



# COVID-19 AND WORKERS COMPENSATION: FREQUENCY ASSUMPTIONS UPDATE

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## Executive Summary

In April 2020, the National Council on Compensation Insurance (NCCI) authored a white paper<sup>1</sup> to aid the workers compensation (WC) industry in understanding the potential cost impacts of the novel coronavirus (COVID-19) pandemic on WC losses.<sup>2</sup> This culminated in the development of NCCI's COVID-19 Hypothetical Scenarios Tool,<sup>3</sup> which allows users to vary placeholder assumptions within the calculation framework in order to estimate potential impacts on expected losses under various hypothetical scenarios.

This research brief examines recent data and research pertaining to the various frequency-related assumptions discussed in the white paper and utilized in the COVID-19 Hypothetical Scenarios Tool. Key takeaways include:

- While a large amount of uncertainty remains for many of the frequency assumptions, a key metric in estimating the potential impact of COVID-19 on WC losses, confirmed COVID-19 cases reported to the Centers for Disease and Control and Prevention (CDC) has been low relative to initial projections thus far.
- The ranges for infection and report rate are lower compared to initial sources, while the critical care rate range increased.
- Based on the assumptions discussed in this research brief, the frequency of COVID-19 claim filings is estimated to be 20% or less through Calendar Year 2020. This figure is prior to the determination of compensability.
- The compensability of COVID-19 claims is anticipated to have a significant effect on the ultimate incurred WC system costs related to COVID-19. Data available as of the writing of this paper, though currently very limited, indicates considerable variation in compensability rates by state and occupation.

Due to the substantial amount of uncertainty remaining for the underlying assumptions and continued course of the pandemic, the ultimate impact COVID-19 will have on WC system costs is still not reasonably determinable. However, based on confirmed cases to date, the impact for Calendar Year 2020 appears to be modest relative to initial projections. As NCCI continues to monitor the pandemic and data becomes more readily available, our intent is to provide further updates to the assumptions underlying this framework.

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<sup>1</sup> "COVID-19 and Workers Compensation: Modeling Potential Impacts." NCCI (April 2020).

<https://www.ncci.com/Articles/Pages/Insights-COVID-19-WorkersComp-Modeling-Potential-Impacts.pdf>

<sup>2</sup> In this document, the use of the terms "WC system costs" and "WC losses" are considered synonymous.

<sup>3</sup> "COVID-19 Hypothetical Scenarios Tool." NCCI (May 2020).

<https://www.ncci.com/Articles/Pages/Insights-COVID-19-Hypothetical-Scenarios-Tool.aspx>

## Background

In April 2020, NCCI published a white paper<sup>1</sup> with the purpose of aiding the workers compensation (WC) industry in understanding the potential impacts of the novel coronavirus (COVID-19) pandemic on WC system costs. At the time the paper was written, COVID-19 had been officially declared a pandemic for approximately six weeks. Due to the infancy of the pandemic and the unprecedented nature of such a crisis, there was and still remains a substantial amount of uncertainty surrounding potential short- and long-term effects of such a crisis. NCCI leveraged its' available data to estimate certain factors related to indemnity and medical average claim costs (i.e., severities), and otherwise relied on external research for assumptions pertaining to infection, report, hospitalization, critical care, and fatal rates. Four detailed, hypothetical scenarios utilizing a broad range of assumptions were presented to demonstrate the potential range of impacts COVID-19 could have on WC expected losses.

In the months since the white paper was released, COVID-19 has been closely monitored by the Centers for Disease Control and Prevention (CDC), the World Health Organization, and many other health and governmental entities. NCCI has reviewed updated research, data, and legislative/regulatory activity relevant to frequency measures that were used in the white paper. This document will discuss infection, report, hospitalization, critical care, and fatal rates, as well as compensability rates, with the intent of refining the ranges of assumptions presented in the white paper.

NCCI's Hypothetical Scenarios Tool will retain the current broad frequency assumption ranges to ensure users have sufficient flexibility in selecting assumptions that fit various state- and occupation-specific contexts applicable in their analysis. The default selected assumptions have been modified as indicated in the following discussion.

## Infection Rate

Initial estimates of the infection rate for COVID-19 varied considerably due to limited data and a rapidly changing environment. Depending on the assumptions used, the external models cited in the white paper suggested ultimate infection rates up to 80%. As of early October 2020, almost 7.2 million<sup>4</sup> cases of COVID-19 have been reported to the CDC, which translates to approximately 2.2% of the United States population.<sup>5</sup> However, several sources (see Table 2) indicate that the observed cases are understated due to those with no symptoms or very mild symptoms who were never tested. Thus, the true infection rate could be significantly higher than what is indicated solely by the confirmed cases.

As the pandemic continues to unfold, it remains unclear what the ultimate infection rate will be, though it does seem that the confirmed cases observed to date have been lower than initial projections. Sources continue to suggest there remains significant uncertainty around the infection rate, as shown in Table 1.

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<sup>4</sup> Total Number of COVID-19 Cases in the US Reported to the CDC, by State/Territory. CDC COVID Data Tracker (10/2/2020). <https://covid.cdc.gov/covid-data-tracker/#cases>

<sup>5</sup> U.S. and World Population Clock. United States Census Bureau (10/2/2020). <https://www.census.gov/popclock/>

**Table 1: Projected Infection Rates by Source**

Rate	Source (Date of Estimate)	Comments
Confirmed Cases 2.4% to 3.7%	COVID-19 Forecast Hub (9/28/2020) <sup>6</sup>	Projection through 10/24/2020; upper bound extended weekly case projection through 1/1/2021. Confirmed case estimate divided by US population. Implied infection rate assumes a 1:2 to 1:11 ratio of confirmed to all cases.
Implied Infection Rate 5% to 40%		
Implied Confirmed Cases 4% to 8%	Institute for Health Metrics and Evaluation (9/17/2020) <sup>7</sup>	Projection through 1/1/2021. Infection rate based on estimate of total infected divided by US population. Implied confirmed case assumes the historical ratio (1:3) of confirmed to all cases in the underlying data set of the projection.
Infection Rate 13% to 23%		

Based on confirmed cases and more recent projections, **the infection rate for Calendar Year 2020 is currently expected to range from 5% to 40%**, which still implies a great amount of uncertainty. The ultimate infection rates could be considerably impacted by various factors, including:

- Evolving social practices (e.g., social distancing, the use of facial coverings/masks, isolation)
- Government-mandated lockdowns and phased re-openings
- Limited operational capacity for certain businesses
- Mandatory and voluntary quarantines

Additionally, the infection rate for any specific occupation is expected to vary due to differences in exposure to the public.

### Report Rate

One difficulty in determining the percentage of the population that will ultimately be infected is the subset who either do not develop symptoms (asymptomatic) or experience mild enough symptoms to not test or seek/need medical care. Early studies on asymptomatic rates varied between 5% and 80%, as documented in the white paper. However, as of September 2020, the CDC indicates that the asymptomatic rate may be closer to 40%, with a lower and upper bound of 10% and 70%, respectively.<sup>8</sup>

If we use the asymptomatic rate as a proxy to determine the likelihood of an infected worker reporting a claim for workers compensation benefits, then we would expect a report rate, which is the percentage of infected workforce that files a claim, between 30% (= 1.0 – 70%) and 90% (= 1.0 – 10%). However, the asymptomatic rate as a proxy may overstate the

<sup>6</sup> Nutch Wattanachit, Evan Ray, Nicholas Reich, et al. "COVIDhub-ensemble." COVID-19 Forecast Hub (October 2020).

<https://viz.covid19forecasthub.org/>

<sup>7</sup> COVID-19 Projections. "Daily infections and testing." Institute for Health Metrics and Evaluation (October 2020).

<https://covid19.healthdata.org/global?view=social-distancing&tab=trend>

<sup>8</sup> "COVID-19 Pandemic Planning Scenarios." Centers for Disease Control and Prevention (October 2020).

<https://www.cdc.gov/coronavirus/2019-ncov/hcp/planning-scenarios.html>

report rate. The number of confirmed cases reported to the CDC compared to the estimated total infected population implies that asymptomatic cases do not make up the totality of unreported cases to the CDC. The remainder of unreported cases is likely made up of cases that are sufficiently mild enough to not be tested or seek/need medical services.

For example, assume a population of 1,000 where 10% are infected with COVID-19. Further assume the infected population is composed of 40 asymptomatic cases, 40 mild symptomatic cases that do not seek medical services, and 20 symptomatic cases that seek medical services. Under this context, we would expect that the:

- Infection rate would equal 10% (= 100 / 1000)
- Confirmed cases would equal 2% (= 20 / 1000)
- Asymptomatic rate would equal 40% (= 40 / 100)
- Report rate, using the asymptomatic rate proxy, would equal 60% (= 100% – 40%)

However, the report rate of 60% assumes that the 40 cases with sufficiently mild symptoms to not seek/need medical services would report a claim for benefits. Because such cases are made up of those who either are not aware they are infected by COVID-19 or are exposure-only/quarantine-only cases, it is unknown whether such cases would result in a WC claim filing. It follows that a report rate of 20% (= 20 / 100) is more reasonable because it captures only confirmed cases of the infection that would more likely result in the filing of a WC claim. As such, an alternative assumption was considered for the report rate based on current estimates of the confirmed-to-total-infected case ratio, which ranges between 1:2 and 1:24.

**Table 2: Confirmed-to-Total-Infected Cases by Source**

Ratio	Source (Date of Estimate)	Comments
1:11	Centers for Disease Control and Prevention (9/10/2020) <sup>8</sup>	Mean ratio of estimated infections to reported case counts
1:2 to 1:11	Max Planck Institute for Demographic Research in Rostock, University of Helsinki (6/7/2020) <sup>9</sup>	Based on 95% confidence of modeled estimate of the number of unreported cases in the US
1:6 to 1:24 Point Est. 1:10	JAMA Internal Medicine (7/21/2020) <sup>10</sup>	Based on a study of 10 US testing sites between 3/23/2020 and 5/12/2020

Using the ratio of confirmed case to total infected cases as an alternative proxy, the implied report rate ranges between 4% (= 1/24 = 1:24 ratio) and 50% (= 1/2 = 1:2 ratio). Considering the infection rate projections cited in Table 1 assume or imply

<sup>9</sup> "How Many People Actually Have COVID-19? Significant Global Differences in Undetected Cases." Max Planck Society (June 2020). <https://scitechdaily.com/how-many-people-actually-have-covid-19-significant-global-differences-in-undetected-cases/>

<sup>10</sup> Fiona Havers, MD, MHS; Carrie Reed, PhD; Travis Lim, DrPH; et al. "Seroprevalence of Antibodies to SARS-CoV-2 in 10 Sites in the United States, March 23-May 12, 2020." JAMA International Medicine (July 2020). doi: 10.1001/jamainternmed.2020.4130

a similar ratio of confirmed to total infected, the ratio of confirmed to total infected cases is expected to serve as a better proxy when compared with the asymptomatic rate in determining the report rate.

**Therefore, the report rate is currently expected to be less than 50%.<sup>11</sup>**

To the extent cases that require no medical services do result in a workers compensation claim filing, the range of expected report rates may be understated. Additionally, testing capacity in the United States has increased significantly from the beginning of the pandemic through mid-July 2020 and has remained largely consistent since.<sup>12</sup> Increased testing is anticipated to result in a higher likelihood that cases with mild symptoms are tested and reported as a COVID-19 case. To the extent the above ratios in Table 2 are based on data prior to the current testing capacity, they may understate the implied report rate.

### Hospitalization Rate

When determining the estimated cost of wage replacement benefits and medical services for COVID-19 claims, NCCI's white paper separated the population of cases into three distinct symptom groups:

Symptom Group	Description
Mild	Requires some medical treatment but no hospitalization
Moderate	Requires a hospital stay without an intensive care unit (ICU) stay or ventilation
Severe	Requires a hospital stay involving an ICU stay and/or ventilation

Mild cases are determined as the complement of the hospitalization rate. Early estimates of the hospitalization rate in April 2020 indicated a hospitalization rate of 31% or less, varying substantially due to age, prevalence of pre-existing health conditions, or intensity of exposure to the virus. Current CDC data shows that the cumulative COVID-19 hospitalization rate is 178.2 per 100,000 of the US population.<sup>13</sup> Based on the current national infection rate of 2.2%, this implies a hospitalization rate of 8% ( $= 178.2 / 100,000 / 2.2\%$ ).

Other observed hospitalization rates range between 4% and 20%.

<sup>11</sup> We assume that mild cases requiring no medical services, such as a COVID-19 test, are not anticipated to result in a claim for WC benefits. NCCI's Hypothetical Scenarios Tool does not incorporate the potential for exposure only (also known as quarantine) claims; it only includes situations where the worker is physically incapacitated (i.e., contracts COVID-19).

<sup>12</sup> Hasell, J., Mathieu, E., Beltekian, D. et al. "A cross-country database of COVID-19 testing." *Sci Data* 7, 345 (2020).  
<https://ourworldindata.org/coronavirus-testing>

<sup>13</sup> "Laboratory-Confirmed COVID-19-Associated Hospitalizations" COVID-NET (September 2020).  
[https://gis.cdc.gov/grasp/COVIDNet/COVID19\\_3.html](https://gis.cdc.gov/grasp/COVIDNet/COVID19_3.html)

**Table 3: Hospitalization Rates by Source**

Rate	Source (Date of Estimate)	Comments
4% to 20% Point Est. 9%	The COVID Tracking Project (10/3/2020) <sup>14</sup>	Observed hospitalizations over positive tests by state, point estimate is the national aggregate
4% to 10% Point Est. 6%	Institute for Health Metrics and Evaluation (9/17/2020) <sup>7</sup>	Ratio of estimated admissions over estimated confirmed cases; confirmed cases determined as described in Table 1

The rates shown in Table 3 are applicable to the US population in total. Because there is a correlation between the severity of symptoms and age, we would anticipate differences in these rates to the extent the age distribution of the workforce is different compared to the US population. Utilizing updated hospitalization rates from the CDC weighted with employee counts by age from the US Bureau of Labor Statistics (BLS), we note an immaterial difference (less than 1%) in average hospitalization rates.

**Therefore, the hospitalization rate is currently expected to range between 4% and 20%** as shown by source on Table 3.

### Critical Care Rate

Further segmenting the hospitalization data into Moderate and Severe symptom groups, we now look at the percentage of hospitalized cases that require an ICU stay or ventilator. Initial estimates cited in the white paper ranged between 5% and 30%, while updated data indicates a range between 12% and 42%.

**Table 4: Critical Care Rate by Source**

Rate	Source (Date of Estimate)	Comments
12% to 36% Point Est. 21%	The COVID Tracking Project (10/3/2020) <sup>14</sup>	Observed cases with an ICU stay or ventilator over admissions by state, point estimate is the national aggregate
24% to 35%	Centers for Disease Control and Prevention (9/10/2020) <sup>8</sup>	Common scenario parameter by age group for percent admitted to ICU among those hospitalized
42%	Institute for Health Metrics and Evaluation (9/17/2020) <sup>7</sup>	Ratio of estimated new stays at the ICU over the mean estimated admissions

<sup>14</sup> The COVID Tracking Project Data as of 10/3/2020. <https://covidtracking.com/data>

Narrowing the range to national estimates (versus rates by state), **the critical care rate ranges between 21% and 42%**. We note similar uncertainty in the range, though the rates themselves have increased over initial estimates. It is unclear, based on the above sources, why the critical care rate increased relative to initial estimates. It is possible this observed increase could be caused by changes in ICU bed capacity or changes in evaluation metrics used for admission to the ICU. Or it may simply reflect a more robust data set.

### Fatal Rate

NCCI’s Hypothetical Scenarios Tool applied the fatal rate to reported cases (infection rate x report rate). Therefore, we are looking at fatal rates as a percentage of cases with symptoms and associated medical services, such as a COVID-19 virus test. The white paper cited sources that estimated fatal rates between 0.2% to 2.0%. Current sources indicate fatal rates range between 1% and 3%.

**Table 5: Fatal Rate by Source**

Rate	Source (Date of Estimate)	Comments
0.6% to 7.8% Point Est. 2.5%	The COVID Tracking Project (10/3/2020) <sup>14</sup>	Observed deaths over positive cases by state; point estimate is the national aggregate
2.8%	Centers for Disease Control and Prevention (9/10/2020)	Observed total deaths over total cases
1.2% to 3.1% Point Est. 2.0%	Institute for Health Metrics and Evaluation (9/17/2020) <sup>7</sup>	Ratio of estimated deaths over estimated confirmed cases; confirmed cases determined as estimated infected / 3.0

Similar to the rates in Table 3, the fatal rates shown in Table 5 are relative to the US population as a whole. So the average fatal rate will be different to the extent the age distribution underlying the US workforce is different than the total population. Due to the significantly higher relative fatal rate for older individuals (e.g., 74+), we anticipate a large difference in the average fatal rate in the workforce compared to the overall US population. Using fatal rates by age group from the CDC weighted by the workforce counts by age group from BLS, we note the fatal rate attributable to the workforce is about 40% of that in the overall US population.

**Therefore, we expect the fatal rate associated for reported COVID-19 WC claims to range between 0.5% (= 1.2% x 40%) and 1.25% (= 3.1% x 40%).**

### Compensability Rate

Prior to the pandemic, several states’ WC statutes included compensability presumptions for certain chronic illnesses and occupational diseases for certain workers. However, many state statutes exclude “ordinary diseases of life,” such as the common cold or flu, with some exceptions. The COVID-19 pandemic has created unique challenges and many questions related to the compensability of such claims and its potential impact on WC system costs.

Since March 2020, numerous states have passed legislation or issued executive orders addressing determinations and presumptions of compensability related to employees contracting, or being exposed to, COVID-19. (That is, a presumption that the exposure for certain workers arises out of the course and scope of employment.) These modified compensability standards have largely been focused on first responders, healthcare workers, and certain other essential or frontline workers who may be considered to be at greater risk of contracting the virus due to work-related exposure. Many of these COVID-19 related presumptions include a sunset provision and are temporary in nature. For states that have implemented compensability presumptions for COVID-19—and for those that didn’t—there still may be substantial uncertainty surrounding the extent to which claims for benefits related to COVID-19 will be found compensable and their resulting impact on WC system costs, due to:

- Varying definitions and ambiguity pertaining to the definition of “essential workers”
- Requirements/ability to rebut a compensability presumption in states where one exists
- Burden of proving that the illness was contracted on the job in the course of job-related activities/duties
- Requirements for positive COVID-19 test results and/or diagnosis by a licensed physician

Some data has begun to emerge, indicating a large variation in compensability rates by state.

**Table 6: WC Compensability Rates by Source**

Rate	Source (Date of Estimate)	Comments
69% to 71%	California Workers’ Compensation Institute (9/21/2020) <sup>15</sup>	Based on 25,102 to 31,891 California claims; excluding and including self-insureds, respectively
56%	Tennessee Department of Labor and Workforce Development (10/13/2020) <sup>16</sup>	Based on 3,291 Tennessee claims
44% to 56%	Florida Division of Workers’ Compensation (8/31/2020) <sup>17</sup>	Based on 8,697 to 17,653 Florida claims; excluding and including self-insureds, respectively

Data on compensability rates is currently very limited. Published compensability rates may be impacted by (a) the inclusion of claim filings for workers who did not contract the virus (e.g., exposure only or negative test result), and (b) delayed testing capacity, which was more prevalent at the start of the pandemic.

While observed compensability rates shown above provide some insight into the variance by state, there is also significant uncertainty related to how these rates will change over time. As lockdowns end and the economy continues to open up more broadly, the connection of exposure to the virus and the workplace may become less clear. In addition to the

<sup>15</sup> “California 2020 COVID-19 Workers’ Compensation Claims.” California Workers’ Compensation Institute (October 2020). <https://www.cwci.org/CV19claims.html>

<sup>16</sup> COVID-19 claims information through 10/13/2020 provided by the Tennessee Department of Labor and Workforce Development, Bureau of Workers Compensation (October 2020).

<https://tennesseelookout.com/2020/08/27/workers-compensation-for-covid-19-an-uphill-battle-for-tennessee-workers/>

<sup>17</sup> “Florida Division of Workers’ Compensation 2020 COVID-19 Report.” Florida Division of Workers’ Compensation (September 2020). <https://www.myfloridacfo.com/Division/WC/PublicationsFormsManualsReports/Reports/Default.htm>

compensability rate varying by state, it is also expected to vary significantly by occupation both due to differences in the application of presumptions, if they exist, and also the connection between exposure to the virus and the workplace.

**While no specific range can be attributed to the compensability rate at this time, it is expected to be strictly less than 100%.**

## Conclusion

While a number of frequency assumptions are discussed in this paper, the infection, report, and compensability rates are primary measures of frequency and drivers of the ultimate number of compensable COVID-19 claims in the model. The sources cited in this paper suggest that the:

- Infection rate is between 5% and 40%
- Report rate is less than 50%
- Compensability rate is less than 100%

The hospitalization, critical care, and fatal rates determine the frequency and type of symptoms applicable to these claims. The sources cited in this paper suggest that the:

- Hospitalization rate is between 4% and 20%
- Critical care rate is between 21% and 42%
- Fatal rate is between 0.5% and 1.25%

The ranges cited may vary significantly by state and occupation for several reasons, such as differences in the definition of “essential worker” or demographics of the state or occupation.

A large amount of uncertainty remains for many of the frequency assumptions underlying the NCCI Hypothetical Scenarios Tool. However, utilizing more recent data and statistics from various sources we observe narrower ranges than those originally presented in both the white paper and Hypothetical Scenarios Tool. Reported COVID-19 cases, a key metric in estimating the potential impact of COVID-19 on WC system costs, have been lower compared to early estimates. Considering the infection and report rate, the range of projected COVID-19 claim filings through Calendar Year 2020 is currently 20% (= 40% x 50%) or less, as a percentage of the workforce.

Additionally, anecdotal information to date indicates the number of claims actually reported to insurers is also lower relative to initial projections and have relatively small average costs per case. The range of reported claims is **prior to the determination of compensability; therefore, the ultimate number of compensable COVID-19 claims per worker is estimated to be less than 20% through Calendar Year 2020.**

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