MILLIMAN REPORT

Prevalence and costs of diabetes in Texas Medicaid

Analysis of type 2 diabetes and select risk factors among Medicaid beneficiaries in the state of Texas

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Milliman

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Executive summary

The Episcopal Health Foundation (EHF) engaged Milliman to produce a study with the goal of understanding the cost of type 2 diabetes mellitus to the Texas Medicaid program. Type 2 diabetes is a condition where cells in the body respond poorly to insulin, a hormone that facilitates the entry of blood sugar (glucose) into cells.[1] Over time, the pancreas is no longer able to produce enough insulin, resulting in high blood glucose levels.[2] High blood glucose levels have significant effects on many different body systems, and can cause heart disease, kidney disease, nerve damage, vision loss, and other problems.[3] There are other types of diabetes with different causes, such as type 1 diabetes (generally thought to be caused by an errant autoimmune response to insulin), and gestational diabetes (experienced during pregnancy in women who have never otherwise had diabetes).[4] This report focuses on type 2 diabetes.

We completed an analysis of healthcare claims and enrollment data for Texas Medicaid managed care plans to identify individuals with diabetes or select risk factors and describe their demographics and healthcare cost experience. We relied on data provided by several managed care organizations (MCOs) in the Harris and Jefferson service delivery areas (SDAs) as well as the Transformed Medicaid Statistical Information System (T-MSIS) data maintained by the Centers for Medicare and Medicaid Services (CMS). The Harris and Jefferson SDAs included about 27% of Texas Medicaid beneficiaries in 2021, and T-MSIS includes data for all Texas Medicaid beneficiaries.[5] Key findings from national literature and from our analysis include the following:

Nationally, the Centers for Disease Control and Prevention (CDC) reports that:

- About 11.3% of U.S. adults and 11.5% of adults in Texas have type 2 diabetes, and nearly a quarter of them may not realize they have it.[6]
- About 38% of U.S. adults, representing almost 100 million people, have prediabetes, which increases the risk of developing type 2 diabetes in the future.[7]

In Texas:

- The Texas Medicaid program provided healthcare coverage to 5.63 million people in fiscal year (FY) 2021, at a cost of about $39.3 billion in benefit expenditures.[8,9]
- In FY2021, adults (those of any enrollment group other than children) accounted for about 39% of Medicaid beneficiaries and about 70% of Medicaid medical expenditures in Texas.[10,11]
- Based on an analysis of T-MSIS data, we identified about 11.2% of adults in the Texas Medicaid population as having diabetes in FY2021, and another 9.5% to 11.1% of adults as having at least one of the identified risk factors studied. This likely understates the true prevalence compared to more comprehensive estimates due to known limitations of measuring prevalence of healthcare conditions from claims data.
- Pairing these prevalence findings above with an analysis of cost data contributed by several MCOs, we estimate that total healthcare costs for individuals with diabetes covered by Medicaid in Texas may have been between $6.2 billion and $8.1 billion in FY2021 (including both state and federal payments). This represents about 15.9% to 20.6% of total Medicaid medical benefits spending in FY2021, or about 22.7% to 29.5% of spending for adults.
- Our estimates of total healthcare costs for the population are likely understated because an analysis of healthcare claims data alone will not identify all people with diabetes.

Takeaways:

- While type 2 diabetes has a significant impact on health outcomes and healthcare costs for those who experience it, some of its key risk factors are well understood, and potentially modifiable.
- Programs that can effectively reduce the incidence of diabetes may be able to generate healthcare cost savings—though whether there will be savings net of intervention costs depends on the effectiveness of the program, and the costs of implementing it.
- Implementation of diabetes screening practices that are consistent with clinical guidelines may lead to earlier or more thorough identification of individuals who are prediabetic or diabetic.

Introduction

The Episcopal Health Foundation (EHF) engaged Milliman to conduct an analysis of the healthcare costs and demographic characteristics of Texas Medicaid beneficiaries with type 2 diabetes or select risk factors. We used Texas Medicaid managed care data to model the healthcare costs experienced by individuals with diabetes and diabetes risk factors, including prediabetes and obesity, separately for those in Harris and Jefferson service delivery areas (SDAs) and for the statewide Medicaid managed care population as a whole. Results are stratified by sociodemographic characteristics and Medicaid program eligibility, where data are available to do so.

Preventing diabetes has been a focus of public health efforts nationally and is a priority for EHF. The CDC estimates that, as of 2021, nearly 100 million adults in the United States (or 38% of the adult population) had prediabetes, and over 38 million (or 14.7% of the adult population) had diabetes.[12] Among those who had diabetes, the CDC estimates 8.7 million adults met laboratory criteria for diabetes but were not aware of or did not report having diabetes.[13] This suggests that nearly a quarter of adults with diabetes, representing one out of every 29 adults in the United States, may have had diabetes in 2021 without realizing it.[14]

The CDC estimates that the overall prevalence of self-reported diabetes in Texas is similar to the national average, at 11.5% of adults in Texas, compared to 11.3% of adults in the United States.[15] This represents nearly 2.6 million Texans.[16]

According to a study of 2019 data, adults under the age of 65 with diabetes were nearly twice as likely to have Medicaid coverage as those without diabetes (14.6% vs. 7.8%, respectively).[17] Additionally, a CDC study reports that the prevalence of diabetes in 2021 was twice as high for low-income adults compared to high-income adults in Texas (15.7% vs. 7.8%, respectively).[18] People with diabetes are at risk for developing complications, including eye disease, nerve damage, kidney disease, and cardiovascular disease.[19] Diabetes is also associated with higher healthcare costs.[20] One study estimated the total direct medical costs of diagnosed diabetes to be $307 billion dollars nationally in 2022.[21] Prior literature does not provide clarity on the share of these costs that are borne by Medicaid, but Medicaid programs play a significant role in providing access to healthcare services for low-income adults with diabetes. This report provides an analysis of the healthcare costs experienced by individuals enrolled in Medicaid managed care programs in Texas (which account for about 97% of all Medicaid beneficiaries in the state) separately for those with diabetes and select risk factors.[22]

Note that the emphasis throughout this report on type 2 diabetes, rather than type 1, is in no way meant to reflect the relative importance of one type compared to the other. Type 1 diabetes also has significant impacts on the lives of those who experience it and likely also has a significant impact on Medicaid programs in Texas and nationwide. However, this report focuses on type 2 diabetes rather than type 1 only because there is no known way to prevent type 1 diabetes.[23] For the sake of simplicity, references to diabetes throughout this report refer to type 2 diabetes, unless labeled otherwise.

Demographics and cost drivers for individuals with diabetes and select risk factors in Texas

EHF requested an analysis describing the characteristics and healthcare experience of individuals in Texas covered by Medicaid who have diabetes or are at risk for diabetes. We completed a study based on data provided by several MCOs in the Harris and Jefferson SDAs, as well as for the entire statewide Medicaid population using data from the Transformed Medicaid Statistical Information System (T-MSIS). We relied on both sources due to differences in the types of data available in each. The data provided by MCOs includes cost details but does not include the full population, whereas T-MSIS includes the full population but does not include cost details for most Medicaid beneficiaries in Texas. The intent of this analysis is to provide a reference for how the demographics of these patients compare to the broader Texas Medicaid population, and to illustrate differences in the healthcare experience of each cohort. This includes details on the unique experiences of individuals enrolled in different Medicaid programs or belonging to different socioeconomic groups that may be informative as diabetes prevention programs are considered.

This analysis is not intended to calculate or project any specific financial impacts for any particular intervention—and is instead intended to describe the backdrop against which any such program would operate. Additionally, this analysis is not meant to suggest that diabetes alone explains the entirety of the variation observed between cohorts. Other demographic and clinical differences also exist and contribute to differences between cohorts.

For this analysis, we have focused on individuals with type 2 diabetes, prediabetes, obesity, gestational diabetes, or a history of gestational diabetes. Our intent was to identify individuals who might potentially have or be at risk for developing diabetes in Texas, at least among those with risk factors that are identifiable in healthcare claims data. Prediabetes, obesity, and a history of gestational diabetes are all risk factors for developing diabetes.[24]

In this section of the report, we provide results for the statewide managed care adult population, as well as separately for the Harris and Jefferson SDAs. Statewide prevalence results are based on an analysis of T-MSIS, the CMS dataset that includes data for the entire Texas Medicaid and Children's Health Insurance Program (CHIP) population. Direct costs of healthcare services are only reported for the Harris and Jefferson SDAs, as data on the direct costs of healthcare services is not reported in T-MSIS for the managed care population. Our results focus on the adult population, as the risk of developing type 2 diabetes is generally low during childhood and adolescence, though results for those under 18 years of age are provided in Appendix A.

Results that are specific to Harris and Jefferson SDAs are based on data submitted directly by several MCOs and are provided to give an example of how costs vary between one large urban area (Harris) and one rural area (Jefferson). Note that comparisons between these areas have not been adjusted for differences in underlying demographics or healthcare risks. Differences between crude rates for the two areas are not caused by rural versus urban dynamics alone, but instead are reflective of all characteristics that are different between the two areas.

DISEASE PREVALENCE

We estimated the prevalence of diabetes and select risk factors based on analysis diagnosis codes present on healthcare claims in data provided by MCOs and T-MSIS. Overall, we found that the prevalence of type 2 diabetes among adults (as identifiable in claims data) was about 14.6% statewide in 2019, dropping to about 11.2% in 2021. This drop may reflect changes in the overall composition of the Medicaid population, as significant numbers of individuals were added to the Medicaid rolls in 2020 and 2021 during the COVID-19 pandemic, rather than changes in the underlying risk level for those already covered by Medicaid in 2019. Rates of prediabetes, obesity, or gestational diabetes were generally flat or rising over the same time period, as demonstrated in Figure 1.

FIGURE 1: PREVALENCE OF DIABETES AND SELECT RISK FACTORS AMONG TEXAS ADULTS COVERED BY MEDICAID

FISCAL YEAR	SAMPLE SIZE	TYPE 2 DIABETES	PREDIABETES	PREDIABETES AND OBESITY	OBESITY WITHOUT DIABETES OR PREDIABETES	GESTATIONAL DIABETES
2019	1,221,571	14.6%	1.1%	0.2%	8.0%	1.7%
2020	1,207,507	13.4%	1.1%	0.2%	8.2%	1.9%
2021	1,443,933	11.2%	1.2%	0.2%	8.3%	1.6%

Prevalence rates for type 2 diabetes were slightly higher in 2019 and 2020 than what has been reported by the CDC for the state of Texas based on other datasets, but results for 2021 are in line with the national and statewide estimates.

On the other hand, rates of prediabetes and obesity are much lower than what has been reported by the CDC. Some studies have shown that using administrative health claims to identify individuals as having obesity or prediabetes may meaningfully underestimate the prevalence of those conditions relative to more comprehensive approaches.[25] Conditions are identified in claims using diagnosis codes, which rely on individuals seeking care, presenting their condition to clinicians, and then healthcare providers coding an official diagnosis on a claim record. Prevalence rates for these conditions as reported by the CDC generally rely on self-reported status on survey instruments, not claims.

There are many reasons why rates based on claims data may be lower than rates reported elsewhere, including differences in the populations included (total vs. Medicaid only), challenges with identifying prediabetes through healthcare claims alone, undertreatment of prediabetes or diabetes (resulting in some individuals with these conditions having no claims reflecting their diagnosis), low diabetes screening rates relative to the at-risk population, and potentially data quality and reporting challenges inherent to T-MSIS.

Differences between Medicaid programs

In Texas, Medicaid is comprised of the following programs:[26]

- CHIP (Children's Health Insurance Program): a program for pregnant individuals or children in families that do not meet the low-income requirement for Medicaid, but cannot afford private insurance.
- MMP (Medicare-Medicaid Plan): A program for individuals who are eligible for both Medicare and Medicaid (dual-eligible). It integrates both sets of benefits into a single plan to provide coordinated care and improve health outcomes.
- STAR: A managed care program that provides Medicaid services to low-income children, pregnant women, and families.
- STAR HEALTH: A Medicaid program for children and youth in the Texas foster care system. It includes comprehensive health care services, behavioral health care, and case management.
- STAR Kids: A managed care program for children and young adults (age 20 and younger) who have disabilities. It provides Medicaid services, including medical care, behavioral health services, and long-term services and supports.
- STAR+PLUS: A managed care program for adults who have disabilities or are aged 65 and older that combines Medicaid services with long-term services and supports.

The prevalence of diabetes and the studied risk factors varies widely between individuals in different Medicaid programs (Figure 2). In general, the STAR+PLUS population and the Medicare-Medicaid Plan (MMP) population

(both of which include those dually eligible for Medicare and Medicaid, which tends to be an older population than other Medicaid programs) experience the highest prevalence of diabetes and prediabetes in all three years studied, and by a wide margin. Diabetes and prediabetes are less prevalent for STAR, CHIP, STAR Health, and STAR Kids programs. These patterns align with well-understood associations between diabetes prevalence and older age.[27] Note that totals in Figure 2 may not align with totals in other figures due to the exclusion of individuals that could not be mapped to a specific Medicaid program.

FIGURE 2: PREVALENCE OF DIABETES AND SELECT RISK FACTORS AMONG TEXAS ADULTS COVERED BY MEDICAID, BY PROGRAM

PROGRAM	SAMPLE SIZE	TYPE 2 DIABETES	PREDIABETES	PREDIABETES AND OBESITY	OBESITY WITHOUT DIABETES OR PREDIABETES	GESTATIONAL DIABETES
Fiscal Year 2019						
CHIP	86,174	2.0%	0.4%	0.1%	14.1%	7.0%
MMP	3,746	25.1%	0.3%	0.0%	0.3%	0.0%
STAR	456,860	4.2%	0.7%	0.2%	11.9%	3.1%
STAR HEALTH	4,837	0.9%	0.0%	0.0%	6.6%	0.0%
STAR KIDS	17,943	2.0%	0.6%	0.1%	5.9%	0.0%
STAR+PLUS	597,453	26.2%	1.7%	0.3%	4.7%	0.0%
Fiscal Year 2020						
CHIP	76,999	2.2%	0.2%	0.1%	15.0%	8.0%
MMP	1,216	13.1%	0.0%	0.0%	0.0%	0.0%
STAR	493,245	4.0%	0.7%	0.2%	12.4%	3.2%
STAR HEALTH	4,950	0.3%	0.3%	0.0%	6.1%	0.0%
STAR KIDS	18,517	1.8%	0.6%	0.1%	6.0%	0.0%
STAR+PLUS	590,129	23.7%	1.6%	0.2%	4.1%	0.0%
Fiscal Year 2021						
CHIP	72,534	2.5%	0.2%	0.0%	18.4%	8.0%
MMP	300	23.0%	0.0%	0.0%	0.0%	0.0%
STAR	743,919	3.6%	0.8%	0.3%	10.6%	2.3%
STAR HEALTH	5,757	0.8%	0.0%	0.0%	6.1%	0.2%
STAR KIDS	22,135	2.0%	0.8%	0.1%	6.0%	0.0%
STAR+PLUS	589,823	22.6%	1.8%	0.3%	4.1%	0.0%

Differences between age groups

When examining the prevalence of each studied condition by age rather than Medicaid program, not surprisingly we found that the prevalence of diabetes is generally highest for ages 45 and up (Figure 3). The prevalence of prediabetes, with or without accompanying obesity, generally increases with age. Having obesity but not prediabetes is more likely in younger ages.

FIGURE 3: PREVALENCE OF DIABETES AND SELECT RISK FACTORS AMONG TEXAS ADULTS COVERED BY MEDICAID, BY AGE

AGE BAND	SAMPLE SIZE	TYPE 2 DIABETES	PREDIABETES	PREDIABETES AND OBESITY	OBESITY WITHOUT DIABETES OR PREDIABETES	GESTATIONAL DIABETES
Fiscal Year 2019						
19-24	273,176	1.1%	0.3%	0.1%	8.8%	1.4%
25-29	174,912	2.4%	0.6%	0.2%	12.9%	3.2%
30-34	134,882	4.6%	0.8%	0.2%	12.4%	4.4%
35-39	95,349	8.2%	1.2%	0.3%	10.9%	4.3%
40-44	59,644	14.4%	1.6%	0.3%	9.6%	2.1%
45-49	46,576	22.0%	2.1%	0.4%	8.0%	0.1%
50-54	50,177	28.7%	2.5%	0.4%	6.8%	0.0%
55-59	67,511	32.4%	2.4%	0.5%	5.6%	0.0%
60-64	69,716	35.7%	2.3%	0.4%	4.5%	0.0%
65+	249,628	31.1%	1.3%	0.1%	1.8%	0.0%
Fiscal Year 2020						
19-24	275,962	1.1%	0.3%	0.1%	9.4%	1.5%
25-29	167,971	2.4%	0.5%	0.2%	14.3%	3.7%
30-34	134,909	4.4%	0.8%	0.2%	13.1%	4.9%
35-39	94,059	8.0%	1.2%	0.3%	11.1%	4.7%
40-44	60,024	13.7%	1.6%	0.3%	9.1%	2.2%
45-49	44,599	21.3%	2.2%	0.4%	7.5%	0.2%
50-54	48,311	27.6%	2.5%	0.4%	6.3%	0.0%
55-59	65,701	30.6%	2.6%	0.5%	5.0%	0.0%
60-64	70,160	33.3%	2.4%	0.3%	4.1%	0.0%
65+	245,811	27.1%	1.1%	0.1%	1.4%	0.0%
Fiscal Year 2021						
19-24	404,496	1.1%	0.4%	0.1%	8.2%	1.0%
25-29	207,018	2.3%	0.6%	0.2%	13.8%	3.1%
30-34	169,824	4.3%	0.9%	0.3%	12.9%	4.0%
35-39	114,696	7.4%	1.4%	0.4%	11.1%	3.9%
40-44	71,939	12.8%	1.9%	0.5%	9.3%	1.9%
45-49	48,041	20.6%	2.7%	0.6%	7.7%	0.1%
50-54	50,358	27.3%	2.9%	0.5%	6.5%	0.0%
55-59	64,465	30.5%	2.9%	0.5%	5.0%	0.0%
60-64	72,367	32.5%	2.8%	0.5%	4.1%	0.0%
65+	240,729	25.4%	1.2%	0.1%	1.4%	0.0%

Differences between races/ethnicities

We found that, in all three years studied, type 2 diabetes was most prevalent among Hawaiian/Pacific Islanders compared to other races/ethnicities that are represented in T-MSIS, though sample sizes are also smaller for this group than most others (Figure 4). Diabetes also tended to be more prevalent for those of Asian descent compared to most other races or ethnicities. Rates were roughly similar across non-Hispanic white, non-Hispanic Black, and Hispanic race/ethnicity categories in all three years studied. Note that totals in Figure 4 may not align with totals elsewhere due to the exclusion of individuals for which race/ethnicity was not identifiable in T-MSIS.

FIGURE 4: TEXAS MEDICAID CONDITION PREVALENCE RATES BY RACE/ETHNICITY, ADULTS ONLY

RACE/ETHNICITY	SAMPLE SIZE	TYPE 2 DIABETES	PREDIABETES	PREDIABETES AND OBESITY	OBESITY WITHOUT DIABETES OR PREDIABETES	GESTATIONAL DIABETES
Fiscal Year 2019						
White, non-Hispanic	283,309	13.2%	0.7%	0.1%	6.9%	1.0%
Black, non-Hispanic	204,490	13.6%	0.9%	0.2%	8.3%	0.9%
Asian, non-Hispanic	28,841	16.8%	1.0%	0.0%	1.9%	1.9%
American Indian and Alaska Native, non-Hispanic	1,525	3.4%	0.0%	0.0%	5.6%	0.0%
Hawaiian/Pacific Islander	2,802	22.8%	0.5%	0.0%	2.6%	0.0%
Multiracial, non-Hispanic	4,292	1.0%	0.0%	0.0%	9.1%	0.6%
Hispanic, all races	521,930	14.3%	1.1%	0.3%	9.6%	2.7%
Fiscal Year 2020						
White, non-Hispanic	273,653	12.2%	0.7%	0.1%	6.8%	1.1%
Black, non-Hispanic	198,632	12.5%	0.9%	0.2%	8.8%	1.1%
Asian, non-Hispanic	28,188	14.5%	0.8%	0.0%	2.0%	2.2%
American Indian and Alaska Native, non-Hispanic	1,587	2.5%	0.0%	0.0%	7.0%	0.0%
Hawaiian/Pacific Islander	2,605	17.7%	0.4%	0.0%	3.1%	0.0%
Multiracial, non-Hispanic	4,729	0.7%	0.0%	0.0%	10.8%	1.2%
Hispanic, all races	523,307	13.2%	1.0%	0.3%	10.0%	2.8%
Fiscal Year 2021						
White, non-Hispanic	313,252	10.5%	0.8%	0.2%	6.9%	1.0%
Black, non-Hispanic	239,426	10.4%	1.1%	0.3%	8.5%	0.9%
Asian, non-Hispanic	32,118	12.5%	0.8%	0.0%	2.1%	1.9%
American Indian and Alaska Native, non-Hispanic	2,188	1.2%	0.0%	0.0%	6.8%	0.0%
Hawaiian/Pacific Islander	2,755	15.1%	0.4%	0.0%	3.9%	0.0%
Multiracial, non-Hispanic	6,716	0.6%	0.0%	0.0%	9.6%	0.8%
Hispanic, all races	659,762	10.6%	1.1%	0.3%	9.9%	2.4%

Note that there are a number of significant limitations to relying on race/ethnicity data as captured by T-MSIS. We have used the categories and labels as they appear in the underlying data for the sake of clarity, but this does not reflect the full variation in the identity of many Americans. In some cases, the labels appearing in the data may not be self-reported, and thus may not actually reflect the identity that many individuals may have assigned to themselves. Furthermore, in many cases, the race/ethnicity field is not populated in T-MSIS.

Differences between SDAs

Broadly speaking, the prevalence of the studied conditions tended to be lower in the Jefferson SDA than in the Harris SDA (Figures 5 and 6). Additional results stratified by program and age are provided in Appendix B.

FIGURE 5: HARRIS SDA MEDICAID CONDITION PREVALENCE RATES, ADULTS ONLY

FISCAL YEAR	SAMPLE SIZE	TYPE 2 DIABETES	PREDIABETES	PREDIABETES AND OBESITY	OBESITY WITHOUT DIABETES OR PREDIABETES	GESTATIONAL DIABETES
2019	161,928	10.6%	1.2%	0.6%	10.6%	1.6%
2020	198,506	11.4%	1.6%	0.7%	10.4%	2.1%
2021	220,525	11.5%	2.1%	0.9%	11.2%	2.4%

FIGURE 6: JEFFERSON MEDICAID CONDITION PREVALENCE RATES, ADULTS ONLY

FISCAL YEAR	SAMPLE SIZE	TYPE 2 DIABETES	PREDIABETES	PREDIABETES AND OBESITY	OBESITY WITHOUT DIABETES OR PREDIABETES	GESTATIONAL DIABETES
2019	21,023	9.6%	0.9%	0.5%	13.6%	1.1%
2020	22,562	11.0%	1.1%	0.4%	13.0%	1.6%
2021	26,033	11.3%	1.6%	0.5%	13.0%	1.9%

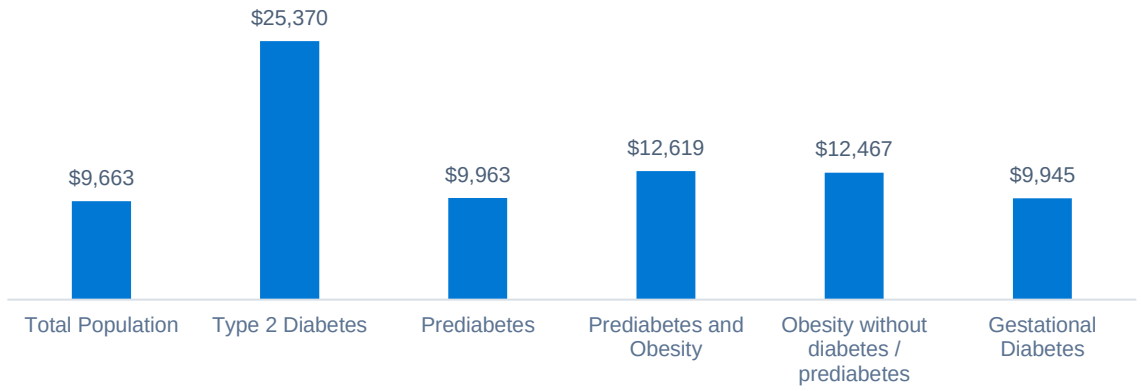
As noted earlier in this report, these prevalence rates have not been adjusted for differences in demographics, morbidity, or other characteristics. As such, differences in results between SDAs reflect all the characteristics that are different between them, not just rural-urban dynamics.

HEALTHCARE COSTS

Cost results are only reported for the Harris and Jefferson SDAs using MCO claim data. As previously mentioned, cost details are unavailable in managed care service records in T-MSIS. Healthcare costs reported may not be representative of the entire state, as healthcare costs and experience may vary by many factors, including geographically.

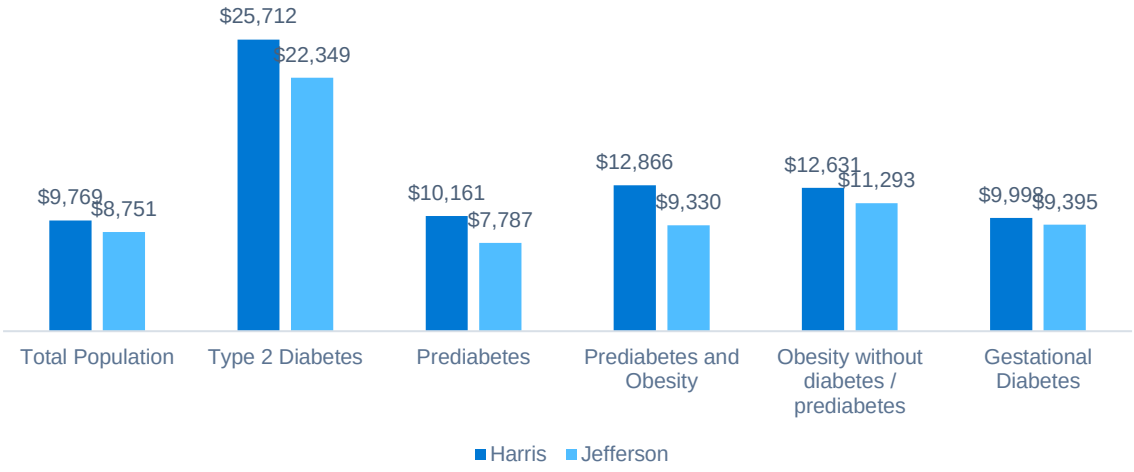
Across the whole population in the Harris and Jefferson SDA MCO claims data, we found that individuals with diabetes experienced an average of over $25,000 in total healthcare costs per year in FY2021 (Figure 7). For reference, total healthcare costs averaged just under $9,700 per year for the entire population. Healthcare costs were elevated for those with prediabetes, obesity, or gestational diabetes compared to the general population as well, ranging from nearly per person per year $10,000 (for those with gestational diabetes) to over $12,000 (for those with prediabetes and obesity), depending on the condition. These differences are not adjusted for underlying differences in demographics or overall health status, so are not solely attributable to the conditions identified. That said, these results are still illustrative of the overall magnitude of differences in costs experienced by those with different conditions included in this study.

FIGURE 7: AVERAGE ANNUAL COST PER ADULT MEMBER BY CONDITION, FY2021



Results for healthcare costs per year in FY2021 by SDA were similar to the whole population, with Harris SDA having slighty higher costs compared to statewide on average and Jefferson SDA having slightly lower costs compare to statewide on average (Figure 8).

FIGURE 8: AVERAGE ANNUAL COST* PER ADULT MEMBER BY CONDITION AND SDA, FY2021

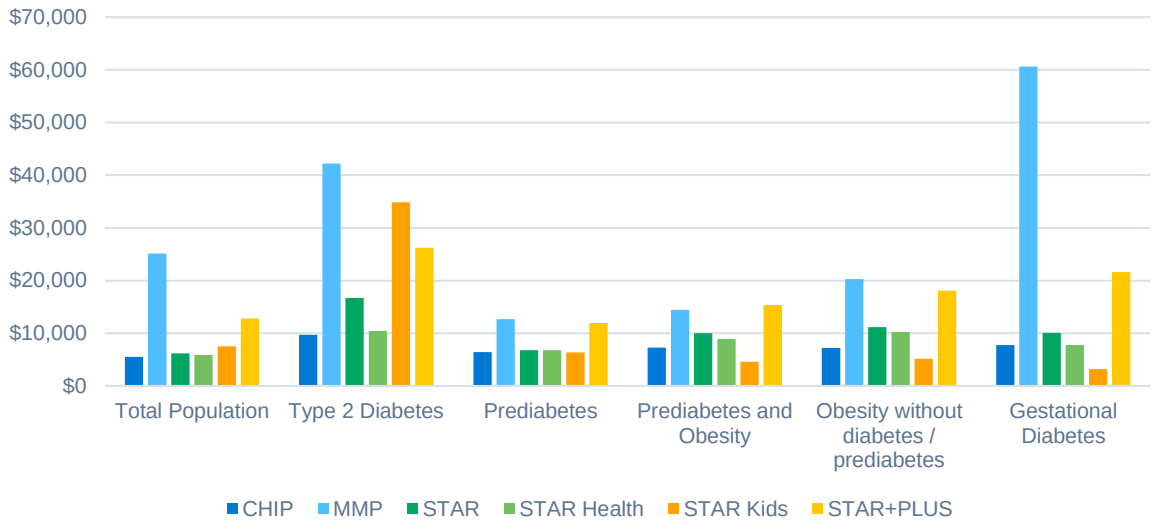


**Note that costs are reported without any adjustment for differences in the age or sex distribution of each SDA, or for any other differences.*

Differences between Medicaid programs

With some exceptions, the healthcare costs for individuals with each condition tended to be highest for those in the Medicare-Medicaid Plan (MPP) (see Figure 9). Costs for those in the STAR+PLUS program were also generally on the higher end compared to other groups. Notably, costs for those with type 2 diabetes were higher for those in the STAR Kids program compared to most other programs, despite the STAR Kids program generally being lower-cost relative to other programs for most other conditions. Costs for those in the CHIP and STAR programs were generally at the lower end for most conditions. Still, STAR members with type 2 diabetes had costs 2.7 times greater than the total STAR population.

FIGURE 9: AVERAGE ANNUAL COST PER MEMBER BY CONDITION AND MEDICAID PROGRAM, ADULTS ONLY, FY2021



As with other areas of this analysis, note that we have not adjusted these cost comparisons for differences in the underlying demographics or overall health status of the individuals in each group. As such, these comparisons reflect all of the characteristics that are different between each group—and are not solely attributable to differences in the conditions identified. That said, these results are still indicative of the overall level of healthcare resources needed for those in each cohort.

Differences by type of healthcare service

To better understand differences in costs among those with different conditions, we also summarized costs by major healthcare service category. Figure 10 contains results from the MCO data across the whole population. Members with type 2 diabetes had the highest costs overall, with inpatient and outpatient medical costs being the biggest drivers of differences. For those with prediabetes or obesity, cost differences were more widely distributed across all of the major healthcare service categories examined. Results stratified by SDA can be found in Appendix C.

FIGURE 10: DISTRIBUTION OF COSTS BY MAJOR SERVICE CATEGORY FOR SELECT CONDITIONS, ADULTS ONLY

		Allowed costs PMPM			Cost relative to total population		
Service Category	**Total population**	**Prediabetes**	**Obesity**	**Type 2 Diabetes**	**Prediabetes**	**Obesity**	**Type 2 Diabetes**
Fiscal Year 2019							
Inpatient - Medical	$490.80	$177.21	$476.32	$1,154.62	0.36x	0.97x	2.35x
Inpatient - BH	$1.02	$0.63	$1.66	$2.21	0.62x	1.62x	2.16x
Outpatient - Medical	$117.36	$154.77	$254.24	$287.38	1.32x	2.17x	2.45x
ER visits	$24.46	$28.02	$48.60	$44.61	1.15x	1.99x	1.82x
Outpatient - BH	$0.07	$0.05	$0.10	$0.17	0.63x	1.38x	2.26x
Prof - Medical	$136.74	$154.81	$286.13	$246.36	1.13x	2.09x	1.80x
Prof - BH	$0.72	$0.13	$0.44	$0.50	0.18x	0.61x	0.69x
Other	$263.90	$235.07	$271.66	$505.00	0.89x	1.03x	1.91x
Additional Benefits	$2.20	$1.12	$1.89	$3.20	0.51x	0.86x	1.45x
Total Medical	**$1,037.28**	**$751.80**	**$1,341.04**	**$2,244.04**	**0.72x**	**1.29x**	**2.16x**
Fiscal Year 2020							
Inpatient - Medical	$390.05	$204.53	$533.95	$987.08	0.52x	1.37x	2.53x
Inpatient - BH	$3.68	$7.53	$7.00	$6.89	2.05x	1.90x	1.87x
Outpatient - Medical	$100.42	$147.69	$233.41	$263.16	1.47x	2.32x	2.62x
ER visits	$24.47	$28.99	$53.97	$41.87	1.18x	2.21x	1.71x
Outpatient - BH	$0.35	$0.64	$0.47	$0.31	1.84x	1.35x	0.91x
Prof - Medical	$128.32	$166.91	$290.17	$223.31	1.30x	2.26x	1.74x
Prof - BH	$2.58	$5.04	$3.72	$2.87	1.96x	1.44x	1.11x
Other	$248.33	$251.45	$222.33	$494.87	1.01x	0.90x	1.99x
Additional Benefits	$2.37	$4.08	$1.92	$3.69	1.73x	0.81x	1.56x
Total Medical	**$900.55**	**$816.85**	**$1,346.93**	**$2,024.06**	**0.91x**	**1.50x**	**2.25x**
Fiscal Year 2021							
Inpatient - Medical	$333.80	$243.51	$662.82	$1,032.10	0.73x	1.99x	3.09x
Inpatient - BH	$4.66	$5.43	$10.67	$10.42	1.17x	2.29x	2.24x
Outpatient - Medical	$114.35	$175.63	$286.46	$320.34	1.54x	2.51x	2.80x
ER visits	$34.53	$39.73	$75.93	$60.05	1.15x	2.20x	1.74x
Outpatient - BH	$0.55	$1.09	$0.91	$0.69	1.99x	1.67x	1.27x
Prof - Medical	$115.61	$148.08	$264.76	$228.55	1.28x	2.29x	1.98x
Prof - BH	$2.88	$6.53	$5.03	$3.16	2.27x	1.75x	1.10x
Other	$196.06	$204.36	$175.33	$454.18	1.04x	0.89x	2.32x
Additional Benefits	$2.78	$5.87	$2.63	$4.71	2.11x	0.94x	1.69x
Total Medical	**$805.22**	**$830.23**	**$1,484.53**	**$2,114.20**	**1.03x**	**1.84x**	**2.63x**

As noted in other sections, these differences in healthcare costs reflect all of the characteristics that differ between each group and are not solely attributable to the conditions identified. That said, these results are still reflective of the typical healthcare cost experience of those who have each condition.

Extrapolations to statewide totals

According to data published by the Medicaid and CHIP Payment and Access Commission (MACPAC), total Medicaid spending on benefits in Texas was $39.3 billion in FY2021, for a total of 5.6 million covered individuals.[28,29] This reflects an average of just over $7,000 per individual per year. According to the Kaiser Family Foundation (KFF) analyses of T-MSIS data, adults (inclusive of all Medicaid enrollment groups other than those for children as delineated by MACPAC) accounted for 39% of the Medicaid population in Texas (or about 2.2 million individuals), and about 70% of expenditures (or about $27.5 billion) in FY2021.[30,31] This reflects an average expenditure of about $12,500 per adult per year.

In our analysis of data for several MCOs in Harris and Jefferson SDAs, individuals with type 2 diabetes experienced total healthcare costs that were about 2.6 times higher than for the total adult population ($25,370 for those with diabetes versus $9,663 for the total population). If the average cost per adult with diabetes observed in Harris and Jefferson SDAs held constant across the entire state, this would translate to approximately $6.2 billion in total Medicaid spending for adults with type 2 diabetes statewide. On the other hand, if the ratio of costs between adults with diabetes and the general adult population observed in Harris and Jefferson SDAs held constant across the entire state, then individuals with diabetes could average just over $32,900 per year in healthcare costs, or about $8.1 billion in total statewide. Using these two approaches, we estimate that total statewide Medicaid spending for adults with diabetes may have ranged between $6.2 billion and $8.1 billion in FY2021, which translates to about 15.9% to 20.6% of total state Medicaid expenditures, or 22.7% to 29.5% of state Medicaid expenditures for adults.

Individuals with risk factors for diabetes also experience higher costs than the broader Medicaid population, though the difference is not as pronounced as it is for those with diabetes. If the ratios of healthcare costs for those with obesity, prediabetes, or gestational diabetes relative to the overall Medicaid population (as identified in our analysis of data provided by several MCOs) held for the entire Texas Medicaid population, then individuals in those groups could experience costs between $10,000 to $12,600 per year on average (depending on the condition). Some of the differences in costs between those with diabetes versus those with obesity, prediabetes, or gestational diabetes is likely explained by differences in age—as those with diabetes are likely to be older and may have other underlying differences in health status that contribute to cost differences. Paired with the prevalence rates that we identified for these conditions (in claims data), these conditions may account for another $6.5 billion to $7.4 billion, or about 16.5% to 18.8% of total Medicaid benefit spending in Texas in FY2021.

Key limitations of extrapolations

Note that Harris and Jefferson SDAs accounted for about 27% of Texas Medicaid beneficiaries in 2021, and as such represent a significant but incomplete sample of the entire state.[32] These estimates should be interpreted with an understanding of the inherent uncertainty of these extrapolations.

The true proportion of individuals covered by Medicaid in Texas who have diabetes would differ from these estimates due to limitations inherent to identifying diseases or conditions based on claims data alone. A more comprehensive number would likely be higher. On the other hand, identifying individuals with diabetes based on claims data is disproportionately likely to identify individuals with more severe cases due to the greater frequency with which those individuals are likely to encounter healthcare providers. The healthcare costs experienced by a more comprehensive set of individuals with diabetes would likely be lower on average. Additionally, the average costs or the relativities in costs between adults with diabetes and the general population observed in Harris and Jefferson SDAs may not be reflective of statewide averages or relativities. As such, the true cost for adults with diabetes could potentially fall outside of this estimated range.

As with estimates for diabetes, the true number of individuals with risk factors for diabetes would likely differ from our estimates due to the limitations inherent in relying on claims data. The average costs experienced by those individuals would also differ if we were able to capture those at-risk more comprehensively. Total costs associated with the identified risk factors would likely be higher but, as before, the increase in costs would likely not be proportional to the increase in the number of individuals identified.

Conclusions

Diabetes is a serious healthcare condition with significant consequences both to the health of those who experience the condition, and to the budgets of those that provide them with healthcare coverage. As such, diabetes prevention has been an area of significant research and policy interest for many years.

Increased diabetes screening has been identified as an important prevention strategy. The U.S. Preventive Services Task Force (USPSTF) recommends adults aged 35 to 70 years of age with overweight or obesity identifications receive glucose testing once every three years.[33] In a study of diabetes screening criteria using 2013-2018 National Health and Nutrition Examination Surveys, 63.1% of eligible adults without diagnosed diabetes reported receiving a glucose test within the last three years.[34] Low screening rates may be driven by a number of factors, including provider awareness of the guidelines, lack of accurate electronic health record (EHR) documentation, and patient preferences.[35,36]

Lifestyle and behavior change programs are also common interventions for preventing or delaying diabetes in individuals with prediabetes. The CDC's Diabetes Prevention Program (DPP), which first entered clinical trials in 1996, has since been adapted to many different populations and programs, and is currently available nationally as a Medicare benefit and in 13 states as a Medicaid benefit.[37] The program focuses on weight loss through physical activity and diet changes. Evidence for the clinical and cost-effectiveness of diabetes prevention programs (DPPs) is mixed—with promising results in clinical trials, but less compelling findings in real-world implementations.[38,39,40,41] Still, some program characteristics appear to be associated with better outcomes, such as greater levels of participation and engagement from enrollees, sustainable payment models and other types of support for providers, and flexibility in treatment modalities to allow for broader reach. DPPs that can successfully combine the best practices gleaned from the past few decades of implementation and research may stand a chance of performing better than average. However, lackluster results are possible if not implemented effectively.

Texas currently runs a national DPP program that primarily enrolls underinsured and uninsured populations through the Texas Department of State Health Services (DSHS).[42] These programs are funded through state general revenue, federal grant funding, and a cooperative agreement with the CDC. The Medicare DPP also operates in Texas.

Extrapolating from our analysis and other public reports on the Texas Medicaid program, we estimate that total Medicaid benefit spending in Texas for individuals with diabetes (as identifiable via claims data) may have been as high as $6.2 billion to $8.1 billion in FY2021. This represents 15.9% to 20.6% of total Medicaid benefits spending, for a group of individuals that makes up 11.2% of the total population. Another 9.5% to 11.1% of the population had at least one of the studied risk factors for developing diabetes that was identifiable in claims data. The actual prevalence of these conditions is likely higher than our claims-based estimates, given that evidence shows these conditions are underdiagnosed and under-coded.[43] A prediabetes diagnosis is confirmed by a biochemical measurement. Results of lab tests are not reported in claims and it is possible that patients were screened for prediabetes or diabetes but the associated ICD10 code was not documented by the provider. The prevalence of diabetes and prediabetes increases with age and is most prevalent among +STAR+PLUS members, consistent with broader patterns of diabetes prevalence evident in other literature and datasets.[44] There are also disparities in prevalence rates among different racial and ethnic groups, with diabetes being most prevalent among Hawaiian/Pacific Islanders, followed by Asian and Asian-American individuals.

Any program that could successfully reduce the incidence of diabetes could help to improve health outcomes and potentially lower costs and reduce racial and ethnic disparities in diabetes prevalence. Whether or not there would be net savings after considering the costs of the program would depend on the effectiveness of the program and the costs of its implementation. The overall impact on health outcomes for individuals in Texas and the costs to the Texas Medicaid program would ultimately depend on the types of programs implemented, the number of individuals reached, and the effectiveness of the program's delivery. To the extent that Texas could identify and adopt the practices that have made other implementations successful, and do so at a sustainable cost, net savings may be possible.

Data and methodology

The measures for this report were constructed using two key data sources. The first of these sources was the CMS Transformed Medicaid Statistical Information System (T-MSIS), which contains detailed administrative claims, managed care encounters, and enrollment records for all patients covered by Medicaid and the Children's Health Insurance Program (CHIP). We used data for all patients covered by Medicaid programs across the state of Texas during fiscal years 2019 to 2021 for this analysis.

We also used membership data, as well as detailed medical and pharmacy claims data, for fiscal years 2019 to 2021 from five of the MCOs offering Medicaid coverage in the Harris and Jefferson SDAs. T-MSIS includes detailed service records but does not include costs for managed care enrollees in Texas. As such, cost estimates are based on claims submitted by these MCOs. We did not include any adjustment for incurred but not reported (IBNR) claims as there was enough runout for the data to be considered complete for the time periods examined in this analysis. The MCOs included data for all of their covered Medicaid populations. The authors would like to thank Community Health Choice, Molina Health Plan, Superior Health Plan, Texas Children's Health Plan, and United Healthcare for contributing data for this analysis.

We identified members with obesity as those with at least one claim containing any of the ICD-10-CM diagnosis codes described in Figure 11. Once the member is identified as obese, they are considered as such for the full year.

FIGURE 11: IDENTIFICATION OF OBESITY

CONDITION	DIAGNOSIS CODES
OBESITY	E660, E661, E662, E668, E669, Z6830 - Z6845, Z6854 - Z6856, O99210 - O99215

We identified members with prediabetes as those with at least one non-lab claim with a prediabetes diagnosis or at least one claim for diabetes prevention program services. Once the member is identified as prediabetic, they are considered prediabetic for the full analysis period unless they also received a type 1 or type 2 diabetes diagnosis at some point. Figure 12 shows the diagnosis codes we used to define prediabetes.

FIGURE 12: IDENTIFICATION OF PREDIABETES

CONDITION	DIAGNOSIS CODES
PRE-DIABETES	R7301, R7302, R7303

We identified diabetes using diagnosis codes. Figure 13 shows the diagnosis codes we used to define type 2 diabetes and gestational diabetes.

- Type 2 diabetes is identified when a member has at least one non-lab claim with a type 2 diabetes diagnosis. Once the member is identified as having type 2 diabetes, they are considered diabetic for the full analysis period.
- Gestational diabetes is identified when a member has at least one non-lab claim with a diagnosis for gestational diabetes, where that member is pregnant and has not already received a type 1 or type 2 diabetes diagnosis. To confirm that a member with a gestational diabetes diagnosis is pregnant, the member must have a pregnancy-related claim within 30 days of the gestational diabetes diagnosis. We also identified members with gestational diabetes as those with at least one non-lab claim with a diagnosis for history of gestational diabetes. Once the member is identified as having gestational diabetes or a history of it, they are considered diabetic for the full analysis period. To identify pregnancy-related claims, we used a list of procedure codes and diagnosis codes related to the following: prenatal, delivery, postnatal, and pregnancy end.

FIGURE 13: IDENTIFICATION OF DIABETES

CONDITION	DIAGNOSIS CODES
TYPE 2 DIABETES	E11, O241
GESTATIONAL DIABETES	O244, Z8632

The percentage of individuals shown to have the selected health conditions is likely understated relative to actual totals. Many healthcare conditions are known to be underdiagnosed or under-coded in a medical setting. The degree of undercounting is likely higher for conditions that many people experience for long periods of time before receiving an official diagnosis, that are undertreated, or that are of a severity that does not necessarily require frequent healthcare services. For some individuals, prediabetes and obesity may not immediately generate significant healthcare needs, even if those conditions are likely to have substantial impacts over the longer term.

Caveats and limitations

This report was commissioned by the Episcopal Health Foundation and is intended to highlight the prevalence and healthcare costs of diabetes and select risk factors in the Texas Medicaid population. It may not be appropriate and should not be used for other purposes. This report does not represent conclusive recommendations regarding any specific interventions or strategies. Milliman does not intend to benefit or create a legal duty to any other recipient of this work.

Milliman relied on detailed claims and enrollment data from third parties to conduct this analysis. We have not audited or verified these data but have reviewed them for reasonability. If the underlying data is inaccurate or incomplete, the results of our analysis may likewise be inaccurate or incomplete.

Evaluating or validating any purported savings or improvements in outcomes from external studies was beyond the scope of our engagement. We encourage readers to review our references in full.

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Appendix A

FIGURE 14: TEXAS MEDICAID CONDITION PREVALENCE RATES, CHILDREN ONLY

FISCAL YEAR	SAMPLE SIZE	TYPE 2 DIABETES	PREDIABETES	PREDIABETES AND OBESITY	OBESITY WITHOUT DIABETES OR PREDIABETES	GESTATIONAL DIABETES
2019	3,849,409	0.2%	0.1%	0.1%	3.8%	0.0%
2020	3,775,840	0.2%	0.2%	0.1%	4.3%	0.0%
2021	3,952,476	0.2%	0.2%	0.1%	5.3%	0.0%

FIGURE 15: TEXAS MEDICAID CONDITION PREVALENCE RATES BY PROGRAM, CHILDREN ONLY

PROGRAM	SAMPLE SIZE	TYPE 2 DIABETES	PREDIABETES	PREDIABETES AND OBESITY	OBESITY WITHOUT DIABETES OR PREDIABETES	GESTATIONAL DIABETES
Fiscal Year 2019						
CHIP	624,147	0.1%	0.1%	0.1%	4.0%	0.0%
MMP	0	n/a	n/a	n/a	n/a	n/a
STAR	2,936,301	0.1%	0.1%	0.1%	3.6%	0.0%
STAR HEALTH	98,573	0.1%	0.1%	0.0%	3.1%	0.0%
STAR KIDS	143,009	0.6%	0.4%	0.2%	5.8%	0.0%
STAR+PLUS	4,238	0.0%	0.0%	0.0%	1.0%	0.0%
Fiscal Year 2020						
CHIP	446,611	0.1%	0.2%	0.1%	4.6%	0.0%
MMP	0	n/a	n/a	n/a	n/a	n/a
STAR	3,081,353	0.1%	0.2%	0.1%	4.1%	0.0%
STAR HEALTH	99,650	0.1%	0.2%	0.1%	3.8%	0.0%
STAR KIDS	139,660	0.6%	0.4%	0.2%	6.2%	0.0%
STAR+PLUS	4,095	0.0%	0.0%	0.0%	1.0%	0.0%
Fiscal Year 2021						
CHIP	270,935	0.1%	0.2%	0.1%	5.7%	0.0%
MMP	0	n/a	n/a	n/a	n/a	n/a
STAR	3,429,486	0.2%	0.2%	0.1%	5.3%	0.0%
STAR HEALTH	104,314	0.1%	0.2%	0.1%	4.0%	0.0%
STAR KIDS	138,839	0.7%	0.5%	0.3%	7.5%	0.0%
STAR+PLUS	3,917	0.0%	0.0%	0.0%	1.0%	0.0%

FIGURE 16: TEXAS MEDICAID CONDITION PREVALENCE RATES BY AGE, CHILDREN ONLY

AGE	SAMPLE SIZE	TYPE 2 DIABETES	PREDIABETES	PREDIABETES AND OBESITY	OBESITY WITHOUT DIABETES OR PREDIABETES	GESTATIONAL DIABETES
Fiscal Year 2019						
0	220,487	0.0%	0.0%	0.0%	0.0%	0.0%
1	241,051	0.0%	0.0%	0.0%	0.2%	0.0%
2-6	1,081,197	0.0%	0.0%	0.0%	2.2%	0.0%
7-18	2,306,674	0.2%	0.2%	0.1%	5.3%	0.0%
Fiscal Year 2020						
0	213,409	0.0%	0.0%	0.0%	0.1%	0.0%
1	236,265	0.0%	0.0%	0.0%	0.2%	0.0%
2-6	1,049,630	0.0%	0.0%	0.0%	2.9%	0.0%
7-18	2,276,536	0.3%	0.3%	0.1%	5.7%	0.0%
Fiscal Year 2021						
0	209,073	0.0%	0.0%	0.0%	0.0%	0.0%
1	231,366	0.0%	0.0%	0.0%	0.2%	0.0%
2-6	1,103,281	0.0%	0.0%	0.0%	3.6%	0.0%
7-18	2,408,742	0.3%	0.4%	0.2%	7.1%	0.0%

FIGURE 17: TEXAS MEDICAID CONDITION PREVALENCE RATES BY RACE/ETHNICITY, CHILDREN ONLY

RACE	SAMPLE SIZE	TYPE 2 DIABETES	PREDIABETES	PREDIABETES AND OBESITY	OBESITY WITHOUT DIABETES OR PREDIABETES	GESTATIONAL DIABETES
Fiscal Year 2019						
White, non-Hispanic	585,055	0.1%	0.1%	0.0%	2.2%	0.0%
Black, non-Hispanic	513,238	0.1%	0.1%	0.1%	2.7%	0.0%
Asian, non-Hispanic	63,938	0.0%	0.0%	0.0%	2.3%	0.0%
American Indian and Alaska Native, non-Hispanic	7,374	0.0%	0.0%	0.0%	2.5%	0.0%
Hawaiian/Pacific Islander	3,412	0.0%	0.0%	0.0%	1.3%	0.0%
Multiracial, non-Hispanic	23,449	0.0%	0.0%	0.0%	1.7%	0.0%
Hispanic, all races	2,047,394	0.2%	0.2%	0.1%	5.1%	0.0%
Fiscal Year 2020						
White, non-Hispanic	561,474	0.1%	0.1%	0.0%	2.6%	0.0%
Black, non-Hispanic	500,375	0.1%	0.2%	0.1%	3.2%	0.0%
Asian, non-Hispanic	60,848	0.0%	0.0%	0.0%	3.0%	0.0%
American Indian and Alaska Native, non-Hispanic	6,823	0.0%	0.0%	0.0%	2.6%	0.0%
Hawaiian/Pacific Islander	3,413	0.0%	0.0%	0.0%	2.5%	0.0%
Multiracial, non-Hispanic	25,629	0.0%	0.0%	0.0%	2.3%	0.0%
Hispanic, all races	1,987,839	0.2%	0.2%	0.1%	5.6%	0.0%
Fiscal Year 2021						
White, non-Hispanic	579,351	0.1%	0.1%	0.0%	3.1%	0.0%
Black, non-Hispanic	520,621	0.2%	0.2%	0.1%	4.4%	0.0%
Asian, non-Hispanic	62,586	0.0%	0.1%	0.0%	3.4%	0.0%
American Indian and Alaska Native, non-Hispanic	7,021	0.0%	0.0%	0.0%	3.8%	0.0%
Hawaiian/Pacific Islander	3,846	0.0%	0.0%	0.0%	3.6%	0.0%
Multiracial, non-Hispanic	29,029	0.0%	0.0%	0.0%	2.8%	0.0%
Hispanic, all races	2,038,370	0.3%	0.3%	0.2%	7.0%	0.0%

FIGURE 18: DISTRIBUTION OF COSTS BY SERVICE CATEGORY FOR SELECT CONDITIONS, CHILDREN ONLY

		Allowed costs PMPM			Cost relative to total population		
Service Category	**Total Population**	**Prediabetes**	**Obesity**	**Type 2 Diabetes**	**Prediabetes**	**Obesity**	**Type 2 Diabetes**
Fiscal Year 2019							
Inpatient - Medical	$56.04	$93.49	$56.81	$576.68	1.67x	1.01x	10.29x
Inpatient - BH	$4.19	$51.54	$21.27	$124.69	12.30x	5.08x	29.76x
Outpatient - Medical	$43.72	$131.20	$91.51	$549.38	3.00x	2.09x	12.56x
ER visits	$12.54	$16.61	$16.26	$63.22	1.32x	1.30x	5.04x
Outpatient - BH	$0.06	$0.64	$0.43	$0.47	10.43x	7.05x	7.78x
Prof - Medical	$68.12	$110.92	$89.80	$251.82	1.63x	1.32x	3.70x
Prof - BH	$5.25	$14.06	$10.10	$30.21	2.68x	1.92x	5.75x
Other	$41.96	$63.72	$41.19	$171.95	1.52x	0.98x	4.10x
Additional Benefits	$1.56	$6.20	$2.42	$9.03	3.99x	1.56x	5.81x
Total Medical	**$233.44**	**$488.38**	**$329.80**	**$1,777.46**	**2.09x**	**1.41x**	**7.61x**
Fiscal Year 2020							
Inpatient - Medical	$65.05	$30.36	$32.79	$414.27	0.47x	0.50x	6.37x
Inpatient - BH	$4.15	$45.68	$18.73	$102.50	10.99x	4.51x	24.67x
Outpatient - Medical	$33.93	$45.77	$59.07	$518.13	1.35x	1.74x	15.27x
ER visits	$10.96	$16.60	$13.52	$55.39	1.51x	1.23x	5.05x
Outpatient - BH	$0.27	$1.19	$0.74	$3.40	4.48x	2.78x	12.79x
Prof - Medical	$60.13	$80.65	$78.75	$166.70	1.34x	1.31x	2.77x
Prof - BH	$7.06	$20.95	$11.40	$35.78	2.97x	1.62x	5.07x
Other	$33.33	$12.19	$24.27	$186.66	0.37x	0.73x	5.60x
Additional Benefits	$1.72	$5.79	$2.41	$5.18	3.36x	1.40x	3.01x
Total Medical	**$214.88**	**$253.38**	**$239.28**	**$1,482.83**	**1.18x**	**1.11x**	**6.90x**
Fiscal Year 2021							
Inpatient - Medical	$80.05	$67.43	$42.35	$449.35	0.84x	0.53x	5.61x
Inpatient - BH	$3.90	$40.47	$12.85	$76.17	10.37x	3.29x	19.52x
Outpatient - Medical	$31.03	$55.10	$48.06	$292.53	1.78x	1.55x	9.43x
ER visits	$11.02	$16.28	$13.23	$54.66	1.48x	1.20x	4.96x
Outpatient - BH	$0.31	$1.34	$0.84	$3.48	4.38x	2.74x	11.36x
Prof - Medical	$60.00	$80.62	$71.25	$145.94	1.34x	1.19x	2.43x
Prof - BH	$6.60	$22.06	$9.04	$31.30	3.34x	1.37x	4.74x
Other	$28.61	$11.73	$21.34	$203.51	0.41x	0.75x	7.11x
Additional Benefits	$1.73	$3.11	$2.10	$7.37	1.80x	1.21x	4.26x
Total Medical	**$223.26**	**$298.14**	**$221.06**	**$1,264.32**	**1.34x**	**0.99x**	**5.66x**

Appendix B

FIGURE 19: HARRIS SDA MEDICAID CONDITION PREVALENCE RATES BY PROGRAM, ADULTS ONLY

PROGRAM	SAMPLE SIZE	TYPE 2 DIABETES	PREDIABETES	PREDIABETES AND OBESITY	OBESITY WITHOUT DIABETES OR PREDIABETES	GESTATIONAL DIABETES
Fiscal Year 2019						
CHIP	15,490	2.2%	0.6%	0.3%	14.9%	5.9%
MMP	7,722	30.0%	2.6%	0.9%	5.3%	0.0%
STAR	65,372	4.0%	0.8%	0.5%	14.1%	2.4%
STAR Health	557	2.9%	0.2%	0.2%	9.0%	0.0%
STAR Kids	2,478	2.0%	0.4%	0.4%	9.1%	0.0%
STAR+PLUS	70,309	16.9%	1.6%	0.7%	7.2%	0.0%
Fiscal Year 2020						
CHIP	20,232	3.0%	0.8%	0.4%	16.9%	6.5%
MMP	7,290	33.2%	3.6%	0.9%	5.0%	0.0%
STAR	79,788	4.6%	1.2%	0.6%	15.2%	3.5%
STAR Health	603	2.8%	0.8%	0.8%	7.0%	0.0%
STAR Kids	2,451	2.5%	1.2%	0.5%	7.8%	0.1%
STAR+PLUS	88,145	18.0%	2.0%	0.7%	5.1%	0.0%
Fiscal Year 2021						
CHIP	17,715	3.7%	1.0%	0.5%	18.4%	6.8%
MMP	6,983	34.3%	4.4%	1.1%	5.5%	0.1%
STAR	103,203	5.0%	1.6%	0.8%	15.5%	3.9%
STAR Health	635	3.5%	2.2%	1.1%	8.8%	0.2%
STAR Kids	2,818	3.0%	1.7%	0.7%	9.2%	0.3%
STAR+PLUS	89,174	19.2%	2.7%	1.0%	5.2%	0.0%

FIGURE 20: JEFFERSON SDA MEDICAID CONDITION PREVALENCE RATES BY PROGRAM, ADULTS ONLY

PROGRAM	SAMPLE SIZE	TYPE 2 DIABETES	PREDIABETES	PREDIABETES AND OBESITY	OBESITY WITHOUT DIABETES OR PREDIABETES	GESTATIONAL DIABETES
Fiscal Year 2019						
CHIP	963	1.8%	0.7%	0.3%	18.0%	5.3%
MMP	0	0.0%	0.0%	0.0%	0.0%	0.0%
STAR	10,317	4.1%	0.7%	0.4%	16.8%	1.7%
STAR Health	71	4.2%	1.4%	1.4%	7.0%	0.0%
STAR Kids	591	1.9%	0.0%	0.0%	8.8%	0.0%
STAR+PLUS	9,081	17.3%	1.2%	0.6%	9.8%	0.0%
Fiscal Year 2020						
CHIP	904	3.3%	0.6%	0.3%	22.2%	6.4%
MMP	0	0.0%	0.0%	0.0%	0.0%	0.0%
STAR	11,250	4.8%	0.8%	0.4%	17.1%	2.6%
STAR Health	87	2.3%	0.0%	0.0%	9.2%	2.3%
STAR Kids	569	2.8%	0.4%	0.4%	7.6%	0.0%
STAR+PLUS	9,752	19.5%	1.6%	0.5%	7.8%	0.1%
Fiscal Year 2021						
CHIP	759	3.7%	0.5%	0.3%	28.7%	7.4%
MMP	0	0.0%	0.0%	0.0%	0.0%	0.0%
STAR	13,978	5.3%	1.2%	0.5%	17.2%	3.0%
STAR Health	87	1.1%	1.1%	1.1%	6.9%	2.3%
STAR Kids	626	2.1%	0.5%	0.2%	6.4%	0.0%
STAR+PLUS	10,583	20.6%	2.4%	0.6%	6.6%	0.1%

FIGURE 21: HARRIS SDA MEDICAID CONDITION PREVALENCE RATES BY AGE, ADULTS ONLY

AGE	SAMPLE SIZE	TYPE 2 DIABETES	PREDIABETES	PREDIABETES AND OBESITY	OBESITY WITHOUT DIABETES OR PREDIABETES	GESTATIONAL DIABETES
Fiscal Year 2019						
19-22	25,424	1.0%	0.4%	0.2%	8.8%	0.7%
23-24	12,142	1.7%	0.4%	0.2%	14.3%	2.1%
25-29	24,042	2.5%	0.7%	0.4%	15.4%	3.0%
30-34	18,831	4.6%	1.1%	0.6%	15.5%	3.8%
35-39	12,970	8.1%	1.4%	0.8%	15.0%	3.9%
40-44	7,929	13.5%	1.8%	0.9%	14.0%	1.7%
45-49	6,124	20.3%	2.3%	1.1%	12.4%	0.1%
50-54	6,730	25.7%	2.8%	1.1%	10.9%	0.0%
55-59	9,146	30.0%	3.3%	1.5%	9.3%	0.0%
60-64	8,433	32.8%	2.7%	1.1%	7.7%	0.0%
65+	30,157	15.4%	0.9%	0.2%	1.9%	0.0%
Fiscal Year 2020						
19-22	30,549	1.3%	0.7%	0.3%	10.0%	1.1%
23-24	14,730	2.2%	0.7%	0.4%	15.2%	2.8%
25-29	29,238	3.1%	0.9%	0.5%	16.6%	3.8%
30-34	23,761	5.4%	1.4%	0.7%	15.7%	5.0%
35-39	16,534	9.4%	1.9%	1.1%	14.9%	4.9%
40-44	10,016	15.0%	2.8%	1.3%	12.9%	2.2%
45-49	7,326	21.6%	3.3%	1.3%	9.8%	0.2%
50-54	7,899	27.2%	3.9%	1.4%	8.6%	0.0%
55-59	10,719	31.1%	4.1%	1.5%	6.9%	0.0%
60-64	10,678	34.0%	3.6%	1.1%	5.2%	0.0%
65+	37,055	16.2%	0.9%	0.1%	0.9%	0.0%
Fiscal Year 2021						
19-22	39,525	1.3%	0.9%	0.4%	10.5%	1.0%
23-24	17,019	2.5%	1.0%	0.5%	15.9%	3.4%
25-29	32,913	3.5%	1.2%	0.6%	17.3%	4.3%
30-34	27,199	6.1%	1.7%	0.9%	16.6%	5.7%
35-39	18,645	9.9%	2.6%	1.4%	15.1%	5.4%
40-44	11,436	15.6%	3.6%	1.9%	13.8%	2.6%
45-49	7,737	23.5%	4.5%	1.9%	10.4%	0.3%
50-54	8,122	29.3%	5.1%	2.1%	8.7%	0.0%
55-59	10,699	33.9%	5.2%	1.9%	6.8%	0.0%
60-64	11,081	35.8%	4.9%	1.4%	5.3%	0.0%
65+	36,148	17.3%	1.2%	0.2%	0.9%	0.0%

FIGURE 22: JEFFERSON SDA MEDICAID CONDITION PREVALENCE RATES BY AGE, ADULTS ONLY

AGE	SAMPLE SIZE	TYPE 2 DIABETES	PREDIABETES	PREDIABETES AND OBESITY	OBESITY WITHOUT DIABETES OR PREDIABETES	GESTATIONAL DIABETES
Fiscal Year 2019						
19-22	4,040	1.0%	0.1%	0.1%	10.2%	0.8%
23-24	1,833	1.7%	0.4%	0.2%	17.5%	2.0%
25-29	3,160	2.5%	0.6%	0.4%	18.4%	1.8%
30-34	2,326	5.5%	0.8%	0.5%	19.0%	2.5%
35-39	1,836	9.4%	1.5%	0.9%	16.6%	2.5%
40-44	1,121	12.2%	2.1%	1.2%	18.2%	0.4%
45-49	866	21.2%	1.7%	0.9%	14.3%	0.0%
50-54	1,021	26.2%	2.2%	1.0%	13.4%	0.0%
55-59	1,473	26.2%	1.8%	0.7%	11.0%	0.0%
60-64	1,256	27.4%	2.2%	1.0%	11.4%	0.0%
65+	2,091	12.3%	0.0%	0.0%	1.2%	0.0%
Fiscal Year 2020						
19-22	4,355	1.4%	0.3%	0.1%	10.8%	1.3%
23-24	1,949	2.0%	0.4%	0.3%	18.8%	2.4%
25-29	3,349	3.1%	0.4%	0.2%	19.5%	2.8%
30-34	2,572	6.2%	0.7%	0.5%	18.3%	3.2%
35-39	1,880	11.5%	2.1%	0.9%	15.8%	3.4%
40-44	1,286	15.2%	2.1%	0.9%	14.8%	0.9%
45-49	897	21.4%	2.1%	0.4%	12.9%	0.0%
50-54	1,001	30.1%	2.5%	0.8%	10.5%	0.0%
55-59	1,582	29.5%	2.5%	0.8%	8.8%	0.0%
60-64	1,381	29.6%	2.8%	0.9%	8.3%	0.0%
65+	2,310	15.1%	0.4%	0.1%	0.9%	0.0%
Blank	0	0.0%	0.0%	0.0%	0.0%	0.0%
Fiscal Year 2021						
19-22	5,537	1.6%	0.6%	0.3%	11.3%	1.2%
23-24	2,300	2.0%	0.5%	0.2%	18.1%	3.4%
25-29	3,898	3.4%	0.7%	0.4%	20.1%	2.9%
30-34	2,965	6.7%	1.1%	0.5%	18.7%	3.8%
35-39	2,070	11.4%	2.4%	1.2%	16.7%	4.2%
40-44	1,501	15.9%	3.3%	1.4%	13.9%	2.0%
45-49	1,022	23.5%	3.1%	0.9%	13.2%	0.0%
50-54	1,074	29.2%	3.5%	0.6%	9.0%	0.0%
55-59	1,629	32.4%	3.4%	0.6%	6.6%	0.0%
60-64	1,588	31.9%	4.3%	1.1%	5.2%	0.0%
65+	2,449	17.5%	0.9%	0.0%	0.6%	0.0%

Appendix C

FIGURE 23: HARRIS SDA DISTRIBUTION OF COSTS BY SERVICE CATEGORY FOR SELECT CONDITIONS, ADULTS ONLY

		Allowed costs PMPM			Cost relative to total population		
Service Category	**Total Population**	**Prediabetes**	**Obesity**	**Type 2 Diabetes**	**Prediabetes**	**Obesity**	**Type 2 Diabetes**
Fiscal Year 2019							
Inpatient - Medical	$475.61	$183.19	$488.72	$1,155.23	0.39x	1.03x	2.43x
Inpatient - BH	$1.08	$0.69	$1.78	$2.38	0.64x	1.65x	2.20x
Outpatient - Medical	$116.77	$157.59	$257.02	$289.80	1.35x	2.20x	2.48x
ER visits	$25.13	$28.88	$50.88	$45.61	1.15x	2.03x	1.82x
Outpatient - BH	$0.08	$0.05	$0.12	$0.18	0.63x	1.45x	2.30x
Prof - Medical	$137.61	$154.39	$290.70	$248.06	1.12x	2.11x	1.80x
Prof - BH	$0.73	$0.14	$0.49	$0.52	0.19x	0.67x	0.72x
Other	$279.64	$248.03	$290.95	$529.07	0.89x	1.04x	1.89x
Additional Benefits	$2.24	$1.14	$2.05	$3.37	0.51x	0.91x	1.50x
Total Medical	**$1,038.89**	**$774.10**	**$1,382.70**	**$2,274.22**	**0.75x**	**1.33x**	**2.19x**
Fiscal Year 2020							
Inpatient - Medical	$391.15	$210.05	$546.99	$1,010.21	0.54x	1.40x	2.58x
Inpatient - BH	$3.92	$7.92	$7.62	$7.39	2.02x	1.94x	1.88x
Outpatient - Medical	$99.90	$151.43	$235.20	$267.29	1.52x	2.35x	2.68x
ER visits	$24.87	$29.54	$55.78	$42.50	1.19x	2.24x	1.71x
Outpatient - BH	$0.37	$0.68	$0.52	$0.35	1.86x	1.41x	0.94x
Prof - Medical	$129.13	$169.31	$296.43	$225.93	1.31x	2.30x	1.75x
Prof - BH	$2.71	$5.40	$3.97	$3.09	1.99x	1.46x	1.14x
Other	$260.36	$258.16	$233.47	$517.77	0.99x	0.90x	1.99x
Additional Benefits	$2.47	$4.26	$2.08	$3.84	1.72x	0.84x	1.55x
Total Medical	**$914.89**	**$836.76**	**$1,382.05**	**$2,078.36**	**0.91x**	**1.51x**	**2.27x**
Fiscal Year 2021							
Inpatient - Medical	$331.68	$246.06	$683.23	$1,034.53	0.74x	2.06x	3.12x
Inpatient - BH	$4.93	$5.84	$11.54	$11.04	1.18x	2.34x	2.24x
Outpatient - Medical	$112.94	$178.14	$285.90	$320.16	1.58x	2.53x	2.83x
ER visits	$35.38	$39.97	$78.55	$61.62	1.13x	2.22x	1.74x
Outpatient - BH	$0.58	$1.18	$0.99	$0.73	2.06x	1.73x	1.26x
Prof - Medical	$116.51	$150.01	$268.62	$228.99	1.29x	2.31x	1.97x
Prof - BH	$3.06	$6.86	$5.53	$3.38	2.24x	1.81x	1.11x
Other	$206.11	$212.45	$182.70	$477.32	1.03x	0.89x	2.32x
Additional Benefits	$2.92	$6.26	$2.76	$4.90	2.14x	0.94x	1.68x
Total Medical	**$814.09**	**$846.77**	**$1,519.81**	**$2,142.67**	**1.04x**	**1.87x**	**2.63x**

FIGURE 24: JEFFERSON SDA DISTRIBUTION OF COSTS BY SERVICE CATEGORY FOR SELECT CONDITIONS, ADULTS ONLY

		Allowed costs PMPM			Cost relative to total population		
Service Category	**Total Population**	**Prediabetes**	**Obesity**	**Type 2 Diabetes**	**Prediabetes**	**Obesity**	**Type 2 Diabetes**
Fiscal Year 2019							
Inpatient - Medical	$608.50	$115.03	$398.46	$1,149.37	0.19x	0.65x	1.89x
Inpatient - BH	$0.58	$0.00	$0.91	$0.77	0.00x	1.57x	1.32x
Outpatient - Medical	$121.91	$125.45	$236.78	$266.46	1.03x	1.94x	2.19x
ER visits	$19.30	$19.12	$34.22	$35.93	0.99x	1.77x	1.86x
Outpatient - BH	$0.02	$0.00	$0.00	$0.00	0.00x	0.14x	0.00x
Prof - Medical	$129.97	$159.17	$257.44	$231.66	1.22x	1.98x	1.78x
Prof - BH	$0.68	$0.03	$0.17	$0.26	0.05x	0.25x	0.38x
Other	$142.01	$100.43	$150.49	$296.92	0.71x	1.06x	2.09x
Additional Benefits	$1.88	$0.87	$0.93	$1.73	0.46x	0.49x	0.92x
Total Medical	**$1,024.85**	**$520.10**	**$1,079.41**	**$1,983.08**	**0.51x**	**1.05x**	**1.93x**
Fiscal Year 2020							
Inpatient - Medical	$380.15	$132.89	$438.52	$770.42	0.35x	1.15x	2.03x
Inpatient - BH	$1.51	$2.43	$2.47	$2.24	1.62x	1.64x	1.49x
Outpatient - Medical	$105.05	$99.17	$220.28	$224.51	0.94x	2.10x	2.14x
ER visits	$20.79	$21.76	$40.72	$35.91	1.05x	1.96x	1.73x
Outpatient - BH	$0.14	$0.00	$0.09	$0.01	0.00x	0.62x	0.07x
Prof - Medical	$121.04	$135.80	$244.31	$198.72	1.12x	2.02x	1.64x
Prof - BH	$1.36	$0.39	$1.88	$0.79	0.29x	1.38x	0.58x
Other	$140.24	$164.32	$140.77	$280.36	1.17x	1.00x	2.00x
Additional Benefits	$1.44	$1.80	$0.76	$2.34	1.25x	0.52x	1.63x
Total Medical	**$771.73**	**$558.57**	**$1,089.78**	**$1,515.30**	**0.72x**	**1.41x**	**1.96x**
Fiscal Year 2021							
Inpatient - Medical	$351.97	$215.51	$503.88	$1,010.62	0.61x	1.43x	2.87x
Inpatient - BH	$2.34	$0.98	$3.86	$4.89	0.42x	1.65x	2.09x
Outpatient - Medical	$126.48	$148.11	$290.81	$321.93	1.17x	2.30x	2.55x
ER visits	$27.32	$37.08	$55.55	$46.18	1.36x	2.03x	1.69x
Outpatient - BH	$0.30	$0.00	$0.27	$0.38	0.00x	0.90x	1.28x
Prof - Medical	$107.91	$126.93	$234.72	$224.63	1.18x	2.18x	2.08x
Prof - BH	$1.36	$2.88	$1.16	$1.22	2.12x	0.86x	0.90x
Other	$109.99	$115.72	$117.95	$249.51	1.05x	1.07x	2.27x
Additional Benefits	$1.57	$1.68	$1.59	$3.06	1.07x	1.02x	1.95x
Total Medical	**$729.23**	**$648.88**	**$1,209.80**	**$1,862.43**	**0.89x**	**1.66x**	**2.55x**

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