COLORADO
Lt. Gov. Dianne Primavera

December 10, 2020

Colorado Health Foundation
1780 Pennsylvania Street
Denver, CO 80203

RE: Return on Investment Report

Background: In its initial proposal, the Colorado State Innovation Model (SIM) proposed to include a return- on-investment (ROI) analysis as part of the final evaluation. Milliman, an actuarial firm, was contracted to conduct these analyses. At the time of the SIM proposal, Milliman estimated that the model would save or avoid $127 million with the investment of up to $65 million, equaling a ROI of 1.95. The report we are submitting today was conducted in July and August 2020 as an attempt to capture additional claims information that was not available at the end of SIM.

Data Lag Challenges: The analyses are based on health insurance plan enrollment and claims data from the Colorado All-Payer Claims Database (APCD), managed by the Center for Improving Value in Health Care (CIVHC). Due to the lag in claims data reporting, the ROI analysis uses data from 2015 through the end of 2018 with the exception of Medicare Part D (pharmacy) claims that experience longer processing delays compared to other claims. SIM's logic model posited that the initiative would impact cost and utilization first by increasing utilization of certain upstream services as patients have increased access to the integrated physical and behavioral care they need and this improvement will lower utilization of more costly downstream, acute services. Since it might take years to realize some of these downstream services, the current analysis may understate the long-term ROI of the SIM investments and future analyses with additional years of data will likely provide a more accurate measure of the impact that SIM had on health care cost and utilization.

Assumptions: This is an actuarial ROI that measures the difference between projected and actual costs compared with the amount CMMI invested in the Colorado SIM initiative. The projected costs are meant to model a counterfactual situation or what we would have expected the costs and utilization of patients served by SIM participating health care providers to be if SIM had not happened. The difference between projected and actual costs is reported as cost-savings attributed to SIM. These calculated cost-savings are then compared with the SIM investment by CMMI to measure the ROI. As such, the ROI results are highly dependent on the projected trend rates used in the analysis. Multiple factors influence the selection of the trend rates in health care costs and Milliman provided the forecasted trends they believed were the most appropriate. While a formal sensitivity analysis was considered,

there were insufficient funds and time available to design and conduct such an analysis. A sensitivity analysis would be a valuable component of future analyses.

SIM Model Design: The SIM Model was a multifaceted initiative that included a primary emphasis on practice transformation support for integrating primary care and behavioral health in over 300 primary care practices and 4 community mental health centers. It is important to keep in mind that cost savings in an ROI analysis could only be realized if patients interacted with practices on a regular basis. This can be a challenge for patients if their health insurance plans changed and/or they were covered by Medicaid where they may face barriers to accessing care (e.g., transportation barriers) that impact their participation in primary care activities. Additional research should be conducted to better document this challenge for patients interacting with SIM participating practices.

Medicare Trends: In this report, the Medicare line of business includes Medicare fee-for-service and Medicare Advantage plan members. Since it is expected that Medicare fee-for-service would have different costs and utilization trends than Medicare Advantage, the ROI analyses may be skewed if the patients in SIM participating practices have a different percentage in fee-for-service and Medicare Advantage plans than the population for which the projections were based. This factor was not considered when the SIM ROI analysis plan was developed and as a result Milliman combined the Medicare fee-for-service and Medicare Advantage for this analysis. To the extent possible, future analyses should distinguish Medicare fee-for-service and Medicare Advantage as separate lines of business to improve accuracy of results.

Medicaid Adjustments: In early 2019, discrepancies were discovered between Medicaid claims data at the Department of Health Care Policy and Financing (HCPF) and data in the APCD. Discrepancies appeared to be due to changes in HCPF's and CIVHC's data management vendors. The Colorado SIM Office led efforts to identify the cause, magnitude, and time frame of the discrepancies and create adjustment factors to be applied to Medicaid data from the APCD to align it to HCPF's data. Documentation of this process and results are now included on CIVHC's website and distributed with data extracts for everyone using Medicaid claims data in the APCD. The adjustments Milliman applied for this ROI analysis are described in the methodology section of the report. Since we were not able to verify the data of other payers in this manner, results are reliant on the data that Medicare and commercial payers submit to the APCD.

Lack of Comparison Group: Previously the SIM office attempted to develop independent cost and utilization trends for the ROI analysis using a comparison group approach instead of trend projections to represent the counterfactual situation. Again, a comparison group approach was not considered at the time the SIM ROI analysis plan was developed and the comparison group was not included in the Milliman scope of work for the actuarial analysis. An individual level data file was created that would allow for future analysis using a comparison group approach conducted by evaluation partners with experience in conducting these types of analyses.

Recommendations: Since health care trend rates are highly variable and influenced by multiple factors that are not accounted for in forecasts, we recommend that future health care initiatives include a comparison group approach to analyze cost and utilization in addition to an actuarial ROI analysis so that the impact of the initiative can be more accurately measured and a formal sensitivity analysis can be performed. The reduced ROI for the pediatric practice population, which influenced the Medicaid total ROI, could be studied further, including the consideration for adjustments to the attribution PMPM between pediatrics and adults.

Summary: Overall the results presented in the report show a ROI of 2.00, which exceeds the targeted return of 1.89. However, this overall finding reflects mixed results across lines of business. Projected savings were the highest for the Medicare line of business, followed by the Commercial line of business and the Medicaid line of business had projected negative savings. The population that has most struggled to achieve projected savings is the pediatric population, both within the Commercial line of business and especially within the Medicaid line of business, which covers significantly more children (40%+ of the covered population) than Medicare or Commercial. The pediatric population discrepancy could also relate to the comparative practice readiness of pediatric practices or the PMPM attribution payments for children versus adults. Medicaid analysis may have also been hampered by the tremendous churn within the Medicaid population compared to say, Medicare, which has little churn. Various data challenges, including data lags, Medicaid capitation to Regional Accountable Entities for behavioral health claims and the encounter data reporting to Medicaid and CIVHC, and the short time frame between completion of the initiative and the evaluation, have limited the ability to accurately measure the full impact of SIM. Future analyses should work to address the above concerns and try to better explain the impact of SIM to identify which service categories saw the highest change in cost and/or utilization through participation in SIM and how those changes affect the ROI results.

Respectfully,

Dianne Primavera
Lieutenant Governor

SIM Healthcare Cost Savings and Return-on-Investment Report

July 2020

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INTRODUCTION

In 2015, the Center for Medicare and Medicaid Innovation (CMMI) awarded the State of Colorado up to $65 million in the form of a cooperative agreement to implement its State Healthcare Innovation Plan. The State's proposal and planning process included large-scale stakeholder engagement and contributions to ensure the statewide model would be comprehensive and sustainable. This model was developed to address the Quadruple Aim to improve patient experience (both the quality of and satisfaction with care), improve population health, reduce and avoid healthcare costs, and improve the work life of providers. The model included four key elements:

1. Practice transformation that supported over 300 primary medical care practices and 4 community mental health centers in the integration of physical and behavioral healthcare services and prepare for value-based payment models.
2. Payment reform that engaged seven payers to implement at least one value-based payment model for each of the participating primary care practices.
3. Health Information Technology to improve use of electronic health records to support practice transformation and health information exchange connectivity.
4. Population health to support community efforts to reduce stigma, promote coordination of primary care and public health, and reduce barriers to accessing integrated physical and behavioral healthcare.

CMMI desires to obtain a positive return on this investment (ROI). The State of Colorado projected a healthcare cost savings (i.e. avoided healthcare costs) of $122.7 million through the end of model test year 3 (the end of the award period) in its State Innovation Model (SIM) application, which translates to a return-on-investment (ROI) of 1.89 (assuming the full $65 million gets paid to the SIM office).

Three cohorts of primary care practices participated in the SIM project. Each cohort had a "base period" which is the calendar year before implementation of the integrated medical-behavioral initiative, and an "implementation period" which includes the calendar years after the start of the integration initiative. Cohort 1 practices and community mental health centers had a base period of 2015 and implementation years beginning in 2016 for ROI determination purposes. Cohort 2 practices had a base period of 2016 and implementation years beginning in 2017 for ROI determination purposes. The kickoff date for Cohort 2 practices was September 2017, so the choice of 2017 as the first implementation year is conservative in that there was just 4 months of actual implementation for the Cohort 2 practices in 2017. Cohort 3 practices had a base period of 2017 and implementation years beginning in 2018 for ROI purposes. The kickoff date for Cohort 3 practices was June 2018, which gives Cohort 3 practices about 7 months of actual implementation in their chosen implementation year. This ROI analysis presents projected healthcare cost savings and the corresponding ROI for calendar years 2016 through the end of 2018.

METHODOLOGY

Data Reliance

We relied on Colorado's All Payer Claims Database (APCD) received from CIVHC on March 31, 2020 for this analysis. This version of the APCD extends from 2012 through the following date ranges by line of business:

For medical claims,

- Commercial data extends through December 2019 and looks to be complete through October 2019.
- Medicaid data extends through December 2019 and looks to be complete through October 2019.
- Medicare data extends through December 2019 and looks to be complete through December 2018 due to slower processing of Medicare fee-for-service claims.

For pharmacy claims,

- Commercial data extends through January 2020 and looks to be complete through December 2019.
- Medicaid data extends through January 2020 and looks to be complete through December 2019.
- Medicare extends through January 2019 and looks to be complete through December 2017 due to slower processing of the Medicare fee-for-service claims.

We did not develop any completion factors for the claim data through 2018, which is the calendar period used for the development of claims savings that are used in the ROI calculations. To the extent that any of these claim data are incomplete, especially incurred claims in 2018, the reported claims would be understated. We note that 2018 Medicare pharmacy claims are lower than prior years.

We were informed by the SIM office that there is an issue with the Medicaid claims data reported in the APCD. The APCD data did not align with values expected by HCPF, largely due to both HCPF and CIVHC changing information system vendors during 2016. In order to correct this issue, adjustment factors were calculated by calendar year and quarter to be applied to the APCD data to better align the PMPMs with totals expected by HCPF. These adjustment factors have been applied to all Medicaid costs for this analysis. The factors were based on differences between CIVHC total PMPMs by incurred month/year and those PMPMs reported by HCPF systems. The quarterly PMPM adjustments made to the CIVHC reported results are shown in Table 1:

Table 1: Adjustments to CIVHC Reported Medicaid Total PMPM Costs to Balance to HCPF Reports

Quarter/Year	HCPF PMPM	CIVHC PMPM	Adjustment Percent
1st Quarter 2015	$ 347.10	$ 360.68	-3.77%
2nd Quarter 2015	$ 343.50	$ 359.17	-4.36%
3rd Quarter 2015	$ 345.08	$ 364.04	-5.21%
4th Quarter 2015	$ 338.00	$ 370.99	-8.89%
1st Quarter 2016	$ 354.71	$ 412.11	-13.93%
2nd Quarter 2016	$ 351.40	$ 372.34	-5.62%
3rd Quarter 2016	$ 353.12	$ 392.10	-9.94%
4th Quarter 2016	$ 344.65	$ 390.96	-11.84%
1st Quarter 2017	$ 353.30	$ 380.95	-7.26%
2nd Quarter 2017	$ 347.89	$ 352.81	-1.40%
3rd Quarter 2017	$ 356.03	$ 360.65	-1.28%
4th Quarter 2017	$ 369.76	$ 375.41	-1.51%
1st Quarter 2018	$ 390.30	$ 396.84	-1.65%
2nd Quarter 2018	$ 379.16	$ 395.78	-4.20%

Note that the 3rd and 4th quarters of 2018 did not require adjustment. We have included CIVHC's report on "Investigation into Differences between HCPF and CO APCD Medicaid Data" as an attachment to this report, which contains further detail.

CIVHC informed us that there was an issue with duplicated eligibility and pharmacy claims in the Medicare Part D data. The commercial payers' claims include both RESDAC/Payer 300 claims and any other amounts the commercial payer pays at the time of a given claim. In order to adjust for this, we identified any members that appeared in both the RESDAC/Payer 300 submissions and the commercial submissions and removed those associated with RESDAC/Payer 300.

Our ROI methodology includes the following:

1. **Large Claim Exclusion**: Large claimants (members whose claims equal or exceed $250,000 in either the base year or the subsequent three implementation years for Cohort 1, the base year or the subsequent two implementation years for Cohort 2, and the base year and the subsequent implementation year for Cohort 3) are excluded.

2. **Minimum Eligibility Requirement**: Members must have at least 6 months of eligibility in both the base year and subsequent three implementation years for Cohort 1, the base year and the subsequent two implementation years for Cohort 2, and the base year and the subsequent implementation year for Cohort 3 to be included.

Return-on-investment Calculations

Return-on-investment is calculated as the ratio of healthcare cost savings (avoided healthcare costs) to program investment costs. In order to calculate estimated healthcare cost savings, we projected allowed healthcare costs beyond the base periods and compared these projected results to actual allowed healthcare costs by SIM practice. We then aggregated our healthcare cost savings estimates across the participating SIM PCP practices and CMHCs to estimate total cost savings for the SIM program to-date. More information about how we calculated healthcare cost projections is presented in the section below. The SIM office provided us three estimates of investment costs for the program, representing the total CMMI investment in the SIM program through January 1, 2018, through January 1, 2019 and through July 31, 2019.

We calculated ROI as the sum of the healthcare cost savings estimates for each SIM practice, determined as the difference between projected and actual costs, divided by the total CMMI investment cost as follows:

$$ROI = \frac{\sum(Projected\ PMPM - Actual\ PMPM) * Member\ Months}{CMMI\ Investment\ Cost}$$

Projected Allowed Costs

In order to project allowed costs for the implementation periods, we first calculated total base year allowed per member per month (PMPM) costs by line of business and major service category for each practice. Claims were assigned service categories using a combination of revenue and procedure codes. We then applied trend rates, seasonality factors, and risk adjustment to base year allowed costs to estimate quarterly PMPM costs for the implementation periods.

To determine the trend rates for this analysis, we first examined year-over-year cost trends by broad service category at the SIM-attributed, state-attributed, and statewide levels in the APCD. We looked at all available data for calendar years 2013 - 2015 for each line of business. We did not adjust any allowed dollars, paid dollars, or units in the claim data, nor the member counts that are also included in the APCD. The year-over-year trends looked somewhat erratic and did not produce rates that were reasonable for future cost projections.

Healthcare trend assumptions can vary significantly depending on several key factors. These factors include plan type, benefits, and geographic area. These factors also have a tendency to be dynamic, requiring on-going analysis and evaluation. We reviewed ranges of total annual cost trends from the 2019 Milliman *Health Cost Guidelines* for the SIM Commercial population use. We chose the low end of the trend ranges for our projections to be conservative (not overstating projected healthcare costs). The chosen Medicaid trend rates were developed from data from the Medicaid and CHIP Payment and Access Commission (MACPAC) and the Colorado Department of Health Care Policy and Financing (HCPF), balanced by service category using 2017 SIM Medicaid allowed cost distributions. The trend rates used in this analysis are shown in Table 2:

Table 2: Conservative Low End Assumptions for Assumed Annual Trend Rates

Service Category	Commercial	Medicaid	Medicare
Inpatient Facility	2.0%	1.5%	-1.0%
Outpatient Facility/Emergency Room	3.0%	0.0%	3.5%
Professional/Other	2.0%	2.0%	-0.5%
Prescription Drugs	6.3%	6.5%	3.5%

After trending base period PMPM costs to implementation periods, we applied a risk adjustment factor for each Cohort to account for differences between morbidity and demographic mix in the practice populations between the baseline and experience periods. The risk adjustment factor development is described in more detail below.

Risk Adjustment

Risk adjustment is the process of aggregating members' detailed claim data (such as past diagnoses, incurred medical services, and prescription medications) and translating these data into a single risk score to account for morbidity differences between members. A risk adjuster is a statistical model that predicts (or explains) an individual's claim cost using detailed historical claim or other data to make the prediction. Typically, the predictor variables are binary condition categories (with a value of '1' if there is a presence of a claim with a particular diagnosis, and '0' otherwise) but could also be more complex in nature. Results from a risk adjuster model are typically scaled to the average cost of the population such that an average risk score is 1.0 for that population. An age-gender component is also included in the risk score, which reflects an expected morbidity for an average individual of a particular age and gender without a claim for a relevant medical diagnosis.

Milliman Advanced Risk Adjusters (MARA) were used for this analysis. MARA is a suite of risk adjustment tools with a variety of predictive modeling applications for the health insurance industry. MARA was developed by leading actuaries, clinicians, and healthcare business experts at Milliman. The MARA models offer a significant advancement over traditional risk "groupers," risk assessment tools, or predictive models. These advancements are the result of years of healthcare analysis and the application of more sophisticated methods of building predictions.

Milliman's concurrent commercial risk adjuster model was used to adjust cost data for the commercial and Medicaid populations in this analysis, and Milliman's concurrent Medicare risk adjuster model was used for the Medicare populations. The concurrent commercial risk adjuster model (which has proven effective for both Medicaid and commercial populations) relies on both medical and pharmacy claims data. The concurrent Medicare risk adjuster model relies on medical claims data only. A concurrent risk adjuster uses a given year's (or assessment period's) claim data to calculate the individual risk scores for the same time period. Each risk score is a measurement of what an individual's assessment period risk typically would be, based on his or her condition profile, when compared to the average MARA calibration population. The risk scores were then

normalized to the total SIM population separately by line of business. This means that the average risk scores for the entire commercial, Medicaid, and Medicare blocks of members in any base year are 1.00. For Cohort 1 practices and CMHCs, 2015-2018 risk scores are normalized against total 2015 data (for Cohort 1 practices and CMHCs combined). For Cohort 2 practices, 2016-2018 risk scores are normalized against total 2016 data (for Cohort 2 practices combined). For Cohort 3 practices, 2017-2018 risk scores are normalized against total 2017 data (for Cohort 3 practices combined). The concurrent risk score is used as an explanatory tool to quantify the expected morbidity level of a given year's healthcare expenditures, which are known (actual costs).

We calculated risk scores for each attributed member in their base period year and each implementation year. We then calculated average risk scores by practice and line of business, weighted by individual enrollment months. The risk adjustment factor applied to projected allowed costs was calculated as follows:

$$Risk\ Adjustment\ Factor = \frac{Implementation\ Year\ Average\ Risk\ Score}{Base\ Year\ Average\ Risk\ Score}$$

Thus, the projected allowed cost PMPM was calculated by practice and line of business as follows:

$$Projected\ PMPM = Actual\ PMPM * Trend * Seasonality\ Factor * Risk\ Adjustment\ Factor$$

Medicare Risk Adjustment Factors

In developing the risk adjustment factors, as defined above, for the Medicare population, we noted a much steeper year-over-year risk score slope that would be expected. Upon further analysis, we found the APCD to show a greater volume of diagnosis information in more recent years, including 2017 and 2018, than prior years, such as 2015 and 2016. This change in coding intensity would increase risk scores, but not necessarily for reasons reflective of actual health status change, for which our risk adjustment factor is intended to normalize. When applied as-is, the magnitude of the coding intensity change over time results in projected costs that are much higher than would be expected.

To account for this, we modified our risk adjustment factors for the Medicare population by allowing only 50% of the risk adjustment impact to the projected allowed cost PMPM. We determined this percentage adjustment to be consistent with expected year over year age and gender changes for this population, as well as expected increases due to disease trends (i.e. changes in prevalence and severity of conditions over time). According to the United States Center for Disease Control (CDC) and the National Cancer Institute, the observed disease trend for Cancer cases based on data through 2017 for an over age 65 population is much lower than the observed disease trend in the APCD between 2015 and 2018. Similarly, for diabetes, the CDC reported disease trend of approximately 9% for new cases in recent years through 2016; whereas, the APCD showed disease prevalence trend for this condition for the Medicare population over 40,000-45,000 members of over 70% in some years. The chosen percentage impact for the Medicare population risk adjustment factors reflects what we believe to be a more reasonable representation of actual changes over time due to change in population mix and health status, rather than coding intensity. To the extent that a higher percentage impact adjustment could be justified, our projected savings estimates that follow, and the corresponding ROI, would increase.

Savings Calculation

After calculating savings estimates by quarter for the implementation periods for each practice, we aggregated savings for all SIM PCP practices and CMHCs in total, as well as by practice type. Due to populations in pediatric practices differing widely from those in internal medicine practices, we summarized PCP practice savings by pediatric, mixed primary care, and internal medicine practice type, as shown in the results section below. The SIM office provided these classifications for all participating practices. Cost savings are shown as positive numbers, while negative numbers indicate that projected costs were lower than actual costs.

CAVEATS AND LIMITATIONS

We relied on the All Payer Claim Database (APCD) provided by CIVHC on March 31, 2020, for this analysis. We also relied on the SIM multi-year attribution file provided by CIVHC in March 2019, the CMHC attribution file received on June 24, 2019, and the de-duplicated provider and practice NPI lists for aggregate reporting provided by the SIM office and TriWest on July 3 and July 7, 2019. We have not audited the data but have reviewed this version of the APCD for reasonability and have made adjustments to interpolate or exclude erratic or missing data accordingly. We relied on the Medicaid BHO data provided by the Colorado Department of Health Care Policy and Financing (HCPF) on April 5, 2019. Due to 42 CFR Part 2, substance use claims are restricted in this data, meaning behavioral healthcare claims may be underreported. No adjustments have been made to supplement potentially underreported behavioral healthcare claims. This applies to both the baseline years and the projection years. If there are any errors or omissions in the provided data, our results may be impacted.

We also relied on estimates of SIM expenses to-date provided by the SIM office on June 25, 2020, for the calculation of return-on-investment (ROI) in this report. To the extent that SIM expense estimates are understated, ROI may be overstated, and vice versa.

This analysis is intended for the use of the SIM office and CMMI in evaluating the program's ROI in July 2020. Other uses may be inappropriate. No portion of this information may be provided to any other party without Milliman's prior written consent. Milliman does not intend to benefit or create a legal duty to any third party recipient of its work.

There are several considerations to note that may affect the results of this analysis:

- The APCD includes data from public payers, private payers, and several self-insurers across the state. The APCD does not include BHO encounter data, TRICARE data, or all self-insured data in Colorado. As noted above, we exclude or interpolate data for payers with erratic or missing submissions to avoid skewing the average costs per member per month calculated for this analysis. To the extent that missing data in the APCD causes actual costs for the SIM attributed population to emerge differently than the data that is currently being included in this analysis, savings and ROI calculations will be affected.

- We received a file with Medicaid BHO encounter data for fiscal years 2015 through 2018 from the SIM office on April 5, 2019. In the data set, there are fee-for-service (FFS) payments and payments made through sub-capitation. For those made under sub-capitation, some BHOs populate this cost value based on the previous year's base unit cost, while others might provide a 1 or a 0. FFS costs were used as provided, as well as sub-capitated claim amounts that were populated with a prior year base cost. For the sub-capitated claims populated with a 1 or 0, we assigned the average cost per unit by calendar year in the data.

- Data for community mental health centers is included in this analysis. We have assumed the same baseline and model test years for the CMHCs as for the Cohort 1 SIM primary care physician (PCP) practices (2015 and 2016+ respectively). To the extent that SIM implementation for any of the CMHCs did not line up with these time periods, savings and ROI calculations may be affected.

- Attribution of SIM PCP practices is performed by CIVHC at the National Provider Identifier (NPI) level. We are aware that multiple sites in a provider system may bill to one practice site. To the extent that multiple sites (both participating and not participating in the SIM program) use the same NPI, member attribution and projected savings may be skewed.

- We relied on CIVHC's multi-year attribution file to develop these results, where members are attributed to Cohort 1 NPIs using 2015 attribution, Cohort 2 NPIs using 2016 attribution, and Cohort 3 NPIs using 2017 attribution. Any members that were attributed to more than one cohort were attributed to the earliest Cohort NPI to avoid duplication. Additionally, any members attributed to both a CMHC and a primary care practice were attributed to the CMHC.

- A number of factors can affect healthcare costs in any measurement period. In this analysis, we compare actual costs to projected costs and consider the differences as "savings" or avoided costs when actual costs are lower than projected costs. These differences can be caused by random fluctuation, changes in health technology, inflation, demographic changes, personal care changes, accident rates, and a number of other factors. We made adjustments for expected morbidity levels using MARA risk scores between the baseline period and each implementation period. We modified the risk score adjustment for the Medicare population to account for excess coding intensity. We consider any resulting savings relative to projected costs to be correlated with the SIM practice care patterns and, thus, relate these SIM practice healthcare cost savings to the CMMI SIM investment.

- The healthcare cost savings reflected in this report were estimated using risk-adjusted APCD claims data, as differences in costs between time periods incorporate differences in morbidity and demographic mix of the populations within each practice during the two comparison periods. Concurrent risk scores were used in this analysis. Risk scores are not perfect representations of actual claims costs; however, risk scores are commonly used to quantify member and population morbidity and are useful in comparing healthcare costs over time. Risk scores tend to show greater variations over time for small sample sizes. As noted below, we aggregated projected costs across each participating SIM practice in this analysis without making any adjustments for credibility of small practice sizes. More information about risk adjustment is provided in the "Methodology" section of this report. While many of the clinical features that impact risk scores tend to be persistent over time, in some cases the improvements in care management achieved through integration could lead some patients to experience decreases in disease severity over time. To the extent that this occurs, risk-adjusted costs may understate the true savings achieved through the program.

- We made adjustments to remove members with large claims, at or exceeding $250,000 during the base year or subsequent three implementation years for Cohort 1, the base year or subsequent two implementation years for Cohort 2, and the base year or subsequent implementation year for Cohort 3 from this analysis. Large claims are typically generated by very expensive acute events that include significant hospital care. They may come from accidents, premature babies, or high cost surgeries and treatments. This adjustment dampens the impact of large claim prevalence and amounts differing between the baseline periods and first implementation periods. To the extent that the impact of other fairly large claims (e.g. those between $200,000 and $250,000) is skewed between the baseline and implementation periods, our projected results may be affected and not representative of the true savings.

- In addition to the large claim adjustments, we also incorporated criteria requiring minimum eligibility for member inclusion in the analysis, described in the "ROI Results" section below. The purpose of the criteria is to establish a stable patient base between the baselines and experience periods so that projections are not unreasonably skewed by patients in one period and not the other. A potential side-effect of applying exclusion criteria to the analysis is introducing bias in the ROI calculations. While the goal of the criteria is to reduce noise in the projections while limiting potential biases, results may be impacted by the selected criteria.

- In setting trend rates, we calculated trends in the APCD over the past several years by service category. The trend rates implied in the APCD fluctuated widely year over year. This significant variation did not produce stable trend rates that could be applied within our calculations, and thus we relied primarily on Milliman proprietary data, Colorado HCPF trend data, and national Medicaid data to select trends. We used the low end of Milliman published trend ranges for the Commercial and Medicare lines of business in these calculations in order to be conservative. To the extent that these trend rates do not reflect the SIM population, our projected costs and savings estimates may be affected and not representative of the true savings. The impact of increasing or decreasing trend assumptions is further evaluated in the Methodology section and the ROI Results section.

- Total savings attributed to the SIM program were calculated by aggregating the savings estimates across each participating practice. Several SIM practices do not have enough attributed membership to be considered credible. For the purposes of this analysis, we did not make any adjustments for credibility.

Guidelines issued by the American Academy of Actuaries require actuaries to include their professional qualifications in all actuarial communications. Stephen P. Melek and Katie Matthews are members of the American Academy of Actuaries and meet the qualification standards for performing the analyses in this report.

ROI RESULTS

We report healthcare cost savings (i.e. avoided costs) by line of business (Commercial, Medicaid, and Medicare) and calendar year. These results rely on data from the APCD and from BHO encounter data for Medicaid members.

Cost savings occur when actual emerging healthcare costs are lower than those we projected for the experience periods (please see the following section for more detail regarding our methodology).

Table 3 shows our projected healthcare cost savings estimates for all Cohort 1 SIM PCP practices combined by line of business and calendar years 2016, 2017 and 2018. Table 4 shows these savings for all CMHCs combined. Tables 5 through 7 show PCP results broken out further for all Mixed Primary Care practice sites combined, all Internal Medicine practice sites combined, and all Pediatric practice sites combined, respectively.

Table 8 shows our projected healthcare cost savings estimates for all Cohort 2 SIM PCP practices combined by line of business and calendar years 2017 and 2018. Tables 9 through 11 show these SIM PCP results broken out further for all Mixed Primary Care practice sites combined, all Internal Medicine practice sites combined, and all Pediatric practice sites combined, respectively.

Table 12 shows our projected healthcare cost savings estimates for all Cohort 3 SIM PCP practices combined by line of business and calendar year 2018. Tables 13 through 15 show these SIM PCP results broken out further for all Mixed Primary Care practice sites combined, all Internal Medicine practice sites combined, and all Pediatric practice sites combined, respectively.

Table 16 shows a summary of projected healthcare cost savings estimates by year for all Cohort 1 SIM PCP practices, Cohort 2 SIM PCP practices, Cohort 3 SIM PCP practices, and CMHCs combined.

Table 3: Total Projected Healthcare Cost Savings Estimates – PCP Practices – Cohort 1						
Line of Business	Calendar Period	Projected PMPM	Actual PMPM	Savings PMPM	Member Months	Total Savings
Commercial	2016	$405.55	$395.06	$10.49	492,371	$5,165,777
Medicaid	2016	$309.19	$296.69	$12.50	1,741,644	$21,763,139
Medicare	2016	$1,083.22	$1,105.72	($22.51)	491,685	($11,066,352)
Total	2016	$466.22	$460.40	$5.82	2,725,700	$15,862,563
Commercial	2017	$430.19	$401.56	$28.63	488,676	$13,989,423
Medicaid	2017	$332.46	$340.57	($8.10)	1,717,731	($13,921,746)
Medicare	2017	$1,184.65	$1,186.62	($1.97)	506,275	($997,237)
Total	2017	$509.11	$509.46	($0.34)	2,712,682	($929,561)
Commercial	2018	$459.71	$420.54	$39.17	480,361	$18,814,593
Medicaid	2018	$364.57	$370.28	($5.71)	1,669,054	($9,526,807)
Medicare	2018	$1,267.33	$1,160.13	$107.20	516,192	$55,333,710
Total	2018	$556.53	$532.29	$24.24	2,665,607	$64,621,496

Table 4: Total Projected Healthcare Cost Savings Estimates – CMHCs						
Line of Business	Calendar Period	Projected PMPM	Actual PMPM	Savings PMPM	Member Months	Total Savings
Commercial	2016	$484.73	$465.28	$19.45	8,559	$166,476
Medicaid	2016	$707.75	$676.77	$30.98	153,973	$4,770,388
Medicare	2016	$2,080.39	$2,084.48	($4.09)	25,508	($104,209)
Total	2016	$883.80	$858.10	$25.70	188,040	$4,832,655
Commercial	2017	$575.33	$460.11	$115.21	7,897	$909,837
Medicaid	2017	$735.38	$681.26	$54.13	151,481	$8,199,166
Medicare	2017	$2,251.68	$2,256.69	($5.01)	27,542	($138,061)
Total	2017	$952.04	$904.05	$47.99	186,920	$8,970,941
Commercial	2018	$575.85	$459.51	$116.33	7,877	$916,358
Medicaid	2018	$765.82	$679.30	$86.52	150,639	$13,033,795
Medicare	2018	$2,419.11	$1,872.01	$547.10	25,159	$13,764,515
Total	2018	$984.13	$833.24	$150.89	183,675	$27,714,669

Table 5: Total Projected Healthcare Cost Savings Estimates – Mixed Primary Care – Cohort 1						
Line of Business	Calendar Period	Projected PMPM	Actual PMPM	Savings PMPM	Member Months	Total Savings
Commercial	2016	$443.96	$433.48	$10.49	356,940	$3,743,973
Medicaid	2016	$395.75	$373.78	$21.97	929,775	$20,426,441
Medicare	2016	$1,073.38	$1,095.61	($22.23)	412,320	($9,165,324)
Total	2016	$570.33	$561.49	$8.83	1,699,035	$15,005,090
Commercial	2017	$473.68	$443.46	$30.22	352,931	$10,667,235
Medicaid	2017	$425.19	$423.20	$2.00	912,962	$1,821,881
Medicare	2017	$1,169.80	$1,172.22	($2.43)	426,800	($1,036,404)
Total	2017	$623.05	$616.28	$6.77	1,692,693	$11,452,712
Commercial	2018	$508.23	$467.97	$40.26	342,964	$13,806,311
Medicaid	2018	$466.82	$457.93	$8.89	885,443	$7,867,345
Medicare	2018	$1,251.57	$1,137.71	$113.86	436,075	$49,651,946
Total	2018	$680.95	$638.10	$42.85	1,664,482	$71,325,602

Table 6: Total Projected Healthcare Cost Savings Estimates – Internal Medicine Practices – Cohort 1						
Line of Business	Calendar Period	Projected PMPM	Actual PMPM	Savings PMPM	Member Months	Total Savings
Commercial	2016	$717.29	$675.82	$41.47	27,995	$1,161,068
Medicaid	2016	$455.89	$400.48	$55.42	102,262	$5,667,177
Medicare	2016	$1,164.28	$1,182.86	($18.58)	73,360	($1,362,741)
Total	2016	$747.05	$720.21	$26.84	203,617	$5,465,503
Commercial	2017	$799.32	$728.85	$70.47	26,783	$1,887,401
Medicaid	2017	$505.83	$466.21	$39.62	102,545	$4,062,529
Medicare	2017	$1,301.93	$1,299.07	$2.87	73,722	$211,294
Total	2017	$833.59	$803.24	$30.34	203,050	$6,161,224
Commercial	2018	$886.23	$791.98	$94.25	25,679	$2,420,230
Medicaid	2018	$602.09	$548.45	$53.64	101,211	$5,429,161
Medicare	2018	$1,392.17	$1,307.35	$84.82	73,463	$6,231,012
Total	2018	$928.20	$857.93	$70.28	200,353	$14,080,403

Table 7: Total Projected Healthcare Cost Savings Estimates – Pediatric Practices – Cohort 1						
Line of Business	Calendar Period	Projected PMPM	Actual PMPM	Savings PMPM	Member Months	Total Savings
Commercial	2016	$196.70	$194.28	$2.43	107,436	$260,736
Medicaid	2016	$174.62	$180.72	($6.10)	709,607	($4,330,479)
Medicare	2016	$768.27	$857.91	($89.64)	6,005	($538,287)
Total	2016	$181.83	$187.43	($5.60)	823,048	($4,608,030)
Commercial	2017	$198.56	$185.39	$13.17	108,962	$1,434,787
Medicaid	2017	$186.59	$214.80	($28.20)	702,224	($19,806,157)
Medicare	2017	$783.31	$813.23	($29.92)	5,753	($172,127)
Total	2017	$192.39	$215.09	($22.70)	816,939	($18,543,497)
Commercial	2018	$212.70	$189.53	$23.17	111,718	$2,588,053
Medicaid	2018	$196.67	$230.12	($33.45)	682,400	($22,823,313)
Medicare	2018	$921.75	$1,004.29	($82.54)	6,654	($549,249)
Total	2018	$204.93	$230.89	($25.96)	800,772	($20,784,509)

Table 8: Total Projected Healthcare Cost Savings Estimates – PCP Practices – Cohort 2						
Line of Business	Calendar Period	Projected PMPM	Actual PMPM	Savings PMPM	Member Months	Total Savings
Commercial	2017	$406.18	$387.34	$18.83	495,352	$9,329,531
Medicaid	2017	$344.92	$371.12	($26.20)	933,331	($24,455,362)
Medicare	2017	$1,083.56	$1,091.51	($7.95)	368,464	($2,928,566)
Total	2017	$513.25	$523.29	($10.05)	1,797,147	($18,054,397)
Commercial	2018	$428.30	$408.19	$20.12	481,464	$9,684,703
Medicaid	2018	$370.57	$398.40	($27.82)	903,003	($25,126,020)
Medicare	2018	$1,171.18	$1,102.26	$68.91	377,626	$26,023,846
Total	2018	$557.92	$551.91	$6.01	1,762,093	$10,582,529

Table 9: Total Projected Healthcare Cost Savings Estimates – Mixed Primary Care Practices – Cohort 2

Line of Business	Calendar Period	Projected PMPM	Actual PMPM	Savings PMPM	Member Months	Total Savings
Commercial	2017	$448.66	$425.03	$23.63	379,429	$8,967,430
Medicaid	2017	$342.10	$353.63	($11.53)	618,965	($7,137,205)
Medicare	2017	$1,048.68	$1,063.03	($14.34)	329,457	($4,725,520)
Total	2017	$547.86	$550.04	($2.18)	1,327,851	($2,895,295)
Commercial	2018	$479.85	$452.99	$26.85	364,581	$9,790,649
Medicaid	2018	$372.61	$378.35	($5.74)	598,696	($3,436,395)
Medicare	2018	$1,135.87	$1,079.74	$56.13	339,040	$19,030,190
Total	2018	$601.34	$581.84	$19.49	1,302,317	$25,384,445

Table 10: Total Projected Healthcare Cost Savings Estimates – Internal Medicine Practices – Cohort 2

Line of Business	Calendar Period	Projected PMPM	Actual PMPM	Savings PMPM	Member Months	Total Savings
Commercial	2017	$720.95	$704.17	$16.79	13,026	$218,694
Medicaid	2017	$1,487.37	$1,414.56	$72.81	11,118	$809,511
Medicare	2017	$1,338.84	$1,301.82	$37.02	35,463	$1,312,726
Total	2017	$1,231.52	$1,192.24	$39.27	59,607	$2,340,930
Commercial	2018	$795.73	$782.27	$13.45	12,096	$162,735
Medicaid	2018	$1,601.34	$1,509.70	$91.65	11,598	$1,062,925
Medicare	2018	$1,448.29	$1,289.47	$158.81	35,007	$5,559,594
Total	2018	$1,344.06	$1,228.47	$115.59	58,701	$6,785,253

Table 11: Total Projected Healthcare Cost Savings Estimates – Pediatric Practices – Cohort 2

Line of Business	Calendar Period	Projected PMPM	Actual PMPM	Savings PMPM	Member Months	Total Savings
Commercial	2017	$209.67	$208.27	$1.39	102,897	$143,408
Medicaid	2017	$308.79	$368.57	($59.78)	303,248	($18,127,668)
Medicare	2017	$1,771.75	$1,635.12	$136.63	3,544	$484,228
Total	2017	$296.55	$339.26	($42.72)	409,689	($17,500,032)
Commercial	2018	$206.54	$209.10	($2.56)	104,787	($268,681)
Medicaid	2018	$317.64	$395.37	($77.73)	292,709	($22,752,549)
Medicare	2018	$1,805.54	$1,404.85	$400.69	3,579	$1,434,061
Total	2018	$301.89	$355.71	($53.82)	401,075	($21,587,169)

Table 12: Total Projected Healthcare Cost Savings Estimates – PCP Practices – Cohort 3						
Line of Business	Calendar Period	Projected PMPM	Actual PMPM	Savings PMPM	Member Months	Total Savings
Commercial	2018	$368.06	$375.20	($7.14)	583,342	($4,163,886)
Medicaid	2018	$414.81	$429.52	($14.70)	514,387	($7,563,872)
Medicare	2018	$1,117.82	$1,040.93	$76.89	311,908	$23,983,509
Total	2018	$551.02	$542.32	$8.69	1,409,637	$12,255,752

Table 13: Total Projected Healthcare Cost Savings Estimates – Mixed Primary Care Practices – Cohort 3						
Line of Business	Calendar Period	Projected PMPM	Actual PMPM	Savings PMPM	Member Months	Total Savings
Commercial	2018	$404.77	$415.03	($10.27)	411,281	($4,221,983)
Medicaid	2018	$478.90	$499.46	($20.55)	246,928	($5,075,047)
Medicare	2018	$1,052.20	$975.88	$76.33	222,109	$16,953,238
Total	2018	$588.91	$580.22	$8.70	880,318	$7,656,208

Table 14: Total Projected Healthcare Cost Savings Estimates – Internal Medicine Practices – Cohort 3						
Line of Business	Calendar Period	Projected PMPM	Actual PMPM	Savings PMPM	Member Months	Total Savings
Commercial	2018	$524.28	$506.99	$17.29	44,860	$775,715
Medicaid	2018	$835.42	$810.57	$24.85	57,354	$1,425,404
Medicare	2018	$1,266.13	$1,194.03	$72.10	88,770	$6,400,265
Total	2018	$962.53	$917.50	$45.04	190,984	$8,601,384

Table 15: Total Projected Healthcare Cost Savings Estimates – Pediatric Practices – Cohort 3						
Line of Business	Calendar Period	Projected PMPM	Actual PMPM	Savings PMPM	Member Months	Total Savings
Commercial	2018	$194.28	$199.93	($5.64)	127,201	($717,618)
Medicaid	2018	$224.67	$243.30	($18.63)	210,105	($3,914,228)
Medicare	2018	$2,486.94	$1,874.69	$612.25	1,029	$630,006
Total	2018	$220.13	$231.95	($11.83)	338,335	($4,001,840)

Table 16 Summary of Cost Savings Estimates – Cohort 1, Cohort 2, Cohort 3, CMHCs				
Line of Business	**Calendar Period**	**Savings PMPM**	**Member Months**	**Total Savings**
Commercial	2016*	$10.64	500,930	$5,332,252
Medicaid	2016*	$14.00	1,895,617	$26,533,527
Medicare	2016*	($21.60)	517,193	($11,170,562)
Total	2016*	$7.10	2,913,740	$20,695,217
Commercial	2017*	$24.43	991,925	$24,228,790
Medicaid	2017*	($10.77)	2,802,543	($30,177,942)
Medicare	2017*	($4.50)	902,281	($4,063,865)
Total	2017*	($2.13)	4,696,749	($10,013,016)
Commercial	2018	$16.26	1,553,044	$25,251,769
Medicaid	2018	($9.02)	3,237,083	($29,182,904)
Medicare	2018	$96.76	1,230,885	$119,105,580
Total	2018	$19.13	6,021,012	$115,174,445
Commercial	2016-2018*	$18.00	3,045,899	$54,812,812
Medicaid	2016-2018*	($4.14)	7,935,243	($32,827,319)
Medicare	2016-2018*	$39.19	2,650,359	$103,871,154
Total	2016-2018*	$9.23	13,631,501	$125,856,647

**Note that only Cohort 1 and CMHC results are included in 2016; Cohort 1, CMHC, and Cohort 2 results are included in 2017; and Cohort 1, CMHC, Cohort 2, and Cohort 3 results are included in 2018.*

The estimated healthcare cost savings for all SIM Cohort 1 PCP practices in 2016 is approximately $15.9 million, which represents 1.2% of projected healthcare cost levels during 2016. The estimated healthcare cost savings for all SIM Cohort 1 and Cohort 2 PCP practices combined in 2017 is approximately -$19.0 million, which represents -0.8% of projected healthcare cost levels during 2017. The estimated healthcare cost savings for all SIM Cohort 1, Cohort 2, and Cohort 3 PCP practices combined in 2018 is approximately $87.5 million, which represents 2.7% of projected healthcare cost levels during 2018. Combined, the projected savings for all PCP practices through 2018 is $84.3 million, or approximately 1.2% of projected healthcare costs.

The estimated healthcare cost savings for all CMHCs in 2016 is approximately $4.8 million, which represents 2.9% of projected healthcare cost levels during 2016. The estimated healthcare cost savings for CMHCs in 2017 is approximately $9.0 million, which represents 5.0% of projected healthcare cost levels during 2017. The estimated healthcare cost savings for CMHCs in 2018 is approximately $27.7 million, which represents 15.3% of projected healthcare cost levels during 2018. Combined, the projected savings for all CMHCs through 2018 is $41.5 million, or approximately 7.9% of projected healthcare costs.

For all SIM Cohort 1, Cohort 2, Cohort 3 PCP practices and CMHCs combined, the projected savings through 2018 is $125.9 million, or approximately 1.7% of projected healthcare costs. There are many different factors that can affect or contribute to these results, as noted in the caveats section.

These results are based on the low end of the ranges of trend rates that are published in our Milliman Health Cost Guidelines (HCGs), including the Commercial HCGs and the Over 65 HCGs, as well as those observed for the Colorado Medicaid program as reported by HCPF. To be conservative, we chose the lower ends of these rate ranges and apply the trend assumptions as shown in Table 17:

Table 17: Conservative Low End Assumptions for Assumed Annual Trend Rates			
Service Category	**Commercial**	**Medicaid**	**Medicare**
Inpatient Facility	2.0%	1.5%	-1.0%
Outpatient Facility/Emergency Room	3.0%	0.0%	3.5%
Professional/Other	2.0%	2.0%	-0.5%
Prescription Drugs	6.3%	6.5%	3.5%

We have also tested the sensitivity of trend assumptions on projected savings for Cohort 1 and Cohort 2 PCP practices and CMHCs. We tested each of the trend rates shown in Table 17 by +/-1% (e.g. test the Commercial Inpatient Facility trend rate at 3% and 1% instead of 2%). The projected healthcare cost savings for each year for each Cohort and CMHCs fluctuated within a range of approximately 20-60% of the ROI projected savings, varying by Cohort and year. The results of these tests showed a high degree of sensitivity to the assumed trend rates. Accordingly, we have assumed low-end, conservative trend rates for all lines of business. Although we did not explicitly test Cohort 3 PCP practices in this sensitivity testing, we expect to see a comparable level of sensitivity and thus have selected conservative trend for this Cohort, as well.

According to the SIM office, $23.9 million of CMMI funding has been released for the SIM work in the pre-implementation year (2015) and the subsequent three model test years (2016, 2017, and 2018) as of 1/1/18, while $62.9 million has been released, in total, through 7/31/19. This investment combined with the projected healthcare cost savings of $125.9 million through 2018 results in a projected ROI of 2.00, which is above our target ratio of 1.89.

The average normalized risk scores by practice type, line of business, and year are provided in Table 18 (for Cohort 1 and CMHCs), Table 19 (for Cohort 2), and Table 20 (for Cohort 3) below. For Cohort 1 practices and CMHCs, 2015-2018 risk scores are normalized against total 2015 data. For Cohort 2 practices, 2016-2018 risk scores are normalized against total 2016 data. For Cohort 3 practices, 2017-2018 risk scores are normalized against total 2017 data.

Table 18: Average Normalized Risk Scores by Practice Type, Line of Business, and Year for Cohort 1												
	2015 Risk Score			**2016 Risk Score**			**2017 Risk Score**			**2018 Risk Score**		
Practice Type	**Comm.**	**Medicaid**	**Medicare**	**Comm.**	**Medicaid**	**Medicare**	**Comm.**	**Medicaid**	**Medicare**	**Comm.**	**Medicaid**	**Medicare**
Mixed Primary Care	1.054	1.122	0.957	1.063	1.132	1.082	1.103	1.186	1.233	1.149	1.265	1.360
Pediatric	0.554	0.632	0.773	0.504	0.545	1.060	0.496	0.573	1.086	0.516	0.594	1.375
Internal Medicine	1.810	1.228	1.133	1.584	1.353	1.285	1.714	1.457	1.510	1.833	1.673	1.659
CMHC	1.397	1.786	1.373	1.416	2.048	1.649	1.614	2.080	1.843	1.560	2.107	2.001

Table 19: Average Normalized Risk Scores by Practice Type, Line of Business, and Year for Cohort 2									
	2016 Risk Score			**2017 Risk Score**			**2018 Risk Score**		
Practice Type	**Commercial**	**Medicaid**	**Medicare**	**Commercial**	**Medicaid**	**Medicare**	**Commercial**	**Medicaid**	**Medicare**
Mixed Primary Care	1.068	1.006	0.969	1.079	1.024	1.140	1.120	1.083	1.279
Pediatric	0.645	0.895	1.295	0.580	0.793	1.510	0.561	0.797	1.544
Internal Medicine	1.719	3.685	1.251	1.682	3.907	1.475	1.781	4.121	1.648

Table 20: Average Normalized Risk Scores by Practice Type, Line of Business, and Year for Cohort 3

	2017 Risk Score			2018 Risk Score		
Practice Type	Commercial	Medicaid	Medicare	Commercial	Medicaid	Medicare
Mixed Primary Care	1.096	1.150	0.896	1.155	1.176	0.998
Pediatric	0.561	0.557	1.416	0.529	0.517	1.482
Internal Medicine	1.306	1.979	1.242	1.299	1.988	1.305

Note that the risk scores for lines of business and practice types with low attributed membership may appear unreasonable due to low sample sizes. For example, there are few Medicare members attributed to pediatric practices.

The Medicare risk scores shown in the tables above are the full risk scores produced by MARA for this population. Note that in applying these risk scores in our analysis, we have reduced the impact by 50% to account for observed increases in the diagnosis information available in the APCD, which increases risk scores over time due to coding intensity.

More information about the assumed trend rates used in this analysis is provided in the “Methodology” section above.

CONCLUSIONS

The Colorado SIM program has achieved its aims through July 2020 with achieving one important element of the quadruple aim – reducing per-capita healthcare spending. The $62.9 million investment of CMMI in the Colorado SIM through 7/31/19, combined with the projected healthcare cost savings of $125.9 million, results in a projected ROI of 2.00, which is above our target ratio of 1.89.

Projected savings have been the highest for the Medicare line of business, followed by the Commercial line of business and CMHCs. The Medicaid line of business has projected losses under the Colorado SIM program. The population that has most struggled to achieve projected savings is the pediatric population, both within the Commercial line of business, but especially within the Medicaid line of business. This may be due to lower utilization of primary care services in this line of business in general. The commercial and Medicare lines of business show higher utilization rates for physical primary care services compared to Medicaid. Under the SIM program, patients must have a primary care visit for the practice-based efforts to affect patient cost of care. As a result of this lower utilization, primary care practices may not have had the same opportunity to affect the Medicaid population as they did for the commercial and Medicare populations.

The pediatric population may experience the delayed cost savings that follow heightened utilization of preventive care, as noted above. It may be that “early return” savings of integrated medical-behavioral healthcare may be more easily obtained within the Medicare population, whereas the pediatric population needs additional healthcare services in the short term that will, hopefully, lead to overall savings down the road. Further research could shed more light on which medical and behavioral conditions are the most challenging for cost containment efforts for the pediatric populations and which types of services are being most utilized in the Pediatric SIM cohorts.

Investigation into Differences between HCPF and CO APCD Medicaid Data: Summary

The purpose of this document is to provide a summary of recent efforts to resolve differences in the Medicaid data between the HCPF interChange system and the CO APCD.

Background

CO APCD receives claims submissions from HCPF's contracted data management vendor. Starting in February 2017, HCPF transitioned vendors from 3M to IBM/Truven. Medicaid claims were not submitted to the CO APCD during the transition period but IBM/Truven restarted the submissions in February 2018.

After the submissions were restarted, several data quality problems were investigated and resolved, including duplicate claims, invalid date fields and the inadvertent inclusion of substance use disorder claims. In January 2019, monthly Medicaid cost PMPM calculations were produced by HCPF using interChange and by CIVHC using the CO APCD. The results were different and raised new questions about the quality of the Medicaid data in the CO APCD and concerns about the use of the data for the forthcoming SIM evaluation.

In March, CIVHC convened a team consisting of representatives from HCPF, IBM/Truven, SIM, CIVHC and HSRI to accomplish a short term goal of identifying and addressing the root causes of the differences and a long term goal of establishing a method for conducting a routine parity check between the interChange and the CO APCD.

Analysis and Discoveries

Analysts from HCPF and CIVHC compared the methods they used to calculate cost PMPM and then created and implemented new logic to eliminate differences in methods in an effort to align cost PMPM values.

- HCPF removed Substance Use Disorder claims as these claims are not received by the CO APCD;
- HCPF adjusted their calculation to utilize Allowed amount as opposed to Paid amount (this decision was subsequently reversed);
- HCPF modified their Claim Type coding (i.e., Inpatient, Outpatient, Professional, Pharmacy) to align with the definitions provided by CIVHC;
- CIVHC adjusted calculation to exclude capitated payments.

Unfortunately, revised cost PMPM calculations were still different. CIVHC reported lower cost PMPM values, which appeared to be driven by higher member month counts. CIVHC also reported higher claim counts. To better understand the reasons for the differences the team attempted to match member and claims records for a specific time period to determine the characteristics of the records that do not match.

Investigation into Differences between HCPF and CO APCD Medicaid Data

From the member and claims matching analysis, the team discovered:

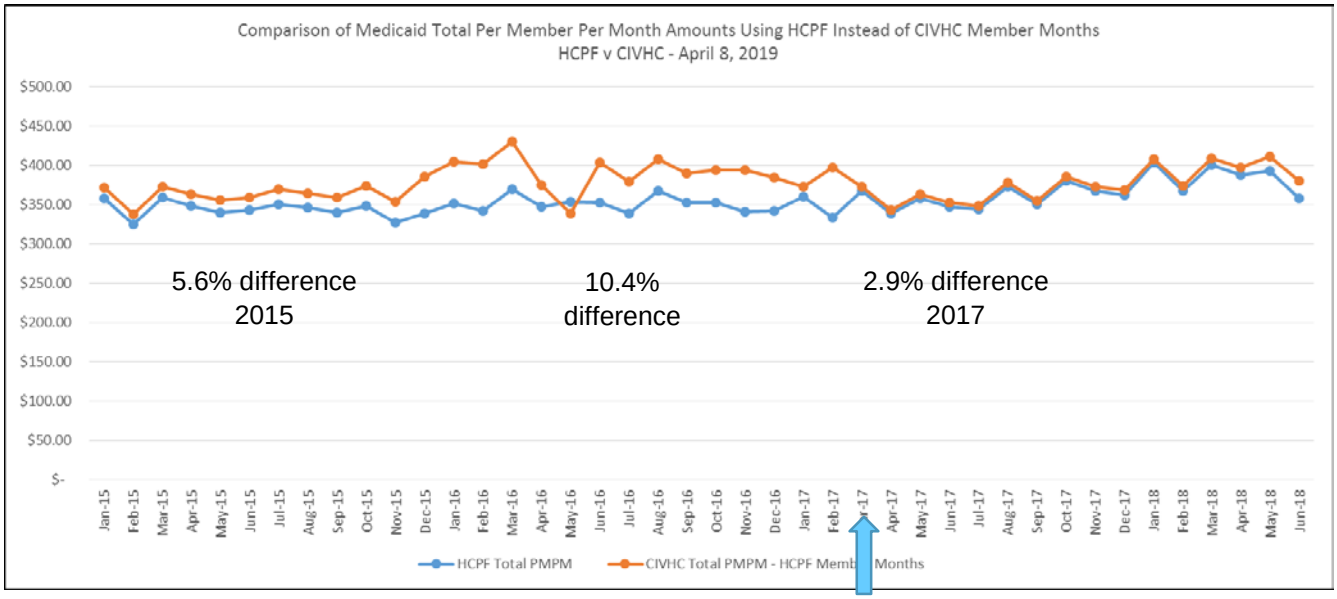
- The member month differences were due to CHP+ and managed care members being included in the CIVHC calculations. (Note: This difference could not be eliminated in the short term because CIVHC has no way of identifying these members from HCPF data submissions (see recommendations below)).
- The claim count differences were due to discrepancies in Substance Use Disorder (SUD) and Medicare crossover claim processing. HCPF made adjustments to fully remove SUD claims and to include the Medicare crossover claims in their calculations.

- Efforts were made to adjust the HCPF claim line level processing to mimic the method CIVHC uses to calculate allowed amounts, which resulted in HCPF inpatient payments to increase substantially and inaccurately. Further analysis into this situation indicated that the Paid Amount should be used for the HCPF and CIVHC calculations as this is the basis for HCPF analysis.

Following these steps, the CIVHC and HCPF methodologies were finalized. HCPF and CIVHC calculated and compared costs PMPM and made minor coding adjustments as anomalies were discovered through another cycle of analysis and improvement.

Comparison of Medicaid PMPM Paid Amounts

A comparison of Medicaid PMPM paid amounts from interChange and the APCD was completed April 8th. (Graph) The PMPM paid amounts from both sources were calculated using HCPF member month values because APCD Medicaid eligibility files include managed care members that currently cannot be identified and excluded. The comparison shows that results from each data source were very similar after March 2017, when HCPF transitioned to IBM/Truven. Results were somewhat variable prior to the transition, with PMPM values being close in 2015, but less so in 2016. In addition, the overall variance in both the HCPF PMPM and the CIVHC PMPM calculations has decreased – resulting in smoother trending from month-to-month for each source.



IBM/Truven

Next Steps/Recommendations

The team will continue their discussions to solve the problem of incomplete submissions of Medicaid member eligibility and to improve the long term parity of the systems. In the short term, the team recommends that HCPF/Truven modify the eligibility file submitted to the CO APCD to include the Insurance Type Code, which will allow CIVHC to identify CHP+/Managed Care members and calculate accurate member months. The team will also continue to investigate differences in the legacy data (specifically 2016).

Long term, the team will create monthly, automated reports comparing cost PMPM and its component member month and paid claims dollars and counts between interChange and the CO APCD.