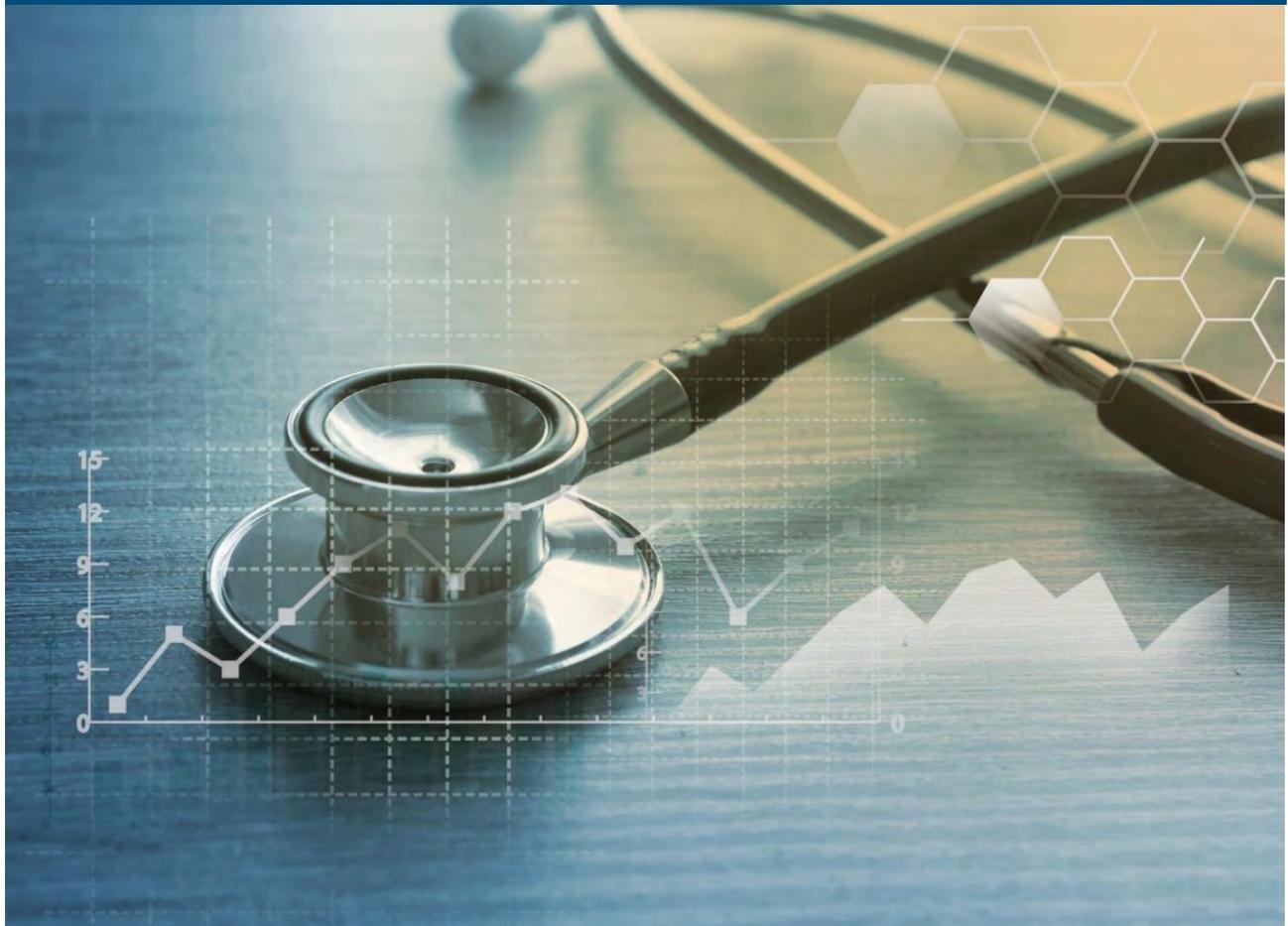


# COVID-19 Costs to Commercial Health Insurers



# COVID-19 Costs to Commercial Health Insurers

**AUTHOR** Achilles Natsis, FSA, MAAA  
Health Research Actuary  
Society of Actuaries

Over the past month, the emergence of the COVID-19 pandemic has had a significant and devastating impact on many aspects of people’s lives, as well as on a wide array of industries. The health care services industry is one which is undergoing upheaval with ramifications on many different aspects, from access to services, to cost and utilization of services. As health care providers deal with this crisis on the front lines, payers are scrambling to determine the impact of this pandemic on current and future health care costs. Some key considerations of health care payers include the costs of current COVID-19 treatments, the impact of staying at home and social distancing on current health care costs, and future health care costs beyond the first wave of COVID-19.

COVID-19 presents a unique problem in terms of estimating cost due to its novelty and prevalence throughout the world. For countries with nationalized health care, such as Great Britain, and most of the European Union countries, the onus of determining its associated costs and reimbursing providers falls on government health entities. For countries like the United States, the payer responsibility is spread between government entities, health insurance providers, self-insured employers, stop loss insurers, and reinsurers. This brief will focus on costs related to the United States.

## Costs of Current COVID-19 Treatments

The different types of costs related to the COVID-19 disease itself are relatively straightforward, but their estimation can be more challenging. There are different levels of severity associated with this disease and each one comes with its own potential costs. A categorization of COVID-19 disease states is listed below in Table 1 along with a range of prevalences among them. In addition, a series of potential cost types related to different stages are also included in this table.

**Table 1**  
TYPES OF MEDICAL EXPENSES ASSOCIATED WITH VARIOUS COVID-19 DISEASE STATES

| Disease State and Services Rendered | Asymptomatic | Mild    | Moderate | Severe  | Critical | Deceased |
|-------------------------------------|--------------|---------|----------|---------|----------|----------|
| Population Prevalence               | 20%-40%      | 20%-30% | 15%-30%  | 12%-20% | 2%-6%    | 1% - 4%  |
| COVID-19 Testing                    | 5%           | 50%     | 75%      | 100%    | 100%     | 100%     |
| Physician Visit                     | 0%           | 50%     | 80%      | 90%     | 90%      | 90%      |
| Therapeutic Drugs                   | 5%           | 20%     | 30%      | 30%     | 30%      | 30%      |
| Hospital Admission                  | 0%           | 0%      | 0%       | 100%    | 100%     | 95%      |
| Intensive Care Unit (ICU)           | 0%           | 0%      | 0%       | 0%      | 100%     | 95%      |
| ICU with Ventilator                 | 0%           | 0%      | 0%       | 0%      | 75%      | 95%      |

In the current environment, physician visit costs are most likely to take place through telemedicine or a telephonic setting. Also, severe cases are considered to be those that result in hospitalization in this example. Finally, deceased members are considered to be those who died while receiving treatment for the virus. Not all COVID-19 deaths occur or will occur in a hospital setting and this table attempts to reflect this reality.

The next logical step is to estimate the costs associated with each service rendered within a particular disease state. Several industry studies have looked at potential estimates for health care services related to COVID-19. Table 2 includes estimated ranges of expenses for the cost categories shown in Table 1.

**Table 2**  
COST ESTIMATES OF SERVICES ASSOCIATED WITH COVID-19

| Cost of Services                   | Low Estimate | Mid Estimate | High Estimate |
|------------------------------------|--------------|--------------|---------------|
| COVID-19 Testing <sup>1</sup>      | \$ 40        | \$ 70        | \$ 100        |
| Physician Visit <sup>2</sup>       | \$ 75        | \$ 125       | \$ 200        |
| Therapeutic Drugs <sup>3,4,5</sup> | \$ 70        | \$ 100       | \$ 500        |
| Daily Hospital Costs <sup>6</sup>  | \$ 3,000     | \$ 5,000     | \$ 7,000      |
| Daily ICU/Ventilator Costs         | \$ 10,000    | \$ 15,000    | \$ 20,000     |

Note that the estimates are derived from different sources with an intentionally wide range to reflect some of the unit pricing differences that may exist in different geographies. They are based on typical commercial health insurance pricing with the midpoint representing values close to the average of what was available. The reimbursement rates are intended to be for commercial health insurance. These rates may change significantly as insurers explore the possibility of unique provider reimbursement arrangements specific to COVID-19. Table 3 below summarizes some new ICD-10-CM COVID-19 coding changes that went live in March and will be effective for hospital discharges on or after April 1. These new codes implemented by the Centers for Medicare & Medicaid Services (CMS)<sup>7</sup> are likely to drive contracting changes between insurers and participating hospitals. In this particular table, CC stands for “Co-morbidities and/or Complications,” while MCC stands for “Major Co-morbidities and/or Complications.” MS-DRG stands for “Medicare Severity Diagnosis Related Group.” Also, ICD-10-CM is a methodology for providing diagnosis detail on claims. These are all standard terminologies used by providers to appropriately classify claims and help determine reimbursement amounts.

**Table 3**  
UPDATED ICD-10-CM COVID-19 CODES

| Diagnosis Code | Description | CC  | MCC | MS-DRG      |
|----------------|-------------|-----|-----|-------------|
|                |             |     | 04  | 177,178,179 |
| U07.1          | COVID-19    | MCC | 15  | 791,793     |
|                |             |     | 25  | 974,975,976 |

The emphasis on hospital costs is because, while COVID-19 treatment is relatively inexpensive for individuals who do not require hospitalization, costs for hospitalized COVID-19 patients can be prohibitive. Table 4 below illustrates that point as the costs for the first three disease states that do not result in hospitalization pale in comparison to those that do. In addition, patients who require intensive care (ICU) and intubation have even steeper cost estimates than those who are merely hospitalized. In fact, critical patients who survive often have higher costs than those who don’t since they may require additional hospitalization at a lower acuity setting as they convalesce. Those costs were calculated using factors from Table 2. Lengths of Stay were estimated using anticipated lengths of stay and potential variances for each disease state. Also, some of the lower acuity hospitalizations may have very short stays. This is more likely to take place in settings where hospital space is becoming scarce and patients may be sent home with oxygen to continue their recovery there, thus freeing up space for new cases as well as more severe conditions.

**Table 4**  
COST ESTIMATES OF DIFFERENT COVID-19 DISEASE STATES

| Total Treatment Cost | Asymptomatic | Mild  | Moderate | Severe   | Critical  | Deceased  |
|----------------------|--------------|-------|----------|----------|-----------|-----------|
| Low Estimate         | \$0          | \$0   | \$100    | \$4,000  | \$63,000  | \$100     |
| Mid Estimate         | \$100        | \$200 | \$200    | \$30,000 | \$143,000 | \$102,000 |
| High Estimate        | \$300        | \$300 | \$600    | \$57,000 | \$242,000 | \$172,000 |

This model of potential costs helps to emphasize the importance of identifying members who are on track to hospitalization and intensive care and utilizing whatever steps are needed to try to treat them prior to their hospitalization.

In addition, understanding COVID-19 disease state distributions is key to estimating total cost impacts on a macro level. There are significant variations in how susceptible different populations are to the virus. One trend that stands out is the variation of hospitalization and mortality rates by Age. According to a study conducted by Neil Ferguson et al. of the Imperial College of London on data from Chinese patients, there is a strong correlation between age and hospitalization rates, as hospitalizations rise significantly with age. Mortality rates are even more skewed towards higher ages as shown in Table 5 below<sup>8</sup>.

**Table 5**  
COVID-19 HOSPITALIZATION RATES FOR DIFFERENT AGE COHORTS

| Age Cohort           | Under 10 | 10-19 | 20-29 | 30-39 | 40-49 | 50-59 | 60-69 | 70-79 | 80+   |
|----------------------|----------|-------|-------|-------|-------|-------|-------|-------|-------|
| Hospitalization Rate | 0.1%     | 1.0%  | 1.0%  | 3.4%  | 4.3%  | 8.2%  | 11.8% | 16.6% | 18.4% |
| Mortality Rate       | 0.0%     | 0.0%  | 0.0%  | 0.0%  | 0.2%  | 0.6%  | 2.0%  | 4.3%  | 7.8%  |

While not explicitly shown, one can infer that the rate of patients in an intensive care unit will probably lie somewhere between the hospitalization rate and the mortality rate, again skewed more towards older populations. As new data emerges over time, this distribution can be further explored and fine-tuned. In addition, it is important to note that the definition of what qualifies as an infection may skew the overall hospitalization and mortality rate values. This is particularly in light of the uncertainty around the levels of cases with no symptoms or mild symptoms. It may be better to emphasize the key point that mortality and morbidity statistics by age point to a heavily skewed distribution towards older members rather than to focus on

Nevertheless, the incidence rate of COVID-19 along with the hospitalization rate is key to estimating future costs. As time passes, the likelihood increases that different therapies and cures will be developed to help bring down fatalities, hospitalizations, and, ultimately, the costs of this disease. The most important goal is to produce a vaccine. This is necessary in order to achieve the most dramatic reductions and stop the pandemic in its tracks. Despite extensive work by many on this endeavor, that goal is not likely to be achieved until sometime next year.

Finally, there are other aspects of the COVID-19 pandemic which are not being specifically addressed in this brief. Those include reductions in elective medical services due to the implementation of social distancing measures, as well as closures of “non-essential” businesses. In addition, there are likely to be lower rates of accidents as people remain at home. Behavioral health disorders and substance abuse are likely to rise as individuals attempt to cope with increased loneliness and job losses. These all need to be considered when projecting medical costs. Nevertheless, significant uncertainty remains surrounding the expected duration of COVID-19. As a result, it is difficult to project medical costs for future years.

These and other considerations will be addressed in future SOA COVID-19 briefs.

## References

- <sup>1</sup> Coronavirus Tests From Labcorp, Quest Will Cost \$50 to \$100, March 31, 2020. <https://www.bloomberg.com/news/articles/2020-03-15/coronavirus-tests-from-labcorp-quest-will-cost-50-to-100>. Accessed April 7, 2020.
- <sup>2</sup> Health Care Cost Institute, 2009-2015 Commercial Health Care Data Extract, July 23, 2019. <https://www.soa.org/resources/research-reports/2019/commercial-health-care-cost-utilization-trends/>. Accessed April 1, 2020.
- <sup>3</sup> Hydroxychloroquine Prices, Coupons and Patient Assistance Programs, March 2, 2020. <https://www.drugs.com/price-guide/hydroxychloroquine>. Accessed March 30, 2020.
- <sup>4</sup> GoodRx Azithromycin Quote. [https://www.goodrx.com/azithromycin?kw=price&utm\\_source=bing&utm\\_medium=cpc&utm\\_term=%2Bazithromycin%20%2Bcost|b&utm\\_campaign=azithromycin&utm\\_content=Ad-Group\\_Price&msclkid=4bac8c374342177afe3cd2b0ae6e750f](https://www.goodrx.com/azithromycin?kw=price&utm_source=bing&utm_medium=cpc&utm_term=%2Bazithromycin%20%2Bcost|b&utm_campaign=azithromycin&utm_content=Ad-Group_Price&msclkid=4bac8c374342177afe3cd2b0ae6e750f). Accessed April 3, 2020.
- <sup>5</sup> GoodRx Chloroquine Phosphate Quote. <https://www.goodrx.com/chloroquine-phosphate>. Accessed April 3, 2020.
- <sup>6</sup> Health Care Cost and Utilization Report (HCCUR) - Data Download, February 20, 2020. <https://healthcostinstitute.org/health-care-cost-and-utilization-report/annual-reports>. Accessed April 1, 2020.
- <sup>7</sup> Centers for Medicare & Medicaid Services (CMS), ICD-10 MS-DRGs Version 37.1 R1 Effective April 1, 2020, March 23, 2020. <https://edit.cms.gov/files/document/icd-10-ms-drgs-version-371-r1-effective-april-1-2020-updated-march-23-2020.pdf>. Accessed April 7, 2020.
- <sup>8</sup> Medical X Press, Odds of hospitalization, death from COVID-19 rise steadily with age. March 31, 2020. <https://medicalxpress.com/news/2020-03-odds-hospitalization-death-covid-steadily.html>. Accessed April 1, 2020.

## About The Society of Actuaries

With roots dating back to 1889, the [Society of Actuaries](#) (SOA) is the world's largest actuarial professional organizations with more than 31,000 members. Through research and education, the SOA's mission is to advance actuarial knowledge and to enhance the ability of actuaries to provide expert advice and relevant solutions for financial, business and societal challenges. The SOA's vision is for actuaries to be the leading professionals in the measurement and management of risk.

The SOA supports actuaries and advances knowledge through research and education. As part of its work, the SOA seeks to inform public policy development and public understanding through research. The SOA aspires to be a trusted source of objective, data-driven research and analysis with an actuarial perspective for its members, industry, policymakers and the public. This distinct perspective comes from the SOA as an association of actuaries, who have a rigorous formal education and direct experience as practitioners as they perform applied research. The SOA also welcomes the opportunity to partner with other organizations in our work where appropriate.

The SOA has a history of working with public policymakers and regulators in developing historical experience studies and projection techniques as well as individual reports on health care, retirement and other topics. The SOA's research is intended to aid the work of policymakers and regulators and follow certain core principles:

**Objectivity:** The SOA's research informs and provides analysis that can be relied upon by other individuals or organizations involved in public policy discussions. The SOA does not take advocacy positions or lobby specific policy proposals.

**Quality:** The SOA aspires to the highest ethical and quality standards in all of its research and analysis. Our research process is overseen by experienced actuaries and nonactuaries from a range of industry sectors and organizations. A rigorous peer-review process ensures the quality and integrity of our work.

**Relevance:** The SOA provides timely research on public policy issues. Our research advances actuarial knowledge while providing critical insights on key policy issues, and thereby provides value to stakeholders and decision makers.

**Quantification:** The SOA leverages the diverse skill sets of actuaries to provide research and findings that are driven by the best available data and methods. Actuaries use detailed modeling to analyze financial risk and provide distinct insight and quantification. Further, actuarial standards require transparency and the disclosure of the assumptions and analytic approach underlying the work.

Society of Actuaries  
475 N. Martingale Road, Suite 600  
Schaumburg, Illinois 60173  
[www.SOA.org](http://www.SOA.org)