



## COVID-19 AND WORKERS COMPENSATION: PERMANENT DISABILITY

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In April 2020, the National Council on Compensation Insurance (NCCI) crafted a white paper<sup>1</sup> to assist stakeholders in understanding the potential direct cost impact on workers compensation (WC) losses due to the novel coronavirus (COVID-19). This culminated in the creation of NCCI's COVID-19 Hypothetical Scenarios Tool<sup>2</sup> which allows users to vary assumptions in the calculation framework and estimate potential impacts to expected losses under various hypothetical scenarios. This paper describes the updates made to the Tool which incorporate the potential for permanent disability outcomes within the calculation framework.

The permanent disability research brief presents a qualitative discussion concerning the challenges in estimating key assumptions and outlines the potential variables contemplated in the tool update. Takeaways from this brief include the following:

- Data on permanent disability related to COVID-19 is extremely limited. However, permanent disability outcomes are anticipated to occur.
- While permanent disability is expected to be a material component of the direct COVID-19 impact on overall WC system costs, other key assumptions—such as the infection rate and compensability rate—are currently anticipated to have a greater effect.
- The average fatal benefit for a COVID-19 claim is generally expected to be significantly smaller relative to the overall average fatal benefit due to differences in the average age of dependents.

The underlying assumptions and resulting estimated impact of COVID-19 on the WC system continues to be highly uncertain. As such, a range of the potential impact on benefit costs still cannot be reasonably determined. Anecdotal information to date indicates that relatively low numbers of compensable COVID-19 claims have been filed, and many are for low dollar amounts. These indications can vary significantly based on jurisdiction and class of business.

The update to the NCCI Hypothetical Scenarios Tool will allow users to dynamically vary all severity and permanent disability assumptions to assist in understanding the potential cost impact on WC expected losses due to COVID-19 for NCCI states under a wide array of hypothetical scenarios. As NCCI continues to monitor the pandemic, and data becomes more readily available, our intent is to provide further updates to both frequency and severity 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> "COVID-19 Hypothetical Scenarios Tool." NCCI (May 2020)  
<https://www.ncci.com/Articles/Pages/Insights-COVID-19-Hypothetical-Scenarios-Tool.aspx>



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## Introduction

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.<sup>2</sup> 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 the potential short- and long-term effects. This culminated in the creation of NCCI's COVID-19 Hypothetical Scenarios Tool,<sup>3</sup> which allows users to vary assumptions in the calculation framework and estimate potential impacts to expected losses under various hypothetical scenarios.

In an effort to provide timely information, and given the uncertainty surrounding the pandemic, the tool did not directly incorporate the potential for permanent disability within its original scope. NCCI has continued to study the issue and has now incorporated selections for permanent disability scenarios in the tool. While credible data on the permanent effects of contracting COVID-19 is not yet available, there are observed examples of permanent disability related to COVID-19.<sup>4</sup> This document will discuss the possible frequency and severity of such cases and detail how NCCI has incorporated permanent disability into its Hypothetical Scenarios Tool.

Anecdotal information to date indicates that relatively low numbers of compensable COVID-19 claims have been filed, and many are for low dollar amounts. These indications can vary significantly based on jurisdiction and class of business. Ultimately, the passage of time and availability of validated data will give us a truer picture of the impact of COVID-19 claims on WC system costs. NCCI will continue to monitor COVID-19 claim activity as data becomes available. In the meantime, this Hypothetical Scenario Tool update will help stakeholders in their assessment of their own projected scenarios.

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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>

<sup>4</sup> Michael Choo, MD, MBA, FACEP, FAAEM. "Catastrophic COVID-19 Workers Compensation Claims—Case Studies and the Pandemic." Paradigm and NCCI (October 2020)

<https://www.ncci.com/Articles/Pages/Insights-Catastrophic-COVID-19-WorkersComp-Claim-Case-Studies-Pandemic.aspx>

## Frequency of Permanent Disability

COVID-19 symptoms can vary dramatically by individual. In severe cases, where hospitalization in an intensive care unit (ICU) or the use of a ventilator is required, it is reasonable to expect that some of these individuals may incur a permanent disability<sup>5</sup> (e.g., due to the severity of symptoms or the life-saving medical treatment needed). Even in moderate cases, where hospitalization is required without an ICU stay or ventilator, studies have shown that diseases with similar symptoms such as severe acute respiratory syndrome (SARS) can result in long-term disabilities, including chronic fatigue, impaired lung function, and psychiatric disorders.<sup>6,7</sup> Due to the immaturity of COVID-19-related claims experience, it is still too early to directly observe the frequency of such outcomes. Therefore, we will focus on historical data for similar injuries and external research to provide guidance on the potential permanent effects.

Using NCCI's Unit Statistical Plan (USP) data for injuries with similar characteristics to what may be expected for COVID-19, we reviewed the ratio of claims with permanent disability benefits to all injuries between Policy Years 2002 and 2015 for all NCCI states. Claims subject to federal WC act benefits, such as black lung claims, were excluded from the analysis. Additionally, the analysis focused on lost-time claims with medical incurred amounts greater than zero; this was done to limit the impact of inhalation claims (asbestosis, silicosis, gasses, etc.), which tend to have high rates of permanent disability with limited medical benefits, and were assumed to be sufficiently different compared to COVID-19 claims. We analyzed various types of injuries in order to gain a broader perspective of the range of potential outcomes that may arise from COVID-19. A combination of NCCI USP fields, including Nature of Injury and Part of Body, were used to develop the following claim types and observed permanency rates:

**Table 1: Observed Permanent Disability Rate by Claim Type**

	Total Observed Claims	Permanent Partial Rate	Permanent Total Rate
(1) Infection <sup>8</sup> Claims	19,876	25%	0.1%
(2) Lung <sup>9</sup> Claims	10,327	40%	1.0%
(3) Occupational Disease <sup>10</sup> Lung Claims	3,334	40% - 50%	1.5%
(4) Occupational Disease Infection Claims	666	20%	0.0%
(5) Infection Lung Claims	275	35%	0.0%

<sup>5</sup> Abbis Jaffri and Ume Abbiyha Jaffri. "Post-Intensive care syndrome and COVID-19: crisis after a crisis?" *Heart & Lung : The Journal of Cardiopulmonary and Acute Care*. (June 2020) doi:10.1016/j.hrtlng.2020.06.006

<sup>6</sup> MH Lam, YK Wing, MW Yu, et al. "Mental morbidities and chronic fatigue in severe acute respiratory syndrome survivors: long-term follow-up." *Archives of Internal Medicine*. (2009) doi: 10.1001/archinternmed.2009.384

<sup>7</sup> Hui DSC, Wong KT, Antonio GE, et al. "Long-term sequelae of SARS: physical, neuropsychiatric, and quality-of-life assessment." *Hong Kong Medical Journal*. (December 2009)

<sup>8</sup> Infection defined as claims with a reported nature of injury code 36 (Specific Injury: Infection) or 73 (Occupational Disease or Cumulative Injury: Contagious Disease)

<sup>9</sup> Lung defined as claims with a reported part of body code 60 (Trunk: Lung)

<sup>10</sup> Occupational Disease defined as claims with a reported loss condition code of 02 (Occupational Disease)

Based on the data in Table 1, we observed a permanent partial disability (PPD) rate between 20% and 50% depending on the types of claims considered, whereas the permanent total disability (PTD) rate ranged between 0.0% and 1.5%. The claim types chosen serve as a proxy for potential outcomes from COVID-19 injuries. To the extent that symptoms from COVID-19 differ from those observed under these claim types, the permanency rates may differ. NCCI assumed that mild cases, which are defined as those claims that do not require hospitalization, would result in a negligible rate of permanent disability, which is supported by some initial guidance on impairment ratings<sup>11,12</sup> for COVID-19. Under this assumption, the above percentages would only be applicable to the Moderate and Severe symptom groups.

Given that severe cases are expected to have a higher likelihood of permanent disability, particularly PTD injuries, NCCI assumed that all PTD claims would occur in this symptom grouping. Adjusting our PTD rate to between 0.0% and 1.5% to be applicable to only severe cases, we observe a PTD rate between 0% and 10% (= 1.5% / 15%) using the default Critical Care Rate from the NCCI Hypothetical Scenarios Tool.

One interpretation of this assumption could be that moderate cases behave more like infection claims which tend to have a near-zero PTD rate. If we compare the lung and infection PPD rates, we observe that lung claims have about twice the likelihood of a PPD injury compared to infection claims. To the extent that moderate cases of COVID-19 behave like infection claims and severe cases behave like lung claims, then a similar difference in the PPD rate may be expected. Under this view, the Severe PPD rate would range between 40% and 50% with an implied Moderate PPD rate ranging between 20% and 25%.

From a review of published research on the subject (Table 2), we can see that permanent disability expectations vary significantly by source ranging between 25% and 67% for PPD rates and 2.9% or higher for PTD rates. The large variation is understandable considering that we cannot directly observe COVID-19 cases with permanent injuries yet, and it is still unclear what types of claims are best to use as a proxy for outcomes involving permanent disability.

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<sup>11</sup> James B. Talmage, MD; Mark H. Hyman, MD; and Robert B. Snyder, MD. "Rating Survivors of COVID 19 for Permanent Impairment." *AdMIRable Review* Volume 9, Summer 2020

<sup>12</sup> To the extent that hospitals are at full capacity during the pandemic, the likelihood of an individual not hospitalized incurring permanent disability could increase. However, such limited occurrences wouldn't be expected to have a material impact on overall WC system costs.

**Table 2: Permanent Disability Rate by Source**

Permanent Partial Rate	Permanent Total Rate	Source (Date of Estimate)	Comments
30% - 66.6%	2.9% - 3.6%	NYCIRB (June 2020) <sup>13</sup>	NY data (2012-2019) for lung, ICU, or ventilator claims and a review of claims from 9/11 World Trade Center clean-up.
Combined Permanent Rate 25% of Moderate Cases 50% of Severe Cases		WCIRB (May 2020) <sup>14</sup>	Based on California data, external research, and consultation with claim experts. PPD and PTD not separated.
Not Specified	6% of Severe Cases	Canadian Critical Trials Group (April 2011) <sup>15</sup>	Sample (N = 53); return to work 5 years after discharge from ICU for acute respiratory distress syndrome.
Not Specified	7% of Non-healthcare 30% of Healthcare	Official Journal of the Asian Pacific Society of Respirology (April 2010) <sup>16</sup>	Sample (N = 41); return to work 2 years after discharge from hospital for severe acute respiratory syndrome.

**For the purposes of updating NCCI’s Hypothetical Scenarios Tool, we assume:**

- **A 3% default Severe PTD Rate** from a range of 0% to 10%
- **A 40% default Severe PPD Rate** from a range of 30% to 66.6%
- **A 20% default Moderate PPD Rate** (assumed half the Severe PPD rate)

To put these assumptions in perspective, this translates to a 2.3%<sup>17</sup> chance that a reported<sup>18</sup> COVID-19 claim will result in a permanent partial injury and a 0.05%<sup>19</sup> likelihood for it to result in a permanent total injury, using the default rate assumptions underlying the tool.

<sup>13</sup> “Analysis of the COVID-19 Pandemic’s Impact on the New York State Workers’ Compensation System.” New York Compensation Insurance Rating Board (NYCIRB) (June 2020)

[https://www.nycirb.org/officialdocs/COVID-19\\_Study\\_June\\_2020.pdf](https://www.nycirb.org/officialdocs/COVID-19_Study_June_2020.pdf)

<sup>14</sup> “Evaluation of Cost Impact of Governor Newsom’s Executive Order on Rebuttable Presumption for California COVID-19 Workers’ Compensation Claims.” Workers’ Compensation Insurance Rating Bureau of California (WCIRB) (May 2020)

<https://www.wcirb.com/document/33026>

<sup>15</sup> Margaret S. Herridge M.D., M.P.H, Catherine M. Tansey M.Sc., Andrea Matté B.Sc., et al. “Functional disability 5 years after acute respiratory distress syndrome.” *New England Journal of Medicine* (April 2011)

<sup>16</sup> Jenny C. Ngai, Fanny W. Ko, Susanna S. Ng, et al. “The long-term impact of severe acute respiratory syndrome on pulmonary function, exercise capacity and health status.” *Respirology* (April 2010)

<sup>17</sup> = 10% x [15% x 40% + 85% x 20%] = Hospitalization Rate x [Critical Care Rate x Severe PPD Rate + (1 – Critical Care Rate) x Moderate PPD Rate]

<sup>18</sup> Reported claims are defined as symptomatic cases with some medical services. This follows from the definition of the report rate used in the NCCI Hypothetical Scenarios Tool

<sup>19</sup> = 10% x 15% x 3% = Hospitalization Rate x Critical Care Rate x PTD Rate

## Severity of Permanent Disability

Now we turn our focus to the potential magnitude of these permanent disability benefits. As a starting point, we determine the average observed indemnity benefit for a PPD or PTD injury by state. Because of the infrequent nature of some of these injuries, particularly PTD by state, NCCI used modeled average cost per case values based on empirical values as the model inputs. The Appendix lists the implied severity for PPD, PTD, and fatal injuries that result from the model underlying NCCI's retrospective rating plan parameters less the modeled temporary total disability (TTD) benefits (so as not to double count wage replacement benefits in the tool's framework). While only the PPD and PTD severities are addressed in this discussion, we are also updating the fatal severities in the tool to be consistent within the framework.

Permanent disability benefits are influenced by a number of factors, including age and the level of impairment or disability. It is expected that average permanent and fatal benefit costs arising from COVID-19 claims may be different than the severities found in the Appendix. In order to recognize key factors that may distinguish permanent and fatal claims related to COVID-19, we apply the following adjustments to the base severity values in the Appendix in updating the default example included in the NCCI Hypothetical Scenarios Tool:

### ➤ Adjustment for Age Distribution

Since PTD and fatal benefits are often paid for the injured worker's or spouse's lifetime,<sup>20,21</sup> the average age at injury would directly influence the overall benefit payment. It is assumed that PPD benefits would not be materially impacted by differences in the age distribution.<sup>22</sup> NCCI's Call for Detailed Claim Information (DCI) was used to determine the countrywide average age of PTD claimants (48) and fatal claimants (46), which is expected to tie to the average age in the base severities shown in the Appendix. Hospitalization and fatal rates from the Centers for Disease Control and Prevention (CDC),<sup>23,24</sup> in conjunction with a distribution of workers by age from the US Bureau of Labor Statistics (BLS),<sup>25</sup> were used to determine the assumed average age of hospitalized COVID-19 patients (49.5) and the assumed average age of patients whose cases result in death (58.5).

A comparison of age-specific annuity factors from NCCI's *Statistical Plan* Part 7 – Pension Tables,<sup>26</sup> adjusted to remove the effect of discounting, is then used to determine the expected difference in lifetime benefits between the base PTD and fatal severities and those expected for COVID-19. **For the purposes of the default assumptions**

<sup>20</sup> Some jurisdictions limit the duration for PTD or fatal benefits. In such cases, the age adjustment resulting from this analysis should be reduced to be closer to unity (i.e., 1.00). Conversely, in jurisdictions that apply cost of living adjustments or retirement offsets, a more significant age adjustment factor (i.e., farther away from 1.00) may be warranted.

<sup>21</sup> While spouse is referenced, fatal benefits may be payable to other dependents of the worker as well.

<sup>22</sup> The age adjustment could have a notable effect on PPD injuries in jurisdictions where those benefits may be payable for life (e.g., Maine) or at an age near retirement (e.g., Nevada).

<sup>23</sup> "Laboratory-Confirmed COVID-19-Associated Hospitalizations Preliminary cumulative rates as of 9/5/2020." COVID-NET (9/17/2020) [https://gis.cdc.gov/grasp/COVIDNet/COVID19\\_3.html](https://gis.cdc.gov/grasp/COVIDNet/COVID19_3.html)

<sup>24</sup> "Weekly Updates by Select Demographics and Geographic Characteristics Provisional Death Counts for Coronavirus Disease 2019 (COVID-19)." National Center for Health Statistics (9/17/2020) [https://www.cdc.gov/nchs/nvss/vsrr/covid\\_weekly/index.htm#AgeAndSex](https://www.cdc.gov/nchs/nvss/vsrr/covid_weekly/index.htm#AgeAndSex)

<sup>25</sup> "Labor Force Statistics from the Current Population Survey." US Bureau of Labor Statistics (9/17/2020) <https://www.bls.gov/cps/cpsaat11b.htm>

<sup>26</sup> Using restated tables I-A and III-M-A for fatal and permanent total injuries, respectively. Tables were restated to remove discounting (zero percent interest rate assumption) to reflect differences in severity at ultimate

included in the Hypothetical Scenarios Tool, we selected a **PTD age-adjustment factor of 0.95** and a **fatal age-adjustment factor of 0.75**. Table 3 (below) demonstrates the sensitivity of the age-adjustment factor to the assumed average age for the associated COVID-19 injury type.

**Table 3: Adjustment Factor by Assumed COVID-19 Average Age**

PTD Average Age	PTD Adjustment	Fatal Average Age	Fatal Adjustment
48	1.00	57	0.78
49	0.97	58	0.76
<b>Selected</b>	<b>0.95</b>	<b>Selected</b>	<b>0.75</b>
50	0.94	59	0.74
51	0.92	60	0.72

➤ Adjustment for PPD Severity

COVID-19 can affect several of the body’s vital systems, which has the potential to lead to lower or higher average PPD severities compared to the average reflected in our modeled base severity values. This can occur due to differences in the level of functional impairment rating, disability ratings, and loss of earning capacity, depending on how individual jurisdictions determine PPD benefits. We begin by directly taking the ratio of severities for claims with similar symptoms expected for COVID-19 and for all claims with PPD benefits incurred. Similar to the review of frequency, this comparison was performed by claim type, as shown in Table 4.

**Table 4: Severity Differential by Claim Type**

	Total Observed PPD Claims	Permanent Partial Adjustment
(1) Infection Claims	4,743	0.9
(2) Lung Claims	4,010	1.5
(3) Occupational Disease Lung Claims	1,575	1.5
(4) Occupational Disease Infection Claims	147	0.8
(5) Infection Lung Claims	97	1.5

We observe a PPD severity differential ranging between 0.8 and 1.5. **For the purposes of the default assumptions included in the Hypothetical Scenarios Tool, we selected a PPD severity adjustment of 0.9 for moderate cases.** This is consistent with our frequency selections, in which moderate cases are expected to behave more like infection claims as shown in rows (1) and (4); these tend to have slightly lower severities or implied impairment ratings, disability ratings, and loss of earning capacity.

It was assumed that PPD injuries stemming from the severe symptom grouping will have higher average severity compared to the base modeled severity. This assumption follows from the expectation that severe symptoms and the use of an ICU or ventilator are likely correlated with worse outcomes. This is also consistent with the logic used in our frequency discussion in which severe cases are expected to behave more like lung claims which indicate adjustments near 1.5, as shown in rows (2), (3), and (5). **For the purposes of the default assumptions included in the Hypothetical Scenarios Tool, we selected a PPD severity adjustment of 1.5 for severe cases.**

We apply these adjustments multiplicatively to the modeled base severities by state, shown in Appendix 1, to obtain COVID-specific severity estimates for PPD, PTD, and fatal injuries. On an overall basis, this results in the following benefits by injury type:

**Table 5: Benefits by Injury Type**

Injury Type	Appendix 1 Overall Severity	X	Age Adjustment	X	Severity Adjustment	=	Average Benefit
PPD (Moderate)	25,643	X	1.00	X	0.90	=	\$23,079
PPD (Severe)	25,643	X	1.00	X	1.50	=	\$38,465
PTD	630,482	X	0.95	X	1.00	=	\$598,958
Fatal	327,461	X	0.75	X	1.00	=	\$245,596

**Impact to Expected Losses by Scenario**

The following example calculation, Hypothetical Scenario #1, utilizes all the default scenario assumptions underlying NCCI’s COVID-19 Hypothetical Scenarios Tool and the permanent disability rates and severities discussed so far. Please note the following when reviewing potential impacts to WC losses for the below-specified scenarios:

- Impacts assume all cases with medical services would result in a compensable WC claim. The actual percentage of COVID-19 cases that may ultimately be deemed compensable is unknown but is expected to be less than 100%. This parameter is expected to be modified by the user based on their expectations of compensability by jurisdiction and occupation.
- Impacts assume all cases with mild symptoms receive some medical services. To the extent that cases with no medical services are found compensable, the illustrated scenario impact may be understated because the report rate assumes that these cases are currently not compensable.



### Hypothetical Scenario #1—Impact to Expected Losses

Updates to Framework **Bolded** for Permanent Disability and Fatal

Scenario				(i)	(ii)	(iii)	(iv)	(v)
Frequency Inputs	Assumption	Scenario Assumptions	Frequency	Wage Replacement	Permanent Disability	Medical	Nonfatal	
(1) Infection Rate	10%	(12) Mild	4.500%	\$688	\$0	\$1,000	\$1,688	
(2) Report Rate	50%	(13) Moderate	0.425%	\$1,403	<b>\$4,616</b>	\$22,300	\$28,319	
(3) Hospitalization Rate	10%	(14) Severe	0.075%	\$3,146	<b>\$33,355</b>	\$67,000	\$103,501	
(4) Critical Care Rate	15%	(15) Overall	5.000%	\$786	<b>\$893</b>	\$3,801	\$5,479	
<b>(a) Permanent Partial Rate</b>	<b>40.0%</b>							
<b>(b) Permanent Total Rate</b>	<b>3.0%</b>							
(5) Fatal Rate	0.5%							
(6) Compensability Rate	100.0%							

  

Severity and Benefit Inputs	Relativity	Scenario Assumption	Scenario Impacts	Estimate
(7) Wage Replacement	\$786 x 1.00 =	\$786	(16) Average Salary	\$50,258
<b>(8) Fatal</b>	<b>\$327,461 x 0.75 =</b>	<b>\$245,596</b>	(17) Pure Premium Factor	0.74
<b>(9) Permanent Partial</b>	<b>x</b>		(18) Workforce (Total)	86,351,950
<b>(a) Moderate</b>	<b>\$25,643 x 0.90 =</b>	<b>\$23,079</b>	(19) Expected Payroll	\$4,339,876M
<b>(b) Severe</b>	<b>\$25,643 x 1.50 =</b>	<b>\$38,465</b>	(20) COVID-19 Total Severity	\$6,707
<b>(10) Permanent Total</b>	<b>\$630,482 x 0.95 =</b>	<b>\$598,958</b>	(21) COVID-19 Expected Losses	\$28,957.2M
(11) Medical			(22) Expected Losses Without COVID-19	\$32,115.1M
(a) Mild	\$1,000 x 1.00 =	\$1,000	<b>(23) Scenario Expected Losses With COVID-19</b>	<b>\$61,072.3M</b>
(b) Moderate	\$22,300 x 1.00 =	\$22,300	(24) All NCCI States—Scenario Overall Impact	90%
(c) Severe	\$67,000 x 1.00 =	\$67,000		

(1),(2),(3),(4),(5),(6),(7),(11),(16),(17),(18),(ii),(iv),(v) from COVID-19 and Workers Compensation: Modeling Potential Impacts

(12i) = (1) x (2) x [1.0 - (3)]

(13i) = (1) x (2) x (3) x [1.0 - (4)]

(14i) = (1) x (2) x (3) x (4)

(13iii) = [(4a) / 2.0] x (9a)

(14iii) = [(4a) x (9b)] + [(4b) x (10)]

(15) derived as the weighted average of Mild/Moderate/Severe symptom values

(19) = (16) x (18)

(20) = (15v) + (5) x (8)

(21) = (20) x (18) x (15i) x (6)

(22) = (19)/100 x (17)

(23) = (21) + (22)

(24) = (23) / (22) - 1.0

To provide some insight into the sensitivity of the permanency rate selections, the assumptions under Hypothetical Scenario #1 are fixed, except that both the permanent total and permanent partial rates are varied. Doing this results in the following impacts to expected losses:

**Table 6: Overall WC Loss Impacts by Permanent Injury Rates**

Impact to Expected Losses	Severe PTD Rate										
	0%	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
0%	78%	79%	81%	82%	83%	84%	85%	87%	88%	89%	90%
5%	79%	80%	82%	83%	84%	85%	86%	88%	89%	90%	91%
10%	80%	81%	83%	84%	85%	86%	88%	89%	90%	91%	92%
15%	81%	83%	84%	85%	86%	87%	89%	90%	91%	92%	93%
20%	82%	84%	85%	86%	87%	88%	90%	91%	92%	93%	94%
25%	83%	85%	86%	87%	88%	89%	91%	92%	93%	94%	95%
30%	84%	86%	87%	88%	89%	90%	92%	93%	94%	95%	97%
35%	85%	87%	88%	89%	90%	92%	93%	94%	95%	96%	98%
40%	87%	88%	89%	<b>90%</b>	91%	93%	94%	95%	96%	97%	99%
45%	88%	89%	90%	91%	92%	94%	95%	96%	97%	98%	100%
50%	89%	90%	91%	92%	93%	95%	96%	97%	98%	100%	101%

For reference, the results from the tool without the updated permanent disability or fatal severities is +85% under similar assumptions to Scenario #1. We can see that the update just to the fatal severities decreased the projection to 78% (Table 6, under the 0% permanent rate assumptions) due primarily to the 0.75 relativity applied for differences in the age distribution. However, the inclusion of permanent disability more than offsets this, increasing the overall impact to +90% using the default assumptions. Additionally, a review of the total severity implies that permanent disability constitutes around 13%<sup>27</sup> of expected losses related to COVID-19 under the assumptions in Scenario #1.

NCCI’s Hypothetical Scenarios Tool has been updated to incorporate the updated permanent disability and fatal assumptions as shown in the enclosed appendices, as applicable for total workforce, healthcare workers, and first responders by state.

**Summary**

There is a substantial amount of uncertainty when determining the ultimate impact of COVID-19 on WC expected losses either on a national, state, or occupation-specific level. This is also true as it relates to the ultimate outcome of injured workers both in the likelihood and costs of permanent disability injuries. If historical lung or infection claims are a suitable proxy, then it is reasonable to expect such outcomes may occur as a result of COVID-19 and be a material source of expected losses for COVID-19 claims. However, depending on the number of infected workers, severity of symptoms, and compensability standards, the degree of variation in estimated impacts on overall WC expected losses may be extreme.

<sup>27</sup> 13% = \$893 / \$6,707 = Permanent Disability Severity / Total Severity = (15c) / (20) from Hypothetical Example #1

**Appendix 1: Scenario Inputs by State  
All Workers**

State	Fatal Claim Severity	Permanent Disability Severity	
		Partial Severity	Total Severity
Alabama	142,209	29,647	310,322
Alaska	425,000	28,067	463,002
Arizona	463,044	23,103	456,433
Arkansas	248,716	18,166	564,271
Colorado	321,545	21,348	400,309
Connecticut	309,225	41,070	1,544,913
District of Columbia	503,888	62,355	1,214,975
Florida	120,671	13,603	525,004
Georgia	176,235	20,803	502,758
Hawaii	248,394	32,134	698,736
Idaho	159,647	26,590	486,817
Illinois	316,387	32,996	763,810
Indiana	180,063	13,592	376,732
Iowa	622,225	35,673	777,153
Kansas	242,866	11,215	241,901
Kentucky	321,120	30,897	629,846
Louisiana	220,206	53,039	496,209
Maine	210,170	84,937	850,604
Maryland	225,100	34,426	597,937
Mississippi	93,250	16,149	176,218
Missouri	334,481	15,222	740,692
Montana	251,729	48,888	330,967
Nebraska	389,471	24,141	582,836
Nevada	1,325,664	37,556	1,602,282
New Hampshire	398,617	32,548	288,968
New Mexico	317,975	32,165	426,266
North Carolina	214,998	22,223	652,840
Oklahoma	515,191	22,535	439,204
Oregon	565,816	22,975	646,878
Rhode Island	479,519	61,488	707,851
South Carolina	182,664	15,766	262,424
South Dakota	372,340	22,768	397,936
Tennessee	188,383	13,018	324,650
Texas	665,375	18,227	942,927
Utah	308,848	19,396	731,348
Vermont	321,545	57,689	579,234
Virginia	195,355	37,341	691,212
West Virginia	525,717	23,255	654,234
Countrywide	327,461	25,643	630,482

**Appendix 2: Scenario Inputs by State  
Healthcare Workers**

State	Fatal Claim Severity	Permanent Disability Severity	
		Partial Severity	Total Severity
Alabama	169,229	35,280	369,283
Alaska	535,500	35,364	583,383
Arizona	574,175	28,648	565,977
Arkansas	305,921	22,344	694,053
Colorado	360,130	23,910	448,346
Connecticut	337,055	44,766	1,683,955
District of Columbia	428,305	53,002	1,032,729
Florida	155,666	17,548	677,255
Georgia	216,769	25,588	618,392
Hawaii	337,816	43,702	950,281
Idaho	201,155	33,503	613,389
Illinois	354,353	36,956	855,467
Indiana	232,281	17,534	485,984
Iowa	746,670	42,808	932,584
Kansas	272,010	12,561	270,929
Kentucky	401,400	38,621	787,308
Louisiana	248,833	59,934	560,716
Maine	262,713	106,171	1,063,255
Maryland	258,865	39,590	687,628
Mississippi	117,495	20,348	222,035
Missouri	374,619	17,049	829,575
Montana	339,834	65,999	446,805
Nebraska	479,049	29,693	716,888
Nevada	1,922,213	54,456	2,323,309
New Hampshire	506,244	41,336	366,989
New Mexico	368,851	37,311	494,469
North Carolina	255,848	26,445	776,880
Oklahoma	633,685	27,718	540,221
Oregon	735,561	29,868	840,941
Rhode Island	580,218	74,400	856,500
South Carolina	231,983	20,023	333,278
South Dakota	510,106	31,192	545,172
Tennessee	233,595	16,142	402,566
Texas	731,913	20,050	1,037,220
Utah	358,264	22,499	848,364
Vermont	389,069	69,804	700,873
Virginia	214,891	41,075	760,333
West Virginia	651,889	28,836	811,250
Countrywide	386,404	30,259	743,969

**Appendix 3: Scenario Inputs by State  
First Responders**

State	Fatal Claim Severity	Permanent Disability Severity	
		Partial Severity	Total Severity
Alabama	149,319	31,129	325,838
Alaska	539,750	35,645	588,013
Arizona	546,392	27,262	538,591
Arkansas	243,742	17,803	552,986
Colorado	382,639	25,404	476,368
Connecticut	358,701	47,641	1,792,099
District of Columbia	458,538	56,743	1,105,627
Florida	143,598	16,188	624,755
Georgia	163,899	19,347	467,565
Hawaii	340,300	44,024	957,268
Idaho	180,401	30,047	550,103
Illinois	414,467	43,225	1,000,591
Indiana	199,870	15,087	418,173
Iowa	765,337	43,878	955,898
Kansas	257,438	11,888	256,415
Kentucky	317,909	30,588	623,548
Louisiana	213,600	51,448	481,323
Maine	222,780	90,033	901,640
Maryland	261,116	39,934	693,607
Mississippi	88,588	15,342	167,407
Missouri	361,239	16,440	799,947
Montana	312,144	60,621	410,399
Nebraska	447,892	27,762	670,261
Nevada	2,015,009	57,085	2,435,469
New Hampshire	422,534	34,501	306,306
New Mexico	343,413	34,738	460,367
North Carolina	202,098	20,890	613,670
Oklahoma	561,558	24,563	478,732
Oregon	746,877	30,327	853,879
Rhode Island	570,628	73,171	842,343
South Carolina	180,837	15,608	259,800
South Dakota	424,468	25,956	453,647
Tennessee	197,802	13,669	340,883
Texas	771,835	21,143	1,093,795
Utah	345,910	21,724	819,110
Vermont	366,561	65,765	660,327
Virginia	201,216	38,461	711,948
West Virginia	520,460	23,022	647,692
Countrywide	363,482	28,464	699,835

Severities by specified workforce derived from Appendix 1 base severity multiplied by relativity in average salaries according to the US Bureau of Labor Statistics

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