

Evaluation of Integrated Managed Care for Medicaid Beneficiaries in Southwest Washington: First Year Outcomes

Prepared by DSHS-Research and Data Analysis Division as part of the Washington State Innovation Model Grant evaluation.

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ON APRIL 1, 2016, Clark and Skamania counties became the first region to adopt an integrated managed care (IMC) model through which Medicaid beneficiaries receive physical and behavioral health services through a single integrated managed care plan. The alignment of behavioral and physical health care financing within a single plan is intended to support better coordination of care for beneficiaries with physical and behavioral health comorbidities, increase access to needed services, reduce potentially avoidable health care costs, and improve beneficiary care experiences. State law requires all regions of Washington State to transition to the IMC model by 2020.

This evaluation examines the impact of the transition to IMC on the health and social outcomes of Medicaid beneficiaries in Clark and Skamania counties. Difference-in-difference approaches were used to examine changes in a broad set of health care performance metrics in the first year after implementation of the IMC model (April 1, 2016 to March 31, 2017), relative to beneficiary experience in the prior year. We report findings derived from both simple t-tests and generalized estimating equation (GEE) models that control for the potential confounding effect of regional differences in beneficiary characteristics.

Of the health and social outcome metrics examined, two-thirds showed no significant relative change in Southwest Washington, compared to the balance of state. The outcome measures that had significant differences were mostly positive for the Southwest region, with few statistically significant negative results. For example, mental health treatment penetration, inpatient utilization, and diabetes screening rates for individuals with serious mental illnesses such as schizophrenia or bipolar disorder saw statistically significant favorable improvements in Clark and Skamania counties when compared to the balance of the state. Additional analyses were conducted for subpopulations with serious mental illness and co-occurring mental illness and substance use disorder, with results generally similar to those experienced in the broader Medicaid population.

Background: Integrated Managed Care in Washington

As part of the Healthier Washington Initiative, the state of Washington applied for a State Innovation Model (SIM) grant from the U.S. Centers for Medicare and Medicaid Innovation (CMMI). This multi-year initiative allows states to develop and implement delivery system reform models to lower costs, achieve better quality of care, and improve the health of the population in the state.¹ Washington selected four alternative payment models focused on different aspects of the Washington state health care delivery system to be implemented over the life of the SIM grant (February 2014 through January 2019).² The focus of this evaluation is on Payment Model 1: Integrated Managed Care.³

¹ For more information about the State Innovation Model program, see <https://innovation.cms.gov/initiatives/state-innovations/>

² For more information about Washington's SIM program, see https://www.hca.wa.gov/assets/program/SHCIP_InnovationPlan.pdf

³ For more information about Washington's approach to integrated managed care, see <https://www.hca.wa.gov/about-hca/healthier-washington/regional-resources>.



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Statewide implementation of integrated managed care by 2020 is also required in state law, as directed by the Washington State Legislature through Senate Bill 6312 passed in 2014. We note that throughout the U.S., many states are moving towards integrated managed care (IMC) models in their Medicaid programs.⁴

In non-IMC regions of Washington State, most Medicaid beneficiaries are enrolled with both a behavioral health organization (BHO) and a separate managed care organization (MCO). In these regions, the BHO provides mental health services for persons with serious mental illness, and provides most forms of substance use disorder (SUD) treatment. The separate MCO is responsible for physical health services, mental health services for those with mental health needs but deemed not seriously mentally ill, all psychotropic medications, and most medications to treat SUD (except methadone, which would be accessed through the BHO). Concerns about misalignment of financial incentives and suboptimal coordination of care, particularly for beneficiaries with serious mental illness and/or substance use disorders, were key drivers leading to the implementation of the IMC model. On April 1, 2016, two counties in southwest Washington, Clark and Skamania, moved to an IMC model with all physical and behavioral health services for most Medicaid beneficiaries delivered through a single managed care plan provided through Molina Healthcare of Washington or Community Health Plan of Washington.

We note that at the same time that the IMC model was implemented in the Southwest region, in the balance of the state’s previously separate mental health and substance use disorder delivery systems were aligned into newly created BHOs. Operationally, this meant the alignment of most substance use disorder treatment services under the managed care organizations previously responsible for providing mental health services to persons with serious mental illness (Regional Support Networks).

FIGURE 1.
Washington Counties Participating in Integrated Managed Care in 2016



⁴ Fully Integrated Managed Care National Review, April 2017 (available at: <https://www.hca.wa.gov/assets/program/fimc.nationalreview.pdf>)

Data and Methods

The focus of this evaluation is on differences in outcomes for the early adopter region of integrated managed care (Clark and Skamania counties) compared to the balance of the state. This analysis examines the impact in the first year after moving to IMC on a set of health and social outcomes. Twenty-nine metrics that measure access to care, quality of care, coordination of care, utilization of high intensity services, and social outcomes were included in this analysis. Table 1 contains a crosswalk between the names of the outcome metrics (as stated in the technical specifications) and the description used in subsequent tables.

TABLE 1.
Terms Referenced in Subsequent Tables

	Metric Name	Description
Access	HEDIS-AAP (ages 20-64 only)	Adult Access to Preventative/Ambulatory Care (20-64)
	HEDIS-BCS (females, ages 50-64 only)	Breast Cancer Screening (50-64, F)
	HEDIS-CCS (females, ages 21-64 only)	Cervical Cancer Screening (21-64, F)
	HEDIS-CHL (females, ages 18-24 only)	Chlamydia Screening in Women (18-24, F)
	HEDIS-COL (ages 50-64 only)	Colorectal Cancer Screening (50-64)
	SUPPL-SUD	Substance Use Disorder Treatment Penetration
	SUPPL-MH-B	Mental Health Treatment Penetration
Quality	HEDIS-PCR-MP	Plan All-Cause Readmissions
	PCR-P	Psychiatric Inpatient Readmissions
	HEDIS-CDC-HBA1C	Comprehensive Diabetes Care - Hemoglobin A1c Testing
	HEDIS-AMM-84D	Antidepressant Medication Management (84 days)
	HEDIS-AMM-180D	Antidepressant Medication Management (180 days)
	HEDIS-SPC-PRSCR (males ages 21-64 only, females ages 40-64 only)	Received Statin Therapy (21-64 M/40-64 F)
	HEDIS-SPC-80PCT (males ages 21-64 only, females ages 40-64 only)	Statin Therapy Adherence – 80% (21-64 M/40-64 F)
	HEDIS-SAA	Adherence to Antipsychotics for Persons with Schizophrenia
Coordination	HEDIS-SSD	Diabetes Screening for People with Schizophrenia or Bipolar Disorder
	HEDIS-FUA-7D	Follow-Up after Emergency Department (ED) Visit for Alcohol or Other Drug Dependence (AOD) – Within 7 Days
	HEDIS-FUA-30D	Follow-Up after ED Visit for AOD – Within 30 Days
	HEDIS-FUH-7D	Follow-Up after Hospitalization for Mental Illness – Within 7 Days
	HEDIS-FUH-30D	Follow-Up after Hospitalization for Mental Illness – Within 30 Days
	HEDIS-FUM-7D	Follow-Up after Emergency Department (ED) Visit for Mental Illness – Within 7 Days
	HEDIS-FUM-30D	Follow-Up after ED Visit for Mental Illness – Within 30 Days
Utilization	SUPPL-ED	Emergency Department Utilization
	SUPPL-IP	Inpatient Utilization
	SUPPL-HCBS	Home and Community Based Services Utilization
Social Outcomes	SUPPL-HOME-N	Homeless (Narrow)
	SUPPL-HOME-B	Homeless (Broad)
	SUPPL-EMP	Employed
	SUPPL-ARREST	Arrested

All data is drawn from the Department of Social and Health Service's Integrated Client Database. The ICDB contains data from several state administrative data systems, including the State's ProviderOne MMIS data system that contains Medicaid claims and encounter data (additional information about the data source can be found in the Technical Notes section).

The experience of the Washington Medicaid population between the ages of 18 and 64 is the primary focus of this evaluation.⁵ Separate analyses examined the impact of integration for Medicaid beneficiaries with serious mental illness (SMI) and for those with co-occurring mental illness and substance use disorder (COD). These subpopulations reflect beneficiaries potentially most impacted by integration, as they would be likely to receive behavioral health services through a separate BHO in non-IMC regions and might derive the greatest benefit from alignment of physical and behavioral health care services in a single managed care plan.

The analysis uses two methodological approaches to understand the impact of IMC on each of the three populations. The first approach, a difference-in-difference t-test, compares the change in outcomes in the year before and year after IMC implementation for Clark/Skamania counties with the experience in the balance of the state. The second approach uses generalized estimating equation (GEE) regression models to examine the relative change in outcomes while controlling for potential differences in case mix between Clark/Skamania counties and the balance of the state. In addition, the GEE regression models examined each of the Medicaid populations of interest including and excluding those who were dually eligible for Medicaid and Medicare. Additional information about the methodological approach is available in the Technical Notes section.

Findings

For each Medicaid population, the results of difference-in-difference t-tests and the GEE regression models are reported by metric. Table 2⁶ summarizes the relative change between the IMC region and the balance of the state from the year prior to IMC adoption (April 1, 2015 to March 31, 2016) to the year after IMC adoption (April 1, 2016 to March 31, 2017). A positive (++) or (+) relative change indicates a favorable change in a metric outcome for the IMC region, pre to post implementation, compared to the change in the rest of the state during the pre to post implementation period. A negative (-- or -) relative change indicates an unfavorable change in metric outcome for the IMC region, pre to post implementation, compared to the change in the rest of the state during the same time.

In the table below, a statistically significant relative change at the 95% confidence level is noted as a '++' for a favorable change or a '--' for an unfavorable change. Relative changes with p-values above 0.05 but less than 0.20 are noted as '+' (favorable) and '-' (unfavorable). Results at this lower confidence level are reported to provide a broader perspective on relative changes in beneficiary outcomes in the first year of implementation of the IMC model. Relative changes associated with p-values above 0.20 are indicated with 'ns' to indicate non-significant results.

⁵ Seven metrics require different age group restrictions that are described in the Technical Notes section.

⁶ Sample sizes are not reported in this table. Depending on the metric specifications and the population, sample sizes vary. Appendix Table 1 contains the sample sizes for each analysis.

TABLE 2.

Comparison of Difference-in-Difference t-Tests and GEE Models

++/-- indicates favorable/unfavorable relative change statistically significant at the 95% confidence level

+/- indicates favorable/unfavorable relative change with p-values above 0.05 and less than 0.20

ns indicates non-significant relative changes (p-values greater than 0.20)

		ALL MEDICAID			Medicaid Beneficiaries with . . .					
					SMI			COD		
		Diff-In-Diff	GEE w/ Duals	GEE w/o Duals	Diff-In-Diff	GEE w/ Duals	GEE w/o Duals	Diff-In-Diff	GEE w/ Duals	GEE w/o Duals
Access	Adult Access to Preventative/ Ambulatory Care (20-64)	++	++	++	ns	ns	ns	++	++	++
	Breast Cancer Screening (50-64, F)	-	-	--	ns	ns	--	ns	ns	ns
	Cervical Cancer Screening (21-64, F)	++	++	++	++	++	++	++	++	++
	Chlamydia Screening in Women (18-24, F)	++	++	++	++	++	++	ns	ns	ns
	Colorectal Cancer Screening (50-64)	ns	ns	ns	ns	ns	+	ns	ns	+
	Substance Use Disorder Treatment	++	NULL	NULL	++	NULL	NULL	++	NULL	NULL
	Mental Health Treatment	++	++	++	++	++	++	++	++	++
Quality	Plan All-Cause Readmissions	ns	ns	ns	ns	ns	ns	ns	ns	ns
	Psychiatric Inpatient Readmissions	+	+	ns	ns	+	ns	ns	***	***
	Comprehensive Diabetes Care - Hemoglobin A1c Testing	ns	ns	+	ns	ns	ns	ns	+	+
	Antidepressant Medication Management (84 days)	ns	ns	ns	ns	ns	ns	ns	ns	ns
	Antidepressant Medication Management (180 days)	ns	ns	ns	ns	ns	ns	ns	ns	ns
	Received Statin Therapy (21-64 M/40-64 F)	ns	ns*	ns*	ns	ns*	ns*	ns	+*	+*
	Statin Therapy Adherence – 80% (21-64 M/40-64 F)	ns	+*	+*	ns	+*	++*	ns	++*	+*
	Adherence to Antipsychotics for Persons with Schizophrenia	ns	ns	ns	ns	ns	ns	ns	ns	-
Coordination	Diabetes Screening for People with Schizophrenia or Bipolar Disorder	++	++	++	++	++	++	+	++	++
	Follow-Up after ED Visit for AOD – Within 7 Days	+	++**	++**	++	++	++	++	++	++
	Follow-Up after ED Visit for AOD – Within 30 Days	+	+*	+*	+	+	++	+	+	+
	Follow-Up after Hospitalization for Mental Illness – Within 7 Days	+	+	ns	ns	+	ns	ns	+	ns
	Follow-Up after Hospitalization for Mental Illness – Within 30 Days	ns	ns	ns	ns	ns	ns	ns	ns	ns
	Follow-Up after ED Visit for Mental Illness – Within 7 Days	ns	ns	ns	ns	ns	ns	ns	ns	ns
	Follow-Up after ED Visit for Mental Illness – Within 30 Days	ns	ns	ns	ns	ns	ns	ns	ns	ns
Utilization	Emergency Department Utilization	--	ns	ns	--	ns	ns	--	ns	ns
	Inpatient Services Utilization	++	ns	ns	++	++	++	++	+	+
	Home and Community Based Services Utilization	ns	ns	ns	+	-	ns	--	--	-
Social Outcome	Homeless (Narrow)	ns	ns	ns	ns	ns	ns	ns	ns	ns
	Homeless (Broad)	+	++	++	ns	ns	ns	++	++	++
	Employed	ns	ns	ns	+	ns	ns	ns	+	+
	Arrested	+	++	++	+	+	+	++	++	++

NOTES for cells in yellow:

Case mix variables that must be dropped for GEE model to converge (see explanation on next page):

* Age, gender, race variables were dropped to achieve convergence.

** Behavioral health variables were dropped to achieve convergence.

In general, the two analytical approaches produced consistent results. One notable difference is for the utilization of emergency department (ED) services. The difference-in-difference t-test suggests that Medicaid beneficiaries had significant and negative changes in ED utilization relative to the balance of the state. However, the GEE models show no significant relative change after implementation of the IMC model. This difference is likely due to the lower utilization of emergency department services in Clark/Skamania counties in the pre-implementation year compared to the remainder of the state. Thus, change in utilization that resulted in Clark/Skamania Medicaid beneficiaries moving towards the state norm would be more likely to appear as a significant negative result in the difference-in-difference t-test, but could result in a non-significant result in a GEE model if the balance of the state also shifted.

In addition, a few GEE regression models required a modified list of case mix control variables due to small sample sizes and a lack of variation within relevant population. Adjustments to the case mix control set are noted in yellow and described below the results tables. A GEE regression model was not found to converge for the substance use disorder treatment penetration outcome metric and is noted as “NULL” in the tables below. Detailed information about these models is available in the Technical Notes section at the end of this paper.

All Medicaid Beneficiaries

Across both the dual and non-dual populations, adult Medicaid beneficiaries in Clark and Skamania counties showed some favorable changes to health and social metrics after the integration of managed care. Specifically, the post-IMC period shows significant positive relative changes in many of the access to care measures, including access to ambulatory and preventative care, mental health treatment, cervical cancer screening, and chlamydia screening. The one exception to this in the access to care measures set is breast cancer screening, which had a significant and unfavorable change in the IMC region for the population not dually eligible for Medicare.

One coordination of care measure, diabetes screening for those with schizophrenia and bipolar disorder, showed statistically significant positive relative change in the IMC region. Two social outcome metrics, homelessness (broad) and arrests, also showed a significant positive improvement for adult Medicaid beneficiaries.

Medicaid Beneficiaries with Serious Mental Illness

As with the general Medicaid population, Medicaid beneficiaries in Clark and Skamania counties with serious mental illness (SMI) saw some significant positive improvements post IMC. In particular, Medicaid beneficiaries with SMI showed significant favorable relative change in mental health treatment penetration, cervical cancer screening, and chlamydia screening. In addition, this analysis found a significant positive relative change in diabetes screening for those with schizophrenia and bipolar disorder, as well as improvements in inpatient utilization and follow-up care after emergency department visits for alcohol or other drug dependence. Also consistent with the general Medicaid population, Medicaid beneficiaries with SMI only had one instance of significant and unfavorable change (breast cancer screening for those not dually eligible for Medicare).

Unlike the general Medicaid population, Medicaid beneficiaries with SMI did not see any significant positive improvements on the social outcome metrics or a significant improvement in access to ambulatory and preventative care.

Medicaid Beneficiaries with Co-Occurring Mental Illness and Substance Use Disorder

Consistent with the general Medicaid population and Medicaid beneficiaries with SMI, Medicaid beneficiaries in Clark and Skamania counties with COD saw significant improvements in access to care measures. This includes favorable relative change in mental health treatment penetration, ambulatory/preventive care, and cervical cancer screening. This population also saw significant improvements to follow-up care after an emergency department visit for alcohol or other drug dependence and diabetes screening for those with schizophrenia and bipolar disorder.

Contrary to the outcomes of the general Medicaid population and Medicaid beneficiaries with SMI, Medicaid beneficiaries with COD did not see improvements in chlamydia screening. However, they also did not see a significant unfavorable relative change in breast cancer screening. Medicaid beneficiaries with COD did see a significant negative impact on home and community based services utilization (a measure of the use of HCBS relative to nursing facility care), whereas other populations did not see significant change in this metric. The COD population in Clark and Skamania counties showed significant and favorable relative change on two social outcome metrics: arrests and homelessness (broad – includes homeless with housing).

Discussion

Looking across Medicaid populations, improvements in access to needed services were most commonly observed. Of the seven access to care measures, three measures, including mental health treatment penetration, saw statistically significant improvements for Medicaid beneficiaries in Clark and Skamania counties relative to the balance of the state. This includes those with serious mental illness and co-occurring mental health and substance use disorders. Two other access to care measures showed significant positive relative change for all Medicaid beneficiaries for either those with serious mental illness or co-occurring disorders.

TABLE 3.

Summary of IMC Impact across Populations

Clark/Skamania county experience relative to balance of state:	ALL MEDICAID		
	Diff-In-Diff	GEE w/ Duals	GEE w/o Duals
Better and statistically significant (++)	7	8	8
Worse and statistically significant (--)	1	0	1
Not statistically significant (all other)	21	21	20

	Medicaid Beneficiaries with SMI		
Better and statistically significant (++)	7	6	8
Worse and statistically significant (--)	1	0	1
Not statistically significant (all other)	21	23	20

	Medicaid Beneficiaries with COD		
Better and statistically significant (++)	8	8	7
Worse and statistically significant (--)	2	1	0
Not statistically significant (all other)	19	20	22

Other measurement areas, including quality, coordination of care, and utilization metrics, saw improvements that were more modest. This included significant positive relative change in diabetes screening for individuals with schizophrenia or bipolar disorder and follow-up after emergency department visits for alcohol or other drug dependence (at both 7 and 30 days). However, most metrics showed no significant relative change between the IMC region and the balance of the state.

There are also several indicators of improvement in beneficiary level of functions and quality of life, as measured by social outcomes. For Medicaid beneficiaries broadly, and those with co-occurring disorders, we found a significant improvement in the rate of homelessness (broad definition including both the unhoused and unstably housed) and a significant positive relative change in criminal justice interactions (fewer arrests) for those in the IMC region compared to the balance of the state. Neither the narrow definition of homeless (including only the unhoused) nor employment rates showed improvements in the first year post implementation of IMC.

The focus of this evaluation was on the experience of Medicaid beneficiaries after the first year of IMC. Longer-term impacts of the shift to IMC are unknown. In addition, as of January 1, 2019, more than half of the counties in Washington have implemented IMC and by January 1, 2020, all 39 counties in the state of Washington will move to IMC⁷. As more counties move to IMC and as the early adopters of IMC create more established practices and mechanisms for IMC in their regions, the Medicaid beneficiary experience may change.

⁷ For more information on the transition to IMC in Washington, see <https://www.hca.wa.gov/assets/free-or-low-cost/19-0025.pdf>

APPENDIX

APPENDIX TABLE 1.

Comparison of Difference-in-Difference Test and GEE Models

Sample Sizes

		ALL MEDICAID		Medicaid Beneficiaries with . . .			
				SMI		COD	
		GEE w/ Duals	GEE w/o Duals	GEE w/ Duals	GEE w/o Duals	GEE w/ Duals	GEE w/o Duals
Access	Adult Access to Preventative/ Ambulatory Care (20-64)	500,126	468,308	136,010	119,050	53,195	48,695
	Breast Cancer Screening (50-64, F)	38,574	32,137	15,211	11,625	4,936	3,985
	Cervical Cancer Screening (21-64, F)	250,918	235,222	77,844	69,015	27,232	24,877
	Chlamydia Screening in Women (18- 24, F)	26,858	26,649	6,706	6,563	1,457	1,436
	Colorectal Cancer Screening (50-64)	96,136	83,450	30,681	23,984	11,873	10,061
	Substance Use Disorder Treatment	117,952	110,752	56,527	51,239	58,594	53,703
	Mental Health Treatment	274,659	249,153	161,454	143,010	61,593	56,462
Quality	Plan All-Cause Readmissions	18,799	15,009	12,826	9,907	10,050	8,271
	Psychiatric Inpatient Readmissions	2,488	1,983	2,474	1,972	1,875	1,519
	Comprehensive Diabetes Care - Hemoglobin A1c Testing	40,729	34,582	16,524	12,954	5,504	4,502
	Antidepressant Medication Management (84 days)	3,686	3,430	2,943	2,722	1,183	1,087
	Antidepressant Medication Management (180 days)	3,686	3,430	2,943	2,722	1,183	1,087
	Received Statin Therapy (21-64 M/40- 64 F)	2,757	2,252	1,076	831	483	401
	Statin Therapy Adherence – 80% (21- 64 M/40-64 F)	2,160	1,779	813	633	347	293
	Adherence to Antipsychotics for Persons with Schizophrenia	6,861	4,368	6,861	4,368	2,289	1,645
Coordination	Diabetes Screening for People with Schizophrenia or Bipolar Disorder	10,951	8,023	10,951	8,023	4,275	3,421
	Follow-Up after ED Visit for AOD – Within 7 Days	5,018	4,760	3,625	3,387	4,299	4,056
	Follow-Up after ED Visit for AOD – Within 30 Days	5,018	4,760	3,625	3,387	4,299	4,056
	Follow-Up after Hospitalization for Mental Illness – Within 7 Days	2,503	1,979	2,489	1,968	1,807	1,442
	Follow-Up after Hospitalization for Mental Illness – Within 30 Days	2,503	1,979	2,489	1,968	1,807	1,442
	Follow-Up after ED Visit for Mental Illness – Within 7 Days	2,945	2,500	2,891	2,450	2,074	1,788
	Follow-Up after ED Visit for Mental Illness – Within 30 Days	2,945	2,500	2,891	2,450	2,074	1,788
Utilization	Emergency Department Utilization	672,507	636,136	163,493	144,143	61,992	56,619
	Inpatient Utilization	672,507	636,136	163,493	144,143	61,992	56,619
	Home and Community Based Services Utilization	672,507	636,136	163,493	144,143	61,992	56,619
Social Outcome	Homeless (Narrow)	661,286	626,566	160,352	141,876	61,096	55,993
	Homeless (Broad)	661,286	626,566	160,352	141,876	61,096	55,993
	Employed	661,286	626,566	160,352	141,876	61,096	55,993
	Arrested	661,286	626,566	160,352	141,876	61,096	55,993

TECHNICAL NOTES

GENERALIZED ESTIMATING EQUATIONS

A Generalized Estimating Equations (GEE) regression model was selected because it can account for data collected from the same individuals over time by specifically modeling within-subject correlation. Multiple observations from the same individual (in this context measurements from the Pre-FIMC and Post-FIMC time periods) are likely to be auto-correlated. The GEE model accounts for within-subject correlation with the addition of a nuisance parameter, producing corrected estimates of the effects of the independent variables on the outcome of interest.

While using a GEE regression model approach helps account for any within-subject correlation, GEE models require a substantial sample size when incorporating case mix control variables. As shown in the results tables, a few of some outcome variables have comparatively small sample sizes due to narrow eligible population definitions. This results in some GEE models failing to converge when the full suite of case mix control variables are included. Case mix variables were removed one at a time until the models converged. Typically, removing demographic variable controls was sufficient and allowed models to converge. In two cases (PCR-P and FUA-7D), behavioral health case mix variables had to be removed.

However, the GEE model for the SUD treatment outcome variable failed to converge at all. This may be due to a change in the underlying reporting of substance use disorder with the shift in billing codes from ICD-9 to ICD-10, which began October 1, 2015 (middle of pre-implementation period). ICD-10 changed how substance use disorders are coded, including an increased number of codes and secondary diagnoses options. Thus, only results from the difference-in-difference analysis are shown for the SUD treatment outcome measure.

STUDY POPULATION

The Difference-in-Difference analysis examined three populations: All adult Medicaid beneficiaries (including those dually eligible for Medicaid and Medicare), adult Medicaid beneficiaries with serious mental illness (including those dually eligible for Medicaid and Medicare), and adult Medicaid beneficiaries with co-occurring mental illness and substance use disorder (including those dually eligible for Medicaid and Medicare).

The GEE Regression model analysis looked at six study populations:

- Adult Medicaid beneficiaries, including those dually eligible for Medicaid and Medicare.
- Adult Medicaid beneficiaries, excluding those dually eligible for Medicaid and Medicare.
- Adult Medicaid beneficiaries with serious mental illness, including those dually eligible for Medicaid and Medicare.
- Adult Medicaid beneficiaries with serious mental illness, excluding those dually eligible for Medicaid and Medicare.
- Adult Medicaid beneficiaries with co-occurring mental illness and substance use disorder, including those dually eligible for Medicaid and Medicare.
- Adult Medicaid beneficiaries with co-occurring mental illness and substance use disorder, excluding those dually eligible for Medicaid and Medicare.

Both analyses focused on the adult Medicaid population aged 18-64 (except where measure specifications required different age groups) who were on Medicaid throughout the pre and post IMC implementation time periods. Medicaid beneficiaries with a non-Medicaid primary health care coverage (also referred to as third-party liability) were excluded from both analyses, as complete health care information may not be available for these individuals.

DATA SOURCE

Data were derived from the integrated administrative data maintained in the Department of Social and Health Services Integrated Client Databases (ICDB). The ICDB contains data from several state administrative data systems, including the State's ProviderOne MMIS data system that contains Medicaid claims and encounter data. The ICDB was explicitly designed to support quasi-experimental evaluation of health and social service interventions in Washington State, and has been widely used in evaluation studies published in peer-reviewed journals and for the production the performance and monitoring measures. The ICDB contains nearly 20 years of individual-level, massively dimensional data for nearly 6 million persons residing in Washington State over that time span. The ICDB allows for the examination of a broad set of outcome measure across the topics of: access to care, quality of care, coordination of care, utilization of high intensity services, and social outcomes.

CASE MIX CONTROL VARIABLES

A set of control variables are included in the GEE regression models to minimize the impact of differences in case mix between Clark/Skamania counties and the balance of the state. Three types of indicators were included: demographic characteristics, Medicaid coverage information, and physical/behavioral health indicators. Demographic characteristics included age, gender, and race/ethnicity. Medicaid coverage information included three different categories of Medicaid coverage: New Adults

covered by Medicaid Expansion under the Affordable Care Act, Disabled Adults, and “Classic” non-disabled Medicaid adults enrolled in coverage categories existing prior to Medicaid Expansion. For analyses including persons dually eligible for Medicaid and Medicare, a “dual status” indicator was included in the case-mix control set.

The physical and behavioral health variables included indicators for:

- The presence of mental health treatment need within the last 24 months.
- The presence of a serious mental illness (e.g. schizophrenia, bipolar disorder, major recurrent depression) within the last 24 months.
- The presence of substance use disorder within the last 24 months.
- The presence of co-occurring mental health treatment need and substance use disorder within the last 24 months.
- A measure of chronic disease burden derived from a risk model leveraging the CDPS and Medicaid-Rx risk groupers and calibrated to the Washington State Medicaid population. Additional information about CDPS and Medicaid-Rx risk groupers can be found at <http://cdps.ucsd.edu>.

OUTCOME MEASURES

Outcome measure specifications, measure stewards, and age- and gender-related population restrictions are listed below. HEDIS® specifications are proprietary; more information about HEDIS® is available at: <https://www.ncqa.org/hedis/measures>.

• Access to Care Measures

- **Adults’ Access to Preventive/Ambulatory Health Services:** HEDIS® metric, ages 20-64.
- **Substance Use Disorder Treatment Penetration:** DSHS-RDA stewarded metric, ages 18-64. Specification available at: <https://www.dshs.wa.gov/ffa/research-and-data-analysis/measure-specifications>.
- **Mental Health Service Penetration:** DSHS-RDA stewarded metric, ages 18-64. Specification available at: <https://www.dshs.wa.gov/ffa/research-and-data-analysis/measure-specifications>.
- **Breast Cancer Screening:** HEDIS® metric, ages 50-64 (female only).
- **Cervical Cancer Screening:** HEDIS® metric, ages 21-64 (female only).
- **Colorectal Cancer Screening:** HEDIS® metric, ages 50-64.
- **Chlamydia Screening in Women:** HEDIS® metric, ages 18-24 (female only).

• Quality of Care Measures

- **Plan-All Cause 30-Day Readmissions:** HEDIS® metric, ages 18-64.
- **Comprehensive Diabetes Care – Hemoglobin A1c Testing:** HEDIS® metric, ages 18-64.
- **Antidepressant Medication Management – Acute and Continuation Phase Treatment:** HEDIS® metric, ages 18-64.
- **Statin Therapy for Patients with Cardiovascular Disease – Received Statin Therapy:** HEDIS® metric, ages 21-64 for males and ages 40-64 for females.
- **Statin Therapy for Patients with Cardiovascular Disease – Statin Therapy Adherence 80%:** HEDIS® metric, ages 21-64 for males and ages 40-64 for females.
- **Adherence to Antipsychotics for Persons with Schizophrenia:** HEDIS® metric, ages 18-64.

• Coordination of Care

- **Diabetes Screening for People with Schizophrenia/Bipolar Disorder:** HEDIS® metric, ages 18-64.
- **Follow-Up after Emergency Department Visit for Alcohol or Other Drug Dependence – Within 7 or 30 Days:** HEDIS® metric, ages 18-64.
- **Follow-Up after Emergency Department Visit for Mental Illness – Within 7 or 30 Days:** HEDIS® metric, ages 18-64.
- **Follow-Up after Hospitalization for Mental Illness – Within 7 or 30 Days:** HEDIS® metric, ages 18-64.

• Utilization of ED, Inpatient, and HCBS Services:

The majority of outcome measures in this analysis have binary outcomes (yes/no, present/absent). However, three underlying measures reflect utilization on a member-month basis. To enable a consistent statistical approach across outcome measures, a series of binary measures were created for the GEE analyses from the original count data to better analyze service utilization metrics.

- **Emergency Department Utilization:** DSHS-RDA stewarded metric, ages 18-64. Specification available at: <https://www.dshs.wa.gov/ffa/research-and-data-analysis/measure-specifications>.
 - Binary variable: 0-2 visits/year vs. 3 or more visits/year.

- **Inpatient Utilization:** ages 18-64.
 - Binary variable: no admissions vs. one or more admissions in the measurement year
- **Home and Community Based Services and Nursing Facility Utilization:** DSHS-RDA stewarded metric, ages 18-64. Specification available at: <https://www.dshs.wa.gov/ffa/research-and-data-analysis/measure-specifications>.
 - Binary variable: no utilization vs. any utilization in the measurement year
- **Social Outcomes**
 - **Homeless – Narrow:** DSHS-RDA stewarded metric, ages 18-64. Specification available at: <https://www.dshs.wa.gov/ffa/research-and-data-analysis/measure-specifications>.
 - **Homeless – Broad:** DSHS-RDA stewarded metric, ages 18-64. Specification available at: <https://www.dshs.wa.gov/ffa/research-and-data-analysis/measure-specifications>.
 - **Employed:** DSHS-RDA stewarded metric, ages 18-64. Specification available at: <https://www.dshs.wa.gov/ffa/research-and-data-analysis/measure-specifications>.
 - **Arrested:** DSHS-RDA stewarded metric, ages 18-64. Specification available at: <https://www.dshs.wa.gov/ffa/research-and-data-analysis/measure-specifications>.