for identifying hospitalizations in MMIS data is based on criteria obtained from the MHD and is described in Appendix B. Data on community inpatient hospitalizations funded through the Pierce County Regional Support Network are missing from CSDB data for most of the study period.

⁷ Beginning in January 2002, the Mental Health Division is collecting mental illness diagnoses for all MHD clients.

Table 1. Mental Illness Diagnosis Groups⁸

Group Name	ICD-9-CM Codes	ICD-9-CM Category Name
<i>Psychotic disorders</i>	295 297 298.2 to 298.9 299	Schizophrenic disorders Paranoid states Other non-organic Psychoses, childhood origin
<i>Mania & Bipolar disorders</i>	296.0-296.1 296.4-296.9 298.1	Manic Bipolar Excitative-type psychosis
<i>Depression</i>	296.2 296.3 298.0 300.4 311	Major depression, single Major depression, recurrent Depressive type psychosis Neurotic depression Depression, not otherwise classified
<i>Dementia & Organic disorders</i>	290 293 294 310	Dementia Transient organic psychosis Chronic organic psychosis Organic, non-psychotic
<i>Neurotic, Personality, & Attention Deficit Disorder (ADD)</i>	300 (except 300.0, 300.1 300.4) 301 302 307 312 313 314.0 314.2-314.9	Neurotic (e.g. phobia, obsessive-compulsive, etc) Personality (e.g. anti-social, histrionic, paranoid, etc) Sexual deviation/disorder Symptoms or syndrome not otherwise classified Conduct disturbance Childhood/Adolescent emotion disturbances Attention Deficit Disorder Other Attention Deficit Disorder, ADHD
<i>Adjustment & Stress Disorders</i>	300.0 300.1 308 309	Anxiety Hysteria Acute stress reaction Adjustment reaction (e.g., post-traumatic stress disorder)
<i>Alcohol or Other Illegal Drug Disorders</i>	303 305.0 291 304 305.2 to 305.9 292	Alcohol Dependence Alcohol abuse Alcoholic psychosis Drug Dependence Drug abuse Drug psychosis

Mental health clients are grouped into mutually exclusive categories based on the types of treatment they received in FY 2002 using a hierarchical grouping that gives precedence to state hospital services over community inpatient services, and, in turn, gives precedence to community inpatient services over community outpatient services.⁹ The client groups are compared with regard to their mental illness profile, chemical dependency treatment experiences, demographic characteristics, chronic disease and prescription drug risk adjustment scores used to predict future medical costs, and expenditure levels. Characteristics of Medicaid-only clients are shown in Table 2, dual eligible clients in Table 3, and GA-U clients in Table 4.

⁸ Source: Elizabeth Kohlenberg, DSHS Research and Data Analysis Division, October 2002

⁹ Thus, the community outpatient group excludes clients who were in a state hospital or received community inpatient services in the fiscal year, and the community inpatient group excludes clients who were in a state hospital in the fiscal year.

The following patterns emerge in all three medical assistance eligibility groups:

- Psychotic disorder diagnoses are most prevalent among state hospital clients. For example, 78 percent of Medicaid-only state hospital clients have a psychotic diagnosis in the medical record, compared to 57 percent of community inpatient clients, 29 percent of community outpatient clients, and 4 percent of clients who do not receive mental health treatment.
- Manic/bipolar, depression, alcohol/drug use, and adjustment/stress disorders are most prevalent among community inpatient clients. Community inpatient clients have the highest average number of diagnosis categories represented in their mental illness profile.
- Outpatient clients have a profile of less severe mental illnesses than inpatient clients.
- The prevalence of mental illness is higher among outpatient clients than among clients who do not receive mental health treatment.
- Mental health clients are more likely than other aged, blind, and disabled clients to be using chemical dependency services through the Division of Alcohol and Substance Abuse (DASA). However, the percentage using DASA services is substantially lower than the percentage with an alcohol/drug use disorder diagnosis in their medical record.
- Many clients who do not receive mental health treatment services use anti-depressant or anti-anxiety medications. Thus, a large proportion of the “untreated” group used as a base of comparison in subsequent cost offset analyses receives psychotropic medications funded through Medical Assistance.

These findings motivate several decisions regarding the definition of treatment and comparison groups and the selection of control variables in the analyses to follow:

1. **Restrict analyses to clients with a mental illness diagnosis.** It would be inappropriate to compare aged, blind, and disabled clients receiving mental health treatment to **all other** aged, blind, and disabled clients because of the vast disparity between the two groups in the prevalence of mental illness. Consequently, in the statistical analyses that follow we restrict the treatment and untreated comparison groups to clients with a mental illness diagnosis in their medical record.
2. **Analyze inpatient and outpatient treatment separately.** Because inpatient clients have far more severe mental illness profiles, we analyze outcomes separately for inpatient and outpatient clients. Furthermore, when we analyze outcomes for inpatient clients, we use comparison groups with a more severe mental illness profile than that of the general population of untreated clients with mental illness.
3. **Control for differences in mental illness profile.** Even though treatment and comparison groups will be restricted to clients with an indication of mental illness, it will be important to include control variables to account for differences in the severity of mental illness between the treatment and comparison groups. Consequently, our analyses will include variables indicating mental illness using the diagnosis categories described in Table 1.

4. **Control for the effect of chemical dependency treatment.** Previous research has found that chemical dependency (CD) treatment reduces medical costs and criminal recidivism.¹⁰ If we did not include a separate control for receipt of CD treatment, there would be a danger of confounding mental health treatment effects with CD treatment effects because mental health clients are more likely to receive CD treatment.

¹⁰ See Estee and Nordlund, 2003.

Table 2. Medicaid-only Client Characteristics, FY 2002
by Type of Mental Health Treatment Received in FY 2002

	Mental Health Division Clients			All Other Medicaid- only Clients
	Community Outpatient Only	Community Inpatient	State Hospital	
Number of Clients	21,393	2,293	840	75,645
Percent of Clients by Mental Illness Diagnoses ^a				
Psychotic Disorders	29 %	57 %	78 %	4 %
Mania & Bipolar Disorders	25 %	50 %	40 %	4 %
Depression	48 %	72 %	48 %	17 %
Alcohol or Drug Use Disorders	28 %	60 %	43 %	12 %
Neurotic, Personality, ADD	30 %	73 %	73 %	9 %
Adjustment & Stress Disorders	30 %	49 %	29 %	12 %
Dementia & Organic Disorders	6 %	13 %	14 %	3 %
Average # of Diagnosis Categories	2.0	3.8	3.2	0.6
Percent of Clients with Psychotropic Rx				
Anti-depressants/Anti-anxiety	72 %	84 %	59 %	38 %
Anti-psychotics/Anti-manía	46 %	70 %	73 %	5 %
Percent of Clients Receiving DASA Services				
Residential Treatment	2 %	5 %	3 %	1 %
Outpatient Treatment	9 %	13 %	7 %	3 %
Opiate Substitution Treatment	2 %	2 %	0 %	1 %
Detoxification	3 %	9 %	5 %	1 %
Assessment	8 %	16 %	10 %	3 %
Age Distribution				
18-24	10 %	12 %	18 %	10 %
25-44	46 %	52 %	51 %	29 %
45-64	41 %	34 %	29 %	45 %
65-74	2 %	1 %	1 %	11 %
75-84	1 %	0 %	1 %	4 %
85+	0 %	0 %	0 %	2 %
Gender				
Male	44 %	45 %	61 %	45 %
Female	56 %	55 %	39 %	55 %
Average Dx-Based Risk Adjustment Score	1.09	1.54	1.08	1.09
Average Rx-Based Risk Adjustment Score	1.17	1.38	0.97	1.04
Average Medical PMPM	\$719	\$1,110	\$699 ^d	\$803
Average Aging/Adult Services PMPM	\$146	\$108	\$66	\$159
Average Community Outpatient Only PMPM	\$281	\$491	\$943	\$0
Average Community Inpatient PMPM	\$0	\$762	\$396	\$0
Average State Hospital PMPM	\$0	\$0	\$2,405 ^c	\$0

^a Clients are counted in each mental illness diagnosis category represented in their medical record.

^b Does not include medical costs incurred while in the state hospital, if client is aged 22-64.

^c Does not include state hospital expenditures in months when clients are not eligible for medical assistance due to the Institutions of Mental Disease (IMD) exclusion. See Mancuso and Estee (2003), page 23, for more information about the IMD exclusion.

Table 3. Dual Eligible Client Characteristics, FY 2002
by Type of Mental Health Treatment Received in FY 2002

	Mental Health Division Clients			All Other Dual Eligible Clients
	Community Outpatient Only	Community Inpatient	State Hospital	
Number of Clients	17,669	1,268	692	98,353
Percent of Clients by Mental Illness Diagnoses ^a				
Psychotic Disorders	34 %	47 %	66 %	3 %
Mania & Bipolar Disorders	19 %	33 %	28 %	2 %
Depression	32 %	45 %	25 %	8 %
Alcohol or Drug Use Disorders	13 %	28 %	19 %	3 %
Neurotic, Personality, ADD	18 %	40 %	53 %	3 %
Adjustment & Stress Disorders	17 %	27 %	16 %	5 %
Dementia & Organic Disorders	11 %	14 %	12 %	6 %
Average # of Diagnosis Categories	1.4	2.3	2.2	0.3
Percent of Clients with Psychotropic Rx				
Anti-depressants/Anti-anxiety	69 %	75 %	61 %	36 %
Anti-psychotics/Anti-manía	55 %	66 %	75 %	8 %
Percent of Clients Receiving DASA Services				
Residential Treatment	1 %	3 %	2 %	0 %
Outpatient Treatment	4 %	7 %	4 %	1 %
Opiate Substitution Treatment	1 %	1 %	0 %	0 %
Detoxification	1 %	5 %	1 %	0 %
Assessment	3 %	8 %	3 %	0 %
Age Distribution				
18-24	2 %	2 %	3 %	1 %
25-44	33 %	41 %	47 %	13 %
45-64	35 %	33 %	34 %	21 %
65-74	11 %	9 %	5 %	24 %
75-84	12 %	8 %	9 %	23 %
85+	8 %	6 %	3 %	17 %
Gender				
Male	45 %	44 %	65 %	37 %
Female	55 %	56 %	35 %	63 %
Average Dx-Based Risk Adjustment Score	1.288	1.517	1.281	0.987
Average Rx-Based Risk Adjustment Score	1.482	1.645	1.376	0.987
Average Medical PMPM	\$456	\$520	\$386 ^d	\$277
Average Aging/Adult Services PMPM	\$622	\$334	\$299	\$605
Average Community Outpatient Only PMPM	\$340	\$548	\$877	\$0
Average Community Inpatient PMPM	\$0	\$114	\$49	\$0
Average State Hospital PMPM	\$0	\$0	\$2,650 ^c	\$0

^a Clients are counted in each mental illness diagnosis category represented in their medical record.

^b Does not include medical costs incurred while in the state hospital, if client is aged 22-64.

^c Does not include state hospital expenditures in months when clients are not eligible for medical assistance due to the Institutions of Mental Disease (IMD) exclusion. See Mancuso and Estee (2003), page 23, for more information about the IMD exclusion.

Table 4. GA-U Client Characteristics, FY 2002
by Type of Mental Health Treatment Received in FY 2002

	Mental Health Division Clients			All Other GA-U Clients
	Community Outpatient Only	Community Inpatient	State Hospital	
Number of Clients	4,218	455	131	17,756
Percent of Clients by Mental Illness Diagnoses ^a				
Psychotic Disorders	16 %	37 %	53 %	2 %
Mania & Bipolar Disorders	22 %	46 %	22 %	5 %
Depression	49 %	79 %	34 %	18 %
Alcohol or Drug Use Disorders	33 %	74 %	47 %	20 %
Neurotic, Personality, ADD	25 %	70 %	53 %	7 %
Adjustment & Stress Disorders	26 %	48 %	19 %	11 %
Dementia & Organic Disorders	3 %	9 %	5 %	1 %
Average # of Diagnosis Categories	1.7	3.6	2.3	0.6
Percent of Clients with Psychotropic Rx				
Anti-depressants/Anti-anxiety	70 %	84 %	51 %	39 %
Anti-psychotics/Anti-manía	35 %	61 %	62 %	5 %
Percent of Clients Receiving DASA Services				
Residential Treatment	7 %	13 %	8 %	4 %
Outpatient Treatment	15 %	15 %	11 %	9 %
Opiate Substitution Treatment	1 %	1 %	0 %	2 %
Detoxification	6 %	18 %	9 %	4 %
Assessment	21 %	33 %	26 %	13 %
Age Distribution				
18-24	15 %	15 %	25 %	10 %
25-44	57 %	65 %	56 %	46 %
45-64	27 %	20 %	19 %	44 %
65-74	0 %	0 %	0 %	0 %
75-84	0 %	0 %	0 %	0 %
85+	0 %	0 %	0 %	0 %
Gender				
Male	52 %	59 %	75 %	61 %
Female	48 %	41 %	25 %	39 %
Average Dx-Based Risk Adjustment Score	0.799	1.298	0.723	0.834
Average Rx-Based Risk Adjustment Score	0.844	1.158	0.742	0.796
Average Medical PMPM	\$382	\$808	\$361 ^b	\$427
Average Aging/Adult Services PMPM	\$11	\$14	\$9	\$20
Average Community Outpatient Only PMPM	\$329	\$426	\$822	\$0
Average Community Inpatient PMPM	\$0	\$645	\$104	\$0
Average State Hospital PMPM	\$0	\$0	\$2,657 ^c	\$0

^a Clients are counted in each mental illness diagnosis category represented in their medical record.

^b Does not include medical costs incurred while in the state hospital, if client is aged 22-64.

^c Does not include state hospital expenditures in months when clients are not eligible for medical assistance due to the Institutions of Mental Disease (IMD) exclusion. See Mancuso and Estee (2003), page 23, for more information about the IMD exclusion.

2 Medical Costs

Cost Offset Model

Changes in medical costs of adult aged, blind and disabled clients who receive mental health treatment are compared to changes in costs over the same fiscal years among clients with diagnoses of mental illness who do **not** receive treatment in the mental health system. The effects of inpatient and outpatient mental health treatment are examined separately, and analyses of outpatient treatment exclude clients who **ever** received inpatient treatment in the study period. Since this report is an attempt to determine if receiving mental health treatment offsets medical costs paid for through Medicaid or state funds, medical cost offset analyses are conducted for Medicaid-only and GA-U clients but not for dual eligible clients for whom most medical costs (except prescription drug costs) are borne by Medicare.

Medical Assistance Administration Costs

Medical costs for the study population are paid on a fee-for-service basis, and therefore detailed records of their medical expenses are available from MMIS.¹¹ Medical costs were limited to those expenses administered by the Medical Assistance Administration (MAA) of DSHS.¹² These included the following major types of services: inpatient hospitalizations, outpatient hospitalizations, physicians, other providers, prescription drugs, emergency room visits, durable medical equipment, and transportation. To account for changes in the price of medical care over the study period, medical costs were adjusted to constant FY 2002 dollars using the U.S. city average medical care price index.

Per Member Per Month Cost Measures

Average monthly medical expenditures were computed for each client for each fiscal year by dividing total expenditures for the client by the number of months the client was eligible for medical assistance. If a client's eligibility status changed during a fiscal year (e.g., shifted from GA-U to Medicaid-only), the client was included in analyses for both eligibility groups and his or her monthly expenditures were allocated appropriately to each eligibility status.

Controlling for Chronic Health Conditions

Two risk adjustment scores were used to control for differences between treated and untreated clients in baseline chronic health conditions. Because chronic health conditions are strongly correlated with ongoing medical expenditures, it is important to control for baseline differences in chronic conditions to isolate the effect of mental health treatment on medical costs. The Chronic Disease Payment System (CDPS) score measures chronic health conditions using diagnosis data from MMIS. The Medicaid Rx score measures health conditions using

¹¹ The study population does not include managed care clients covered through the Healthy Options program.

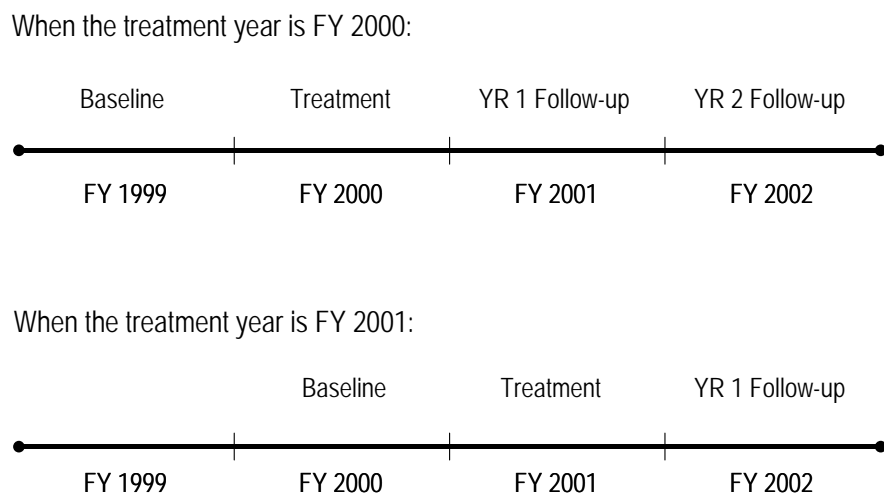
¹² After excluding community inpatient mental health services, MAA-only Medicaid-paid claims were selected by using MMIS category of service codes 01-85 and 97.

prescription drug information from MMIS. The CDPS and Medicaid Rx risk adjustment models are described in Kronick *et al.* (2000) and Gilmer *et al.* (2001), respectively.¹³

Time Periods

To allow sufficient time to establish baseline conditions and measure post-treatment outcomes, analyses focused on the effect of mental health treatment provided in FY 2000 and FY 2001. Figure 1 describes the time periods used to measure baseline conditions and treatment outcomes.

Figure 1. Analysis Timeline



Regression Methods

To estimate cost differences, we considered two statistical models. The standard regression model analyzes the **level** of per member per month medical expenditures in the follow-up year. However, the standard model would be inappropriate if selection bias results in systematic cost differences between treatment and comparison groups that are not accounted for by observable characteristics such as age, gender, baseline medical expenditures, baseline risk adjustment scores, and mental illness profile. Consequently, we also estimated models that control for certain forms of selection bias, and chose the conditional difference-in-differences approach described in Heckman *et al.* (1997). This approach analyzes the **change** in per member per month medical expenditures from the baseline year to the follow-up year. This model removes selection bias if the amount of bias does not change from baseline to follow-up period.

We found that the standard regression model and the conditional difference-in-differences model provided similar estimates of the medical cost offsets associated with mental health treatment,

¹³ Briefly, these models group diagnosis and prescription drug information available in MMIS into a relatively small number of categories that are correlated with future medical costs. We constructed risk weights for these categories using FY 1999 and 2000 eligibility and medical expenditure data, and used these weights to calculate risk-adjustment scores for each individual for each fiscal year based on the specific illness conditions or drug prescriptions present in their medical record.

with the latter model tending to give somewhat larger cost offset estimates. In the tables that follow, we report results from the conditional difference-in-differences model.

We used the following control variables: mental illness diagnosis indicators using the Table 1 classification; baseline year CDPS and Medicaid-Rx risk adjustment scores; an indicator of receipt of chemical dependency treatment services in the treatment year; detailed age and gender interactions; number of months eligible for medical assistance in the baseline year; number of months eligible for medical assistance in the follow-up year; and the estimated probability of receiving outpatient mental health treatment.¹⁴

The following criteria were used to select clients for the **outpatient** treatment group and the untreated comparison group:

1. Clients must be eligible for medical assistance for at least 1 month in each of the following years: baseline, treatment, and follow-up¹⁵
2. Clients must be age 18 or above by the end of the treatment year
3. Clients must have a diagnosis of mental illness in their four-year medical record
4. Clients **ever** receiving community inpatient or state mental hospital services in the four-year study period are excluded
5. Clients meeting conditions #1 - 4 who received outpatient services in the treatment year form the treatment group
6. Clients meeting conditions #1 - 4 who **never** received community outpatient services in the four-year study period form the comparison group

The number of treatment group and comparison group clients obtained using these six criteria is shown by year in Table 5. For clients who received treatment in FY 2000, there were two follow-up years: year one was FY 2001 and year two was FY 2002. For clients who received treatment in FY 2001, there was only one follow-up year: FY 2002. In subsequent analyses, the baseline year was the year preceding the year of treatment. Change in medical costs or other costs were measured by comparing costs in the baseline year with costs in follow-up year one or two.

¹⁴ This is estimated using a logistic regression model and is sometimes referred to as the “Heckman correction” term.

¹⁵ For the Medicaid-only and dual eligible analyses, we required at least one month of medical assistance eligibility in the specific eligibility status under consideration in the baseline, treatment, and follow-up year. Because GA-U eligibility spells tend to be much shorter, we expanded the criteria for the GA-U analysis to include GA-U clients who received outpatient treatment in the treatment year and were eligible for medical assistance in **any** eligibility category in the baseline and follow-up years.

Table 5. Number of Clients in Outpatient Treatment and Comparison Groups^a by Eligibility Group, Treatment Year, and Follow-up Year

Eligibility Group	Treatment Year	Follow-up Year	Number of Clients	
			Treated	Untreated
Medicaid-only	2000	Year 1 - 2001	7,929	12,649
	2000	Year 2 - 2002	7,025	11,277
	2001	Year 1 - 2002	8,658	13,319
GA-U	2000	Year 1 - 2001	1,743	1,886
	2000	Year 2 - 2002	1,506	1,557
	2001	Year 1 - 2002	1,843	2,019

^a Clients who were eligible for medical assistance for at least 1 month in the baseline, treatment, and follow-up years; age 18 or above by the end of the treatment year; have an indication of mental illness in their 4-year medical record; and never received inpatient mental health treatment in the study period.

Community Mental Health Outpatient Treatment

Medical Cost Savings

For Medicaid-only clients, the estimated medical savings for clients who receive outpatient mental health treatment based on the conditional differences-in-differences model is \$102 to \$109 pmpm in the first follow-up year, depending on the year of treatment. For clients receiving outpatient treatment in FY 2000, the savings estimate increases to \$126 pmpm in the second follow-up year. These estimates are statistically significant, as shown in Table 6. Detailed regression results are contained in Appendix C.

For GA-U clients, the estimated savings in the first follow-up year range from \$174 to \$255 pmpm, depending on the treatment year.¹⁶ Both estimates are statistically significant. For GA-U clients receiving outpatient treatment in FY 2000, the estimated savings falls to \$81 pmpm in FY 2002, and the estimate is not statistically significant. Fewer clients are used in the GA-U analysis than in the Medicaid-only analysis, which may help to account for the lower degree of precision in the estimated treatment effect for the GA-U population.

¹⁶ GA-U spells tend to be of limited duration. Because clients frequently transition from GA-U to other medical assistance eligibility categories, for GA-U clients we calculated per member per month medical expenditures using all months in which the client was eligible for medical assistance in any eligibility category in the baseline and follow-up years.

Table 6. Estimated Savings in Medical Costs per Member per Month (pmpm)
Associated with Outpatient Mental Health Treatment

Eligibility Group	Treatment Year	Follow-up Year	Medical Cost Savings (pmpm)	Standard Error	p-Value
Medicaid-only	2000	Year 1	-\$109 *	\$46	0.019
	2000	Year 2	-\$126 **	\$45	0.005
	2001	Year 1	-\$102 *	\$47	0.030
GA-U	2000	Year 1	-\$255 *	\$118	0.030
	2000	Year 2	-\$81	\$71	0.254
	2001	Year 1	-\$174 *	\$70	0.012

* Statistically significant at the .05 level

** Statistically significant at the .01 level

The cost for providing community mental health outpatient treatment averaged about \$250 pmpm for Medicaid-only clients. Therefore, the medical cost savings of just over \$100 in each of the first years of follow-up offset the cost of mental health care by just over 40 percent. Since medical cost savings rose to over \$126 in the second year of follow-up, these savings offset the cost of outpatient mental health care by 50 percent. Thus, for Medicaid-only clients the estimated savings in medical costs offset the cost for outpatient mental health treatment by over 40 percent in the first year of follow-up and 50 percent in the second year.¹⁷

Outpatient mental health treatment cost \$180 pmpm for GA-U clients. As a result, the medical savings of \$255 and \$174 offset the cost of mental health care by either 142 percent, which represents a net reduction in total expenditures, or by 97 percent, such that reductions in medical costs almost completely cover the cost of mental health treatment. Since the medical savings estimate was not statistically significant for GA-U clients in the second year of follow-up, it is possible that the medical cost savings for these clients may not persist over time. Additional analyses with more years of data could help establish long-term cost offsets.

¹⁷ Note that the cost offset estimates include the effect of differences in the cost of psychotropic medications used by treated and untreated clients. Clients receiving outpatient mental health treatment are more likely than untreated clients to be using psychotropic medication (see Table 7). Thus, if we excluded psychotropic medication costs from the calculation, the estimated medical cost offsets might be **larger** than the estimates reported here.

Table 7. Use of Psychotropic Medication by Mental Illness Disorder
 Clients who Received Outpatient Mental Health Treatment versus Untreated Clients
 Medicaid-only Clients, FY 2000

Mental Illness Disorder	% with Anti-depressant or Anti-anxiety Rx		% with Anti-psychotic or Anti-mania Rx	
	Treated Clients	Untreated Clients	Treated Clients	Untreated Clients
Psychotic	64%	51%	86%	36%
Mania & Bipolar	77%	64%	61%	34%
Depression	87%	76%	32%	6%
Alcohol or Drug Related	77%	48%	35%	3%
Neurotic, Personality, ADD	80%	57%	41%	7%
Adjustment & Stress	84%	69%	31%	5%
Dementia & Organic	78%	50%	47%	9%

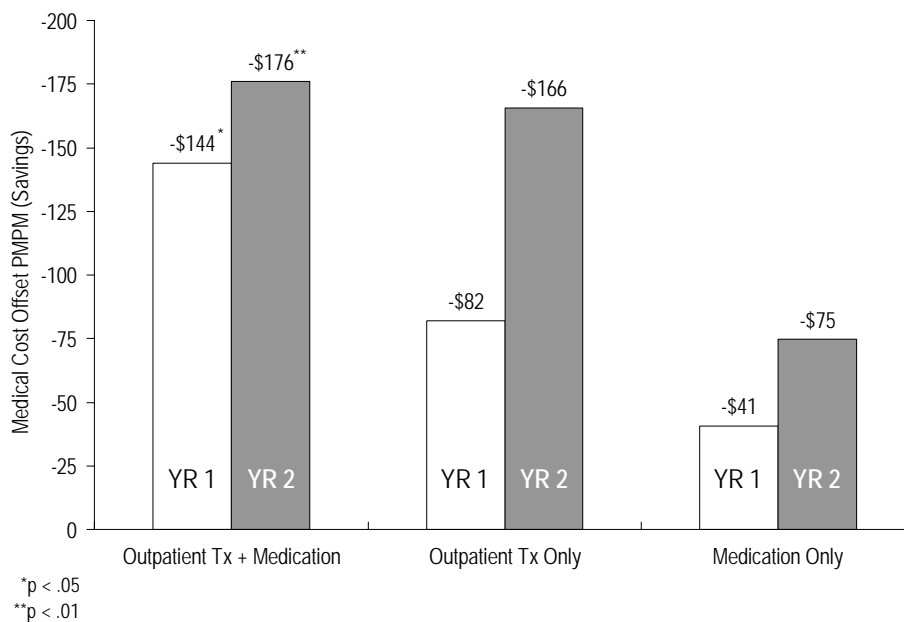
Effects of Outpatient Treatment Versus Psychotropic Medication Alone

Significant medical cost offsets were found even though most clients who did not receive outpatient treatment within the community mental health system (i.e., the untreated clients used as a base of comparison) were prescribed psychotropic medication (primarily anti-depressants). Between 48 and 76 percent of the Medicaid-only clients in the so-called “untreated” comparison group were prescribed anti-depressant or anti-anxiety medication in FY 2000, with the proportion varying depending on the type of mental illness (see Table 7). In addition, 36 percent of the psychotic clients in the comparison group and 34 percent of those with bipolar disorders received anti-psychotic or anti-mania medication in FY 2000.

To distinguish the effect of outpatient treatment from the effect of psychotropic medications, we divided the treatment and comparison clients into two groups based on whether they received psychotropic medication in FY 2000. We then estimated three separate “treatment” effects (relative to clients who received neither outpatient treatment nor psychotropic medication):

1. The effect of **outpatient treatment with medication**,
2. The effect of **outpatient treatment without medication**, and
3. The effect of **medication without outpatient treatment**.

Figure 2: Medical Cost Savings: Outpatient Treatment vs. Psychotropic Medication
 Medicaid-only Clients, FY 2000 Treatment Year, Follow-up Years 1 and 2
 Savings Relative to Clients Receiving Neither Outpatient Tx Nor Psychotropic Rx



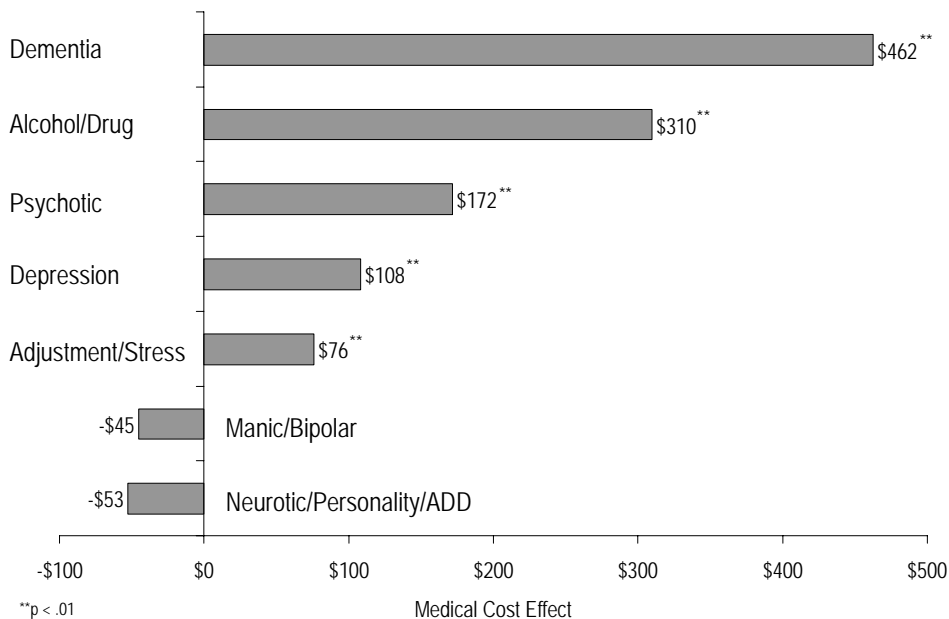
Medical costs for Medicaid-only clients who received both community mental health outpatient treatment and psychotropic medication were significantly lower than medical costs for clients who received neither outpatient treatment nor psychotropic medication (Figure 2). Medical savings equaled \$144 in the first follow-up year and \$176 pmpm in the second follow-up year.

In contrast, when Medicaid-only clients who received psychotropic medications without any outpatient treatment were compared to clients with mental illness who received neither outpatient treatment nor psychotropic medication, no statistically significant cost savings were found. Thus, outpatient mental health treatment appears to have a beneficial effect in reducing medical costs, while psychotropic medication without outpatient treatment does not appear to reduce medical costs.

Because the vast majority of outpatient treatment clients receive some form of psychotropic medication, the “outpatient treatment only” group is quite small relative to the other two groups examined here.¹⁸ As a consequence, although the estimated cost offsets associated with “outpatient treatment only” are relatively large (\$82 and \$166 pmpm in the first and second follow-up years, respectively), the savings are less precisely estimated and are not statistically significant.

¹⁸ Specifically, there were 901 “outpatient treatment only” clients, compared to 7,028 “outpatient treatment plus medication” and 7,496 “medication only” clients in FY 2000.

Figure 3. Medical Cost Effects by Mental Illness Diagnosis
 Medicaid-only Clients with Outpatient Treatment in FY2000, Year One Follow-up

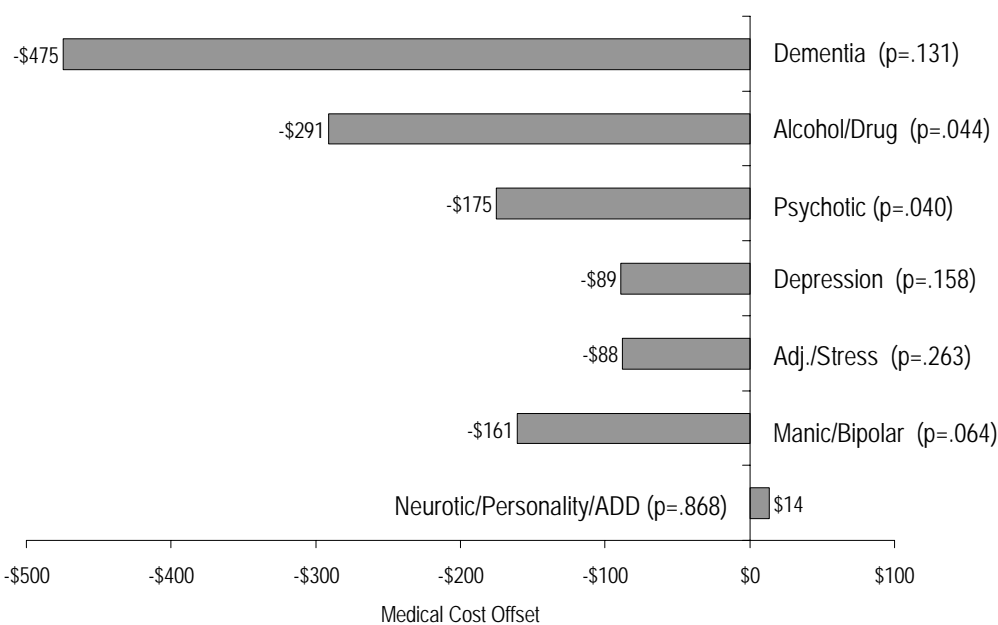


Effects of Mental Illness on Medical Costs

Medical costs vary according to the type of mental illness clients have, independently of their mental health treatment status. Among Medicaid-only clients with at least one mental illness diagnosis, those with dementia and organic disorders experience the largest increases in medical costs – an additional +\$462 per member per month (see Figure 3).¹⁹ Higher statistically significant medical costs were also found for clients with alcohol or drug disorders (+\$310 pmpm), psychotic disorders (+\$172 pmpm), depression (+\$108 pmpm), and adjustment/stress disorders (+\$76 pmpm). Medical costs were not significantly higher among clients in the two remaining mental illness categories – bipolar disorders or neurotic, personality, or attention deficit disorders.

¹⁹ The results presented in Figure 2 were derived from the standard regression model for the Medicaid-only eligibility group using the FY 2000 treatment year and the FY 2001 follow-up year. The model included controls for age, gender, baseline year CDPS and Medicaid-Rx risk adjustment scores, receipt of DASA treatment in FY 2000, and receipt of outpatient mental health treatment in FY 2000.

Figure 4. Medical Cost Savings Associated with Outpatient Mental Health Treatment by Mental Illness Diagnosis
Medicaid-only Clients, FY 2000 Treatment Year, Year 1 Follow-up

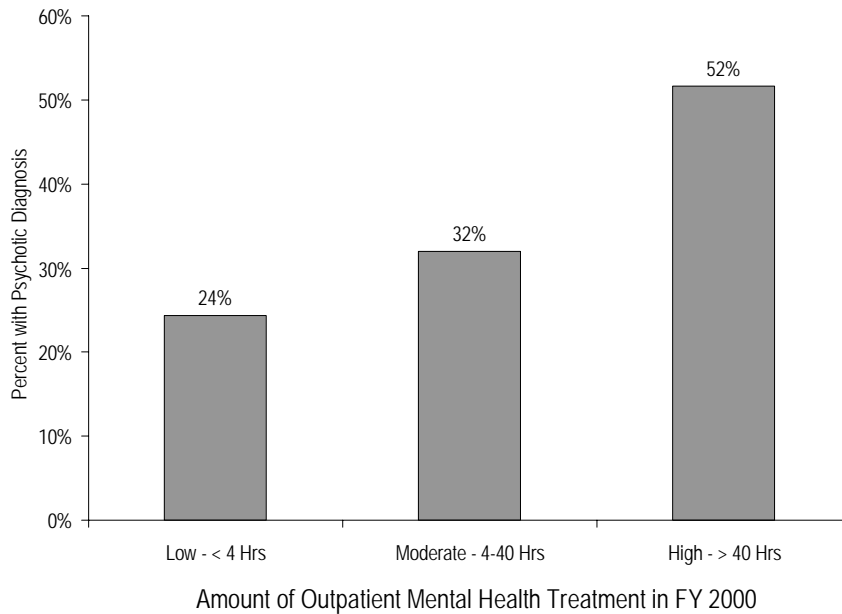


Medical Cost Savings Vary by Mental Illness Condition

By using the conditional difference-in-differences regression model separately for each mental illness category, it was possible to estimate medical cost savings associated with mental health treatment by type of mental diagnosis (see Figure 4). Note that clients with multiple mental illness disorders appear in the analysis for each condition present in their mental illness profile. In other words, clients were **not unduplicated** into a single mental illness category.

It is reasonable to expect the potential for savings to be greatest for the treatment of mental illness conditions that increase medical costs the most. Therefore it is not surprising that the three conditions associated with the largest increases in medical costs—dementia, alcohol/drug, and psychotic disorders—are associated with the largest medical cost offsets when the client receives mental health treatment, with savings of \$475, \$291, and \$175 per member per month, respectively. For most mental illness diagnoses, the medical cost savings associated with outpatient mental health treatment is roughly equal in magnitude to the increase in medical cost associated with the condition. The one exception to this is for those with mania or bipolar disorder. This mental illness condition is not associated with higher medical costs in the study population (as shown in Figure 2), but receiving outpatient mental health treatment is associated with a savings of \$161 pmpm in medical costs among clients with this condition.

Figure 5. Prevalence of Psychotic Disorders by Amount of Outpatient Treatment
FY 2000 Medicaid-only Clients



Medical Cost Savings Vary by Amount of Treatment Received

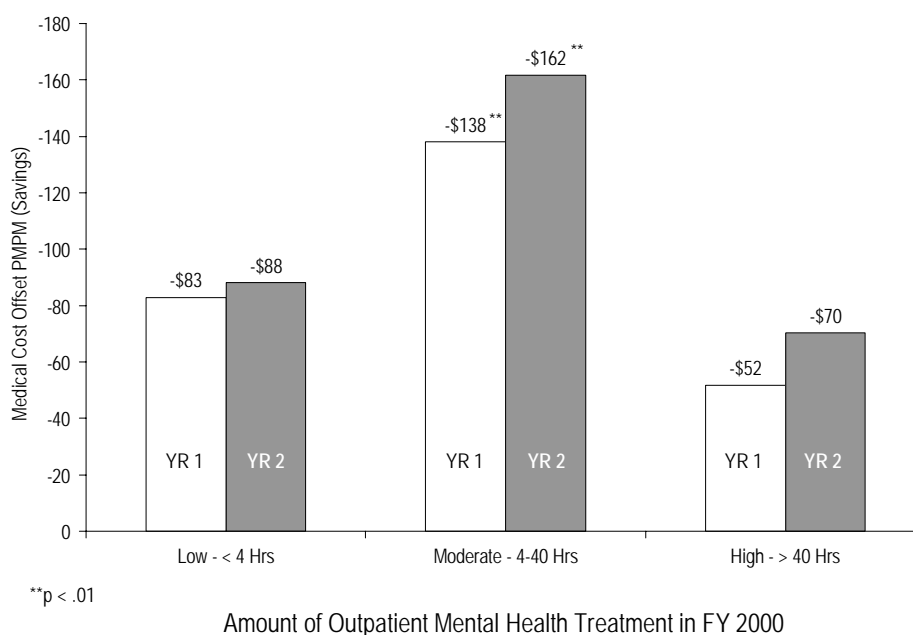
We next examined whether estimates of medical cost savings vary with the quantity of community outpatient services received in the treatment year. Based on input from Mental Health Division research staff, we grouped community outpatient clients into three categories based the volume of outpatient services received in FY 2000:

1. Low outpatient treatment – less than 4 hours in the treatment year (24 percent of clients)
2. Moderate outpatient treatment – 4 to 40 hours in the treatment year (56 percent of clients)
3. High outpatient treatment – more than 40 hours in the treatment year (20 percent of clients)

The prevalence of psychotic disorders varies with the amount of community mental health outpatient treatment received by Medicaid-only clients in FY 2000, as shown in Figure 5. While only one in four of the clients who received low levels of outpatient mental health treatment were diagnosed with psychoses, at least one in two of those who received high levels of outpatient treatment were diagnosed with this very serious form of mental illness. In fact, the prevalence of psychotic disorder among clients receiving high levels of **outpatient** services is similar to the 58 percent rate observed among community **inpatient** clients in FY 2000.

Intensive outpatient treatment is sometimes used as a substitute for inpatient services, either due to inpatient capacity constraints or as a planned alternative to inpatient care. Thus, clients with many hours of outpatient mental health treatment may be more similar to clients who receive inpatient mental health treatment in terms of the severity of their mental illness.

Figure 6. Medical Cost Savings by Amount of Outpatient Treatment
Medicaid-only Clients, Treatment Year FY 2000, Follow-up Years 1 and 2



Using Medicaid-only clients who received outpatient mental health treatment in FY 2000 as a representative example, medical cost savings associated with different amounts of outpatient treatment were examined (see Figure 6). Medical costs were reduced by statistically significant amounts equal to \$138 and \$162 pmpm in the first and second years of follow-up, respectively, among clients who received moderate amounts of outpatient services (4 to 40 hours). Clients who received the fewest hours of treatment evidenced lower and non-significant estimates of medical cost savings (\$83 and \$88), and those who received the most hours had even lower, non-significant savings estimates (\$52 and \$70).

Combined with the earlier information about the higher prevalence of psychoses among the clients who received the greatest amount of outpatient treatment, this finding suggests that it may not be appropriate to compare high-volume outpatient clients to untreated clients with **any** mental illness disorder. Specifically, it may be more appropriate to compare clients receiving high levels of outpatient treatment to untreated clients with psychotic disorders. We address this issue directly in the next section.

Inpatient and Intensive Outpatient Mental Health Treatment

In this section we examine the relationship between inpatient and intensive outpatient treatment and medical costs, where inpatient treatment is defined as stays in a community psychiatric facility or a state mental hospital, and intensive outpatient treatment is defined as receipt of more than 40 hours of outpatient services in the treatment year. We focus on Medicaid-only clients because the small number of GA-U clients in this group limits our ability to make precise cost offset estimates.

The following criteria were used to define the treatment and comparison groups:

1. Clients must be eligible for medical assistance for at least 1 month in the baseline, treatment, and follow-up years
2. Clients must be age 18 or above by the end of the treatment year
3. Clients must have an indication of mental illness in their four-year medical record
4. Clients meeting conditions #1-3 and receiving inpatient or intensive outpatient mental health services in the treatment year form the **treatment group**
5. Clients meeting conditions #1-3 and **never** receiving any inpatient or outpatient treatment in the four-year study period form the **untreated comparison group**

Because inpatient and intensive outpatient clients have extremely high rates of severe mental illness (particularly psychotic disorders) compared to untreated clients with a mental illness diagnosis in their medical record, we also estimated models that used the following alternatives for criterion 3:

- 3a. Clients must have a psychotic disorder diagnosis in their four-year medical record,
OR
- 3b. Clients must have a psychotic disorder diagnosis and at least one other mental illness disorder in their four-year medical record.

Table 8. Number of Clients in Inpatient and Intensive Outpatient Treatment and Comparison Groups^a
by Mental Illness Criterion, Treatment Year, and Follow-up Year
Medicaid-only Clients

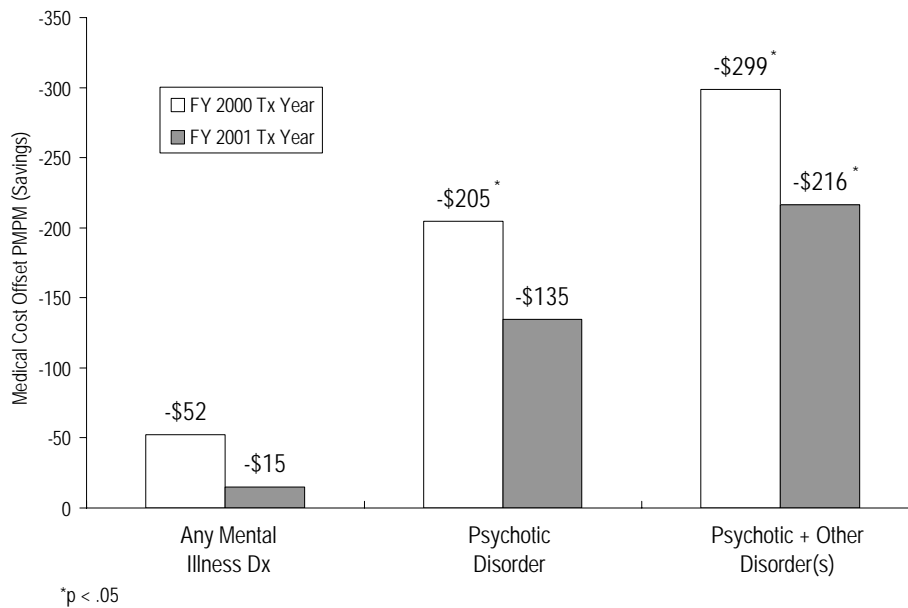
Mental Illness Criterion	Treatment Year	Follow-up Year	Number of Treated Clients	Number of Untreated Clients
Any Mental Illness Diagnoses	2000	Year 1 - 2001	4,366	12,649
	2000	Year 2 - 2002	3,816	11,277
Psychotic Disorder	2001	Year 1 - 2002	4,383	13,319
	2000	Year 1 - 2001	2,742	1,057
	2000	Year 2 - 2002	2,459	960
Psychotic Disorder + Other Disorder(s)	2001	Year 1 - 2002	2,722	1,082
	2000	Year 1 - 2001	2,335	619
	2000	Year 2 - 2002	2,083	553
	2001	Year 1 - 2002	2,338	622

^a Clients who were eligible for medical assistance for at least 1 month in the baseline, treatment, and follow-up years; age 18 or above by the end of the treatment year; and met the specified mental illness condition.

Clients Receiving Inpatient and Intensive Outpatient Treatment

The number of clients who met the criteria for selection to be used in analyses of the effects of inpatient and intensive outpatient mental health treatment is shown in Table 8 for the separate treatment and follow-up periods. Clients with any form of mental illness numbered between 3,816 and 4,383 in the treated category and 11,277 to 13,319 in the untreated comparison group, depending on the treatment and follow-up years. Between 2,459 and 2,742 clients with diagnoses of psychotic disorder were used in the regression models, which included 376 to 407 with **only** a psychosis diagnosis in their medical records plus 2,083 to 2,338 with psychosis and at least one other mental illness diagnosis. The number of clients with diagnoses of psychosis who remained untreated was around 1,000 for the overall group and around 550 to 620 for those diagnosed with psychosis and at least one other mental disorder.

Figure 7. Medical Cost Savings from Inpatient and Intensive Outpatient Treatment
 Clients with Any Mental Illness or with Psychotic Disorders
 Medicaid-only Clients, Treatment Years FY 2000 and 2001, Follow-up Year 1



Medical Cost Savings by Mental Illness Type

When the clients with any mental disorder were considered, no medical cost savings were found to be associated with inpatient or intensive outpatient mental health treatment. Since these more intensive forms of mental health treatment tend to be used for clients with more severe disorders, the analyses were refined by restricting the treatment and comparison groups to clients with a psychotic disorder or to those with a psychotic disorder and at least one other mental illness disorder. Statistically significant medical cost savings were found in the first follow-up year for each group (see Figure 7). For the slightly broader group of clients with a psychotic disorder, the savings equaled \$205 and \$135, depending on the treatment year. For clients who had a psychotic disorder and at least one other mental disorder diagnosed, the savings in medical costs were even higher: \$299 and \$216 in the two separate treatment years. The medical savings, however, did not appear to persist into the second follow-up year for clients treated in FY 2000 (not shown in Figure 7), so it is not clear whether these savings would be expected to continue over time without further analyses.

Cost Offsets

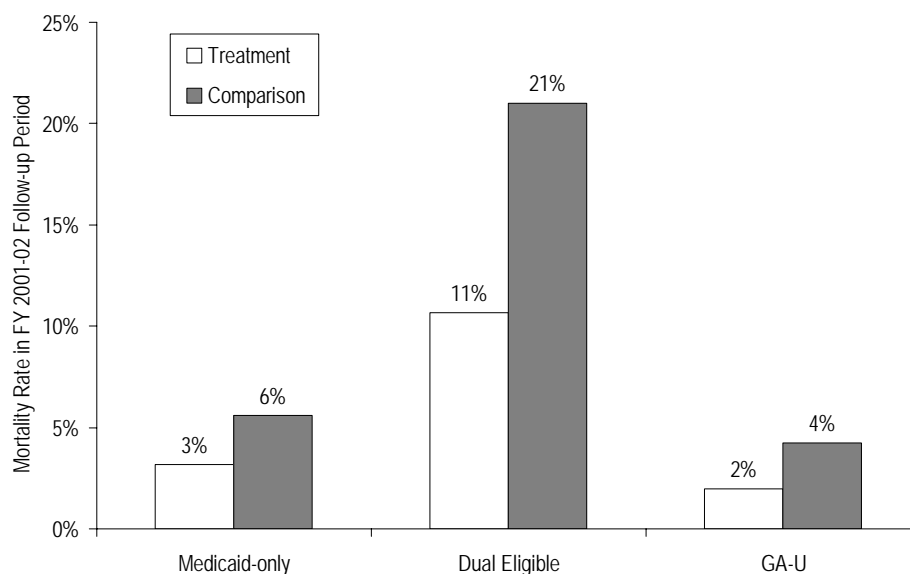
Even though the medical cost savings associated with providing inpatient or intensive outpatient mental health treatment to clients with psychoses are substantial, the monthly costs for providing such treatment averaged \$1,574 to \$1,661 per person per month depending on the year of treatment. As a result, the medical cost savings among clients with psychoses offset only about 13 to 19 percent of the costs to provide inpatient or intensive outpatient mental health treatment.

3 Mortality

In this chapter we analyze the relationship between receipt of **outpatient** mental health treatment and the risk of death. We focus on treatment provided in FY 2000, to allow for two follow-up years to track outcomes. We used the same criteria to define the treatment and comparison groups as in the outpatient treatment medical cost analysis.

Unadjusted mortality rates are 50 percent lower for clients receiving mental health treatment in each eligibility group (see Figure 8). However, comparing unadjusted mortality rates overstates the relationship between mental health treatment and mortality because it does not control for other differences between the treatment and comparison groups (e.g., age) that are strongly related to mortality risk. Therefore, we use logistic regression models to estimate the effect of mental health treatment on the risk of death after controlling for differences between the treatment and comparison groups in age, gender, mental illness profile, DASA treatment, baseline medical risk adjustment scores, and baseline long-term care expenditures.²⁰

Figure 8. Unadjusted Mortality Rates
Outpatient Treatment Clients vs Untreated Comparison Group
FY 2000 Treatment Year, FY 2001-02 Follow-up Period



²⁰ Long-term care expenditures include costs for nursing home, adult residential, assisted living, adult family home, and in-home services administered by the Aging and Disability Services Administration. This variable can be interpreted as a proxy for the baseline health status assessment that determines eligibility for long-term care services, and therefore determines long-term care expenditure amounts.

Table 9. Mortality Odds Ratios Associated with Outpatient MH Treatment and Mental Illness Diagnoses
FY 2000 Tx Year, FY 2001-02 Follow-up Period

	Odds Ratio Estimates		
	Medicaid-only	Dual Eligible	GA-U
Received Outpatient Treatment	0.77 **	0.97	0.71 *
Mental Illness Diagnosis			
Psychotic	1.39 **	0.87 *	1.52
Mania & Bipolar	0.81	0.67 **	0.54 *
Depression	0.93	0.77 **	0.78
Alcohol or Drugs	2.64 **	1.06	2.77 **
Neurotic, Personality, ADD	0.63 **	0.79 *	0.92
Adjustment & Stress	0.85 *	0.73 **	0.86
Dementia & Organic	1.77 **	1.42 **	2.76 **
Number of Clients	20,578	19,191	6,837

* Significantly different from 1 at the 5% level

** Significantly different from 1 at the 1% level

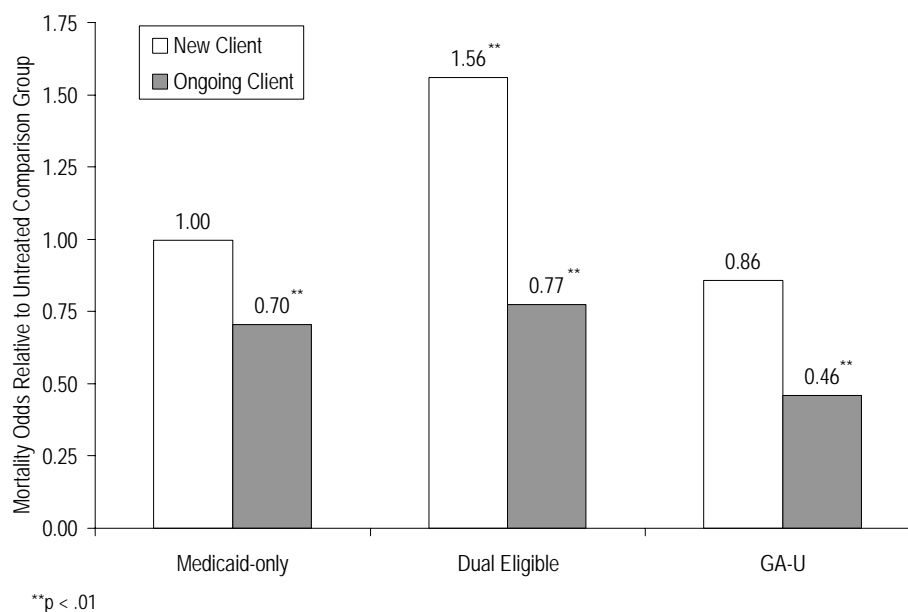
Effect of Outpatient Treatment on Mortality Odds

Table 9 reports the relationship between outpatient mental health treatment and the chance of death in the follow-up period, as measured by odds ratios derived from logistic regression models. The table also reports the estimated relationship between mental illness diagnoses and the odds of death in the follow-up period. Complete regression results are in Appendix D. An odds ratio **less than 1** with respect to a particular characteristic would mean that clients having that characteristic were **less likely** to die than clients without that characteristic. Conversely, an odds ratio greater than 1 would mean that clients with that characteristic were more likely to die in the follow-up period.

For Medicaid-only and GA-U clients, outpatient treatment is associated with a reduced risk of death, even after controlling for age, baseline health status, and other factors. Among Medicaid-only clients, the odds ratio associated with mental health treatment is 0.77, which translates into 23 percent lower odds of death for clients receiving mental health treatment, relative to the comparison group. Among GA-U clients, the odds of death are 29 percent lower for clients receiving treatment. We did not find a statistically significant relationship between outpatient treatment and the risk of death among dual eligible clients.

The dementia and alcohol/drug related disorders are the mental illness conditions most strongly related to an increased risk of death. Among Medicaid-only and GA-U clients, the odds of death are about 2.7 times greater among clients with a alcohol or drug related disorder. All three eligibility groups show an increased odds of death associated with the dementia diagnosis group.

Figure 9. Mortality Odds Ratios, New vs Ongoing Clients
Relative to Untreated Comparison Group
FY 2000 Treatment Year, FY 2001-02 Follow-up Period



New Versus Ongoing Clients: Differences in Mortality Odds

There are important differences in mortality outcomes between new and ongoing outpatient mental health treatment clients. To show this, we separated FY 2000 outpatient treatment clients into two groups:

- **New** clients who did not receive outpatient treatment in the baseline year (FY 1999)
- **Ongoing** clients who received community outpatient treatment in FY 1999

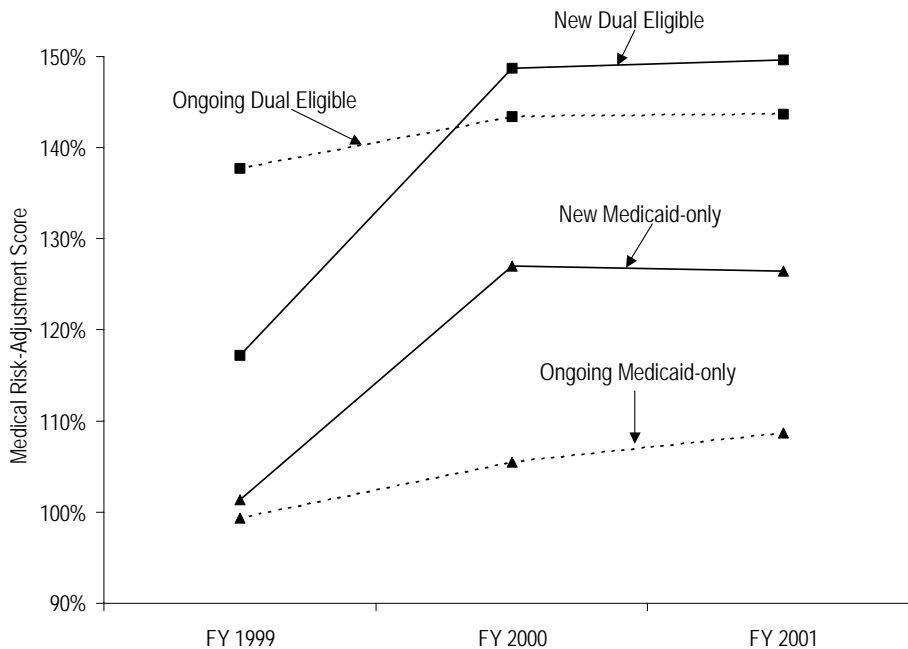
Eighty percent of FY 2000 Medicaid-only and dual eligible clients used in our regression models fall into the “ongoing” group, while 20 percent were “new” clients in FY 2000.

The odds of death for **new** outpatient treatment clients are much **higher** than for ongoing clients, even with controls for age, gender, mental illness profile, DASA treatment, and baseline risk adjustment scores (see Figure 9). Among Medicaid-only clients, the odds of death for ongoing clients are 30 percent less than the odds for new clients. Among dual eligible and GA-U clients, the odds of death for ongoing clients are about half the odds for new clients. These results are statistically significant at the 1 percent level.

New Versus Ongoing Clients: Trends in Health Status

Clients who have recently started outpatient mental health treatment have higher mortality rates because declining health conditions tend to coincide with the beginning of an outpatient treatment episode. This relationship can be illustrated using chronic disease scores that are designed to predict future medical costs based on diagnosis and prescription drug information in the client's medical record. For example, a client with an FY 1999 chronic disease score of 150% is expected to have 1.5 times the medical expenditures in FY 2000 of a client with an FY 1999 score of 100%. The scores are normalized separately for Medicaid-only and dual eligible clients, so that 100% is the average score in each eligibility group.²¹

Figure 10. Trend in Chronic Disease Scores, New vs Ongoing Outpatient Clients
Medical Risk Adjustment Scores, FY 1999 to FY 2001



The trend in chronic disease scores for FY 2000 Medicaid-only and dual eligible outpatient clients verifies that clients tend to experience a deterioration in health conditions in the year they begin a new outpatient mental health treatment episode (see Figure 10). For new Medicaid-only clients the average risk adjustment score jumps from 101% in FY 1999 to 127% in FY 2000. For new dual eligible clients the average risk adjustment score jumps from 117% to 149% over the same period.²²

²¹ The normalization is not restricted to clients with a mental illness disorder.

²² The diagnosis-based CDPS risk adjustment score was used for Medicaid-only clients. The Medicaid-Rx score was used for dual eligible clients because we have complete prescription drug information and incomplete diagnosis information for these clients.

Table 10. Characteristics of New and Ongoing Outpatient Treatment Clients, FY 2000

	Medicaid-only		Dual Eligible	
	Ongoing	New	Ongoing	New
Percent with Diagnosis:				
Psychotic	38%	17%	48%	21%
Mania & Bipolar	27%	18%	20%	13%
Depression	50%	59%	35%	47%
Alcohol or Drugs	22%	33%	10%	13%
Neurotic, Personality, ADD	27%	30%	14%	15%
Adjustment & Stress	32%	41%	19%	26%
Dementia & Organic	7%	9%	14%	28%
Received DASA Tx in FY 2000	9%	14%	5%	6%
Percent Female	57%	58%	50%	59%
Percent Age 65+	2%	3%	22%	41%
Number of Clients	6,337	1,592	6,531	1,457

New Versus Ongoing Clients: Differences in Mental Illness Conditions

New and ongoing clients also differ in terms of their mental illness conditions. New clients are much **less likely** than ongoing clients to have psychotic and mania/bipolar disorders, and **more likely** to have depression and adjustment/stress disorders (see Table 12). Among dual eligible clients receiving outpatient treatment, new clients are twice as likely (28 percent vs. 14 percent) to have a dementia disorder. Not surprisingly, new dual eligible clients are also about twice as likely to be age 65+. Among Medicaid-only clients, new outpatient treatment clients are 50 percent more likely than ongoing clients to have an alcohol or drug disorder (33 percent vs. 22 percent), and are about 50 percent more likely to have received DASA-funded chemical dependency treatment in FY 2000.

4 Criminal Justice Outcomes

Are clients with mental illness disorders more likely than other aged, blind, or disabled clients to be arrested or convicted of a crime? Among clients with a mental illness, is there a relationship between receipt of outpatient mental health treatment and the chance of being arrested or convicted of a crime? This chapter addresses these two questions.

Effects of Mental Illness on the Odds of Arrest or Conviction

Table 13 reports odds ratio estimates of the relationship between mental illness disorders and the chance of arrest or conviction. The results are for clients served in FY 2000, with FY 2001 and 2002 used as the follow-up period for measuring arrest or conviction outcomes. Unlike previous analyses, the population is not restricted to clients with a mental disorder because we are interested in identifying the relationship between mental illness and the odds of arrest or conviction among the full population of adult aged, blind, and disabled clients. Age, gender, and baseline (FY 1999) risk adjustment scores were used as control variables.²³

Table 11. Arrest and Conviction Odds Ratios Associated with Mental Illness Disorders
FY 2000 Aged, Blind, or Disabled Clients with FY 2001-02 Follow-up Period

Mental Illness Disorder	Odds Ratio Estimates		
	Medicaid-only	Dual Eligible	GA-U
Arrested in FY 2001-02			
Psychotic	0.99	1.10	0.90
Mania & Bipolar	1.32 **	1.58 **	1.07
Depression	1.17 **	1.39 **	0.94
Alcohol or Drug Related	4.99 **	5.76 **	2.89 **
Neurotic, Personality, ADD	1.15 **	1.59 **	1.09
Adjustment & Stress	1.15 **	1.16 *	1.03
Dementia & Organic	0.97	0.79 *	0.95
Convicted in FY 2001-02			
Psychotic	0.93	0.84 *	2.04 **
Mania & Bipolar	1.16 **	1.41 **	1.29 *
Depression	1.06	1.35 **	1.05
Alcohol or Drug Related	5.09 **	6.24 **	2.68 **
Neurotic, Personality, ADD	1.17 **	1.43 **	1.30 *
Adjustment & Stress	1.10 *	1.17 *	0.94
Dementia & Organic	0.82 **	0.61 **	0.83
Number of Clients	82,416	83,263	20,254

* Statistically significant difference from 1 at the 5% level

** Statistically significant difference from 1 at the 1% level

²³ The effects associated with these variables work in the expected direction and are not reported. Arrest and conviction odds are higher among young adults, among males, and among clients with less severe chronic physical conditions.

An odds ratio **less than 1** with respect to a particular diagnosis would mean that clients having that diagnosis are **less likely** to be arrested or convicted than clients without that diagnosis. Conversely, an odds ratio greater than 1 would mean that clients having that diagnosis are more likely to be arrested or convicted.

The main findings from Table 13 are summarized below:

- There is an extremely strong relationship between alcohol or drug related diagnoses and the odds of arrest or conviction. The odds ratios for this diagnosis group are about 5 to 1 for Medicaid only clients, 6 to 1 for dual eligible clients, and almost 3 to 1 for GA-U clients. These dwarf the odds ratios for other mental illness conditions.
- The mania and bipolar disorder group and the neurotic, personality, and ADD disorder group are associated with higher likelihood of arrest or conviction (i.e., odds ratios are generally greater than 1 and statistically significant).
- Depression and adjustment/stress disorders tend to be associated with higher odds of arrest or conviction among Medicaid-only and dual eligible clients. However, among GA-U clients no relationship was found between these conditions and the chance of arrest or conviction.
- Psychotic disorders are not associated with higher odds of arrest or conviction, except among GA-U clients where there is an effect on the odds of conviction.
- Dementia and organic disorders tend to be associated with lower odds of arrest or conviction, particularly among dual eligible clients.

Outpatient Mental Health Treatment and Criminal Justice Outcomes

We next examine the relationship between receipt of outpatient mental health treatment and arrest and conviction outcomes. We focus on aged, blind, and disabled clients served in FY 2000 to allow for two years for tracking outcomes. Treatment and comparison groups were selected using the same criteria as in the medical cost and mortality analyses, except that we required eligibility for medical assistance of at least 1 month only in the treatment year (FY 2000). We did not require eligibility in FY 1999 and FY 2001, as in other analyses, because this would tend to exclude clients who were not eligible for medical assistance due to incarceration in the baseline or follow-up periods.

We used logistic regression models to analyze the effect of mental health treatment on **recidivism** rates while controlling for differences between the treatment and comparison groups in age, gender, mental illness profile, DASA treatment, and baseline risk adjustment scores. Analyses were limited to clients who had a record of an arrest or a conviction in FY 1998 or 1999 and examined the effect of receiving outpatient treatment in FY 2000 on the likelihood of re-arrest or re-conviction in FY 2001 or 2002.²⁴

Five of the six models produced an odds ratio estimate slightly greater than 1 (implying that treatment was associated with an increased risk of arrest or conviction), but none of these

²⁴ More specifically, analyses of the effect of treatment on re-arrest were limited to clients with a prior arrest in 1998 or 1999, and analyses of the effect on re-conviction were limited to clients with a prior conviction in that two-year period.

estimates were statistically significant (see Table 14). Only in the case of arrests of dual eligible clients is outpatient treatment associated with reduced odds of recidivism. Complete estimation results are reported in Appendix E.

Table 12. Arrest and Conviction Recidivism Odds Ratios
Associated with Outpatient Mental Health Treatment
FY 2000 Tx Year, FY 2001-02 Follow-up Period

	Odds Ratio Estimates		
	Medicaid-only	Dual Eligible	GA-U
Arrest			
Outpatient Treatment Odds Ratio	1.15	0.68 *	1.16
Number of Clients	2,984	1,098	1,710
Conviction			
Outpatient Treatment Odds Ratio	1.09	1.15	1.34
Number of Clients	2,760	803	424

* Significantly different from 1 at the 5% level

5 Summary and Conclusions

Medical Care Costs

Publicly funded mental health treatment is associated with lower medical costs. For Medicaid-only clients, medical cost savings increased from just over \$100 per member per month (pmpm) in the first year of follow-up to \$126 pmpm in the second follow-up year. The savings offset 41 to 50 percent of the cost for providing the outpatient mental health care. Among GA-U clients, medical costs were reduced by \$255 and \$174 per person per month in the year following community mental health services provided in FY 2000 and 2001, respectively. Since community mental health treatment cost approximately \$180 pmpm for GA-U clients, the medical savings more than offset the cost of the mental health care or nearly did so, depending on the year of treatment.

Many of the clients with mental illness diagnoses in their medical records who did not receive treatment through the mental health system were prescribed medications (e.g., anti-depressants, anti-psychotics, anti-mania drugs) used to treat certain mental health problems. Medication provided without outpatient therapy, however, was not found to be effective in reducing costs for other forms of medical treatment. Medical costs of Medicaid-only clients who received outpatient mental health treatment declined \$144 pmpm in the first year after treatment and \$176 pmpm in the second year compared to the change in costs among clients with mental illness who received neither psychotropic medication nor outpatient treatment. In contrast, medical costs did not decline significantly among clients who received only psychotropic medication compared to costs for the medical care of those who received neither medication nor outpatient treatment.

Medical cost reductions associated with receiving community outpatient mental health treatment varied by the type of mental illness diagnosis among Medicaid-only clients. Cost reductions occurred for clients with alcohol or drug related diagnoses (\$291 pmpm) and psychosis (\$175 pmpm). Medical cost savings of over \$100 per member per month that approached statistical significance were also found for clients with bipolar disorders (\$161).

The amount of community mental health treatment accounted for different degrees of medical cost savings. Savings ranged from \$138 to \$162 pmpm in the first and second follow-up years, respectively, among Medicaid-only clients who received moderate amounts of treatment (between four and 40 hours in a year) and who accounted for over half of the clients receiving outpatient mental health care. Savings were lower and not significant among clients who received less than four hours of outpatient treatment (\$83 to \$88) or more than 40 hours in a year (\$52 to \$70).

Inpatient mental health treatment or intensive outpatient treatment resulted in medical cost savings for clients with a psychotic disorder but not those with less serious mental illnesses. For psychotic clients who were treated in either community psychiatric hospitals or a state hospital or who received more than 40 hours of outpatient mental health care in a year, the medical cost savings were \$205 and \$135 in the first year of follow up, depending on the year of treatment.

For psychotic clients who also had some other mental illness diagnosis, the medical savings were even greater: \$298 and \$216 pmpm in the first year of follow-up (depending on the year of treatment). These higher medical cost savings offset 13 to 19 percent of the costs to provide inpatient or intensive outpatient mental health treatment, which averaged \$1,574 to \$1,661 per person per month depending on the year of treatment.

Mortality

Receipt of outpatient treatment is associated with reduced odds of death in the two-year follow-up period, with a 23 percent reduction in mortality odds for Medicaid-only clients and a 29 percent reduction for GA-U clients. Clients receiving outpatient mental health care for two years in a row had an even lower risk of death compared to those who began treatment more recently. The risk of death for the ongoing clients compared to the new ones was 30 percent lower among Medicaid-only clients and about 50 percent lower among dual eligible and GA-U clients.

Criminal Justice Outcomes

There is an extremely strong relationship between the presence of an alcohol or drug related diagnosis in a client's medical record and the likelihood the client will be arrested or convicted. Although the relationship is weaker, mania/bipolar disorders and neurotic/personality/ADD disorders also are associated with a higher likelihood of arrest or conviction. Depression and adjustment/stress disorders are associated with higher odds of arrest or conviction among Medicaid-only and dual eligible clients. On the other hand, psychotic disorders generally are not associated with increased risk of arrest or conviction, and dementia and organic disorders tend to be associated with lower odds of arrest or conviction, particularly among dual eligible clients.

No significant relationship was found between criminal justice outcomes and receipt of outpatient mental health treatment.

Directions for Future Research

Clients who have recently started to receive mental health treatment appear to suffer more serious medical problems than those who have received treatment more consistently over time. These differences seem to warrant further investigation to explain the underlying circumstances that precipitate the onset of mental health treatment, worsening chronic disease conditions, and increased risk of death.

The finding that outpatient treatment produces savings while psychotropic medication alone does not may warrant further investigation. By analyzing the effects associated with different types of outpatient treatment (e.g., individual therapy, group therapy, medication management), it may be possible to identify which aspects of outpatient treatment appear to be most effective in reducing medical costs. Additional analysis could also determine whether Mental Health Division clients are more likely than clients receiving medication alone to be receiving care that meets established quality standards for psychotropic medication management.

Finally, the availability of mental illness diagnosis information collected by the Mental Health Division beginning in January 2002 provides an opportunity to refine these analyses. The new diagnosis information will provide a more complete mental illness profile than is available in the medical record. Although the new data will be available only for clients receiving MHD administered services, it may be possible to benchmark mental illness diagnosis data in the medical record to the new MHD data and thereby create a better measure of mental illness conditions for untreated clients from their medical record. Thus it may be possible to leverage the new mental illness diagnosis data to create more accurate mental illness profiles for both treated and untreated clients to improve estimates of the effect of treatment on client outcomes.

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Appendix A: Description of Data Sources

Medicaid Management Information System Extended Database (MMIS). The Medicaid Management Information System is maintained by the Medical Assistance Administration (MAA) and contains detailed information on payments for fee-for-service medical care, including procedure, diagnosis, and prescription drug classification codes. MMIS data were used to identify mental illness diagnoses and psychotropic prescription drug use, and to measure costs for medical care and community psychiatric hospitalizations.

Client Services Database (CSDB). Client Services Database consists of an ongoing record of unduplicated individuals served by the Department of Social and Health Services (DSHS), the services they received, the time periods and locations for those services, and the costs (beginning with FY2001) associated with each service. For this report, CSDB data for FY1999 –FY2002 were used to measure costs for services funded through the Mental Health Division including state hospitalizations, mental health community outpatient services, and certain community psychiatric hospitalizations not captured in MMIS data. Furthermore, the linkage and unduplication of DSHS client identifiers was used as the basis for creating the unduplicated longitudinal research files for this study.

Medical Assistance Eligibility Database. This database is maintained by the Office of Financial Management and contains monthly medical assistance eligibility information. The database was used to determine the eligibility status of each client during each month of the study period.

Washington State Patrol Arrest Records. Washington State Patrol (WSP) receives records of arrests from all jurisdictions across the state where the arrestee is fingerprinted. These are primarily felonies and gross misdemeanors. The records include date of arrest, the charge for which the individual was arrested, and personal identifiers. WSP data were used in analyses of arrests in the chapter on criminal justice outcomes.

Washington State Institute for Public Policy Criminal Recidivism Database. The Washington State Institute for Public Policy (WSIPP) has linked court case data obtained from the Washington State Administrative Office of the Courts (AOC) to create a person-based criminal history database. Conviction records from AOC pertain to all cases filed in each level of the state court system, including Juvenile Courts, District Courts and Superior Courts. The Criminal Recidivism Database, updated quarterly by WSIPP, contains a longitudinal record of case-specific information, such as the date of an offense, the charge, and disposition, which was used in the analyses of convictions by type of offense in the chapter on criminal justice outcomes.

DOH Death Certificate Database. Department of Health (DOH) Center for Health Statistics vital statistics data were used to measure client mortality.

Appendix B: Community Mental Health Hospitalization Identification

Community mental health hospitalizations captured in MMIS-EDB data are identified based on the category of service, the claim input form indicator, and the first five ICD-9-CM diagnosis codes on paid Medicaid claims. **If any of the three conditions** listed below **are true** for a claim, then it is classified as a community mental health hospital cost.

Condition 1

The category of service in the Medicaid Management Information System equals:

- 94 – Inpatient Psychiatric Hospitalization or
- 95 – Involuntary Treatment Act

Condition 2

The claim input form indicator is equal to A, R, S, Q, and the DRG code is in the range from 424-437 or 743-751, where

Claim input form indicators:

- A – DRG Inpatient Outlier
- R – DRG Hospital Claim
- S – Non-DRG Hospital Claim
- Q – Gross Adjustment

DRG code:

- 424 Operating Room Procedures with Principal Diagnosis of Mental Illness
- 425 Acute Adjustment Reaction & Disturbances of Psychosocial Dysfunction
- 426 Depressive Neuroses
- 427 Neuroses Except Depressive
- 428 Disorders of Personality & Impulse Control
- 429 Organic Disturbances & Mental Retardation
- 430 Psychoses
- 431 Childhood Mental Disorders
- 432 Other Diagnoses of Mental Disorders
- 433 Substance Use & Substance Induced Organic Mental Disorders, left against medical advice
- 434 Drug Dependence
- 435 Drug Use Except Dependence
- 436 Alcohol Dependence
- 437 Alcohol Use Except Dependence

- 743 Opioid Abuse or Dependence, left against medical advice

- 744 Opioid Abuse or Dependence with Complications
- 745 Opioid Abuse or Dependence without Complications
- 746 Cocaine or Other Drug Abuse or Dependence, left against medical advice
- 747 Cocaine or Other Drug Abuse or Dependence with Complications
- 748 Cocaine or Other Drug Abuse or Dependence without Complications
- 749 Alcohol Abuse or Dependence, left against medical advice
- 750 Alcohol Abuse or Dependence with Complications
- 751 Alcohol Abuse or Dependence without Complications

Condition 3

- A. The claim input form is a Medicare Crossover Inpatient Claim (code = V) and the second, third, fourth, or fifth diagnosis begins with any one of the following:

- 291 Alcoholic Psychoses
- 292 Drug Psychoses
- 303 Alcohol Dependence Syndrome
- 304 Drug Dependence

OR

- B. The claim input form is a Medicare Crossover Inpatient Claim (code = V) and the primary diagnosis begins with one of the diagnoses in the following list

- 290 Senile/Presenile Psychoses
- 291 Alcoholic Psychoses
- 292 Drug Psychoses
- 293 Transient Organic Mental Disorder
- 294 Other Organic Psychiatric Conditions
- 295 Schizophrenic Disorders
- 296 Affective Psychoses
- 297 Paranoid States
- 298 Other Non-organic Psychoses
- 299 Psychoses of Childhood
- 300 Neurotic Disorders
- 301 Personality Disorders
- 302 Sexual Disorders
- 303 Alcohol Dependence Syndrome
- 304 Drug Dependence
- 305 Nondependent Drug Abuse
- 306 Psychophysiologic Disorders
- 307 Special Symptom Not Elsewhere Classified
- 308 Acute Reaction To Stress
- 309 Adjustment Reaction
- 310 Nonpsychotic Brain Syndrome
- 311 Depressive Disorder Not Elsewhere Classified

- 312 Conduct Disturbance Not Elsewhere Classified
- 313 Emotional Disorders Childhood/Adolescence
- 314 Hyperkinetic Syndrome
- 315 Specific Developmental Delays
- 316 Psychic Factor with Other Disorders
- 317 Mild Mental Retardation
- 319 Mental Retardation Not Otherwise Specified
- 318.0 Moderate Mental Retardation
- 318.1 Severe Mental Retardation
- 318.2 Profound Mental Retardation
- 758.0 Down's Syndrome
- 758.1 Patau's Syndrome
- 758.2 Edwards' Syndrome
- 758.3 Autosomal Deletion Syndrome
- 760.71 Maternal Alcohol Affecting Newborn
- 760.72 Maternal Narcotic Affecting Newborn
- 760.75 Cocaine - Noxious Influencing Fetus
- 779.2 Central Nervous System Dysfunction Syndrome of Newborn
- 779.4 Newborn Drug Reaction/Intoxication
- 779.5 Newborn Drug Withdrawal Syndrome
- 780.1 Hallucinations
- 780.50 Sleep Disturbance Not Otherwise Specified
- 780.52 Insomnia Not Elsewhere Classified
- 780.54 Hypersomnia Not Elsewhere Classified
- 780.55 Irregular Sleep-Wake Rhythm Not Otherwise Specified
- 780.56 Sleep Stage Dysfunctions
- 780.59 Sleep Disturbances Not Elsewhere Classified
- 784.60 Symbolic Dysfunction Not Otherwise Specified
- 784.61 Alexia And Dyslexia
- 784.69 Symbolic Dysfunction Not Elsewhere Classified
- 790.3 Excess Blood-Alcohol Level
- V71.01 Observation-Adult Antisocial Behavior
- V71.02 Observation -Adolescent Antisocial Behavior
- V71.09 Observation-Other Suspected Mental Condition

Appendix C: Medical Cost Regression Results

Table C-1. Medicaid-only Clients

Effect of Outpatient Mental Health Treatment on Change in Medical Costs per Member per Month

	FY 2000 Tx Year Year 1 Follow-up	FY 2000 Tx Year Year 2 Follow-up	FY 2001 Tx Year Year 1 Follow-up
Received Outpatient Treatment	-109 *	-126 **	-102 *
Baseline Year CDPS Score	-434 **	-413 **	-457 **
Baseline Year MRX Score	97 **	33	73 **
Baseline Year Eligibility Months	94 **	107 **	108 **
Follow-up Year Eligibility Months	-45 **	-15	-42 **
Estimated Treatment Probability (Heckman)	690	367	1026 *
Mental Illness Diagnosis Indicators			
Psychotic	-101	5	-299
Mania & Bipolar	-190	-63	-305 *
Depression	30	92	-106
Alcohol or Drugs	95	70	25
Neurotic, Personality, ADD	-83	-54	-51
Adjustment & Stress	27	45	-60
Dementia & Organic	103	54	-279 **
Received DASA Treatment	97	119	108
Demographic Indicators			
Female Age 18-24	Ref.	Ref.	Ref.
Female Age 25-44	-68	-56	-121
Female Age 45-54	215 **	151	152
Female Age 55-64	347 **	214 *	266 **
Female Age 65-74	127	139	185
Female Age 75-84	430	266	262
Female Age 85+	503	407	639
Male Age 18-24	-264 *	-203	-466 **
Male Age 25-44	-216 **	-159 *	-311 **
Male Age 45-54	-83	-70	-86
Male Age 55-64	334 **	298 **	353 **
Male Age 65-74	204	179	123
Male Age 75-84	245	429	527
Male Age 85+	421	268	455
Mean of Dependent Variable	86	132	35
R-Square	0.036	0.038	0.041
Number of Clients	20,578	18,302	21,977

* Statistically significant at the 5% level

** Statistically significant at the 1% level

Table C-2. GA-U Clients
Effect of Outpatient Mental Health Treatment on Change in Medical Costs per Member per Month

	FY 2000 Tx Year Year 1 Follow-up	FY 2000 Tx Year Year 2 Follow-up	FY 2001 Tx Year Year 1 Follow-up
Received Outpatient Treatment	-255 *	-81	-174 *
Baseline Year CDPS Score	-386 **	-205 **	-382 **
Baseline Year MRX Score	115	-20	-89
Baseline Medicaid-only Eligibility Months	21	18	25 *
Baseline Dual Eligible Eligibility Months	11	12	45
Baseline GA-U Eligibility Months	39 *	8	31 **
Baseline Other Medical Assistance Eligibility Months	17	12	14
Follow-up Medicaid-only Eligibility Months	-31 *	0	22 *
Follow-up Dual Eligible Eligibility Months	-61	-47 **	3
Follow-up GAU Eligibility Months	-54 **	-24	-1
Follow-up Other Medical Assistance Eligibility Months	-43	-17	0
Estimated Treatment Probability (Heckman)	339	17	-110
Mental Illness Diagnosis Indicators			
Psychotic	325	313 **	105
Mania & Bipolar	22	13	96
Depression	120	134	123
Alcohol or Drugs	-65	149 **	28
Neurotic, Personality, ADD	-147	-3	143
Adjustment & Stress	-78	86	81
Dementia & Organic	401	421 **	304
Received DASA Treatment	372 **	-86	-56
Demographic Indicators			
Female Age 18-24	Ref.	Ref.	Ref.
Female Age 25-44	140	68	138
Female Age 45-54	711 **	289 *	145
Female Age 55-64	227	96	-73
Female Age 65+	54	-55	N/A
Male Age 18-24	445	-96	-310
Male Age 25-44	-33	-17	-60
Male Age 45-54	241	291 *	235
Male Age 55-64	273	-292	188
Male Age 65+	23	-127	N/A
Mean of Dependent Variable	187	184	142
R-Square	0.026	0.036	0.035
Number of Clients	3,629	3,063	3,862

* Statistically significant at the 5% level

** Statistically significant at the 1% level

Appendix D: Mortality Logistic Regression Results

Table D-1. Mortality Odds Ratios
Effect of Outpatient Mental Health Treatment on Mortality Odds
FY 2000 Treatment Year, FY 2001-02 Follow-up Period

	Odds Ratio Estimates		
	Medicaid-only	Dual Eligible	GA-U
Received Outpatient Treatment	0.77 **	0.97	0.71 *
Baseline Year CDPS Score	1.31 **	1.29 **	1.13
Baseline Year MRX Score	1.10 **	1.29 **	1.00
Baseline Year Long-term Care Expenditures	1.04 **	1.22 **	N/A
Mental Illness Diagnosis Indicators			
Psychotic	1.39 **	0.87 *	1.52
Mania & Bipolar	0.81	0.67 **	0.54 *
Depression	0.93	0.77 **	0.78
Alcohol or Drugs	2.64 **	1.06	2.77 **
Neurotic, Personality, ADD	0.63 **	0.79 **	0.92
Adjustment & Stress	0.85 *	0.73 **	0.86
Dementia & Organic	1.77 **	1.42 **	2.76 **
Received DASA Treatment	0.62 **	1.05	1.16
Demographic Indicators			
Female Age 18-24	ref.	ref.	ref.
Female Age 25-44	0.48 **	0.11 **	0.55
Female Age 45-54	0.94	0.24 **	1.70
Female Age 55-64	1.55 **	0.39 **	1.21
Female Age 65-74	1.14	0.90	N/A
Female Age 75-84	2.76 **	1.58 **	N/A
Female Age 85+	5.20 **	3.43 **	N/A
Male Age 18-24	0.31 **	0.14 **	0.17
Male Age 25-44	0.51 **	0.15 **	0.97
Male Age 45-54	1.07	0.36 **	1.59
Male Age 55-64	1.74 **	0.60 **	3.03 **
Male Age 65-74	1.94 **	1.45 **	N/A
Male Age 75-84	4.50 **	2.23 **	N/A
Male Age 85+	3.55 *	4.79 **	N/A
Mean of Dependent Variable	0.047	0.167	0.033
Number of Clients	20,578	19,191	6,837

* Statistically significant at the 5% level

** Statistically significant at the 1% level

Appendix E: Arrest and Conviction Recidivism Logistic Regression Results

Table E-1. Arrest Recidivism Odds Ratios
 Effect of Outpatient Mental Health Treatment on Arrest Recidivism Odds
 FY 2000 Treatment Year, FY 2001-02 Follow-up Period

	Odds Ratio Estimates		
	Medicaid-only	Dual Eligible	GA-U
Received Outpatient Treatment	1.15	0.68 *	1.16
Baseline Year CDPS Score	0.91	1.04	0.91
Baseline Year MRX Score	0.91	0.76 *	0.96
Mental Illness Diagnosis Indicators			
Psychotic	0.77	1.32	1.10
Mania & Bipolar	1.18	2.40 **	0.98
Depression	0.89	1.03	0.93
Alcohol or Drugs	2.30 **	2.61 **	1.97 **
Neurotic, Personality, ADD	1.08	1.26	0.85
Adjustment & Stress	1.06	1.02	0.95
Dementia & Organic	1.15	1.19	0.86
Received DASA Treatment	0.98	0.96	1.03
Demographic Indicators			
Age 18-24	1.61 *	3.44 **	1.31
Age 25-44	1.50 *	1.80 *	1.59 *
Age 45-54	1.04	1.11	0.85
Age 55-64	0.66	0.50	0.69
Age 65+	ref.	ref.	ref.
Male	1.44 **	1.64 **	1.54 **
Female	ref.	ref.	ref.
Mean of Dependent Variable	0.365	0.308	0.454
Number of Clients	2,984	1,098	1,710

* Statistically significant at the 5% level

** Statistically significant at the 1% level

Table E-2. Conviction Recidivism Odds Ratios
 Effect of Outpatient Mental Health Treatment on Conviction Recidivism Odds
 FY 2000 Treatment Year, FY 2001-02 Follow-up Period

	Odds Ratio Estimates		
	Medicaid-only	Dual Eligible	GA-U
Received Outpatient Treatment	1.09	1.15	1.34
Baseline Year CDPS Score	0.89 *	1.17	0.96
Baseline Year MRX Score	0.98	0.78 *	1.22
Mental Illness Diagnosis Indicators			
Psychotic	0.80	1.03	0.94
Mania & Bipolar	1.01	1.21	1.11
Depression	1.00	0.95	0.75
Alcohol or Drugs	2.19 **	2.59 **	1.50
Neurotic, Personality, ADD	1.30	1.32	1.24
Adjustment & Stress	0.95	0.97	0.61
Dementia & Organic	1.02	0.82	0.57
Received DASA Treatment	0.93	0.94	0.85
Demographic Indicators			
Age 18-24	1.44	2.41 *	1.11
Age 25-44	1.26	1.88 *	0.67
Age 45-54	0.72	1.10	0.55
Age 55-64	0.59 *	0.86	0.47
Age 65+	ref.	ref.	ref.
Male	1.62 **	1.35	1.62 *
Female	ref.	ref.	ref.
Mean of Dependent Variable	0.358	0.351	0.342
Number of Clients	2,760	803	424

* Statistically significant at the 5% level

** Statistically significant at the 1% level



Research and Data Analysis Division
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