

Impacts of COVID-19 on in-force LTC insurance

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This paper discusses potential impacts of coronavirus (COVID-19) on the long-term care (LTC) insurance industry based on a mortality case study, along with various considerations. While mortality and interest rates are perhaps the most noticeable areas of impact, there are also more subtle impacts that may manifest. The focus is on in-force blocks of stand-alone LTC insurance in the United States, but similar concepts may also extend to other countries and/or insurance products.

COVID-19 has been changing life in the United States as we know it, and it could also result in changes to the LTC industry.

One of the authors vividly remembers sitting in class on September 11, 2001, watching the aftermath of the World Trade Center attacks. The teacher of the class very poignantly said:

“I don’t know what to do in a situation like this. So I’m going to teach math because that is what I know how to do. But I understand if you are distracted.”

The current COVID-19 situation across the United States and world has many of us in the same position of not knowing what to do. While a majority of society’s usual outlets, like sporting events, religious gatherings, and other social events, have been postponed, canceled, or are occurring virtually, many people are looking for a distraction from the news. We have found a partial distraction in considering how this disease could impact LTC insurance, our primary area of focus. While the topic of this paper is related to COVID-19, we hope that you find it thought-provoking and that it provides a respite for you from the current news cycle.

The remainder of this paper discusses our case study and additional considerations.

Mortality impact

As we watch the daily news and see the spread of the disease and death tolls rising, the most visual impact of COVID-19 for LTC is on mortality. Unfortunately, this is especially true in LTC facilities, where COVID-19 has resulted in a large number of fatalities where infections have been confirmed. Policy persistency is a key assumption in LTC pricing and reserving. Higher policy persistency (i.e., lower lapse and mortality rates) than expected in original pricing has been one of the primary drivers of the poor financial performance of many LTC blocks of business over the past two decades. Changes in mortality, both

short-term and long-term, could have material impacts on the outlook for LTC insurance.

BLOCKS OF BUSINESS FOR CASE STUDY

We performed a case study of the potential impact of increased mortality due to COVID-19 on two separate blocks of actual LTC policies issued by a single carrier (with its permission). The first block is representative of a legacy LTC block issued in the early 1990s to mid-2000s. The second block is representative of a modern LTC block issued in the mid-2000s to mid-2010s. The table in Figure 1 provides summary characteristics for each block, including certain present values (PVs) of projected future experience.

The most visual impact of COVID-19 for LTC is on mortality.

FIGURE 1: LTC CASE STUDY BLOCK CHARACTERISTICS

METRIC	LEGACY BLOCK	MODERN BLOCK
Issue Year Range	1992 to 2004	2004 to 2013
In-force Policy Count	7k	11k
Average Attained Age	80	65
PV Future Paid Claims	\$556.7M	\$760.4M
PV Future Loss Ratio	780%	240%

COVID-19 CONSIDERATIONS FOR MORTALITY

There is substantial uncertainty regarding the potential impact of COVID-19 on mortality. This is due to the following factors, among others:

- Lack of consistent testing rates across, and within, countries. This prevents a complete understanding of the portion of populations infected by COVID-19 and leads to the true total infection rate being unknown.
- Incomplete mortality experience for confirmed cases. While the number of deaths is increasing, experience is incomplete and not yet fully credible as it is still early in the pandemic.

- Variation in mortality experience by country. At the time of writing this paper, Italy is seeing higher case fatality rates than other countries. This is speculated to be due to the higher average age of its population, making it more vulnerable, along with a healthcare system overrun with severe cases.¹ Based on recent media reports, it may also be influenced by alleged underreporting of both infections and deaths in some countries.^{2 3} Variations in testing and reporting rates make it difficult to fully understand COVID-19 case fatality rates.
- Uncertainty in infection rate and case fatality rates across demographic characteristics. Certain factors such as gender and smoker status have been hypothesized to have an impact on the fatality rate.
- Impact of the strain on healthcare resources and secondary (i.e., non-COVID-19) mortality. While COVID-19 is depleting hospital resources, other illnesses and accidents are still occurring. Additionally, many nonemergency procedures are being delayed. The lack of resources and delays in procedures may result in higher mortality from other causes than would normally be expected.

Variations in testing and reporting rates make it difficult to fully understand COVID-19 case fatality rates.

There is additional uncertainty around the LTC insured population, which is partially demonstrated with the following questions:

- Because LTC policyholders are more affluent than the general population, on average, do they have better access to quality healthcare to deal with COVID-19? While actions have been taken by governments and health insurers to provide testing and treatment of COVID-19 without cost, do more affluent portions of the population still have access to better healthcare options?
- Does the demographic distribution of LTC policyholders vary significantly from the general population? For example, it is well documented that there is a higher proportion of female LTC policyholders than the general population.

¹ Rettner, R. (March 27, 2020). Why are deaths from coronavirus so high in Italy? Live Science. Retrieved April 1, 2020, from <https://www.livescience.com/why-italy-coronavirus-deaths-so-high.html>.

² Wadhams, N. & Jacobs, J. (April 1, 2020). China Concealed Extent of Virus Outbreak, U.S. intelligence says. Bloomberg News. Retrieved April 2, 2020, from <https://www.bloomberg.com/news/articles/2020-04-01/china-concealed-extent-of-virus-outbreak-u-s-intelligence-says?srnd=premium>.

³ Kliff, S. & Bosman, J. (April 6, 2020). Official Counts Understate the U.S. Coronavirus Death Toll. The New York Times. Retrieved April 6, 2020, from <https://www.nytimes.com/2020/04/05/us/coronavirus-deaths-undercount.html>.

Are insureds who are already in care facilities more at risk or less at risk of contracting COVID-19 than the general population?

- Are insureds who are already in care facilities more at risk or less at risk of contracting COVID-19 than the general population? Facilities going into lockdown and isolation may provide a layer of protection for residents. However, once COVID-19 enters a facility, it has been shown to spread very quickly.⁴
- Do insureds already on claim (i.e., disabled) have higher risks of death if they contract COVID-19 than similar insureds not on claim (i.e., active)? How might the comorbidities that result in LTC claims interact with COVID-19 and impact mortality?
- Does a carrier have a heavy concentration of policyholders in a geographic region that is more heavily impacted by COVID-19? At the time of writing this paper, New York City is an epicenter of the pandemic in the United States, but there are other “hot spots” throughout the country.^{5 6}

CASE STUDY SCENARIOS

Due to the uncertainty from the information referenced above, we calculated the impact of COVID-19 on mortality under a range of possible outcomes. Wide ranges of estimated total infection rates have been proposed by government officials and public health experts. The true scope of total infections may never be known as a result of inconsistent testing rates and the fact that a large portion of the infected population appears to have mild or no symptoms. We focused our analysis on estimates of confirmed infection rates and case fatality rates.

The tables in Figures 2 and 3 provide details on the illustrative scenarios tested for the portion of the population with confirmed infections. Included are three assumed uniform confirmed infection rate scenarios, along with two assumed age-graded confirmed infection rate scenarios. The graded confirmed infection rate scenarios reflect the impact of higher disease severity and testing rates at older ages (i.e., higher portions of confirmed infections at older ages). The graded scenarios were

⁴ Hellmann, J. (April 1, 2020). Coronavirus creates emergency in nursing homes. The Hill. Retrieved April 3, 2020, from <https://thehill.com/homenews/state-watch/490715-coronavirus-creates-emergency-in-nursing-homes>.

⁵ Vitagliano, B. & Orden, E. (April 1, 2020). Morgues and funeral homes in New York City say they are overwhelmed and the death toll keeps climbing. CNN. Retrieved April 1, 2020, from <https://www.cnn.com/2020/04/01/us/coronavirus-new-york-cases-funeral-homes/index.html>.

⁶ Chiwaya, N. & Murphy, J. (April 1, 2020). Tracking new coronavirus cases in hot spots across the United States. NBC News. Retrieved April 1, 2020, from <https://www.nbcnews.com/health/health-news/coronavirus-count-state-day-2020-united-states-n1173421>.

based on the estimated COVID-19 case fatality rates by age and included for comparison with the assumed uniform scenarios. Actual total infection rates are likely to be higher than the scenarios presented in Figure 2 due to the large number of unconfirmed (asymptomatic or untested) cases.

FIGURE 2: ASSUMED COVID-19 INFECTION SCENARIOS (MEASURING CONFIRMED CASES)

SCENARIO	DESCRIPTION
Baseline	No COVID-19 infections
1.0% Uniform	Uniform 1.0% of all age groups are infected
2.5% Uniform	Uniform 2.5% of all age groups are infected
5.0% Uniform	Uniform 5.0% of all age groups are infected
1.0% Graded	Graded infection rates by age group, with aggregate average infection rate of 1.0%
5.0% Graded	Graded infection rates by age group, with aggregate average infection rate of 5.0%

FIGURE 3: GRADED INFECTION SCENARIO DETAIL OF ASSUMED COVID-19 CASES BY AGE GROUP (MEASURING CONFIRMED CASES)

AGE GROUP	2018 UNITED STATES POPULATION (MILLIONS)*	2018 UNITED STATES	
		1.0% GRADED	5.0% GRADED
<40	171	0.2%	1.0%
40-49	40	0.4%	2.0%
50-59	43	0.8%	4.0%
60-69	37	2.0%	10.0%
70-79	23	4.0%	20.0%
80+	13	6.0%	30.0%
Total/Average	327	1.0%	5.0%

* Source: <https://www.statista.com/statistics/241488/population-of-the-us-by-sex-and-age/>.

The table in Figure 4 provides the assumed case fatality rates due to COVID-19 for those with confirmed cases. The rates are based on a study by the Chinese Center for Disease Control and Prevention, published in the Chinese Journal of Epidemiology on February 17, 2020.⁷ This study provided estimated case fatality rates based on approximately 72 thousand confirmed, suspected, clinically diagnosed, or asymptomatic cases. Potential underreporting of infections, along with the presumed large

number of unknown asymptomatic cases, likely means that the actual case fatality rates due to COVID-19 for all cases are lower than those shown in Figure 4.

FIGURE 4: ASSUMED COVID-19 CASE FATALITY RATES BY AGE GROUP FOR CONFIRMED CASES

AGE GROUP	CASE FATALITY RATE
<40	0.2%
40-49	0.4%
50-59	1.3%
60-69	3.6%
70-79	8.0%
80+	14.8%

Although the assumptions shown in Figures 2, 3, and 4 are speculative, they produce a reasonable shock mortality impact based on recent government estimates. The table in Figure 5 provides an estimate of the assumed deaths across the United States from the assumptions in Figures 2, 3, and 4 and the 2018 United States population. The numbers vary widely in Figure 5 but are consistent with other wide-ranging estimates. For example, on March 31, 2020, the White House Coronavirus Task Force presented a range of 100,000 to 240,000 American deaths, assuming social distancing and other mitigation efforts.⁸ Previously, Dr. Deborah Birx of the task force stated that, without mitigation efforts, total deaths in the United States from COVID-19 could be as high as 2.2 million.⁹

FIGURE 5: ESTIMATED COVID-19 DEATHS IN UNITED STATES BY AGE GROUP UNDER ASSUMED SCENARIOS (IN THOUSANDS)

AGE GROUP	1.0% UNIFORM	2.5% UNIFORM	5.0% UNIFORM	1.0% GRADED	5.0% GRADED
<40	3	9	17	1	3
40-49	2	4	8	1	3
50-59	6	14	28	4	22
60-69	13	34	67	27	135
70-79	18	45	91	73	363
80+	19	47	94	113	563
Total	61	152	305	218	1,089

⁷ Table 1. Vital Surveillances: The Epidemiological Characteristics of an Outbreak of 2019 Novel Coronavirus Diseases (COVID-19) - China, 2020. The Novel Coronavirus Pneumonia Emergency Response Epidemiology Team. Retrieved March 30, 2020, from <http://weekly.chinacdc.cn/en/article/id/e53946e2-c6c4-41e9-9a9b-fea8db1a8f51>.

⁸ Noack, R., et al. (March 31, 2020). White House task force projects 100,000 to 240,000 deaths in U.S., even with mitigation efforts. The Washington Post. Retrieved April 3, 2020, from <https://www.washingtonpost.com/world/2020/03/31/coronavirus-latest-news/>.

⁹ Kessler, B. (March 30, 2020). Dr. Birx predicts up to 200,000 U.S. coronavirus deaths 'if we do things almost perfectly'. CNBC. Retrieved April 3, 2020, from <https://www.cnbc.com/2020/03/30/white-house-coronavirus-expert-predicts-up-to-200000-us-coronavirus-deaths.html>.

The mortality impact implied by the assumed confirmed infection rates and case fatality rates can be calculated by dividing the values in Figure 5 by the 2018 United States population include in Figure 3. As an example, under the 1.0% graded scenario, the age 80+ segment has an implied mortality shock of 0.9% (equal to 113 thousand deaths divided by 13 million people).

CASE STUDY RESULTS

We modeled the mortality impact of the scenarios above as a mortality shock on each policyholder's next policy anniversary following March 31, 2020. This implies that most of the modeled impact will be in 2020, with some residual impact in 2021. There is speculation that COVID-19 could come in multiple waves, similar to the 1918 Spanish flu,¹⁰ with 2020 being the first wave. However, we did not attempt to model additional impacts.

The tables in Figures 6 and 7 provide the results of our analysis for the legacy and modern blocks, respectively. Included are the PVs of future cash flows and the gross premium reserve (GPR). All PVs use a 4.00% discount rate. The GPR is defined as the PV of paid claims plus the PV of expenses minus the PV of collected premium and represents the amount of future cash outflows to be funded with current reserves. Our analysis of the impact of COVID-19 focused on the change in the GPR.

FIGURE 6: COVID-19 SENSITIVITY RESULTS (IN \$ MILLIONS), LEGACY BLOCK

METRIC	BASELINE	1.0% UNIFORM	2.5% UNIFORM	5.0% UNIFORM	1.0% GRADED	5.0% GRADED
PV Collected Premium	\$71.2	\$71.1	\$71.0	\$70.9	\$70.8	\$69.3
PV Paid Claims	556.7	556.3	555.6	554.5	554.4	545.0
PV Expenses	33.0	32.9	32.9	32.8	32.8	32.2
GPR	518.4	518.0	517.4	516.4	516.3	508.0
GPR Change (\$)		-0.4	-1.0	-2.0	-2.1	-10.5
GPR Change (%)		-0.1%	-0.2%	-0.4%	-0.4%	-2.0%

FIGURE 7: COVID-19 SENSITIVITY RESULTS (IN \$ MILLIONS), MODERN BLOCK

METRIC	BASELINE	1.0% UNIFORM	2.5% UNIFORM	5.0% UNIFORM	1.0% GRADED	5.0% GRADED
PV Collected Premium	\$314.5	\$314.4	\$314.1	\$313.7	\$313.9	\$311.5
PV Paid Claims	760.4	760.0	759.4	758.5	759.0	753.4
PV Expenses	77.6	77.6	77.5	77.4	77.4	76.9
GPR	523.5	523.2	522.8	522.1	522.5	518.8
GPR Change (\$)		-0.3	-0.7	-1.3	-0.9	-4.7
GPR Change (%)		-0.1%	-0.1%	-0.3%	-0.2%	-0.9%

As expected, the scenarios with higher mortality shocks impact the GPR the most. Also, the legacy block is impacted to a greater extent (on both a dollar and percentage basis) than the modern block. This is due to the modern block consisting of a younger cohort of policyholders, on average, which is assumed to have a lower COVID-19 case fatality rate.

Figures 8 and 9 provide a graphical comparison of the baseline, 5.0% uniform, and 5.0% graded scenarios. Figure 8 provides a comparison of the projected incurred claims, presented as ratios of the tested scenarios to the baseline, while Figure 9 provides a comparison of the policy termination rates. Included are graphs for both the legacy the modern blocks.

¹⁰ Centers for Disease Control and Prevention (May 11, 2018). 1918 Pandemic Influenza: Three Waves. Retrieved April 2, 2020, from <https://www.cdc.gov/flu/pandemic-resources/1918-commemoration/three-waves.htm>.

FIGURE 8: COVID-19 INCURRED CLAIM IMPACT

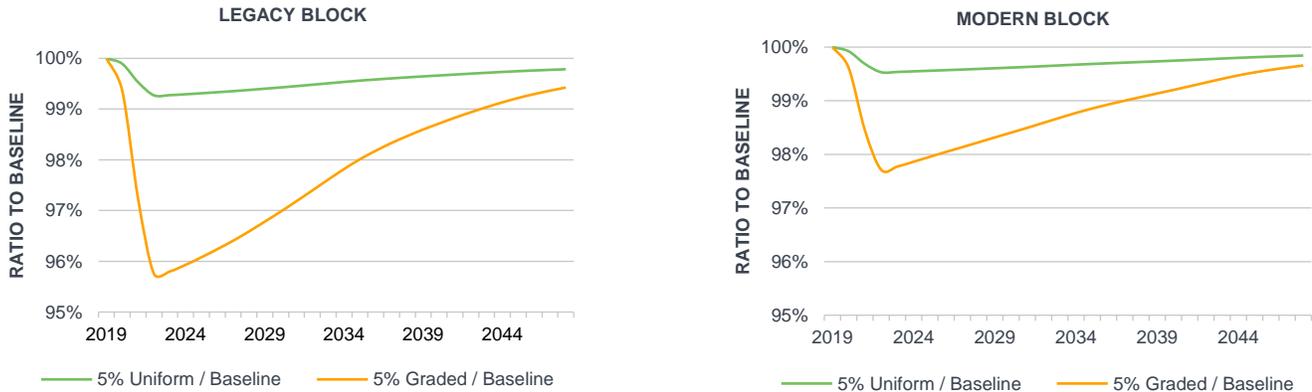
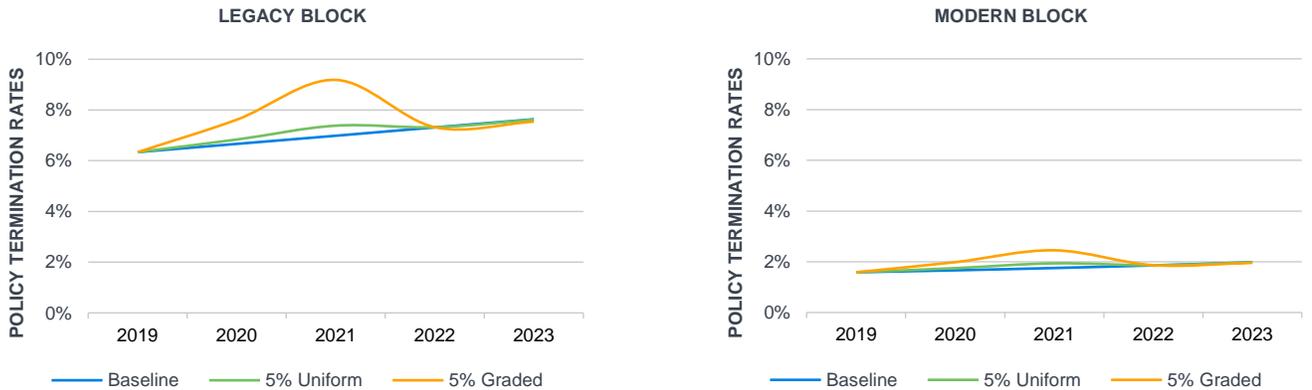


FIGURE 9: COVID-19 POLICY TERMINATION RATE IMPACT



Consistent with Figures 6 and 7 above, the mortality shocks have a larger impact on the legacy block as its policyholders are older, on average, than those in the modern block. The incurred claim impact is smaller on the modern block than on the legacy block and the incurred claims under each scenario converge in the tail of the projection for both blocks. Also, while the shape of the policy termination rate impact is similar between the legacy and modern blocks, the magnitude is not. For both blocks, projected future policy termination rates after the mortality shock are slightly lower in the 5% graded scenario than in the baseline scenario, as the mortality shock disproportionately impacts older insureds and results in a lower average attained age after the adjustment.

ADDITIONAL CONSIDERATIONS

As noted above, our analysis only considers a single shock to mortality from COVID-19. It does not consider other impacts to mortality, morbidity, or voluntary lapse. A few questions to consider as part of additional scenario testing might be:

- Will mortality be materially different after the pandemic than what was previously observed? Additional waves of COVID-19 may result in higher mortality until global immunity is reached or a vaccine is developed. Also, policyholders who are infected with COVID-19 and survive may suffer lasting effects that result in increased mortality risk. On the other hand, if COVID-19 most severely impacts those who are most frail, it may leave the population after the pandemic healthier, on average, than before. If a vaccine is developed, will it also provide protection from other viruses and improve overall mortality?
- What proportion of deaths due to COVID-19 are additional mortality, rather than an acceleration of mortality from other causes? If there is an improvement in mortality after the pandemic, will it persist or wear off over time?

Will mortality be materially different after the pandemic than what was previously observed?

- What is the impact of COVID-19 on morbidity? If COVID-19 more severely impacts those who are sicker, on average, or have various comorbidities, then the average morbidity after the pandemic may be better. Conversely, if COVID-19 leaves longer-lasting impacts on infected individuals' respiratory systems, then the average morbidity after the pandemic may be worse.
- While the United States economy has quickly moved into a recession, does this economic downturn have a material impact on the average LTC insured's ability and willingness to pay premiums? LTC policyholders are generally more affluent, and for many blocks of business, the average attained age is relatively high. This may mitigate any impact on voluntary lapse.

Interest rate impact

LTC blocks have been suffering for many years due to the low-interest rate environment. The recent interest rate cuts by the Federal Reserve in response to COVID-19, of 50 basis points (bps) on March 3, 2020 and of 100 bps on March 16, 2020 (to a target rate of 0.00% to 0.25%), have contributed to United States Treasuries reaching all-time lows.^{11 12} Due to the interest-sensitive nature of LTC insurance, this will likely put further pressure on companies in the industry.

There is also a great amount of uncertainty in the United States regarding solvency of companies as a result of the pandemic, especially small businesses and businesses in certain industries (travel and hospitality, entertainment, and energy to name a few). LTC carriers may have also observed a deterioration in asset value due to the swift financial market downturn. If economic conditions result in widespread failure of companies, even after remedies enacted by the government, LTC carriers could observe higher bond default costs, lower investment income, and lower projected yields. The impact felt by LTC companies on their investment income will vary due to different investment strategies and asset mixes.

We tested the impact of a 25 bps decrease in the discount rate assumption for our case study. The decrease to the discount rate increases the GPR and more than offsets the decreases to the GPR in all mortality shock scenarios tested.

¹¹ Board of Governors of the Federal Reserve System (March 16, 2020). Policy Tools - Open Market Operations. Retrieved March 27, 2020, from <https://www.federalreserve.gov/monetarypolicy/openmarket.htm>.

Other impacts

While the immediate impacts of COVID-19 on mortality and interest rate are the most recognizable, there are other more subtle impacts that are likely to manifest.

LONG-TERM MORTALITY AND MORBIDITY IMPACTS

As mentioned in the Mortality Impact section above, in addition to a shock to mortality, COVID-19 may result in longer-lasting impacts to the mortality or morbidity of LTC policyholders. It is far too early to understand what these longer-term impacts may be. As researchers continue to study and understand the overall medical implications of COVID-19 infection, it will be important to consider the potential long-term impacts as part of future mortality and morbidity expectations of LTC blocks.

PROCESSING DELAYS

Staffing shortages at insurers or third-party administrators may occur due to employees becoming infected, or needing to care for children who are out of school or family members who are infected themselves. Others may be required to work from home and may not have the ability or technology to support their work at the same level of efficiency as in the office setting.

Staffing shortages may lead to delays in processing claims and larger in course of settlement and incurred but not reported liabilities than a company would normally observe. This may also occur due to impacts of COVID-19 on LTC providers if there are delays in sending invoices to payers for services rendered. Claim adjudicators transitioning to evaluate claims remotely, versus the typical face-to-face evaluations, may also lead to a higher volume of pending claims. This would be in addition to any increases in pending claims due to loss of capacity or efficiency in claim processing resulting from staff shortages.

As researchers continue to study and understand the overall medical implications of COVID-19 infection, it will be important to consider the potential long-term impacts as part of future mortality and morbidity expectations of LTC blocks.

¹² U.S. Department of the Treasury (March 27, 2020). Daily Treasury Yield Curve Rates. Retrieved March 28, 2020, from <https://www.treasury.gov/resource-center/data-chart-center/interest-rates/Pages/TextView.aspx?data=yieldYear&year=2020>.

HIGHER ADMINISTRATION COSTS

A portion of claims are evaluated using face-to-face interactions. Social distancing, whether by recommendation or governmental order, likely does not allow for this. In order to continue evaluating these claims, companies may need to invest in technology or change their procedures to allow for evaluations to be performed virtually. This technology comes at a cost and new procedures could require additional time and training, all of which lead to increased costs for administering claims in the short term. However, investments in technology or process improvements should result in long-term reductions in administration costs, if they are carefully developed and implemented.

HUSH AND RUSH

As COVID-19 continues to dominate the news, policyholders on the edge of requiring care may postpone decisions to receive services and file claims. These policyholders simply may not deem it a prudent time to introduce new social interactions through a home health aide or by entering a facility unless absolutely necessary. Additionally, some care facilities are not accepting new residents during the pandemic. As a result, LTC carriers may observe a down-tick in new LTC claims during the COVID-19 pandemic.

Policyholders on the edge of requiring care may postpone decisions to receive services and file claims.

Similarly, it seems likely that, once the pandemic subsides, there may be pent-up demand from policyholders that had been delaying services. As a result, LTC carriers may observe a "hush" of new claims during the pandemic followed by a "rush" of new claims after COVID-19 abates. However, given differences in attitudes toward social distancing, potential public perception of LTC facilities being at higher risk for spread of infectious disease, and the variability of the COVID-19 impact by geographic region, the rush of new claimants may, in reality, be more gradual.

Looking forward

Along with most of the world, we are anxiously waiting for this pandemic to pass. Once it does, many actuaries will work to understand the residual impacts of the disease. It will be important to consider the COVID-19 impact on the historical results included in future experience studies. There are also several questions that will likely need to be answered. Were new claims artificially low during social distancing? How widespread was the COVID-19 infection and what was the impact to mortality? Do we expect morbidity and/or mortality following COVID-19 to be better or worse due to the demographic impact of the pandemic? Were investments made in technology that will lead to administrative cost savings going forward? Only time will tell the answers to these and other questions.



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