SOA Research INSTITUTE

Mortality and Longevity

Group Life COVID-19 Mortality Survey Report

NOVEMBER | 2022

Group Life COVID-19 Mortality Survey Report

AUTHORS Thomas J. Britt, FSA, MAAA
Paul Correia, FSA, MAAA
Patrick Hurley, FSA, MAAA
Mike Krohn, FSA, CERA, MAAA
Tony LaSala, FSA, MAAA
Rick Leavitt, ASA, MAAA
Robert Lumia, FSA, MAAA
Cynthia S. MacDonald, FSA, MAAA, SOA
Patrick Nolan, FSA, MAAA, SOA
Steve Rulis, FSA, MAAA
Bram Spector, FSA, MAAA

SPONSORS Group Life Experience Committee

CONTENTS

Group Life COVID-19 Mortality Survey Report

Section 1: Purpose of the Survey

The purpose of this survey was to gather a high-level view of U.S. Group Term Life Insurance mortality results during the COVID-19 pandemic, as compared to prior period baseline mortality results. COVID-19 is caused by the novel coronavirus SARS-CoV-2, which was identified in 2019. As of the writing of this document, complications from COVID-19 have resulted in more than 1.0 million deaths in the U.S. alone, and more than 6.6 million worldwide.

This report is an update to the previous Group Life COVID-19 Mortality Survey published in August 2022, which included pandemic data from April 2020 through March 2022. This update includes Group Life mortality results from April 2020 through June 2022 (referred to in this report as the "pandemic period"), representing 27 months of Group Life mortality experience during the COVID-19 pandemic. A new feature to this report that was not included in previous iterations is an analysis of excess mortality by a more detailed categorization of cause of death, which can be found in Section 6.

The survey was conducted by the Group Life Experience Committee (the Committee) of the Society of Actuaries and has been structured as a recurring monthly data collection and compilation process from U.S. Group Term Life insurers. The datasets for this report encompass all Group Term Life claims for the calendar years 2017–2022 reported to participating carriers as of June 30, 2022, and include more than 2.4 million claims and more than $109 billion in earned premium. The Committee is grateful that 20 of the top 21 U.S. Group Term Life insurers focused on employer groups are participating in this survey, with market share representing roughly 90% of the employer-based Group Term Life industry. Thus, the Committee believes the findings herein are representative of the COVID-19 mortality impact on the U.S. Group Term Life industry as a whole.

Guiding principles for the survey include the following:

- Providing timely information on total high-level Group Life mortality results versus baseline expectations during the pandemic is the most important goal. Thus, the survey is *not* a seriatim mortality study. Rather, it is a synopsis of monthly Group Life exposures, death counts and amounts.
- It is critical for this survey to compare current Group Life mortality from all causes of death to the baseline expected all-cause mortality levels. The Committee recognizes the existence of limitations in the ability to code deaths as COVID-19 related, within both the general population and Group Life exposures. Also, the survey seeks to analyze whether the pandemic has had indirect impacts on population mortality, beyond deaths associated directly with the COVID-19 virus. Thus, tracking just Group Life deaths coded with a cause of COVID-19 may not accurately measure the total impact of the pandemic.
- The Committee asked carriers to provide segmentation data when feasible. However, the Committee did not want the additional detailed data request to become so onerous that it materially delayed the survey reporting process or shrank the number of carriers willing and able to participate. Thus, the survey includes high-level exposure and claims data for all 20 carriers, but much of the segmentation data are based on results for just subsets of carriers.

Section 2: Overview

2.1 BACKGROUND

Carriers provided a complete set of monthly Group Life exposures dating back to January 2017, along with all Group Life death claims reported in January 2017 or later. The reported death claims also identified the months of death, that is, incurred months.

Exposures and deaths during the three-year period of 2017–2019 were used to set baseline mortality expectations. The dataset for this report encompasses all Group Life claims reported to participating carriers as of June 30, 2022. Reported claims are easier to measure than incurred claims, but they do not tell the full story about Group Life mortality through June 2022 because the reported claims in a given month include deaths from prior periods. Therefore, claim reporting patterns from prior periods have been analyzed to develop completion factors, which are used to estimate incurred but not yet reported claims for each month. This enabled the Committee to estimate incurred claims for each month up through June 2022.

As in prior reports, the most recent one-to-two incurral months should not be fully relied upon because of the maturity of the completion of reported claims, with the completion factors for the most recent two months falling in the 30%–35% and 70%–75% ranges, respectively. The Committee has observed significant reporting lag volatility over the course of the study, resulting in volatility of incurred incidence development over time, especially in the most recent incurred months.

2.2 SCOPE

The following specifications were used to define claims and exposures within the survey:

- Include Group Term Life only. Exclude Group Whole Life, Group Universal Life, Company-Owned Life Insurance, and 10- or 20-year Group Term etc.
- Include both list billed and self-administered business.
- Include employee, spouse and child exposures and deaths.
- Include both active and retired lives and claims.
- Include death benefits only; exclude riders, interest payments and claims expenses.
- Include only the life insurance benefit for accidental deaths; exclude any additional Accidental Death and Dismemberment rider amounts.
- Exclude Waiver of Premium disabilities but include deaths from persons on Waiver of Premium status.
- Portability and Conversion exposures and claims may be either included or excluded based on each company's internal reporting procedures.

2.3 SURVEY HIGHLIGHTS

Tables 2.1 through 2.4[1] display high-level incidence results for the second quarter of 2020 through the second quarter of 2022 compared to the 2017–2019 baseline period for each combination of (a) incurred/reported basis and (b) count/amount basis as of June 30, 2022. In these tables, the number of COVID-19 claims has not been adjusted for seasonality, but the ratios to baseline have been adjusted for seasonality.

Table 2.1

COUNT-BASED INCURRED INCIDENCE RESULTS RELATIVE TO 2017–2019 BASELINE

Count-Based	2Q20–4Q20	2021	1Q22	2Q22	2022	2Q20–2Q22
Total/Baseline	119.7%	122.4%	116.3%	100.3%	108.3%	118.3%
COVID-19 Claims	46,649	78,188	18,848	1,654	20,502	145,339
COVID/Baseline	*14.7%*	*18.4%*	*16.5%*	*1.6%*	*9.0%*	*15.0%*
Non-COVID/Baseline	*105.0%*	*104.0%*	*99.8%*	*98.7%*	*99.3%*	*103.3%*

Table 2.2

AMOUNT-BASED INCURRED INCIDENCE RESULTS RELATIVE TO 2017–2019 BASELINE

Amount-Based	2Q20–4Q20	2021	1Q22	2Q22	2022	2Q20–2Q22
Total/Baseline	125.9%	140.3%	128.4%	112.3%	120.3%	131.0%
COVID-19 Claims	1,721.5 M	3,982.6 M	837.7 M	55.3 M	893.1 M	6,597.2 M
COVID/Baseline	*14.8%*	*25.9%*	*20.0%*	*1.4%*	*10.7%*	*18.8%*
Non-COVID/Baseline	*111.1%*	*114.4%*	*108.4%*	*110.9%*	*109.6%*	*112.2%*

Table 2.3

COUNT-BASED REPORTED INCIDENCE RESULTS RELATIVE TO 2017–2019 BASELINE

Count-Based	2Q20–4Q20	2021	1Q22	2Q22	2022	2Q20–2Q22
Total/Baseline	115.5%	123.8%	123.3%	99.8%	111.5%	118.3%
COVID-19 Claims	34,493	80,827	22,696	4,453	27,149	142,469
COVID/Baseline	*11.2%*	*19.2%*	*19.6%*	*4.0%*	*11.8%*	*14.8%*
Non-COVID/Baseline	*104.3%*	*104.6%*	*103.7%*	*95.8%*	*99.7%*	*103.5%*

[1] A small number of COVID-19 claims received were dated before 2020. The Committee assumes these dates are data errors. They were not assigned to a particular date in 2020 or later, and so these claims are excluded from Tables 2.1–2.4. They are, however, included in the total COVID claims in Section 5.

Table 2.4
AMOUNT-BASED REPORTED INCIDENCE RESULTS RELATIVE TO 2017–2019 BASELINE

Amount-Based	2Q20–4Q20	2021	1Q22	2Q22	2022	2Q20–2Q22
Total/Baseline	123.9%	140.8%	137.8%	107.0%	122.3%	131.0%
COVID-19 Claims	1,367.9 M	3,957.5 M	1,049.0 M	151.2 M	1,200.2 M	6,525.6 M
COVID/Baseline	*12.3%*	*26.1%*	*25.0%*	*3.8%*	*14.3%*	*18.8%*
Non-COVID/Baseline	*111.6%*	*114.7%*	*112.8%*	*103.2%*	*108.0%*	*112.2%*

Group Life carriers generally started receiving a small number of COVID-19 death claims during March 2020, but April 2020 was the first month in which the Group Life industry saw a material number of reported COVID-19 death claims. This drove April 2020 Group Life reported incidence to be measurably larger than baseline expected reported incidence. Reported incidence has remained materially higher than baseline in almost all months during the pandemic period. The lone exceptions were May 2021 and May 2022, during which reported incidence was approximately 1% and 3% lower than baseline, respectively.

It is important to note that incurred estimates for the most recent months lack credibility because of the low level of completion of the data used at the time of this analysis. Group Life claim completion has been especially volatile during the pandemic waves, driven both by the ultimate incurred levels fluctuating from month to month and by company-specific claim-processing speeds fluctuating up and down because of increases or decreases in staffing levels and build-up or build-down of claim backlogs.

From an incurred mortality viewpoint, 25 of the 27 months from April 2020 through June 2022 showed excess mortality[2] versus baseline expectations. The lone exceptions were March and April 2022, during which mortality was 2% and 6% lower than baseline, respectively. December 2020, January 2021, August 2021 and September 2021 each had very high incurred excess mortality spikes of 40% or more.

The 27-month period of April 2020 through June 2022 showed the following Group Life mortality results:

- Estimated reported Group Life claim incidence rates were up 18.3% on a seasonally adjusted basis compared to 2017–2019 reported claims.
- Estimated incurred Group Life incidence rates were 18.3% higher than baseline on a seasonally adjusted basis. As noted above, the incurred incidence rates in May and June 2022 are based on fairly incomplete data, so they are subject to change and should not be fully relied upon at this point.

Additional highlights include the following:

- Approximately 13% of all reported Group Life claims with death dates in the pandemic period were determined to have a cause of death (COD) of COVID-19.
- The Grey-Collar group had the lowest actual-to-expected ratios (A/Es) relative to baseline over the pandemic period at around 14%, followed by the Blue-Collar group at 16%. The White-Collar group continues to have the highest mortality A/E relative to baseline at 20% during the pandemic period.

[2]For the purposes of this report, "excess mortality" refers to the percentage change in incidence rates observed during the pandemic compared to the 2017–2019 baseline period.

- Group Life mortality patterns by region have changed over time during the COVID-19 pandemic. The Midwest region had the highest excess mortality for the most recent quarter included in this update. The following regions had the highest excess mortality in each quarter shown:
    - Q2 2020: Northeast (41%)
    - Q3 2020: Southeast (27%)
    - Q4 2020: Midwest (34%)
    - Q1 2021: Southeast (33%)
    - Q2 2021: Southeast (11%)
    - Q3 2021: Southeast (63%)
    - Q4 2021: Midwest (33%)
    - Q1 2022: Southeast (19%)
    - Q2 2022: Midwest (8%)
- Starting with the June 2022 data submission, companies began supplying much more granular COD data. Initial findings show incurred mortality increases in several causes during the pandemic period, including cardiovascular, liver, diabetes, and drug overdoses. Cancer and influenza/pneumonia incurred mortality levels have been down during the pandemic period as compared to baseline. Additional details are shown in Section 6.
- Early quarters of the pandemic period (Q2 and Q3 2020) showed the Group Life insured population studied within this survey experienced a lower percentage of excess deaths than the U.S. population, as shown in Table 2.5. Each quarter in 2021 showed higher excess mortality in the U.S. population than the Group Life population. For 2022, the U.S. population and Group Life populations showed roughly equal excess mortality in the first quarter, with the Group Life excess mortality lower in the second quarter for the first time since 2020.

Table 2.5

GROUP LIFE AND U.S. POPULATION EXCESS MORTALITY PERCENTAGES BY QUARTER

Age	Q2 2020	Q3 2020	Q4 2020	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022	Q2 2022
Group Life	16%	15%	28%	23%	7%	34%	26%	16%	0%
U.S. Population	21%	18%	28%	18%	6%	25%	20%	16%	6%
Difference	**−5%**	**−3%**	**0%**	**5%**	**1%**	**9%**	**6%**	**0%**	**−6%**

- In the third quarter of 2021, a moderate negative correlation was seen between vaccination rate and excess mortality by state. However, this correlation weakened during the fourth quarter of 2021 and the first two quarters of 2022. Other factors potentially influencing this relationship are climate, seasonality, preventative measures (e.g., social distancing and masking), deaths from causes other than COVID-19, varying degrees of vaccine effectiveness against different variants of the virus, and a higher degree of natural immunity due to past infections in the later period. This is explained in further detail in subsection 9.3.
- Section 9 of this report contains analysis of the relationship between vaccination rate and excess mortality at the county level. This is additional detail that was not present in previous updates.

Section 3: Group Life Mortality Results—Reported Death Claims

3.1 REPORTED CLAIM INCIDENCE BY COUNT—ALL CAUSES

The Q2 2022 reported incidence by count was 99.8% of baseline levels, with May 2022 being 3.3% below baseline while April and June were slightly above baseline. May 2022 and May 2021 are the only months during the pandemic period where reported-basis mortality was consistent with or less than the corresponding baseline months.

Reported overall Group Life claim incidence rates during the pandemic period, as shown in Figure 3.1, are up approximately 18% compared to 2017–2019 reported claims. Reported claims are easier to measure than incurred, because no estimation of completeness is required. However, reported claims do not tell the true economic impact of what is happening in the claim experience of a particular reported period, because those reported claims include deaths associated with prior periods, which may or may not have been accurately expected and accrued in prior period claim liabilities.

Note that the March 2022 reported incidence figure is slightly different from the amount documented in the August 2022 report, because of an updated data file from a participant.

Figure 3.1

AGGREGATE REPORTED CLAIM INCIDENCE PER 1,000 BY CALENDAR YEAR AND MONTH

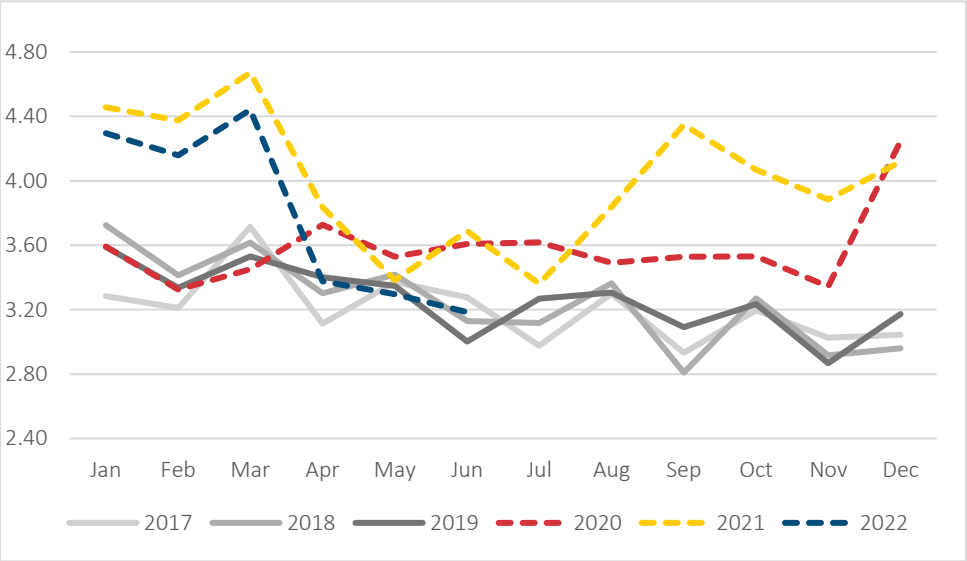
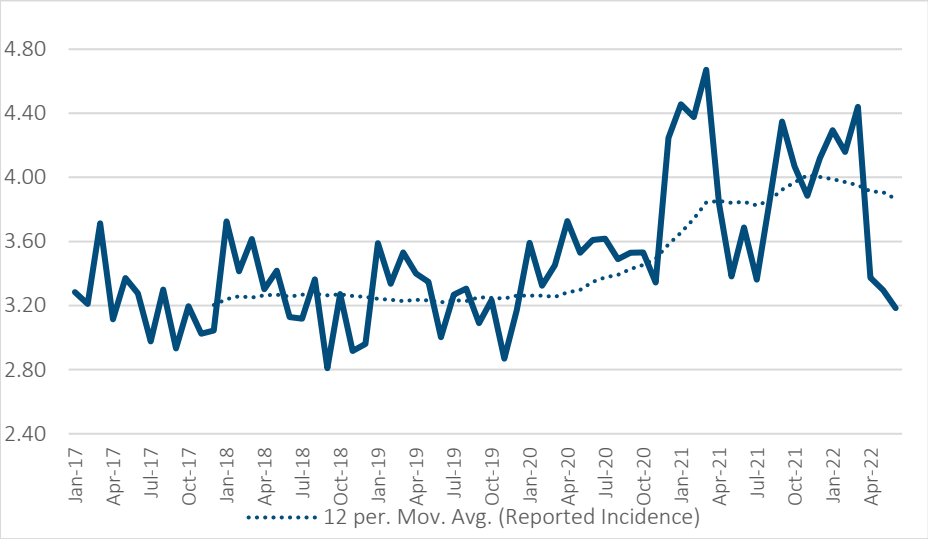


Figure 3.2 is a different view of the data displayed in Figure 3.1 to illustrate the flow of excess reported mortality over the entire pandemic period.

Figure 3.2
AGGREGATE REPORTED CLAIM INCIDENCE PER 1,000 BY CALENDAR MONTH



3.2 REPORTED CLAIM INCIDENCE BY COUNT—COVID-19 VERSUS ALL OTHER CAUSES

A total of 142,469 COVID-19 death claims were reported during the pandemic period. Roughly 73.5% of the COVID-19 claims were for Basic Group Life coverage and roughly 26.5% for Supplemental/Voluntary coverage, with both figures including active employees and retirees. Note that the exposures and claim counts for insureds with both Basic and Supplemental/Voluntary coverage were included in both product lines. Thus, some deaths were counted as both Basic and Supplemental/Voluntary deaths, so the total number of Group Life insureds with COVID-19 deaths is less than 142,469.

Table 3.1 shows the total death claim incidence level (mortality rate) for each quarter during the pandemic relative to the baseline period metric. The table also shows a relativity for COVID-19 claims and non-COVID claims. As the table illustrates, COVID-19 claims do not fully explain the increase in reported claim incidence over the baseline period.

Table 3.1
COUNT-BASED REPORTED INCIDENCE RESULTS RELATIVE TO 2017–2019 BASELINE

Count-Based	2Q20–4Q20	2021	1Q22	2Q22	2022	2Q20–2Q22
Total/Baseline	115.5%	123.8%	123.3%	99.8%	111.5%	118.3%
COVID-19 Claims	34,493	80,827	22,696	4,453	27,149	142,469
COVID/Baseline	*11.2%*	*19.2%*	*19.6%*	*4.0%*	*11.8%*	*14.8%*
Non-COVID/Baseline	*104.3%*	*104.6%*	*103.7%*	*95.8%*	*99.7%*	*103.5%*

Reported claim details by month are shown in Table 3.2, along with calculated monthly reported incidence rates. Note that a small number of COVID-19 claims have reported dates of death in 2019 or prior, which are likely due to data errors.

Table 3.2
REPORTED CLAIMS AND INCIDENCE RATES, 2017 THROUGH Q2 2022

Report Date	Raw Submitted Numbers			Calculated Amounts				
	Reported Claims		Premium ($ 000)	Life Years Exposed (000)		Annual Incidence per 1,000 (Lives Basis)	Adjusted for Seasonality	
	Total	COVID		By Month	Yrly Avg		Total	Total/Baseline
6/1/22	35,498	840	1,806,711	11,241	11,146	3.18	3.28	101.2%
5/1/22	36,745	1,356	1,793,909	11,070	11,146	3.30	3.13	96.7%
4/1/22	37,614	2,257	1,811,028	11,202	11,146	3.37	3.29	101.5%
3/1/22	49,503	5,889	1,806,855	11,079	11,146	4.44	3.97	122.4%
2/1/22	46,360	8,280	1,807,762	11,162	11,146	4.16	4.08	125.9%
1/1/22	47,870	8,527	1,804,659	11,123	11,146	4.29	3.94	121.5%
12/1/21	44,710	6,955	1,741,304	11,015	10,857	4.12	4.44	137.0%
11/1/21	42,171	7,049	1,707,231	10,786	10,857	3.88	4.29	132.3%
10/1/21	44,183	9,440	1,723,799	10,829	10,857	4.07	4.09	126.2%
9/1/21	47,204	10,026	1,709,525	10,752	10,857	4.35	4.80	148.1%
8/1/21	41,677	4,807	1,703,577	10,817	10,857	3.84	3.73	115.0%
7/1/21	36,495	1,823	1,723,395	10,796	10,857	3.36	3.51	108.3%
6/1/21	40,036	2,732	1,727,901	10,897	10,857	3.69	3.80	117.2%
5/1/21	36,725	3,493	1,736,725	10,897	10,857	3.38	3.22	99.2%
4/1/21	41,647	4,937	1,740,432	10,922	10,857	3.84	3.74	115.4%
3/1/21	50,720	8,201	1,729,937	10,879	10,857	4.67	4.17	128.8%
2/1/21	47,506	10,349	1,722,897	10,873	10,857	4.38	4.29	132.4%
1/1/21	48,378	11,015	1,716,417	10,821	10,857	4.46	4.09	126.0%
12/1/20	46,566	8,057	1,688,832	10,959	10,968	4.25	4.59	141.6%
11/1/20	36,681	3,682	1,667,815	10,868	10,968	3.34	3.70	114.3%
10/1/20	38,725	2,811	1,669,575	10,773	10,968	3.53	3.56	109.8%
9/1/20	38,702	3,161	1,672,791	10,847	10,968	3.53	3.91	120.5%
8/1/20	38,280	3,455	1,675,367	10,892	10,968	3.49	3.40	104.9%
7/1/20	39,672	2,941	1,695,280	10,981	10,968	3.62	3.79	116.9%
6/1/20	39,579	3,182	1,684,614	10,945	10,968	3.61	3.73	115.0%
5/1/20	38,703	4,029	1,740,446	11,201	10,968	3.53	3.36	103.8%
4/1/20	40,879	3,175	1,696,718	10,888	10,968	3.73	3.64	112.4%
3/1/20	37,850	157	1,700,614	10,977	10,968	3.45	3.09	95.4%
2/1/20	36,464	3	1,727,521	11,295	10,968	3.32	3.16	97.4%
1/1/20	39,394	4	1,683,199	10,984	10,968	3.59	3.30	101.9%
2017–2019 Baseline	**34,725**	**0**	**1,592,964**	**10,717**	**10,717**	**3.24**	**3.24**	**100.0%**
2019 Monthly	35,523	1	1,647,713	10,889	10,889	3.26	3.27	100.7%
2018 Monthly	34,773	1	1,589,353	10,688	10,688	3.25	3.25	100.3%
2017 Monthly	33,879	0	1,541,826	10,575	10,575	3.20	3.21	98.9%

3.3 REPORTED CLAIM INCIDENCE BY AMOUNT—ALL CAUSES

Reported overall Group Life claim incidence rates by amount during the pandemic period were up 31% compared to 2017–2019 reported amounts. This increase in incidence rates by amount is notably higher than the corresponding incidence rate increase by count. The Committee estimates that roughly half the difference is due to changes in age and gender mix, and the remainder is likely due to salary and face amount inflation over the four-year period.

3.4 REPORTED CLAIM INCIDENCE BY AMOUNT—COVID-19 VERSUS ALL OTHER CAUSES

Table 3.3

AMOUNT-BASED REPORTED INCIDENCE RESULTS RELATIVE TO 2017–2019 BASELINE

Amount-Based	2Q20–4Q20	2021	1Q22	2Q22	2022	2Q20–2Q22
Total/Baseline	123.9%	140.8%	137.8%	107.0%	122.3%	131.0%
COVID-19 Claims	1,367.9 M	3,957.5 M	1,049.0 M	151.2 M	1,200.2 M	6,525.6 M
COVID/Baseline	*12.3%*	*26.1%*	*25.0%*	*3.8%*	*14.3%*	*18.8%*
Non-COVID/Baseline	*111.6%*	*114.7%*	*112.8%*	*103.2%*	*108.0%*	*112.2%*

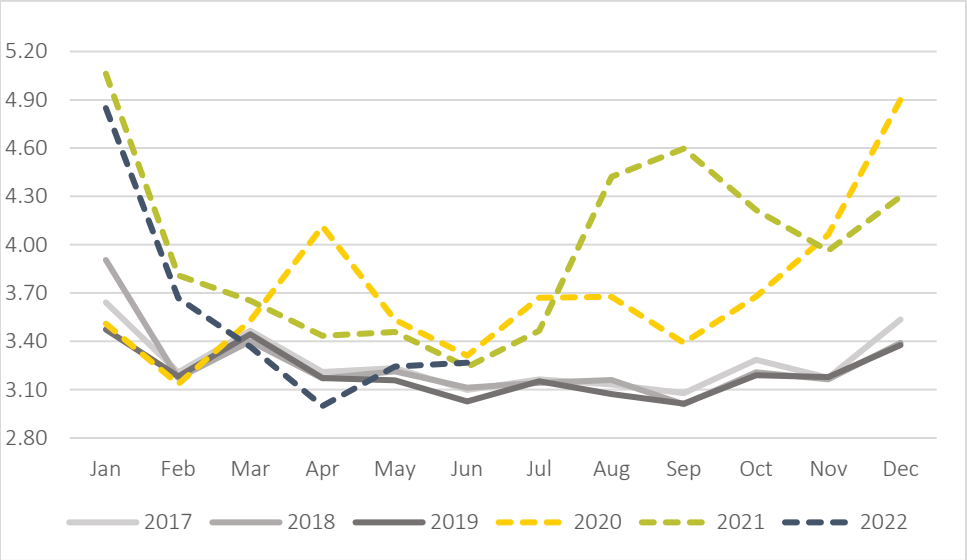
Section 4: Group Life Mortality Results—Estimated Incurred Death Claims

4.1 INCURRED CLAIM INCIDENCE BY COUNT—ALL CAUSES

A completed estimate of incurred incidence rates by count indicates that excess mortality for the pandemic period was approximately 18% higher than the 2017–2019 baseline incurred incidence. Figure 4.1 displays the various monthly estimated incurred incidence rates.

Figure 4.1

AGGREGATE INCURRED[3] CLAIM INCIDENCE PER 1,000 BY CALENDAR YEAR AND MONTH



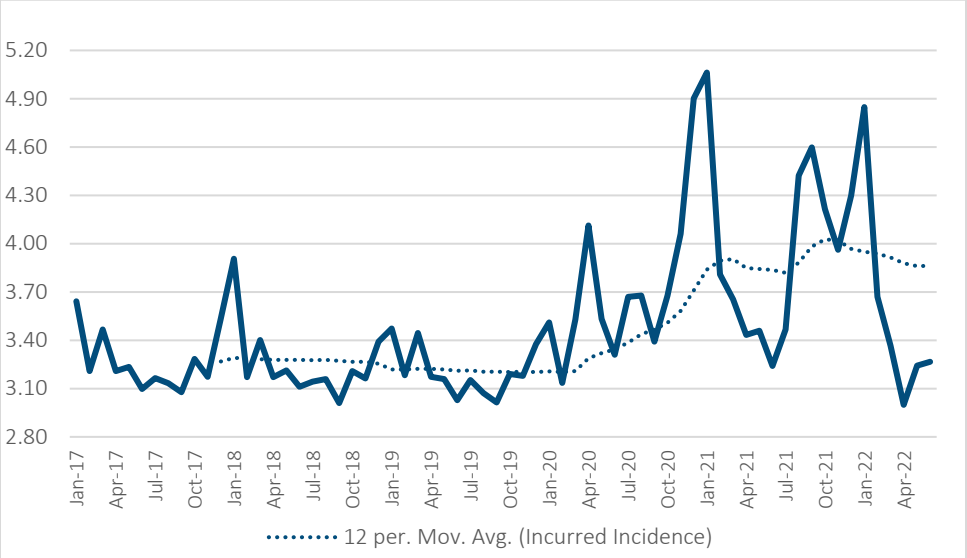
The initial estimates of Q2 2022 incurred incidence rates indicate that mortality was 100.3% of baseline on a seasonally adjusted count basis. The monthly results within Q2 show April 2022 estimated incurred mortality of 6% below baseline, whereas May and June were slightly above baseline. This April 2022 estimated incurred mortality result is the low-water mark for any month during the pandemic period. The May and June results are still highly incomplete and likely to change as more months of reported claims are revealed.

The current view of Q1 2022 results indicate Q1 excess incurred mortality of 16.3%, but the monthly results for Q1 2022 indicate a material reduction in excess mortality as the months progressed. Excess mortality for January by count was 36%, whereas excess mortality was 15% for February and March was 2% below baseline.

Figure 4.2 is a different view of the data displayed in Figure 4.1 to illustrate the flow of estimated excess incurred mortality over the entire pandemic period.

[3] Adjusted for assumed completion.

Figure 4.2
AGGREGATE INCURRED[4] CLAIM INCIDENCE PER 1,000 BY CALENDAR MONTH



4.2 INCURRED CLAIM INCIDENCE BY COUNT—COVID-19 VERSUS ALL OTHER CAUSES

Similar to reported claim metrics, Table 4.1 shows that COVID-19 claims do not fully explain the increase in incurred claim incidence on a count basis. COVID-19 claims account for roughly 82% of the excess incurred Group Life mortality during the second quarter of 2020 through the second quarter of 2022, with the other 18% coming from claims that were not coded with COVID-19 as COD.

Table 4.1
INCURRED EXCESS MORTALITY BY CLAIM COUNT COMPARED TO 2017–2019 BASELINE

Count-Based	2Q20–4Q20	2021	1Q22	2Q22	2022	2Q20–2Q22
Total/Baseline	119.7%	122.4%	116.3%	100.3%	108.3%	118.3%
COVID-19 Claims	46,649	78,188	18,848	1,654	20,502	145,339
COVID/Baseline	*14.7%*	*18.4%*	*16.5%*	*1.6%*	*9.0%*	*15.0%*
Non-COVID/Baseline	*105.0%*	*104.0%*	*99.8%*	*98.7%*	*99.3%*	*103.3%*

[4] Adjusted for assumed completion.

Incurred claim details by month are shown in Table 4.2, along with calculated monthly incurred incidence rates. Note that a small number of COVID-19 claims have incurred dates of death in 2019 or prior, which are likely due to data errors.

Table 4.2
INCURRED CLAIM COUNTS AND INCIDENCE RATES, 2017 THROUGH Q2 2022

Incurral Date	Raw Submitted Numbers			Calculated Amounts				
	Average Incurred Claim Counts		Average Premium ($ 000)	Average Life Years Exposed (000)	Average Completed Claim Counts	Annual Incidence per 1,000 (Lives Basis)	Adjusted for Seasonality	
	Total	COVID					Total	Total/Baseline
6/1/22	11,173	136	1,806,711	11,241	36,722	3.27	3.44	106.0%
5/1/22	25,340	439	1,793,909	11,070	35,898	3.24	3.28	101.1%
4/1/22	28,650	467	1,811,028	11,202	33,593	3.00	3.04	93.9%
3/1/22	33,864	1,480	1,806,855	11,079	37,300	3.37	3.18	98.1%
2/1/22	38,253	5,491	1,807,762	11,162	40,953	3.67	3.74	115.2%
1/1/22	51,166	10,753	1,804,659	11,123	53,928	4.85	4.40	135.6%
12/1/21	45,410	7,713	1,741,304	11,015	47,358	4.30	4.06	125.1%
11/1/21	41,246	5,478	1,707,231	10,786	42,739	3.96	4.03	124.2%
10/1/21	44,254	7,788	1,723,799	10,829	45,642	4.21	4.21	129.8%
9/1/21	48,094	12,405	1,709,525	10,752	49,425	4.60	4.90	151.0%
8/1/21	46,686	9,859	1,703,577	10,817	47,841	4.42	4.58	141.2%
7/1/21	36,613	1,912	1,723,395	10,796	37,422	3.47	3.55	109.6%
6/1/21	34,635	1,325	1,727,901	10,897	35,316	3.24	3.41	105.1%
5/1/21	37,029	2,445	1,736,725	10,897	37,684	3.46	3.49	107.8%
4/1/21	36,910	3,010	1,740,432	10,922	37,507	3.43	3.49	107.5%
3/1/21	39,161	3,288	1,729,937	10,879	39,739	3.65	3.45	106.4%
2/1/21	40,863	6,721	1,722,897	10,873	41,420	3.81	3.88	119.6%
1/1/21	54,101	14,402	1,716,417	10,821	54,781	5.06	4.59	141.6%
12/1/20	53,095	13,262	1,688,832	10,959	53,709	4.90	4.64	143.0%
11/1/20	43,676	7,143	1,667,815	10,868	44,143	4.06	4.14	127.6%
10/1/20	39,243	3,083	1,669,575	10,773	39,628	3.68	3.68	113.6%
9/1/20	36,450	2,382	1,672,791	10,847	36,778	3.39	3.62	111.7%
8/1/20	39,724	3,691	1,675,367	10,892	40,053	3.68	3.82	117.7%
7/1/20	39,996	3,724	1,695,280	10,981	40,300	3.67	3.77	116.4%
6/1/20	35,984	1,961	1,684,614	10,945	36,231	3.31	3.49	107.7%
5/1/20	39,330	3,870	1,740,446	11,201	39,575	3.53	3.58	110.4%
4/1/20	44,533	7,115	1,696,718	10,888	44,784	4.11	4.19	129.1%
3/1/20	38,528	1,082	1,700,614	10,977	38,726	3.53	3.34	103.1%
2/1/20	35,244	22	1,727,521	11,295	35,407	3.13	3.09	95.3%
1/1/20	38,395	65	1,683,199	10,984	38,556	3.51	3.19	98.5%
2017–2019 Baseline	**34,713**	**2**	**1,592,964**	**10,717**	**34,744**	**3.24**	**3.24**	**100.0%**
2019 Monthly	34,831	2	1,647,713	10,889	34,885	3.20	3.20	98.9%
2018 Monthly	34,758	2	1,589,353	10,688	34,777	3.25	3.25	100.3%
2017 Monthly	34,551	1	1,541,826	10,575	34,570	3.27	3.27	100.8%

4.3 INCURRED CLAIM INCIDENCE BY AMOUNT—ALL CAUSES

Overall, seasonally adjusted incurred Group Life claim incidence rates by amount during the pandemic period were up 31% compared to the 2017–2019 baseline. This increase in incidence rates by amount is notably higher than the corresponding increase in incidence rates by count. The Committee estimates that roughly half the difference is due to changes in age and sex mix, and the remainder is likely due to salary and face amount inflation over the experience period.

4.4 INCURRED CLAIM INCIDENCE BY AMOUNT—COVID-19 VERSUS ALL OTHER CAUSES

Similar to Table 4.1, Table 4.3 shows that COVID-19 claims do not fully explain the increase in incurred claim incidence on an amount basis.

Table 4.3

AMOUNT-BASED INCURRED INCIDENCE RESULTS RELATIVE TO 2017–2019 BASELINE

Amount-Based	2Q20–4Q20	2021	1Q22	2Q22	2022	2Q20–2Q22
Total/Baseline	125.9%	140.3%	128.4%	112.3%	120.3%	131.0%
COVID-19 Claims	1,721.5 M	3,982.6 M	837.7 M	55.3 M	893.1 M	6,597.2 M
COVID/Baseline	*14.8%*	*25.9%*	*20.0%*	*1.4%*	*10.7%*	*18.8%*
Non-COVID/Baseline	*111.1%*	*114.4%*	*108.4%*	*110.9%*	*109.6%*	*112.2%*

Section 5: Estimated Incurred Mortality Results by Segment

Analysis of results by segment will focus on claim count experience for simplicity and credibility. In general, results by claim amount follow similar patterns as results by claim count.

The following notes apply to the data presented in the subsections below:

- Claims and A/E ratios are presented on an incurred basis. The "expected" basis is the 2017–2019 baseline.
- Although most companies were able to provide segment detail, some did not. Results by Company Size reflect all companies. Results for Industry reflect approximately 97% of total company claims, results for Geography reflect 98% of total company claims, and results by Age/Sex reflect approximately 91% of total company claims.
- The total claim counts and A/E ratios in each subsection include only the data from companies that produced the breakout being analyzed. For example, the "All Segments" row in the tables in subsection 5.1 includes only data from companies that were able to supply claims data by Industry.
- The "% COVID" columns in the tables below show the monthly average COVID claims during the pandemic period as a percentage of the average total monthly claims from the 2017–2019 baseline period. The "% Non-COVID" column in the Age and Sex tables reflects excess mortality due to non-COVID claims.
- The "% Count" columns in the tables below show the proportion of baseline claims in each segment. For some segments, there were claims with "Unknown" segmentation value. The Unknowns and their ratios were omitted from the following tables because they tended to account for a small percent of the total.
- For formatting purposes, the information for Q2 2020 no longer appears in the charts for this section; see prior iterations of this report for information on excess mortality in Q2 2020.

5.1 INDUSTRY

Table 5.1 displays mortality A/E ratios by industry collar and quarter. Over the entire pandemic period, the White-Collar category has experienced a higher A/E ratio than the Blue- and Grey-Collar industries, and this relationship has been relatively consistent across time. All three categories showed peak excess mortality in the third quarter of 2021 and have had consistently declining excess mortality in every quarter since. In the second quarter of 2022, the White-Collar category remained slightly above a 100% A/E ratio, while the Blue- and Grey-Collar groups were under 100% for the first time in the pandemic.

Table 5.1

EXCESS MORTALITY BY INDUSTRY COLLAR

Industry Collar	Q3 2020	Q4 2020	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022	Q2 2022	4/20-6/22	% COVID	% Count
Blue	110%	127%	123%	107%	129%	126%	114%	99%	116%	15.7%	40%
Grey	115%	127%	118%	104%	133%	122%	106%	91%	114%	16.2%	19%
White	119%	129%	123%	107%	138%	126%	120%	102%	120%	15.0%	40%
All Collars[5]	**115%**	**128%**	**122%**	**107%**	**134%**	**126%**	**116%**	**100%**	**118%**	**15.6%**	**100%**

[5] Includes only companies that provided Industry splits; see second bullet at the beginning of Section 5.

Tables 5.2 and 5.3 show more detailed industry results for the top 10 industry segments by number of COVID claims. These are the same top 10 industry groupings from the August 2022 report but in a slightly different order. Public Administration (White-Collar), Manufacturing–Auto, Airplanes (Blue-Collar), Misc. Services (Grey-Collar) and Doctors' Offices (health care, also White-Collar) have had the highest A/E ratios since April 2020. Heavy Steel Manufacturing (Blue-Collar) had a much lower A/E ratio than the other top 10 industries. In Table 5.2, "B," "W", and "G" refer to Blue-Collar, White-Collar, and Grey-Collar, respectively.

Table 5.2

EXCESS MORTALITY FOR TOP TEN INDUSTRIES BY NUMBER OF COVID CLAIMS

Industry	Q3 2020	Q4 2020	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022	Q2 2022	4/20-6/22
W: Public Administration	120%	133%	122%	107%	147%	137%	134%	111%	126%
B: Transport; Communication; Utilities	111%	126%	120%	103%	130%	122%	112%	98%	115%
B: Manufacturing–Auto, Airplanes	106%	126%	131%	118%	133%	141%	130%	124%	125%
B: Manufacturing–Heavy; Steel	104%	126%	111%	96%	113%	115%	98%	78%	106%
W: Educational Services	118%	124%	122%	106%	135%	116%	107%	96%	115%
W: Doctors' Offices	122%	125%	121%	105%	135%	116%	110%	100%	117%
G: Manufacturing–Paper; Drugs	110%	127%	123%	106%	127%	122%	108%	82%	112%
G: Retail–Trade	106%	113%	118%	101%	138%	122%	103%	87%	111%
G: Wholesale Trade	121%	138%	103%	96%	120%	115%	97%	94%	112%
G: Misc. Services/Data Processing	122%	128%	127%	115%	153%	130%	118%	106%	124%
All Segments[6]	**115%**	**128%**	**122%**	**107%**	**134%**	**126%**	**116%**	**100%**	**118%**

Table 5.3

COVID CLAIMS FOR TOP 10 INDUSTRIES BY NUMBER OF COVID CLAIMS

Industry	4/20–6/22	% COVID	% Count	# COVID
W: Public Administration	126%	14.4%	14%	19,216
B: Transport; Communication; Utilities	115%	15.6%	13%	18,846
B: Manufacturing–Auto, Airplanes	125%	15.9%	9%	13,275
B: Manufacturing–Heavy; Steel	106%	14.2%	9%	11,361
W: Educational Services	115%	14.8%	6%	8,771
W: Doctors' Offices	117%	16.5%	6%	8,525
G: Manufacturing–Paper; Drugs	112%	14.1%	6%	7,710
G: Retail–Trade	111%	17.7%	4%	7,157
G: Wholesale Trade	112%	15.9%	5%	6,774
G: Misc. Service/Data Processing	124%	18.2%	3%	5,375
All Segments[7]	**118%**	**15.6%**	**100%**	**143,690**

It should be noted that the high A/E ratios for Public Administration are driven by experience in the Executive, Legislative and General Government segment (Standard Industry Classification [SIC] codes 9100–9199). This segment does not include police and fire and represents more than 85% of claims in the broader Public Administration segment.

[6] Includes only companies that provided Industry splits; see second bullet at the beginning of Section 5.
[7] Includes only companies that provided Industry splits; see second bullet at the beginning of Section 5.

5.2 GEOGRAPHY

Results by Geography appear to be consistent with broad population results in terms of timing of regional spikes across the country, as shown in Table 5.4. Since April 2020, the Southeast region shows the highest overall A/E ratio, as well as the highest percentage of claims identified as COVID. All four regions experienced relatively high A/E ratios in the fourth quarter of 2021, but all regions showed successive improvement in A/E ratio in the first and second quarters of 2022. In the second quarter of 2022, both the West and Southwest regions had A/E ratios lower than 100%, with the West showing the lowest A/E ratio at 88%.

Table 5.4
EXCESS MORTALITY BY GEOGRAPHIC REGION

Region	Q3 2020	Q4 2020	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022	Q2 2022	4/20–6/22	% COVID	% Count
Northeast	106%	123%	123%	108%	115%	124%	117%	100%	118%	12.9%	21%
West	121%	129%	130%	105%	131%	125%	110%	88%	116%	15.1%	16%
Midwest	107%	134%	109%	105%	117%	133%	118%	108%	116%	14.6%	28%
Southeast	127%	129%	133%	111%	163%	124%	119%	99%	124%	18.5%	35%
All Regions[8]	**115%**	**128%**	**123%**	**107%**	**134%**	**126%**	**116%**	**100%**	**118%**	**15.5%**	**100%**

A closer look at the states with the highest number of COVID claims in Table 5.5 shows results that are not surprising, given the regional results in Table 5.4. Most states saw a decrease in A/E ratios in the second quarter of 2021, and most saw a return to high ratios in the third quarter of 2021. Several Southeastern states (Florida, Georgia, Tennessee, Texas) showed extreme spikes in the third quarter of 2021, although those ratios have improved considerably except for Tennessee. High A/E ratios in Michigan and Ohio contributed to the deterioration in Midwest region results in the fourth quarter of 2021. All the states in the exhibit have seen quarter over quarter improvements in A/E ratios for the first two quarters in 2022. California had the lowest Q2 2022 A/E ratio of the top 10 states at 81% and Michigan had the highest at 116%.

Table 5.5
EXCESS MORTALITY FOR TOP 10 STATES BY NUMBER OF COVID CLAIMS

State	Q3 2020	Q4 2020	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022	Q2 2022	4/20-6/22	% COVID	% Count	# COVID
TX - Southeast	134%	135%	138%	105%	160%	119%	116%	87%	122%	22.0%	8%	16,902
CA - West	124%	135%	148%	102%	128%	113%	111%	81%	117%	15.7%	6%	9,316
FL - Southeast	130%	118%	128%	117%	186%	118%	114%	99%	124%	15.3%	6%	8,781
MI - Midwest	104%	130%	109%	117%	110%	146%	117%	116%	120%	15.6%	6%	8,279
OH - Midwest	106%	130%	111%	100%	116%	138%	114%	97%	113%	15.7%	5%	7,167
GA - Southeast	136%	131%	146%	119%	180%	133%	121%	109%	133%	20.4%	3%	6,480
PA - Northeast	106%	130%	121%	108%	114%	136%	116%	102%	117%	13.7%	5%	6,271
IL - Midwest	108%	134%	109%	103%	113%	120%	117%	104%	114%	12.8%	5%	6,015
NY - Northeast	108%	117%	131%	107%	111%	118%	111%	90%	117%	11.9%	4%	4,946
TN - Southeast	122%	135%	131%	117%	159%	137%	126%	106%	126%	19.2%	3%	4,674
All States[9]	**115%**	**128%**	**123%**	**107%**	**134%**	**126%**	**116%**	**100%**	**118%**	**15.5%**	**100%**	**145,269**

5.3 AGE AND SEX

For the Age and Sex segments, excess mortality for the pandemic period was split between COVID and non-COVID claims. For example, for the 45–64 age group, the 22.3% COVID and 7.2% Non-COVID total 29.5% excess mortality,

[8] Includes only companies that provided Geography splits; see second bullet at the beginning of Section 5.
[9] Includes only companies that provided geography splits; see second bullet at the beginning of Section 5.

which equates to the 130% A/E ratio since April 2020. Generally the 65+ age band continues to have lower A/E ratios. However, essentially all of the excess mortality for this age group (which includes retirees) was identified as COVID. Cumulative A/E ratios for the pandemic period have been similar for the 0–44 and 45–64 age bands, but there is significant volatility by quarter. The 0–44 age band saw an extremely high A/E ratio in Q3 2021, following by a significant improvement in both Q4 2021 and Q1 2022. The A/E ratio for this 0–44 age band did not materially improve in Q2 2022, despite the 45–64 and 65+ bands seeing significant improvement compared to Q1 2022. Over the full pandemic period, the 45–64 age band has the highest excess mortality due to COVID, whereas the 0–44 age band has the highest excess mortality from non-COVID causes, as shown in Table 5.6.

Table 5.6
EXCESS MORTALITY BY AGE BAND

Age	Q3 2020	Q4 2020	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022	Q2 2022	4/20-6/22	% COVID	% Non-COVID	% Count
0–44	131%	121%	120%	130%	180%	142%	121%	119%	132%	14.7%	17.1%	8%
45–64	124%	129%	131%	116%	162%	144%	126%	114%	130%	22.3%	7.2%	28%
65+	110%	129%	120%	100%	116%	117%	113%	94%	112%	12.6%	-0.1%	64%
All[10]	**115%**	**128%**	**123%**	**107%**	**134%**	**127%**	**117%**	**102%**	**119%**	**15.5%**	**3.3%**	**100%**

The greater age band detail in Table 5.7 provides further insight on excess mortality by age. The youngest age bands saw significant improvement in Q4 2021 and 1Q 2022 but less improvement in 2Q 2022 versus older ages. The working-age population continues to see the highest A/E ratios. The overall A/E ratios are similar (but slightly higher) by amount versus count for age bands below 65. For age bands over 65, A/E ratios in recent quarters tend to be higher by amount than count.

Table 5.7
EXCESS MORTALITY BY DETAILED AGE BAND

Age	Q3 2020	Q4 2020	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022	Q2 2022	4/20-6/22	% COVID	Non-COVID %	% Count
0–24	124%	104%	101%	119%	128%	112%	95%	100%	111%	3.1%	7.8%	2%
25–34	132%	121%	118%	132%	179%	136%	122%	123%	132%	11.9%	20.1%	2%
35–44	133%	127%	129%	133%	200%	158%	131%	124%	140%	20.7%	19.1%	4%
45–54	126%	129%	133%	119%	180%	152%	129%	120%	134%	24.3%	10.2%	9%
55–64	123%	129%	129%	114%	153%	140%	125%	112%	127%	21.2%	5.7%	18%
65–74	115%	133%	130%	108%	130%	125%	117%	100%	119%	16.8%	2.6%	17%
75–84	113%	133%	123%	105%	119%	123%	121%	99%	117%	13.0%	3.6%	20%
85+	103%	124%	111%	92%	105%	107%	104%	86%	105%	9.7%	-4.7%	27%
All[11]	**115%**	**128%**	**123%**	**107%**	**134%**	**127%**	**117%**	**102%**	**119%**	**15.5%**	**3.3%**	**100%**

By sex, A/E ratios have been higher for males in every quarter of the study period, as is the cumulative excess mortality due to claims identified as COVID. As shown in Table 5.8, both males and females showed significant improvement in Q2 2022. While not shown, A/E ratios for males within the 35–64 age bands run approximately 10% higher than female ratios, whereas ratios tend to be more similar by sex for other age bands.

[10] Includes only companies that provided age splits; see second bullet at the beginning of Section 5.
[11] Includes only companies that provided age splits; see second bullet at the beginning of Section 5.

Table 5.8
EXCESS MORTALITY BY SEX

Sex	Q3 2020	Q4 2020	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022	Q2 2022	4/20-6/22	% COVID	% Non-COVID	% Count
Female	114%	123%	119%	105%	130%	122%	113%	98%	115%	13.4%	1.9%	32%
Male	115%	130%	124%	107%	135%	128%	119%	101%	120%	16.4%	3.1%	66%
All[12]	**115%**	**128%**	**123%**	**107%**	**134%**	**126%**	**117%**	**101%**	**119%**	**15.5%**	**3.2%**	**100%**

5.4 COMPANY SIZE

Contributing companies were assigned a size indicator of Large, Medium or Small per the criteria described in Appendix C.2.5. Results since April 2020 have indicated higher excess mortality (and higher percentage claims identified as COVID) by decreasing company size, although the results by Company Size were generally of the same magnitude and were generally consistent in pattern from quarter to quarter. Ratios for Large Companies tended to be lower than other companies for most quarters. All company size categories saw a drop in A/E ratios in the second quarter of 2021, followed by a steep increase in the third quarter of 2021. Small Companies were the only category not to experience an improvement in A/E ratio in Q1 2022. All companies consistently saw improvement in A/E ratio for 2Q 2022, as shown in Table 5.9.

Table 5.9
EXCESS MORTALITY BY COMPANY SIZE

Company Size	Q3 2020	Q4 2020	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022	Q2 2022	4/20-6/22	% COVID	% Non-COVID	% Count
Large	113%	127%	122%	106%	132%	125%	116%	100%	117%	15.1%	2.2%	79%
Medium	122%	132%	121%	109%	141%	132%	117%	100%	122%	17.4%	4.4%	16%
Small	123%	137%	132%	111%	146%	133%	124%	109%	125%	15.6%	9.8%	4%
All	**115%**	**128%**	**123%**	**107%**	**134%**	**126%**	**116%**	**100%**	**118%**	**15.5%**	**2.9%**	**100%**

[12] Includes only companies that provided sex splits; see second bullet at the beginning of Section 5.

Section 6: Detailed Cause of Death

Beginning with the June 2022 data submission, participating companies were asked to expand the study's three previous cause of death (COD) groups (COVID-19, Accident, Illness) into 12 COD groupings. A survey of the companies was completed prior to this request to identify what groupings would be feasible to provide dating back to 2017. This survey, along with CDC cause of death groupings, informed the groupings presented in this report. The mapping of these COD groups can be found in Appendix E.

Despite expansion of the COD categories, 30%–40% of claims still fall into the "All Other/Unknown" group, and it would be ideal to decrease this number further. One challenge is that three of the 20 companies were not able to provide more detailed COD information back to 2017 than what was part of the original survey, and other companies did not track one or more ICD-10 diagnosis codes consistently over the course of the study period, so some of the new COD categories were labeled as "Unknown."

It has been noted that there is room for further refinement and expansion of these groupings and ICD codes that comprise them. The Committee will consider whether the COD categories can be refined further at some point in the future. However, although it may prove possible to expand the number of COD groupings from 12 to closer to 20, some CODs still will not fit into the more refined groupings, and a substantial number of claims will still be tagged as "All Other / Unknown."

The graphs in Figures 6.1 and 6.2 show excess mortality relative to baseline (2017–2019), ranked by the COD with the most claim counts at the top (All Other / Unknown) and the fewest at the bottom (Homicide). The graphs have been split into two parts, with the top six COD in the first and the bottom five COD categories in the second. Note that the COVID-19 COD is not a shown in these figures because there is no baseline mortality for COVID-19 from 2017–2019. Also, the 2022 incurred periods are incomplete with respect to COD; it is expected that the All Other/Unknown category will decrease in excess mortality and other categories will increase in the 2022 periods as COD reporting matures over time.

Figure 6.1

GROUP LIFE ACTUAL TO EXPECTED INCURRED MORTALITY—TOP SIX CAUSES OF DEATH

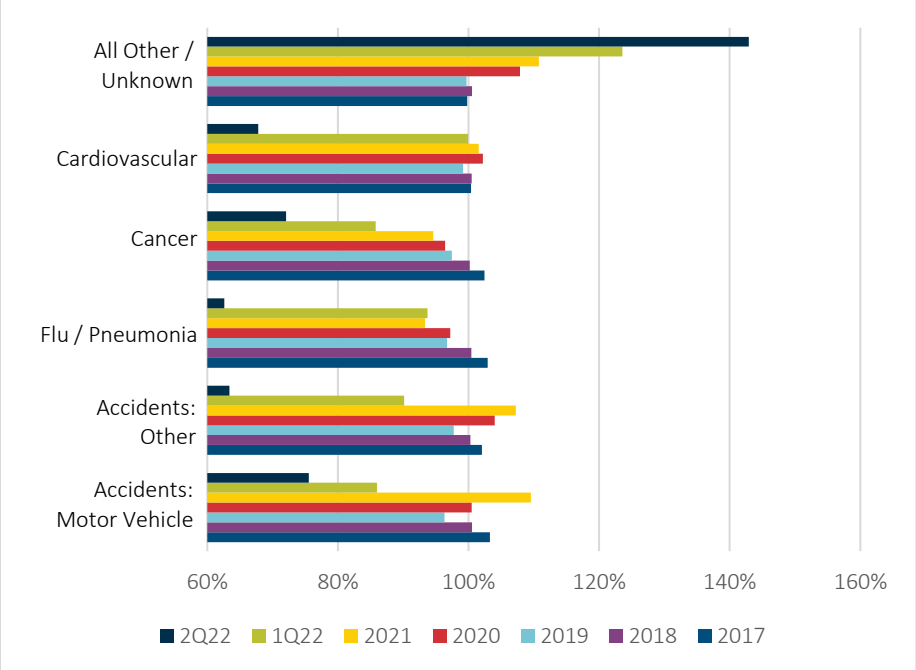
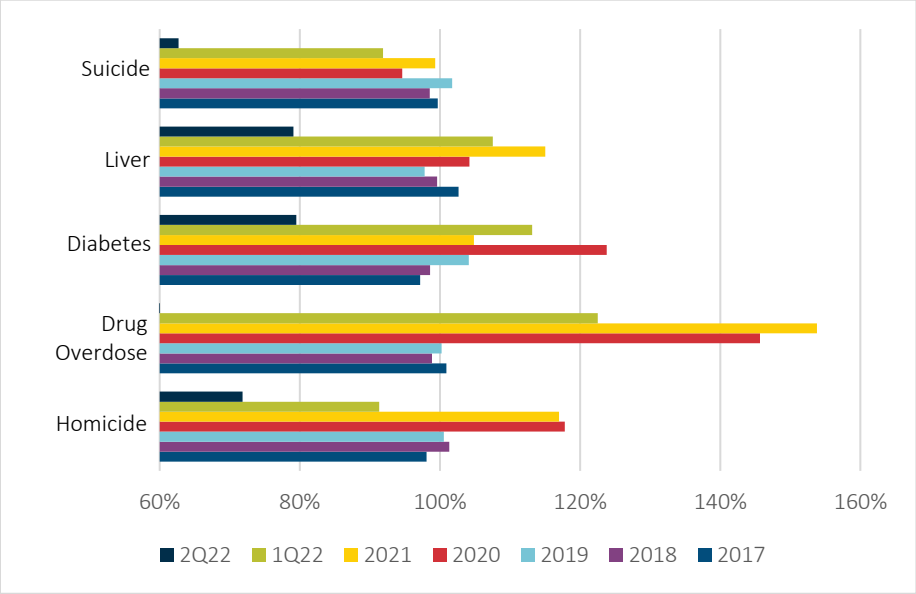


Figure 6.2

GROUP LIFE ACTUAL TO EXPECTED INCURRED MORTALITY—BOTTOM FIVE CAUSES OF DEATH



As shown in these figures, mortality rates from Cancer and Influenza/Pneumonia have consistently dropped during the 2017–2022 observation period. Accidents[13] (both Motor Vehicle and non-Motor-Vehicle) increased 5%–10% in 2021. Diabetes and Liver deaths, often cited comorbidities with COVID-19 deaths, appear to be elevated 10%–15% during the entire pandemic period. Finally, "deaths of despair," particularly Drug Overdose and Homicides, have increased 50% and 15%, respectively.

Figure 6.3 displays the COD distribution in the 2017–2019 baseline period by count. Approximately half of the 2017–2019 baseline Group Life claims were Cardiovascular or Cancer. The top 10 COD groupings covered approximately two-thirds of all Group Life baseline claims. Although Figure 6.2 shows substantial percentage increases in the Liver, Diabetes, Drug Overdose and Homicide causes of death during the pandemic period, Figure 6.3 indicates that these causes constituted a relatively low percentage of overall deaths.

[13] A small number of companies did not break down Accidents between motor-vehicle and non-motor-vehicle. For these companies, claims from Accidents were allocated to motor-vehicle and non-motor-vehicle in proportion to the number of claims in each category from companies that were able to provide this breakdown.

Figure 6.3

GROUP LIFE CAUSE OF DEATH DISTRIBUTION, 2017–2019 BASELINE, BY COUNT

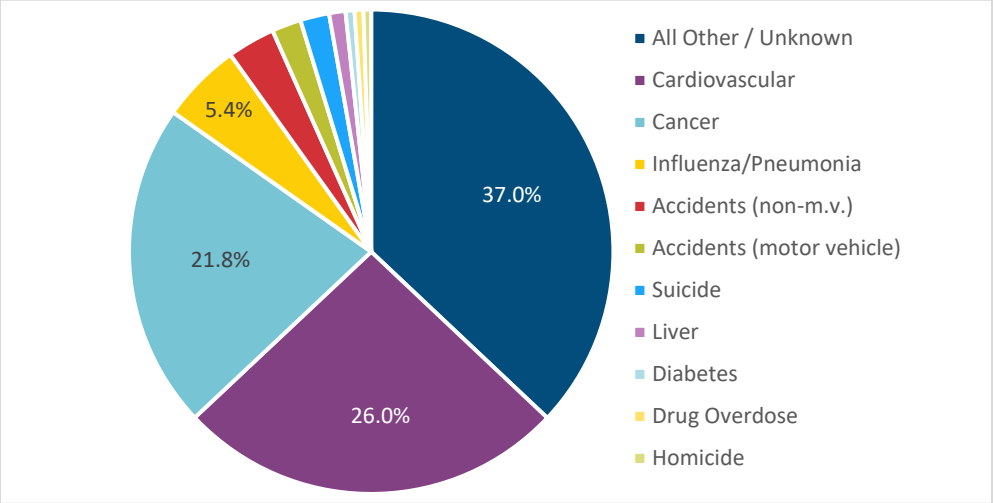


Figure 6.4 displays the annual incidence trend of various CODs over the period 2017 – 2021, with current estimates for the first quarter of 2022 (not included in the trend). The trend for drug overdose has been steeply increasing over the five years, with more modest but still noticeable upward patterns for Liver and Homicide. The trend for Suicide has been flat, if not decreasing over the five-year period. Accidents have also shown a significant uptick in 2021, particularly for motor vehicle accidents. Although claims for the first quarter of 2022 are shown, it is expected that COD assignment for this quarter is not yet fully complete, which contributes to the orange bar appearing lower than the incidence rates for prior periods.

Figure 6.4

ANNUAL INCIDENCE RATES FOR SELECT CAUSES OF DEATH FOR 2017–2021 AND FIRST QUARTER 2022

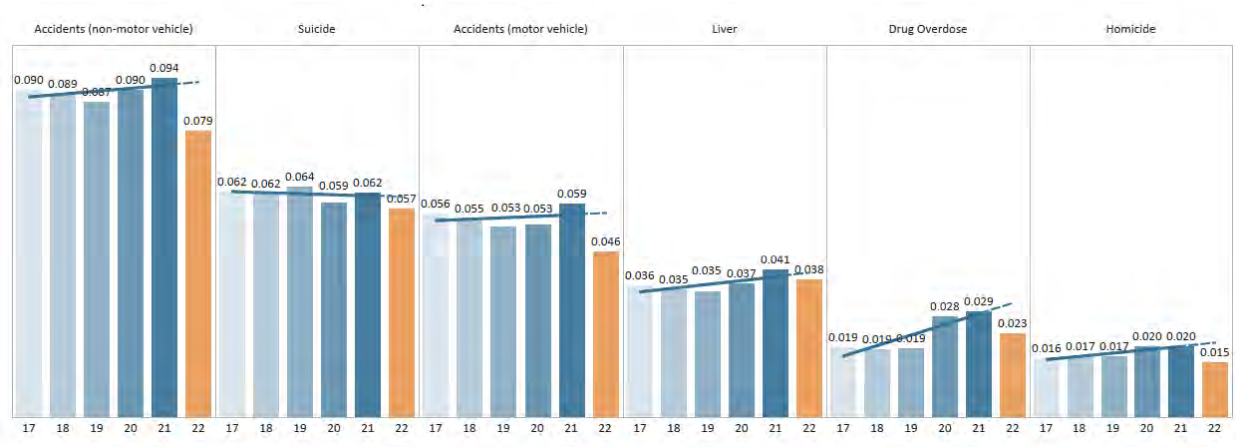
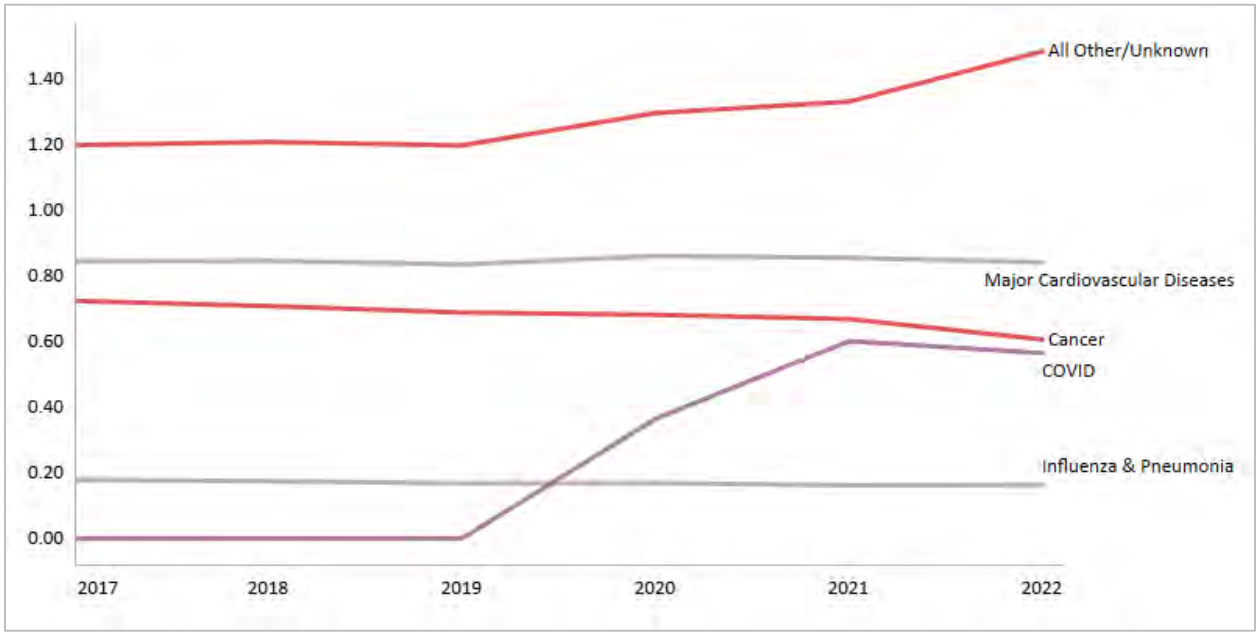


Figure 6.5 displays the annual incidence rates by year for the top CODs for the years 2017–2021 and the first quarter of 2022. Cancer has continued its steady decline over time, while deaths from Influenza & Pneumonia and Major Cardiovascular Diseases have remained relatively stable. Of particular note is the All Other/Unknown classification, which has increased significantly since the start of the pandemic. A partial reason for this is a general increase in deaths during the pandemic from causes not included in the main groupings included in this study. However, the increase in recent periods (particularly the first quarter of 2022) is due to deaths from causes that have yet to be identified that were labeled as “Unknown.” This is likely a reason for the relatively lower incidence rates for known COD categories in the first quarter of 2022, as observed in Figure 6.4.

Figure 6.5

ANNUAL INCIDENCE RATES FOR TOP CAUSES OF DEATH FOR 2017–2021 AND FIRST QUARTER 2022



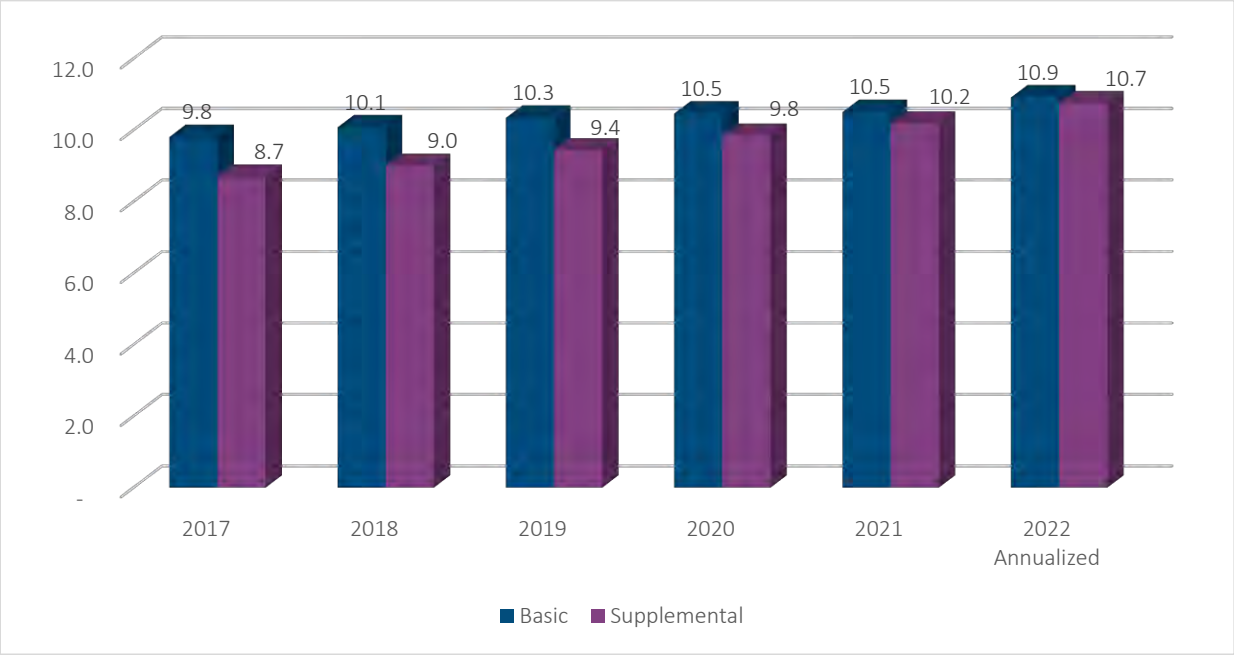
Section 7: Exposure Trends

7.1 PREMIUMS

The Committee reviewed the premiums submitted for the study to determine if the premium exposure was stable or exhibited volatility during the experience period. Figure 7.1 indicates a gradual increase in premium exposure during the experience period, as expected when wage inflation is considered. Basic premium has been relatively stable for the past few years, whereas supplemental premium has increased monotonically. The 2022 premiums in Figure 7.1 were annualized based on the monthly premiums from January through June 2022. The stable trends in premiums by year shown below are helpful for validating the premium data, which were used for calculating premium per life (PPL) metrics and estimating covered lives when carriers could not provide this information.

Figure 7.1

REPORTED PREMIUM ($ BILLIONS) BY YEAR, 2017–2022[14]

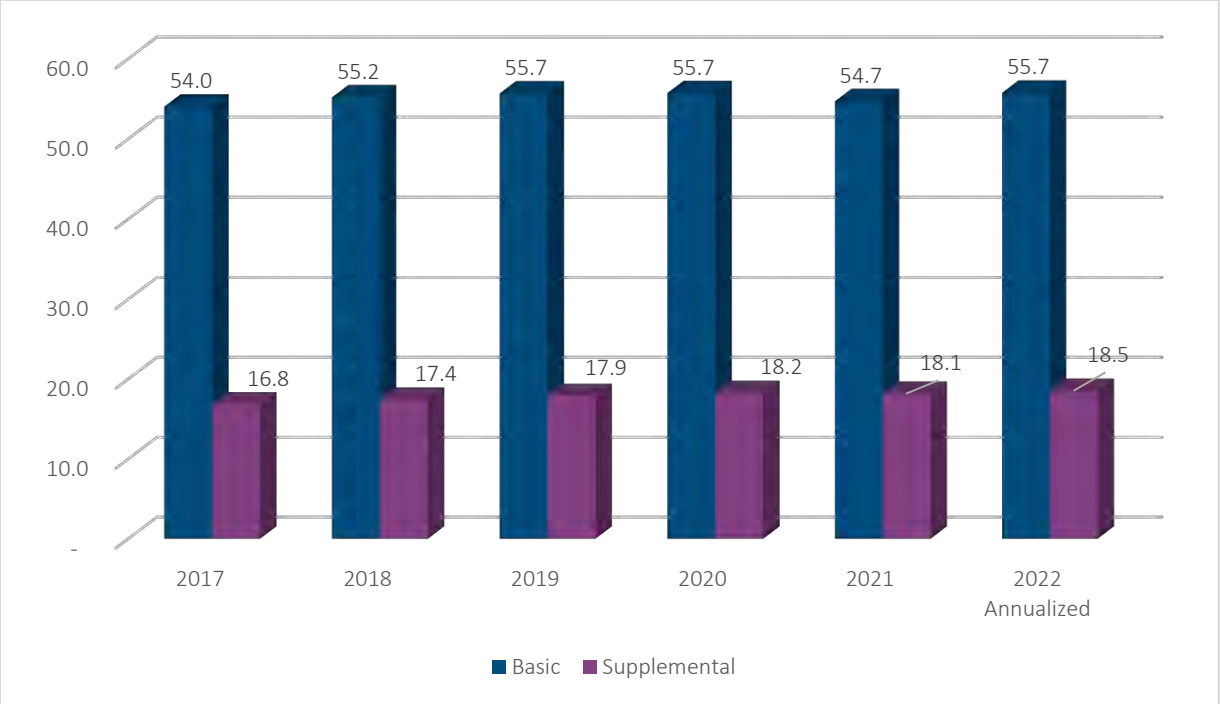


[14] 2022 Premium in Figure 7.1 was annualized based on the monthly premiums reported from January through June 2022.

7.2 LIVES

The Committee also reviewed life-years of exposure (LYEs) reported for the study. Figure 7.2 shows reported LYEs from 2017 through 2022, where the 2022 LYE was annualized based on monthly exposure from January through June 2022. A slight drop in LYE occurred in 2021, possibly because of disruptions from the COVID-19 pandemic. Otherwise, basic LYE was relatively stable during the experience period, and supplemental LYE has been increasing gradually.

Figure 7.2
LIFE-YEARS OF EXPOSURE (MILLIONS) BY YEAR, 2017–2022[15]



[15] The 2022 LYE in Figure 7.2 was annualized based on experience from January through June 2022.

Table 7.1 shows average premium per LYE based on the data provided for the study along with the change from the prior year. In 2021, the average premium per LYE increased by 2.3% for basic coverages and 4.0% for supplemental coverages. Before 2021, the changes in average premium per LYE were more modest and possibly linked to wage growth. The 4.0% increase in the supplemental average premium per LYE in 2021 may be attributed to employees increasing their supplemental benefit amounts because of the COVID-19 pandemic. Also, the increase in average premium per LYE in 2022 may be due to above-average wage growth in 2022 coinciding with increases in inflation and the consumer price index.

Table 7.1

AVERAGE PREMIUM PER LIFE-YEARS OF EXPOSURE BY YEAR AND COVERAGE TYPE

Year	Average Premium per LYE		Change in Average Premium per LYE	
	Basic	Supplemental	Basic	Supplemental
2017	$181.6	$517.1	NA	NA
2018	$182.7	$517.5	0.6%	0.1%
2019	$185.9	$528.1	1.8%	2.0%
2020	$187.8	$539.2	1.1%	2.1%
2021	$192.1	$561.0	2.3%	4.0%
2022	$195.8	$580.7	1.9%	3.5%

Section 8: Company Variations

8.1 VARIATIONS IN COVID-19 MORTALITY RESULTS

The survey showed that all participating companies had elevated Group Life mortality experience during the pandemic. However, the level of excess mortality varied between carriers. To provide insight into the dispersion of industry experience, Tables 8.1 and 8.2 provide the quartile baseline and pandemic experience, ranked by highest implied excess mortality percentage (by claim count) to lowest over the full pandemic period. The quartile incidence rates and excess mortality ratios are the weighted average of the five contributing companies' incidence rates in each quartile.

Table 8.1

QUARTERLY SEASONALLY ADJUSTED INCURRED INCIDENCE RATES (BY COUNT)—COMPANY QUARTILES

Quartile	Baseline	2Q–4Q 2020	2021	1Q 2022	2Q 2022	2022	2Q20–2Q22
Quartile 1	2.418	3.170	3.309	3.015	2.570	2.792	3.146
Quartile 2	2.529	3.148	3.249	2.983	2.609	2.794	3.111
Quartile 3	3.610	4.256	4.332	4.264	3.639	3.952	4.221
Quartile 4	4.093	4.574	4.539	4.212	3.746	3.978	4.426
Total	**3.242**	**3.880**	**3.967**	**3.771**	**3.252**	**3.511**	**3.835**

Table 8.2

QUARTERLY SEASONALLY ADJUSTED INCURRED A/E RATIOS (BY COUNT)—COMPANY QUARTILES

Quartile	Baseline	2Q–4Q 2020	2021	1Q 2022	2Q 2022	2022	2Q20–2Q22
Quartile 1	2.429	31.1%	36.8%	24.7%	6.3%	15.5%	30.1%
Quartile 2	2.508	24.4%	28.4%	17.9%	3.2%	10.5%	23.0%
Quartile 3	3.580	17.9%	20.0%	18.1%	0.8%	9.5%	16.9%
Quartile 4	4.093	11.7%	10.9%	2.9%	−8.5%	−2.8%	8.1%
Total	**3.227**	**19.7%**	**22.4%**	**16.3%**	**0.3%**	**8.3%**	**18.3%**

8.2 VARIATIONS IN COVID-19 CLAIM CODING PROCEDURES

Participating carriers were asked about the data sources and procedures they used to determine whether a claim should be coded as a COVID-19 cause of death. Eighteen of the 20 carriers in the survey provided details on their claim coding procedures, and the Committee learned the following:

- Seventeen of the 18 respondents included the claim as a COVID-19 death if COVID-19 appeared anywhere on the death certificate.
- Eight of the 18 appeared to do everything in their power to research all available sources to create an exhaustive tracking of all claims where COVID was a contributing cause. These companies used five or more of the following sources to identify whether a death was caused by COVID-19:
    - Primary cause of death on death certificate
    - Secondary cause of death on death certificate
    - Claim form
    - Communication with employer or beneficiary
    - Obituary
    - Communication with medical examiner or funeral home
- One carrier coded claims with cause of COVID-19 only when COVID-19 was identified as the primary cause of death on the death certificate.
- The other nine participating carriers generally classified a death as COVID-19 if it appeared anywhere on the death certificate.

8.3 VARIATIONS IN CLAIM REPORTING PATTERNS

Appendix D.4 documents that incurred claim completion rates varied significantly from company to company. Upon analyzing the differences, the 20 contributing companies were grouped into five “reporting speed” groups based on similar reporting patterns.

The Committee investigated whether the company reporting speed groupings would be correlated to company size. However, this was not the case. The Large, Medium and Small companies are well dispersed among the five reporting speed categories.

Section 9: Comparisons to General U.S. Population Mortality Results

9.1 AGGREGATE EXCESS MORTALITY COMPARISONS

From April 2020 through March 2022, 145,339 incurred COVID claims were estimated to be in the Group Life survey data, compared with more than 1,022,000 COVID deaths in the U.S. population during the same time span according to the Centers for Disease Control and Prevention (CDC).[16]

Past studies that have compared insured mortality to population mortality have found that mortality among insured lives tends to be lower. In particular, the SOA's 2016 Group Term Life Mortality Study[17] found that, in the key working ages, insured mortality is between 30% and 40% of general population mortality. This is often considered to be a function of the fact that an employee generally is in good health to be actively at work, often has access to health care and tends to have a higher level of income (which is correlated with better health). Because the mortality rates between the two populations tend to differ, the Committee analyzed the relative impact of the COVID-19 pandemic on the Group Life data and the U.S. population by considering excess death percentages, defined as the percentage increase in mortality rate over a baseline expectation.

The excess deaths in the Group Life data were determined via a comparison to average death rates in the Group Life data from the 2017–2019 baseline, adjusted for seasonality. For the U.S. population, the Committee considered two different expectation bases. The first basis was expected deaths published by the CDC,[18] which were developed using Farrington surveillance algorithms and historical data[19] (CDC method). For the second method, the Committee estimated expected deaths by computing the average CDC deaths from 2017 through 2019 and adjusting this average for changes in U.S. population size, changes in the U.S. population demographic mix by age and sex, and the trend for death rates by age group (Committee method).

[16] National Center for Health Statistics, Provisional Death Counts for Coronavirus Disease 2019 (COVID-19), https://www.cdc.gov/nchs/nvss/vsrr/covid19/index.htm.
[17] Society of Actuaries, 2016 Group Term Life Mortality Study & Tables, https://www.soa.org/resources/experience-studies/2016/2016-group-life-mortality-study/.
[18] National Center for Health Statistics. Excess Deaths Associated with COVID-19, https://www.cdc.gov/nchs/nvss/vsrr/covid19/excess_deaths.htm.
[19] More information can be found in the technical notes on the National Center for Health Statistics website, where the CDC publishes excess deaths: https://www.cdc.gov/nchs/nvss/vsrr/covid19/excess_deaths.htm#techNotes.

Table 9.1 shows the evolution of this comparison by quarter using the Committee method for U.S. population results. The results for Q2 2022 show substantially lower excess mortality in the Group Life population than the U.S. population. The Q1 2022 Group Life excess mortality completed downward from the 20% shown in the previous iteration of this report, and it is now approximately equal to the U.S. population excess mortality for the first quarter of 2022. Also, note that a CDC methodology change resulted in a restatement of the excess mortality for the U.S. population for the first quarter of 2022.

Table 9.1
GROUP LIFE AND U.S. POPULATION EXCESS MORTALITY PERCENTAGES BY QUARTER

Age	Q2 2020	Q3 2020	Q4 2020	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022	Q2 2022
Group Life	16%	15%	28%	23%	7%	34%	26%	16%	0%
U.S. Population	21%	18%	28%	18%	6%	25%	20%	16%	6%
Difference	**–5%**	**–3%**	**0%**	**5%**	**1%**	**9%**	**6%**	**0%**	**–6%**

To fully explore the differences in excess mortality, it is important to first understand the relative demographics of the two populations. As might generally be expected, the U.S. population data are much more evenly dispersed across the age categories, whereas a smaller portion of the Group Life survey data exposure is for children and retirees. It is also important to consider that mortality rates increase materially as age increases. Table 9.2 compares the age distribution of expected deaths between the Group Life survey data and the U.S. population, taking into consideration the same expected mortality applied to the two different demographics. Again, given the differences in demographics, a significantly higher proportion of deaths would be expected to occur in the working-age population for the Group Life exposure.

Table 9.2
DISTRIBUTION OF EXPECTED DEATHS BY AGE GROUP

Age	Group Life Survey Data[20]	U.S. Population[21]
0–44	8%	7%
45–64	28%	18%
65+	64%	75%
All	**100%**	**100%**

[20] Percentages represent allocation of deaths in the 2017–2019 baseline period.
[21] Percentages represent expected deaths based on estimates using the Committee method.

However, the demographic differences constitute only a partial explanation. Table 9.3 shows the difference in excess mortality percentages between the Group Life and U.S. populations across the pandemic by age group. The Group Life population has experienced higher excess mortality within the under-65 age groups over the full pandemic period. However, this relationship has not been consistent across time. In the first two quarters of 2022, excess mortality in the Group Life population has been lower than that in the U.S. population for people under age 45 and over age 65. The 45–64 age group has generally had higher excess mortality in the Group Life population than the U.S. population since the first quarter of the pandemic.

Table 9.3
GROUP LIFE EXCESS DEATH PERCENTAGES MINUS U.S. POPULATION EXCESS DEATH PERCENTAGES

Age	Q2 2020	Q3 2020	Q4 2020	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022	Q2 2022	4/20-6/22
0–44	1%	8%	0%	−5%	4%	34%	7%	−6%	−4%	5%
45–64	−3%	3%	4%	6%	0%	19%	12%	3%	6%	6%
65+	−7%	−6%	0%	4%	−2%	−3%	1%	−1%	−9%	−3%
All	**−5%**	**−3%**	**0%**	**5%**	**1%**	**9%**	**6%**	**0%**	**−6%**	**0%**

Because of variability in claim completion patterns, and the maturity of the most recent quarter's incurred claim experience, these observations may change over time.

9.2 EXCESS MORTALITY COMPARISON BY GEOGRAPHIC REGION

The CDC method described above for U.S. population expected deaths enables a comparison of excess death percentages by month and geographic region. Tables 9.4 and 9.5 display the excess death percentages by quarter and region for the U.S. population and the Group Life survey data, respectively. The "Total Excl. Other" row shows the weighted average A/E ratio for claims that could be allocated to the four regions.

Table 9.4
U.S. POPULATION EXCESS DEATH PERCENTAGE BY QUARTER AND GEOGRAPHIC REGION

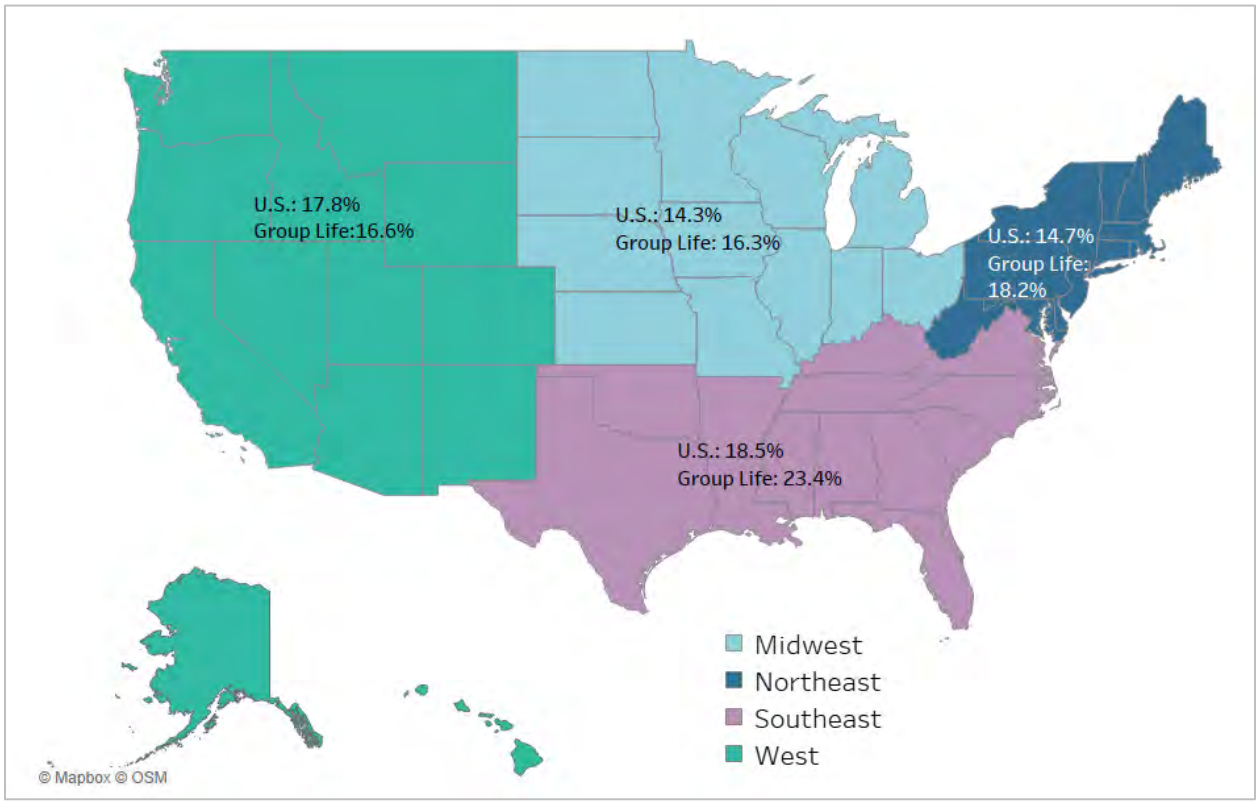
Region	Q2-Q4 2020	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022	Q2 2022	Q2 2020–Q2 2022	% of Total COVID Deaths
Midwest	19.2%	9.3%	3.1%	11.4%	24.7%	19.8%	3.6%	**14.3%**	21.1%
Northeast	23.4%	17.3%	2.4%	5.5%	14.7%	18.1%	4.6%	**14.7%**	21.4%
Southeast	18.1%	24.3%	6.2%	36.0%	18.4%	22.8%	5.2%	**18.5%**	38.3%
West	15.6%	28.8%	4.9%	24.0%	26.2%	21.6%	7.3%	**17.8%**	19.2%
Total Excl. Other	**18.9%**	**20.4%**	**4.4%**	**21.7%**	**20.6%**	**20.9%**	**5.1%**	**16.6%**	**99.5%**
Total	**18.8%**	**20.2%**	**4.5%**	**21.7%**	**20.5%**	**20.9%**	**5.3%**	**16.6%**	**100.0%**

Table 9.5
GROUP LIFE COVID-19 SURVEY EXCESS DEATH PERCENTAGE BY QUARTER AND GEOGRAPHIC REGION

Region	Q2-Q4 2020	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022	Q2 2022	Q2 2020–Q2 2022	% of Total COVID Deaths
Midwest	18.3%	8.8%	4.9%	17.2%	33.4%	17.9%	7.9%	**16.3%**	26.1%
Northeast	23.5%	22.7%	7.5%	15.5%	24.4%	17.4%	0.0%	**18.2%**	17.3%
Southeast	21.5%	33.0%	11.1%	62.6%	23.8%	18.8%	-1.4%	**23.4%**	41.4%
West	19.3%	29.6%	4.6%	31.3%	25.5%	10.3%	-12.5%	**16.6%**	15.2%
Total Excl. Other	**20.7%**	**23.5%**	**7.6%**	**35.0%**	**26.9%**	**16.9%**	**-0.2%**	**19.1%**	**99.5%**
Total	**19.7%**	**22.5%**	**6.8%**	**33.9%**	**26.3%**	**16.3%**	**0.3%**	**18.5%**	**100.0%**

Figure 9.1 shows excess death percentages by region for both the Group Life data and the U.S. population data.

Figure 9.1
EXCESS DEATH PERCENTAGES BY GEOGRAPHIC REGION, APRIL 2020 THROUGH JUNE 2022



For the April 2020 through June 2022 period, the Southeast region shows the highest excess mortality for both the Group Life data and the U.S. population. The Midwest region experienced the lowest excess mortality for both datasets during the pandemic period, though significant variations by season have been seen. For the Group Life data, the Southeast region is the only region with higher-than-average excess mortality. The largest contrast between the Group Life data and the U.S. population data is in the Southeast region, where the U.S. population has excess mortality 5.6% (additive) higher than the U.S. population.

9.3 EXCESS MORTALITY COMPARISON BY VACCINATION UPTAKE

The Committee researched vaccination uptake statistics as of June 30, 2021 by state using data furnished by the CDC.[22] Using this information, the Committee analyzed excess mortality percentages by statewide vaccination rates[23] in the Group Life population and the U.S. population (using the CDC method for expected deaths).[24]

[22]Centers for Disease Control and Prevention, COVID-19 Vaccinations in the United States, Jurisdiction: https://data.cdc.gov/Vaccinations/COVID-19-Vaccinations-in-the-United-States-Jurisdi/unsk-b7fc. In these CDC data, the percent fully vaccinated means the percent of people who have had the second dose of a two-dose vaccine or one dose of a single-dose vaccine.
[23]Although COVID-19 vaccines were approved only for ages 12 and up as of June 30, 2021, the denominators for the vaccination rates shown in this subsection are total state populations including all ages.
[24]National Center for Health Statistics, Excess Deaths Associated with COVID-19: https://www.cdc.gov/nchs/nvss/vsrr/covid19/excess_deaths.htm. Note that the CDC excess deaths are reported on a weekly basis. In this section of the report, for the population graphs, actual and excess deaths for a particular reporting period are for weeks that ended in that reporting period.

The scatterplots in Figures 9.2 through 9.7 show the correlation between the statewide vaccination rate and excess mortality in the U.S. population and the Group Life data. Figures 9.2 and 9.3 present true-ups of the third quarter of 2021 plots shown in the January 2022 and August 2022 reports. Figures 9.4 and 9.5 present true-ups of the analysis for the period of October 2021 through March 2022 shown in the August report. Finally, Figures 9.6 and 9.7 show the correlation for the period of July 2021 through June 2022 to incorporate data from the second quarter of 2022.

Figure 9.2

U.S. POPULATION EXCESS MORTALITY BY STATEWIDE VACCINATION RATE, JULY THROUGH SEPTEMBER 2021

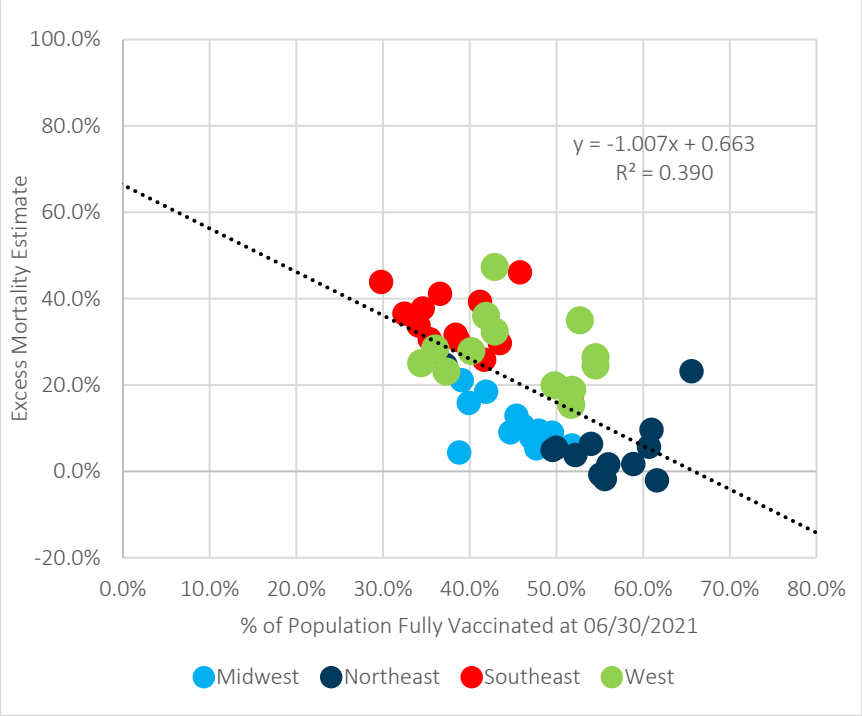


Figure 9.3

GROUP LIFE EXCESS MORTALITY BY STATEWIDE VACCINATION RATE, JULY THROUGH SEPTEMBER 2021

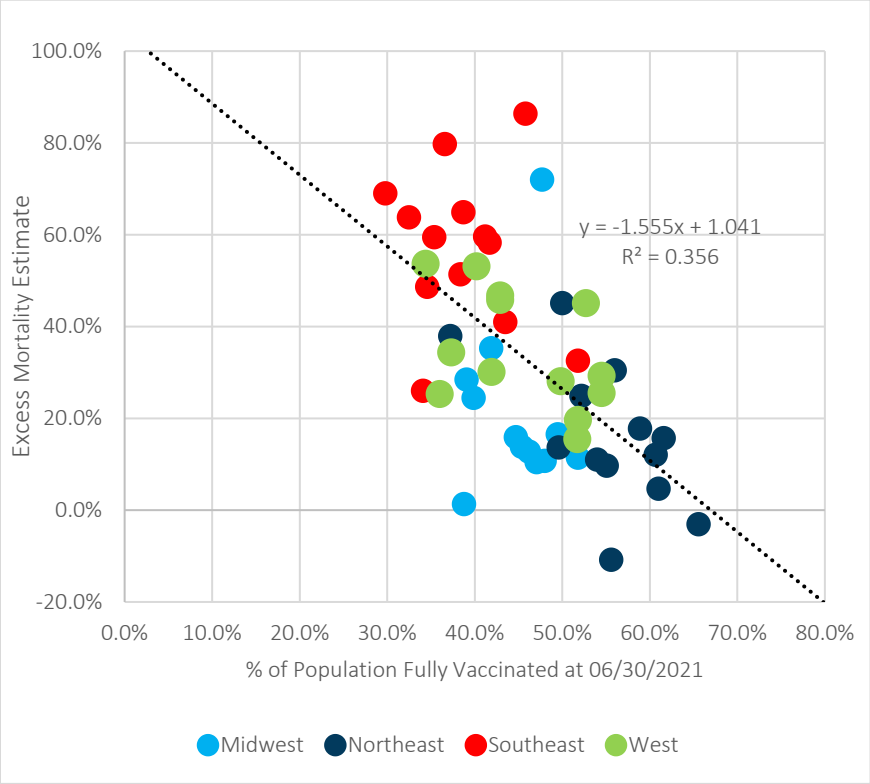


Figure 9.4

U.S. POPULATION EXCESS MORTALITY BY STATEWIDE VACCINATION RATE, OCTOBER 2021 THROUGH MARCH 2022

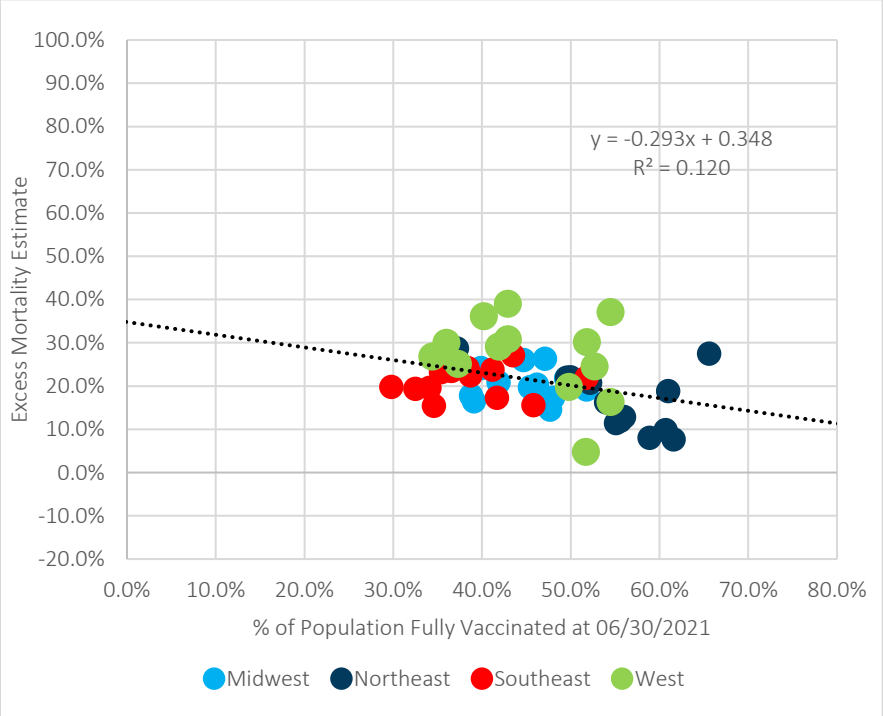


Figure 9.5

GROUP LIFE EXCESS MORTALITY BY STATEWIDE VACCINATION RATE, OCTOBER 2021 THROUGH MARCH 2022

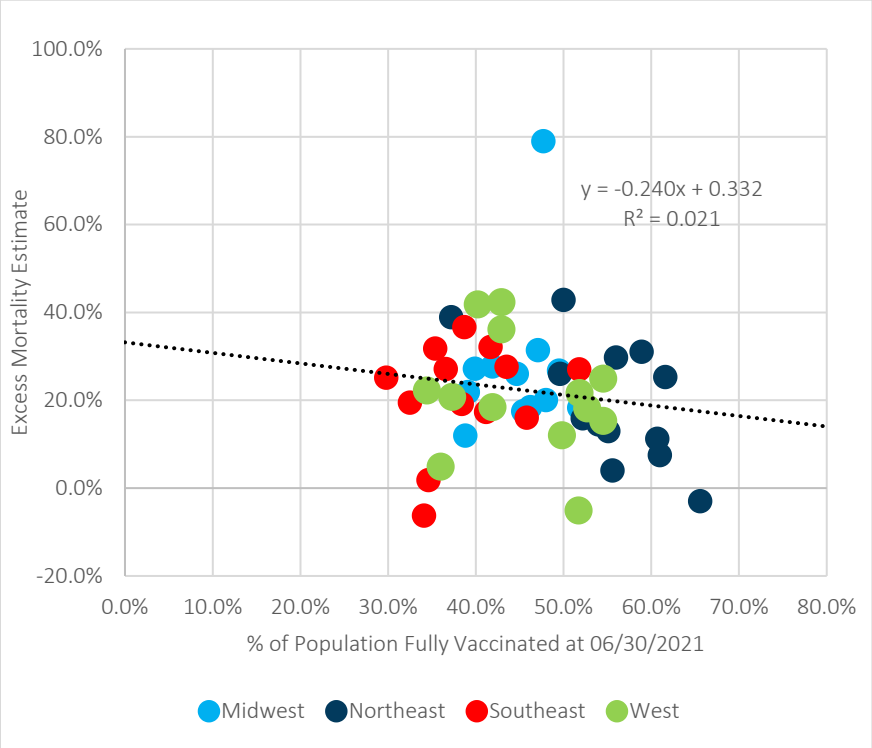


Figure 9.6

U.S. POPULATION EXCESS MORTALITY BY STATEWIDE VACCINATION RATE, JULY 2021 THROUGH JUNE 2022

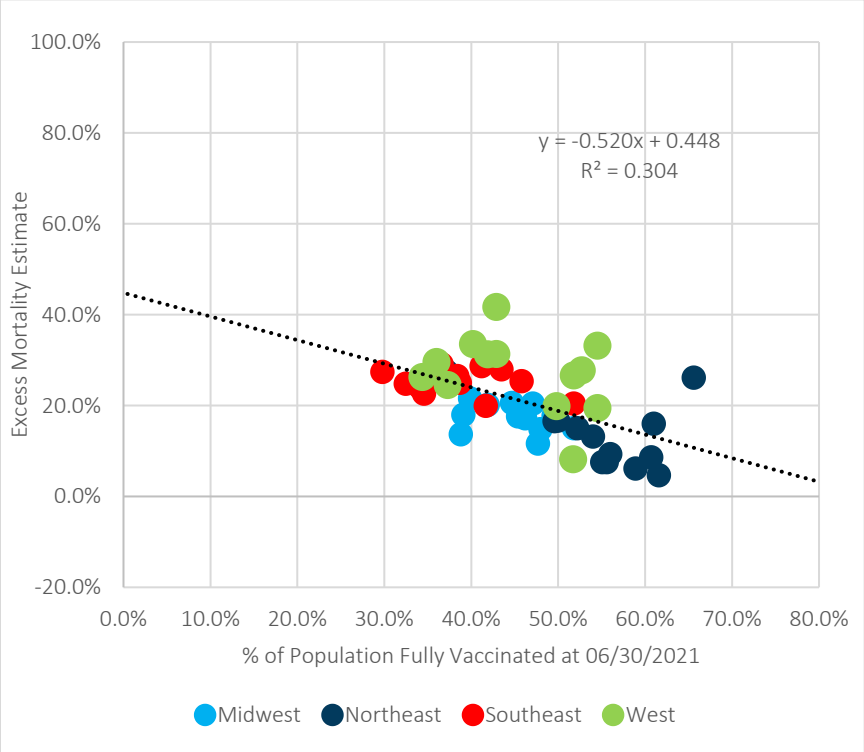
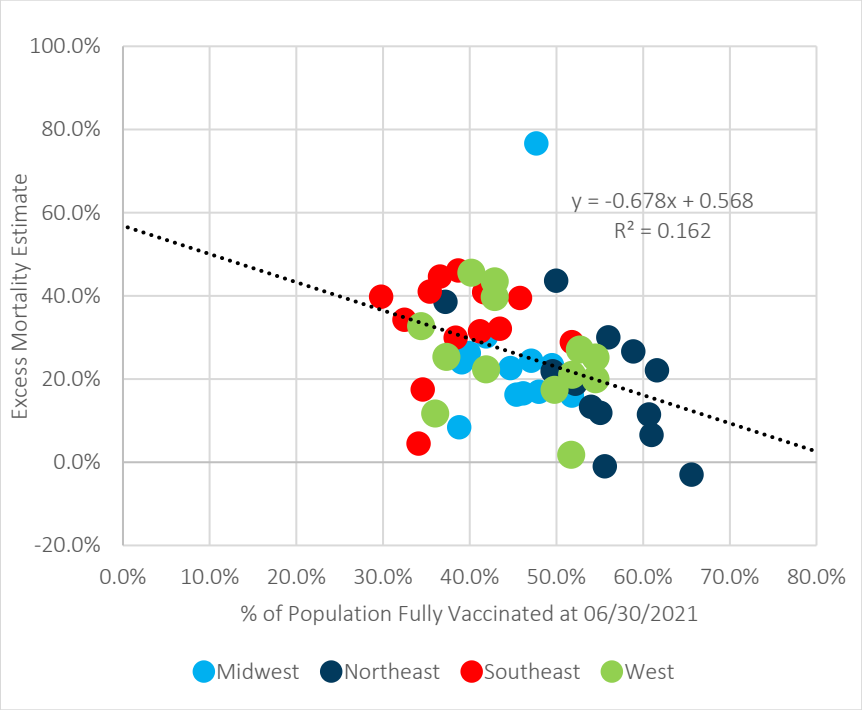


Figure 9.7

GROUP LIFE EXCESS MORTALITY BY STATEWIDE VACCINATION RATE, JULY 2021 THROUGH JUNE 2022



Comparing state-level excess mortality percentage estimates to estimated COVID-19 vaccinated percentages shows a moderate negative correlation for both the U.S. population and the Group Life data for the third quarter of 2021. For subsequent periods, although some negative correlation was still seen, it was less pronounced than the third quarter of 2021. Other variables in addition to COVID-19 vaccination rates are certainly relevant for explaining the excess mortality trends observed in the United States, and various potential reasons likely can be identified for the lower degree of negative correlation in the later period relative to the earlier period. Contributing factors for this shift might include varying degrees of vaccine effectiveness against different variants of the virus or a higher degree of natural immunity because of past infections in the later period.

The color-coded geographic regions in Figures 9.2 through 9.7 show a noticeable clustering of excess mortality results regardless of vaccination percentage, especially in the U.S. population data. Climate and seasonality are possible contributing factors to this observation because weather patterns in broad geographic regions may contribute to similar behavior patterns and levels of viral transmission for states within the same region, which may lead to different waves of the pandemic affecting different geographic regions at different times. State-level differences may also be seen in preventative measures (e.g., social distancing and masking) that produce different transmission and death rates. Finally, COVID-19 deaths do not explain all of the excess mortality observed in the datasets presented here, and mortality patterns for other CODs also influence the patterns shown above.

The data collected for the Group Life survey do not include county-level information to allow for a similar analysis at the county level for the Group Life population. However, enough county-level information is available from the CDC for at least a portion of the counties in the U.S. to allow for a similar analysis at the county level for the U.S. population. There are roughly 3,143 counties and county equivalents in the U.S. After filtering out counties with missing data or gaps in data, roughly 2,100 remaining counties had sufficient data to complete this analysis.

Expected mortality was determined by applying the 2017–2019 county-specific population mortality rate from the CDC[25] to the estimated July 1, 2021, population for each county from the U.S. Census Bureau.[26] Actual mortality was based on the CDC provisional mortality by county and by month.[27] Actual mortality was adjusted for seasonality and the number of days in each calendar month.[28] The counties were then sorted and separated into 50 bins by vaccination rate with an excess mortality percentage determined for each bin. The analysis was completed only through the end of March 2022 to account for the lag in CDC reporting of deaths at the county level.

The scatterplots in Figures 9.8 and 9.9 show the correlation between the county vaccination rates and the excess mortality in the U.S. population. Figures 9.8 shows the third quarter of 2021 for comparison to the state-level analysis in Figure 9.2. Figure 9.9 shows the period of October 2021 through March 2022 shown for comparison to the state-level analysis in Figure 9.4.

Figure 9.8

U.S. COUNTY-SPECIFIC POPULATION EXCESS MORTALITY BY VACCINATION RATE, JULY THROUGH SEPTEMBER 2021

[25] https://wonder.cdc.gov.

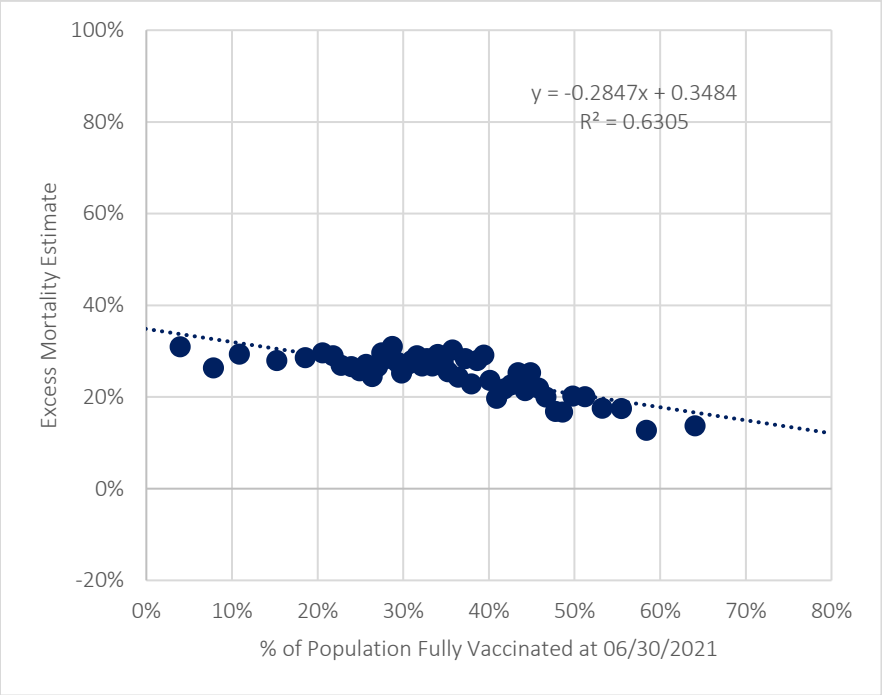
[26] https://www.census.gov/data/tables/time-series/demo/popest/2020s-counties-total.html

[27] https://wonder.cdc.gov/mcd-icd10-provisional.html

[28] The seasonality factors were developed using the same logic as outlined in the SOA paper *2020 Excess Deaths in the U.S. General Population by Age and Sex*, https://www.soa.org/resources/research-reports/2021/excess-deaths-gen-population/. As a simplifying assumption, the same set of country-wide seasonality factors were applied to all counties rather than developing a separate set of seasonality factors for each county based on the demographic mix within each county.

Figure 9.9

U.S. COUNTY-SPECIFIC POPULATION EXCESS MORTALITY BY VACCINATION RATE, OCTOBER THROUGH MARCH 2022



Similar to the state-level analysis for the U.S. population, the county-level analysis shows negative correlation between the excess mortality percentage estimates and the percentages of the population that are fully vaccinated. As was the case with the state-level analysis, the third quarter of 2021 shows a steeper slope than the subsequent periods. In comparing the county-level and state-level graphs for the same corresponding time periods, the *R*-squared statistics suggest a stronger fit at the county level relative to the state level. However, the steeper slopes on the state-level graphs relative to the county-level graphs suggest a larger change in excess mortality per percentage change in vaccination rate at the state level.

Given the range of potential contributing factors for the shifting level of correlation between the vaccination rate and excess mortality, and for the clustering of results by geographic region, the Committee urges caution in drawing definitive conclusions regarding the degree of correlation between the vaccination rate and excess mortality or the geographic clustering.

Section 10: Reliance and Limitations

In producing this report, the Committee relied upon data furnished by contributing companies and data published by the CDC. The Committee would like to stress that the data presented in this survey are emerging. Contributing companies may true up this data over time. The Committee also notes that carriers submitted data in different formats; it is possible that the homogenization of data submissions could introduce some unintended distortion in the survey results. The reader should review the limitations noted throughout the report.

Section 11: List of Participating Companies

The Committee would like to thank the following companies that submitted data and made this COVID-19 mortality survey possible:

Aflac
Anthem
Dearborn National
Guardian
The Hartford
Lincoln Financial Group
MetLife
Mutual of Omaha
New York Life Group Benefit Solutions
OneAmerica
Principal Financial
Reliance Standard
Renaissance
Securian Financial Group
Standard Insurance Group
SunLife Financial Group
Symetra
Unum
USAble
Voya

Appendix A: 2020 SOA Group Term Life COVID-19 Mortality Survey Data Request

Purpose

This is the data request for a Group Term Life Claim study intended to allow a quick assessment of the impact of the COVID-19 pandemic on the Group Life industry – primarily by measuring the extra mortality occurring during the pandemic as compared to prior periods. This high level study will become a valuable data source for Group Life insurers, since the industry wide COVID-19 claims will be significantly more credible than the claims experience for any one carrier.

Timing

We are requesting the initial data submission be provided by **Friday, June 19th**. We acknowledge that this is a tight turnaround, but due to the rapidly changing environment, time is of the essence. Please let us know ASAP if you have a problem with this date or any element of this request. We plan to act quickly on the data – releasing an initial summary report to participating carriers the week of July 6th.

The initial data request is for data from January 2017 through May 2020. We also plan to update the study monthly throughout the duration of the pandemic. Please consider this when you build your queries for the initial request, so that the monthly updates are easier to produce. We request that updates be submitted by the 3rd Friday of each month. Contributors will receive a detailed summary report of their submitted data with some analysis of all the contributed data after each monthly submission. The SOA will also be releasing summary reports of the aggregated results periodically throughout the duration of the study.

General Comments

Our goal is to measure patterns and trends rather than actual mortality rates. For the data request, this means we are more interested in how things change by month than whether they are 100% accurate or even consistent with other carrier submissions. We understand this data assembly will take some effort, and want to minimize unnecessary data manipulation. To this end, please develop your submission as best you can to align with our request, but more importantly, please ensure it is consistent over subsequent monthly updates.

Claim Data Request

Broadly, we are requesting summarized death claim information for your group life business with limited segmentation. The limited segmentation will support further analysis/validation of observed trends. We hope all carriers will be able to provide the Baseline data below. Please also provide the Segmentation if feasible, but we can include your submission in the study even if these components are not readily available.

1. Baseline – The essential data requested is claim counts by incurred month, reported month, product segment, and limited cause of death. Ideally, claim amounts can also be provided.
    - Product Segment = Basic Life, Supp/Optional/Voluntary Life, and Retiree Life
    - Cause of Death = COVID, Accident, and All Other

2. Segmentation – We are also requesting claim counts and amounts for three separate segments – industry, state, and age/sex. Data for each requested segment would be further split into the product and cause of death categories referenced above.
    - Industry = 2-digit SIC code is ideal
    - State = Based on residence, or work location if residence not available
    - Age/Sex = M/F/U, and 10-year age bands

Claim Data Specifics

Again, as we will be looking at trends and patterns rather than actual mortality, it is most important that your submission be consistent month to month. Nevertheless, the ideal submission should consider the following specific criteria:

- Include only group term life business. Exclude any GUL/GVUL, COLI/BOLI, 10/20-year group term, etc.
- Include both self-administered and list-billed business
- Include employee, spouse, and child claims
- Include or exclude portability and conversion claims – whichever is easier - based on your company reporting.
- Include deaths from persons on waiver of premium; exclude active waivers
- Include only death claims; exclude counts or amounts for various riders, especially living benefit riders or critical illness riders
- Include only the life insurance amount for accidental deaths
- Exclude any interest payments or expenses

Exposure Data Request

As stated, this is not a mortality rate study, and we do not intend to calculate mortality rates. The purpose of exposure data is to help explain and validate any observed trends. As with claims, we are requesting both high-level exposure data, as well as exposure data by segment. However, the most critical information is exposures by month.

1. Baseline – The essential data requested is earned premium by report month and product segment. Optional data would include exposed lives by month.
    - Product Segment = Basic Life, Supp/Optional/Voluntary Life, and Retiree Life

2. Segmentation – We are also requesting exposure data for the segments – industry, state, and age/sex. Data for each requested segment would be further split by product.
    - Industry = 2-digit SIC code is ideal
    - State = Based on residence, or work location if residence not available
    - Age/Sex = M/F/U, and 10-year age bands

Exposure Data Specifics

We recognize that it can be difficult to provide exposed lives data, which is why we have selected earned premium as the primary exposure metric. Exposed lives is certainly a valuable addition, if it is available. As with claims, we stress the importance of consistency month to month, and reiterate that we are interested in the information you can provide with relative ease. Some specific (ideal) considerations include:

- Include only group term life business. Exclude any GUL/GVUL, COLI/BOLI, 10/20-year group term, etc.
- Include or exclude premium for accident riders depending on how they are handled in your system; just be consistent and identify what is included.
- Include both self-administered and list-billed business.
- For exposed lives, we recognize that some data (list billed groups, for example) may be more current and accurate than other data. Please provide your best representation of exposed lives, and identify any particular limitations or special considerations in your submission.

Final Notes on Requested Data

We intend to turn around results rapidly to maximize value on internal decision-making for participating carriers. With that in mind, we have tried to keep the request as simple as possible. We have tried to define exactly what we are requesting, but if your own tracking does not align and the customization is difficult, then please provide what you normally track rather than trying to match our definitions. The period-over-period change will be most

valuable, so consistency is more important than precise definitions. We understand there can be nuances in how carriers count claims and track exposures, but we think the recently observed changes will be valuable. If you have any questions at all about what we are asking, please reach out.

PLEASE NOTE: YOUR DATA SUBMISSIONS SHOULD NOT CONTAIN ANY INDIVIDUAL POLICY LEVEL INFORMATION. PLEASE SEND ONLY THE AGGREGATED SUMMARY INFORMATION REQUESTED.

SOA staff will be receiving and compiling your submissions and the SOA is not able to receive any personal information on your policyholders.

Reports

Our minimal request is for the monthly results without industry, geographic, or demographic segmentation. Please provide the additional segment data as you are able, and we will return cross-industry information consistent with your submission. We do not plan to provide individual carrier-level experience.

We plan to show cross-industry extra mortality by calendar month. We will compare the most recent months to the prior periods, including prior months, and the same month a year ago.

We will not show individual carrier experience, but may comment on the consistencies of changes across carriers.

Technical Notes

The accompanying Excel workbook contains specific templates for the data submission. You can use the Excel templates or submit data in a format of your choosing. The workbook includes an "Outline" tab to guide your submission.

Please return the submission via e-mail to Korrel Crawford at kcrawford@soa.org. If you have concerns about file security, please contact her and she will provide you with an alternate means of submitting data in a more secure fashion.

Appendix B: Geography and Industry Code Mappings

Table B.1

GEOGRAPHY CODE MAPPINGS

Abbreviation	State/Province Name	Division	Region
AA	U.S. Armed Forces–Americas	Division 11: Unknown	Other
AB	Alberta	Division 10: Canada	Other
AE	U.S. Armed Forces–Europe	Division 11: Unknown	Other
AK	Alaska	Division 09: Pacific	West
AL	Alabama	Division 06: East South Central	Southeast
AP	U.S. Armed Forces–Pacific	Division 11: Unknown	Other
AR	Arkansas	Division 07: West South Central	Southeast
AS	American Samoa	Division 09: Pacific	Other
AZ	Arizona	Division 08: Mountain	West
BC	British Columbia	Division 10: Canada	Other
CA	California	Division 09: Pacific	West
CO	Colorado	Division 08: Mountain	West
CT	Connecticut	Division 01A: Southern New England	Northeast
DC	District of Columbia	Division 02: Middle Atlantic	Northeast
DE	Delaware	Division 02: Middle Atlantic	Northeast
FL	Florida	Division 05: South Atlantic	Southeast
FM	Micronesia	Division 09: Pacific	Other
GA	Georgia	Division 05: South Atlantic	Southeast
GU	Guam	Division 09: Pacific	Other
HI	Hawaii	Division 09: Pacific	West
IA	Iowa	Division 04: North Central	Midwest
ID	Idaho	Division 08: Mountain	West
IL	Illinois	Division 03: Great Lakes	Midwest
IN	Indiana	Division 03: Great Lakes	Midwest
KS	Kansas	Division 04: North Central	Midwest
KY	Kentucky	Division 06: East South Central	Southeast
LA	Louisiana	Division 07: West South Central	Southeast
MA	Massachusetts	Division 01A: Southern New England	Northeast
MB	Manitoba	Division 10: Canada	Other
MD	Maryland	Division 02: Middle Atlantic	Northeast
ME	Maine	Division 01B: Northern New England	Northeast
MH	Marshall Islands	Division 09: Pacific	Other
MI	Michigan	Division 03: Great Lakes	Midwest
MN	Minnesota	Division 04: North Central	Midwest
MO	Missouri	Division 04: North Central	Midwest
MP	Northern Mariana Islands	Division 09: Pacific	Other
MS	Mississippi	Division 06: East South Central	Southeast
MT	Montana	Division 08: Mountain	West

Abbreviation	State/Province Name	Division	Region
NB	New Brunswick	Division 10: Canada	Other
NC	North Carolina	Division 05: South Atlantic	Southeast
ND	North Dakota	Division 04: North Central	Midwest
NE	Nebraska	Division 04: North Central	Midwest
NH	New Hampshire	Division 01B: Northern New England	Northeast
NJ	New Jersey	Division 02: Middle Atlantic	Northeast
NL	Newfoundland and Labrador	Division 10: Canada	Other
NM	New Mexico	Division 08: Mountain	West
NS	Nova Scotia	Division 10: Canada	Other
NU	Nunavut	Division 10: Canada	Other
NV	Nevada	Division 08: Mountain	West
NW	Northwest Territories	Division 10: Canada	Other
NY	New York	Division 02: Middle Atlantic	Northeast
OH	Ohio	Division 03: Great Lakes	Midwest
OK	Oklahoma	Division 07: West South Central	Southeast
ON	Ontario	Division 10: Canada	Other
OR	Oregon	Division 09: Pacific	West
Other	Other	Division 11: Unknown	Other
PA	Pennsylvania	Division 02: Middle Atlantic	Northeast
PE	Prince Edward Island	Division 10: Canada	Other
PR	Puerto Rico	Division 05: South Atlantic	Other
PW	Palau	Division 09: Pacific	Other
QC	Quebec	Division 10: Canada	Other
RI	Rhode Island	Division 01A: Southern New England	Northeast
SC	South Carolina	Division 05: South Atlantic	Southeast
SD	South Dakota	Division 04: North Central	Midwest
SK	Saskatchewan	Division 10: Canada	Other
TN	Tennessee	Division 06: East South Central	Southeast
TX	Texas	Division 07: West South Central	Southeast
UN	Unknown	Division 11: Unknown	Other
Unknown	Unknown	Division 11: Unknown	Other
UT	Utah	Division 08: Mountain	West
VA	Virginia	Division 05: South Atlantic	Southeast
VI	U.S. Virgin Islands	Division 05: South Atlantic	Other
VT	Vermont	Division 01B: Northern New England	Northeast
WA	Washington	Division 09: Pacific	West
WI	Wisconsin	Division 03: Great Lakes	Midwest
WV	West Virginia	Division 02: Middle Atlantic	Northeast
WY	Wyoming	Division 08: Mountain	West
YK	Yukon	Division 10: Canada	Other

Table B.2
INDUSTRY CODE MAPPINGS

Two-Digit SIC Code	Industry Group	Collar Color
00	Unknown/Invalid	Unknown
01	Agricultural; Forestry; Fishing	Blue
02	Agricultural; Forestry; Fishing	Blue
03	Agricultural; Forestry; Fishing	Blue
04	Agricultural; Forestry; Fishing	Blue
05	Agricultural; Forestry; Fishing	Blue
07	Agricultural; Forestry; Fishing	Blue
08	Agricultural; Forestry; Fishing	Blue
09	Agricultural; Forestry; Fishing	Blue
10	Mining	Blue
11	Mining	Blue
12	Mining	Blue
13	Mining	Blue
14	Mining	Blue
15	Construction	Blue
16	Construction	Blue
17	Construction	Blue
18	Construction	Blue
19	Construction	Blue
20	Manufacturing–Food	Blue
21	Manufacturing–Food	Blue
22	Manufacturing–Clothes; Textile; Wood	Blue
23	Manufacturing–Clothes; Textile; Wood	Blue
24	Manufacturing–Clothes; Textile; Wood	Blue
25	Manufacturing–Clothes; Textile; Wood	Blue
26	Manufacturing–Clothes; Textile; Wood	Blue
27	Manufacturing–Paper; Drugs	Grey
28	Manufacturing–Paper; Drugs	Grey
29	Manufacturing–Paper; Drugs	Grey
30	Manufacturing–Paper; Drugs	Grey
31	Manufacturing–Paper; Drugs	Grey
32	Manufacturing–Paper; Drugs	Grey
33	Manufacturing–Heavy; Steel;	Blue
34	Manufacturing–Heavy; Steel;	Blue
35	Manufacturing–Heavy; Steel;	Blue
36	Manufacturing–Heavy; Steel;	Blue
37	Manufacturing–Auto, Airplanes, Precision Equipment	Blue
38	Manufacturing–Auto, Airplanes, Precision Equipment	Blue
39	Manufacturing–Auto, Airplanes, Precision Equipment	Blue

Two-Digit SIC Code	Industry Group	Collar Color
40	Transport; Communication; Utilities	Blue
41	Transport; Communication; Utilities	Blue
42	Transport; Communication; Utilities	Blue
43	Transport; Communication; Utilities	Blue
44	Transport; Communication; Utilities	Blue
45	Transport; Communication; Utilities	Blue
46	Transport; Communication; Utilities	Blue
47	Transport; Communication; Utilities	Blue
48	Transport; Communication; Utilities	Blue
49	Transport; Communication; Utilities	Blue
50	Wholesale Trade	Grey
51	Wholesale Trade	Grey
52	Retail–Trade	Grey
53	Retail–Trade	Grey
54	Retail–Trade	Grey
55	Retail–Trade	Grey
56	Retail–Trade	Grey
57	Retail–Trade	Grey
58	Retail–Trade	Grey
59	Retail–Trade	Grey
60	Banks and Securities	White
61	Banks and Securities	White
62	Banks and Securities	White
63	Insurance; Other Finance	White
64	Insurance; Other Finance	White
65	Insurance; Other Finance	White
66	Insurance; Other Finance	White
67	Insurance; Other Finance	White
68	Insurance; Other Finance	White
69	Insurance; Other Finance	White
70	Hotels/Personal Services	Grey
71	Hotels/Personal Services	Grey
72	Hotels/Personal Services	Grey
73	Misc. Service/Data Processing	Grey
74	Misc. Service/Data Processing	Grey
75	Misc. Service/Data Processing	Grey
76	Misc. Service/Data Processing	Grey
78	Misc. Service/Data Processing	Grey
79	Misc. Service/Data Processing	Grey
80	Doctors' Offices	White
81	Legal Services	White

Two-Digit SIC Code	Industry Group	Collar Color
82	Educational Services	White
83	Social Services	White
84	Museums and Membership Organizations	White
85	Museums and Membership Organizations	White
86	Museums and Membership Organizations	White
87	Engineering, Architecture, Business Consulting	White
88	Engineering, Architecture, Business Consulting	White
89	Engineering, Architecture, Business Consulting	White
90	Public Administration	White
91	Public Administration	White
92	Public Administration	White
93	Public Administration	White
94	Public Administration	White
95	Public Administration	White
96	Public Administration	White
97	Public Administration	White
99	Unknown/Invalid	Unknown
Unknown	Unknown/Invalid	Unknown

Appendix C: Survey Methodology and Documentation

C.1 DOCUMENTATION

Participating companies provided both claims and exposure data on a monthly basis. The initial data request can be found in Appendix A. For claims information, the following fields were requested:

- Incurred Month
- Reported Month
- Product Type
- Cause of Death
- Number of Claims
- Total Claim Amount Covered/Paid

For exposure information, the following fields were requested:

- Exposure Month
- Product Type
- Exposed Premium
- Number of Inforce Lives

In addition to the above "core" request, participants were also optionally asked to provide the above information split by state, age/sex grouping and industry (two-digit SIC code). The lone exception is that Reported Month was not requested for the claims portion of these three more granular cuts of the data.

Below is a summary of the key processing assumptions and decisions for each of these fields.

Claims–Incurred Month

Incurred Months were generally used as provided without adjustment. The primary exception was that data with an Incurred Month after the as-of-date were excluded. For example, for the March 2022 data submissions, claims with an Incurred Month of April 2022 were excluded.

Claims–Reported Month

Claims with a Reported Month before the Incurred Month were adjusted by setting the Reported Month equal to the Incurred Month.

Claims–Product Type

Carriers were asked to provide data with one of three Product Types: Employee Basic, Employee Supplemental/Voluntary and Retiree Life. All alternative codes received for the Product Type field were sent as data questions to carriers and ultimately mapped to one of these three principal product types. Notably, dependent claims were mapped to one of the two employee types, depending on the code received.

Claims–Cause of Death

Contributors were asked to identify claims as due to COVID, Accident, All-Other Non-Accident (Illness) or Unknown.

Claims–Number of Claims and Total Claim Amount Covered/Paid

Claims by Reported Date were processed as is without adjustment. However, on an incurred basis, the claims needed to be adjusted with completion factors as described in subsection C.2.1; otherwise, the incidence rates in recent periods would be understated.

Exposure–Exposure Month and Product Type

Processing for these fields was analogous to the corresponding claims fields.

Exposure–Exposed Premium

The proximity of the survey request to the reporting dates of the data requested presented some challenges in the monthly collection process because recent exposure data may be unavailable. For example, one carrier indicated that their premium information for March 2022 was incomplete; therefore, the average premiums for October through December 2021 were imputed for March 2022 for this carrier.

Exposure–Number of Inforce Lives

Not all carriers provided the Number of Inforce Lives. For these carriers, this field was imputed using the average premium per life (PPL) from carriers that supplied both premiums and lives. A separate PPL was calculated for each year and product type, and the missing Number of Inforce Lives was populated by dividing the provided premium by the PPL appropriate to the year and product type for which the premium was earned. The Committee acknowledges that PPL varies by company and that the exposure completion methodology may result in an aggregate incidence rate that differs materially from the actual level of incidence, but the Committee does not expect that it distorted the trends monitored in this study.

Segment Information–State Code

State codes that did not match a listing of valid U.S. state, U.S. overseas territory or Canadian province codes were sent as data questions to the contributors. Some records with indeterminate codes after this questioning process were mapped to an “unknown” category.

Segment Information–Age and Sex

Companies provided age information according to the following categories: 0–24, 25–34, 35–44, 45–54, 55–64, 65–74, 75–84 and 85+. These age groupings were then lumped into the following broader groupings: 0–44, 45–64 and 65+. Sex information was collected as male, female and unknown.

Segment Information–Industry

For the Industry field, contributors were asked to provide two-digit SIC codes. Codes that did not match a list of valid two-digit SIC codes were sent as data questions to the contributor for resolution. Some records with indeterminate codes after this questioning process were mapped to an “Unknown” category.

C.2 RESULTS PROCESSING AND REVIEW

C.2.1 COMPLETION OF CLAIMS

A table of claim counts by Incurred Month and Reported Month was compiled to develop completion factors. Month-to-month completion factors were estimated using the accumulated totals for a particular incurred month in consecutive reported months. Some seasonal variation was observed in the completion factors, so adjustments to the factors for calendar month were incorporated.

The total completion factors were computed by cumulatively applying the month-to-month completion factors to all subsequent months. For example, the total completion factor for a claim in month 0 is the factor for month 0 to 1, times the factor for month 1 to 2, times the factor for month 2 to 3, and so forth. In total, 36 months of completion were used.

Completion factors vary by calendar month, reflecting the seasonal nature of claim reporting and claim processing speeds. The Committee also incorporated factor variation by reporting speed groups. The rate at which the contributing companies' claims complete was analyzed and categorized into five groups, with three to five companies in each reporting speed group.

C.2.2 BROADER CLASSIFICATION OF SEGMENT INFORMATION

For credibility and confidentiality reasons, the industry codes and state codes were grouped into broader segments for analysis. State codes were mapped to one of 11 divisions, with the New England division split into northern and southern portions. The state codes were also mapped to four broader U.S. regions (Northeast, Midwest, Southeast, West), with Canada, overseas territories and unknown codes grouped into a fifth "Other" region.

The two-digit SIC codes were organized into 23 different groupings, and then more broadly into one of four codes by collar color (White, Grey, Blue, Unknown).

A table showing the details of these mappings can be found in Appendix B.

C.2.3 UNKNOWN CLAIM DIAGNOSIS

The Unknown claim diagnosis category is artificially large for December 2021 through March 2022. This is primarily because of the newness of these claims and a reflection of the claim adjudication lifecycle. It is not uncommon to find an additional time lag between the claim reporting date and the point in the claim adjudication process when the COD is known, allowing for the claim to be categorized. As claims data have been collected and refreshed each month, the Committee has observed that the concentration of claims with an unknown COD decreases as the number of months between the original reporting date and the data collection date increases.

C.2.4 COVID-19 CLAIMS FROM 2019 OR EARLIER

The data show a handful of COVID-19 claims with dates of death in 2019 or earlier. The Committee believes that these are coding errors where incorrect COD codes were supplied. These claims remain in the data as submitted without adjustment.

C.2.5 GROUPINGS BY COMPANY SIZE

To review results by company size (see subsection 5.4), contributors were split into three groups based on annualized premium amounts from 2019. The Small group consists of companies with less than $300 million in 2019 premiums, the Medium group consists of companies with between $300 million and $1 billion, and the Large group

consists of companies with more than $1 billion. The breakpoints were chosen to ensure at least six companies in each group. The Small group contains six companies, and the Medium and Large groups contain seven companies each.

Appendix D: Completion Factor Development

D.1 BY CLAIM COUNT

Historic Group Life claim reporting patterns by claim count have been studied to develop completion factors, which were then used to translate reported claims through August 2020 by incurral month into estimated ultimate incurred claims for each month. The completion factors for this report are based on the total set of claims by all causes from all 20 participating carriers, with incurred dates of January 2017 or later and reported dates up through September 2020. Since that time, completion factors have been reviewed periodically, and no changes were made to them.

Claims were batched into a claim triangle with incurred month on the horizontal axis and reported month on the vertical axis. Lag is defined as the number of months between when a death occurs and when the claim is reported to a carrier. Thus, a death that was both incurred and reported in August 2020 would have a lag of zero, whereas a death incurred in June 2020 but reported in August 2020 would have a lag of two, and so on. A subset of the claim triangle is displayed in Table D.1.

Table D.1

2020 INCURRED CLAIMS BY INCURRED MONTH AND REPORTING LAG

Months of Reporting Lag	Incurred Month							
	Jan-20	Feb-20	Mar-20	Apr-20	May-20	Jun-20	Jul-20	Aug-20
0	11,887	10,137	10,932	13,971	11,276	10,786	13,014	12,826
1	14,647	14,412	15,443	16,559	16,158	14,850	15,686	
2	5,822	4,961	5,713	6,916	6,109	5,517		
3	2,159	1,867	2,656	2,785	2,249			
4	1,350	1,242	1,283	1,386				
5	910	623	732					
6	559	374						
7	438							

Month-to-month completion factors were developed using the accumulated totals for a particular incurred month in consecutive reported months. Seasonal variations were observed during the first two months of lag, so adjustments to the factors for calendar month were incorporated. The total completion factors, as displayed in Table D.2, were computed by cumulatively applying the month-to-month completion factors to all subsequent months. The data presented in both Tables D.1 and D.2 have not been changed since the July 2021 publication of this report.

Table D.2

ESTIMATED COMPLETION FACTORS BY NUMBER OF MONTHS OF LAG AND CALENDAR MONTH

Lag	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
0	3.5594	3.7656	3.4405	3.4405	3.4405	3.4405	3.3387	3.1129	3.3387	3.2384	3.5594	4.0150
1	1.4808	1.4313	1.4313	1.4313	1.4313	1.4313	1.3890	1.4313	1.3890	1.4313	1.4808	1.4313
2	1.1752	1.1752	1.1752	1.1752	1.1752	1.1752	1.1752	1.1752	1.1752	1.1752	1.1752	1.1752
3	1.1015	1.1015	1.1015	1.1015	1.1015	1.1015	1.1015	1.1015	1.1015	1.1015	1.1015	1.1015
4	1.0697	1.0697	1.0697	1.0697	1.0697	1.0697	1.0697	1.0697	1.0697	1.0697	1.0697	1.0697
5	1.0530	1.0530	1.0530	1.0530	1.0530	1.0530	1.0530	1.0530	1.0530	1.0530	1.0530	1.0530
6	1.0430	1.0430	1.0430	1.0430	1.0430	1.0430	1.0430	1.0430	1.0430	1.0430	1.0430	1.0430
7	1.0363	1.0363	1.0363	1.0363	1.0363	1.0363	1.0363	1.0363	1.0363	1.0363	1.0363	1.0363
8	1.0314	1.0314	1.0314	1.0314	1.0314	1.0314	1.0314	1.0314	1.0314	1.0314	1.0314	1.0314
9	1.0277	1.0277	1.0277	1.0277	1.0277	1.0277	1.0277	1.0277	1.0277	1.0277	1.0277	1.0277
10	1.0248	1.0248	1.0248	1.0248	1.0248	1.0248	1.0248	1.0248	1.0248	1.0248	1.0248	1.0248
11	1.0221	1.0221	1.0221	1.0221	1.0221	1.0221	1.0221	1.0221	1.0221	1.0221	1.0221	1.0221
12	1.0197	1.0197	1.0197	1.0197	1.0197	1.0197	1.0197	1.0197	1.0197	1.0197	1.0197	1.0197
13	1.0177	1.0177	1.0177	1.0177	1.0177	1.0177	1.0177	1.0177	1.0177	1.0177	1.0177	1.0177
14	1.0162	1.0162	1.0162	1.0162	1.0162	1.0162	1.0162	1.0162	1.0162	1.0162	1.0162	1.0162
15	1.0148	1.0148	1.0148	1.0148	1.0148	1.0148	1.0148	1.0148	1.0148	1.0148	1.0148	1.0148
16	1.0136	1.0136	1.0136	1.0136	1.0136	1.0136	1.0136	1.0136	1.0136	1.0136	1.0136	1.0136
17	1.0126	1.0126	1.0126	1.0126	1.0126	1.0126	1.0126	1.0126	1.0126	1.0126	1.0126	1.0126
18	1.0116	1.0116	1.0116	1.0116	1.0116	1.0116	1.0116	1.0116	1.0116	1.0116	1.0116	1.0116
19	1.0107	1.0107	1.0107	1.0107	1.0107	1.0107	1.0107	1.0107	1.0107	1.0107	1.0107	1.0107
20	1.0098	1.0098	1.0098	1.0098	1.0098	1.0098	1.0098	1.0098	1.0098	1.0098	1.0098	1.0098
21	1.0090	1.0090	1.0090	1.0090	1.0090	1.0090	1.0090	1.0090	1.0090	1.0090	1.0090	1.0090
22	1.0083	1.0083	1.0083	1.0083	1.0083	1.0083	1.0083	1.0083	1.0083	1.0083	1.0083	1.0083
23	1.0076	1.0076	1.0076	1.0076	1.0076	1.0076	1.0076	1.0076	1.0076	1.0076	1.0076	1.0076
24	1.0069	1.0069	1.0069	1.0069	1.0069	1.0069	1.0069	1.0069	1.0069	1.0069	1.0069	1.0069
25	1.0062	1.0062	1.0062	1.0062	1.0062	1.0062	1.0062	1.0062	1.0062	1.0062	1.0062	1.0062
26	1.0056	1.0056	1.0056	1.0056	1.0056	1.0056	1.0056	1.0056	1.0056	1.0056	1.0056	1.0056
27	1.0051	1.0051	1.0051	1.0051	1.0051	1.0051	1.0051	1.0051	1.0051	1.0051	1.0051	1.0051
28	1.0046	1.0046	1.0046	1.0046	1.0046	1.0046	1.0046	1.0046	1.0046	1.0046	1.0046	1.0046
29	1.0042	1.0042	1.0042	1.0042	1.0042	1.0042	1.0042	1.0042	1.0042	1.0042	1.0042	1.0042
30	1.0038	1.0038	1.0038	1.0038	1.0038	1.0038	1.0038	1.0038	1.0038	1.0038	1.0038	1.0038
31	1.0033	1.0033	1.0033	1.0033	1.0033	1.0033	1.0033	1.0033	1.0033	1.0033	1.0033	1.0033
32	1.0030	1.0030	1.0030	1.0030	1.0030	1.0030	1.0030	1.0030	1.0030	1.0030	1.0030	1.0030
33	1.0025	1.0025	1.0025	1.0025	1.0025	1.0025	1.0025	1.0025	1.0025	1.0025	1.0025	1.0025
34	1.0022	1.0022	1.0022	1.0022	1.0022	1.0022	1.0022	1.0022	1.0022	1.0022	1.0022	1.0022
35	1.0006	1.0006	1.0006	1.0006	1.0006	1.0006	1.0006	1.0006	1.0006	1.0006	1.0006	1.0006

D.2 BY FACE AMOUNT

Our analysis showed that larger face amount claims report faster than lower face amount claims. Thus, over time the average face amount for an incurral month decreases as claims continue to be reported in later months. For example, the average face amount of claims reported in the first month of an incurral period may be $40,000, but three years later, it may be $36,000. This would imply that an adjustment factor of 90% is needed to more accurately complete the total claim amounts.

The development of average claim amounts over time was studied from 2017 to 2019 for each month, and a set of factors were developed to adjust the projected claim amounts in future reports. Table D.3 shows a summarized version of the resulting adjustment factors. These adjustment factors have since been incorporated into the completion factors used within this report.

Table D.3

AVERAGE CLAIM AMOUNT ADJUSTMENT FACTORS BY REPORTING LAG MONTH (ILLUSTRATIVE)

Reporting Lag Month	Adjustment to Average Size
0	86.0%
1	92.7%
2	95.8%
3	97.2%
10	99.1%
20	99.7%
35	100.0%

D.3 BY CAUSE OF DEATH

It was unknown early in the pandemic whether COVID-19 claims would be reported more quickly or slowly than other claims. Assignment of the COD is typically later in the claim adjudication cycle then reporting of the claim, so COVID claims in general were expected to complete a bit more slowly than average claims because of the need to complete that step in the adjudication cycle. For deaths in June 2020 through February 2021, it appears that COVID-19 claims were being reported at roughly the same rate as the non-COVID-19 set of claims (see Table D.4). The Committee has reviewed the relative reporting speed of COVID-19 claims at multiple intervals during the pandemic and has concluded that it is not materially different than average; for this reason, the analysis has not been revisited for this report.

Table D.4

CHAIN-LINK FACTORS FOR DEATHS IN JUNE 2020–FEBRUARY 2021

Lag Months	COVID	All Other Causes	COVID/All Other Causes
0	2.188	2.202	99.3%
1	1.203	1.198	100.4%
2	1.062	1.068	99.4%
3	1.031	1.034	99.7%
0–3	2.888	2.916	99.1%

D.4 BY COMPANY REPORTING SPEED

The Committee observed that incurred claim completion rates vary significantly from company to company. Upon analyzing the differences, the 20 contributing companies were grouped into five "reporting speed" groups based on similar reporting patterns. The completion ratios were studied from 2017 through 2020 for these five groups, but more significant weight was placed on data from 2020 as was the case for the base completion factor development. The completion patterns for the five groups were compared to the aggregate completion factors and expressed as adjustments in Table D.5. The Committee observed that the differential in completion time was material for the first six reporting months for each incurred period. Further, the Committee did not discern any credible difference in the speed by incurral calendar month; hence only one vector of adjustments is provided for each group. These adjustments provide a more representative picture for the individual company reports and, to a lesser extent, improve the predictive fit of completed claims in total. Thus, the current speed group factors have been updated as compared to subsection 9.3 of the December 2020 publication.

Table D.5

COMPLETION ADJUSTMENT FACTORS BY REPORTING SPEED GROUP

Lag	Group 1	Group 2	Group 3	Group 4	Group 5	Aggregate
0	64.8%	81.6%	111.2%	122.0%	250.0%	100.0%
1	86.1%	94.6%	100.7%	101.4%	125.7%	100.0%
2	94.3%	98.5%	100.5%	100.9%	107.1%	100.0%
3	96.9%	99.3%	100.3%	100.7%	103.7%	100.0%
4	98.0%	99.6%	100.2%	100.5%	102.5%	100.0%
5	98.5%	99.8%	100.1%	100.4%	101.9%	100.0%

Groups 1 and 2 reported claims faster than the aggregate completion factors, evidenced by reducing the magnitude of completion factors for the first six months of reporting. Groups 3 through 5 reported claims slower than the aggregate completion factors.

Appendix E: Cause of Death Mapping

Table E.1
CAUSE OF DEATH MAPPING

COD Group No.	Group Name	ICD10 Codes	CDC ICD-10 Grouping Analog	ICD9 Codes	CDC ICD9 Grouping Analog
1	Cancer	C00–C97	4 to 14	140–239	4 to 11
2	Diabetes	E10–E14	15	249–250	12
3	Influenza & Pneumonia	J09–J18	24	480–488 (pneumonia and influenza) or 487–488 (just influenza)	20
4	Major Cardiovascular Diseases	I00–I09, I11, I13, I20–I51	17 to 23	393–429	13 to 20
5	COVID-19	U07.1, U07.2, B97.29, B97.26, Z03.818, Z20.828, Underlying Cause of Death	N/A	N/A	N/A
6	Accidents (motor vehicle)	V02–V04, V09.0, V09.2, V12–V14, V19.0–V19.2, V19.4–V19.6, V20–V79, V80.3–V80.5, V81.0–V81.1, V82.0–V82.1, V83–V86, V87.0–V87.8, V88.0–V88.8, V89.0, V89.2	35	E810–E829	33
7	Accidents (non-motor vehicle)	W00–X59, Y86, V01, V05–V06, V09.1, V09.3–V09.9, V10–V11, V15–V18, V19.3, V19.8–V19.9, V80.0–V80.2, V80.6–V80.9, V81.2–V81.9, V82.2–V82.9, V87.9, V88.9, V89.1, V89.3, V89.9, V90–V99, Y85	36	Subset of 800–959 and 978–999, along with supplemental E-codes	34 (subset)
8	Suicide	U03, X60–X84, Y87.0	37	E950–E959	35
9	Homicide	U01–U02, X85–Y09, Y87.1	38	E960–E969	36
10	Liver	K70, K73–K74	27	570–573	26
11	Drug Overdose	Is a subset of accident, assault, suicide and undetermined and requires more than the primary COD to identify: X40–44, X60–64, X85 or Y10–Y14 in combination with any of the following multiple COD codes: T40.9, T40.1, T40.2, T40.3, T40.4 or T40.6	Subset of 36 and 39	960–977 and E930–E949	Subset of 32 and 34
12	All Other/ Unknown	All claims not in groups 1–11	All other groups/ codes	All claims/codes not in above groups	All other groups/codes

About The Society of Actuaries Research Institute

Serving as the research arm of the Society of Actuaries (SOA), the SOA Research Institute provides objective, data-driven research bringing together tried and true practices and future-focused approaches to address societal challenges and your business needs. The Institute provides trusted knowledge, extensive experience and new technologies to help effectively identify, predict and manage risks.

Representing the thousands of actuaries who help conduct critical research, the SOA Research Institute provides clarity and solutions on risks and societal challenges. The Institute connects actuaries, academics, employers, the insurance industry, regulators, research partners, foundations and research institutions, sponsors and non-governmental organizations, building an effective network which provides support, knowledge and expertise regarding the management of risk to benefit the industry and the public.

Managed by experienced actuaries and research experts from a broad range of industries, the SOA Research Institute creates, funds, develops and distributes research to elevate actuaries as leaders in measuring and managing risk. These efforts include studies, essay collections, webcasts, research papers, survey reports, and original research on topics impacting society.

Harnessing its peer-reviewed research, leading-edge technologies, new data tools and innovative practices, the Institute seeks to understand the underlying causes of risk and the possible outcomes. The Institute develops objective research spanning a variety of topics with its strategic research programs: aging and retirement; actuarial innovation and technology; mortality and longevity; diversity, equity and inclusion; health care cost trends; and catastrophe and climate risk. The Institute has a large volume of topical research available, including an expanding collection of international and market-specific research, experience studies, models and timely research.

Society of Actuaries Research Institute
475 N. Martingale Road, Suite 600
Schaumburg, Illinois 60173
www.SOA.org