

March 4, 2021

Mr. Kevin Ruggeberg, FSA, MAAA
Vice President & Consulting Actuary
Consulting Actuary

**Subject: Your 2/23/2021 Questions re: Blue Cross and Blue Shield of Vermont
3Q 2021 Large Group Rating Program Filing (SERFF Tracking #: BCVT-132713612) and
re: The Vermont Health Plan 3Q 2021 Large Group Rating Program Filing (SERFF Tracking #: BCVT-
132713919)**

Dear Mr. Kevin Ruggeberg:

In response to your request dated February 23, 2021, here are *your questions* and our answers

- 1) *Clarify if and how the Medicare Primary manual rate increase is incorporated in the “Impact of Formula and Factor Changes” table in the actuarial memorandum.*

The ‘Impact of Formula and Factor Changes’ includes the impact of both the active and Medicare Primary manual rate increase. We developed the impact of formula and factors changes using the current groups in the block of business, so the extent to which the existing groups offer Medicare Primary coverage determines the degree to which each manual rate is incorporated into the total increase. Medicare Primary membership is approximately one percent of membership in this filing.

- 2) *Explain why the MLR calculation in the actuarial memorandum assumes that various quantities, such as rebates, will be unchanged and untrended from 2019, despite some of these values being assumed to have changed elsewhere in the filing.*

We provided the MLR calculation in a manner that was consistent with previous filings. However, we agree that the use of the estimated rebates underlying the rate change in section 2.3 to be more indicative of the anticipated MLR in the projection period. The other item in the MLR calculation that comes directly from the 2019 MLR filing is the HCQ expenses, which we consider to be a reasonable proxy for the 2022 HCQ expenses.

Please see the attached file *Response to Q3 2021 LG Filing 02.23.2021 Inquiry – Q2.xlsx* for updated versions of the BCBSVT and TVHP MLR calculations.

- 3) *Regarding the deferred care adjustments provided in Exhibit 6E and used in Exhibits 1A and 1B:*
a) *Provide more detail about how these factors were developed, including any implicit trend level incorporated in the calculation.*

These factors are based on modeling recently performed for DFR. Please see the attached file *Response to Q3 2021 LG Filing 02.23.2021 Inquiry – Q3.pdf* for the actuarial report that describes the modeling in detail.

b) The sample calculation shown in Exhibit 1B shows a simple average of the 12 monthly factors applicable to the experience period. By L&E's estimation, this would typically result in an overstatement of about 4% to incurred claims. This is because the highest inverse factors are applicable to the months with the lowest claims, and vice versa. Please confirm the precise manner in which this adjustment will be calculated for particular groups.

We apply the factors on a monthly basis to calculate the experience adjustment factor. Please see the attached file *Response to Q3 2021 LG Filing 02.23.2021 Inquiry – Q3.xlsx* for a precise illustrative demonstration of the calculation of the factor. The monthly application of the factors to claims, rather than using a simple average, ensures that incurred claims are not overstated.

4) Explain why clinical guidance of a 5% increase from new drugs in the future should be applied to the historical trend, which presumably already includes past new drugs of a similar magnitude

Pharmaceuticals dispensed in a medical setting feature a number of challenges when setting future trends. These claims are often high-cost and low-frequency and the advent of a new drug in this class may cause a significant escalation of trend in a given year. For example, in the year ended February 2019, this class of drug experienced an annual trend of 15.5 percent, which was higher the approved Q3 2020 filing trend of 11.3 percent. The lower trend experienced from 201902 to 202002 is the result of the leveling off in utilization of certain drugs that were first available in 2017 or 2018, as the initial pent-up demand for these medications became part of the entire trend experience period. The additional 5 percent is to account for new drugs, such as Ocrelizumab, which are not included in the baseline. Many of the newly developed specialty drugs are now dispensed through the medical benefit and their impact can vary widely. As shown in the table below, the most recent year over year total trend included a smaller-than-historical impact of pipeline drugs.

Impact of Pipeline			
Type	201802	201902	202002
Trend without Pipeline	-0.7%	6.4%	5.0%
Trend with Pipeline	5.4%	15.5%	8.4%
Impact of Pipeline	6.0%	8.5%	3.2%

In summary, a long-term view for this class is necessary due to the substantial year-to-year variations in annual trends caused by the introduction of new, high-cost drug therapies.

5) Provide more detail on how Exhibit 2G is used. For example, the factors for Rx claims from March 2017 and April 2017 and 1.000 and 0.8863, respectively. Does this imply that claims from April are trended by an additional 13% over claims in March?

We average the factors in Exhibit 2G based on the months in each respective experience period. The ratio of the average of the most recent experience period over the average of each preceding experience calculates the prior experience trend. Please see the attached file *Response to Q3 2021*

LG Filing 02.23.2021 Inquiry – Q5.xlsx for an illustrative demonstration of the calculation of the prior period trend factors.

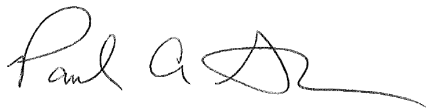
6) Please list all rating variables which vary between the TVHP and BCBSVT

There are two rating variables that vary:

- Medical Unit Cost: For marketing reasons, provider contracting negotiates different unit cost increases for the BCBSVT Managed, BCBSVT Non-Managed, and TVHP Managed contracts.
- Contribution to Reserve (CTR): The BCBSVT Insured Group CTR factor is 1.5 percent of premium. Because TVHP remains taxable at the federal level, its long-term CTR target is 2 percent.

Please let us know if you have any further questions, or if we can provide additional clarity on any of the items above.

Sincerely,

A handwritten signature in black ink, appearing to read "Paul A. Schultz", with a stylized flourish at the end.

Paul A. Schultz, F.S.A., M.A.A.A.

TVHP PROJECTED 2022 MLR CALCULATION

(A)	Manual Rate	\$ 612.01	Exhibit 4A
(B)	Rebates	\$40.60	Actuarial Memorandum, Section 2.3
(C)	Estimated HCQ	\$3.27	2019 MLR Filing, untrended
(D)	State Mandates and Assessments	\$13.84	Calculation as described on Exhibit 1C, using latest actual PMPM as needed
(E)	MLR Numerator	\$588.52	= (A) – (B) + (C) + (D)
(F)	Projected Claims	\$585.25	= (A) – (B) + (D)
(G)	Net Cost of Reinsurance	\$1.56	Actuarial Memorandum, Section 6.4
(H)	Administrative Charge	\$55.62	Calculation as of January 2022, from Exhibit 5A
(I)	GMCB Billbacks	\$2.31	Actuarial Memorandum, Section 6.8
(J)	Patient-Centered Outcomes Research Institute I	\$0.24	Actuarial Memorandum, Section 6.9
(K)	Subtotal	\$644.98	= (F) + (G) + (H) + (I) + (J)
(L)	Total Premium	\$673.39	= (J) / (1 - 0.022 - 0.020)
(M)	Commissions	\$14.94	= (L) x 2.2% (from 2019 MLR filing)
(N)	Contribution to Reserve	\$13.47	= (L) x 2.0% (from Actuarial Memorandum, Section 6.6)
(O)	MLR Denominator	\$673.39	= (L)
(P)	MLR	87.4%	= (E) / (O)

BCBSVT PROJECTED 2022 MLR CALCULATION

(A)	Manual Rate	\$ 612.01	Exhibit 4A
(B)	Rebates	\$40.60	Actuarial Memorandum, Section 2.3
(C)	Estimated HCQ	\$2.75	2019 MLR Filing, untrended
(D)	State Mandates and Assessments	\$13.84	Calculation as described on Exhibit 1C, using latest actual PMPM as needed
(E)	MLR Numerator	\$588.00	= (A) – (B) + (C) + (D)
(F)	Projected Claims	\$585.25	= (A) – (B) + (D)
(G)	Net Cost of Reinsurance	\$1.56	Actuarial Memorandum, Section 6.4
(H)	Administrative Charge	\$55.62	Calculation as of January 2022, from Exhibit 5A
(I)	GMCB Billbacks	\$2.31	Actuarial Memorandum, Section 6.8
(J)	Patient-Centered Outcomes Research Institute I	\$0.24	Actuarial Memorandum, Section 6.9
(K)	Subtotal	\$644.98	= (F) + (G) + (H) + (I) + (J)
(L)	Total Premium	\$662.22	= (K) / (1 - 0.011 - 0.015)
(M)	Commissions	\$7.31	= (L) x 1.1% (from 2019 MLR filing)
(N)	Contribution to Reserve	\$9.93	= (L) x 1.5% (from Actuarial Memorandum, Section 6.6)
(O)	MLR Denominator	\$662.22	= (L)
(P)	MLR	88.8%	= (E) / (O)

Blue Cross and Blue Shield of Vermont
COVID-19 Modeling

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Blue Cross and Blue Shield of Vermont COVID-19 Modeling

Purpose

The COVID-19 pandemic has introduced significant uncertainty into the anticipated level of claim costs. In the spring of 2020, stay at home orders resulted in a significant drop in claims volume. Over subsequent months, a return of deferred care increased utilization above expected levels, while infection rates remained low through the summer before spiking in late autumn. Looking forward, there are uncertain impacts around the ongoing level of infection, the availability and cost of a vaccine, and the degree to which deferred or foregone care will lead to increased population morbidity, among many other uncertainties.

To examine the possible variance in paid claims in 2020, 2021, and 2022 BCBSVT has created a model that simulates paid claims under varying scenarios for directly-written insured lines of business¹. The model and results are intended to quantify the impact varying scenarios have on BCBSVT's performance by line of business, projected net income and risk based capital ratio (RBC). It should not be used for any other purpose.

Not included in this modeling are a number of additional operational costs incurred by BCBSVT related to the COVID-19 pandemic. BCBSVT has implemented programming to enhance access to and affordability of retail pharmaceuticals during the crisis, extended grace periods and offered premium flexibility to customers, cancelled the recoupment of certain overpayments to providers, waived any deductible amounts applying to generic wellness drugs and insulins and temporarily suspended claims audit activity.

This modeling is specific to claims costs directly related to COVID-19, along with the deferral of medical care due to the economic shutdown and that care's eventual (partial) return. We specifically note the exclusion of retail pharmacy from this modeling².

This model does not project ongoing COVID-19 illness beyond the end of Calendar Year (CY) 2022. Neither does it attempt to quantify the financial impact of long-term health complications that have been noted among individuals who have contracted and recovered from COVID-19.

Data

The model and its inputs rely on several sources of information. We use as a baseline projected claims, trend, actuarial value, and membership information presented in or underlying the BCBSVT 2021 Vermont Individual and Small Group Rate Filing (BCVT-132371410), the BCBSVT and TVHP Q3 2020 Large Group Rating Program Filing (BCVT-132350241 & BCVT-132350492), the 2021 TVHP Medigap Blue Rate Filing (BCVT-132559586), and the 2021 BCBSVT Medicare Supplement Rate Filing (BCVT-132570622). The large group filings do not project membership, so for these lines of business we use membership from

¹ These include the Vermont Individual and Small Group (VISG) merged market, BCBSVT insured large groups, TVHP insured large groups, BCBSVT Medicare Supplement products, and TVHP Medicare Supplement products.

² Patterns of retail pharmacy utilization were impacted by the pandemic (e.g. an unusually large number of 90-day scripts were filled in late March) but the overall level of utilization was not materially impacted.

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internal reporting as of November 30, 2020 to approximate 2020, 2021, and 2022 membership. We include direct COVID-related costs incurred in February through October 2020 and paid through November 30, 2020 from BCBSVT's data warehouse.

To calculate the level of deferred care, we use claims incurred from January 2019 through September 2020 for all BCBSVT members. We apply completion factors developed from the monthly financial reporting process (best estimates before margin and before blending with trended estimates). Shelter in place restrictions were put in place in March 2020; therefore, the slowdown period was defined as the incurred period from March 2020 through May 2020. Beginning in June, utilization levels can be observed to have returned to levels that surpass trended pre-pandemic benchmarks across the BCBSVT book of business. This slowdown period was quantified by comparing the PMPM of the slowdown period relative to a benchmark PMPM. We calculate the level of deferred care separately for Medicare Supplement members. For more detail, please refer to the *Deferred Care* section.

Methodology

Baseline Claims

Given that the timing of the deferred and returning care (see subsequent sections) is variable on a monthly basis, we convert the claim totals included in the 2021 filings to monthly totals.

To estimate VISG claims, we start with the 2021 projected allowed medical and pharmacy claims from the 2021 VISG filing. We apply paid claim seasonality factors developed as part of the monthly reserving process. We then calculate a monthly allowed trend for medical and pharmacy claims using the approved allowed trend factors. Lastly, we set the starting trend for January 2020 such that the total projected allowed claims equals the figure presented in Exhibit 5 of the filing. Finally, we apply the 2021 actuarial value³ to convert from allowed claims to paid claims.

To estimate the insured large group claims, we start with the approved manual rate in the Q3 2020 BCBSVT/TVHP Large Group filing. The manual rate represents an estimated paid claim amount for the 12-month period starting January 1, 2021. We then divide by the effective actuarial value underlying the Q3 2020 benefit relativity model to convert the manual rate to an allowed claim total. Then, we split medical and pharmacy claims using the proportion of each comprising the manual rate. We then apply paid claim seasonality factors developed as part of the reserving process and convert the annual allowed medical and pharmacy trend in the filing to monthly factors. We set the starting trend for January 2021 such that the total projected allowed claims per member for the year equals the allowed manual rate. We then apply the average actuarial value to convert the allowed claims back to paid claims.

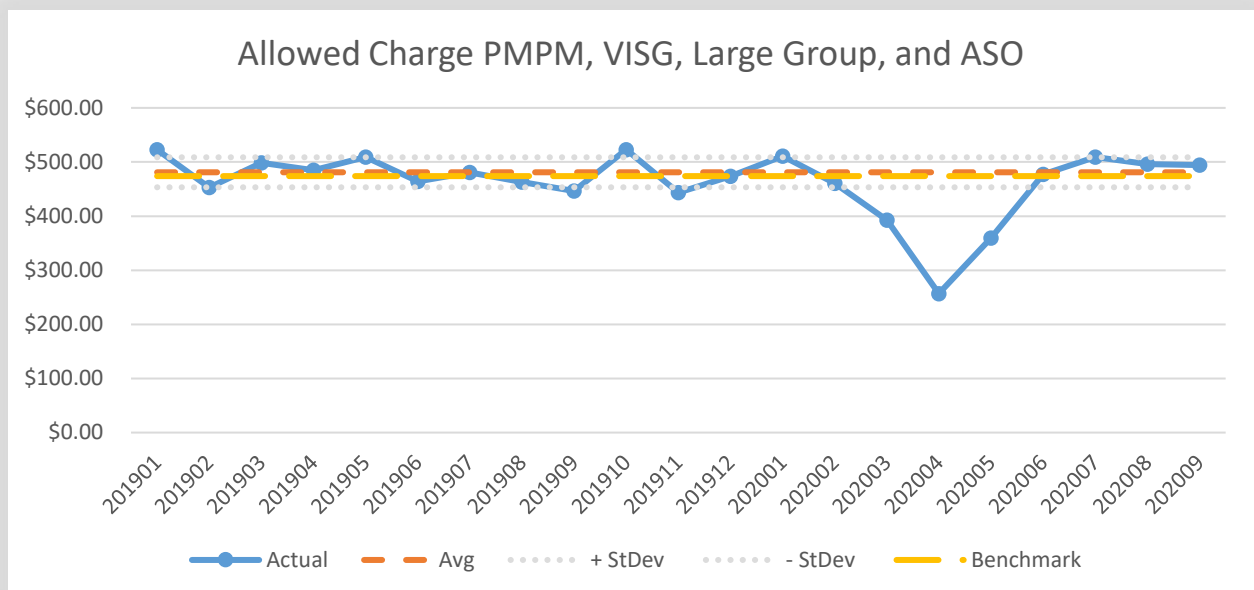
³ We used the actuarial value calculated using BCBSVT population from column L of exhibit 6E of the 2021 VISG rate filing.

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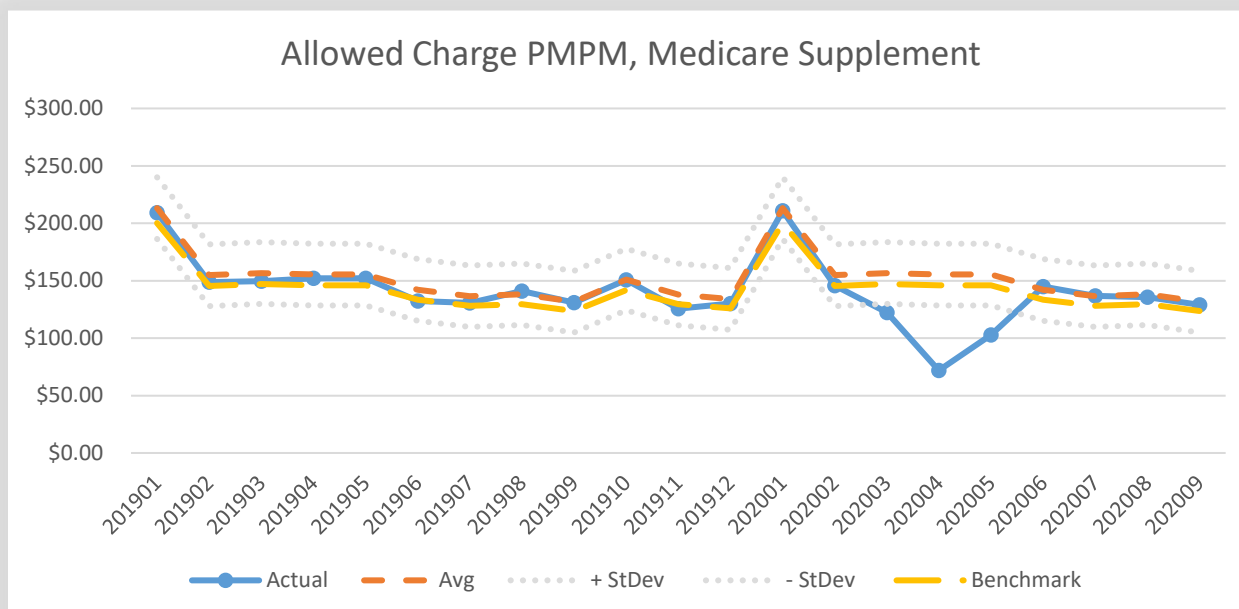
To estimate Medicare Supplement claims, we start with the 2021 projected medical claims from the 2021 BCBSVT Medicare Supplement and 2021 TVHP Medigap Blue filings. We apply paid claim seasonality factors developed as part of the monthly reserving process. We then calculate a monthly allowed trend for medical claims using the approved allowed trend factors. We set the starting monthly claims so that the annual claims are equal to the totals presented in the filing.

Deferred Care

Using the period identified in the *Data* section, we create the following graphs showing the total monthly PMPMs spanning over the benchmark and slowdown periods. We calculate the benchmark PMPM as the monthly average PMPM less the monthly standard deviation PMPM divided by the square root of three in order to ensure that we are isolating the deferred services from normal fluctuations. We calculate benchmarks separately for Medicare Supplement members. We apply a seasonal adjustment to the Medicare Supplement benchmark due to the significant monthly seasonality pattern present.



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We further subdivided our total claims by service category to make determinations about the percentage of claims in our slowdown period that are likely to be rescheduled rather than foregone. We also made assumptions about changes in demand that certain claim categories are likely to experience in the future due to temporary or more lasting changes to the care delivery system expected to result from the pandemic.

We use place of service, DRG, ICD-10 procedure code, CPT/HCPCS, revenue code and ICD-10 diagnosis code to bucket the total claims into 33 sub-categories we considered in estimating the impact of deferred services. A table displaying the assumptions for each of the 33 categories can be found in Appendix E.

BCBSVT actuaries worked closely with BCBSVT medical directors to develop assumptions for the return of care for each service category.

Mental health services apart from inpatient stays can be observed to exceed the benchmark, presumably due to the availability of telehealth options as well as the increased stress the pandemic and economic disruption have inflicted upon our members. While there was a slowdown in inpatient mental health admissions, we assume that this was representative of a change in site of care rather than an indication of pent-up demand.

Medical-drug services (such as injections), durable medical equipment and services at a home health & hospice locations experienced very little or no slowdown; we assume that the limited amount of care that did not take place can be foregone completely or has been resolved using other methods of care. Emergency and urgent care experienced a significant percent slowdown in services during the spring of 2020 but have since rebounded. We expect these services to not return because any emergent event that occurred during March to May has been handled in other ways. We assumed that influenza and pneumonia-based claims will

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not be made up because they are seasonal and do not result in pent-up demand. Newborns and delivery/pregnancy care for mothers cannot be deferred or made up for obvious reasons.

Rescheduling of laboratory, radiology and evaluation and management services depends on whether the service was for chronic care or acute care. We assumed that 100 percent of chronic services will be made up while any acute care that did not take place in the slowdown period has been foregone⁴. We also assumed that any oncology treatment or immunization services that were deferred during the lockdown will be made up fully due to the necessary but deferrable nature of this care.

All surgeries had relatively significant slowdowns during the period. We project that all of these services will be made up due to the necessity of this care. We note that various Vermont hospitals and surgical centers have expanded their hours to contend with the glut of services.

Overall, we estimate that 50.3 percent of the services that were deferred during the slowdown period have been or will be made up. For Medicare Supplement members, we estimate 45.2 percent of deferred services will return. This can be calculated by taking the weighted average of the 'percent rescheduled services' and 'slowdown PMPM' from the table by type of service provided in Appendix E.

We note the independent BCBSVT analysis is closely aligned with industry sources^{5,6}, which lends additional confidence to our assumption.

In any month where services are less than 100 percent of our non-COVID expectation, it is assumed that a mean of 50.3 percent of the claims will return at a later date (a mean of 45.2 percent for Medicare Supplement members). This includes any months during a subsequent increased period of infection where non-emergent care is deferred such that claims are less than expected. In the stochastic model, we assume the level of deferred care is normally distributed with above-referenced means and a standard deviation of one-tenth the mean. This standard deviation allows for a reasonable range of results around our best estimate, roughly equivalent to the "high" and "low" estimates within the above-referenced Milliman white paper.

⁴ While it is unlikely that literally every deferred service in this category will return, the difference between using 100 percent and a figure as low as 90 percent is immaterial to the modeling results. The expectation is that the vast majority of services for the management of chronic disease has been or will be rescheduled. Similarly, it is unlikely that every service we categorized as "acute" will be foregone, but using an assumption of, say, 5 percent has no material impact on results.

⁵ <https://milliman-cdn.azureedge.net/-/media/milliman/pdfs/articles/estimating-the-financial-impact-covid19.ashx>

⁶ <https://www.soa.org/globalassets/assets/files/resources/research-report/2020/illustrative-forecasts-covid-19.pdf>

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Returning Care

The timing of the return of care is dependent on the capacity of the health care system. We use emerging experience to estimate the expanded capacity of the health care system. We assume a total maximum capacity range of 104 to 108 percent.

To model the return of care, we randomly generate capacity factors to apply for each month from October 2020 through December 2022. The capacity in a given month is not allowed to exceed the maximum noted above. We also estimate the potential cost of subsequent restrictions on access to non-emergent medical care. Subsequent periods of more severe economic restrictions would pose a great challenge for Vermonters, Vermont health care providers and Vermont small businesses. The decision to issue further rounds of shelter-in-place orders and/or similar restrictions will not be made lightly.

Massachusetts announced on December 7, 2020 that hospitals would begin limiting elective surgeries⁷. New York also recently limited elective surgeries in Erie County⁸. The case incidence in Massachusetts and Erie County, NY was approximately 600 cases per million at the time these restrictions were put in place, which we use as the level where Vermont once again implements restrictions on access to medical care.

In the month following the conclusion of a period of restricted access to health care, the factors are dampened to reflect the deferral of care. In the second month following a period of restricted access, we apply the additive factors to account for the return of services. We also apply dampening factors that eventually revert care to 100 percent of the benchmark to reflect that the health care system likely cannot operate at maximum capacity for an extended duration. We include an additive term that helps prevent the dampening factors from returning the maximum capacity to 100 percent before returning care reaches the percentage randomly selected for the simulation. Lastly, we end any excess capacity upon reaching the modeled percent of care returning.

Capacity Factors	Provider Max	Period of Restricted Access to Care
Low	104%	85%
High	108%	95%

See Appendix F for a sample of capacity distributions randomly generated by these mechanics.

⁷ <https://www.bostonglobe.com/2020/12/07/metro/baker-says-mass-hospitals-will-stop-elective-surgeries-amid-covid-19-spike/>, accessed December 14, 2020.

⁸ <https://www.wkbw.com/news/coronavirus/cuomo-elective-surgeries-will-be-stopped-in-erie-county-as-of-friday>, accessed December 14, 2020.

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Changes in Demand

The 'Stay Home, Stay Safe' order changed the way many Vermonters access care. BCBSVT actuarial staff again worked with medical directors to make assumptions about persistent changes in utilization resulting from the pandemic and economic crisis.

We expect physical therapy, chiropractic services, ambulance, and influenza and pneumonia services will continue to remain dampened until a vaccine is available. The first two categories are largely attributable to patients seeking non-emergent services less actively during the pandemic, while the final two stem from lower rates of infection that result from social distancing protocols. Ambulance services are likely dampened due to fewer transportation accidents and activity-related injuries.

As noted above, non-inpatient mental health services are being utilized at higher than historical levels, presumably due to the availability of telehealth options as well as the increased stress the pandemic and economic disruption have inflicted upon our members. Across our book of business, we have observed a 14 percent increase during the slowdown period in the allowed charge PMPM for non-inpatient mental health services. We assume that the increase represents the new norm through 2022. We assumed that inpatient mental health admissions will resume at a higher level due to the fallout from the extreme stress of the pandemic, lockdown, economic crisis and social unrest. There is evidence of an increase in PTSD in the aftermath of such events. The literature notes a possible uptick of as much as 7 percent in MHSA services after a catastrophic event⁹; we use this figure—half of the observed non-inpatient increase—as an ongoing increase in inpatient MHSA utilization.

Previous iterations of the modeling assumed a reduction in future emergency and urgent care services due to the anticipated acceptance of telehealth services as a viable alternative. As noted in the *Deferred Care* section, emergency and urgent care have returned to their baseline levels following the slowdown in services during the spring of 2020. On the basis of this evidence, we do not include any ongoing reduction in these services from baseline levels.

The weighted average of the "Future Demand %" and "Benchmark PMPM" columns in the table below yields a \$0.50 increase in allowed PMPM preceding vaccine availability and a \$2.42 increase in allowed PMPM following vaccine availability. We use these figures as the change in ongoing demand. For Medicare Supplement members, the respective changes are a \$0.75 PMPM decrease and a \$0.27 PMPM increase. We treat these as best estimate assumptions and do not allow them to vary within the stochastic modeling.

⁹ <https://www.annualreviews.org/doi/full/10.1146/annurev-publhealth-032013-182435>

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Type of Service	VISG & Insured Large Group		Medicare Supplement	
	Benchmark PMPM	Future Demand %	Benchmark PMPM	Future Demand %
Mental Health (Inpatient)	\$4.95	7%	\$0.27	7%
Mental Health (Other)	\$14.79	14%	\$1.82	14%
PT & Chiropractic**	\$18.01	-5%	\$6.83	-5%
Ambulance**	\$2.65	-15%	\$1.69	-15%
Influenza/Pneumonia**	\$1.55	-40%	\$1.07	-40%
Pre-Vaccine Changes in Demand, Allowed PMPM	\$0.50		(\$0.75)	
Post-Vaccine Changes in Demand, Allowed PMPM	\$2.42		\$0.27	

** Future demand reverts to baseline levels following vaccine availability.

Deferred Care Morbidity Impact

As outlined above, a broad spectrum of medical services experienced a decline during the spring. While we anticipate many of these services will be deferred to a later date, many will not occur at all. The cancellation and delay of services has created public health impacts¹⁰, and similar events that have impaired access to care have increased population morbidity¹¹.

The health impacts created by the limited access to care in the spring of 2020 are unknown. Catastrophic events have a documented long-term impact on population morbidity. Given the long-term nature of the current health and economic crises, we consider it important to model possible morbidity effects created by the lack of access to care during periods of significant government restrictions. We set the stochastic model to randomly generate a morbidity factor uniformly distributed between 1.000 and 1.005 that is applied to projected medical and pharmacy claims.

Treatment Costs

To estimate treatment costs, we first develop an incidence rate. We use the SOA's "A Tool for Tabulating Johns Hopkins University's Coronavirus Database"¹² and data from the COVID Tracking Project¹³ to collate cases on a daily basis for Vermont. We then calculate a weekly average incidence from April 1, 2020 through December 8, 2020.

¹⁰ <https://www.cdph.ca.gov/Programs/CID/DCDC/Pages/COVID-19/ResumingCalifornia%E2%80%99sDeferredandPreventiveHealthCare.aspx>

¹¹ <https://www.washingtonpost.com/opinions/2020/04/08/covid-19-pandemic-will-end-americas-next-health-crisis-is-already-starting/>

¹² <https://www.soa.org/globalassets/assets/files/resources/research-report/2020/tabulating-coronavirus-database.xlsm>, accessed November 16, 2020

¹³ <https://covidtracking.com/data/state/vermont/cases/>, accessed December 9, 2020.

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Next, we fit a time series to the historical data. The formula we use to project the weekly case rate is as follows:

$$\text{Estimated cases}_t = ((\alpha * \text{Actual cases}_{t-1} \div \text{Seasonal factor}_{t-1} + (1 - \alpha) * (\text{Estimated cases}_{t-1} + \beta_{t-1}) + \beta_t) * \text{Seasonal factor}_t$$

First, we develop the seasonal factors. Other coronaviruses have exhibited a seasonal pattern, where the case prevalence increases in winter months¹⁴. To model the variation in seasonal incidence, we use a sine wave with a peak set in January and February, and a trough in July and August. We set the amplitude at 0.5, which corresponds to an approximate 3:1 ratio of prevalence in peak months versus trough months. We use the resulting factors as the seasonal factors in the above time series equation.

Next, we set alpha as 0.6. This factor represents the degree to which the estimated claims for the current week are based on the prior week's claims, prior to seasonality. This selection balances the high correlation of cases from week-to-week, but still allows for cases to vary due to other factors.

The remaining portion of the incidence rate, beta, is set as the sum of a social distancing trend factor and a seasonal trend factor. The social distancing trend factor is based on the approximate level of restrictions in effect, which is based on the average case rate in the preceding four weeks. The factor for lowest social distancing level, which is analogous to the period in the summer where limited interstate travel was allowed, randomly varies between 0 and 1. The second level of distancing corresponds to a level of social distancing where interstate travel is restricted and there are moderate limits on gatherings. The third level of distancing corresponds to a status where in-person schooling is limited and there are strict restrictions on gatherings and traveling. The fourth level of social distancing is most restrictive, corresponding to a partial economic shutdown and deferral of non-emergent medical services. For historical weeks, we apply the level based on the approximate level of restrictions in effect and apply the average of the low and high factors in the table below.

Social Distancing Factor			
Social Distancing Level	Low Factor	High Factor	Incidence Start (Cases per million)
4	-30%	-10%	600
3	-3	-1	75
2	-1	0	25
1	0	1	0

¹⁴ <https://www.frontiersin.org/articles/10.3389/fpubh.2020.567184/full>, accessed November 5, 2020.

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The seasonal trend factors adjusts for cases escalating or decreasing based on the slope of the seasonal pattern. This factor is calculated as follows:

$$\text{Seasonal trend factor}_t = ((\text{Seasonal factor}_t \div \text{Seasonal factor}_{t-1}) - 1) * \text{Actual cases}_{t-1}$$

To project future cases we substitute estimated cases for actual cases in the formulas above. Through the week ended December 8, 2020, estimated cases generally fell within 30 percent of actual cases. In the projection of future cases, we include an additional variable in the beta factor that varies by 30 percent from the previous week's cases to account for the random variation in case pattern.

Additionally, four weeks have seen the actual case rate at least double over the prior week's level. Each of these weeks included a specific event in Vermont that gave rise to a spike in cases. To model the potential of a "super-spreader" event, we include a random variable that overrides the time series. This variable is set to occur at a 10 percent probability. In the event the prior week's case rate is less than 150 cases per million, this variable will double the prior weeks the case rate. If the prior week's case rates is between 150 and 450 cases per million, the prior week's cases will increase by the following formula: $150 + 50\% (\text{previous case rate} - 150)$. If the previous week's case rate is above 450, this variable will add 300 cases to the previous week's case rate. This reflects the proportionally lower impact of a "super spreader" event when cases are at an elevated level. These values were informed by an analysis of weekly changes in case rates by state through December 8, 2020.

Upon broad vaccine availability, we dampen the incidence rate using the factors in the Vaccine Development section.

Appendix I provides a summary of the modeled incidence level by month.

To calculate the number of cases that will result in a hospital admission, we use data from The COVID Tracking Project¹⁵ and Vermont Department of Health¹⁶. From July 1, 2020 through September 30, 2020, the ratio of new hospitalizations to cases for Vermont, New Hampshire, Maine, and Massachusetts was 4.6 percent. The rate of hospital admission for COVID-19 varies materially by age. We use "CDC - Laboratory-Confirmed COVID-19-Associated Hospitalizations"¹⁷ to estimate the relative rate of admission by age band. We then apply the above overall hospitalization rate of 4.6 percent, the relative rate of admission, and 2019 census data¹⁸ to calculate an admission rate by age.

¹⁵ <https://covidtracking.com/data>, accessed November 1, 2020. Reporting dates with outliers were smoothed.

¹⁶ <https://www.healthvermont.gov/>, accessed November 1, 2020. COVID19-Weekly-Data-Summary-10-2-2020 and COVID19-Weekly-Data-Summary-7.2.2020

¹⁷ <https://www.cdc.gov/coronavirus/2019-ncov/covid-data/covid-net/purpose-methods.html>, accessed November 2, 2020. Preliminary cumulative rates as of Oct 24, 2020

¹⁸ <https://www.census.gov/data.html>, accessed November 4, 2020.

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To develop a treatment cost, we split admissions into those requiring an ICU stay and non-ICU admissions. The COVID Tracking Project¹⁹ measures the number of individuals currently hospitalized and currently in the ICU. From September 1, 2020 through October 31, 2020, the ratio of individuals in the ICU over total hospitalizations was consistently near 20 percent. We use this figure as our estimate of the percentage of hospital admissions that progress to the ICU. To develop the cost of an admission, we use a mix of BCBSVT contract terms, emerging BCBSVT experience and industry sources, including a Wakely²⁰ study. In particular, the cost of an ICU admission is heavily based on the anticipated cost given BCBSVT's contract terms, while the cost of a non-ICU admission observed within BCBSVT experience data aligns very closely with material published elsewhere in the industry. For members where Medicare is the primary payer, we set the treatment cost equal to the actual or estimated Part A deductible.

Vaccine Development

As of December 18, 2020, Pfizer and Moderna have received Emergency Use Authorization of their vaccines, 18 vaccines are in a Phase III trial, 19 vaccines are in a Phase II trial, and numerous other vaccines are in a Phase I trial or the preclinical phase²¹. Our scenario modeling considers varying dates for which the vaccine will be available for the general population, ranging from the first quarter of 2021 to 2022. In each scenario, we assumed a three-month duration from the date of first availability for the administration of the vaccine across the majority of the population, with a third of the population receiving the vaccination in each month. Treatment costs and testing are assumed to ramp down in the following pattern (where "month zero" is the month in which the vaccine first becomes available):

Vaccine Availability Month	Treatment Costs and Testing Dampening Factor
0	83.33%
1	50.00%
2	16.67%
3	0.00%

It is unclear whether any vaccine administration costs would repeat on an annual basis. Our modeling uses a 50 percent likelihood that vaccine administration will be annual.

The federal government has executed purchasing agreements which we assume will cover the cost of a vaccine through 2021, but plan sponsors will be responsible for the costs of administration. We use our contracted rates for the cost of vaccine administration which is set as the reimbursement levels published by CMS²². For Medicare Supplement, we assume Medicare will cover the entire administration costs. In 2022, we assume the cost of a vaccine

¹⁹ <https://covidtracking.com/data/national/hospitalization>, accessed November 4, 2020.

²⁰ https://www.ahip.org/wp-content/uploads/AHIP-COVID-19-Modeling-Update_Wakely-2020.06.pdf

²¹ <https://www.nytimes.com/interactive/2020/science/coronavirus-vaccine-tracker.html>, accessed December 18, 2020.

²² <https://www.cms.gov/medicare/covid-19/medicare-covid-19-vaccine-shot-payment>, accessed December 7, 2020.

Blue Cross and Blue Shield of Vermont COVID-19 Modeling

will be the responsibility of payers and uniformly distributed between \$20 and \$40 for a two-dose regimen.

To develop the estimate of the vaccination rate, we first set the lower and upper bound of a range of plausible values. We use the CDC's reported 2016 age 65+ pneumococcal vaccination rate, 67 percent, as the lower bound²³. Given the severity and extremely contagious nature of COVID-19 and the strenuous impact of the alternative of social distancing, we consider it likely the COVID-19 vaccination rate will meet or more likely surpass the rate of a vaccine that is widely available and recommended for an adult population. At the high end, the rate of newborns with BCBSVT coverage born between 2016 and 2019 receiving any vaccination is approximately 98 percent. We use this figure—representative of the higher rate of vaccination observed when Vermonters are making choices with potentially serious implications for the health of others—as the upper bound and assume a uniform distribution within the range.

Similarly, the timing of the vaccine for the general population is uncertain. Given this, we model varying vaccine availability scenarios, which we provide with their respective weights in the table below. The availability of a vaccine in the model is defined as the month where its available for broad distribution to VISG and insured large group. Medicare Supplement members are assumed to have broad vaccine availability three months preceding availability for the general population.

Vaccine Timing - VISG and Insured Large Group		
	2021	2022
January - March	0%	5%
April - June	35%	5%
July - September	35%	0%
October - December	20%	0%

Diagnostic Testing

To estimate the cost of diagnostic testing, we calculate a weekly average of testing costs incurred by insured individual, small group and large group members, excluding members where Medicare is the primary payer. The assumed testing cost uses a 4-3-2-1 weighted average, wherein the week ending October 30, 2020 is weighted the most heavily and preceding three weeks weighted in descending order.

The future utilization of testing remains uncertain. Prior lack of testing availability, emerging federal guidance, availability of public health testing, and ongoing federal funding for state-run testing all affect the testing rate. In the stochastic model, we assume the level testing is normally distributed with a mean of 0.380 tests per member per year (PMPY) for VISG and insured large group members and 0.306 tests PMPY for Medicare Supplement members, with a standard deviation of one-tenth the respective means. The observed testing rate for August

²³ <https://www.cdc.gov/vaccines/imz-managers/coverage/adultvaxview/pubs-resources/NHIS-2016.html>

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through October 2020 from VISG and insured large group members is 0.353 tests PMPY, and 0.294 tests PMPY for Medicare Supplement members. We add the respective VISG/insured large group and Medicare Supplement influenza testing rate from January 2019 through December 2020 of 0.027 and 0.012 tests PMPY to set the mean of the assumed distributions²⁴. We do not assume any testing costs for members where Medicare is the primary payer, since Medicare covers diagnostic testing in full.

We also include the cost of an office visit with the cost of testing. We allow the model to select an office visit ratio according to a normal distribution centered at the visit-to-test ratio for August and October 2020. The cost of the office visit is calculated as the average office visit cost, exclusive of emergency room charges, for August through October 2020. Both the visit-to-test ratio and office visit cost are calculated separately for members where Medicare is the primary payer.

Office Visit		
	VISG/Large Group	Medicare Supplement
Cost	\$136.32	\$13.85
Visit-to-Test Ratio	0.368	0.229

[Antibody Testing](#)

Current VDH guidance does not recommend the use of antibody testing for use in the general population nor for places of employment. Emerging studies of the efficacy of antibody testing indicate that there may be little to no benefit to conducting this type of testing. We assume that antibody testing will not occur at significant levels in Vermont, and therefore include no future projected antibody testing costs in our modeling.

Analysis & Results

Below, we examine the impact of varying scenarios for the VISG, Insured Large Group, and Medicare Supplement populations. We run 10,000 simulations using the inputs noted in the *Methodology* section. Appendix G provides the summary statistics of the stochastic modeling²⁵.

²⁴ Influenza-like symptoms that would normally lead to a flu test will now, with near certainty, lead to a COVID test as well, as it will not be clear which of the two is causing the symptoms.

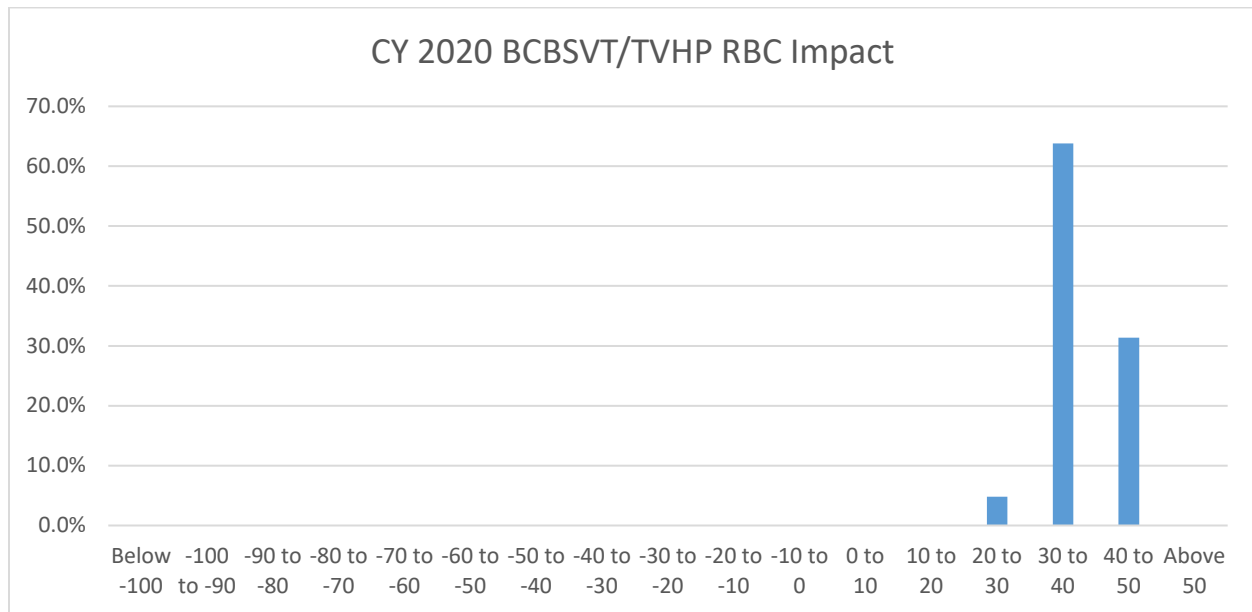
²⁵ The minimum and maximum values are included in Appendix G to assist the evaluation of the reasonability of the full range of modeling results and are not intended to inform the range of likely outcomes.

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[Summary of Results by Year](#)

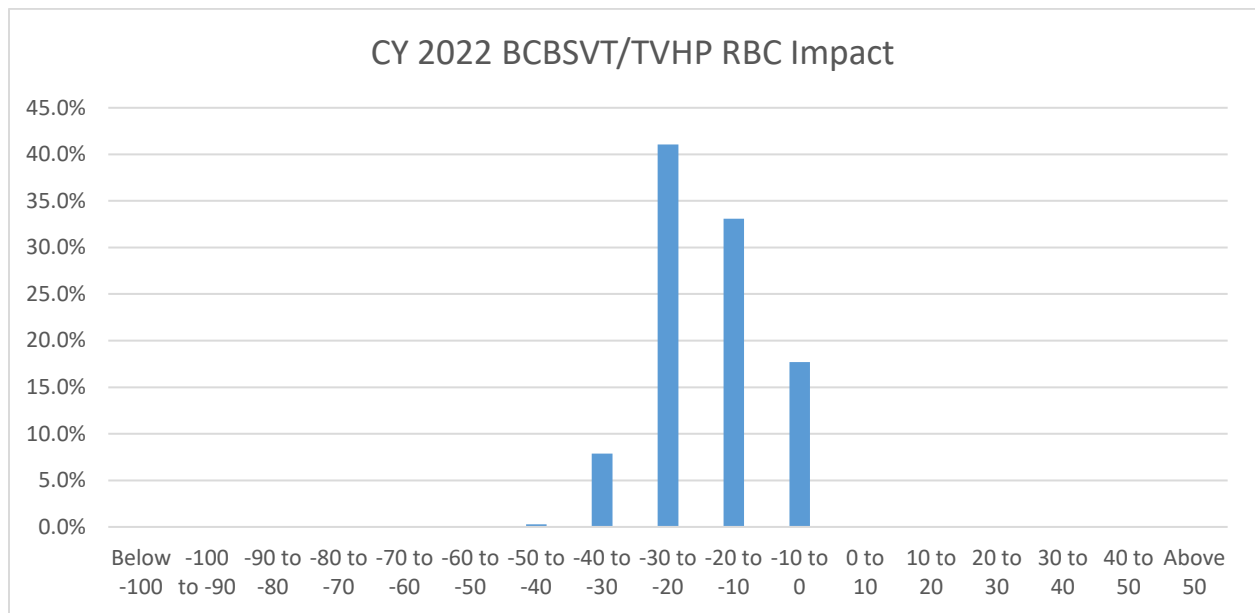
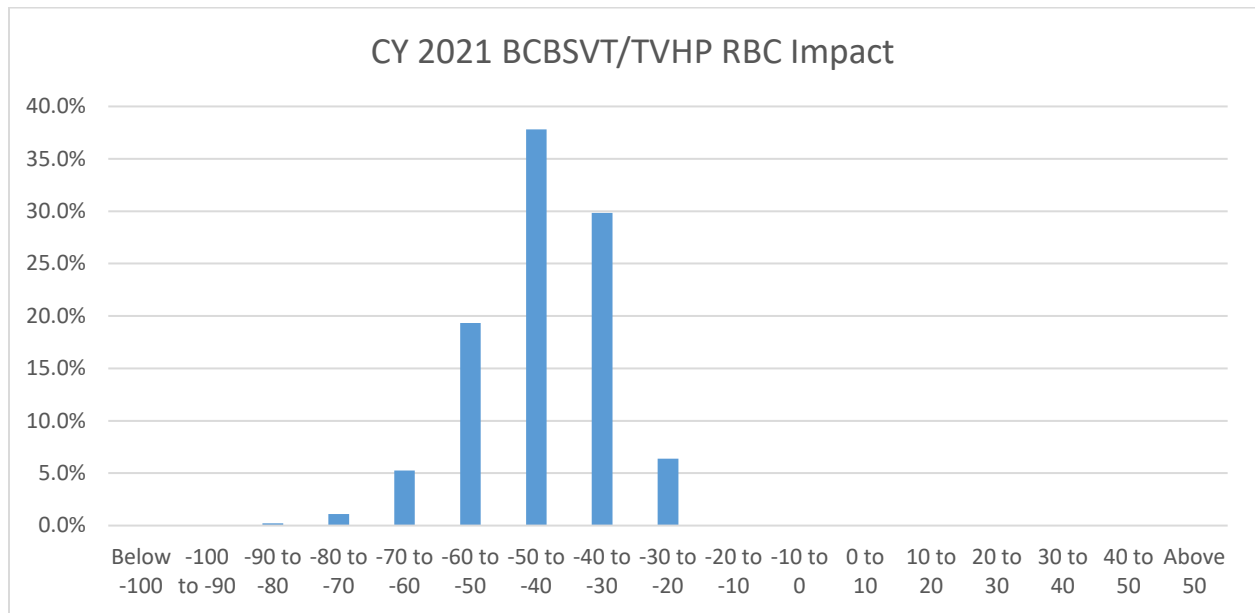
We provide the median modeled impact by calendar year for all insured BCBSVT and TVHP membership. Appendices A-C provide line of business specific results for VISG, Insured Large Group, and Medicare Supplement.

All BCBSVT/TVHP	CY 2020	CY 2021	CY 2022	Total
COVID Impact	(\$8,001,921)	\$9,210,283	\$3,909,808	\$5,118,170
Baseline ²⁶	\$352,580,616	\$384,063,698	\$416,682,693	\$1,153,327,007
Change from Baseline	-2.3%	2.4%	0.9%	0.4%
RBC Change	+37	-43	-18	-24

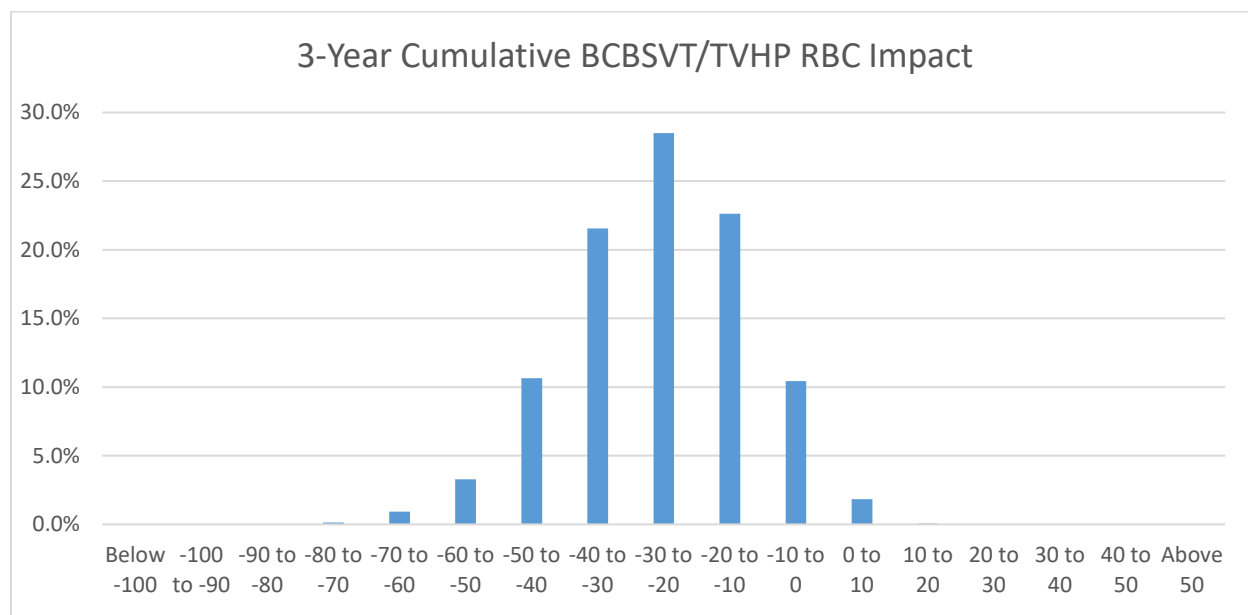


²⁶ Baseline claims reflect the projected medical and pharmacy claims for each respective period in the absence of any COVID-19 impacts. Rates for 2022 have not been submitted for review at this time. The extent to which filed rates incorporate estimated COVID-19 costs will influence the anticipated impact to BCBSVT's reserve position.

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These results demonstrate the disparate claim impacts by year. Notably, CY 2020 results show favorable impacts due to initial slowdown occurring in the spring of 2020, which is not fully offset by the return of deferred care and COVID-related costs. The narrow range of favorable results are attributable to the limited amount time remaining in 2020 for an increase in cases to materially affect results. 2021 results show unfavorable impacts due to testing costs, treatment costs, vaccination costs, and the return of care that was deferred during 2021. The breadth of 2021 results are due to varying vaccine availability dates and the potential presence of a substantial increase in cases. 2022 results demonstrate an upward impact on expected claims, primarily attributable to vaccine administration, heightened utilization of mental health services, and the worsening of morbidity expected to arise from the lapse in care for chronic conditions. The variance is primarily due to whether a vaccine requires annual administration. The likelihood of vaccine availability in 2021 dampens potential variance in 2022 since treatment and testing costs are negligible in many simulations. Results are materially different for Medicare Supplement members. Results are more favorable for this population since Medicare is covering all diagnostic testing and vaccination costs in full while medical claims comprise a smaller portion of the baseline claims. Appendix C provides a summary of the results for Medicare Supplement.

Collectively, these results demonstrate that, while 2020 operating results were significantly favorable, the claims impact of the full pandemic is likely to be unfavorable through 2022. These results are similar to the modeling performed in July, which produced a majority of simulated results that were fairly neutral over a two-year timeframe. The addition of 2022 to the model introduces further unfavorability due to continued effects of the morbidity impact of deferred care and potential vaccination costs. These results show a narrower range of possible outcomes, which is due to increased knowledge on the capacity of the health care system during periods of increased COVID-19 incidence, continued emerging information on vaccine availability and efficacy, and the continued development of 2020 experience.

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Conclusions

The COVID-19 pandemic has created unprecedented uncertainty in the level of paid claims through 2022. There is uncertainty beyond 2022 as well, related to levels of infection, vaccine availability, and vaccine efficacy, all of which may present impacts to BCBSVT's members, groups, and reserve position. This analysis exclusively considers direct costs in 2020, 2021, and 2022.

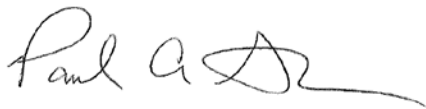
The modeling outlined in the memorandum reflects thousands of scenarios under varying assumptions that produce disparate results. New information regarding the factors outlined in this memorandum continues to emerge and will directly affect BCBSVT's claims and reserve position. Based on the best information known at the time this modeling was performed, the COVID-19 pandemic is likely to have an unfavorable impact on claims costs in both 2021 and 2022.

Actuarial Certification

The purpose of this report is to model possible scenarios related to the COVID-19 pandemic on paid claims and policyholder reserves for BCBSVT. The model and results are intended to quantify the impact varying scenarios have on BCBSVT's projected claims and funded position through 2022. This report is not intended to be used for other purposes.

Appendix J lists applicable limitations and disclosures.

It is my opinion that the modeling presented in this report is reasonable and has been prepared in accordance with applicable Actuarial Standards of Practice. I am a Fellow of the Society of Actuaries and a Member of the American Academy of Actuaries, and I meet the Academy's Qualification Standards to render this opinion.



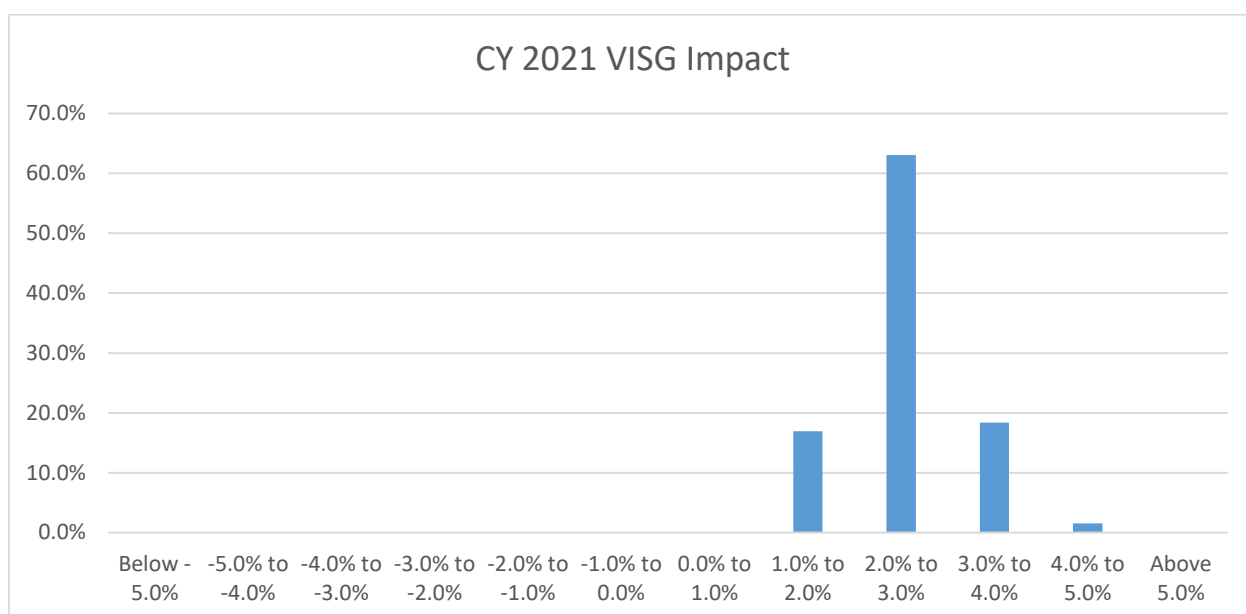
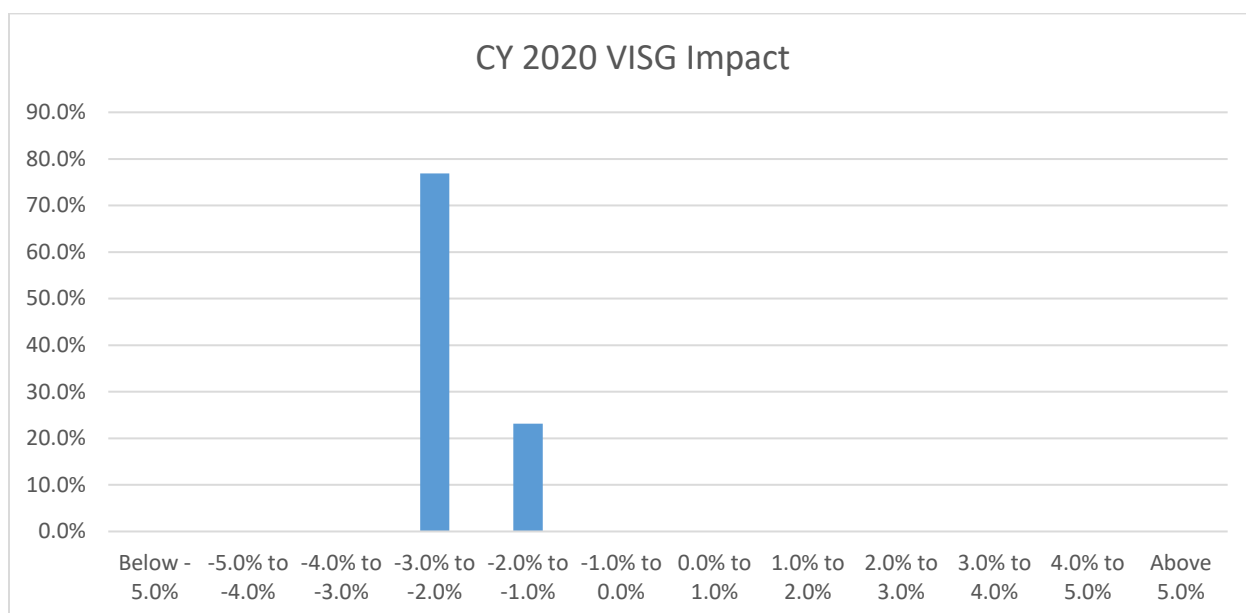
Paul A Schultz, F.S.A., M.A.A.A.

December 31, 2020

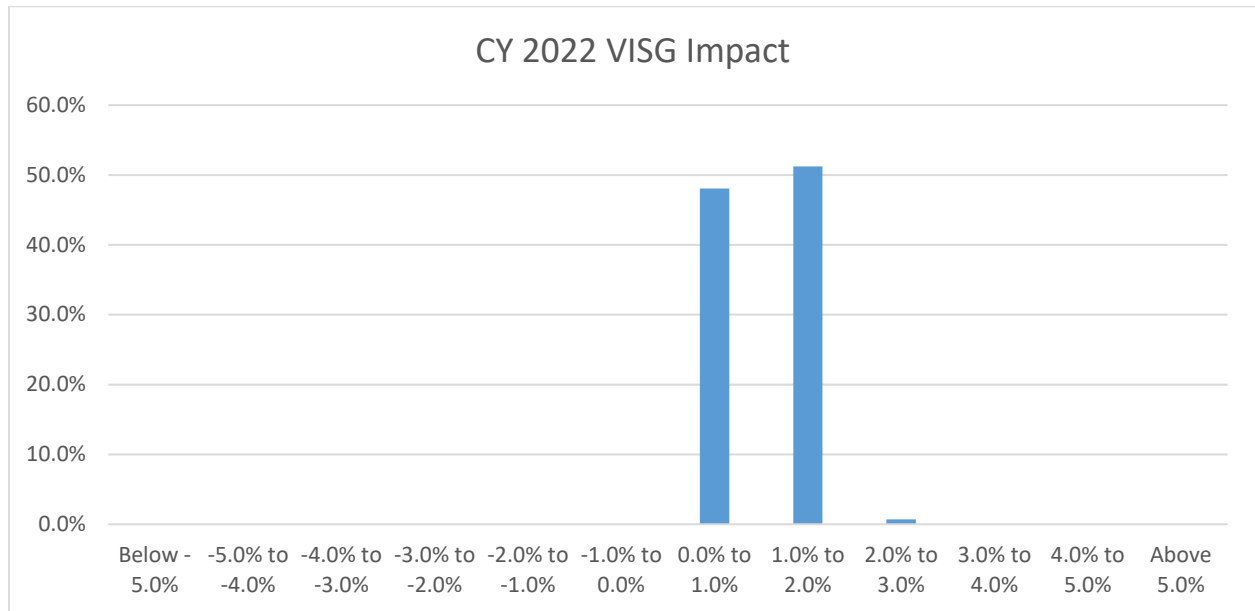
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Appendix A: Vermont Individual and Small Group Results

VISG	CY 2020	CY 2021	CY 2022
Median	(\$6,242,449)	\$7,590,855	\$3,201,532
Baseline	\$280,339,514	\$305,473,959	\$333,005,120
Change from Baseline	-2.2%	2.5%	1.0%



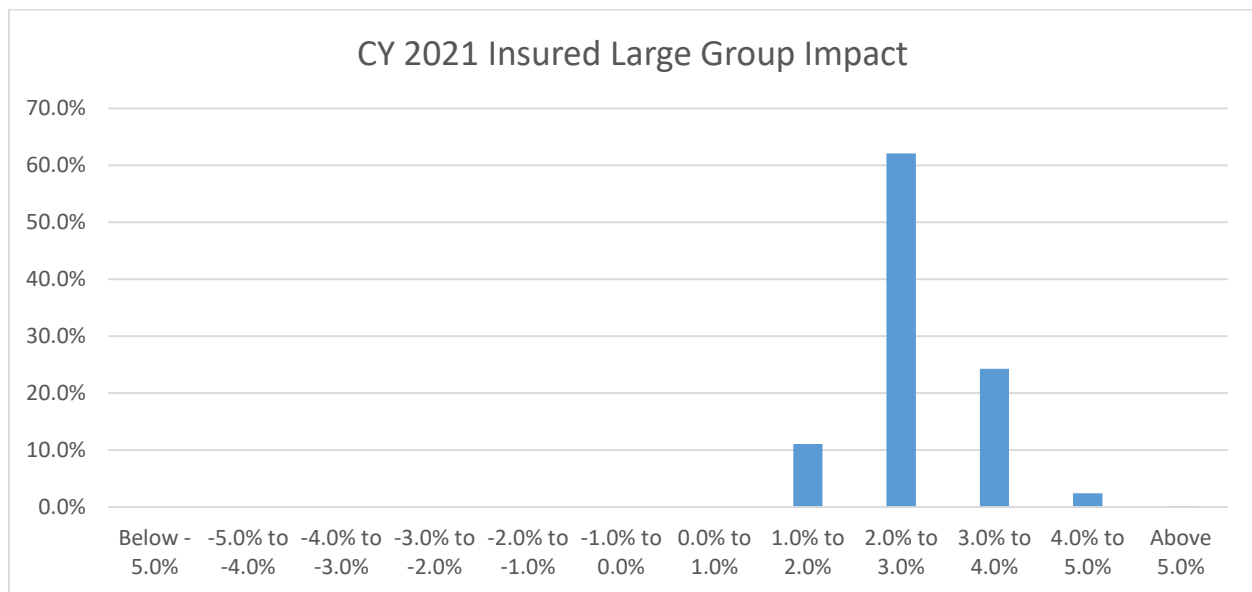
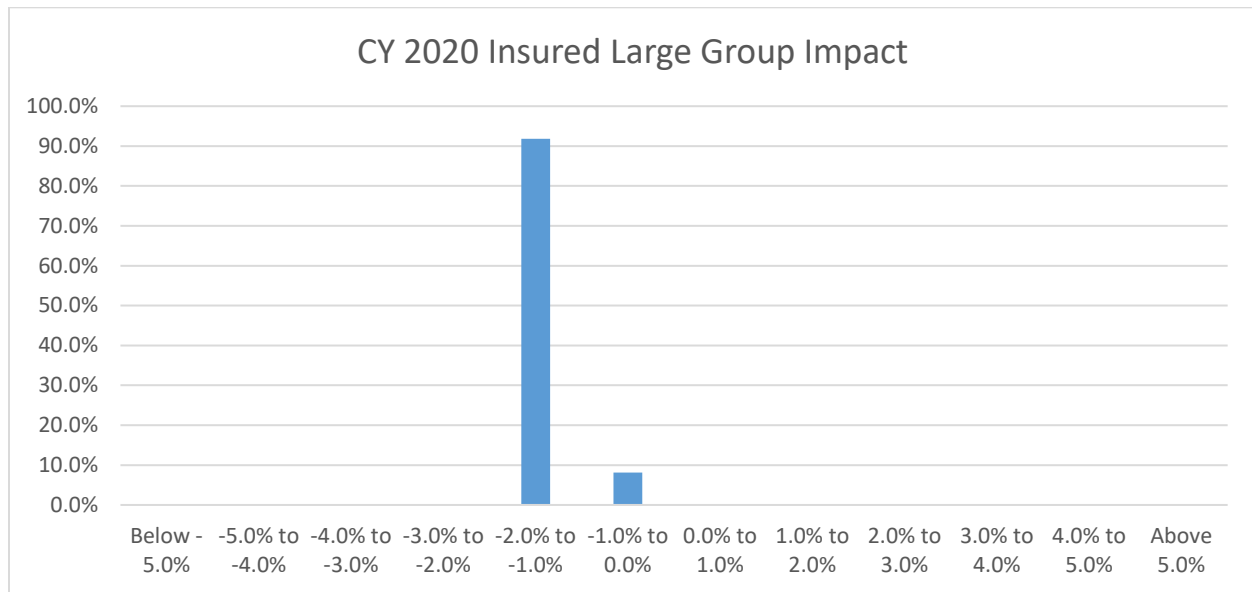
Blue Cross and Blue Shield of Vermont
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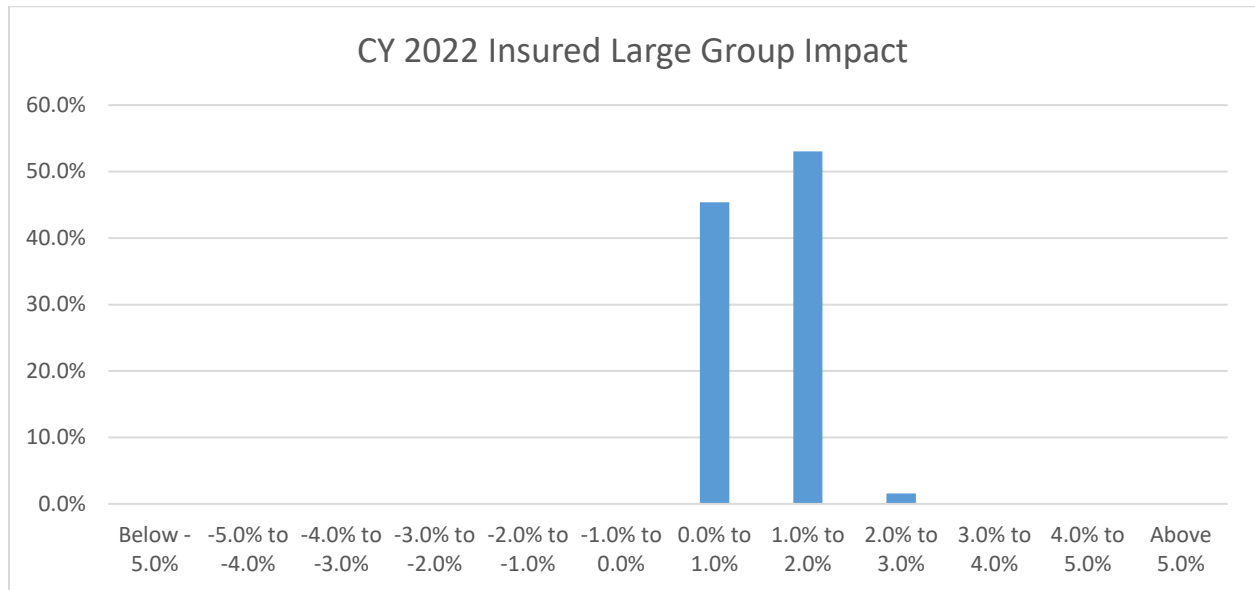
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Appendix B: Insured Large Group Results

Insured Large Group	CY 2020	CY 2021	CY 2022
Median	(\$688,720)	\$1,381,566	\$596,314
Baseline	\$48,948,873	\$52,706,179	\$56,761,820
Change from Baseline	-1.4%	2.6%	1.1%



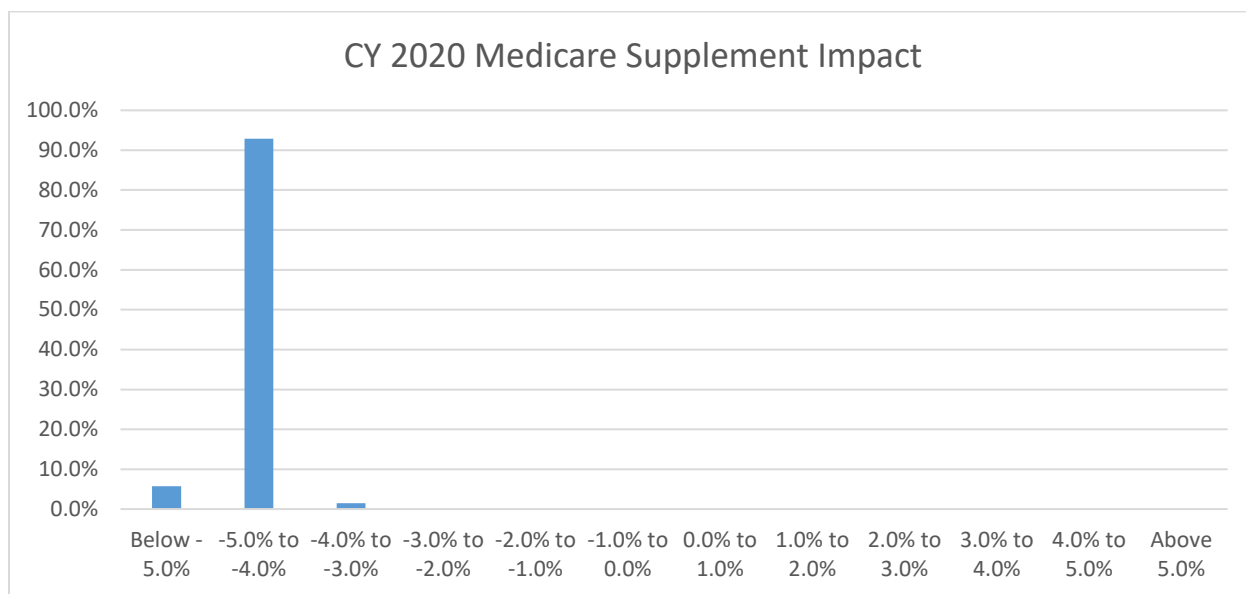
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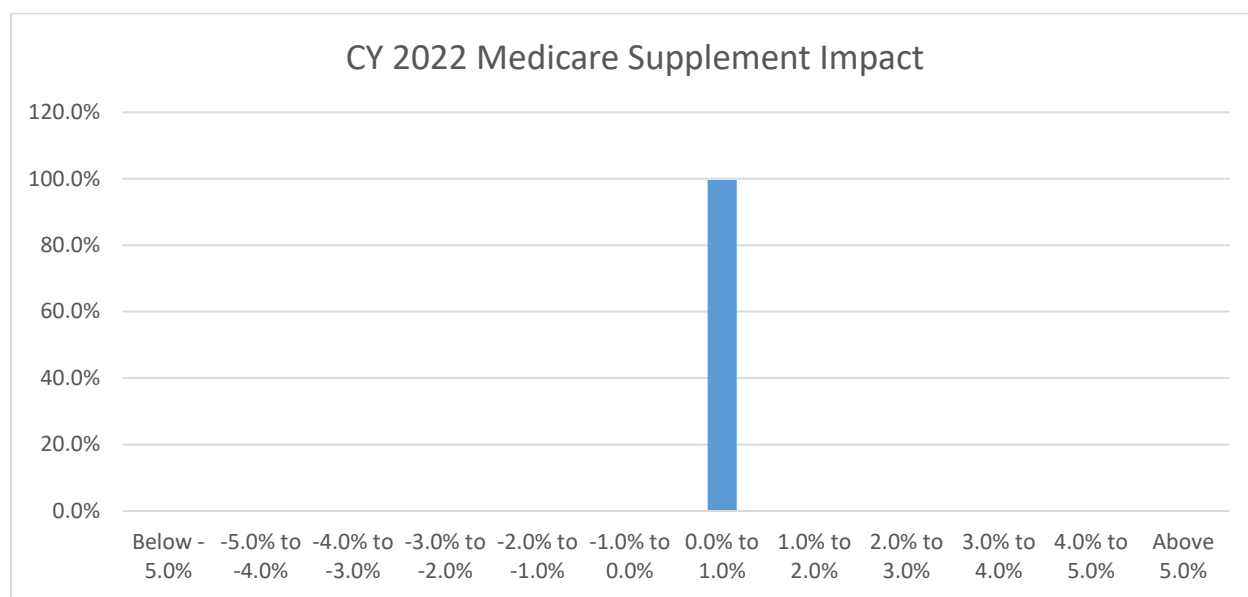
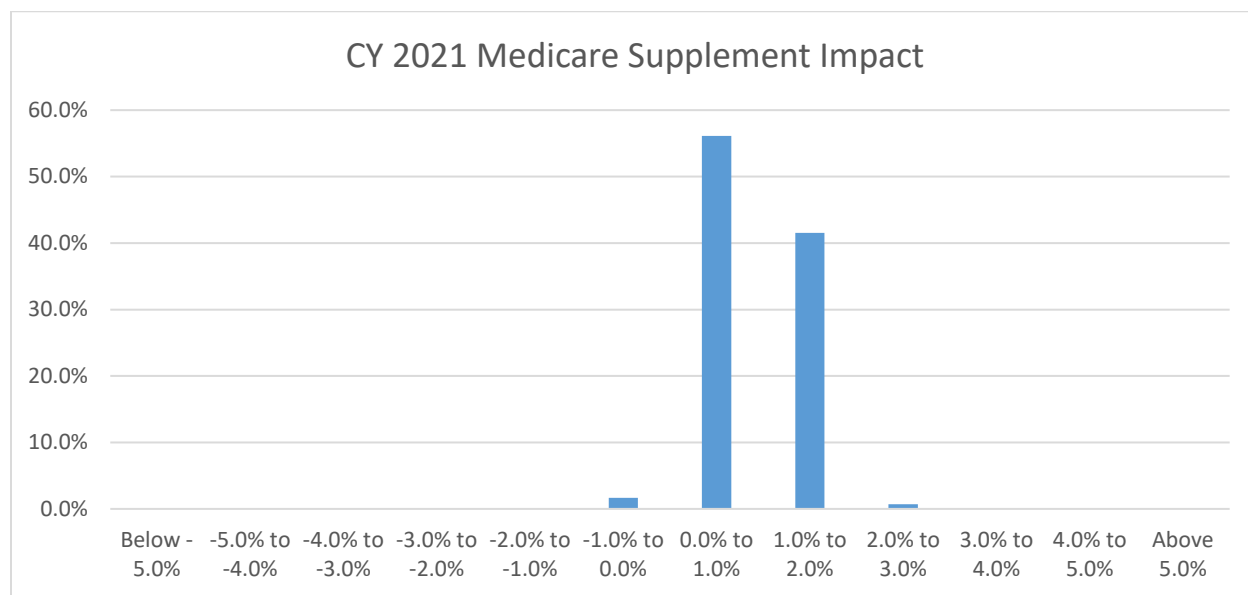
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Appendix C: Medicare Supplement Results

Medicare Supplement	CY 2020	CY 2021	CY 2022
Total	(\$1,070,477)	\$235,377	\$111,962
Baseline	\$23,292,229	\$25,883,560	\$26,915,754
Change from Baseline	-4.6%	0.9%	0.4%



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Appendix D: Sensitivity Testing of Assumptions

Total BCBSVT/TVHP RBC Change by Vaccine Availability					
	Q2 2021	Q3 2021	Q4 2021	Q1 2022	Q2 2022
Simulation Count	3454	3520	2053	504	469
CY 2020	37	37	37	37	37
CY 2021	-40	-45	-49	-45	-46
CY 2022	-18	-18	-18	-25	-31

RBC Impact by Deferred Care Returning Range						
Deferred Care Returning Range	60%+	55%-60%	50%-55%	45%-50%	40%-45%	0%-40%
Simulation Count	255	1486	3494	3292	1257	216
CY 2020	37	37	37	37	38	40
CY 2021	-54	-50	-46	-41	-38	-35
CY 2022	-19	-19	-19	-19	-19	-19

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Appendix E: Derivation of the Estimated Percentage of Returning Deferred Services

VISG and Insured Large Group			
Type of Service	Benchmark PMPM	Slowdown PMPM	Percent Rescheduled Services
Evaluation and Management - Chronic	\$13.82	\$2.79	100%
Radiology - Chronic	\$13.23	\$4.44	100%
Laboratory - Chronic	\$9.95	\$3.46	100%
Oncology Treatment	\$8.25	\$0.00	100%
Immunizations	\$1.06	\$0.44	100%
Surgery (knee/hip/shoulder + other bones)	\$38.00	\$16.33	100%
Surgery - GI	\$18.70	\$7.65	100%
Surgery - Renal/Pancreas/Integumentary	\$14.80	\$4.34	100%
Surgery - Cardiac	\$13.17	\$3.43	100%
Surgery - Other	\$11.93	\$1.76	100%
Surgery - Colonoscopy	\$9.94	\$6.85	100%
Surgery - Reproductive System/Genital	\$9.71	\$4.03	100%
Surgery - Neuro	\$8.67	\$3.14	100%
Surgery - Respiratory (non-Influenza/Pneumonia)	\$4.60	\$2.51	100%
Surgery - Eye	\$2.88	\$1.22	100%
Ophthalmology Services	\$2.35	\$1.39	75%
PT & Chiropractic	\$18.01	\$9.34	40%
Other Outpatient	\$22.12	\$8.83	30%
Other Professional	\$5.12	\$2.16	30%
Cardiology/EKG/ECG/EEG	\$9.56	\$4.51	30%
Other Inpatient	\$11.03	\$2.70	5%
IP - Diseases and Disorders	\$11.45	\$1.30	5%
Mental Health (Inpatient)	\$4.95	\$1.57	0%
Mental Health (Other)	\$14.79	\$0.00	0%
Emergency and Urgent Care	\$37.67	\$11.12	0%
Medical - Rx	\$3.94	\$1.09	0%
Medical - Rx - Chronic	\$43.28	\$0.10	0%
Radiology - Other	\$31.90	\$16.01	0%
Evaluation and Management - Other	\$24.86	\$9.81	0%
Pregnancy/Newborn	\$22.52	\$1.23	0%
Laboratory - Other	\$15.63	\$7.11	0%
Home Health & Hospice	\$9.27	\$0.69	0%
Ambulance	\$2.65	\$0.92	0%
DME	\$2.07	\$0.27	0%
Influenza/Pneumonia	\$1.55	\$0.72	0%
Total			50.3%

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Medicare Supplement			
Type of Service	Benchmark PMPM	Slowdown PMPM	Percent Rescheduled Services
Evaluation and Management - Chronic	\$6.02	\$0.78	100%
Radiology - Chronic	\$3.23	\$1.17	100%
Laboratory - Chronic	\$0.37	\$0.16	100%
Oncology Treatment	\$2.61	\$0.07	100%
Immunizations	\$0.00	\$0.00	100%
Surgery (knee/hip/shoulder + other bones)	\$8.82	\$3.04	100%
Surgery - GI	\$4.86	\$1.93	100%
Surgery - Renal/Pancreas/Integumentary	\$5.55	\$2.02	100%
Surgery - Cardiac	\$2.67	\$0.50	100%
Surgery - Other	\$2.08	\$0.09	100%
Surgery - Reproductive System/Genital	\$1.01	\$0.51	100%
Surgery - Neuro	\$1.89	\$0.21	100%
Surgery - Respiratory (non-Influenza/Pneumonia)	\$0.65	\$0.09	100%
Surgery - Eye	\$3.00	\$1.19	100%
Ophthalmology Services	\$2.31	\$1.10	75%
PT & Chiropractic	\$6.83	\$3.30	40%
Other Outpatient	\$17.86	\$7.64	30%
Other Professional	\$3.70	\$1.09	30%
Cardiology/EKG/ECG/EEG	\$3.10	\$1.01	30%
Other Inpatient	\$7.98	\$2.38	5%
IP - Diseases and Disorders	\$5.13	\$1.03	5%
Mental Health (Inpatient)	\$0.27	\$0.11	0%
Mental Health (Other)	\$1.82	\$0.02	0%
Emergency and Urgent Care	\$10.26	\$2.59	0%
Medical - Rx	\$14.55	\$1.69	0%
Radiology - Other	\$4.59	\$1.56	0%
Evaluation and Management - Other	\$5.14	\$1.27	0%
Pregnancy/Newborn	\$0.00	\$0.00	0%
Laboratory - Other	\$0.64	\$0.23	0%
Home Health & Hospice	\$3.40	\$0.22	0%
Ambulance	\$1.69	\$0.28	0%
DME	\$1.09	\$0.02	0%
Influenza/Pneumonia	\$1.07	\$0.28	0%
Total			45.2%

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Appendix F: Sample Deferred and Returning Care Factor

Sample Deferred and Returning Care Factors										
	<i>Example 1</i>	<i>Example 2</i>	<i>Example 3</i>	<i>Example 4</i>	<i>Example 5</i>	<i>Example 6</i>	<i>Example 7</i>	<i>Example 8</i>	<i>Example 9</i>	<i>Example 10</i>
202010	105.9%	103.8%	104.7%	105.5%	105.0%	104.4%	105.9%	106.6%	106.3%	105.3%
202011	104.8%	103.0%	104.7%	104.2%	104.8%	103.8%	105.9%	106.4%	105.2%	104.4%
202012	103.9%	103.0%	104.4%	103.9%	104.9%	103.4%	104.6%	105.1%	104.1%	104.3%
202101	103.9%	102.7%	103.7%	103.3%	104.6%	103.1%	104.1%	100.6%	104.1%	103.8%
202102	103.3%	102.7%	103.5%	103.3%	102.8%	102.5%	103.6%	100.0%	103.8%	103.5%
202103	103.1%	102.7%	100.1%	102.6%	100.0%	102.1%	102.3%	100.0%	103.1%	102.0%
202104	100.8%	102.4%	100.0%	102.6%	100.0%	102.0%	100.0%	100.0%	100.0%	100.0%
202105	100.0%	102.3%	100.0%	101.6%	100.0%	101.8%	100.0%	100.0%	100.0%	100.0%
202106	100.0%	101.9%	100.0%	100.0%	100.0%	101.7%	100.0%	100.0%	100.0%	100.0%
202107	100.0%	100.6%	100.0%	100.0%	100.0%	101.6%	100.0%	100.0%	100.0%	100.0%
202108	100.0%	100.0%	100.0%	100.0%	100.0%	101.7%	100.0%	100.0%	100.0%	100.0%
202109	100.0%	100.0%	100.0%	100.0%	100.0%	100.8%	100.0%	100.0%	100.0%	100.0%
202110	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
202111	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	90.0%	100.0%	100.0%
202112	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	104.3%	100.0%	100.0%
202201	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
202202	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
202203	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
202204	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
202205	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
202206	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
202207	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
202208	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
202209	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
202210	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
202211	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
202212	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Blue Cross and Blue Shield of Vermont
COVID-19 Modeling

Appendix G: Stochastic Modeling Summary Statistics

Baseline Claims - Total BCBSVT/TVHP		
Component	Year	Value
Baseline Claims	CY 2020	\$352,580,616
	CY 2021	\$384,063,698
	CY 2022	\$416,682,693

Stochastic Modeling Summary Statistics - Total BCBSVT/TVHP					
Component	Year	Mean	Min	Max	Median
Diagnostic Testing	CY 2020	\$1,544,198	\$1,336,770	\$1,789,586	\$1,541,342
	CY 2021	\$1,930,797	\$727,981	\$3,941,477	\$1,904,340
	CY 2022	\$96,276	\$0	\$1,712,157	\$0
Vaccine Administration	CY 2020	\$0	\$0	\$0	\$0
	CY 2021	\$1,427,473	\$0	\$2,036,680	\$1,558,683
	CY 2022	\$1,626,950	\$0	\$4,722,655	\$1,724,943
Morbidity Impact Deferred Care	CY 2020	\$254,118	\$0	\$519,463	\$253,137
	CY 2021	\$959,135	\$0	\$1,938,106	\$954,661
	CY 2022	\$1,034,937	\$0	\$2,079,247	\$1,029,206
Changes in Demand	CY 2020	\$28,417	\$28,417	\$28,417	\$28,417
	CY 2021	\$352,356	\$103,731	\$584,612	\$321,630
	CY 2022	\$1,098,268	\$584,612	\$1,155,659	\$1,155,659
Treatment	CY 2020	\$2,579,058	\$2,395,793	\$2,899,475	\$2,572,674
	CY 2021	\$2,649,401	\$181,161	\$12,718,484	\$2,260,050
	CY 2022	\$173,010	\$0	\$6,130,127	\$0
Delayed Care	CY 2020	-\$20,341,434	-\$20,341,434	-\$20,341,434	-\$20,341,434
	CY 2021	-\$104,595	-\$8,200,397	\$0	\$0
	CY 2022	-\$8,825	-\$4,234,208	\$0	\$0
Returning Care	CY 2020	\$7,947,275	\$6,056,533	\$10,496,438	\$7,925,104
	CY 2021	\$2,213,358	\$0	\$7,069,603	\$2,210,918
	CY 2022	\$25,838	\$0	\$4,454,115	\$0

**Blue Cross and Blue Shield of Vermont
COVID-19 Modeling**

Baseline Claims - VISG		
Component	Year	Value
Baseline Claims	CY 2020	\$280,339,514
	CY 2021	\$305,473,959
	CY 2022	\$333,005,120

Stochastic Modeling Summary Statistics - VISG					
Component	Year	Mean	Min	Max	Median
Diagnostic Testing	CY 2020	\$1,261,131	\$1,088,188	\$1,465,954	\$1,258,746
	CY 2021	\$1,612,735	\$608,597	\$3,290,530	\$1,590,876
	CY 2022	\$80,564	\$0	\$1,431,735	\$0
Vaccine Administration	CY 2020	\$0	\$0	\$0	\$0
	CY 2021	\$1,196,260	\$0	\$1,706,791	\$1,306,218
	CY 2022	\$1,363,427	\$0	\$3,957,710	\$1,445,548
Morbidity Impact Deferred Care	CY 2020	\$203,026	\$0	\$414,884	\$202,259
	CY 2021	\$762,800	\$0	\$1,541,202	\$759,231
	CY 2022	\$827,104	\$0	\$1,661,696	\$822,523
Changes in Demand	CY 2020	\$48,045	\$48,045	\$48,045	\$48,045
	CY 2021	\$342,352	\$192,180	\$501,048	\$315,727
	CY 2022	\$888,046	\$501,048	\$933,462	\$933,462
Treatment	CY 2020	\$1,846,330	\$1,693,656	\$2,113,262	\$1,841,011
	CY 2021	\$2,215,068	\$151,363	\$10,686,421	\$1,890,258
	CY 2022	\$145,875	\$0	\$5,136,048	\$0
Delayed Care	CY 2020	-\$15,729,609	-\$15,729,609	-\$15,729,609	-\$15,729,609
	CY 2021	-\$80,738	-\$6,464,105	\$0	\$0
	CY 2022	-\$6,619	-\$3,207,423	\$0	\$0
Returning Care	CY 2020	\$6,137,736	\$4,687,816	\$8,140,509	\$6,120,869
	CY 2021	\$1,730,045	\$0	\$5,523,830	\$1,728,545
	CY 2022	\$20,720	\$0	\$3,574,478	\$0

**Blue Cross and Blue Shield of Vermont
COVID-19 Modeling**

Baseline Claims - Insured Large Group		
Component	Year	Value
Baseline Claims	CY 2020	\$48,948,873
	CY 2021	\$52,706,179
	CY 2022	\$56,761,820

Stochastic Modeling Summary Statistics - Insured Large Group					
Component	Year	Mean	Min	Max	Median
Diagnostic Testing	CY 2020	\$270,059	\$236,633	\$309,647	\$269,598
	CY 2021	\$311,709	\$117,630	\$635,993	\$307,484
	CY 2022	\$15,571	\$0	\$276,725	\$0
Vaccine Administration	CY 2020	\$0	\$0	\$0	\$0
	CY 2021	\$231,213	\$0	\$329,888	\$252,465
	CY 2022	\$263,523	\$0	\$764,945	\$279,395
Morbidity Impact Deferred Care	CY 2020	\$36,678	\$0	\$74,986	\$36,536
	CY 2021	\$131,615	\$0	\$265,951	\$130,999
	CY 2022	\$140,983	\$0	\$283,241	\$140,202
Changes in Demand	CY 2020	\$9,096	\$9,096	\$9,096	\$9,096
	CY 2021	\$64,812	\$36,382	\$94,855	\$59,772
	CY 2022	\$168,120	\$94,855	\$176,718	\$176,718
Treatment	CY 2020	\$559,908	\$533,091	\$606,794	\$558,974
	CY 2021	\$389,069	\$26,586	\$1,877,031	\$332,017
	CY 2022	\$25,622	\$0	\$902,128	\$0
Delayed Care	CY 2020	-\$2,676,802	-\$2,676,802	-\$2,676,802	-\$2,676,802
	CY 2021	-\$14,229	-\$1,160,866	\$0	\$0
	CY 2022	-\$1,164	-\$566,501	\$0	\$0
Returning Care	CY 2020	\$1,114,315	\$845,290	\$1,483,701	\$1,111,277
	CY 2021	\$299,773	\$0	\$955,412	\$298,829
	CY 2022	\$3,586	\$0	\$596,402	\$0

**Blue Cross and Blue Shield of Vermont
COVID-19 Modeling**

Baseline Claims - Medicare Supplement		
Component	Year	Value
Baseline Claims	CY 2020	\$23,292,229
	CY 2021	\$25,883,560
	CY 2022	\$26,915,754

Stochastic Modeling Summary Statistics - Medicare Supplement					
Component	Year	Mean	Min	Max	Median
Diagnostic Testing	CY 2020	\$13,008	\$11,906	\$14,652	\$12,986
	CY 2021	\$6,354	\$1,299	\$21,574	\$5,913
	CY 2022	\$140	\$0	\$4,495	\$0
Vaccine Administration	CY 2020	\$0	\$0	\$0	\$0
	CY 2021	\$0	\$0	\$0	\$0
	CY 2022	\$0	\$0	\$0	\$0
Morbidity Impact Deferred Care	CY 2020	\$14,414	\$0	\$29,602	\$14,346
	CY 2021	\$64,719	\$0	\$130,952	\$64,410
	CY 2022	\$66,850	\$0	\$134,310	\$66,482
Changes in Demand	CY 2020	-\$28,724	-\$28,724	-\$28,724	-\$28,724
	CY 2021	-\$54,808	-\$124,832	-\$11,291	-\$53,869
	CY 2022	\$42,102	-\$11,291	\$45,480	\$45,480
Treatment	CY 2020	\$172,820	\$169,046	\$179,419	\$172,689
	CY 2021	\$45,265	\$3,118	\$275,189	\$36,817
	CY 2022	\$1,513	\$0	\$101,764	\$0
Delayed Care	CY 2020	-\$1,935,023	-\$1,935,023	-\$1,935,023	-\$1,935,023
	CY 2021	-\$9,628	-\$756,657	\$0	\$0
	CY 2022	-\$1,041	-\$468,399	\$0	\$0
Returning Care	CY 2020	\$695,224	\$523,427	\$872,228	\$693,241
	CY 2021	\$183,539	\$0	\$603,179	\$182,106
	CY 2022	\$1,532	\$0	\$283,236	\$0

Blue Cross and Blue Shield of Vermont
COVID-19 Modeling

Appendix H: Breakout of Claims by Calendar Year

Median Claims by Calendar Year - Total BCBSVT/TVHP			
	CY 2020	CY 2021	CY 2022
Direct Costs	\$4,132,855	\$4,164,390	\$0
Vaccination Costs	\$0	\$1,558,683	\$1,724,943
Delayed Claims	(\$20,341,434)	\$0	\$0
Returning Claims	\$7,925,104	\$2,210,918	\$0
Morbidity Impact Deferred Care	\$253,137	\$954,661	\$1,029,206
Changes in Demand	\$28,417	\$321,630	\$1,155,659
Net Impact by Year	(\$8,001,921)	\$9,210,283	\$3,909,808
Baseline	\$352,580,616	\$384,063,698	\$416,682,693
Change from Baseline	-2.3%	2.4%	0.9%

Median Claims by Calendar Year - VISG			
	CY 2020	CY 2021	CY 2022
Direct Costs	\$3,115,986	\$3,481,134	\$0
Vaccination Costs	\$0	\$1,306,218	\$1,445,548
Delayed Claims	(\$15,729,609)	\$0	\$0
Returning Claims	\$6,120,869	\$1,728,545	\$0
Morbidity Impact Deferred Care	\$202,259	\$759,231	\$822,523
Changes in Demand	\$48,045	\$315,727	\$933,462
Net Impact by Year	(\$6,242,449)	\$7,590,855	\$3,201,532
Baseline	\$280,339,514	\$305,473,959	\$333,005,120
Change from Baseline	-2.2%	2.5%	1.0%

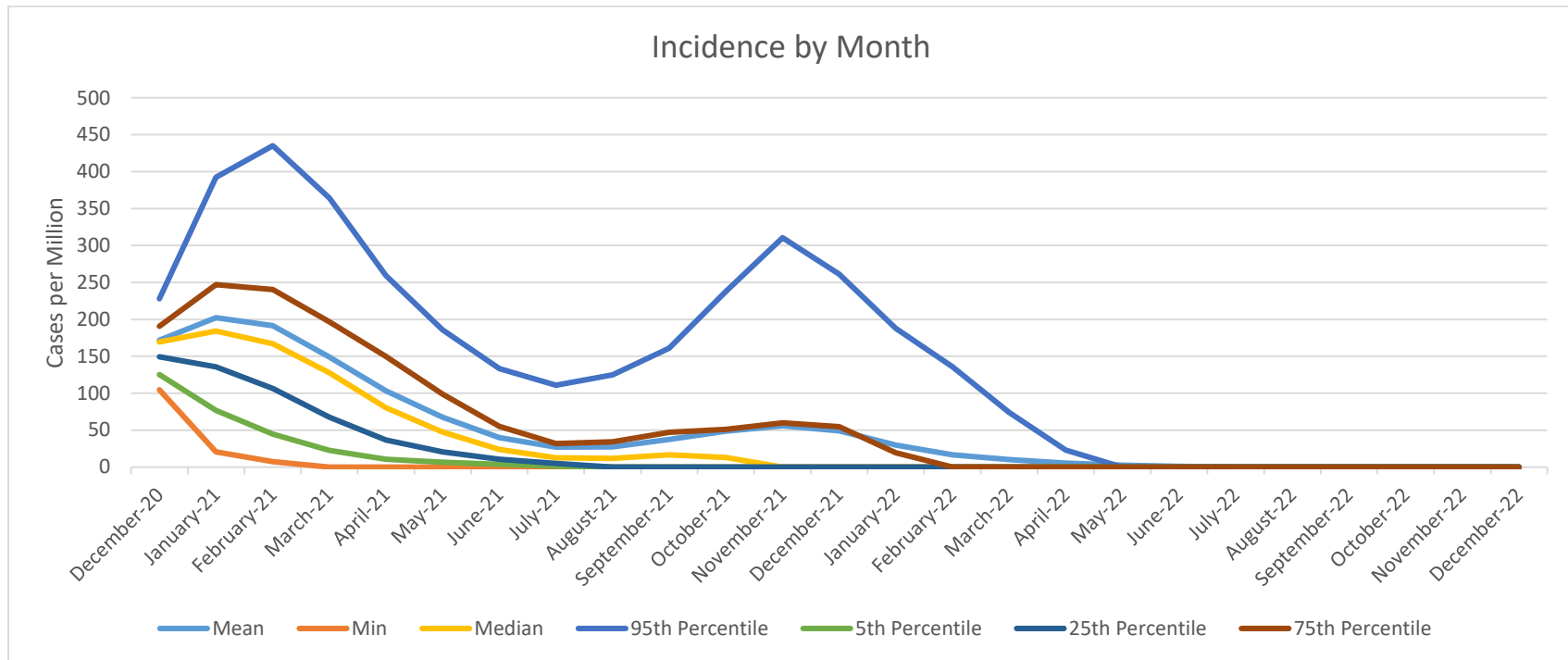
Median Claims by Calendar Year - Insured Large Group			
	CY 2020	CY 2021	CY 2022
Direct Costs	\$831,175	\$639,501	\$0
Vaccination Costs	\$0	\$252,465	\$279,395
Delayed Claims	(\$2,676,802)	\$0	\$0
Returning Claims	\$1,111,277	\$298,829	\$0
Morbidity Impact Deferred Care	\$36,536	\$130,999	\$140,202
Changes in Demand	\$9,096	\$59,772	\$176,718
Net Impact by Year	(\$688,720)	\$1,381,566	\$596,314
Baseline	\$48,948,873	\$52,706,179	\$56,761,820
Change from Baseline	-1.4%	2.6%	1.1%

Blue Cross and Blue Shield of Vermont
COVID-19 Modeling

Median Claims by Calendar Year - Medicare Supplement			
	CY 2020	CY 2021	CY 2022
Direct Costs	\$185,683	\$42,730	\$0
Vaccination Costs	\$0	\$0	\$0
Delayed Claims	(\$1,935,023)	\$0	\$0
Returning Claims	\$693,241	\$182,106	\$0
Morbidity Impact Deferred Care	\$14,346	\$64,410	\$66,482
Changes in Demand	-\$28,724	-\$53,869	\$45,480
Net Impact by Year	(\$1,070,477)	\$235,377	\$111,962
Baseline	\$23,292,229	\$25,883,560	\$26,915,754
Change from Baseline	-4.6%	0.9%	0.4%

Blue Cross and Blue Shield of Vermont
COVID-19 Modeling

Appendix I: Incidence Summary by Month



Blue Cross and Blue Shield of Vermont
COVID-19 Modeling

Appendix J: Disclosures and Limitations

Information Date: The analysis provided in the report is based on information as known on December 29, 2020.

Scope: This result is intended to communicate the effect of possible scenarios related to the COVID-19 pandemic in 2020, 2021, and 2022 on BCBSVT's risk-based capital position. This modeling is not intended to predict the likelihood of any specific scenario or set of scenarios.

Uncertainty or Risk: Future events will affect the results presented in the report. The level of testing, treatment, infection, vaccine availability, vaccine efficacy, infection rates, future federal and state legislation, and additional factors related to the COVID-19 pandemic are unknown. Actual results may vary from the results presented herein, potentially to a significant degree.

Reliance on Other Sources for Data and Other Information: This report relies upon data from the BCBSVT data warehouse. I have reviewed the data for reasonableness, but no audit was performed. We also rely on knowledge provided by BCBSVT medical directors to develop the deferred care anticipated to return and longer-lasting changes to the care delivery system that will result from the pandemic. Lastly, this report relies upon several sources of information, which are cited as footnotes at their respective references. If any of the sources we have relied upon are incorrect or inaccurate, it may affect the accuracy of the results presented in the report.

Subsequent Events: New information related to the COVID-19 pandemic continues to emerge on a regular basis. Subsequent events may affect the results presented herein. The degree to which future events may materially change the results is unknown.

Intended Users: This material has been prepared for consideration by DFR with respect to its assessment of BCBSVT's solvency position as part of the Commissioner's examination order of February 2, 2018. Distribution of this report to any third party must be made in its entirety and must not occur without the prior written consent of BCBSVT. The report should be evaluated only by qualified users. Any parties receiving this report should retain actuarial expertise in interpreting results.

CALCULATION of PRIOR PERIOD TREND FACTORS
ILLUSTRATIVE APPLICATION

Trend Factors for Prior Experience Periods		
Month	Medical	Pharmacy
March 2017	1.0000	1.0000
April 2017	1.0004	0.8863
May 2017	1.0009	0.9568
June 2017	1.0010	1.0070
July 2017	1.0014	0.9073
August 2017	1.0056	0.9725
September 2017	1.0061	0.9097
October 2017	1.0065	1.0193
November 2017	1.0166	1.0343
December 2017	1.0171	1.0359
January 2018	1.0175	0.9755
February 2018	1.0202	0.8798
March 2018	1.0174	1.0877
April 2018	1.0182	1.0395
May 2018	1.0188	1.0434
June 2018	1.0194	0.9927
July 2018	1.0200	0.9965
August 2018	1.0245	1.0970
September 2018	1.0244	0.9987
October 2018	1.0251	1.1687
November 2018	1.0345	1.0712
December 2018	1.0351	1.1487
January 2019	1.0357	1.1026
February 2019	1.0427	1.0023
March 2019	1.0432	1.0705
April 2019	1.0439	1.1490
May 2019	1.0449	1.2076
June 2019	1.0456	1.1226
July 2019	1.0496	1.2245
August 2019	1.0505	1.2090
September 2019	1.0513	1.1833
October 2019	1.0613	1.2589
November 2019	1.0619	1.1747
December 2019	1.0626	1.3781
January 2020	1.0762	1.2385
February 2020	1.0769	1.1709

Development of Prior Period Trend Factors			
Experience Period	A	B	C
Experience Period Start	3/1/2019	3/1/2018	3/1/2017
Experience Period End	2/29/2020	2/28/2019	2/28/2017
Average Medical Factor	1.0557	1.0263	1.0078
Average Pharmacy Factor	1.1990	1.0624	0.9654
Prior Period Medical Trend		1.0286	1.0475
Prior Period Pharmacy Trend		1.1285	1.2420