MILLIMAN RESEARCH REPORT

Potential economic impact of integrated medical-behavioral healthcare

Updated projections for 2017

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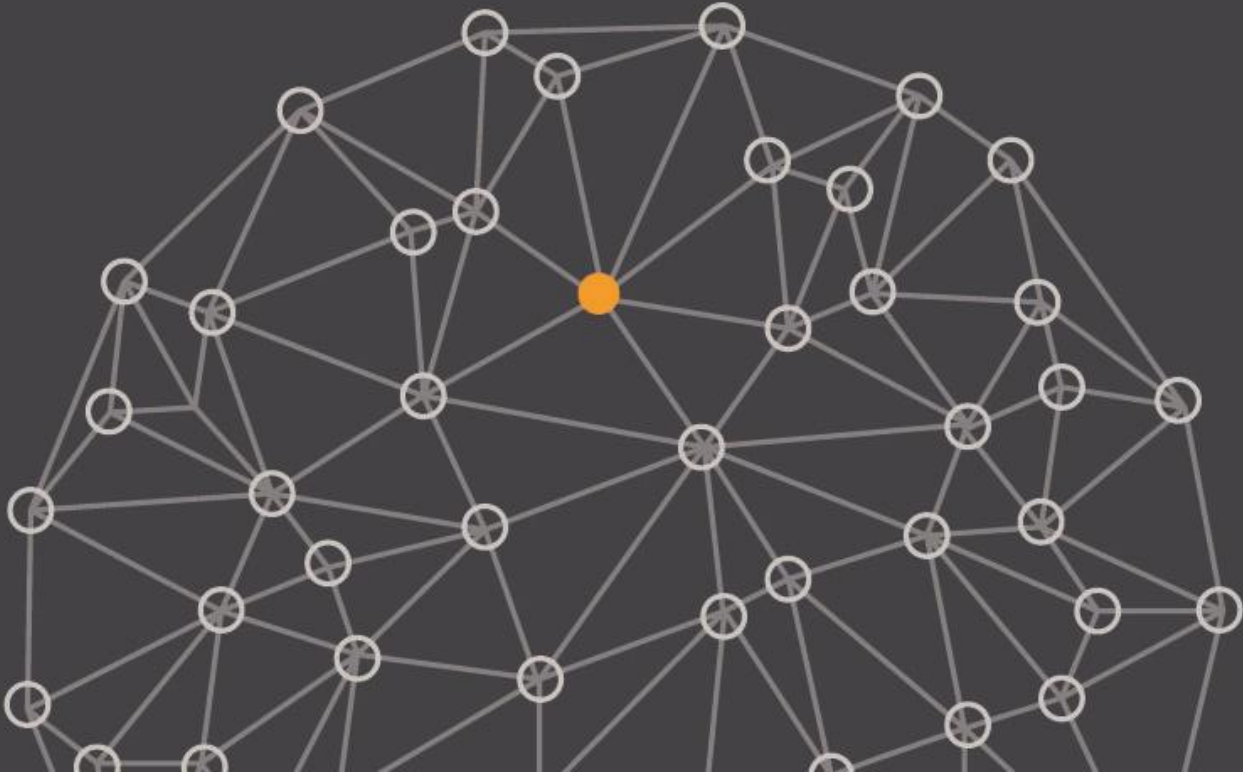Alexandra Weaver, ASA, MAAA
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Executive Summary

Continually escalating healthcare costs have prompted payers to seek ways to improve member health while reducing the rate of growth of healthcare claim expenditures. One such initiative is the integration of medical and behavioral healthcare (IMBH). Some of the advances in IMBH have been driven by primary care providers, while others have been driven by behavioral healthcare practitioners. We completed a report for the American Psychiatric Association in April 2014,[1] presenting a projection of potential annual healthcare cost savings through effective IMBH programs across the United States. This report is an update to our prior report, using more recent healthcare cost and utilization data to project spending estimates[2] for people with chronic medical and comorbid behavioral conditions in 2017.

The analysis provided in this report is intended to be used to help educate payers, providers, employers, and other interested parties about the elevated levels of healthcare costs related to beneficiaries who have chronic medical and behavioral comorbidities. Based on the experience of recent successful IMBH programs, this report also estimates the portion of the elevated healthcare costs for these comorbid patients that may be controlled and impacted through such programs. We also discuss the need for payment model reform in lieu of continued fee-for-service approaches in order to sustain such programs.

Medical costs for treating those patients with chronic medical and comorbid mental health/substance use disorder (MH/SUD) conditions are two to three times higher on average compared to the costs for those beneficiaries who don't have comorbid MH/SUD conditions. The projected additional healthcare costs incurred by people with behavioral comorbidities are estimated to be $406 billion in 2017 across commercially insured, Medicaid, and Medicare beneficiaries in the United States. Most of the increased cost for those with comorbid MH/SUD conditions is attributed to medical services (much more than behavioral services), creating a large opportunity for medical cost savings through integration of behavioral and medical services. Based on our literature review of the results of effective IMBH programs, we calculate that 9% to 17% of this total additional spending may be saved through effective integration of medical and behavioral care, although additional work and direct experience will be needed in this area to validate the actual savings achievable for any particular program or population. Figure 1 shows our projected potential cost savings associated with integration for each of these three large insurance markets. This is the value proposition for IMBH.

FIGURE 1: PROJECTED HEALTHCARE COST SAVINGS THROUGH EFFECTIVE INTEGRATION (NATIONAL, 2017)

PAYER TYPE	ANNUAL COST IMPACT OF INTEGRATION
COMMERCIAL	$19.3 - $38.6 BILLION
MEDICARE	$ 6.0 - $12.0 BILLION
MEDICAID	$12.3 - $17.2 BILLION
TOTAL	**$37.6 - $67.8 BILLION**

As shown above, an estimated $38 billion to $68 billion can potentially be saved annually through effective integration of medical and behavioral services. To put these nationally projected savings in context, the total national expenditures for mental health and substance use services is projected to be about $240 billion in 2017.[3] These projected healthcare cost savings represent 16% to 28% of all spending for MH/SUD services. This also represents an increase of $11.3 billion to $19.5 billion in projected potential annual healthcare cost savings since our previous report, or an annualized increase of over 7%, with percentage increases for Medicare and Medicaid being higher than for commercially insured individuals. This is a significant opportunity that will likely continue to increase as medical costs increase, IMBH programs become more effective, and more people in the country develop comorbid medical and behavioral disorders.

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[1] Melek, Stephen P, et al. (April 2014). Economic Impact of Integrated Medical-Behavioral Healthcare. Milliman American Psychiatric Association Report. Retrieved January 30, 2018, from https://www.psychiatry.org/File%20Library/Psychiatrists/Practice/Professional-Topics/Integrated-Care/Milliman-Report-Economic-Impact-Integrated-Implications-Psychiatry.pdf (PDF download).
[2] Healthcare cost and spending estimates in this report are calculated using allowed dollars, which represents the costs incurred by both the member and the payer for healthcare services.
[3] Substance Abuse and Mental Health Services Administration (2014). Projections of National Expenditures for Treatment of Mental and Substance Use Disorders, 2010–2020. HHS Publication No. SMA-14-4883.

Limitations

This report explores the healthcare costs for people with both chronic medical conditions and MH/SUD conditions. Our analysis does not include a study of the causality of co-occurring medical and behavioral conditions, nor does it involve a detailed risk assessment of each insured member.

This study relies on administrative claim data to identify medical and behavioral conditions. Historically, many individuals with chronic medical conditions and MH/SUD conditions have not been diagnosed and treated for their behavioral conditions.[4] As collaborative care models become more common, more individuals will likely be diagnosed and treated for previously undiagnosed behavioral conditions as a result of proactive screening tools and increased awareness of behavioral disorders. To the extent that behavioral disorders are underdiagnosed in the claim data, our projected healthcare cost savings may be understated.

The studies in the literature that we used to help guide our healthcare cost savings assumptions for effective integrated medical and behavioral healthcare typically do not cover every chronic medical and behavioral condition used in our analysis. The studies tend to cover a specific set of comorbid conditions, such as diabetes with depression. To the extent that the results from these studies cannot be achieved across all of the medical-behavioral comorbidities included in our analysis, the healthcare cost savings projections would be overstated. These same studies tend to reflect a care management approach using a team of professionals for the healthcare being provided to their target population cohorts, not limited to medical doctors. To achieve the potential savings we project in our analysis, it is very likely that a team-based approach of psychiatrists, psychologists, and other healthcare providers and managers would be needed.

We relied on data obtained through published literature and through proprietary and purchased data sources as the basis for our analysis. We did not independently audit or verify the source of the information. If this information is incomplete or inaccurate, our observations and comments may not be appropriate. We performed general reasonability tests on the underlying data. This analysis relies on past data, which may differ from future experience. Milliman does not intend to benefit or create a legal duty to any third-party recipient of its work.

Our national projections extrapolate the results from our database analyses (see Appendix E) to national population estimates for the commercially insured, Medicare, and Medicaid population cohorts. To the extent that the national population healthcare costs and risk levels for any of these cohorts differ from that represented in the databases that we used, our national estimates may need adjustment. The databases we used represent the best available sources for our analysis.

The information in this study is designed to describe the prevalence and healthcare costs of insured members with certain chronic medical conditions, behavioral conditions, or both. It may not be appropriate and should not be used for other purposes.

Qualifications

Guidelines issued by the American Academy of Actuaries require actuaries to include their professional qualifications in all actuarial communications. Stephen P. Melek, Douglas T. Norris, Jordan Paulus, Katherine Matthews, and Alexandra Weaver are members of the American Academy of Actuaries and meet the qualification standards for performing the analysis in this report.

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[4] "Yet despite this intensive familiarization with the presentation of mental pathology, and the appropriateness of the primary care setting to its management, even the most recent surveys indicate that performance is best described by the rule of diminishing halves: only half the patients with a threshold disorder are recognized; only half of those recognized are treated; and only half of those treated are effectively treated." Per Wittchen, H.-U., Mühlig, S., & Beesdo, K. (2003). Mental disorders in primary care. Dialogues in Clinical Neuroscience, 5(2), 115–128.

Results

HEALTHCARE COSTS OF BENEFICIARIES WITH AND WITHOUT BEHAVIORAL DISORDERS

In our April 2014 analysis, we studied the healthcare costs of individuals enrolled in commercial insurance, Medicare, and Medicaid in 2010, and trended those costs to 2012. For this updated analysis, we analyzed claim data for commercially insured and Medicare beneficiaries in 2015, and we relied on the same underlying Medicaid data as in our prior analysis (no updated Medicaid data was available to us). For each population group, we applied factors to our sample data to extrapolate to target national 2017 estimates, as described in Appendix E.

As in our prior analysis, we stratified commercially insured and Medicare populations into four groups, and the Medicaid members into two groups, based on the types of behavioral illnesses present. We updated the criteria used for identification of behavioral conditions, as described in Appendix C.

The four groups used for Medicare and commercial insurance were:

1. Those with no mental health or substance use disorder diagnoses (No MH/SUD).

2. Those with mental health diagnoses, but no serious and persistent mental illness (Non-SPMI MH).

3. Those with serious and persistent mental illness (SPMI).

4. Those with substance use disorder diagnoses (SUD).

Members with both mental illness and substance use diagnoses would appear in both the mental health (either SPMI or non-SPMI MH) and the substance use groups.

We stratified Medicaid members into two groups:

1. Those with no mental health or substance use disorder diagnoses (No MH/SUD).

2. Those with mental health or substance use disorder diagnoses (MH/SUD).

Figure 2 shows a comparison of average per member per month (PMPM) costs for people with a reported behavioral condition (MH/SUD, Non-SPMI MH, SPMI, and SUD) compared to those without a reported behavioral condition (No MH/SUD). The costs are displayed separately for the three population segments (commercial, Medicare, and Medicaid). The costs are also split out by broad service categories: medical, behavioral, medical Rx, and behavioral Rx (as described in Appendix D). The "Medical" column in Figure 2 shows the facility and professional charges for non-behavioral services and the "Medical Rx" column shows the pharmacy charges for drugs used to treat medical conditions (non-behavioral conditions). Similarly, the "Behavioral" column shows the facility and professional charges for treating behavioral conditions and the "Behavioral Rx" column shows the charges for prescription drugs used to treat behavioral conditions. Pharmacy data was not available for the Medicare population.

FIGURE 2: PER MEMBER PER MONTH (PMPM) HEALTHCARE COSTS BY POPULATION AND PRESENCE OF /BEHAVIORAL CONDITIONS, 2017 COSTS

POPULATION	BEHAVIORAL HEALTH DIAGNOSIS	MEMBER MONTHS	MEDICAL	BEHAVIORAL	MEDICAL RX	BEHAVIORAL RX	TOTAL
COMMERCIAL	*NO MH/SUD*	1,674,000,000	$327	$3	$90	$6	$426
	NON-SPMI MH	246,000,000	$765	$33	$246	$65	$1,109
	SPMI	85,000,000	$700	$119	$176	$159	$1,154
	SUD	30,000,000	$980	$153	$214	$73	$1,420
	TOTAL	2,021,000,000	$399	$12	$113	$19	$543
MEDICARE	*NO MH/SUD*	597,000,000	$736	$4	*N/A*	*N/A*	$740
	NON-SPMI MH	23,000,000	$1,899	$52	*N/A*	*N/A*	$1,951
	SPMI	31,000,000	$1,872	$219	*N/A*	*N/A*	$2,091
	SUD	11,000,000	$1,943	$242	*N/A*	*N/A*	$2,185
	TOTAL	656,000,000	$839	$16	*N/A*	*N/A*	$855
MEDICAID	*NO MH/SUD*	577,000,000	$391	$6	$90	$7	$494
	MH/SUD	144,000,000	$957	$380	$243	$128	$1,708
	TOTAL	721,000,000	$504	$81	$121	$31	$737
TOTAL	*NO MH/SUD*	2,848,000,000	$425	$4	$90	$6	$525
	MH/SUD	551,000,000	$923	$149	$230	$98	$1,400
	TOTAL	3,399,000,000	$506	$28	$115	$22	$671

Note: Pharmacy data not available for the Medicare population, and the totals for Medicare do not reflect pharmacy costs.

Figure 2 shows that individuals with a treated behavioral condition typically cost two to three times as much on average as those without a behavioral condition in all market segments. Please note that the member months for "No MH/SUD," "Non-SPMI MH," "SPMI," and "SUD" do not sum to the total because members frequently have both a mental health disorder and a substance use disorder and are included under both cohorts. The "Total" rows represent the total non-duplicated member months. Member months represent the total number of insured months of coverage in each cohort, which is a good indication of the distribution of the population in each cohort.

Figure 3 displays the total medical, behavioral, and pharmacy spending for each category of MH/SUD diagnoses. This is the same information displayed in Figure 2, but is shown in terms of total spending (as opposed to average costs).

FIGURE 3: TOTAL HEALTHCARE SPENDING BY POPULATION AND PRESENCE OF BEHAVIORAL CONDITIONS, 2017 COSTS (MILLIONS)

POPULATION	BEHAVIORAL HEALTH DIAGNOSIS	MEDICAL	BEHAVIORAL	MEDICAL RX	BEHAVIORAL RX	TOTAL
COMMERCIAL	NO MH/SUD	$546,567	$5,723	$151,010	$9,210	$712,510
	NON-SPMI MH	$188,311	$8,054	$60,595	$16,020	$272,980
	SPMI	$59,185	$10,093	$14,907	$13,442	$97,627
	SUD	$29,157	$4,540	$6,362	$2,164	$42,223
	TOTAL	$805,447	$24,795	$228,992	$38,959	$1,098,193
MEDICARE	NO MH/SUD	$439,163	$2,145	N/A	N/A	$441,308
	NON-SPMI MH	$42,859	$1,165	N/A	N/A	$44,024
	SPMI	$58,535	$6,865	N/A	N/A	$65,400
	SUD	$20,882	$2,602	N/A	N/A	$23,484
	TOTAL	$550,751	$10,455	N/A	N/A	$561,206
MEDICAID	NO MH/SUD	$225,370	$3,442	$51,839	$4,270	$284,921
	MH/SUD	$138,067	$54,820	$35,093	$18,422	$246,402
	TOTAL	$363,437	$58,263	$86,932	$22,692	$531,324
TOTAL	NO MH/SUD	$1,211,100	$11,310	$202,849	$13,480	$1,438,739
	MH/SUD	$508,535	$82,203	$113,075	$48,171	$751,984
	TOTAL	$1,719,635	$93,513	$315,924	$61,651	$2,190,723

Note: Pharmacy data not available for the Medicare population, and the totals for Medicare do not reflect pharmacy costs.

The total spending in the United States across all service categories for the populations with MH/SUD disorders is estimated to be $752 billion annually, compared to $2.2 trillion for all service categories and cohorts combined. These totals represent an annualized increase of about 7.5% in MH/SUD healthcare spending compared to our 2012 cost analysis, which is about 2% higher than the annual increase in spending across all categories and population segments. Since 2012, the percentage of members with treated MH/SUD has increased from 14% to 16%, now accounting for 34% of total healthcare spending. This analysis shows that the savings opportunity of integrating medical and behavioral healthcare services has grown since our prior report, as more people are diagnosed with comorbid medical and behavioral disorders and healthcare costs continue to increase.

Please note that the healthcare spending for "No MH/SUD," "Non-SPMI MH," "SPMI," and "SUD" in Figure 3 do not sum to the total because members frequently have both a mental health disorder and a substance use disorder and are included under both cohorts.

Figures 4 through 6 present the results by major service category as a percentage of total costs stratified by the presence of behavioral conditions for the commercial, Medicare, and Medicaid populations, respectively.

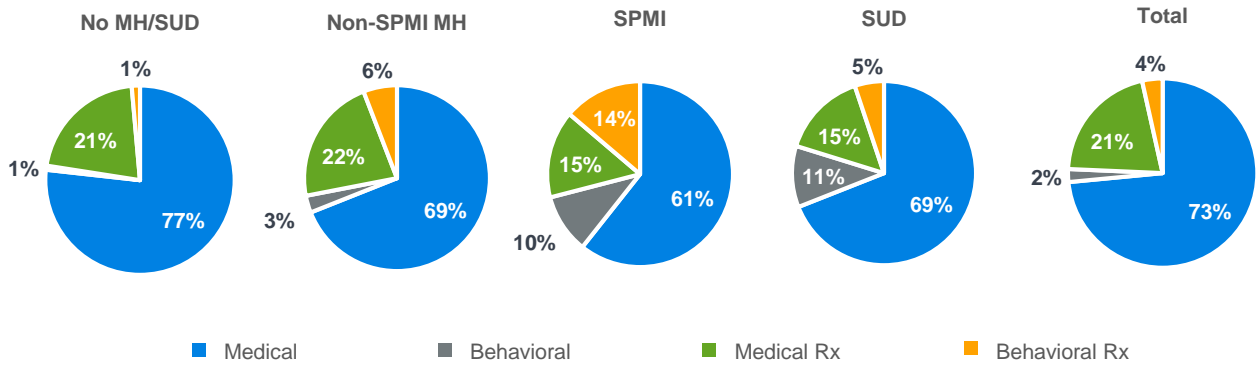**FIGURE 4: PMPM COSTS BY SERVICE CATEGORY, COMMERCIAL**

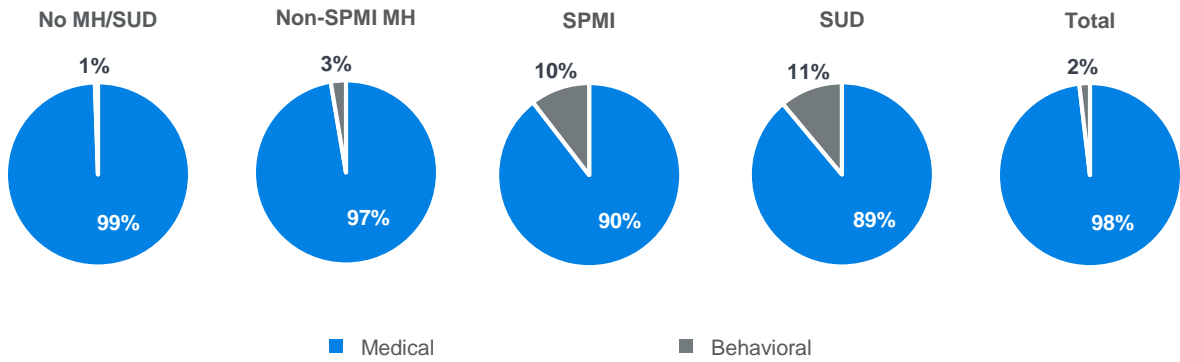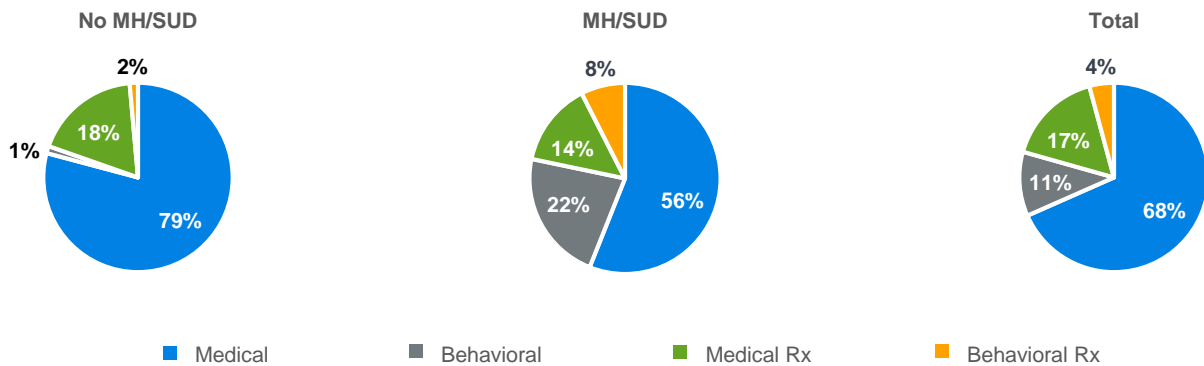**FIGURE 5: PMPM COSTS BY SERVICE CATEGORY, MEDICARE**

FIGURE 6: PMPM COSTS BY SERVICE CATEGORY, MEDICAID

ANALYSIS OF HEALTHCARE SPENDING BY SERVICE CATEGORY

In Figure 2 above, members with reported behavioral disorders were shown to have higher per member per month costs for medical services as well as behavioral services, compared to members without reported behavioral disorders. Medical and behavioral nondrug spending associated with behavioral conditions was further analyzed by major service category to identify whether the additional medical services are high-cost facility-based services (such as inpatient hospital admissions or outpatient facility services that include emergency room [ER]) or lower-cost professional services.

Spending was classified as either inpatient (IP) facility, outpatient (OP) facility, or professional (PROF) services (as described in Appendix D). Figure 7 shows 2017 spending levels by service category and MH/SUD cohort for the commercial population. The "Total" row combines all of the behavioral condition row results. Please note that the healthcare costs for "No MH/SUD," "Non-SPMI MH," "SPMI," and "SUD" do not sum to the total because members frequently have both a mental health disorder and a substance use disorder and are included under both cohorts.

FIGURE 7: TOTAL HEALTHCARE COSTS BY SERVICE CATEGORY AND PRESENCE OF BEHAVIORAL CONDITIONS, 2017 COSTS, COMMERCIALLY INSURED U.S. POPULATION (MILLIONS)

BEHAVIORAL CONDITION	MEDICAL COSTS				BEHAVIORAL COSTS			
	IP FACILITY	OP FACILITY	PROF	TOTAL NON-PHARMACY	IP FACILITY	OP FACILITY	PROF	TOTAL NON-PHARMACY
NO MH/SUD	$120,845	$195,199	$230,523	$546,567	$2,033	$1,070	$2,620	$5,723
NON-SPMI MH	$43,559	$70,011	$74,741	$188,311	$2,107	$1,393	$4,553	$8,054
SPMI	$13,484	$20,251	$25,450	$59,185	$3,314	$1,739	$5,040	$10,093
SUD	$8,464	$10,199	$10,494	$29,157	$2,041	$1,785	$714	$4,540
TOTAL	**$181,147**	**$289,638**	**$334,662**	**$805,447**	**$7,835**	**$4,624**	**$12,336**	**$24,795**

In Figure 7, the cohort with substance use disorders has a higher proportion of facility-based medical costs than any other cohort. Figure 8 displays the distribution of costs presented in Figure 7.

FIGURE 8: DISTRUBITION OF NON-PHARMACY HEALTHCARE COSTS BY SERVICE CATEGORY AND PRESENCE OF BEHAVIORAL CONDITIONS, 2017 COSTS, COMMERCIALLY INSURED U.S. POPULATION (MILLIONS)

BEHAVIORAL CONDITION	MEDICAL COSTS			BEHAVIORAL COSTS		
	IP FACILITY	OP FACILITY	PROF	IP FACILITY	OP FACILITY	PROF
NO MH/SUD	22%	36%	42%	36%	19%	46%
NON-SPMI MH	23%	37%	40%	26%	17%	57%
SPMI	23%	34%	43%	33%	17%	50%
SUD	29%	35%	36%	45%	39%	16%
TOTAL	**22%**	**36%**	**42%**	**32%**	**19%**	**50%**

The SUD cohort incurs about 64% of total non-pharmacy medical costs on facility-based services, as compared to the cohort without MH/SUD that incurs about 58% of total non-pharmacy medical costs on facility-based services. The cohort with Non-SPMI MH disorders also uses a higher percentage of facility-based services than those without MH/SUD, at about 60% of total incurred medical costs. In our prior study, the distribution of facility costs was four percentage points higher in the SPMI group than in the No MH/SUD group; however, in this analysis, the SPMI cohort has a similar distribution of medical spending to the cohort without MH/SUD.

Compared to our prior report, the percentage of behavioral costs associated with facility services has increased across all member cohorts. As with medical services, the SUD group has the largest portion of facility-based behavioral spending of any cohort. Members with SUD spend about 84% of their total behavioral non-pharmacy dollars on facility-based care, much higher than the 54% facility spending for the No MH/SUD group. The Non-SPMI MH group spends 43% of its behavioral costs in facility settings, and the SPMI group spends 50%.

In our prior report, we also saw that the Non-SPMI MH group spent a smaller percentage of its behavioral care dollars on facility-based services than the No MH/SUD group. That gap increased from a 4% difference in our 2012 cost analysis to a 9% difference in the updated 2017 cost analysis. This difference may be caused by undiagnosed individuals receiving behavioral care in costlier facility settings while individuals diagnosed with a behavioral disorder may have treatment plans that direct care toward lower-cost professional settings.

Figure 9 shows similar data for the Medicare population.

FIGURE 9: TOTAL HEALTHCARE COSTS BY SERVICE CATEGORY AND PRESENCE OF BEHAVIORAL CONDITIONS, 2017 COSTS, MEDICARE (MILLIONS)

BEHAVIORAL CONDITION	MEDICAL COSTS				BEHAVIORAL COSTS			
	IP FACILITY	OP FACILITY	PROF	TOTAL NON-PHARMACY	IP FACILITY	OP FACILITY	PROF	TOTAL NON-PHARMACY
NO MH/SUD	$168,528	$99,660	$170,975	$439,163	$1,670	$114	$361	$2,145
NON-SPMI MH	$17,348	$8,509	$17,002	$42,860	$553	$86	$527	$1,165
SPMI	$24,635	$10,815	$23,085	$58,535	$4,889	$698	$1,279	$6,865
SUD	$9,119	$4,432	$7,330	$20,882	$2,203	$194	$205	$2,602
TOTAL	**$214,912**	**$121,213**	**$214,626**	**$550,751**	**$7,359**	**$910**	**$2,186**	**$10,455**

As with the commercial population, we see that the SUD group has a higher proportion of facility-based medical and behavioral services than any other cohort. Further, the proportion of facility-based behavioral costs is again lower for the Non-SPMI MH and SPMI groups than for the No MH/SUD group, which may in part be driven by individuals with undiagnosed behavioral disorders tending to receive costlier facility-based care. The distribution of medical non-pharmacy dollars is similar for the No MH/SUD, Non-SPMI MH, and SPMI groups, at 60% to 61% of care delivery.

Figure 10 shows totals for the Medicaid population.

FIGURE 10: TOTAL HEALTHCARE COSTS BY SERVICE CATEGORY AND PRESENCE OF BEHAVIORAL CONDITIONS, 2017 COSTS, MEDICAID (MILLIONS)

BEHAVIORAL CONDITION	INPATIENT	BEHAVIORAL CARVE-OUT	ER	LTC	OTHER	TOTAL NON-PHARMACY
NO MH/SUD	$47,997	$3,442	$11,354	$17,710	$148,309	$228,812
MH/SUD	$36,166	$54,821	$9,983	$11,367	$80,552	$192,887
TOTAL	**$84,163**	**$58,263**	**$21,337**	**$29,076**	**$228,861**	**$421,699**

In the Medicaid population, inpatient spending for the No MH/SUD group constitutes about 21% of the total non-pharmacy medical spending (for IP, ER, long-term care [LTC], and Other categories). For the MH/SUD group, this proportion is slightly lower, at 19%. Another important observation to note here is that, even though the MH/SUD group constitutes just 20% of the total Medicaid membership,[5] the total healthcare expenditures on this group accounts for 46% of the total Medicaid spending on healthcare services. Similarly, 20% of the total Medicaid members are incurring nearly half of the total Medicaid spending on ER visits.

[5] The MH/SUD cohort represents 144 million of the 721 million total Medicaid member months in this analysis, as shown in Figure 2 above.

Impact of behavioral comorbidities on overall healthcare costs of members with chronic medical conditions

COMORBID COSTS PER PATIENT BY MEDICAL AND BEHAVIORAL CONDITION
We identified several chronic medical conditions in the sample populations for further analysis of cost and value opportunity through medical/behavioral integration. These conditions were selected based on relatively high prevalence rates and ease of identification in claim data. The identification criteria that we used for these chronic medical conditions (diagnosis codes and prescriptions filled) are listed in Appendix B.

The various figures presented in this section compare the total healthcare costs for members with chronic medical conditions between those who do and do not have comorbid behavioral conditions. These figures demonstrate that patients with comorbid behavioral health conditions experience higher healthcare costs than patients without, and that the majority of these additional healthcare costs are experienced on the medical side, rather than the behavioral side. We refer to the difference in these members' costs as the "value opportunity," representing the excess healthcare costs that could potentially be impacted through effective management of a patient's comorbid conditions. Of course, this total savings potential is unlikely to be achievable, as some cost will be necessary to manage behavioral conditions. However, a significant percentage of this differential may demonstrably be saved and is estimated in the next section of this report.[6]

Figure 11 shows the costs per member per month by medical condition and behavioral comorbidity for the commercial population. This comparison is useful for gauging the relative increase in healthcare costs (and associated potential for savings) for each combination of medical condition and behavioral comorbidity if the members with the given condition were targeted for integration programs.

FIGURE 11: IMPACT OF BEHAVIORAL COMORBIDITIES, COMMERCIAL POPULATION, 2017 TOTAL PMPM COSTS

MEDICAL CONDITION	NO MH/SUD	SPMI	NON-SPMI MH	SUD
ANEMIA	$2,292	$3,757	$3,534	$4,455
ARTHRITIS	$1,024	$2,230	$1,922	$2,296
ASTHMA	$817	$2,047	$1,886	$2,307
CANCER	$1,778	$3,183	$2,882	$3,507
CHRONIC KIDNEY DISEASE	$4,598	$5,691	$6,169	$6,359
CONGESTIVE HEART FAILURE	$1,713	$3,149	$2,479	$3,660
CHRONIC OBSTRUCTIVE PULMONARY DISEASE	$1,446	$3,270	$2,671	$2,584
CHRONIC PAIN	$1,609	$2,698	$2,156	$2,641
BACK PAIN	$1,942	$3,482	$2,793	$3,131
HEADACHE	$1,989	$3,402	$2,709	$3,201
DIABETES (WITHOUT COMPLICATIONS)	$1,004	$2,036	$1,566	$2,117
DIABETES (WITH COMPLICATIONS)	$2,061	$3,636	$3,041	$3,836
ENDOCRINE/METABOLIC DISORDERS	$1,043	$2,146	$1,673	$2,287
EPILEPSY	$1,553	$3,649	$3,054	$3,688
HYPERCHOLESTEROLEMIA (WITHOUT COMPLICATIONS)	$855	$1,800	$1,354	$1,812
HYPERCHOLESTEROLEMIA (WITH COMPLICATIONS)	$1,811	$3,447	$2,633	$3,137
HYPERTENSION (WITHOUT COMPLICATIONS)	$894	$1,936	$1,444	$1,833
HYPERTENSION (WITH COMPLICATIONS)	$1,993	$3,657	$2,844	$3,339

[6] It is important to note that the definition of "value opportunity" does not include any costs associated with implementing and maintaining integration programs. As mentioned, it is unlikely that the entire value opportunity could be realized, as it is not expected that there will be zero costs associated with behavioral care. The value opportunity definition also uses the costs for individuals with chronic medical conditions and no comorbid behavioral conditions as the baseline for potential cost savings, which assumes that chronic medical conditions are already being managed effectively.

MEDICAL CONDITION	NO MH/SUD	SPMI	NON-SPMI MH	SUD
ISCHEMIC HEART DISEASE	$1,852	$3,621	$2,824	$2,837
LIVER DISEASE	$2,411	$4,158	$3,640	$4,571
PULMONARY HEART DISEASE	$3,204	$5,249	$4,801	$4,133
OTHER HEART DISEASE	$1,811	$3,430	$2,834	$3,001
OSTEOPOROSIS	$1,232	$3,190	$2,235	$3,139
STROKE	$2,028	$3,674	$3,038	$3,026
NO MEDICAL CONDITION	**$247**	**$653**	**$562**	**$817**
ANY MEDICAL CONDITION	**$894**	**$1,858**	**$1,519**	**$1,934**
TOTAL	**$426**	**$1,155**	**$1,109**	**$1,419**

Anemia shows the greatest value opportunity per patient with $2,163 PMPM ($4,455 less $2,292) in additional healthcare spending for those treated for substance use and $1,242 PMPM ($3,534 less $2,292) in additional costs for those treated for Non-SPMI conditions. Other conditions with significant potential include liver disease, epilepsy, congestive heart failure, and osteoporosis. Overall, patients with a chronic medical condition and comorbid substance use disorder show the greatest value opportunity through integration, with an average additional spending of $1,040 ($1,934 less $894) PMPM. All of these costs can be compared to the "Total" row costs, which represent the average costs across all commercial beneficiaries for the behavioral condition cohort columns.

Figure 12 shows an example of these PMPM costs by major service category to show where the extra spending occurs. It shows costs for anemia with the various comorbid behavioral disorders. The majority of the higher healthcare costs when comorbid behavioral conditions are present occur for medical spending as opposed to behavioral spending, with significant increases in facility-based costs.

FIGURE 12: HEALTHCARE COSTS PMPM BY SERVICE CATEGORY AND PRESENCE OF BEHAVIORAL CONDITIONS, 2017 COSTS, COMMERCIAL, ANEMIA ONLY

BEHAVIORAL DIAGNOSIS	MEDICAL COSTS, NON-RX				BEHAVIORAL COSTS, NON-RX				RX COSTS	
	IP FACILITY	OP FACILITY	PROF	TOTAL MEDICAL	IP FACILITY	OP FACILITY	PROF	TOTAL BEHAVIORAL	MEDICAL RX	BEHAVIORAL RX
NO MH/SUD	$462	$952	$478	$1,893	$1	$0	$2	$4	$383	$13
NON-SPMI MH	$789	$1,236	$778	$2,803	$13	$6	$15	$34	$589	$107
SPMI	$924	$1,035	$881	$2,841	$65	$29	$67	$161	$512	$243
SUD	$1,429	$1,234	$935	$3,598	$112	$55	$27	$194	$506	$157
TOTAL	**$584**	**$1,032**	**$585**	**$2,201**	**$9**	**$4**	**$10**	**$23**	**$445**	**$53**

Figure 13 shows results that are comparable to Figure 11 above for the Medicare population. As pharmacy claims were primarily used to identify those patients with chronic pain, back pain, and headache, and pharmacy data was not available for the Medicare population, those conditions were excluded from our analysis for this population.

FIGURE 13: IMPACT OF BEHAVIORAL COMORBIDITIES, MEDICARE POPULATION, 2017 TOTAL PMPM COSTS

MEDICAL CONDITION	NO MH/SUD	SPMI	NON-SPMI MH	SUD
ANEMIA	$3,129	$4,007	$3,827	$4,852
ARTHRITIS	$1,792	$2,940	$2,614	$2,982
ASTHMA	$2,044	$3,117	$2,903	$3,317
CANCER	$1,877	$3,036	$2,747	$3,102
CHRONIC KIDNEY DISEASE	$3,303	$4,583	$4,513	$5,327
CONGESTIVE HEART FAILURE	$3,418	$4,764	$4,505	$5,601
CHRONIC OBSTRUCTIVE PULMONARY DISEASE	$2,403	$3,627	$3,303	$3,169
DIABETES (WITHOUT COMPLICATIONS)	$1,016	$1,788	$1,569	$2,026
DIABETES (WITH COMPLICATIONS)	$2,267	$3,616	$3,556	$4,036
ENDOCRINE/METABOLIC DISORDERS	$1,473	$2,544	$2,320	$2,856
EPILEPSY	$1,963	$3,183	$2,680	$3,375
HYPERCHOLESTEROLEMIA (WITHOUT COMPLICATIONS)	$1,031	$1,809	$1,531	$1,922
HYPERCHOLESTEROLEMIA (WITH COMPLICATIONS)	$2,007	$3,481	$3,241	$3,513
HYPERTENSION (WITHOUT COMPLICATIONS)	$1,239	$2,196	$1,882	$2,338
HYPERTENSION (WITH COMPLICATIONS)	$2,437	$4,025	$3,575	$4,336
ISCHEMIC HEART DISEASE	$2,094	$3,745	$3,291	$3,785
LIVER DISEASE	$2,511	$3,753	$3,400	$3,910
PULMONARY HEART DISEASE	$3,114	$4,508	$4,422	$5,071
OTHER HEART DISEASE	$2,258	$3,754	$3,354	$4,175
OSTEOPOROSIS	$1,589	$2,739	$2,284	$2,763
STROKE	$2,282	$3,884	$3,365	$3,771
NO MEDICAL CONDITION	**$178**	**$791**	**$760**	**$858**
ANY MEDICAL CONDITION	**$1,387**	**$2,335**	**$2,104**	**$2,414**
TOTAL	**$739**	**$2,091**	**$1,951**	**$2,185**

Congestive heart failure patients show the greatest potential value on a PMPM basis for the Medicare population. Other conditions with high-value opportunities through integration include chronic kidney disease, pulmonary heart disease, and other heart disease.

Figure 14 shows similar results for the Medicaid population, comparing costs of patients both with and without a comorbid behavioral condition. Due to the level of data available, we were not able to segregate results by SPMI, Non-SPMI MH, and substance use disorder. Additionally, the list of medical conditions available in the Medicaid data are different from the ones studied for the commercial and Medicare populations and more often reflect whole body systems rather than specific medical conditions.

FIGURE 14: IMPACT OF BEHAVIORAL COMORBIDITIES, MEDICAID POPULATION, 2017 TOTAL PMPM COSTS

BODY SYSTEM (CONDITION)	NO MH/SUD	MH/SUD
BENIGN/IN SITU/UNCERTAIN NEOPLASM	$922	$2,123
CARDIORESPIRATORY ARREST	$6,445	$6,896
CEREBROVASCULAR	$2,756	$4,432
COGNITIVE DISORDERS	$3,115	$4,772
DIABETES	$1,432	$3,181
EARS, NOSE, AND THROAT	$656	$1,954
EYES	$789	$2,182
GASTROINTESTINAL	$1,132	$2,595
GENITAL SYSTEM	$889	$2,066
HEART	$1,375	$2,867
HEMATOLOGICAL	$1,906	$4,034
LIVER	$1,784	$3,444
LUNG	$990	$2,568
MALIGNANT NEOPLASM	$2,569	$4,278
MUSCULOSKELETAL AND CONNECTIVE TISSUE	$931	$2,181
NEUROLOGICAL	$1,982	$3,177
NUTRITIONAL AND METABOLIC	$1,095	$2,583
PREGNANCY-RELATED	$1,540	$2,242
SKIN AND SUBCUTANEOUS	$804	$2,379
URINARY SYSTEM	$1,449	$3,217
VASCULAR	$2,428	$4,533
TOTAL (INCLUDING THOSE WITHOUT ANY MEDICAL CONDITIONS)	**$494**	**$1,708**

Blood-related conditions have the highest value opportunity per member in the Medicaid market, with additional costs of $2,128 PMPM for those with hematological conditions, and $2,105 for those with vascular conditions. Most other conditions have similar value opportunities, with savings potential ranging from $451 to $2,128 PMPM.

Note that the "Total" row above illustrates the total PMPM costs for the entire Medicaid population, including those with no medical conditions, as well as those with medical conditions other than the ones listed above (the "Total" row is not the total of the conditions listed in the rows above it).

TOTAL VALUE OPPORTUNITY THROUGH INTEGRATION OF COMORBID MEDICAL AND BEHAVIORAL CONDITIONS

Some of the conditions described above may provide significant potential for value through integration at an individual patient level but are low incidence medical conditions. Focusing efforts on those conditions may not provide the best total dollar savings opportunity overall. On the other hand, some chronic medical conditions are highly prevalent, but per member savings opportunities are lower, resulting in similar total overall savings but much larger disease management program costs. We studied the total additional healthcare cost dollars associated with a behavioral comorbidity for each medical condition.

Figures 15 through 17 display the total value opportunity through integration by medical condition for commercial, Medicare, and Medicaid populations. Value opportunities were calculated as the difference in per member per month costs between those treated for MH/SUD conditions and those not treated for MH/SUD conditions, multiplied by the enrolled member months for those members who would be targets for intervention (the members with a behavioral comorbidity). The number of members with chronic medical conditions and comorbid behavioral conditions (SPMI, Non-SPMI MH, or SUD) are also provided. Note that the value opportunities from each condition are not additive, because individuals can have multiple medical conditions (and in fact many do), and these individuals would be included separately under each of their conditions. In calculating the total value opportunity, we have removed this extra counting. As a result, the sum of each row does not equal the "Total" row. Medical conditions are listed from highest value opportunity to lowest.

FIGURE 15: ANNUAL VALUE OPPORTUNITY, COMMERCIAL POPULATION, TOTAL 2017 DOLLARS (MILLIONS)

MEDICAL CONDITION	COMORBID MEMBERS	SPMI	NON-SPMI MH	SUD	TOTAL
ENDOCRINE/METABOLIC DISORDERS	10,751,367	$21,976	$53,573	$10,404	$76,555
ARTHRITIS	4,923,806	$12,379	$33,542	$6,059	$47,133
HYPERTENSION (WITHOUT COMPLICATIONS)	4,962,650	$7,664	$22,296	$4,332	$30,599
HYPERCHOLESTEROLEMIA (WITHOUT COMPLICATIONS)	4,488,569	$6,480	$18,523	$2,927	$24,918
ASTHMA	2,072,841	$6,754	$15,467	$3,232	$23,272
CANCER	1,611,310	$3,577	$14,551	$2,048	$18,671
CONGESTIVE HEART FAILURE	1,436,759	$3,322	$9,055	$2,023	$12,622
DIABETES (WITH COMPLICATIONS)	1,194,150	$3,143	$9,540	$1,402	$12,565
DIABETES (WITHOUT COMPLICATIONS)	1,917,610	$3,158	$8,907	$1,135	$11,774
ANEMIA	882,975	$2,702	$8,399	$1,817	$11,541
CHRONIC OBSTRUCTIVE PULMONARY DISEASE	747,268	$2,606	$6,400	$2,168	$10,088
HYPERTENSION (WITH COMPLICATIONS)	1,029,241	$2,516	$7,148	$1,483	$9,975
OTHER HEART DISEASE	844,686	$2,489	$6,649	$1,214	$9,424
BACK PAIN	786,752	$2,340	$5,170	$1,649	$7,963
HYPERCHOLESTEROLEMIA (WITH COMPLICATIONS)	839,811	$1,961	$5,667	$1,154	$7,806
ISCHEMIC HEART DISEASE	583,168	$1,432	$4,513	$844	$6,175
CHRONIC PAIN	715,737	$1,100	$3,292	$671	$4,251
EPILEPSY	235,791	$2,080	$1,954	$574	$4,167
CHRONIC KIDNEY DISEASE	255,569	$582	$3,053	$440	$3,638
LIVER DISEASE	234,174	$786	$2,152	$863	$3,245
OSTEOPOROSIS	190,286	$617	$1,564	$240	$2,197
STROKE	177,737	$589	$1,321	$285	$2,016
PULMONARY HEART DISEASE	96,839	$396	$1,165	$115	$1,561
HEADACHE	67,190	$203	$376	$101	$587
NO MEDICAL CONDITION	**16,185,202**	**$20,036**	**$33,205**	**$7,821**	**$54,994**
ANY MEDICAL CONDITION	**18,175,661**	**$33,913**	**$87,871**	**$16,666**	**$124,251**
TOTAL	**34,360,862**	**$53,948**	**$121,076**	**$24,487**	**$179,245**

We now estimate a total annual value opportunity of $179 billion in the commercial market through integration, compared to $162 billion in our 2012 cost analysis (a portion of this potential healthcare cost savings can actually be realized as discussed in the next section). A majority of the healthcare cost savings potential in the commercial market comes through effective integration of non-SPMI mental conditions. Endocrine/metabolic disorders ($77 billion), arthritis ($47 billion), hypertension without complications ($31 billion), and hypercholesterolemia without

complications ($25 billion) provide the highest value opportunities in the commercial market. Comorbid non-SPMI conditions make up the highest portion of total value opportunity.

The table in Figure 16 shows similar results for the entire Medicare population.

FIGURE 16: ANNUAL VALUE OPPORTUNITY, MEDICARE POPULATION, TOTAL 2017 DOLLARS (MILLIONS)

MEDICAL CONDITION	COMORBID MEMBERS	SPMI	NON-SPMI MH	SUD	TOTAL
ENDOCRINE/METABOLIC DISORDERS	3,052,334	$19,806	$11,381	$7,444	$36,606
ARTHRITIS	1,768,014	$11,889	$6,607	$4,142	$21,581
HYPERTENSION (WITHOUT COMPLICATIONS)	1,727,055	$9,628	$5,091	$3,493	$17,230
OTHER HEART DISEASE	866,889	$7,346	$4,566	$2,801	$13,885
HYPERTENSION (WITH COMPLICATIONS)	755,691	$6,791	$4,078	$2,412	$12,533
DIABETES (WITH COMPLICATIONS)	764,602	$6,467	$4,150	$2,172	$12,178
ISCHEMIC HEART DISEASE	644,382	$5,867	$3,606	$2,098	$10,969
CHRONIC OBSTRUCTIVE PULMONARY DISEASE	795,824	$5,350	$2,884	$2,055	$9,764
HYPERCHOLESTEROLEMIA (WITHOUT COMPLICATIONS)	931,588	$4,319	$2,121	$1,322	$7,438
CHRONIC KIDNEY DISEASE	462,924	$3,636	$2,425	$1,591	$7,139
ANEMIA	681,031	$3,645	$2,123	$1,884	$6,953
CANCER	543,614	$3,269	$2,397	$1,161	$6,540
CONGESTIVE HEART FAILURE	381,028	$2,893	$2,003	$1,303	$5,658
HYPERCHOLESTEROLEMIA (WITH COMPLICATIONS)	353,156	$2,904	$2,080	$886	$5,629
STROKE	258,173	$2,430	$1,269	$653	$4,155
ASTHMA	318,383	$2,101	$1,110	$1,134	$3,974
DIABETES (WITHOUT COMPLICATIONS)	424,310	$2,135	$926	$763	$3,626
EPILEPSY	160,040	$1,384	$398	$517	$2,099
OSTEOPOROSIS	173,686	$1,081	$635	$239	$1,860
LIVER DISEASE	103,604	$714	$353	$586	$1,465
PULMONARY HEART DISEASE	80,556	$646	$488	$297	$1,318
NO MEDICAL CONDITION	**729,517**	**$3,023**	**$1,497**	**$1,077**	**$5,452**
ANY MEDICAL CONDITION	**4,502,993**	**$24,972**	**$14,340**	**$9,418**	**$46,457**
TOTAL	**5,232,509**	**$27,995**	**$15,836**	**$10,495**	**$51,909**

We estimate a total annual value opportunity of $52 billion in the Medicare market through integration of MH/SUD and medical treatments. As in the commercial population, endocrine/metabolic disorders ($37 billion), arthritis ($22 billion), and hypertension without complications ($17 billion) provide the most value potential among Medicare patients. Comorbid SPMI conditions make up a higher portion of total value potential here, which differs from the results for the commercial market.

The table in Figure 17 shows similar results for the entire Medicaid population—the total annual value opportunity for Medicaid beneficiaries with comorbid medical conditions and MH/SUD conditions.

FIGURE 17: ANNUAL VALUE OPPORTUNITY, MEDICAID POPULATION, TOTAL 2017 DOLLARS (MILLIONS)

BODY SYSTEM (CONDITION)	COMORBID MEMBERS	TOTAL
MUSCULOSKELETAL AND CONNECTIVE TISSUE	7,442,412	$89,332
NUTRITIONAL AND METABOLIC	5,407,575	$77,228
EARS, NOSE, AND THROAT	5,984,556	$74,564
GASTROINTESTINAL	5,096,668	$71,588
LUNG	4,364,948	$66,123
SKIN AND SUBCUTANEOUS	4,074,976	$61,646
HEART	4,240,697	$60,738
EYES	3,925,360	$52,514
URINARY SYSTEM	2,280,032	$38,685
GENITAL SYSTEM	3,050,352	$34,445
HEMATOLOGICAL	1,569,828	$32,071
NEUROLOGICAL	2,598,603	$29,800
DIABETES	1,559,106	$26,172
LIVER	1,616,125	$25,751
VASCULAR	932,502	$18,845
BENIGN/IN SITU/UNCERTAIN NEOPLASM	1,415,930	$16,329
COGNITIVE DISORDERS	662,268	$10,530
MALIGNANT NEOPLASM	443,888	$7,282
CEREBROVASCULAR	393,658	$6,331
PREGNANCY-RELATED	629,320	$4,241
CARDIORESPIRATORY ARREST	354,936	$1,538
TOTAL (INCLUDING THOSE WITHOUT ANY MEDICAL CONDITIONS)	**15,027,132**	**$175,172**

We estimate a total annual value opportunity of $175 billion in the Medicaid market through integration of MH/SUD and medical treatments. The value opportunity was similar for most conditions on a per-patient basis, as shown above in Figure 14. Consequently, conditions with higher prevalence exhibit a greater total value potential. Musculoskeletal and connective tissue, nutritional and metabolic, ear/nose/throat, and gastrointestinal conditions have the highest value potential. Although they are the most valuable on a per-patient basis, low-prevalence vascular and hematological conditions are smaller in terms of total value opportunity through integration in the Medicaid population.

Note that the total row is the total for the entire Medicaid population, and not just the sum of the condition-specific rows above it. The total row also counts only once the savings from people who have multiple conditions.

Across all populations (commercial plus Medicare plus Medicaid), we estimate a total annual value opportunity of $406 billion through integration of behavioral and medical services in the United States, which represents about a 7% annualized increase from our 2012 cost analysis. Endocrine/metabolic disorders show the highest cost savings opportunities in both the commercial and Medicare markets. When combining those with and without complications, hypertension has the second greatest value opportunity in both the commercial ($41 billion) and Medicare ($30 billion) markets.

While high-cost conditions such as congestive heart failure provide substantial potential value on a per-patient basis, higher-prevalence conditions such as hypertension and arthritis provide the most value potential for the entire population.

Note that we are not suggesting that the members with these highlighted medical conditions are necessarily the best targets for integration. The decision to optimally focus limited resources on integration to fewer medical conditions should be based on the costs of integration specific to those conditions and the likelihood of being able to improve both clinical and financial outcomes for the selected patient cohorts. This analysis does not address the clinical efficacy of targeting any particular condition. This question falls outside the scope of this report, and is a good subject for further analysis. There also may be other unmeasured or unknown medical or epidemiological factors that make the actual value proposition different from what is noted here.

Next, we look at the potential financial impact of reducing total healthcare costs for those with comorbid conditions through effective integration of medical and behavioral services.

FINANCIAL IMPACT OF EFFECTIVE IMBH PROGRAMS

Cost-effectiveness research has examined a variety of approaches to integrated medical-behavioral healthcare over the past three decades, with most studies finding that integrated care can lead to reductions in total healthcare costs. Typical cost savings estimates range from 5% to 10% of total healthcare costs over a period of two to four years for patients receiving collaborative care, although the most robust evidence is in the care of depression in older adults.

Intermountain Healthcare, a fully integrated delivery system, completed a retrospective, longitudinal study of patients receiving care in integrated team-based practices versus traditional practices and studied patient outcomes, healthcare utilization, and cost differences.[7] From January 2010 through December 2013, patients in team-based care had 11% fewer hospital admissions, 23% fewer ER visits, 7% fewer primary care visits, 2% fewer specialty care visits, 1% fewer urgent care visits, and 3% lower total healthcare costs. Patients with at least one chronic condition also showed significant cost savings in team-based care.

One study focused on a collaborative depression care management program directed toward a low-income, predominantly Hispanic population with diabetes.[8] The program, called the Multifaceted Diabetes and Depression Program (MDDP), was administered through a randomized clinical trial and was compared with enhanced usual care (EUC). Although not statistically significant, medical cost savings of approximately $39 PMPM were observed during the 18 months following the implementation of the MDDP program. The study identified the 95% confidence interval for the savings of the program as savings of $110 PMPM at the upper limit to an additional cost (or negative savings) of $32 PMPM at the lower limit.[9]

The Pathways study focused on the outcomes of a program utilizing specialized nurses to deliver a 12-month depression treatment program for patients with diabetes.[10] This program was administered through a randomized controlled trial that compared the systematic depression treatment program with care as usual. Total outpatient costs were approximately equal during the 12-month intervention period for both the intervention group and the usual care group, but during the 12-month period following the intervention, median outpatient costs for the intervention group were $50 PMPM lower than costs for the usual care group. Over the entire two-year period, including the intervention period, total healthcare costs (including inpatient and outpatient health services) were $46 PMPM lower for the intervention group than for the usual care group. This represents savings of about 5% of total healthcare costs for the intervention group over a two-year period.

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[7] Reiss-Brennan, B., Brunisholz, K.D., Dredge, C. et al. (August 2016). Association of Integrated Team-Based Care With Health Care Quality, Utilization, and Cost. *JAMA*. 2016;316(8):826–834. Retrieved January 30, 2018, from http://doi:10.1001/jama.2016.11232.

[8] Hay, J. W., Katon, W. J., Ell, K., Lee, P.-J., & Guterman, J. J. (2012). Cost effectiveness analysis of collaborative care management of major depression among low-income, predominantly Hispanics with diabetes. *Value in Health*, 15(2), 249–254. Retrieved January 30, 2018, from http://doi.org/10.1016/j.jval.2011.09.008.

[9] Figure 1 in this study shows that the 98% confidence interval is -$194.92 to $660.88 for six-month cost differences. Dividing these numbers by six leads to $110 PMPM savings to $32 PMPM loss, with a midpoint of $39 PMPM.

[10] Katon, W.J., Von Korff, M., Lin, E.H.B. et al. (October 2004). The Pathways Study: A Randomized Trial of Collaborative Care in Patients With Diabetes and Depression. *Arch Gen Psychiatry*. 2004;61(10):1042–1049. Retrieved January 30, 2018, from http://doi:10.1001/archpsyc.61.10.1042.

The IMPACT study focused on a 12-month collaborative care management program for elderly patients with depression.[11] The program was administered through a randomized clinical trial that compared a collaborative care intervention using teams of depression care managers, primary care doctors, and psychiatrists in the usual care for depression. Total healthcare costs were tracked for a four-year period following the intervention, and costs for the intervention group were an average of $70 PMPM lower than costs for those receiving usual care. This represents savings of about 10% of total healthcare costs for the intervention group over a four-year period. Patients in the collaborative care management program had lower costs in every category that was observed, and the results of a bootstrap analysis indicated that patients in the collaborative care program were 87% more likely to have lower total healthcare costs than those receiving usual care.

Missouri established Community Mental Health Center healthcare homes in 2012 for Medicaid-eligible persons with serious and persistent mental illnesses, comorbid mental health and substance use disorders, and certain chronic medical conditions comorbid with a mental health or substance use disorder.[12] The early results showed that independent living increased by 33%, vocational activity increased by 44%, legal involvement decreased by 68%, psychiatric hospitalization decreased by 52%, and overall healthcare costs decreased by 8.1%.

A meta-analysis of cost-effectiveness research studies identified 22 studies addressing the economics of collaborative care over the past three decades.[13] In nearly all of these studies, collaborative care programs were found to be at least cost-neutral, with most studies indicating actual savings. One study compared the financial outcomes of clinics newly practicing collaborative care to demographically similar clinics practicing usual care. Healthcare costs increased for both groups of clinics following the start of the program, but clinics practicing collaborative care saw only 73% of the increase that clinics practicing usual care experienced, and their patients were 54% less likely to use the ER and 49% less likely to use inpatient psychiatric care. Additional studies and innovation projects will be needed to confirm these findings in other populations and non-research settings.

[11] Unützer, J., Katon, W. J., Fan, M.-Y., Schoenbaum, M. C., Lin, E. H. B., Penna, R. D. D., & Powers, D. (2008). Long-term cost effects of collaborative care for late-life depression. *American Journal of Managed Care*, 14(2), 95–100.

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[13] Verughese, J. et al. (May 2012). Economics of collaborative care for management of depressive disorders: A community guide systematic review. *American Journal of Preventive Medicine*, Retrieved January 30, 2018, from http://www.sciencedirect.com/science/article/pii/S0749379712000566.

Putting things in perspective

Patients with behavioral health conditions cost an estimated $752 billion in healthcare expenditures annually. Literature suggests that an estimated 5% to 10% of these total healthcare expenditures for those with behavioral conditions may be eliminated through effective integration of behavioral healthcare with medical care. In our 2017 cost estimates, total cost savings were estimated by applying 5% to 10% expected savings to the total costs for MH/SUD patients in the commercial and Medicare markets and 5% to 7% in the Medicaid market to introduce conservatism into the Medicaid estimate. The Medicaid population tends to have less stable enrollment periods and is more difficult to manage than the commercially insured or Medicare populations. These calculations result in projected annual savings of $38 billion to $68 billion through IMBH efforts, or 9% to 17% of the total value opportunity of $406 billion in the commercial, Medicare, and Medicaid markets as shown in Figures 15 to 17 above.

The Association of American Medical Colleges reported that there were 37,296 psychiatrists practicing patient care as of 2013.[14] The Bureau of Labor Statistics estimates average annual earnings of $200,220 per practicing psychiatrist as of May 2016.[15] This translates to $7.5 billion in psychiatrist wages annually. The American Psychological Association estimates that there are 106,500 licensed psychologists in the United States as of 2012.[16] The average annual earnings for psychologists in 2017 is $84,486 according to Salary.com, which translates to $9.0 billion in annual wages for psychologists.[17] Comparing these estimates to the projected savings estimate of $38 billion to $68 billion means that the potential financial impact of IMBH programs can be up to 2.3 to 4.1 times the annual earnings of all practicing psychiatrists and psychologists combined. Stated another way, even if the current supply of psychiatrists and psychologists were doubled in order to support effective multidisciplinary IMBH programs, the savings from those programs would more than offset that investment.

The total national expenditures for mental health and substance use services is projected to be about $240 billion in 2017.[18] These projected healthcare cost savings represent 16% to 28% of all spending for mental health and substance use services.

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[14] 2014 Physician Specialty Databook (November 2014). Center for Workforce Studies, Association of American Medical Colleges

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Conclusions: Where do we go from here?

There is clear potential for healthcare expenditure savings through effective integration of behavioral healthcare with medical services. Figure 18 summarizes membership, claims, and potential reduction in healthcare costs through integration.

FIGURE 18: AVERAGE ANNUAL COST SAVINGS AND IMPACT THROUGH EFFECTIVE INTEGRATION, 2017 TOTALS (MILLIONS)

PAYER TYPE	MEMBER MONTHS	TOTAL CLAIMS	VALUE OPPORTUNITY	COST SAVINGS
COMMERCIAL	2,021,000,000	$1,098,193	$179,245	$19,284-$38,568
MEDICARE	656,000,000	$561,206	$51,909	$5,995-$11,990
MEDICAID	721,000,000	$531,324	$175,172	$12,320-$17,248
TOTAL	**3,399,000,000**	**$2,190,723**	**$406,326**	**$37,599-$67,806**

The potential cost impact of $38 billion to $68 billion is several times larger than the estimates of total salaries for both psychiatrists and psychologists and represents 16% to 28% of all spending for mental health and substance use services.

To realize these savings, it may be best to implement integration among conditions that show the highest potential for savings either per person or across the entire population. Figures 11 to 17 show that high-severity conditions such as anemia, liver disease, congestive heart failure, chronic kidney disease, and circulatory conditions have the greatest potential for savings on a per patient basis, while high-incidence illnesses such as endocrine/metabolic disorders, arthritis, and hypertension have the greatest potential for savings across the entire population. Regarding comorbid behavioral conditions, those with more severe SPMI and substance use disorder conditions have the greatest potential for savings on a per patient basis. Non-SPMI MH conditions are more prevalent and therefore represent a higher portion of the savings for all patients combined; although, for a Medicare-specific population, SPMI conditions show higher potential savings than non-SPMI MH conditions.

Potential healthcare savings should not be the only factor used in determining the conditions on which to concentrate integration efforts. Further analysis is needed in order to identify which specific medical and behavioral conditions are clinically responsive to integrated physical and behavioral care. Because the prevalence and severity of each condition varies between different subpopulations, a careful review of the specific needs of any particular population should be conducted in order to tailor integrated care efforts in a way that makes sense for the population to be impacted. Additional consideration should be given to which comorbid conditions and patients that physicians, practitioners, and care management teams believe can most optimally improve clinical and financial outcomes, thus reducing healthcare expenditures through their integration implementation efforts.

Appendix A: Study Design and Methodology

SAMPLE SELECTION

People eligible for inclusion for the commercial and Medicare populations must meet the following criteria:

1. Must have at least three months of enrollment in 2014 to ensure that minimum credible claim data to identify chronic conditions was present.
2. Must have 12 months of continuous enrollment in 2015.
3. Must be eligible for pharmacy benefits in both 2014 and 2015 during the entire period of enrollment (applicable for commercial members only).

Patients with chosen conditions in 2014 were identified and the patients' healthcare utilization and costs were followed through 2015.

The Medicaid population was based on 2010 proprietary state Medicaid data, and all sample data sets were adjusted to target national 2017 estimates, as described in Appendix E.

CONDITION SELECTION

Twenty-four chronic medical conditions were chosen for analysis for the commercial and Medicare populations:

- Anemia
- Arthritis
- Asthma
- Back pain
- Cancer (malignant)
- Congestive heart failure (CHF)
- Chronic kidney disease (CKD)
- Chronic obstructive pulmonary disease (COPD)
- Chronic pain (excluding back pain and headache)
- Diabetes
  - With complications (IHD, CHF, stroke, CKD)
  - Without complications
- Endocrine/metabolic disorders
- Epilepsy
- Headache
- Hypercholesterolemia
  - With IHD, CHF, or stroke
  - Without IHD, CHF, or stroke
- Hypertension
  - With IHD, CHF, or stroke
  - Without IHD, CHF, or stroke
- Ischemic heart disease (IHD)
- Liver disease (LIV)
- Other heart disease (OHD)
- Osteoporosis
- Pulmonary heart disease (PHD)
- Stroke

Twenty-one condition categories were chosen for analysis for the Medicaid population:

- Benign/in situ/uncertain neoplasm
- Cardiorespiratory arrest
- Cerebrovascular
- Cognitive disorders
- Diabetes
- Ears, nose, and throat
- Eyes
- Gastrointestinal
- Genital system
- Heart
- Hematological
- Liver
- Lung
- Malignant neoplasm
- Musculoskeletal and connective tissue
- Nutritional and metabolic
- Neurological
- Pregnancy-related
- Skin and subcutaneous
- Urinary system
- Vascular

Fourteen MH/SUD disorders were selected for this study based on ease of identification in claim data:

- Adjustment reaction
- Alcoholism
- Anxiety
- Bipolar disorder
- Dementia
- Depression
  - Major
  - Minor

- Drug abuse
- Eating disorder
- Paranoid and other psychotic disorders
- Post-traumatic stress disorder (PTSD)
- Psychosis
- Schizoaffective disorder
- Somatoform disorders

Criteria for identification of chronic medical conditions and comorbid behavior conditions are provided in Appendix B.

Appendix B: Identification of Medical and Behavioral Conditions (commercial and Medicare)

Certain conditions were identified using only the primary and secondary ICD-9 diagnosis codes for claims for inpatient (IP), emergency (ER), and outpatient (OP) healthcare services. For other conditions, pharmacy-based criteria were used as well. A member can have multiple chronic medical conditions; these members were analyzed once for each condition. The diagnosis code(s) and pharmacy criteria for identifying each of the conditions are described below. Note that the pharmacy-based criteria was used for the commercial population only due to the lack of pharmacy data for the Medicare population.

For prescription-based criteria, when drugs were used to treat up to four conditions, we required presence of a diagnosis code within 30 days prior to the prescription to identify the condition. If a drug is used to treat a single condition, then we did not require the "diagnosis within 30 days" criteria. Certain conditions are treated with prescription medications that are also used for more than four other conditions. Because these drugs do not help us uniquely identify the patient's condition, we have not included such drugs in the condition identification criteria below.[19]

For certain chronic conditions that are managed using drugs (arthritis and osteoporosis), we may see only prescription claims and no diagnosis of the condition. In such cases, we applied age-and-gender-based criteria to reduce the false positives. For example, for osteoporosis, if only prescriptions for the condition but no diagnosis codes are available, then we required that the member also be a female over the age of 50 to be assessed as having osteoporosis.

Certain prescription-based criteria use therapeutic classes when the drugs within the class uniquely identify a particular condition.

Other prescription-based condition-identification criteria were obtained from Milliman Underwriting Guidelines. The guidelines include uses not approved by the U.S. Food and Drug Administration (FDA) for some of the drugs. If a drug has three or more FDA-approved uses, then the non-FDA-approved conditions for that drug would not be listed. If the drug has fewer than three FDA-approved uses, then they would list up to three "generally accepted" uses. If no such uses exist, then up to three "limited evidence uses" are listed.

CRITERIA FOR DETERMINATION OF MEDICAL AND BEHAVIORAL CONDITIONS

To ensure that we believe credible evidence exists of chronic medical and comorbid behavioral conditions, we applied the following criteria to determine presence of a condition:

- For all conditions where drug-based identification criteria are not used, members had to meet any one of the following criteria: member must have one IP admission, one ER visit, or two OP visits with a diagnosis code identified above.

- For all other conditions except chronic pain, the member had to meet any one of the following criteria: one IP admission, one ER visit, one OP visit and one Rx script (when the Rx is used to treat only condition), one OP visit and one Rx within 30 days of an OP visit (when the Rx is used to treat more than one condition), or two OP visits or two Rx scripts related to the condition (that is, diagnosis code for the condition was present on the visit or the script met the therapeutic class and generic name criteria described above).

- The chronic pain identification criteria are described below.

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[19] This criteria was developed with the guidance of external expert opinion, provided by a psychiatrist and internal medicine physician.

CHRONIC MEDICAL CONDITIONS

Anemia

Any claim with a diagnosis code in the 280.XX-285.XX range.

Arthritis

Any claim with a diagnosis code in the 710.XX-719.XX range.

Asthma

Any claim with a diagnosis code in the 493.XX-493.XX range, or a prescription drug claim with a National Drug Code (NDC) number identified as an asthma medication according to the National Committee for Quality Assurance (NCQA).

Back pain

Any claim with a diagnosis code of 724.XX for patients who had a pain medication possession ratio (MPR) for 75% of their enrolled periods.

Cancer (malignant)

Any claim with a diagnosis code in the 140.XX-208.XX or 230.XX-239.XX ranges.

Congestive heart failure (CHF)

Any claim with a diagnosis code of 402.01, 402.11, 402.91, 404.01, 404.11, or 428.XX. Several drug classes are used to treat CHF. However, the only therapeutic classes that appear to uniquely identify CHF are "Cardiac, Cardiac Glycosides," "Diuretics, Misc.," "Diuretics, Loop Diuretics," "Diuretics, Osmotic," "Diuretics, Potassium-Sparing," and "Diuretics, Carb Anhydrase Inhib." Other therapeutic classes such as "Cardiac, ACE Inhibitors" and "Diuretics, Thiazides & related" are also used to treat other conditions and, therefore, excluded from this criteria.

Chronic kidney disease

Any claim with a diagnosis code in the 580.XX-589.XX range.

Chronic obstructive pulmonary disease (COPD)

Any claim with a diagnosis code in one of the following ranges: 490.XX to 492.XX, 494.XX to 496.XX, or 500.XX to 508.XX.

Or any member over the age of 50 and having at least two prescription drug claims for any of the drugs shown in the table in Figure 19.

FIGURE 19: COPD PRESCRIPTION DRUGS

AIRET	ARALAST	ARCAPTA NEOHALER	COMBIVENT	DALIRESP
GLASSIA	PERFOROMIST	PROLASTIN	SPIRIVA	VOLMAX
ZEMAIRA				

Or at least one prescription drug claim within 30 days of diagnosis for any of the drugs shown in the table in Figure 20.

FIGURE 20: COPD PRESCRIPTION DRUGS

ACCUNEB	ACETYLCYSTEINE	ADVAIR	AEROBID	AEROLATE
ALBUTEROL	AMINOPHYLLINE	BRONDIL	BROVANA	CEDAX
COPD	DG 200	DIFIL-G	DILEX-G	DILOR
DUONEB	DYFLEX-G	DY-G	DYLIX	DYPHYLLINE-GG
ELIXOPHYLLIN	FACTIVE	FLOVENT DISKUS	FORADIL AEROLIZER	JAY-PHYL
KETEK	LEVALBUTEROL	LUFYLLIN	MUCOMYST	PROAIR
PROVENTIL	QUIBRON-T	QVAR	SYMBICORT	THEO-24
THEOCAP	THEOCHRON	THEOLAIR	THEOPHYLLINE	UNIPHYL
VENTOLIN HFA	VOSPIRE ER	XOPENEX		

Chronic pain

Any claim with a diagnosis code of 338.2X and an MPR of 75% (as described under Back Pain above). Any patient with chronic back pain and chronic headaches are not counted under this condition; they are carved out into separate conditions.

Diabetes mellitus

Any claim with a diagnosis code of 250.XX or a pharmacy drug claim with a therapeutic class of "Diabetes Mell/Diab Supply NEC," "Antidiabetic Ag, Sulfonylureas," "Antidiabetic Agents, Insulins," or "Antidiabetic Agents, Misc" resulted in the assignment of this condition.

Complications: Member must also have had ischemic heart disease (IHD), CHF, stroke, kidney disease, retinopathy, or neuropathy. Retinopathy was identified as claims with a diagnosis code starting with 362.0X. Neuropathy was identified as claims with a diagnosis code starting with 365.0X or 356.8X. All other conditions were identified as mentioned elsewhere in this section.

Endocrine/metabolic disorders

Any claim with a diagnosis code in the 240.XX-279.XX range.

Epilepsy

Any claim with a diagnosis code of 345.XX.

Headache

Any claim with a diagnosis code of 784.0X and an MPR of 75% (as described under Back Pain above).

Hypercholesterolemia

Any claim with a diagnosis code of 272.0, 272.1, 272.2, 272.3, 272.4, or 272.9.

Or at least two prescription drug claims for any of the drugs shown in the table in Figure 21.

FIGURE 21: HYPERCHOLESTEROLEMIA PRESCRIPTION DRUGS

ADVICOR	ANTARA	FENOFIBRATE	FENOFIBRIC ACID	FENOGLIDE
FIBRICOR	LIPOFEN	LIVALO	LOFIBRA	LOVAZA
NIASPAN	SIMCOR	TRICOR	TRIGLIDE	TRILIPIX
VYTORIN	ZETIA			

Or at least one prescription drug claim within 30 days of diagnosis for any of the drugs shown in the table in Figure 22.

FIGURE 22: HYPERCHOLESTEROLEMIA PRESCRIPTION DRUGS

ALTOPREV	AMLODIPINE BESYLATE / ATORVASTATIN CALCIUM	ATORVASTATIN CALCIUM	CADUET	CARDIOSTEROL
CHOLESTYRAMINE	COLESTID	COLESTIPOL	CRESTOR	GEMFIBROZIL
JUVISYNC	LESCOL	LIPITOR (BRAND)	LOPID	LOVASTATIN
MEVACOR	MICRONIZED COLESTIPOL HCL	NEO-FRADIN	NIACIN	PANTOTHENIC ACID
POLICOSANOL	PREVALITE	QUESTRAN	SIMVASTATIN	VANADIUM
WELCHOL	ZOCOR	ZYNCOL		

Hypertension

Any claim with a diagnosis code in the 401.XX-405.XX range except for those in the range for congestive heart failure above.

Or at least two prescription drug claims for any of the drugs shown in the table in Figure 23.

FIGURE 23: HYPERTENSION PRESCRIPTION DRUGS

ACCURETIC	ALDOCLOR	ALDORIL	AMLODIPINE BESYLATE / BENAXEPRIL HYDROCHLORIDE	AMTURNIDE
AVALIDE	AZOR	BISOPROLOL FUMARATE / HYDROCHLOROTHIAZIDE	BYSTOLIC	CARTROL
CLEVIPREX	CLORPRES	CORLOPAM	CORZIDE	EDARBI
ENALAPRILAT	ENDURONYL	EPROSARTAN MESYLATE	EXFORGE	EXFORGE HCT
FENOLDOPAM MESYLATE	FOSINOPRIL SODIUM / HYDROCHLOROTHIAZIDE	GUANABENZ ACETATE	INDERIDE	INNOPRAN XL
KERLONE	LEVATOL	LOTREL	METHYCLOTHIAZIDE	METHYLDOPA / HYDROCHLOROTHIAZIDE
METHYLDOPATE HCL	MINIZIDE	MOEXIPRIL	NATURETIN	OLMESARTAN MEDOXOMIL
QUINARETIC	RAUWOLFIA / BENDROFLUMETHIAZIDE	TARKA	TEKAMLO	TEKTURNA
TEKTURNA HCT	TENORETIC	TEVETEN	TIMOLIDE	TRANDOLAPRIL / VERAPAMIL HCL
TRIBENZOR	TWYNSTA	UNIRETIC	UNIVASC	VALTURNA
ZIAC				

Or at least one prescription drug claim within 30 days of diagnosis for any of the drugs shown in the table in Figure 24.

FIGURE 24: HYPERTENSION PRESCRIPTION DRUGS

ACCUPRIL	ACEON	ADALAT	AFEDITAB	ALDACTAZIDE
ALTACE	AMLODIPINE BESYLATE	AMLODIPINE BESYLATE / ATORVASTATIN CALCIUM	ATACAND	ATENOLOL
AVAPRO	BENAZEPRIL HCL	BENICAR	BETAXOLOL HCL	BISOPROLOL FUMARATE
BLOCADREN	BREVIBLOC	BUMETANIDE	CADUET	CALAN
CAPOTEN	CAPOZIDE	CAPTOPRIL	CAPTOPRIL / HYDROCHLOROTHIAZIDE	CARDENE
CARDIZEM	CARDURA	CARTIA XT	CARVEDILOL	CATAPRES
CHLOROTHIAZIDE	CHLOROTHIAZIDE SODIUM	CHLORTHALIDONE	CLONIDINE HCL	COREG
CORGARD	COVERA-HS	COZAAR	DEMADEX	DEMSER
DIBENZYLINE	DILACOR	DILTIA XT	DILTIAZEM	DILT-XR
DILTZAC	DIOVAN	DIURIL	DOXAZOSIN MESYLATE	DYAZIDE
DYNACIRC	DYRENIUM	ENALAPRIL MALEATE	ENALAPRIL MALEATE / HYDROCHLOROTHIAZIDE	EPLERENONE
ESMOLOL HCL	FELODIPINE	FOSINOPRIL SODIUM	FUROSEMIDE	GUANFACINE HCL
HYDRALAZINE	HYDROCHLOROTHIAZIDE	HYTRIN	HYZAAR	INDAPAMIDE
INSPRA	ISOPTIN	ISRADIPINE	LABETALOL HCL	LASIX
LINSEED OIL	LISINOPRIL	LOSARTAN POTASSIUM	LOSARTAN POTASSIUM / HYDROCHLOROTHIAZIDE	LOTENSIN
LOZOL	LYTENSOPRIL	MAGNESIUM SULFATE	MATZIM LA	MAVIK
MAXZIDE	METHYLDOPA	METOLAZONE	METOPROLOL	MICARDIS
MICROZIDE	MIDAMOR	MINIPRESS	MINOXIDIL	MONOPRIL
NADOLOL	NEXICLON XR	NICARDIPINE HCL	NIFEDIAC CC	NIFEDICAL XL
NIFEDIPINE	NISOLDIPINE	NITROGLYCERIN	NITROPRESS	NORVASC
PERINDOPRIL ERBUMINE	PINDOLOL	PLENDIL	PRAZOSIN HCL	PRINIVIL
PRINZIDE	PROCARDIA	QUINAPRIL	RAMIPRIL	RENESE
RESERPINE	SODIUM EDECRIN	SULAR	TAZTIA XT	TENEX
TENORMIN	TERAZOSIN HCL	THALITONE	TIAZAC	TOPROL XL
TORSEMIDE	TRANDATE	TRANDOLAPRIL	TRIAMTERENE / HYDROCHLOROTHIAZIDE	VASERETIC
VASOTEC	VERAPAMIL HCL	VERELAN	ZAROXOLYN	ZEBETA
ZESTORETIC	ZESTRIL			

Ischemic heart disease

Any claim with a diagnosis code in the 410.XX-414.XX range.

Liver disease

Any claim with a diagnosis code in the 570.XX-573.XX range.

Osteoporosis

Any claim with a diagnosis code of 733.0X.

Or any female over the age of 50 and having at least two prescription drug claims for any of the drugs shown in the table in Figure 25.

FIGURE 25: OSTEOPOROSIS PRESCRIPTION DRUGS

ACTIMMUNE	ATELVIA	CALCITONIN-SALMON	FORTEO	FORTICAL
FOSTEUM				

Or at least one prescription drug claim within 30 days of diagnosis for any of the drugs shown in the table in Figure 26.

FIGURE 26: OSTEOPOROSIS PRESCRIPTION DRUGS

ACTIVELLA	ACTONEL	ALENDRONATE SODIUM	ALORA	BONIVA
CALAFOL	CALCIUM ACETATE	CALCIUM*	CAVAREST	CAVIRINSE
CITRUS CALCIUM + D	CLINPRO	CONTROLRX	DENTA 5000 PLUS	DENTAGEL
DENTALL 1100 PLUS	ESTRADERM	ESTROPIPATE	EVISTA	FEMHRT
FLORICAL	FLUORIDE MOUTHWASH	FLUORIDEX DAILY DEFENSE	FLUORIGARD	FOSAMAX
GYNODIOL	JEVANTIQUE	JINTELI	KARIGEL	LISTERINE TOOTH DEFENSE
LISTERMINT	MENOSTAR	MIACALCIN	MIMVEY	NAFRINSE
NEUTRAGARD ADVANCED	NEUTRAL SODIUM FLUORIDE	NITROBID	OGEN	ORTHO-EST
PHOS-FLUR	PHOS-FLUR OTC	PREFEST	PREMPHASE	PREMPRO
PREVIDENT	PROLIA	RECLAST	REMBRANDT	SODIUM FLUORIDE
SODIUM FLUORIDE PLAIN	THERA-FLUR-N	VIVELLE		

Other heart disease

Any claim with a diagnosis code of 429.XX or in the 420.XX-427.XX range.

Pulmonary heart disease

Any claim with a diagnosis code in the 415.XX-417.XX range.

Stroke (ischemic)

Any claim with a diagnosis code in the 430.XX-434.XX range.

Or any member over the age of 50 and having at least two prescription drug claims for Aggrenox.

Or at least one prescription drug claim within 30 days of diagnosis for any of the drugs shown in the table in Figure 27.

FIGURE 27: STROKE (ISCHEMIC) PRESCRIPTION DRUGS

ACTIVASE	ALTACE	ATORVASTATIN CALCIUM	CLOPIDOGREL	COZAAR
HYZAAR	JUVISYNC	LIPITOR (BRAND)	LIPITOR (GENERIC)	LOSARTAN POTASSIUM
LOSARTAN POTASSIUM / HYDROCHLOROTHIAZIDE	MICARDIS	NIMODIPINE	NIMOTOP	PLAVIX
PRADAXA	RAMIPRIL	REOPRO	SIMVASTATIN	TICLID
TICLOPIDINE HCL	XARELTO	ZOCOR		

BEHAVIORAL CONDITIONS

Adjustment reaction

Any claim with a diagnosis code in the range 309.XX-309.XX, excluding 309.81 (which is classified as PTSD below).

Alcoholism

Any claim with a diagnosis code of 303.XX, 305.0X, or 291.XX, excluding 291.2 (which is classified as dementia below).

Anxiety disorder

Any claim with a diagnosis code of 300.0X, 300.2X, 300.3X, or 308.X, or a pharmacy drug with a generic name of "Clonazepam" or "Buspirone Hydrochloride," or a pharmacy drug with a therapeutic class of "ASH, Benzodiazepines."

Bipolar disorder

Any claim with a diagnosis code in the 296.00-296.19 or 296.40-296.89 ranges, or a pharmacy drug claim with a therapeutic class of "Psychother, Antidepressants" within 30 days of diagnosis.

Dementia

Any claim with a diagnosis code of 290.XX, 291.2, 292.82, 292.83, or 294.1X.

Or any member over the age of 65 and having at least two prescription drug claims for Reminyl or Ergoloid Mesylates.

Or at least one prescription drug claim within 30 days of diagnosis for any of the drugs shown in the table in Figure 28.

FIGURE 28: DEMENTIA PRESCRIPTION DRUGS

CARDIOSTEROL	CLA	DHEA	ELDEPRYL	EMULSIFIED OMEGA-3
EPA	FISH OIL	GALANTAMINE	GINKGO BILOBA	NAMENDA
NICOTINE	OMEGA-3	RAZADYNE	SELEGILINE HCL	TRIPLE OMEGA COMPLEX
NAMENDA				

Depression

Minor depression was classified as any claim with a diagnosis code of 296.9X, 311, or 300.4, or at least two pharmacy drug claims with a therapeutic class of "Psychother, Antidepressants."

Major depression was classified as any claim with a diagnosis code in the 296.2X-296.3X range, or a pharmacy drug claim with a therapeutic class of "Psychother, Antidepressants" within 30 days of diagnosis.

Drug abuse

Any claim with a diagnosis code of 304.XX, 305.1X to 305.9X, or 292.XX, excluding 292.82 and 292.83 (which are classified under dementia above).

Eating disorder

Any claim with a diagnosis code of 307.1 or 307.5X.

Paranoid and other psychotic disorders

Any claim with a diagnosis code in the range 290.XX to 319.XX not otherwise specified in Appendix B, or a pharmacy drug claim with a therapeutic class of "Antimanic Agents, NEC" or "Psychother, Tranq/Antipsychotic" within 30 days of diagnosis.

Post-traumatic stress disorder (PTSD)

Any claim with a diagnosis code of 309.81.

Psychosis

Any claim with a diagnosis code in the range 297.XX to 298.XX.

Schizoaffective disorder

Any claim with a diagnosis code of 295.XX, or a pharmacy drug claim with a therapeutic class of "Antimanic Agents, NEC" or "Psychother, Tranq/Antipsychotic" within 30 days of diagnosis

Somatoform disorders

Any claim with a diagnosis code of 300.5 to 300.8X, 316, or 300.11.

Appendix C: Identification of Mental Health/Substance Use Disorder Categories

For those included in the study and identified as having comorbid behavioral conditions as defined in Appendix B, patients were identified as having serious and persistent mental illness (SPMI) diagnoses, mental health diagnoses but no serious and persistent mental illness (Non-SPMI MH) diagnoses, and substance use disorder (SUD) diagnoses based on the criteria below.

SERIOUS AND PERSISTENT MENTAL ILLNESS (SPMI)
Patients meeting the criteria for inclusion in the study and diagnosed with at least one comorbid behavioral condition as defined in Appendix B were identified as having SPMI diagnoses if the patient was identified as treated for a condition in the following list:

- Bipolar disorder

- Major depression

- Paranoid and other psychotic disorders

- Schizoaffective disorder

Since our prior report, we have expanded the definition of "paranoid and other psychotic disorders," which has increased the number of members classified as having an SPMI diagnosis.

MENTAL HEALTH DIAGNOSES BUT NO SERIOUS AND PERSISTENT MENTAL ILLNESS (NON-SPMI MH)
Patients meeting the criteria for inclusion in the study and diagnosed with at least one comorbid behavioral condition as defined in Appendix B were identified as having Non-SPMI MH diagnoses if no ICD-9 codes fell within the ranges to be considered for inclusion with SPMI diagnoses.

SUBSTANCE USE DISORDERS (SUD)
Patients meeting the criteria for inclusion in the study and diagnosed with at least one comorbid behavioral condition as defined in Appendix B were identified as having substance use disorder diagnoses if the patient was identified as treated for drug abuse or alcoholism. Individuals identified with substance use could also be identified as having SPMI or Non-SPMI MH conditions if they also met the criteria described above.

Appendix D: Claim Categories

We conducted our analysis by grouping claims into the healthcare service categories listed below. This allowed us to identify where the elevated costs existed and where the greatest potential for savings exists.

- Inpatient facility (behavioral)
- Inpatient facility (medical)
- OP facility (behavioral)
- OP facility (medical)
- Professional (behavioral)
- Professional (medical)
- Prescription drugs (behavioral)
- Prescription drugs (medical)

These categories were summarized into the following categories for Figures 2 and 3 above.

- Medical: Inpatient facility (medical), OP facility (medical), professional (medical)
- Behavioral: Inpatient facility (behavioral), OP facility (behavioral), professional (behavioral)
- Medical Rx: Prescription drugs (medical)
- Behavioral Rx: Prescription drugs (behavioral)

Medical claim service categories were determined using Milliman's proprietary Health Cost Guidelines™ Grouper (HCG Grouper) Software.[20] The software uses a variety of claim level detail, including revenue codes, Current Procedural Terminology (CPT) codes, Diagnosis-Related Group (DRG) codes, place of service codes, and diagnosis codes, in order to produce service category classifications.

We relied on therapeutic class and specific drug usage in order to identify behavioral prescription drugs. The logic used to classify service categories within the pharmacy data is listed below.

Prescription drugs: Behavioral

Any claims identified by the following criteria were allocated to these categories.

- Anti-anxiety drugs: Therapeutic classes of "ASH, Benzodiazepines," "Anticonvulsant, Benzodiazepine," and "Anxiolytic/Sedative/Hypnot NEC"; generic drugs "Conazepam" and "Buspirone Hydrochloride."
- Central nervous system (CNS) agents: Therapeutic classes of "Analg/Antipyr, Opiate Agonists," "Anticonvulsants, Misc," and "CNS Agents, Misc."
- Anti-psychotics: Therapeutic classes of "Antimanic Agents, NEC" and "Psychother,Tranq/Antipsychotic"; generic drug "Valproic Acid."
- Anti-depressants: Therapeutic class of "Psychother, Antidepressants."
- Anorexiants: Therapeutic class of "Stimulant, Amphetamine Type."
- Memory enhancers: The dementia medication described under the section for identifying dementia above.

Prescription drugs: Medical

Any prescription drug claim not categorized as a behavioral drug above is tagged under this category.

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[20] More information about Milliman's HCG Grouper can be found here: http://www.milliman.com/Solutions/Products/Resources/Health-Cost-Guidelines/Health-Cost-Guidelines---Grouper/

Appendix E: Claim Databases Used in Analysis

MARKETSCAN DATABASE

For purposes of the commercial analyses, the Truven MarketScan® Commercial Claims and Encounters research databases were used. The MarketScan databases represent the inpatient and outpatient healthcare service use of individuals in the United States who are covered by the benefit plans of large employers, health plans, and government and public organizations.

The MarketScan databases link paid claims and encounter data to detailed patient information across sites and types of providers, and over time. The annual medical database includes private-sector health data from approximately 100 payers. Historically, more than 500 million claim records are available in the MarketScan databases.

These data represent the medical experience of insured employees and their dependents (for active employees), early retirees, COBRA continues, and dependents insured by employer-sponsored plans. No Medicaid or workers' compensation data are included.

We used census estimates of commercial enrollment according to the National Health Expenditure (NHE) data produced by the Centers for Medicare and Medicaid Services (CMS) in order to produce member month and total cost spending results on a national basis. Rather than targeting the CMS commercial spending estimate for 2017 exactly (as this estimate relies primarily on survey data), we trended 2015 cost data forward two years using the assumptions shown in Appendix G.

MarketScan data for 2014 and 2015 were used in these analyses, covering a total of more than 700 million member months. When restricting our study to members who were eligible in both 2014 and 2015, with full 2015 prescription history, we are left with approximately 16.6 million individuals for study.

MEDICARE 5% SAMPLE

For purposes of the Medicare analyses, the Medicare 5% Sample claim database was used. This data contains claims and enrollment for a randomly selected, de-identified 5% of the Medicare population. Fee-for-service claims of all categories are counted in, including inpatient, outpatient hospital, skilled nursing facility (SNF), home health, hospice, physician and supplier, and durable medical equipment (DME). This data set includes approximately 2.9 million unique lives.

No commercial, Medicaid, or workers' compensation data are included. Pharmacy data is not included.

Because this data is only a subset of the Medicare population and is fee-for-service spending only, we made adjustments to arrive at an estimate of Medicare spending in total. We used 2017 enrollment estimates according to the NHE data from CMS to calculate Medicare enrollment and costs on a national basis. Rather than trending 2015 data to 2017, we applied additional adjustments to balance the cost estimates to the 2017 estimate of total Medicare personal healthcare spending according to NHE data. These adjustment factors are shown in Appendix G.

Sample data for 2014 and 2015 were used in these analyses. When restricting our study to members who were eligible in both 2014 and 2015, we are left with approximately 2.6 million individuals.

MEDICAID

As in our 2014 report, we used 2010 proprietary state Medicaid data as our starting point to inform the PMPM spending levels for people with various medical conditions with and without behavioral comorbidities. Because this data does not reflect the national estimates of average costs or prevalence rates, we made a variety of adjustments to arrive at our national estimates.

We balanced the average costs and enrollment in the proprietary state data to nationwide averages from CMS. We also adjusted the prevalence rates of various medical and behavioral conditions in the state-specific population to reflect a national estimate of prevalence rates using literature review and actuarial judgment. These adjustment factors are shown in Appendix G.

Appendix F: Demographic Comparisons Used in Extrapolation

Population differences were considered and reviewed when extrapolating the sample population to reflect the full populations for each payer type. Population distribution by gender and age characteristics for the commercial and Medicare samples are provided in Figures 29 (commercial) and 30 (Medicare). In both instances, population differences were considered minimal and no cost adjustments were made.

FIGURE 29: DEMOGRAPHIC DISTRIBUTION, COMMERCIAL SAMPLE

GENDER	AGE BAND	MARKETSCAN SAMPLE	COMMERCIAL CENSUS, 2016
FEMALE	00 TO 24	16.4%	15.2%
	25 TO 29	2.9%	3.6%
	30 TO 34	3.5%	3.5%
	35 TO 39	3.9%	3.5%
	40 TO 44	4.2%	3.3%
	45 TO 49	4.7%	3.8%
	50 TO 54	5.2%	3.9%
	55 TO 59	5.4%	3.9%
	60 TO 64	5.0%	3.5%
	65 TO 69	0.5%	2.3%
	70 TO 74	0.1%	1.6%
	75 TO 79	0.0%	1.0%
	80+	0.0%	1.5%
MALE	00 TO 24	17.1%	15.9%
	25 TO 29	2.7%	3.7%
	30 TO 34	3.0%	3.5%
	35 TO 39	3.4%	3.4%
	40 TO 44	3.7%	3.3%
	45 TO 49	4.1%	3.6%
	50 TO 54	4.5%	3.6%
	55 TO 59	4.7%	3.6%
	60 TO 64	4.3%	3.1%
	65 TO 69	0.6%	2.2%
	70 TO 74	0.1%	1.4%
	75 TO 79	0.0%	0.9%
	80+	0.0%	1.0%

FIGURE 30: DEMOGRAPHIC DISTRIBUTION, MEDICARE SAMPLE

GENDER	AGE BAND	MEDICARE 5% SAMPLE	MEDICARE CENSUS, 2016
FEMALE	00 TO 24	0.1%	0.5%
	25 TO 29	0.2%	0.3%
	30 TO 34	0.3%	0.3%
	35 TO 39	0.4%	0.3%
	40 TO 44	0.6%	0.5%
	45 TO 49	0.9%	0.5%
	50 TO 54	1.4%	1.1%
	55 TO 59	1.9%	1.6%
	60 TO 64	2.0%	2.3%
	65 TO 69	14.6%	14.6%
	70 TO 74	11.2%	12.1%
	75 TO 79	8.1%	8.4%
	80+	12.7%	12.6%
MALE	00 TO 24	0.1%	0.5%
	25 TO 29	0.3%	0.3%
	30 TO 34	0.4%	0.4%
	35 TO 39	0.5%	0.4%
	40 TO 44	0.7%	0.4%
	45 TO 49	0.9%	0.6%
	50 TO 54	1.5%	1.0%
	55 TO 59	2.0%	1.5%
	60 TO 64	2.1%	1.8%
	65 TO 69	13.4%	12.6%
	70 TO 74	9.7%	10.2%
	75 TO 79	6.4%	7.0%
	80+	7.6%	8.3%

Appendix G: Assumptions

As mentioned in Appendix E, we made several adjustments to the data sources in order to present results on a national basis at 2017 cost levels. The sections below describe the adjustments we made to our sample data sets.

COMMERCIAL

We adjusted commercial member months to balance to the NHE 2017 commercial enrollment estimate of 200.1 million members, assuming an average of 10.1 months per member for the year. This average member month assumption was determined using eligibility data in the MarketScan database.

We did not rely on the NHE estimate of 2017 commercial healthcare spending, as this data is primarily survey-based. Rather, we trended 2015 MarketScan costs forward two years at the trend rates shown in the table in Figure 31.

FIGURE 31: COMMERCIAL COST TREND ASSUMPTIONS

SERVICE TYPE	ANNUAL TOTAL COST TREND
MEDICAL	6.5%
BEHAVIORAL	10.0%
MEDICAL RX	10.0%
BEHAVIORAL RX	12.0%

These trend rates result in a total commercial healthcare spending estimate of $1.1 trillion in 2017, about 4% higher than the NHE 2017 commercial spending estimate.

MEDICARE

We adjusted Medicare member months to balance to the NHE 2017 Medicare enrollment estimate of 57.7 million members, assuming an average of 11.4 months per member for the year. This average member month assumption was determined using Medicare eligibility data, as well as research regarding typical enrollment lengths for Medicare members.

We also adjusted Medicare costs to balance to the NHE 2017 Medicare medical healthcare spending estimate. We applied factors to 2015 costs separately for medical and behavioral services, based on our review of cost trends by category in the past several years. These adjustment factors also account for the difference in spending mix between our data source and the national estimate. For example, the Medicare 5% sample data only includes fee-for-service claim data, while the NHE healthcare spending estimate includes Medicare Advantage data as well. The table in Figure 32 presents the factors applied to the Medicare 5% sample data to present 2015 data on a 2017 national basis. Note that Rx data was not available for the Medicare population.

FIGURE 32: MEDICARE COST ADJUSTMENT FACTORS

SERVICE TYPE	2015 FFS MEDICARE TO 2017 NATIONAL TOTAL COST ADJUSTMENT FACTOR
MEDICAL	1.44
BEHAVIORAL	1.36

The factors above result in a total Medicare medical healthcare spending estimate of $561.2 billion, less than 0.5% lower than the NHE 2017 Medicare spending estimate.

MEDICAID

We adjusted Medicaid member months to balance to the enrollment as of January 2017 of 75.1 million, as posted on the Medicaid.gov website. We assumed an average of 9.6 months per member for the year, according to research regarding typical lengths of enrollment for Medicaid members. Additionally, we adjusted the prevalence of behavioral health conditions in the proprietary state Medicaid data to balance to a national level, according to a review of literature that suggests a reasonable prevalence rate of about 20% to 30% in a Medicaid population.

In order to present Medicaid results on a national basis, we applied factors by service category to balance the state-specific spending per enrollee to the 2017 national Medicaid spending per enrollee estimate according to NHE data. The factors we used are shown in the table in Figure 33, which account for differences in medical and behavioral trend rates as well as differences between the state population and a national population.

FIGURE 33: MEDICAID COST ADJUSTMENT FACTORS

SERVICE TYPE	2010 PROPRIETARY STATE TO 2017 NATIONAL PMPM COST ADJUSTMENT FACTOR
MEDICAL	1.66
BEHAVIORAL	1.66
MEDICAL RX	1.95
BEHAVIORAL RX	1.95

The factors above result in a total Medicaid healthcare spending estimate of $531.3 billion, less than 0.5% higher than the NHE 2017 Medicaid spending estimate.

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