



Impact of Serious Mental Illness on Medicaid and Other Public Healthcare Costs in Texas

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Abstract

Medicaid-enrolled adults with serious mental illness may be dually-enrolled in Medicare, and may receive health care services from other state and local programs. To understand cross-program costs of care, we linked 2012 payment data across Medicaid, Medicare, state, and local programs. Average costs were calculated according to presence/absence of SMI, Medicare coverage, SSI coverage, medical comorbidities, and other characteristics. Costs for Medicaid adults with SMI were 57.4% greater than adults without SMI, but only 23.6% of costs were SMI-related. Greater costs were associated with Medicaid-Medicare dual-eligibility, multiple SMI diagnoses, and medical comorbidities. The results support cross-program efforts such as joint Medicaid-Medicare managed care and integrated care.

Keywords Serious mental illness · Medicaid · Costs · Texas · Integrated care

Introduction

Adult Medicaid enrollees with serious mental illness (SMI) are noted to have higher public healthcare costs compared to other adult enrollees, and these high costs have been attributed to a greater burden of comorbid chronic medical conditions (Thorpe et al. 2017; Ward et al. 2017). The overall costs of healthcare utilization among adults with SMI are covered by multiple local state/local and federal governmental programs, including Medicaid and Medicare. Along with medical complexity, SMI often leads to disruptions in housing, transportation, and financial support that may contribute to poor management of illness, and poor quality of

care, which may result in higher public healthcare spending (Alley et al. 2016).

Given the overlap in public programs, cost studies are needed that can link data across programs in order to identify the cost drivers that could be targeted by Medicaid reform strategies. A number of states are considering, or are currently piloting, innovations to improve the quality of care and to reduce costs for Medicaid enrollees with SMI (Bachrach et al. 2014; Miller et al. 2017; THHSC 2017; Woltmann et al. 2012; Shugarman et al. 2015; Thomas-Henkel et al. 2015). Examples of innovations include: mandatory outcomes/performance reporting by health plans; payment models that include incentives for achieving quality goals; developing special service coverage packages according to different levels of need; developing specific plans for those with a serious mental illness; payment models that incentivize care based on a health home or patient-centered medical home model; and integrated care strategies such as combined state agencies or combined contracts covering both medical and behavioral healthcare. These innovative programs should consider costs to both Medicaid and Medicare, and for medical care as well as specialty mental health care.

Demographic and clinical characteristics, as well as program eligibility features, may be related to patient-level costs of care. Some of these patterns have been illuminated. For example, a study based on the Medicare Current Benefit Survey (MCBS; Frank 2014) determined that adults with a

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mental disorder who were dually enrolled in Medicaid and Medicare had combined Medicaid-Medicare costs almost twice as great as those without a mental disorder, and that medical comorbidities were clear correlates of greater costs. This suggests that SMI care, and comorbidities in those with SMI, could be areas to address. Another analysis, examining costs and aspects of utilization for adults enrolled in Medicaid with SMI as they gain Medicare coverage (Burns et al. 2016), noted that physician visits increased modestly, which might indicate more optimal or desirable routine care, but also that emergency room visits increased, indicating the opposite.

The “National Health Care Expenses” series of reports (Stagnitti and Carper 2014), supported by the Agency for Healthcare Research and Quality, includes annual expenses for individuals dually-enrolled in Medicaid and Medicare. They note that those dually enrolled have greater annual expenses relative to Medicare-only enrollees, suggesting the cross-program innovations could address quality and costs. However, that analysis had limited data on clinical and demographic aspects of Medicaid enrollees. A cross-state analysis of costs for dually-enrolled adults, ages 21 to 65, noted that dually-enrolled adults were more likely to have an SMI than those who were Medicare-only enrollees, and to have higher average costs (Kuramoto-Crawford and Zodet 2015), but again the limited data on Medicaid do not provide a necessary level of program-design-relevant detail for states seeking opportunities to address costs or quality. These and other studies demonstrate that there are great opportunities for improving quality and controlling costs in Medicaid.

Given the overlap in public programs, cost studies are needed that can link data across programs in order to identify the cost drivers that could be targeted by Medicaid reform strategies. The purpose of this research study is to link payment data from Medicaid, Medicare and locally funded mental health programs to determine the impact of SMI on total public healthcare costs, and to identify program-design-relevant correlates of costs to target by innovations in program design or administration. We hypothesized that typical costs would be greater for adult Medicaid enrollees with versus without SMI, and, as other literature suggests, that much of this cost difference would be attributable to medical, rather than behavioral health, care. If so, efforts to promote integrated care in Medicaid would be warranted. We also hypothesized that there would be differences along demographic, clinical, and program characteristics, but were less firm in predictions along these policy-relevant characteristics.

To carry out this cross-program cost analysis in Texas for Medicaid-enrolled adults with SMI, we have linked Medicaid and Medicare claims data, obtained from the state’s Medicaid agency (Texas Health and Human Services Commission), and service payment data to the state’s local

mental health authorities (LMHAs) and state psychiatric hospitals from the public health department (Texas Department of State Health Services). For 2012, we calculated costs for adult Medicaid enrollees, with and without SMI, to estimate the incremental cost of SMI and to show how these costs vary according to demographic, clinical, and enrollment characteristics of clients. For adults enrolled in Medicaid with SMI, we examined the proportion of costs associated with medical versus psychiatric care, and, for all adults enrolled in Medicaid, we compared total medical costs of adults with SMI to adults without SMI, and examined the distribution between hospital, outpatient, and pharmacy services, to examine how costs vary across these utilization categories. In addition, we examined the portion covered by Medicaid and Medicare, as well as the portion covered by state funds to LMHAs and to state psychiatric hospitals to identify the funding source covering the costs. Finally, in a generalized linear regression, we estimated the relative importance of each factor (patients’ demographic, clinical, and program enrollment characteristics) upon total costs. Because state Medicaid policies cannot be made on a regional basis, we did not include rural–urban differences in the analysis. The resulting analyses should be useful for identifying program-design-relevant correlates of costs to target by innovations in program design or administration.

Methods

Data Sources and Population

Study Population

The Medicaid data for these analyses came from a larger Medicaid data set covering Texas state fiscal year (FY; September 01 through August 31) 2008 through FY2012. Using this larger data set, we identified adult Medicaid enrollees (ages ≥ 18) who had two or more outpatient claims or encounters, or one inpatient claim or encounter, with an ICD-9 diagnosis code for schizophrenia/schizoaffective disorder (codes: 295.0x–295.9x), major depression (296.2x, 296.3x, 311), or bipolar disorder (296.0x, 296.1x, 296.4x–296.9x). These analyses focus on FY2012; consequently, only Medicaid enrollees with identified SMI diagnoses enrolled in Medicaid during FY2012 were included in this study. Adult Medicaid FY 2012 enrollees without one of our SMI diagnoses, defined as above, were included in our non-SMI comparison group.

Data Sources

We used data from Medicaid, Medicare, Texas LMHAs, and state psychiatric hospitals to estimate healthcare costs of a

cohort of adults with SMI enrolled in the Texas Medicaid program in FY2012. The Medicaid administrative dataset includes eligibility, enrollment, encounter, and claims information for individuals enrolled in the program. The claims files have information for all enrollee services paid through both fee-for-service (FFS) and capitated Medicaid managed care models. Texas Medicare data were obtained and linked for SMI and non-SMI adult patients in our Medicaid cohort. To build a Medicare data set to match the Medicaid FY 2012 data set (September 2011 through August 2012), we combined data from the corresponding months from Medicare files for Calendar Year (CY) 2011, September through December, and CY 2012, January through August. Data were matched using the individuals' Medicaid patient numbers and the appropriate crosswalks provided by the Texas Department of Health and Human Services. The Medicare data sets included enrollment, carrier (provider), institutional inpatient and outpatient, skilled nursing, and Part D files. Individuals enrolled in Medicare Advantage plans were excluded from these analyses since their Medicare claims data are not routinely available.

For the Medicaid claims and encounters data sets, data for each individual's episodes of care (e.g., inpatient admissions or provider services) are uniquely included in the claims or encounter data sets based on the model of reimbursement used. Both types of data include the total paid amount for the episode of care and the attributed primary diagnosis. A primary diagnosis of a mental disorder, within ICD codes 290-319, was used to note any services for behavioral health care.

For all adult Medicaid enrollees with an SMI, data from a third data set, a state-level behavioral health utilization data set, were extracted. This data set includes utilization and costs of Texas LMHA services contracted/funded by the state, and costs for state psychiatric hospital stays in FY 2012. Although these files were restricted to Texas Medicaid enrollees, they include data on LMHA/state psychiatric hospital services received by those individuals for services not covered by Medicaid or Medicare (for the dually enrolled), including any care delivered during gaps in their Medicaid and/or Medicare enrollment.

Measures

Due to Texas Medicaid enrollment rules, Medicaid enrollees often had gaps in their enrollment during FY 2012. To control for differences in enrollment patterns between SMI and non-SMI Medicaid enrollees, we limited the analyses to those Medicaid enrollees (SMI and non-SMI) with continuous enrollment throughout FY2012. Analyses included demographic, clinical, and program characteristics. We obtained the demographic characteristics of each adult enrollee including age group (< 65, 65+), gender (male,

female), race/ethnicity (White non-Hispanic, African-American non-Hispanic, Hispanic, or other).

Clinical characteristics included SMI diagnosis and count of medical comorbidities. SMI diagnosis was per DSM diagnoses noted above. Along with noting those with a diagnosis of depression, bipolar disorder, or schizophrenia, a category was formed for those who had two of these diagnoses associated with a service or encounter across the year of data, and a category for those with all three. Count of medical comorbidities was formed by identifying the ten most common mortality-associated medical comorbidities in the general adult population (Kochanek et al. 2011), and in adults with SMI (Piatt et al. 2010). From this, we identified thirteen medical comorbidities common in people with SMI: diseases of the heart, chronic lower respiratory disease, disorders of lipid metabolism, arthritis, cerebrovascular disease, nephritis/nephrotic syndrome/nephrosis, influenza/pneumonia, malignant neoplasms, septicemia, Alzheimer's Disease, osteoporosis, and hepatitis C.

We also categorized each adult based on program coverage. This included: Medicaid-only or Medicaid/Medicare dually enrolled. Since adults with SMI may qualify for Medicaid in different ways, we used Medicaid program data to further categorize Medicaid-only enrollees as: foster care young adults (ages up through 21), very-low income adult parents, low-income peripartum woman, or Supplemental Security Income (SSI). We categorized dual Medicaid-Medicare eligible adults as SSI recipient or non-SSI recipient. Finally, we categorized Medicaid adult enrollees as having received services in the LMHA system, from a state psychiatric hospital, or neither.

Analysis

We calculated the total Medicaid and Medicare costs for all Medicaid adults, with and without SMI, and added the additional cost of LMHA or state psychiatric hospital services for SMI adults. We then calculated the proportion of costs associated with mental health treatment for SMI related conditions versus treatment for other medical conditions (any service other than those associated with an SMI diagnosis); the proportion of costs paid by Medicaid, Medicare, and for state-funded (LMHA/state hospital) services; and also calculated the proportion of costs for inpatient, outpatient, and pharmacy services. Costs for SMI-related conditions were based on primary diagnosis per service. As anticipated, the distribution of total costs was highly positively skewed, with many having modest costs and a few having high costs. We used a generalized linear regression approach assuming a gamma distribution for total costs and log-link to examine differences in total costs between adult Medicaid enrollees with and without SMI, controlling for differences in demographic, clinical,

and program eligibility characteristics of enrollees. The model was estimated for different eligibility groups. For these analyses, beta coefficients and odds ratios were calculated, and odds ratios were interpreted as representing the measure of effect of different group contrasts upon costs. All analyses were conducted using SAS Enterprise Guide 7.1 (SAS Institute, Inc., Cary, NC). This project was approved by the Center for Protection of Research Subjects at the University of Texas Health Science Center at Houston.

Results

Descriptively, our sample of adult enrollees with SMI ($N = 141,395$) and without SMI ($N = 613,715$) were statistically significantly different on all demographic, clinical, and program characteristics (Table 1). Adult Medicaid enrollees with SMI were more likely to be younger and non-Hispanic, had more medical comorbidities, and were more likely to be enrolled in Medicaid through SSI program eligibility. Most Medicaid enrollees with SMI were diagnosed with major depression (66.5%), either alone (32.8%) or in combination

Table 1 Comparison of the characteristics of adult medicaid enrollees with and without serious mental illness

	SMI ^a (n = 141,395)	Non-SMI (n = 613,715)	Statistic
Age (standard deviation)	48.0 (17.9)	55.2 (21.7)	$t = 131.2^*$
Sex			$\chi^2 = 303.7^*$
Female	88,416 (62.5%)	398,726 (65.0%)	
Male	52,978 (37.5%)	214,960 (35.0%)	
Unknown	1 (0.0%)	29 (0.0%)	
Race/Ethnicity			$\chi^2 = 8397.2^*$
1 White (not Hispanic)	58,407 (41.3%)	195,644 (31.9%)	
2 African-American (not Hispanic)	32,491 (23.0%)	120,204 (19.6%)	
3 Hispanic	32,651 (23.1%)	210,625 (34.3%)	
4 Other	17,846 (12.6%)	87,242 (14.2%)	
Number of comorbidities			$\chi^2 = 5,332.7^*$
0	63,493 (44.9%)	339,953 (55.4%)	
1	34,348 (24.3%)	112,545 (18.3%)	
2	20,769 (14.7%)	76,377 (12.4%)	
3+	22,785 (16.1%)	84,840 (13.8%)	
Medicaid/medicare program eligibility			$\chi^2 = 31,771.6^*$
1 Medicaid-only foster care adult	3067 (2.2%)	6,708 (1.1%)	
2 Medicaid-only parent	5707 (4.0%)	43,849 (7.1%)	
3 Medicaid-only pregnant women	654 (0.5%)	60,934 (9.9%)	
4 Medicaid-only SSI recipient	72,672 (51.4%)	205,285 (33.4%)	
5 Medicaid-Medicare non-SSI	9487 (6.7%)	93,993 (15.3%)	
6 Medicaid-Medicare SSI	49,808 (35.2%)	202,946 (33.1%)	
SMI diagnosis			
Schizophrenia	18,446 (13.0%)	NA	
Major Depression	46,340 (32.8%)	NA	
Bipolar Disorder	19,746 (14.0%)	NA	
Two SMIs	43,395 (30.7%)	NA	
All three SMIs	13,468 (9.5%)	NA	
LMHA/state hospital user			
LMHA	35,442 (25.1%)	NA	
State Psychiatric Hospital	1553 (1.1%)	NA	
Both	1200 (0.9%)	NA	

LMHA local mental health authority

* $p \leq 0.001$

^aSMI is defined with following ICD-9 diagnosis codes for schizophrenia/schizoaffective disorder (codes: 295.0x-295.9x), major depression (296.2x, 296.3x, 311), or bipolar disorder (296.0x, 296.1x, 296.4x-296.9x)

with schizophrenia or bipolar disorder (33.7%), and about a quarter (27.0%) received services (not funded by Medicaid or Medicare) from LMHAs or state psychiatric hospitals.

The average total acute care costs for adults with SMI (\$18,181) were 57.4% greater ($p \leq 0.001$) compared to adults without SMI (\$11,550; Table 2). Across both groups, the majority of costs were paid by Medicare (52.5% and 61.9% for adults with/without an SMI, respectively). Only about 1.3% of total costs were paid directly for LMHA/state psychiatric hospital services, excluding those services reimbursed by Medicaid or Medicare. For adults with an SMI, about 23.6% of their total costs were attributable to SMI-related care. Their non-SMI related medical treatment costs exceeded that of adults without SMI.

The average total acute care costs for adults with SMI were highest (\$26,774) for individuals with all three SMIs, followed by those with major depression only (\$20,818), those with two SMI diagnoses (\$17,881), then those with a diagnosis of schizophrenia (\$12,961) and finally those with a diagnosis of bipolar disorder (\$11,668; Table 2). Among Medicaid enrollees with SMI who had two diagnoses, those with major depression plus another diagnosis tended to have the highest costs (\$20,862 for schizophrenia and major depression, \$17,126 for major depression and bipolar disorder). The share of costs borne by Medicaid and Medicare

were roughly equivalent across SMI diagnoses, with the exception of individuals with the single diagnosis of major depression, where Medicare’s share was approximately 64.0%, Medicaid 35.7%, and LMHA/state psychiatric hospital 0.4%. Two other differences stand out. First, SMI-related treatment costs were highest for individuals with schizophrenia, either alone or in combination with other diagnoses. Second, the portion of costs for LMHA/SPH services was highest for individuals with schizophrenia, especially those with schizophrenia alone (3.5%), and lowest for individuals with major depression alone (0.4%).

The results of our multivariate regression analysis of cost predictors are shown in Table 3. We used the Variance Inflation Factor (VIF) to test if multicollinearity existed among the predictors, All VIF values were less than 5, indicating that there were no problems with collinearity among predictor variables. Controlling for other characteristics, both the SSI and non-SSI Medicaid-Medicare dually enrolled beneficiaries had substantially higher costs than our reference group of Medicaid-only pregnant women (odds ratio [OR] 7.76 [95% CI 7.63, 7.88] and 7.01 [6.89, 7.12], respectively). Medicaid-only enrollees with long-term disability, as indicated by SSI eligibility, had the highest costs among the Medicaid-only population (OR 4.23 [4.17, 4.29]). Compared to individuals with none of

Table 2 Comparison of cost of medicaid adult medicaid enrollees with SMI by diagnosis with adults without serious mental illness

	Schizophrenia	Major depression	Bipolar disorder	Two SMIs	Three SMIs	Adults with SMI	Adults without SMI	Cost difference (95% CI)
Total enrolled adults	18,446	46,340	19,746	43,395	13,468	141,395	613,715	
Average total cost (SD)	\$12,961 (\$17,234)	\$20,818 (\$30,193)	\$11,668 (\$19,712)	\$17,881 (\$24,166)	\$26,774 (\$29,097)	\$18,181 (\$25,893)	\$11,550 (\$22,921)	\$6631 (\$6495, \$6767)
Program cost (% of total)								
Medicaid	\$7070 (54.5%)	\$7429 (35.7%)	\$6883 (59.0%)	\$9004 (50.4%)	\$13,869 (51.8%)	\$8403 (46.2%)	\$4399 (38.1%)	\$4004 (\$3932, \$4076)
Medicare	\$5,432 (41.9%)	\$13,314 (64.0%)	\$4,599 (39.4%)	\$8,623 (48.2%)	\$12,453 (46.5%)	\$9,547 (52.5%)	\$7,151 (61.9%)	\$2396 (\$2281, \$2511)
LMHA/SPH	\$458 (3.5%)	\$75 (0.4%)	\$185 (1.6%)	\$254 (1.4%)	\$451 (1.7%)	\$231 (1.3%)	NA	NA
Treatment cost (% of total)								
SMI treatment	\$5741 (44.3%)	\$1667 (8.0%)	\$2739 (23.5%)	\$5033 (28.1%)	\$11,290 (42.2%)	\$4298 (23.6%)	NA	NA
Other medical treatment	\$7220 (55.7%)	\$19,150 (92.0%)	\$8929 (76.5%)	\$12,848 (71.9%)	\$15,484 (57.8%)	\$13,883 (76.4%)	\$11,550 (100%)	\$2333 (\$2199, \$2468)
Type of cost (% of total)								
Hospital	\$1960 (15.1%)	\$4559 (21.9%)	\$2,114 (18.1%)	\$3833 (21.4%)	\$7063 (26.4%)	\$3894 (21.4%)	\$2610 (22.6%)	\$1284 (1215, \$1353)
Outpatient	\$6368 (49.1%)	\$12,840 (61.7%)	\$5,947 (51.0%)	\$9605 (53.7%)	\$14,035 (52.4%)	\$10,154 (55.8%)	\$7390 (64.0%)	\$2764 (2683, 2845)
Pharmacy	\$4175 (32.2%)	\$3344 (16.1%)	\$3422 (29.3%)	\$4189 (23.4%)	\$5225 (19.5%)	\$3902 (21.5%)	\$1550 (13.4%)	\$2351 (2319, 2384)

SPH State Psychiatric Hospital

Table 3 Predictors of (log of) total costs for individuals with serious mental illness

	Beta-coefficient (SE)	Odds ratio (95% CI)
Diagnosis		
Non-SMI	Reference	
Schizophrenia	0.29 (0.01)	1.33 (1.30, 1.37)
Major depression	0.30 (0.01)	1.35 (1.33, 1.37)
Bipolar disorder	0.19 (0.01)	1.22 (1.19, 1.24)
2 SMI diagnoses	0.46 (0.01)	1.59 (1.56, 1.61)
All three SMI categories	0.83 (0.01)	2.28 (2.22, 2.34)
Age		
< 65	Reference	
65 +	− 0.23 (0.00)	0.79 (0.79, 0.80)
Sex		
Male	Reference	
Female	0.11 (0.00)	1.11 (1.10, 1.12)
Race/Ethnicity		
White (not Hispanic)	Reference	
African-American (not Hispanic)	0.49 (0.00)	0.98 (0.97, 0.99)
Hispanic	0.86 (0.01)	0.89 (0.89, 0.90)
Other	1.50 (0.01)	0.85 (0.84, 0.86)
Comorbidity		
0	Reference	
1	0.49 (0.00)	1.63 (1.61, 1.64)
2	0.86 (0.01)	2.36 (2.33, 2.38)
3+	1.50 (0.01)	4.50 (4.45, 4.55)
Program eligibility		
Medicaid-only pregnant women	Reference	
Medicaid-only foster care young adults	0.57 (0.02)	1.76 (1.71, 1.82)
Medicaid-only parents	0.91 (0.01)	2.47 (2.43, 2.52)
Medicaid-only SSI	1.44 (0.01)	4.23 (4.17, 4.29)
Medicaid-medicare non-SSI	1.95 (0.01)	7.01 (6.89, 7.12)
Medicaid-medicare SSI	2.05 (0.01)	7.76 (7.63, 7.88)

Group numbers as in Table 1

ten most common mortality-associated medical comorbidities, individuals with one, two, and three or more had increasingly high ORs (1.63 [1.61, 1.64], 2.36 [2.33, 2.38], 4.50 [4.45, 4.55], respectively) indicating that as comorbidity burden increased, costs did as well. Controlling for other characteristics, estimated costs were also greater for those with a greater number of SMI diagnoses. Individuals with all three SMI diagnoses were the most costly (OR 2.28 [2.22, 2.34]) compared to individuals with no SMI diagnoses. We tested the incremental effect of greater number of SMIs (0, 1, 2, 3) against the categorical indicators of combinations, and saw no meaningful improvement in model performance. Finally, after adjusting for our other predictors, including Medicaid-Medicare dual enrollment, adults aged 65 and older had lower costs than those under 65 (cost ratio = 0.79 [0.79, 0.80]). Compared to the other characteristics, gender and race/ethnicity had relatively small effects on estimated total costs.

Finally, we classified the Medicaid enrollees in our sample across five relevant dimensions: SMI status (yes/no); age group (< 65, 65 +); Dual Medicaid-Medicare enrollment (yes/no); SSI coverage (yes/no); and number of medical comorbidities. Mean costs are illustrated in Fig. 1. By this illustration, we see that typical costs are generally higher for those with more comorbidities, higher for those under 65, higher for those with versus without SMI, those dually enrolled, and those with SSI.

Discussion

We found that the Texas 2012 Medicaid continuously enrolled adult population with SMI had higher average costs, at \$18,181 (SD \$25,893), than those without SMI, at \$11,550 (SD \$22,921), with an average difference of \$6,631 (95% CI \$6,495, \$6,767). We also found that program-design-relevant

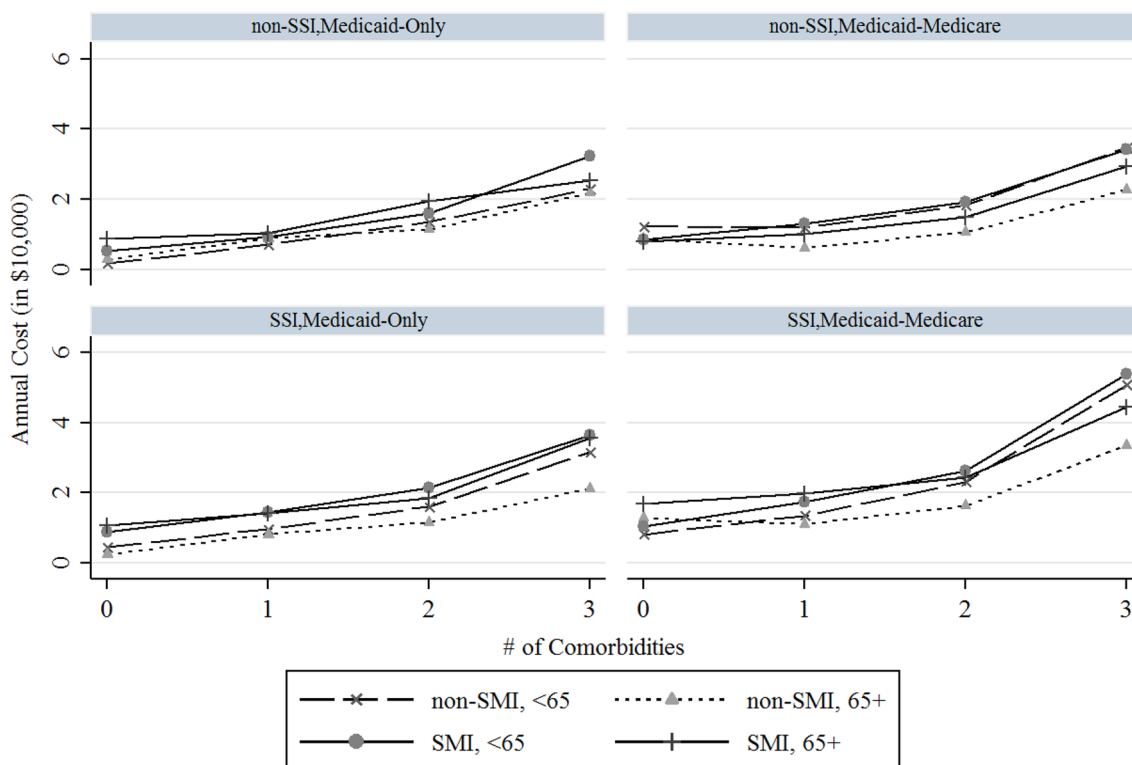


Fig. 1 Predicted annual costs for FY 2012 (in \$10,000 s) by number of comorbidities, SSI status, medicare status, and age group

characteristics, including age group, comorbidity level, and SSI coverage, distinguish those with higher costs, and so can serve as targets for program design innovations. We also noted that the greater level of costs for adults enrolled in Medicaid with SMI is largely devoted to medical, rather than psychiatric, care, at 76.4% of all costs.

This remarkably greater level of average annual costs for adult Medicaid enrollees with versus without SMI was similar to a recent analysis of adults, under age 65, who were dually enrolled in Medicaid and Medicare (Frank 2014). Drawing upon the Medicare Current Benefit Survey (MCBS) and claims analysis, that study determined that dual-enrollees with a mental disorder had combined Medicaid-Medicare costs almost twice as great as those without a mental disorder.

Although Medicaid has traditionally been perceived as the public provider plan for those with SMI, Medicare paid just over half (52.5%) of healthcare costs for this population. This greater portion from Medicare is likely for two reasons. First, those with Medicare may be eligible as a result of a permanent work disability resulting from a chronic psychiatric or medical condition, and consequently their mean costs may be greater than mean costs for other eligibility groups. Second, the high level of medical comorbidities in those with SMI contributes to costs. Finally, a recent analysis (Burns et al. 2016) suggests that, as Medicaid enrollees

become covered by Medicare, there may be some initial boost in typical costs, as “pent-up demand” for services is met by the expanded coverage, and greater reimbursement rates, of Medicare. This phenomenon of greater costs via Medicare versus Medicaid was also found in the MCBS analysis by Frank, et al., where Medicare contributed nearly three times the amount (60% of reported total annual costs for survey participants) than that contributed by Medicaid (23% of total annual costs).

While Medicare covered the greatest portion of costs for adult Medicaid enrollees with SMI, Medicaid was the second-greatest payer, at 46.2% of costs. Payment by other state funding streams, for LMHA services and state psychiatric hospital care, accounted for less than 2% total costs. The modest level of LMHA costs may be due to the fact that these providers are billing Medicaid or Medicare whenever possible. The modest level of state psychiatric hospital expense is partly due to the low availability of this resource, generally, and because Medicaid or Medicare can serve as a payer source at other hospitals, when hospitalization is warranted.

Along with examining payer source, we examined program-relevant aspects of predictors of high costs. The highest costs for this population were associated with dual-eligibility status, the number of comorbid medical conditions, and having more than one diagnosed SMI. Having

more than one SMI may be associated with more complex care, assuming the two or three diagnoses are warranted. Alternately, it may be that a person having a more chaotic or disruptive episode may be seen at a greater range of care settings, and thus be likely to get more than one diagnosis. Clinicians delivering care that is more focused on short term stabilization may be hesitant to assign a diagnosis of bipolar disorder relative to depression, or schizophrenia relative to bipolar. More short-term-focused, stabilization-focused care is less efficient, and more costly, by nature.

Also, while we noted that the majority of cross-program costs for adults enrolled in Medicaid with SMI were for medical care, being more than 75% of costs for those with bipolar disorder and more than 90% of costs for those with depression, medical costs were only 56% of total costs for those with schizophrenia. This variability across diagnostic categories will require further exploration, but may represent opportunities to tailor programs to clinical cohorts with very different utilization profiles.

In our analysis, the greater level of cross-program costs was more prominent in patients with major depression, relative to those with bipolar disorder or schizophrenia. This may be due to a greater portions of adults over 65, with the expected level of medical comorbidity, who also have, and get detected as having, a depressive disorder. Half or more of depression cases under treatment are receiving that care in primary care settings (Harman et al. 2006), and there has been a great deal of emphasis upon screening for depression in geriatric settings. Finally, regarding varied results across diagnoses, it must be acknowledged that this is a broad level of examination, necessarily limited by the nature of the data, and so these analyses do not take into account diagnostic certainty or severity of condition.

Although statistically significant, demographic characteristics were not very strong predictors of annual care costs. Women had costs about ten percent greater than men, and cost differences between racial/ethnic groups were not very great, with the most notable difference being that those noted as Hispanic had costs approximately 10% lower than those noted as African-American or white. Finally, adults under 65 years of age had costs approximately 20% greater than those 65 and older. This is surprising, and may be because many of those under 65 have qualified for Medicare due to disability, as opposed to having aged into Medicare.

Regarding clinical characteristics, each additional medical comorbidity was associated with greater costs, and those with three or more medical comorbidities had costs beyond four times as great as those with no medical comorbidity. This result was very much in line with a recent analysis that drew upon CMS Chronic Condition Warehouse data (CMS 2014): in that analysis, cost for those with five of their noted comorbidities were double the cost of an enrollee with two comorbidities.

Compared to adults enrolled in Medicaid with no SMI diagnosis, costs were at least 20% greater for those with a bipolar diagnosis, were a bit more than 30% greater for those with a depression or schizophrenia diagnosis, were 60% greater for those with two of these diagnoses, and were well more than twice as great for those with all three of these SMI diagnoses. The higher figure for schizophrenia is likely due to the greater portion who require some sort of long-term care. The MCBS-based study, cited above (Frank 2014), noted that dually-enrolled adults with schizophrenia, relative to other mental disorders, “frequently need long-term services and supports that are covered by Medicaid—including case management, residential services, and personal assistance—in addition to medical care.”

Significant cost differences were also found across enrollees with SMI depending on the type of enrollment. Women with SMI who were enrolled in the state’s Peripartum Medicaid program had the lowest cost. This is likely due to the limited time span of coverage: enrollment in this program is based not on disability but on pregnancy, and is designed to end 60 days after expected delivery date. Being predominantly served in obstetric settings, in a delimited time frame, other health care problems may not be detected and addressed as fully as they may be in more extended outpatient care settings.

This study has a set of limitations. Available data are a product of both clinical care delivery and administrative needs, limiting the ability to firmly make conclusions related to clinical or service delivery aspects. Another limitation is that, while some substance abuse care is included in these data, public funding streams for substance abuse care are also in separate funding/data streams, and so these cost analyses are limited. The number of administratively distinct Medicaid programs in Texas, beyond 30, poses another limit. For this analysis, we have opted to maintain a more global overview of cross-program costs, but further examination can be done to explore costs and utilization more finely, by distinct Medicaid programs. It is a limit that we examine costs, while not also examining quality; again further examination can be done to explore the quality of this care, although examining quality by administrative data sets is challenging. Another limit is that we did not include private insurance data. To some degree, those with Medicaid or Medicare, in a given year, may also be covered by private insurance. While that portion is likely to be modest, it is a limit when attempting to have a comprehensive view of healthcare costs.

Although our data set is unique, and our intent on examining adults enrolled in Medicaid with SMI has a different focus from similar analyses, we find that our results are consistent with findings from similar investigations. Overall, these findings suggest that Medicaid administrators and providers in Texas interested in boosting quality and/or reducing

costs should devote attention to adults with SMI and, in particular, those with dual eligibility and receiving SSI. It may be typical for individuals in this cohort to be receiving care across a range of settings, and supported by a range of payment sources. This is a cohort with relatively high costs, mostly due to comorbid medical conditions, that may benefit from coordinated care and integrated care. Along with coordination across settings, there may be opportunities for boosting value by working across payment systems.

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Compliance with Ethical Standards

Conflict of interest All authors declare that they have no conflict of interest.

Ethical Approval This research project was approved by the Institutional Review Board at the University of Texas Health Science Center. This article does not contain any studies with human participants or animals performed by any of the authors.

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