Blue Cross and Blue Shield of Vermont
COVID-19 Modeling

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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. The University of Vermont Health Network experienced a cyberattack in late October that led to further deferrals of care through November. The first quarter of 2021 saw a continuation of returning care from the COVID slowdown and the cyberattack, along with the broad rollout of the first vaccines. Looking forward, there are uncertain impacts around the ongoing level of infection, the cost of annual vaccine administration, 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 2021 and 2022, Blue Cross and Blue Shield of Vermont (Blue Cross) has created a model that simulates paid claims under varying scenarios for directly written insured lines of business[1]. The model and results are intended to quantify the impact varying scenarios have on Blue Cross'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 Blue Cross related to the COVID-19 pandemic. Blue Cross 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 modeling[2].

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, and actuarial value information presented in or underlying the Blue Cross 2022 Vermont ACA

[1] These include the Vermont ACA Markets (Individual and Small Group), Blue Cross insured large groups, TVHP insured large groups, Blue Cross 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.

Individual and Small Group rate filings (BCVT-132829562 & BCVT-132829271), Blue Cross 2021 Vermont Individual and Small Group Rate Filing (BCVT-132371410), the Blue Cross and TVHP Q3 2021 Large Group Rating Program Filing (BCVT-132713612 & BCVT-132713919), the Blue Cross 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 Blue Cross Medicare Supplement Rate Filing (BCVT-132570622).. We approximate membership from May 2021 through December 2022 using membership as of April 30, 2021. We include from the Blue Cross data warehouse direct COVID-related costs incurred in February 2020 through March 2021 and paid through April 30, 2021. We use vaccine claims incurred through April 30, 2021 and paid through May 25, 2021.

To calculate the level of deferred care, we use claims incurred from January 2019 through March 2021 for all Blue Cross 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 July 2020, utilization levels can be observed to have returned to levels that surpass trended pre-pandemic benchmarks across the Blue Cross book of business[3]. The 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 individual and small group claims, we start with the 2020, 2021, and 2022 projected allowed medical and pharmacy claims from the 2022 ACA Market rate filings. 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 allowed trend factors filed with or underlying the 2022 rate filings. Lastly, we set the starting trend for January such that the total projected allowed claims equals the allowed claims from the filing in each respective year. Finally, we apply the 2021 and 2022 actuarial value to convert from allowed claims to paid claims. We used the 2022 filing to project both 2021 and 2022 claims because a significant population shift observed in 2020 had not been anticipated by the 2021 filing. The 2022 filing includes an expectation that the new population would persist through 2021, and is therefore a more appropriate source for projected 2021 claims costs.

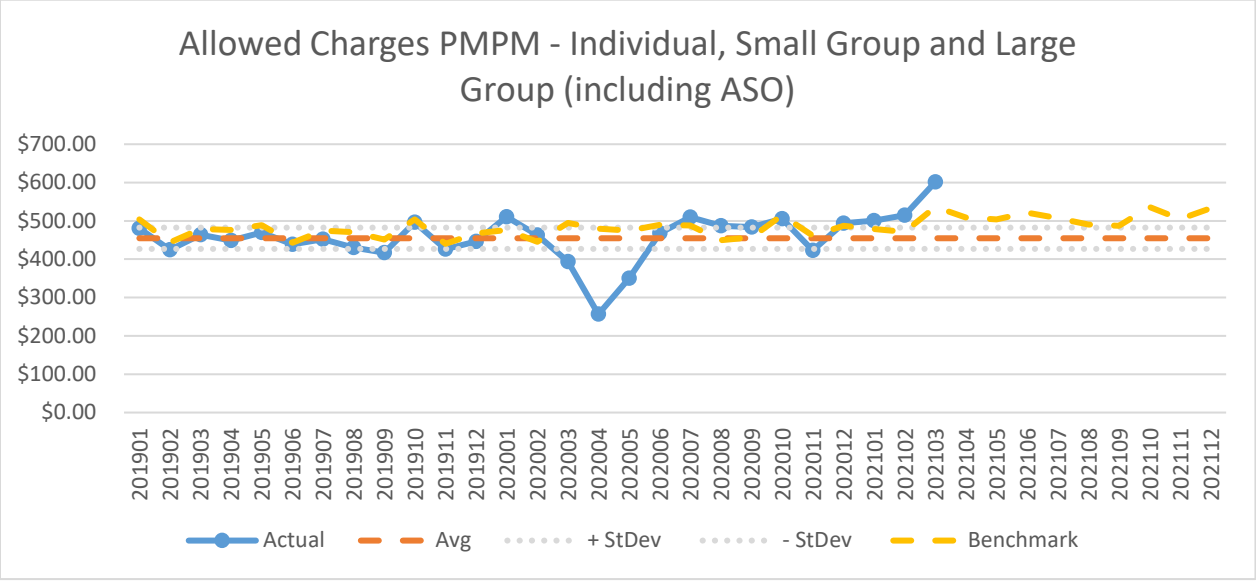
[3] Claims during June 2020 were quite close to benchmark. While the mandated deferral of care had ended by June, returning care had yet begun to manifest in the form of claims costs exceeding benchmark levels. Anecdotally, this period may have persisted for many more months in other areas of the nation.

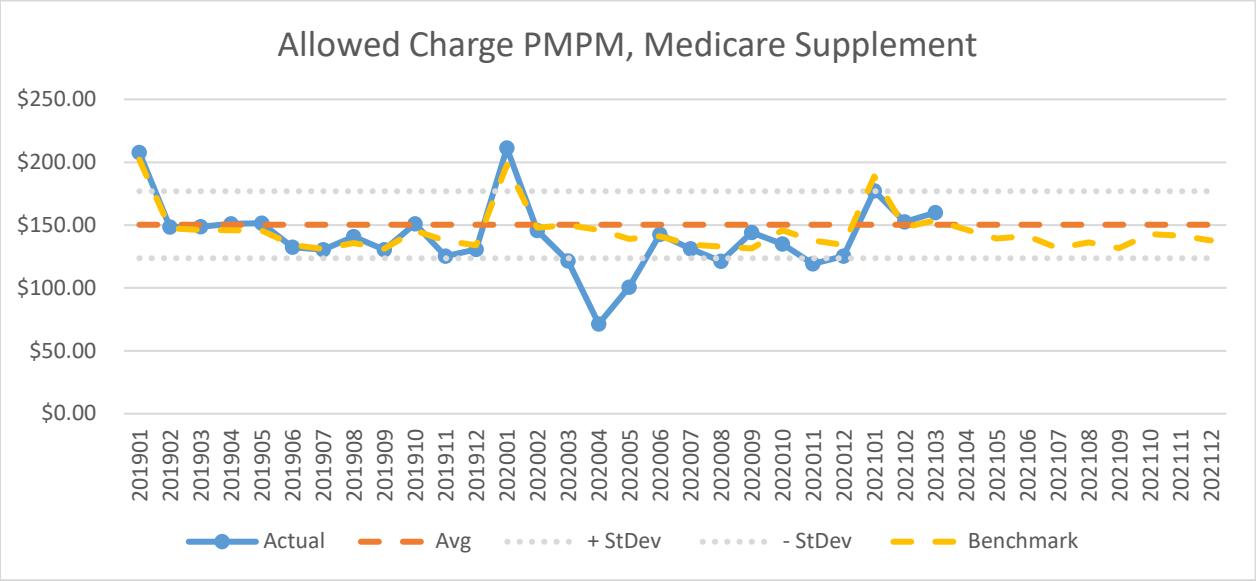
To estimate the insured large group claims, we start with the approved manual rate in the Q3 2020 Blue Cross /TVHP Large Group filing. The manual rate represents an estimated paid claim amount for the 12-month period starting January 1, 2021. We then divide by the effective actuarial value underlying 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. We follow the same methodology to develop 2022 projected claims using the factors included in the Q3 2021 rate filings.

To estimate Medicare Supplement claims, we start with the 2021 projected medical claims from the 2021 Blue Cross 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. We use the monthly trends to project claims for 2022.

Deferred Care

Using the period identified in the *Data* section, we create the following graphs showing the total monthly claims per member spanning over the benchmark, slowdown and recovery periods. In October 2020 there was a cyberattack that impacted all University of Vermont Health Network providers. As a result, non-emergency care was rescheduled from November 2020 to subsequent months. It appears that all care that was originally scheduled for November 2020 has been made up as of March 2021.





We further subdivide 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 make 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 36 sub-categories[4] we considered in estimating the impact of deferred services. A table displaying the assumptions for each of the 36 categories can be found in Appendix D.

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, they returned above benchmark starting in June 2020.

Medical-drug services (such as injections), oncology treatment, dialysis and home health and hospice services experienced no slowdown. 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 resolved in other ways. We assume that influenza and pneumonia-based claims will not be made up because they are

[4] Previous iterations of our modeling used 35 categories. The current modeling split dialysis services from "other outpatient services" because we observed radically different utilization patterns for these types of claims.

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 assume that 60 percent of chronic laboratory and radiology services and 30 percent of chronic evaluation and management services will be made up. Any acute care that did not take place in the slowdown period has been foregone[5]. We also assume that 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 these services will be made up due to the necessity of this care. We note that various Vermont hospitals and surgical centers expanded their hours in 2020 to contend with the glut of services.

Overall, we estimate that 48.1 percent of the services that were deferred during the slowdown period have been or will be made up. For Medicare Supplement members, we estimate 42.8 percent of deferred services have returned or 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 D.

We can observe that the majority of the deferred care that was expected to return for ACA and large group markets has already returned through March 2021. For Medicare Supplement members, only approximately 40 percent of the expected returning care has already returned. We attribute this difference primarily to greater hesitancy among the high-risk population to return to normal patterns of care before vaccination.

	ACA Market	Large Group Insured	Medicare Supplement
Expected returning care	48.0%	48.2%	42.8%
Care returned as of March 2021	43.6%	41.9%	25.4%
Care still expected to return	4.4%	6.4%	17.5%

In the spring months of 2020 during which care was deferred, we assume that a mean of 48.1 percent of the claims will return at a later date (a mean of 42.8 percent for Medicare Supplement members). In the stochastic model, we assume the level of deferred care is normally distributed with above-referenced 'Care still expected to return' means and a standard deviation of one-tenth the mean.

Our estimate that 48.1 percent of the services deferred during the slowdown period have been or will be made up is consistent with the modeling results presented on December 31, 2020 and July 14, 2020, wherein we respectively estimated that 50.3 percent and 51.7 percent of deferred care would return.

[5] 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 have 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.

Returning Care

We measured the observed returning care by considering the subset of 36 service categories, described in the Deferred Care section, where we expected to observe some or all of the deferred care returning. We measured returning care PMPM as the difference between the observed PMPM and benchmark PMPM for months where the observed claims exceeded the benchmark. By definition, we assumed that no more than 100 percent of the deferred care could return in any given service category. The total observed returning care is the average of the slowdown claims PMPM by service category weighted by the observed returning care percentage. Through March 2021, we have observed that 43.6 percent of ACA market claims and 41.9 percent of large group insured market claims have returned.

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 April 2021 through December 2022. The capacity in a given month is not allowed to exceed the maximum noted above. . 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.

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

Changes in Demand

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

We expect influenza and pneumonia services to continue to remain dampened due to lower rates of infection that result from social distancing protocols. Our previous analysis assumed physical therapy and chiropractic services would remain dampened due to patients seeking non emergent services less actively during the pandemic. As of March 2021, we have seen these services exceed their baseline, likely due to the increasing vaccination rates and the pent-up demand for these services. We expect these services to remain 5 percent higher than the benchmark for the through the end of 2022.

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 Vermonters. Across our book of business, we have observed a 20 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 assume 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 event[6]; we use this figure—roughly a third 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 $0.99 decrease in allowed PMPM before July 2021 and a $3.24 increase in allowed PMPM in and after July 2021. We use these figures as the change in ongoing demand. For Medicare Supplement members, the respective changes are a $0.53 PMPM decrease and a $0.31 PMPM increase. We treat these as best estimate assumptions and do not allow them to vary within the stochastic modeling.

	ACA Market & Insured Large Group		**Medicare Supplement**	
Type of Service	**Benchmark PMPM**	**Future Demand %**	**Benchmark PMPM**	**Future Demand %**
Mental Health (Inpatient)	$5.34	7%	$0.42	7%
Mental Health (Other)	$14.83	20%	$2.10	20%
PT & Chiropractic	$17.77	5%	$7.75	5%
Influenza/Pneumonia**	$2.47	-40%	$1.32	-40%
Pre-Vaccine Changes in Demand, Allowed PMPM	**($0.99)**		**($0.53)**	
Post-Vaccine Changes in Demand, Allowed PMPM	**$3.24**		**$0.31**	

** Future demand reverts to baseline levels in July 2021.

Deferred Care Morbidity Impact

As outlined above, a broad spectrum of medical services experienced a decline during the spring of 2020. While many of these services were rescheduled, many will not occur at all. The cancellation and

[6] https://www.annualreviews.org/doi/full/10.1146/annurev-publhealth-032013-182435

delay of services has created public health impacts[7], and similar events that have impaired access to care have increased population morbidity[8].

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 CDC's COVID Data Tracker[9] to collate cases on a daily basis for Vermont. We then calculate a weekly average incidence from April 1, 2020 through May 11, 2021.

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

$$\text{Estimated cases}_t = \big((\alpha * Actual\ cases_{t-1} \div Seasonal\ factor_{t-1} + (1-\alpha) * (Estimated\ cases_{t-1} + \beta_{t-1}) + \beta_t\big) * Seasonal\ factor_t$$

First, we develop the seasonal factors. Other coronaviruses have exhibited a seasonal pattern, where the case prevalence increases in winter months[10]. 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 reflects 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 in turn 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

[7] https://www.cdph.ca.gov/Programs/CID/DCDC/Pages/COVID-19/ResumingCalifornia%E2%80%99sDeferredandPreventiveHealthCare.aspx
[8] https://www.washingtonpost.com/opinions/2020/04/08/covid-19-pandemic-will-end-americas-next-health-crisis-is-already-starting/
[9] https://covid.cdc.gov/covid-data-tracker/#trends_dailytrendscases, accessed May 19, 2021.
[10] https://www.frontiersin.org/articles/10.3389/fpubh.2020.567184/full, accessed November 5, 2020.

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 (units are cases per million unless otherwise specified)			
Social Distancing Level	Low Factor	High Factor	Incidence Start
4	-30%	-10%	600
3	-3	-1	75
2	-1	0	25
1	0	1	0

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

$$\text{Seasonal trend factor}_{\,t} = ((Seasonal\ factor_t \div Seasonal\ factor_{t-1}) - 1) * Actual\ cases_{t-1}$$

To project future cases, we substitute estimated cases for actual cases in the formulas above. Through the week ended May 11, 2021, 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% (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.

Lastly, 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 Project[11] and Vermont Department of Health[12]. From October 1, 2020 through December 31, 2020, the ratio of new hospitalizations to cases for Vermont, New Hampshire, Maine, and Massachusetts was 1.4 percent. The rate of hospital admission for COVID-19 varies materially by age. We use "CDC - Laboratory-Confirmed COVID-19-Associated Hospitalizations"[13] to estimate the relative rate of admission by age band. We then apply the above overall hospitalization rate of 1.4 percent, the relative rate of admission, and 2019 census data[14] to calculate an admission rate by age.

To develop a treatment cost, we split admissions into those requiring an ICU stay and non-ICU admissions. The COVID Tracking Project[15] measures the number of individuals currently hospitalized and currently in the ICU. From September 1, 2020 through March 7, 2021, 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 Wakely[16] 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 April 19, 2021, all Vermont residents age 16 and older are eligible to be vaccinated against COVID-19. We assume the modeled vaccination rate is achieved by the end of June for members ages 16 and above, with vaccine administration costs equally distributed from March through June. Treatment costs for vaccinated members are assumed to ramp down in the following pattern:

Vaccine Availability Month	Treatment Costs Dampening Factor
April 2021	83.33%
May 2021	50.00%
June 2021	16.67%
July 2021+	0.00%

The federal government has executed purchasing agreements which we assume will cover the cost of a vaccine through 2022, while 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

[11] https://covidtracking.com/data, accessed November 1, 2020. Reporting dates with outliers were smoothed.
[12] https://www.healthvermont.gov/, accessed November 1, 2020. COVID19-Weekly-Data-Summary-10-2-2020 and COVID19-Weekly-Data-Summary-7.2.2020
[13] 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
[14] https://www.census.gov/data.html, accessed November 4, 2020.
[15] https://covidtracking.com/data/national/hospitalization, accessed May 7, 2021.
[16] https://www.ahip.org/wp-content/uploads/AHIP-COVID-19-Modeling-Update_Wakely-2020.06.pdf

published by CMS[17]. Starting with vaccines administered on March 15th, CMS increased the payment rate for a two-dose series from $45.33 to $80.00. For Medicare Supplement, we assume Medicare will cover the entire administration costs and any potential vaccine costs.

DFR recently presented results from a survey on the willingness to receive a COVID vaccine[18]. This survey indicated 88 percent of Vermonters would definitely or probably get a vaccine. In the stochastic model, we assume the vaccination rate is normally distributed with a mean of 88 percent with a standard deviation of one-tenth the mean. We also set a lower and upper bound of a range of plausible values using the above referenced survey. We use the Vermont Forward Step 4 goal of 80.0 percent as the lower bound, and the inverse of members of who will definitely not get a vaccine, 94.1 percent, as the upper bound. We lower the vaccination rate by 30 percentage points to account for vaccines administered at sites that are not submitting claims to BCBSVT.

Two of the three vaccines currently being used in Vermont require two doses to be fully protected against COVID-19. For the week of April 26th, the CDC allocated 10,530 Pfizer[19] and 7,300 Moderna[20] first-doses to Vermont. The Johnson & Johnson vaccine requires a single dose to be fully protected against COVID-19. The allocations of the Johnson & Johnson vaccine have varied widely since its Emergency Use Authorization was granted. In its six weeks of CDC allocations, Vermont averaged 3,633 Johnson & Johnson doses[21]. We use the above allocations to estimate that 83 percent of initial doses administered will require a second dose.

The timing of the vaccine for adolescents and children is uncertain. On May 10, 2021, the FDA approved the emergency use of the Pfizer vaccine in ages 12 to 15[22]. On April 13, 2021, Moderna announced their adolescent trial covering ages 12 to 17 was fully enrolled, and their pediatric trial covering ages 6 months to 11 years was currently enrolling[23]. Given this, we assume the vaccine eligibility will expand to cover all ages by the end of 2021. We apply vaccine costs for the 12-15 population proportionally May through August 2021, and apply vaccine costs for the under 12 populationally from September through December 2021.

Both Pfizer and Moderna are actively running trials to study the efficacy of a booster vaccine dose[24] [25]. We assume a one-dose booster vaccine will occur one year following the initial vaccine availability, with a $40 administration cost. We use the same vaccination rate assumptions as above, but use a minimum

[17] https://www.cms.gov/medicare/covid-19/medicare-covid-19-vaccine-shot-payment, accessed April 28, 2021.
[18] https://dfr.vermont.gov/sites/finreg/files/doc_library/dfr-covid19-modeling-040621.pdf, accessed April 28, 2021.
[19] https://data.cdc.gov/Vaccinations/National-Weekly-Pfizer-Allocations/sxbq-3sid, accessed April 27, 2021.
[20] https://data.cdc.gov/Vaccinations/COVID-19-Vaccine-Distribution-Allocations-by-Juris/b7pe-5nws, accessed April 27, 2021.
[21] https://data.cdc.gov/Vaccinations/COVID-19-Vaccine-Distribution-Allocations-by-Juris/w9zu-fywh, accessed April 27, 2021.
[22] https://www.fda.gov/news-events/press-announcements/coronavirus-covid-19-update-fda-authorizes-pfizer-biontech-covid-19-vaccine-emergency-use, accessed May 26, 2021.
[23] https://investors.modernatx.com/news-releases/news-release-details/moderna-provides-clinical-and-supply-updates-covid-19-vaccine, accessed May 26, 2021.
[24] https://www.pfizer.com/news/press-release/press-release-detail/pfizer-and-biontech-initiate-study-part-broad-development, accessed May 26, 2021.
[25] https://investors.modernatx.com/news-releases/news-release-details/moderna-announces-positive-initial-booster-data-against-sars-cov, accessed May 26, 2021.

rate of 57.0 percent, which was the Vermont flu vaccine rate during the 2019-2020 flu season[26]. We assume the vaccination rate is normally distributed, with a standard deviation of one-tenth the mean.

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 March 26, 2021 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 start with the assumption that the level of testing is normally distributed with a mean set at the observed testing rate for February and March 2021, 0.61 tests per member per year (PMPY) for insured individual, small group and large group members and 0.29 tests PMPY for Medicare Supplement members, with a standard deviation of one-tenth the respective means. We do not assume any testing costs for members where Medicare is the primary payer, since Medicare covers diagnostic testing in full. We then dampen the testing factors to an ultimate rate of 50 percent using the factors in the *Vaccine Development* section. We also apply the seasonal factors in the *Treatment Costs* section. The adjusted testing rate represents a background level of testing that will face upward pressure due to relaxations of social distancing and downward pressure due to vaccine availability and administration. See Appendix F for a sample of testing rates randomly generated by these mechanics.

Previous iterations of the model assumed testing would cease upon broad vaccine availability. We now anticipate testing will continue at a background level through 2022 to meet various recreational, occupational, travel, and diagnostic needs. We expect significant testing in the fall for the combination influenza/RSV/COVID test, which will likely persist indefinitely as the standard of care.

We sometimes 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 February and March 2021. The cost of the office visit is calculated as the average office visit cost, exclusive of emergency room charges, for February through March 2021. Both the visit-to-test ratio and office visit cost are calculated separately for members where Medicare is the primary payer.

Office Visit		
	ACA Market/Large Group	Medicare Supplement
Cost	$91.91	$28.14
Visit-to-Test Ratio	0.063	0.036

[26] https://www.kff.org/other/state-indicator/flu-vaccination-rate, accessed May 26, 2021.

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.

Summary of Modeling Changes

As described in the preceding sections, we have made the following changes to the COVID model since the publication of results on December 31, 2020:

- Refreshed data to incorporate claims information through March 2021;
- Updated starting claim assumptions to use values from the individual, small group, and large group filings currently under review or recently approved;
- Updated the benchmark calculation to account for trend, population changes, and seasonality;
- Refreshed the level of deferred and returning care through March 2021 (*neutral impact in total, favorable impact in 2020 due to further deferred care at UVMHN in the fall)*;
- Calculated the level of deferred claims separately for ACA market and insured large group;
- Updated the changes in demand based on emerging information *(unfavorable impact)*;
- Refreshed incidence data to include cases through May 11, 2021;
- Refreshed admission data *(favorable impact)*;
- Updated treatment cost methodology to assume costs beyond vaccine availability for unvaccinated members *(unfavorable impact)*;
- Updated vaccination timeline *(varying impacts)*;
- Updated vaccine cost assumptions to reflect the March 15th CMS update to payment rates *(unfavorable impact)*;
- Updated estimated vaccination rate based on a recent survey *(unfavorable impact)*;
- Assumed testing rate will continue at a dampened level through 2022 *(unfavorable impact)*;
- New information emerges daily relative to the pandemic. We have worked swiftly to incorporate new information and the latest data.

Analysis & Results

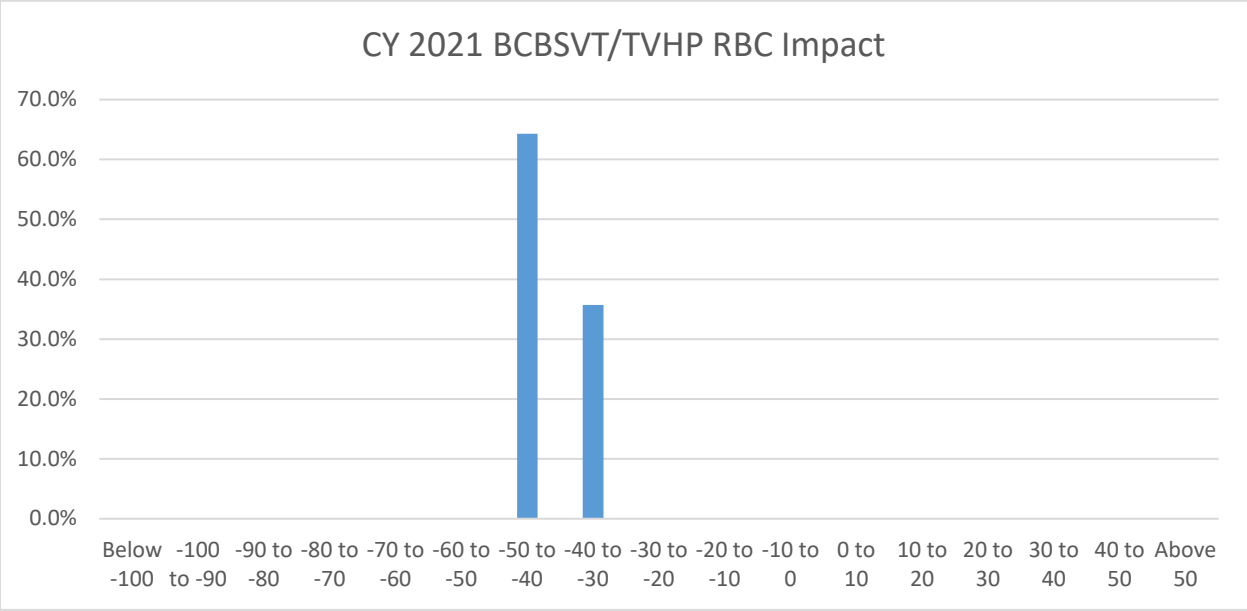
On the following pages, we examine the impact of varying scenarios for the ACA markets, Insured Large Group, and Medicare Supplement populations. We run 10,000 simulations using the inputs noted in the *Methodology* section. Appendix G provides the summary statistics of the stochastic modeling[27].

[27] 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.

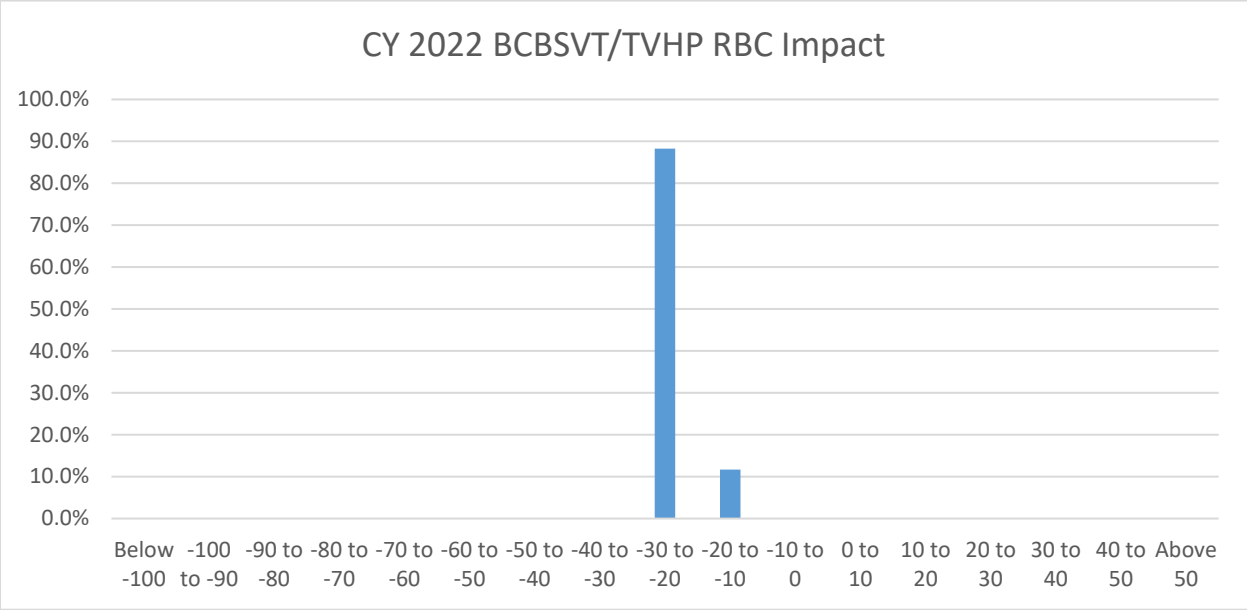
Summary of Results by Year

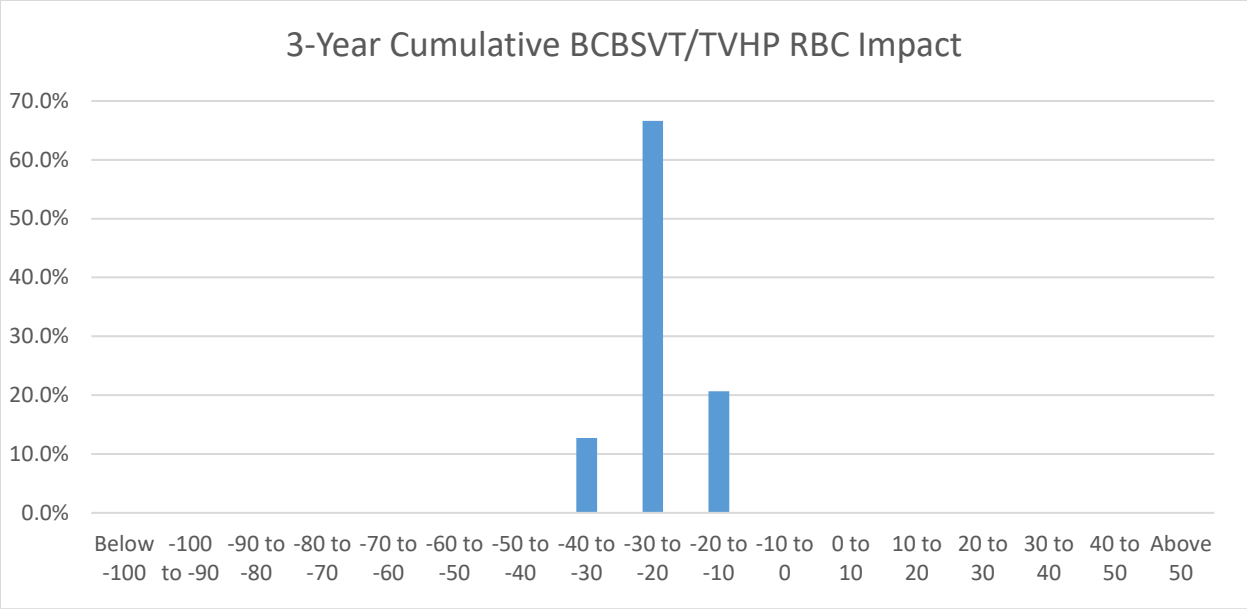
We provide the median modeled impact by calendar year for all insured Blue Cross and TVHP membership. Appendices A-C provide line of business specific results for ACA markets, Insured Large Group, and Medicare Supplement.

All Blue Cross/TVHP	CY 2020	CY 2021	CY 2022	Total
COVID Impact	**($8,504,802)**	**$8,728,354**	**$4,940,099**	**$5,163,652**
Baseline[28]	$343,100,540	$327,370,781	$348,392,423	$1,018,863,745
Change from Baseline	-2.5%	2.7%	1.4%	0.5%
RBC Change	40	-41	-23	-24



[28] Baseline claims reflect the projected medical and pharmacy claims for each respective period in the absence of any COVID-19 impacts.





These results demonstrate the disparate claim impacts by year. Notably, CY 2020 results show favorable impacts due initial slowdown occurring in the spring of 2020, which is not fully offset by the return of deferred care and COVID-related costs. 2021 results show unfavorable impacts due to testing costs, treatment costs, vaccination costs, and the return of care that was deferred during 2021. 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. Vaccine availability in 2021 dampens potential variance in both 2021 and 2022 since future treatment costs are minimal 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. 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 well aligned with the modeling performed in July and December 2020, which produced a majority of simulated results that were fairly neutral over a two-year timeframe. The update to the CMS payment rates, which represents a 76 percent increase in cost in a two-dose series, introduces further unfavorability in 2021 and 2022 due to increased vaccination costs. Additionally, the likelihood of continued diagnostic testing through 2022 contributes to the unfavorability in 2021 and 2022 as compared to previous modeling. These results show a narrower range of possible outcomes than earlier iterations of the COVID modeling, which is due to the ongoing development of COVID experience and vaccine cost and availability.

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 frequency, and vaccine efficacy, all of which may present impacts to Blue Cross members, groups, and its reserve position. This analysis exclusively considers direct costs in 2020, 2021, and 2022.

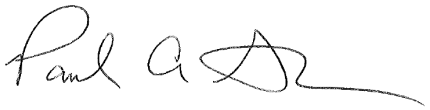
The modeling outlined in the memorandum reflects thousands of scenarios under varying assumptions that produce disparate results. New information regarding the factors outlined in this memorandum continues to emerge and will directly affect claims and the Blue Cross reserve position. Based on the best 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 Blue Cross. 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.



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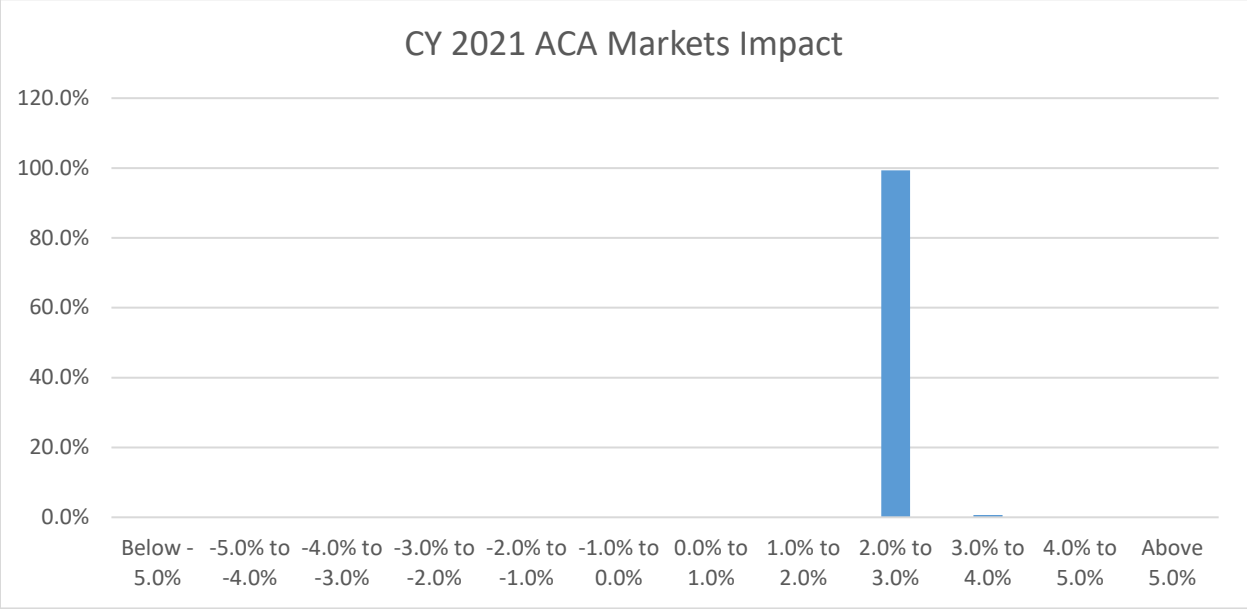
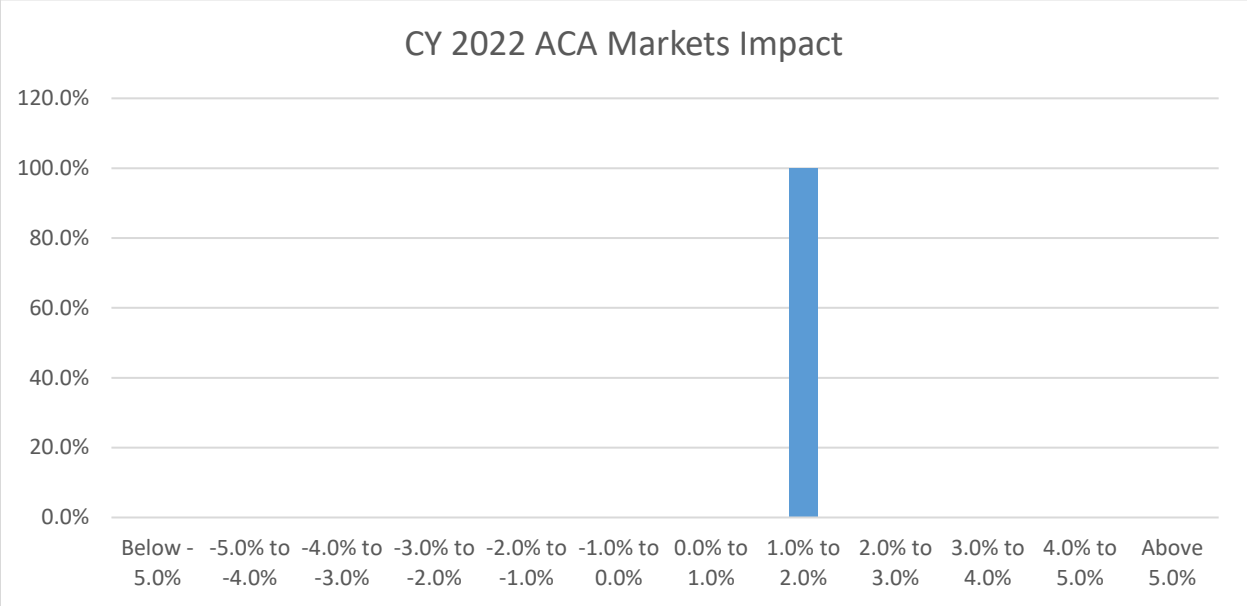
Paul A Schultz, F.S.A., M.A.A.A.

June 1, 2021

Appendix A: ACA Markets Results

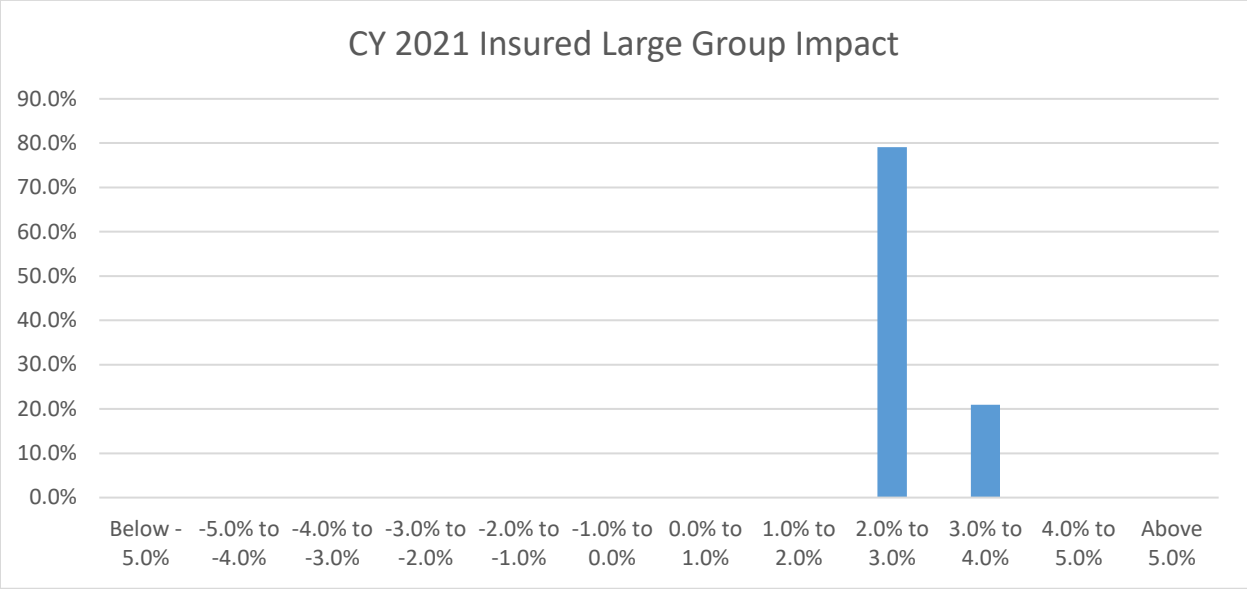
ACA Markets	CY 2020	CY 2021	CY 2022
Median	($5,824,454)	$7,023,868	$4,218,610
Baseline	$264,452,301	$260,088,975	$278,725,720
Change from Baseline	-2.2%	2.7%	1.5%

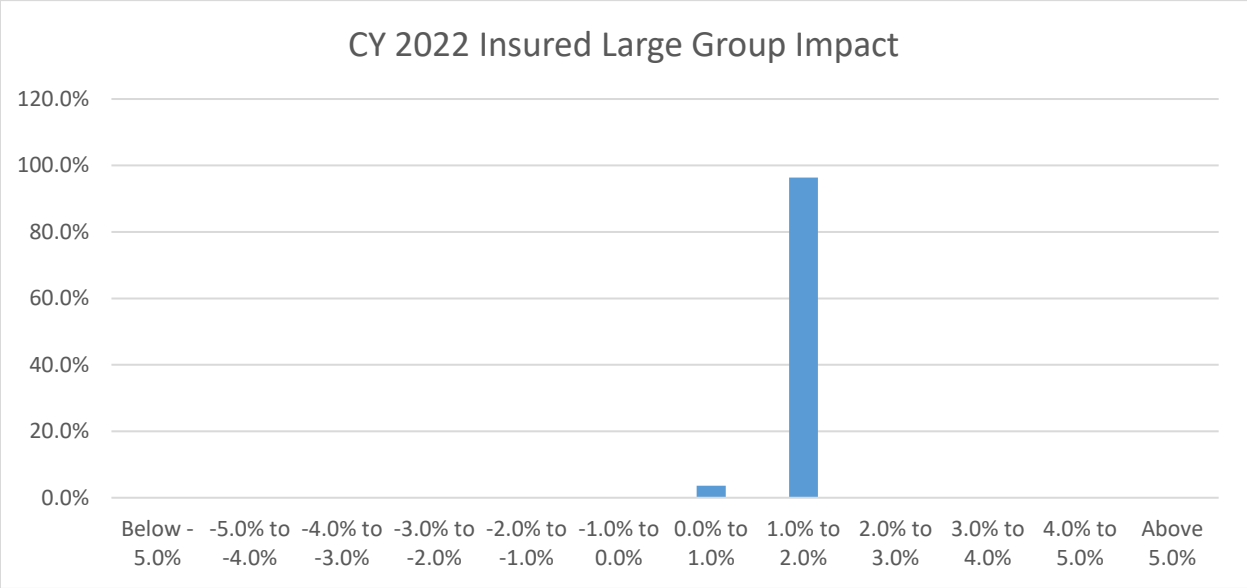




Appendix B: Insured Large Group Results

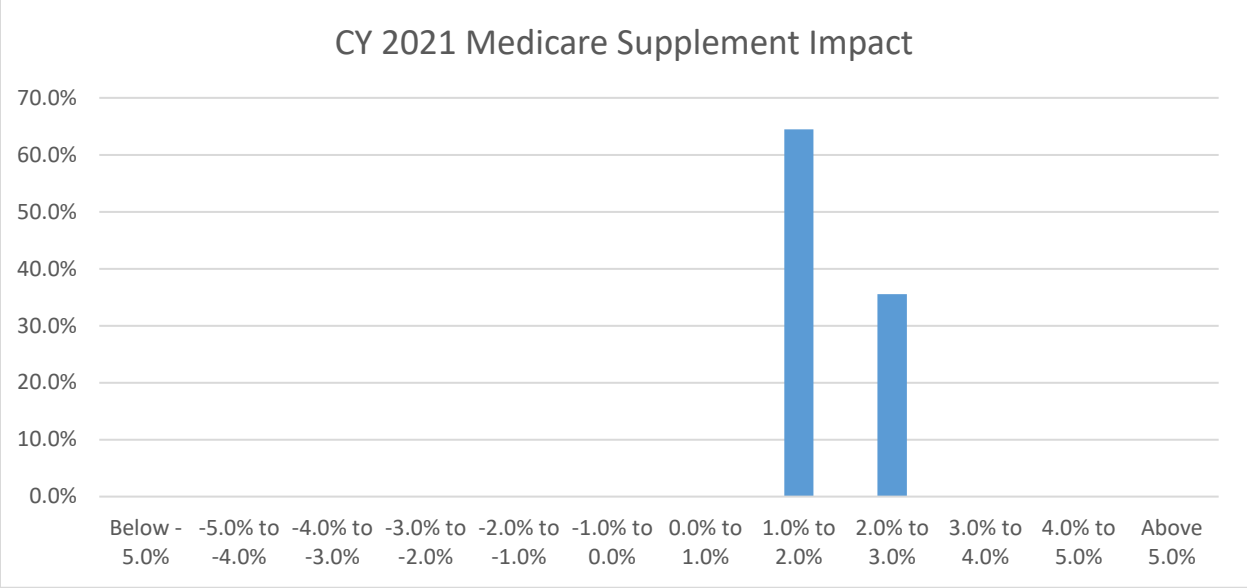
Insured Large Group	CY 2020	CY 2021	CY 2022
Median	($1,572,624)	$1,237,494	$560,725
Baseline	$55,520,093	$43,167,113	$44,578,808
Change from Baseline	-2.8%	2.9%	1.3%

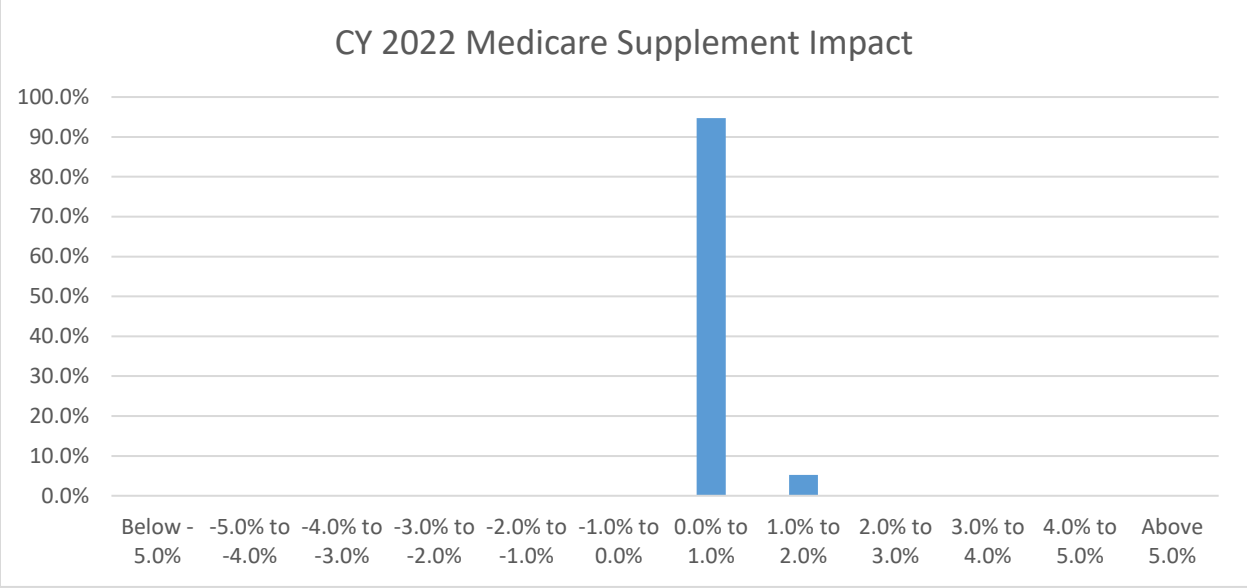




Appendix C: Medicare Supplement Results

Medicare Supplement	CY 2020	CY 2021	CY 2022
Total	($1,107,724)	$466,489	$160,735
Baseline	$23,128,146	$24,114,694	$25,087,895
Change from Baseline	-4.8%	1.9%	0.6%





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

ACA Markets and Insured Large Group			
Type of Service	**Benchmark PMPM**	**Slowdown PMPM**	**Percent Rescheduled Services**
Surgery - Respiratory (non Influenza/Pneumonia)	$5.18	$2.96	30%
Evaluation and Management - Chronic	$13.86	$2.46	30%
Surgery - Cardiac	$15.30	$4.09	100%
Surgery - Other	$13.32	$1.65	100%
Surgery - Renal/Pancreas/Integumentary	$15.67	$5.01	100%
Surgery (knee/hip/shoulder + other bones)	$39.29	$17.07	100%
Surgery - Eye	$3.09	$1.33	100%
Surgery - GI	$19.55	$7.90	100%
Surgery - Colonoscopy	$10.38	$7.17	100%
Laboratory - Chronic	$10.02	$3.13	60%
Surgery - Neuro	$9.25	$2.52	100%
Radiology - Chronic	$13.18	$4.10	60%
Surgery - Reproductive System/Genital	$10.02	$4.15	100%
Immunizations	$1.57	$0.98	100%
Oncology Treatment	$8.76	$0.00	100%
IP - Diseases and Disorders	$12.89	$0.82	5%
Cardiology/EKG/ECG/EEG	$9.82	$4.74	30%
PT & Chiropractic	$17.77	$8.84	40%
Ophthalmology Services	$2.45	$1.42	75%
Other Inpatient	$12.64	$3.22	5%
Other Professional	$5.10	$2.01	30%
Dialysis	$1.70	$0.00	100%
Other Outpatient	$20.46	$9.12	30%
Influenza/Pneumonia	$2.47	$0.86	0%
Evaluation and Management - Other	$24.66	$9.20	0%
DME	$2.10	$0.22	0%
Ambulance	$3.11	$1.25	0%
Emergency and Urgent Care	$36.83	$9.37	0%
Laboratory - Other	$15.49	$6.86	0%
Radiology - Other	$31.63	$15.13	0%
Mental Health (Inpatient)	$5.34	$1.21	0%
Home Health & Hospice	$9.65	$0.00	0%
Pregnancy/Newborn	$21.89	$0.82	0%
Medical-Rx - Other	$3.74	$0.62	0%
Mental Health (Other)	$14.83	$0.00	0%
Medical-Rx - Chronic	$39.91	$0.00	0%
Total			**48.1%**

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Medicare Supplement			
Type of Service	**Benchmark PMPM**	**Slowdown PMPM**	**Percent Rescheduled Services**
Surgery - Respiratory (non Influenza/Pneumonia)	$0.77	$0.00	30%
Evaluation and Management - Chronic	$7.74	$2.56	30%
Surgery - Cardiac	$2.83	$0.64	100%
Surgery - Other	$2.37	$0.31	100%
Surgery - Renal/Pancreas/Integumentary	$6.00	$2.53	100%
Surgery (knee/hip/shoulder + other bones)	$9.47	$3.77	100%
Surgery - Eye	$3.24	$1.47	100%
Surgery - GI	$3.28	$0.88	100%
Surgery - Colonoscopy	$1.78	$1.30	100%
Laboratory - Chronic	$0.40	$0.19	60%
Surgery - Neuro	$2.13	$0.34	100%
Radiology - Chronic	$3.35	$1.33	60%
Surgery - Reproductive System/Genital	$1.18	$0.69	100%
Immunizations	$0.00	$0.00	100%
Oncology Treatment	$2.92	$0.34	100%
IP - Diseases and Disorders	$6.25	$1.91	5%
Cardiology/EKG/ECG/EEG	$3.22	$1.18	30%
PT & Chiropractic	$7.75	$4.22	40%
Ophthalmology Services	$2.86	$1.67	75%
Other Inpatient	$8.68	$2.47	5%
Other Professional	$3.45	$1.15	30%
Dialysis	$3.32	$0.06	100%
Other Outpatient	$15.28	$8.23	30%
Influenza/Pneumonia	$1.32	$0.12	0%
Evaluation and Management - Other	$6.47	$2.67	0%
DME	$1.31	$0.15	0%
Ambulance	$1.78	$0.37	0%
Emergency and Urgent Care	$10.18	$2.56	0%
Laboratory - Other	$0.70	$0.29	0%
Radiology - Other	$4.74	$1.78	0%
Mental Health (Inpatient)	$0.42	$0.27	0%
Home Health & Hospice	$3.68	$0.39	0%
Pregnancy/Newborn	$0.00	$0.00	0%
Medical-Rx - Other	$0.90	$0.34	0%
Mental Health (Other)	$2.10	$0.20	0%
Medical-Rx - Chronic	$13.18	$1.12	0%
Total			**42.8%**

Appendix E: Sample Deferred and Returning Care Factor

Sample Deferred and Returning Care Factors										
	Example 1	*Example 2*	*Example 3*	*Example 4*	*Example 5*	*Example 6*	*Example 7*	*Example 8*	*Example 9*	*Example 10*
202104	103.4%	103.5%	103.8%	103.6%	103.1%	103.0%	103.1%	103.0%	103.4%	103.7%
202105	100.5%	100.3%	100.5%	100.0%	101.1%	100.8%	101.0%	100.6%	100.2%	100.6%
202106	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
202107	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
202108	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
202109	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	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%	100.0%	100.0%	100.0%
202112	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	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%

Appendix F: Sample Diagnostic Testing Rate

Sample Testing Rate (PMPM)										
	Example 1	*Example 2*	*Example 3*	*Example 4*	*Example 5*	*Example 6*	*Example 7*	*Example 8*	*Example 9*	*Example 10*
202101	0.085	0.085	0.085	0.085	0.085	0.085	0.085	0.085	0.085	0.085
202102	0.057	0.057	0.057	0.057	0.057	0.057	0.057	0.057	0.057	0.057
202103	0.046	0.046	0.046	0.046	0.046	0.046	0.046	0.046	0.046	0.046
202104	0.050	0.060	0.055	0.056	0.049	0.049	0.048	0.050	0.052	0.058
202105	0.032	0.039	0.036	0.036	0.031	0.032	0.031	0.033	0.034	0.038
202106	0.019	0.022	0.020	0.021	0.018	0.018	0.018	0.019	0.019	0.022
202107	0.013	0.015	0.014	0.014	0.012	0.012	0.012	0.013	0.013	0.015
202108	0.013	0.015	0.014	0.015	0.013	0.013	0.012	0.013	0.013	0.015
202109	0.016	0.020	0.018	0.018	0.016	0.016	0.016	0.017	0.017	0.019
202110	0.022	0.026	0.024	0.024	0.021	0.021	0.021	0.022	0.022	0.025
202111	0.028	0.033	0.031	0.031	0.027	0.027	0.027	0.028	0.029	0.033
202112	0.033	0.040	0.037	0.038	0.032	0.033	0.032	0.034	0.035	0.039
202201	0.036	0.043	0.040	0.041	0.035	0.036	0.035	0.036	0.038	0.042
202202	0.036	0.043	0.040	0.041	0.035	0.036	0.035	0.036	0.038	0.042
202203	0.033	0.039	0.036	0.037	0.032	0.032	0.031	0.033	0.034	0.038
202204	0.027	0.033	0.030	0.031	0.027	0.027	0.026	0.028	0.028	0.032
202205	0.021	0.025	0.023	0.023	0.020	0.020	0.020	0.021	0.022	0.024
202206	0.015	0.018	0.017	0.017	0.015	0.015	0.015	0.015	0.016	0.018
202207	0.013	0.015	0.014	0.014	0.012	0.012	0.012	0.013	0.013	0.015
202208	0.013	0.015	0.014	0.015	0.013	0.013	0.012	0.013	0.013	0.015
202209	0.016	0.020	0.018	0.018	0.016	0.016	0.016	0.017	0.017	0.019
202210	0.022	0.026	0.024	0.024	0.021	0.021	0.021	0.022	0.022	0.025
202211	0.028	0.033	0.031	0.031	0.027	0.027	0.027	0.028	0.029	0.033
202212	0.033	0.040	0.037	0.038	0.032	0.033	0.032	0.034	0.035	0.039

Appendix G: Stochastic Modeling Summary Statistics

Baseline Claims – Total BCBSVT/TVHP		
Component	**Year**	**Value**
Baseline Claims	CY 2020	$343,100,540
	CY 2021	$327,370,781
	CY 2022	$348,392,423

Stochastic Modeling Summary Statistics - Total BCBSVT/TVHP					
Component	**Year**	**Mean**	**Min**	**Max**	**Median**
Diagnostic Testing	CY 2020	$2,280,120	$2,280,120	$2,280,120	$2,280,120
	CY 2021	$1,885,792	$1,402,001	$2,596,931	$1,880,017
	CY 2022	$1,360,294	$731,206	$2,285,007	$1,352,784
Vaccine Administration	CY 2020	$8,680	$8,680	$8,680	$8,680
	CY 2021	$1,312,334	$1,207,227	$1,400,512	$1,317,778
	CY 2022	$1,225,804	$845,861	$1,328,617	$1,243,402
Morbidity Impact Deferred Care	CY 2020	$0	$0	$0	$0
	CY 2021	$701,514	$0	$1,405,257	$703,275
	CY 2022	$868,679	$0	$1,739,072	$870,981
Changes in Demand	CY 2020	$0	$0	$0	$0
	CY 2021	$453,457	$453,457	$453,457	$453,457
	CY 2022	$1,321,810	$1,321,810	$1,321,810	$1,321,810
Treatment	CY 2020	$3,181,031	$3,181,031	$3,181,031	$3,181,031
	CY 2021	$1,618,528	$1,520,903	$2,053,516	$1,599,113
	CY 2022	$136,317	$4,695	$656,178	$106,357
Delayed Care	CY 2020	-$20,347,952	-$20,347,952	-$20,347,952	-$20,347,952
	CY 2021	$0	$0	$0	$0
	CY 2022	$0	$0	$0	$0
Returning Care	CY 2020	$6,348,167	$6,348,167	$6,348,167	$6,348,167
	CY 2021	$2,768,984	$2,461,529	$3,050,823	$2,769,380
	CY 2022	$47,363	$0	$191,336	$44,765

Blue Cross and Blue Shield of Vermont
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Baseline Claims – ACA Markets		
Component	**Year**	**Value**
Baseline Claims	CY 2020	$264,452,301
	CY 2021	$260,088,975
	CY 2022	$278,725,720

Stochastic Modeling Summary Statistics – ACA Markets					
Component	**Year**	**Mean**	**Min**	**Max**	**Median**
Diagnostic Testing	CY 2020	$1,898,835	$1,898,835	$1,898,835	$1,898,835
	CY 2021	$1,638,924	$1,228,332	$2,242,504	$1,634,011
	CY 2022	$1,154,111	$620,207	$1,938,963	$1,147,722
Vaccine Administration	CY 2020	$6,875	$6,875	$6,875	$6,875
	CY 2021	$1,108,874	$1,020,463	$1,183,045	$1,113,453
	CY 2022	$1,197,745	$826,498	$1,298,204	$1,214,940
Morbidity Impact Deferred Care	CY 2020	$0	$0	$0	$0
	CY 2021	$560,153	$0	$1,121,998	$561,528
	CY 2022	$694,878	$0	$1,390,841	$696,814
Changes in Demand	CY 2020	$0	$0	$0	$0
	CY 2021	$373,620	$373,620	$373,620	$373,620
	CY 2022	$1,069,923	$1,069,923	$1,069,923	$1,069,923
Treatment	CY 2020	$2,289,020	$2,289,020	$2,289,020	$2,289,020
	CY 2021	$1,438,769	$1,356,850	$1,803,773	$1,422,477
	CY 2022	$114,341	$3,938	$550,395	$89,211
Delayed Care	CY 2020	-$15,272,200	-$15,272,200	-$15,272,200	-$15,272,200
	CY 2021	$0	$0	$0	$0
	CY 2022	$0	$0	$0	$0
Returning Care	CY 2020	$5,231,188	$5,231,188	$5,231,188	$5,231,188
	CY 2021	$1,913,639	$1,696,771	$2,143,618	$1,913,814
	CY 2022	$0	$0	$0	$0

Blue Cross and Blue Shield of Vermont
COVID-19 Modeling

Baseline Claims – Insured Large Group		
Component	**Year**	**Value**
Baseline Claims	CY 2020	$55,520,093
	CY 2021	$43,167,113
	CY 2022	$44,578,808

Stochastic Modeling Summary Statistics - Insured Large Group					
Component	**Year**	**Mean**	**Min**	**Max**	**Median**
Diagnostic Testing	CY 2020	$366,299	$366,299	$366,299	$366,299
	CY 2021	$242,047	$169,785	$348,273	$241,182
	CY 2022	$203,116	$109,152	$341,244	$201,991
Vaccine Administration	CY 2020	$1,785	$1,785	$1,785	$1,785
	CY 2021	$199,040	$182,345	$213,047	$199,905
	CY 2022	$28,060	$19,362	$30,413	$28,462
Morbidity Impact Deferred Care	CY 2020	$0	$0	$0	$0
	CY 2021	$92,717	$0	$185,712	$92,946
	CY 2022	$111,137	$0	$222,448	$111,447
Changes in Demand	CY 2020	$0	$0	$0	$0
	CY 2021	$83,156	$83,156	$83,156	$83,156
	CY 2022	$204,770	$204,770	$204,770	$204,770
Treatment	CY 2020	$604,506	$604,506	$604,506	$604,506
	CY 2021	$114,372	$101,466	$171,873	$111,805
	CY 2022	$18,013	$620	$86,708	$14,054
Delayed Care	CY 2020	-$3,296,649	-$3,296,649	-$3,296,649	-$3,296,649
	CY 2021	$0	$0	$0	$0
	CY 2022	$0	$0	$0	$0
Returning Care	CY 2020	$748,112	$748,112	$748,112	$748,112
	CY 2021	$508,103	$473,000	$545,327	$508,131
	CY 2022	$0	$0	$0	$0

Blue Cross and Blue Shield of Vermont
COVID-19 Modeling

Baseline Claims – Medicare Supplement		
Component	**Year**	**Value**
Baseline Claims	CY 2020	$23,128,146
	CY 2021	$24,114,694
	CY 2022	$25,087,895

Stochastic Modeling Summary Statistics - Medicare Supplement					
Component	**Year**	**Mean**	**Min**	**Max**	**Median**
Diagnostic Testing	CY 2020	$14,986	$14,986	$14,986	$14,986
	CY 2021	$4,821	$3,496	$6,722	$4,795
	CY 2022	$3,067	$1,343	$5,538	$3,032
Vaccine Administration	CY 2020	$20	$20	$20	$20
	CY 2021	$4,419	$4,419	$4,419	$4,419
	CY 2022	$0	$0	$0	$0
Morbidity Impact Deferred Care	CY 2020	$0	$0	$0	$0
	CY 2021	$48,644	$0	$97,721	$48,713
	CY 2022	$62,664	$0	$125,782	$62,729
Changes in Demand	CY 2020	$0	$0	$0	$0
	CY 2021	-$3,319	-$3,319	-$3,319	-$3,319
	CY 2022	$47,117	$47,117	$47,117	$47,117
Treatment	CY 2020	$287,505	$287,505	$287,505	$287,505
	CY 2021	$65,388	$62,587	$77,870	$64,831
	CY 2022	$3,963	$136	$19,076	$3,092
Delayed Care	CY 2020	-$1,779,103	-$1,779,103	-$1,779,103	-$1,779,103
	CY 2021	$0	$0	$0	$0
	CY 2022	$0	$0	$0	$0
Returning Care	CY 2020	$368,868	$368,868	$368,868	$368,868
	CY 2021	$347,242	$261,345	$454,449	$347,050
	CY 2022	$47,363	$0	$191,336	$44,765

Appendix H: Breakout of Claims by Calendar Year

Median Claims by Calendar Year – Total BCBSVT/TVHP			
	CY 2020	CY 2021	CY 2022
Direct Costs	$5,486,303	$3,484,465	$1,459,141
Vaccination Costs	$8,680	$1,317,778	$1,243,402
Delayed Claims	($20,347,952)	$0	$0
Returning Claims	$6,348,167	$2,769,380	$44,765
Morbidity Impact Deferred Care	$0	$703,275	$870,981
Changes in Demand	$0	$453,457	$1,321,810
Net Impact by Year	**($8,504,802)**	**$8,728,354**	**$4,940,099**
Baseline	$343,100,540	$327,370,781	$348,392,423
Change from Baseline	-2.5%	2.7%	1.4%

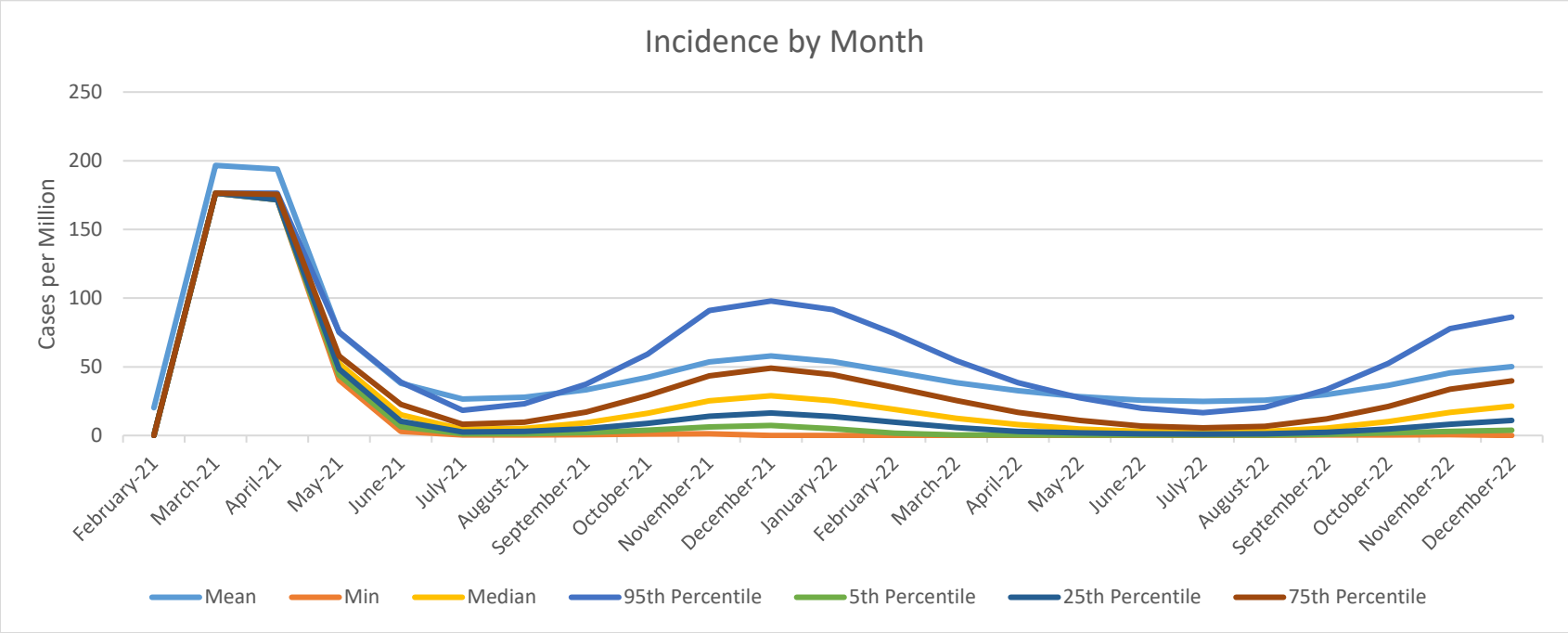
Median Claims by Calendar Year – ACA Markets			
	CY 2020	CY 2021	CY 2022
Direct Costs	$4,209,684	$3,061,453	$1,236,933
Vaccination Costs	$6,875	$1,113,453	$1,214,940
Delayed Claims	($15,272,200)	$0	$0
Returning Claims	$5,231,188	$1,913,814	$0
Morbidity Impact Deferred Care	$0	$561,528	$696,814
Changes in Demand	$0	$373,620	$1,069,923
Net Impact by Year	($5,824,454)	$7,023,868	$4,218,610
Baseline	$264,452,301	$260,088,975	$278,725,720
Change from Baseline	-2.2%	2.7%	1.5%

Median Claims by Calendar Year – Insured Large Group			
	CY 2020	CY 2021	CY 2022
Direct Costs	$974,129	$353,356	$216,045
Vaccination Costs	$1,785	$199,905	$28,462
Delayed Claims	($3,296,649)	$0	$0
Returning Claims	$748,112	$508,131	$0
Morbidity Impact Deferred Care	$0	$92,946	$111,447
Changes in Demand	$0	$83,156	$204,770
Net Impact by Year	($1,572,624)	$1,237,494	$560,725
Baseline	$55,520,093	$43,167,113	$44,578,808
Change from Baseline	-2.8%	2.9%	1.3%

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	$302,491	$69,626	$6,124
Vaccination Costs	$20	$4,419	$0
Delayed Claims	($1,779,103)	$0	$0
Returning Claims	$368,868	$347,050	$44,765
Morbidity Impact Deferred Care	$0	$48,713	$62,729
Changes in Demand	$0	-$3,319	$47,117
Net Impact by Year	($1,107,724)	$466,489	$160,735
Baseline	$23,128,146	$24,114,694	$25,087,895
Change from Baseline	-4.8%	1.9%	0.6%

Appendix I: Incidence Summary by Month



Appendix J: Disclosures and Limitations

Information Date: The analysis provided in the report is based on information as known on June 1, 2021.

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 support of our individual and small group filings. Distribution of this report to any third party must be made in its entirety. The report should be evaluated only by qualified users. Any parties receiving this report should retain actuarial expertise in interpreting results.