

Standardized Regulatory Impact  
Assessment (SRIA) of the Proposed  
California Regulation for COVID-19  
Prevention in the Workplace

California Department of Industrial Relations,  
Division of Occupational Safety and Health

April 2022

## Acknowledgments

This report has benefited from the insights, support, and feedback of many individuals and organizations. Dan Lucido, Eric Berg, Corey Friedman, Rachel Brill, Kathryn Woods, Susan Eckhardt, and Keummi Park of the California Division of Occupational Safety and Health (Cal/OSHA) performed work and provided guidance and review throughout the SRIA process. DIR thanks the California Department of Public Health COVID-19 Modeling Team for sharing insights on projections for COVID-19 cases, hospitalizations and deaths. This analysis also benefited from consultation provided by David Metz, Benjamin Miller, Raffaele Vardavas, and Weilong Kong of the RAND Corporation.

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## 1. Introduction

Coronavirus disease 2019 (COVID-19), the disease caused by the SARS-CoV-2 and its variants, poses a serious risk to workers in California, the United States, and around the world. While a high percentage of individuals affected by COVID-19 will experience mild to moderate flu-like symptoms, some will have more serious symptoms and will require hospitalization, particularly individuals who are elderly or have underlying medical conditions.<sup>1</sup> Serious symptoms of COVID-19 include shortness of breath, difficulty breathing, pneumonia, and organ failure, and COVID-19 can result in death.<sup>2</sup> The virus can damage the lungs, heart, and brain, and can cause long-term health problems.<sup>3</sup>

As of April 19, 2022, there have been 8,550,657 cases of COVID-19 and 89,054 COVID-19 deaths in California.<sup>4</sup> The California Department of Industrial Relations (DIR) is proposing an occupational COVID-19 infection prevention standard to reduce the hazard of COVID-19 in work environments and protect the safety and health of California workers.

### 1.1 Regulatory History

The federal Occupational Safety and Health Administration (OSHA) oversees and enforces standards to protect workers from hazards in the workplace. There is currently no federal regulation specifically designed to protect workers from the hazards associated with COVID-19.

#### Federal ETS for Healthcare (recordkeeping only)

On June 10, 2021, federal OSHA issued emergency temporary standards (ETS) for COVID-19 in healthcare, 29 CFR 1910.502 through 1910.509. These federal regulations addressed COVID-19 hazards and applied to a subset of the facilities, services, and operations which California addresses under existing regulation title 8, section 5199, Aerosol Transmissible Diseases (ATD standard). On December 27, 2021, federal OSHA withdrew all but the recordkeeping portions of the healthcare ETS. Federal OSHA is in the process of establishing an interim final rule for Occupational Exposure to COVID-19 in Healthcare Settings.

#### Federal ETS for General Industry (withdrawn)

On November 5, 2021, federal OSHA issued an ETS for general industry for COVID-19 vaccination, testing, and face coverings, 29 CFR 1910.501. However, effective January 26, 2022, federal OSHA withdrew that ETS.

#### California's ATD Standard

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<sup>1</sup> CDC. Evidence used to update the list of underlying medical conditions that increase a person's risk of severe illness from COVID-19, updated February 15, 2022. Accessed on April 21, 2022.

<https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/evidence-table.html>

<sup>2</sup> Wiersinga WJ, Rhodes A, Cheng AC, Peacock SJ, Prescott HC. Pathophysiology, Transmission, Diagnosis, and Treatment of Coronavirus Disease 2019 (COVID-19): A Review. JAMA. 2020; 324(8):782–793.

doi:10.1001/jama.2020.12839. Accessed April 21, 2022.

<https://jamanetwork.com/journals/jama/fullarticle/2768391>

<sup>3</sup> CDC. Post-COVID Conditions, updated September 16, 2021. Accessed 4-21-22.

<https://www.cdc.gov/coronavirus/2019-ncov/long-term-effects/index.html>

<sup>4</sup> CDPH. Tracking COVID-19 in California. "Today's Update," updated April 19, 2022. Accessed April 20, 2022.

<https://covid19.ca.gov/state-dashboard/>

Certain states, including California, have the authority to mandate and enforce their own occupational safety and health standards. In California, Cal/OSHA's ATD standard, title 8, section 5199, provides important protections to workers in specified work settings from exposure to novel pathogens, including COVID-19, particularly in healthcare and corrections. However, the scope of section 5199 is limited, leaving the majority of California workers unprotected.<sup>5</sup>

#### California's ETS, Petition 583 to Standards Board and Readoptions

During its September 17, 2020, meeting, the Board considered Petition 583, which requested an emergency rulemaking to address the potential harm posed to workers by COVID-19.<sup>6</sup> The Petition sought adoption of an emergency standard that would apply to employees in any facility, service category, or operation not covered by title 8, sections 5199 or 5199.1 (Aerosol Transmissible Diseases – Zoonotic). In addition, the Petition sought a permanent regulation to protect employees from infectious diseases, including those caused by novel pathogens.

The Board voted to grant Petition 583 in part, agreeing that "COVID-19 is a hazard to working people" and that "an emergency regulation would enhance worker safety." The Board requested that the Division of Occupational Safety and Health (Division or Cal/OSHA) draft an emergency rulemaking proposal to protect all workers not covered by section 5199 from COVID-19 exposure in the workplace.<sup>7</sup>

On November 19, 2020, the Board approved the adoption of title 8 sections 3205 and 3205.1 – 3205.4. These emergency regulations became effective on November 30, 2020. Due to the ongoing nature of the pandemic, the need for the ETS, continued.

The ETS was readopted, with amendments, on June 17, 2021 and December 16, 2021, with effective dates of June 17, 2021 and January 14, 2022, respectively.

On December 16, 2021, Governor Gavin Newsom issued Executive Order N-23-21, which waived the limitations found in Government Code section 11346.1(h) and allowed a third readoption of the ETS.<sup>8</sup> The ETS was again readopted, with amendments, on April 21, 2022, with an effective date of May 6, 2022. Per Executive Order N-23-21, the third readoption of the ETS shall not remain in effect beyond December 31, 2022.

## 1.2 Statement of the Need for the Proposed Regulation

COVID-19 is a pandemic disease, found in every county in California, every state in the United States, and nearly every country in the world. While a high percentage of individuals affected by COVID-19 will experience mild to moderate flu-like symptoms, some will have more serious symptoms and will require hospitalization, particularly individuals who are elderly or have underlying medical conditions.<sup>9</sup> Serious

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<sup>5</sup> Cal/OSHA. Title 8 section 5199, Aerosol Transmissible Diseases. <https://www.dir.ca.gov/title8/5199.html>

<sup>6</sup> CA Occupational Safety and Health Standards Board (OSHSB). Petition 583.

<https://www.dir.ca.gov/oshsb/petition-583.html>

<sup>7</sup> OSHSB. Petition 583 Adopted Decision. <https://www.dir.ca.gov/oshsb/documents/petition-583-adopteddecision.pdf>

<sup>8</sup> Governor Gavin Newsom. Executive Order N-23-21. <https://www.gov.ca.gov/wp-content/uploads/2021/12/12.16.21-ETS-Readoption-and-Shareholder-Meeting-EO.pdf>

<sup>9</sup> CDC. Evidence used to update the list of underlying medical conditions that increase a person's risk of severe illness from COVID-19, updated February 15, 2022. Accessed on April 21, 2022.

<https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/evidence-table.html>

symptoms of COVID-19 include shortness of breath, difficulty breathing, pneumonia, and organ failure, and COVID-19 can result in death.<sup>10</sup> The virus can damage the lungs, heart, and brain, and can cause long-term health problems.<sup>11</sup>

As of April 19, 2022, there have been 8,550,657 cases of COVID-19 and 89,054 COVID-19 deaths in California.<sup>12</sup> The case numbers represent an undercount, as the data include only cases identified by a positive polymerase chain reaction (PCR) test and exclude cases identified by a positive antigen test.<sup>13</sup>

The SARS-CoV-2 virus that causes COVID-19 is an airborne transmissible pathogen.<sup>14, 15</sup> The virus is readily transmissible in workplaces because there are areas where multiple people come into contact with one another, often for extended periods of time. When employees report to their workplaces, they may regularly come into contact with co-workers, the public, delivery people, patients, and other people who enter the workplace. Workplace factors that exacerbate the risk of transmission of the virus include working in indoor settings, working in poorly ventilated areas, and spending hours in close proximity with others. Even in the cases where workers can do most of their work from, for example, a private office within a workplace, they share common areas like hallways, restrooms, lunch rooms, and meeting rooms. Many work areas are poorly ventilated.

Data for the number of cases of COVID-19 infection and number of hospitalizations and deaths attributable to workplace exposure to COVID-19 is not currently available; however, the numbers are likely substantial, particularly among essential workers and other employees who interact with the public, due to workers' exposure to persons outside of one's household, along with the close proximity among persons practiced in some industries.

Employees infected with COVID-19 at work can transmit the infection to persons in their homes and communities, resulting in an increase in infection rates.

Clusters and outbreaks of COVID-19 have occurred in workplaces throughout California, including in food manufacturing, agricultural operations, educational services, retail establishments, and warehouses, among other industries.

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<sup>10</sup> Wiersinga WJ, Rhodes A, Cheng AC, Peacock SJ, Prescott HC. Pathophysiology, Transmission, Diagnosis, and Treatment of Coronavirus Disease 2019 (COVID-19): A Review. *JAMA*. 2020; 324(8):782–793. doi:10.1001/jama.2020.12839. Accessed April 21, 2022.

<https://jamanetwork.com/journals/jama/fullarticle/2768391>

<sup>11</sup> CDC. Post-COVID Conditions, updated September 16, 2021. Accessed 4-21-22.

<https://www.cdc.gov/coronavirus/2019-ncov/long-term-effects/index.html>

<sup>12</sup> CDPH. Tracking COVID-19 in California. "Today's Update," updated April 19, 2022. Accessed April 20, 2022.

<https://covid19.ca.gov/state-dashboard/>

<sup>13</sup> California Health and Human Services (CHHS). COVID-19 Cases Deaths Tests Data Dictionary, updated March 20, 2021; accessed February 10, 2022. [https://data.chhs.ca.gov/dataset/f333528b-4d38-4814-bebb-12db1f10f535/resource/e6667716-5ec6-499f-aeab-0e085020135a/download/covid-19\\_cases\\_deaths\\_tests\\_data\\_dictionary.xlsx](https://data.chhs.ca.gov/dataset/f333528b-4d38-4814-bebb-12db1f10f535/resource/e6667716-5ec6-499f-aeab-0e085020135a/download/covid-19_cases_deaths_tests_data_dictionary.xlsx)

<sup>14</sup> An airborne transmissible pathogen is a pathogen transmitted through dissemination of airborne droplet nuclei, small particle aerosols, or dust particles containing the disease agent.

<sup>15</sup> Centers for Disease Control and Prevention. Scientific Brief: SARS-CoV-2 Transmission. May 7, 2021. Accessed April 23, 2022. <https://www.cdc.gov/coronavirus/2019-ncov/science/science-briefs/sars-cov-2-transmission.html>



There has been an overrepresentation of migrant temporary farmworkers testing positive for COVID-19 in California compared with workers in other industries. Many of these workers live in compact, dorm-like housing facilities provided by employers.<sup>16</sup> One California health officer noted that “farmworkers face the greatest infection risk not at work, but at home.”<sup>17</sup> In recognition of the need to control against the spread of COVID-19 among farmworkers, Governor Newsom unveiled the Housing for the Harvest program, which provides 14 paid days of temporary hotel rooms for California farmworkers who have been exposed to, or tested positive for, COVID-19 but are unable to adequately quarantine at home.<sup>18</sup> In addition, the Centers for Disease Control and Prevention (CDC) has published COVID-19 prevention guidance documents encouraging employers to adopt various workplace control measures for workers residing in communal living arrangements, including employer-furnished housing, and workers traveling to and from work in shared motor vehicles.<sup>19</sup>

Occupational safety and health standards within title 8 of the California Code of Regulations (CCR) protect workers from hazards in general. However, other than those employees who are covered under section 5199, there is currently no specific regulation that protects all workers from exposure to airborne diseases such as COVID-19.

The proposed regulation is necessary to combat the spread of COVID-19 in California workers. The proposed regulation would significantly reduce the number COVID-19 related illnesses, disabilities and deaths in California’s workforce.

COVID-19 vaccination has been shown to reduce the incidence of serious illness or death among those infected with COVID-19.<sup>20</sup> However, a serious hazard to employees remains, as evidenced by the emergence of the Delta and Omicron variants of SARS-CoV-2. For the Delta variant, viral loads were found to be on average about 1,000 times greater than the SARS-CoV-2 (alpha) lineages present during the first months of the pandemic.<sup>21</sup> The risk of hospital admission, ICU admission, and death for COVID-19 was much higher for individuals infected with the Delta variant, as compared to strains that were not

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<sup>16</sup> VC Star. Farmworker housing coronavirus outbreak: 188 test positive for COVID-19, dated July 4, 2020. Accessed on November 6, 2020. <https://www.vcstar.com/story/news/local/2020/07/03/oxnard-california-farmworker-housing-covid-19-coronavirus-outbreak/5368774002/>

<sup>17</sup> The Californian. COVID-19 rips through California motel rooms of guest workers who pick nation’s produce, dated August 26, 2020. Accessed on November 6, 2020. <https://www.thecalifornian.com/story/news/2020/08/17/california-motel-guest-farm-workers-coronavirus-case-outbreak/5475182002/>

<sup>18</sup> State of CA. Help for agricultural workers, Housing for the Harvest, updated March 22, 2022. Accessed April 20, 2022. <https://covid19.ca.gov/housing-for-agricultural-workers/>

<sup>19</sup> CDC. Agriculture Workers & Employers, updated November 6, 2020. Accessed on April 20, 2022.

<https://web.archive.org/web/20201106163831/https://www.cdc.gov/coronavirus/2019-ncov/community/guidance-agricultural-workers.html> CDC. COVID-19 Guidance for Shared or Congregate Housing, updated Aug. 22, 2020. Accessed on April 20, 2022.

<https://web.archive.org/web/20201106144800/https://www.cdc.gov/coronavirus/2019-ncov/community/shared-congregate-house/guidance-shared-congregate-housing.html>

<sup>20</sup> Tenforde MW, Self WH, Adams K, et al. Association Between mRNA Vaccination and COVID-19 Hospitalization and Disease Severity. *JAMA*. 2021;326(20):2043–2054. Accessed on April 21, 2022. doi:10.1001/jama.2021.19499

<sup>21</sup> Baisheng Li, et al. Viral infection and transmission in a large, well-traced outbreak caused by the SARS-CoV-2 Delta variant. *Nat Commun*. 2022 Jan 24;13(1):460. Accessed on April 21, 2022.

<https://pubmed.ncbi.nlm.nih.gov/35075154/>

“variants of concern.” The need for ICU admission increased 241 percent and the likelihood of death increased 121 percent.<sup>22</sup>

Beginning in December 2021 and continuing into April 2022, the Omicron variant emerged as dominant, proving at least two to four times more transmissible than the Delta variant.<sup>23</sup> Exposure to the Omicron variant could result in “breakthrough infections” amongst vaccinated persons.<sup>24</sup> The highly transmissible Omicron variant resulted in a surge of COVID-19 cases in late December 2021 into early to mid-January 2022, with levels of cases, emergency department visits, and hospital admissions higher than in previous stages of the pandemic and the average daily number of deaths remaining substantial.<sup>25</sup>

Subvariants of Omicron, such as BA.2 and others, have been shown to be even more transmissible than the original Omicron variant.<sup>26</sup>

Following recommended prevention strategies, therefore, is critical to preventing infections, severe illness, or death from COVID-19. Worker protections continue to be urgently needed in the event another variant emerges which can compete successfully with Omicron.

Due to changes in social norms and in federal, state, and local requirements that make mask-wearing and physical distancing voluntary, future adherence to these precautions is unlikely.<sup>27</sup> As COVID-19 vaccination has been shown to reduce the incidence of serious illness or death among those infected with COVID-19, unvaccinated employees will be particularly at risk for serious illness or death, especially given the spread of highly contagious SARS-CoV-2 variants, unless protective measures are taken.

At this time, non-emergency regulations are necessary to continue providing worker protections and furthering recovery from the pandemic. The emergence of variants like Delta and Omicron underscores that COVID-19 will likely remain a significant workplace hazard for potentially years to come.

### 1.3 Overview of Proposed Regulatory Action

The proposed regulation sets forth requirements to protect employees not covered by existing section 5199 from COVID-19 exposure in the workplace. The proposed regulation includes additional

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<sup>22</sup> Fisman DN and Tuite AR. Evaluation of the relative virulence of novel SARS-CoV-2 variants: a retrospective cohort study in Ontario, Canada. CMAJ. 2021 Oct 25. Accessed on April 21, 2022.

<https://pubmed.ncbi.nlm.nih.gov/34610919/>

<sup>23</sup> CDPH. Tracking Variants, dated February 3, 2022. Accessed on April 21, 2022.

<https://www.cdph.ca.gov/Programs/CID/DCDC/Pages/COVID-19/COVID-Variants.aspx>

<sup>24</sup> CDC. Omicron Variant: What You Need to Know, updated March 29, 2022. Accessed on April 21, 2022.

<https://www.cdc.gov/coronavirus/2019-ncov/variants/omicron-variant.html>

<sup>25</sup> Iuliano AD, Brunkard JM, Boehmer TK, et al. Trends in Disease Severity and Health Care Utilization During the Early Omicron Variant Period Compared with Previous SARS-CoV-2 High Transmission Periods — United States, December 2020–January 2022. MMWR Morb Mortal Wkly Rep 2022;71:146–152; accessed March 29, 2022.

[https://www.cdc.gov/mmwr/volumes/71/wr/mm7104e4.htm?s\\_cid=mm7104e4\\_w](https://www.cdc.gov/mmwr/volumes/71/wr/mm7104e4.htm?s_cid=mm7104e4_w)

<sup>26</sup> Lyngse FP, Kirkeby CT, Denwood M, et al. Transmission of SARS-CoV-2 Omicron VOC subvariants BA.1 and BA.2: Evidence from Danish Households. medRxiv 2022.01.28.22270044. Accessed April 21, 2022.

doi: <https://doi.org/10.1101/2022.01.28.22270044>

<sup>27</sup> Bokemper SE, Cucciniello M, Rotesi T, et al. Experimental evidence that changing beliefs about mask efficacy and social norms increase mask wearing for COVID-19 risk reduction: Results from the United States and Italy. [PLoS One](https://doi.org/10.1371/journal.pone.0258282). 2021; 16(10): e0258282.

Published online 2021 Oct 11. Accessed April 21, 2022. doi: [10.1371/journal.pone.0258282](https://doi.org/10.1371/journal.pone.0258282)

requirements for COVID-19 outbreaks, employer-provided housing and employer-provided transportation. DIR estimates the start date of the proposed regulation will be January 1, 2023 and the regulation will sunset after two years. This section briefly describes the provisions of the proposed rule, and the additional compliance actions required under certain conditions.

The proposed regulation states that the following compliance actions are required for all employees in all places of employment, with exceptions for: work locations with one employee who does not have contact with other persons; employees working from home; employees with occupational exposure as defined by section 5199, when covered by section 5199; and employees teleworking from a location of the employee's choice, which is not under the control of the employer.

- 1. Application of 3203:** The employer must address COVID-19 under section 3203, Injury and Illness Prevention Program (IIPP). The written COVID-19 procedures may be integrated into the employer's written IIPP or kept as a separate document. The employer must treat all persons as potentially infectious regardless of symptoms, vaccination status, or negative COVID-19 test results. When determining measures to prevent COVID-19 transmission and to identify and correct COVID-19 hazards, the employer must review applicable orders and guidance from the State of California and the local health department and must treat COVID-19 as an airborne infectious disease. Employees must receive training regarding COVID-19. The employer's procedure to investigate COVID-19 illness at the workplace must include elements set forth in the regulation. The employer must have effective methods and/or procedures for responding to a COVID-19 case at the workplace.
- 2. Testing of Close Contacts:** The employer must make COVID-19 tests available at no cost, during paid time, to all employees of the employer who had a close contact in the workplace, with the exception of returned cases, as defined in the regulation, and provide them with information on available benefits.
- 3. Notice of COVID-19 Cases:** The employer must notify employees and independent contractors who had a close contact, as well as any employer with an employee who had a close contact. The notice must be provided as soon as possible, and in no case longer than the time required to ensure that the exclusion requirements are met. When Labor Code section 6409.6(a) or any successor law is in effect, the employer must provide notice of a COVID-19 case to employees, employers, and independent contractors at the worksite during the infectious period, as defined in the regulation. The employer must also provide the notice to the authorized representative of employees at the worksite.
- 4. Face Coverings:** The employer must provide face coverings and ensure they are worn by employees when required by a CDPH regulation or order. When a CDPH regulation or order requires face coverings indoors, that includes spaces within vehicles. Face coverings must be clean, undamaged, and worn over the nose and mouth. If an employee is not wearing a face covering pursuant to allowed exceptions, the employer must assess COVID-19 hazards and take necessary action. The employer must not prevent any employee from wearing a face covering, including a respirator, when not required by the regulation, unless it would create a safety hazard.
- 5. Respirators:** Upon request, the employer must provide respirators for voluntary use to all employees who are working indoors or in vehicles with more than one person. Whenever an employer makes respirators for voluntary use available, the employer must encourage their use and

must ensure that employees are provided with a respirator of the correct size and that employees are trained how to properly wear the respirator provided; how to perform a user seal check according to the manufacturer's instructions each time a respirator is worn; and the fact that facial hair interferes with a seal.

6. **Ventilation:** For indoor workplaces, the employer must review guidance from CDPH and the Division regarding ventilation, evaluate whether current ventilation is adequate to reduce the risk of transmission if a COVID-19 case enters the workplace, and where it is not adequate, implement changes as necessary. In vehicles, the employer must maximize the supply of outside air, except when doing so would cause a hazard to employees or expose them to inclement weather. A place of employment subject to COVID-19 outbreaks provisions must continue to comply with the ventilation requirement under the COVID-19 outbreaks section even after the outbreak has passed.

7. **Aerosolizing Procedures:** For employees in work settings that are exempt from section 5199, who are exposed to procedures that may aerosolize potentially infectious material such as saliva or respiratory tract fluids, the employer must evaluate the need for respiratory protection to prevent COVID-19 transmission under section 5144 and must comply with that section.

8. **Reporting and Recordkeeping:** The employer must report information about COVID-19 cases and outbreaks at the workplace to the local health department whenever required by law, and must provide any related information requested by the local health department. The employer must keep a record of and track all COVID-19 cases with information required by the regulation. The employer must also keep a record of persons who had a close contact. The employer must retain the notices required by the regulation. Personal identifying information of COVID-19 cases or persons with COVID-19 symptoms, and any employee medical records required by the regulation, must be kept confidential unless disclosure is required or permitted by law.

Additional compliance actions are required under the following conditions:

9. **COVID-19 Outbreaks:** This section applies to workplaces covered by 3205 if three or more employee COVID-19 cases within an exposed group, as defined in the regulation, visited the workplace during their infectious period during a 14-day period, unless a CDPH regulation nor order defines outbreak differently, in which case this section applies when the number of cases at the workplace constitutes an outbreak under CDPH's definition. This section shall apply until there are no new COVID-19 cases detected in the exposed group for a 14-day period. During an outbreak, the employer must make COVID-19 testing available at no cost to employees within the exposed group. The employer must then make testing available on a weekly basis to all employees in the exposed group who remain at the workplace. Employees who had close contacts must have a negative COVID-19 test taken within three to five days after the close contact or must be excluded from the workplace for the same period that COVID-19 cases are excluded. Employees in the exposed group must wear face coverings when indoors, or when outdoors and less than six feet from another person. The employer must notify employees of their right to request and receive a respirator for voluntary use. The employer must immediately perform a review of potentially relevant COVID-19 policies, procedures, and controls and implement changes as needed to prevent further spread of COVID-19. Indoors, if there is mechanical ventilation, the employer must use at least MERV-13 filters, or the highest level of filter compatible with the existing ventilation system. The employer must use HEPA units in indoor areas where ventilation is inadequate to reduce the risk of COVID-19 transmission.

In major outbreaks where there are 20 or more employee COVID-19 cases in an exposed group within a 30-day period, COVID-19 testing must be required of all employees in the exposed group at least twice a week. Employees in the exposed group must be tested or must be excluded from the workplace for the same period that COVID-19 cases are excluded. The employer must report the outbreak to the Division. The employer must provide respirators for voluntary use to employees in the exposed group, encourage their use, and provide employees training on the respirators. When any employees in the exposed group are not wearing respirators required by the employer, the employer must separate these employees from other persons by at least six feet, except where not feasible or during momentary exposure while persons are in movement.

10. **COVID-19 Prevention in Employer-Provided Housing:** The employer must assign employee housing in a manner that prioritizes keeping households, and cohorts that work or travel together, within the same housing unit. The employer must maximize the quantity and supply of outdoor air and increase filtration efficiency to the highest level compatible with the existing ventilation system. If there is not a MERV-13 or higher filter in use, portable or mounted HEPA filtration units must be used in all sleeping areas. The employer must provide face coverings to all residents and provide information to residents on when they should be used. The employer must encourage residents to report COVID-19 symptoms to the employer. The employer must establish, implement, and maintain effective policies and procedures for COVID-19 testing of residents who had a close contact or COVID-19 symptoms, and communicate these policies and procedures to the residents. The employer must isolate COVID-19 cases from all residents who are not COVID-19 cases, and effectively quarantine persons who had a close contact from all other residents in the employer-provided shared housing unit.
11. **COVID-19 Prevention in Employer-Provided Transportation:** The employer must comply with the requirements of the regulation within a vehicle and respond to a COVID-19 case within the vehicle. The employer must assign transportation such that cohorts travel and work together, separate from other workers. To the extent feasible, employees who usually maintain a household together must travel together.

#### 1.4 Major Regulation Determination

Any agency that anticipates promulgating a regulation that will have an economic impact on California business enterprises and individuals in an amount exceeding \$50 million in any 12-month period between the date it is filed with the Secretary of State through 12 months after it is fully implemented (defined as a major regulation) is required to prepare a Standardized Regulatory Impact Assessment (SRIA). The proposed COVID-19 Prevention regulations would be fully implemented in 2023 and are estimated to result in an annual economic impact exceeding \$50 million starting in 2023. Most provisions of the proposed regulation would be in effect for two years; recordkeeping provisions would be in effect for three years. Cal/OSHA staff has estimated that the proposed regulation could result in direct costs to regulated entities totaling \$0.5 billion to \$1.6 billion in 2023 and \$0.2 billion to \$1.5 billion 2024. The estimated direct benefits range from \$6.0 billion to \$41.2 billion year.

#### 1.5 Baseline Information

In this section DIR estimates the number of affected establishments and employees in industries covered by the proposed regulation. The term “establishment” describes a single physical location. Some business entities own and operate more than one establishment. DIR relies on the most recent

available information in the California Quarterly Census of Employment and Wages (QCEW) using data for the second quarter of 2021. Only business entities that have employees are covered by the proposed regulation. Among those employers, the following are exempt: businesses that are entirely remote/teleworking, whose employees do not come into contact with the public for work; businesses in which employees work alone and do not come into contact with the public for work; and businesses in which all employees are covered by existing Title 8, section 5199, Aerosol Transmissible Diseases (ATD).

The latter are specified in detail in section 5199(a)(1), which generally covers businesses in health care with some limited exceptions. Section 5199 also covers facilities that receive persons from sites where there was an uncontrolled release of a biological agent; public health services, including certain contact tracing; certain police services provided in conjunction with health care or public health operations or during transport or detention of persons reasonably anticipated to be cases or suspected cases of aerosol transmissible diseases; correctional facilities and other inmate/detainee housing; homeless shelters; drug treatment centers; pathology labs and mortuaries that perform aerosol-generating procedures on cadavers; certain labs that do work involving ATD risk; and certain maintenance, renovation, service, and repair operations involving possible aerosol transmissible pathogen contamination.

The proposed regulation does not apply to employees of covered entities (1) who do not report to a workplace where they come into contact with other persons, (2) while working from home, or (3) who are covered by section 5199. The number of establishments that are completely exempt because employees work entirely remotely or they have only one employee who does not have contact with other persons is uncertain, however it is likely to be small because in many cases employees at least occasionally have to come into contact with others for work or at least some employees are not covered by section 5199. Therefore, DIR only provides estimates of the number of employees in each industry that are not covered by the proposed regulation.

DIR relies on the OSHA's estimates in the COVID-19 Vaccination and Testing ETS of the percentage of workers who can work remotely.<sup>28</sup> OSHA starts with estimates from Dingel and Neiman (2020) of number of jobs that U.S. workers can feasibly perform remotely.<sup>29</sup> That study uses surveys from the Occupational Information Network (O\*Net) to evaluate which occupations can be performed remotely and combines them with Bureau of Labor Statistics' (BLS) Occupational Employment and Wage Statistics (OEWS) data on employment by occupation to estimate the total number of workers who can work remotely.

OSHA makes two adjustments to these estimates to account for current conditions. First, OSHA accounts for the tendency toward employees returning to the workplace. This trend is reflected in BLS's Current Population Survey (CPS) for 2021.<sup>30</sup> In particular, OSHA notes that since 2020 most teachers have resumed in-person instruction, other activities that mostly ceased during the pandemic have now

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<sup>28</sup> U.S. Occupational Safety and Health Administration, COVID-19 Vaccination and Testing: Emergency Temporary Standard, Interim Final Rule, 86 FR 212 (61402 – 61555), November 5, 2021.

<sup>29</sup> Dingel, Jonathan I. and Brent Neiman, *How many jobs can be done at home?* Journal of Public Economics. Volume 189, July 2020, 104235.

<sup>30</sup> BLS, Current Population Survey, Table 2. Employed persons who teleworked or worked at home for pay at any time in the last 4 weeks because of the coronavirus pandemic by usual full- or part-time status, occupation, industry, and class of worker; Persons who teleworked because of the coronavirus pandemic. 2021.

resumed, and many places that were closed to the public have re-opened. Second, OSHA uses monthly COVID-specific telework questions added during the pandemic to the CPS to estimate the reduction in teleworking since its peak, which occurred in May 2020 at nearly 40 percent of the workforce, through August 2021 and applies these estimates to further reduce the estimated number of workers currently teleworking.<sup>31</sup> DIR also analyzed the CPS data through February 2022, but determined that there was no significant change in the vast majority of industries relative to August 2021, by which point most of the return to work had already occurred. Many companies that have planned a full return to work in 2022 already have some (or many) employees returning to the office at least part of the time under a hybrid work model. Furthermore, some occupations for which remote work was not initially feasible in 2020 has increasingly become practicable for telework due to business and technological adaptation, so the direction of change is not consistent.

Based on the Cal/OSHA’s knowledge of the application of section 5199, DIR has made assumptions about the percentage of employees covered by that section. The vast majority of these business are healthcare facilities (NAICS 62), but other facilities at increased risk for transmission of ATD infection, such as correctional facilities, and facilities that perform aerosol-generating procedures on cadavers, such as medical examiners’ facilities and coroners’ offices are included under the standard. Table 1.1 reports the percent of employees in industries already covered by section 5199.

**Table 1.1. Percent of Employees in Industries Covered by Section 5199**

NAICS	Description	Percent of Employees covered by 5199	Notes
621	Ambulatory Health Care Services	60%	
622	Hospitals	90%	
623	Nursing and Residential Care Facilities	60%	
6242	Community Food and Housing, and Emergency and Other Relief Services	20%	
8122	Death Care Services	90%	
9221	Justice, Public Order, and Safety Activities	60%	NAICS 922140: Correctional Institutions

According to data from the Employment Development Department (EDD), in California there were 1.6 million establishments, not including private households, and more than 16.6 million workers in the second quarter of 2021. DIR estimates that approximately 25 percent of employees are not covered under the regulation because they work remotely or are already covered under section 5199. Therefore, approximately 12.4 million employees are covered under the proposed regulation. Table 1.2 reports the number of establishments and employees covered by the proposed rule.

<sup>31</sup> OSHA, Analytic Spreadsheets in Support of the COVID-19 Vaccination and Testing ETS, October 2021.

**Table 1.2. Number of Establishments and Employees Covered by the Proposed Rule**

NAICS	Description	Establishments <sup>1</sup>	Employees <sup>1</sup>	Percent who Telework, Dingle & Neiman (2020) <sup>2</sup>	Percent who Telework, OSHA-adjusted (2021) <sup>2</sup>	Percent covered by 5199	Covered Employees
11	Agriculture, Forestry, Fishing and Hunting	17,095	437,342	7.7%	6.8%	0.0%	407,790
21	Mining	799	16,847	15.1%	11.9%	0.0%	14,850
22	Utilities	2,189	108,506	27.5%	22.9%	0.0%	83,621
23	Construction	89,433	892,884	16.0%	14.2%	0.0%	765,734
31-33	Manufacturing	44,894	1,268,522	21.3%	17.5%	0.0%	1,046,114
42	Wholesale Trade	64,550	645,030	43.6%	34.2%	0.0%	424,310
44-45	Retail Trade	107,895	1,576,092	15.8%	13.3%	0.0%	1,366,767
48-49	Transportation and Warehousing	33,548	739,422	14.3%	12.7%	0.0%	645,628
51	Information	30,925	555,575	44.2%	30.4%	0.0%	386,739
52	Finance and Insurance	54,255	541,584	62.1%	43.5%	0.0%	306,149
53	Real Estate and Rental and Leasing	62,489	285,803	41.0%	29.3%	0.0%	202,065
54	Professional and Technical Services	169,611	1,341,680	56.9%	39.1%	0.0%	816,935
55	Management of Companies and Enterprises	4,723	242,799	56.1%	46.3%	0.0%	130,409
56	Administrative and Waste Services	57,922	1,105,486	23.2%	17.6%	0.0%	911,060
61	Educational Services	35,373	1,422,332	61.8%	5.5%	0.0%	1,343,489
62	Health Care and Social Assistance	651,453	2,596,812	27.7%	14.2%	47.4%	1,180,088
71	Arts, Entertainment, and Recreation	31,308	276,153	29.4%	17.3%	0.0%	228,289
72	Accommodation and Food Services	89,423	1,409,601	3.4%	2.6%	0.0%	1,372,871
81	Other Services, ex. Public Administration	73,152	449,051	26.3%	18.3%	2.4%	357,400
92	Public Administration	11,013	706,291	29.2%	22.6%	21.1%	431,469
<b>Total</b>		<b>1,632,050</b>	<b>16,617,812</b>				<b>12,421,775</b>

Source:

1. California Employment Development Department (EDD) Labor Market Information Division, Quarterly Census of Employment and Wages (QCEW), 2021 Q2.
2. OSHA, Analytic Spreadsheets in Support of the COVID-19 Vaccination and Testing ETS, October 2021.

Of these, approximately 98 percent of establishments are owned or operated by private companies, 0.8 percent are state government, and 1.2 percent are local government. The distribution of the California workforce is approximately 86.7 percent employees of private companies, 3.2 percent state government employees, and 10.2 percent local government employees. Table 1.3 reports the distribution of establishments and covered employees by private and government entities.



**Table 1.3. Number of Establishments and Covered Employees, by Private or Government Status**

Owner or Operator	Establishments	Covered Employees
Private	1,599,190	10,727,625
State Government	13,613	361,201
Local Government	19,247	1,332,950
<b>Total</b>	<b>1,632,050</b>	<b>12,421,775</b>

The California legislature defines small businesses as businesses that have fewer than 100 employees, are not dominant in their field, and are independently owned and operated (A.B. 1033, Ch. 346, 2016). Information is only available on the number of employees, rather than ownership structure. Among privately-owned companies in California, approximately 98.8 percent of establishments have fewer than 100 employees. This may overstate the number of small businesses because some establishments may be owned or operated by larger companies or companies that are dominant in their field. Table 1.4 reports the number of businesses by size category in California. Business information is not available for all entities, therefore there is a slight discrepancy in the total number of establishments reported compared to the other tables in this report.

**Table 1.4. Number of Businesses by Size Category**

Total Establishments	Number of Employees								
	0-4	5-9	10-19	20-49	50-99	100-249	250-499	500-999	1000+
1,583,330	1,165,309	170,896	119,351	81,283	26,969	13,992	3,539	1,235	780

Source: EDD, Payroll and Number of Businesses by Size of Business - Classified by Industry, Table 2A, 2021 Q2.

Employees have heterogenous occupational exposure risks but are also subject to individual risk factors affecting the severity of illness and risk of hospitalization or death due to a COVID-19 infection. DIR uses information from the national BLS 2021 CPS to estimate the distribution of civilian employees by age. These data are adjusted to reflect the California workforce using demographic information on the gender breakdown of California workers from the BLS 2020 Geographic Profile of Employment and Unemployment. Table 1.5 summarizes demographic characteristics of the California civilian labor force by age and gender.

**Table 1.5. Demographic Characteristics of California Civilian Labor Force by Age and Gender, Percent of Employees**

Age	Total Employees	Men	Women
16 to 17 years	1.3%	0.7%	0.6%
18 to 29 years	22.0%	11.9%	10.1%
30 to 49 years	43.0%	23.9%	19.0%
50 to 64 years	27.1%	14.8%	12.3%
65-74 years	5.4%	3.1%	2.3%
75 years and over	1.2%	0.7%	0.5%
<b>Total</b>	<b>100%</b>	<b>55.1%</b>	<b>44.9%</b>

Source:

1. BLS, Geographic Profile of Employment and Unemployment, Table 14. Employment status of the civilian noninstitutional population, by gender, age, race, Hispanic or Latino ethnicity, and marital status, 2020 annual averages, California.
2. BLS, CPS, Household Data, Table 3. Employment status of the civilian noninstitutional population by age, sex, and race, U.S. national average.

## 1.6 Public Outreach and Input

DIR staff conducted extensive public outreach on COVID-19 prevention regulation and received many public comments from stakeholders. Representatives from industry, labor, and advocacy groups as well as government agencies and health and safety experts participated and provided input. These meetings provided opportunities for stakeholder comments, as well as for the solicitation of alternatives to the proposed regulation. DIR staff incorporated feedback it received from stakeholders as the draft regulation was being developed. The following is the list of DIR's public outreach efforts:

- 1) December 18, 2020: DOSH held a public meeting via video conference to receive stakeholder input on original California ETS language and possible changes needed or alternatives to a COVID-19 specific regulation.
- 2) February 11, 12, and 16 2021: Public Advisory Committee Meeting via video conference to discuss Cal/OSHA proposed revisions to the original California ETS. Public provided input on possible alternatives and changes to the original ETS.
- 3) June 3, 9, and 17. Public Standards Board Meeting via video conference. Cal/OSHA and CDPH presented information on COVID and the California ETS. Public provided input on possible alternatives and changes to the California ETS including expanding the number of cases that count towards an outbreak and repealing a COVID-19 specific regulation and using the Injury and Illness Program instead of a specific COVID-19 regulation.
- 4) June 21, 2021: Public Standards Board COVID stakeholder subcommittee meeting via video conference. Establishment of new public meeting process to discuss alternatives and changes to the 1<sup>st</sup> revision of the California ETS. Public provided input on possible end date of the ETS and criteria or metrics that could trigger the repeal of a COVID-19 specific regulation.
- 5) July 13, 2021: Public Standards Board COVID stakeholder subcommittee meeting via video conference. The Standards Board staff presented information on workplace COVID outbreak data. The public provided input on alternatives to existing law including looking at other state laws, using workers compensation data to develop future proposals, requirements that will encourage vaccination, requiring employers provide N95 respirators to vulnerable workers, including criteria to trigger greater worker protections, establishing a process and timeline for rescinding the ETS, and making the regulation flexible so that it can change when public health guidance changes.
- 6) July 20, 2021: Public Standards Board COVID stakeholder subcommittee meeting via video conference. The Standards Board staff presented information on COVID-19 worker protection statutes and regulations in other states including Oregon, North Carolina, Washington State, Illinois, Michigan, Nevada, Virginia, and New Jersey. The Cal/OSHA Medical Unit presented information on metrics that could be considered in deciding when to reduce requirements in a COVID-19 specific regulations and the pros and cons of each data including the daily rate of verified new COVID-19 cases, the percentage of the working-age population that is vaccinated, the number of reported workplace outbreaks, the R Effective Value, and Workers' Compensation data. The public provided input on alternatives, including removing the ETS and amending 3203 (IIPP) to address COVID,

changing section 5199 ATD Standard, and a permanent infectious disease regulation that would cover many respiratory diseases and not just COVID.

- 7) August 13, 2021: Public Standards Board COVID stakeholder subcommittee meeting via video conference. The Cal/OSHA Medical Unit and the Cal/OSHA Research and Standards Unit presented on the latest scientific evidence on COVID-19 and trends for vaccination, case rates, deaths, and hospitalizations. CDPH Occupational Health Branch presented on workplace outbreak data, time trends, high COVID rate industries, and data limitations. The public provided input on possible changes to the California ETS or future alternatives: exclude non-vaccinated employees from paid isolation and quarantine benefits, metrics for additional protections, criteria for rescinding COVID-19 regulations, and making COVID-19 regulations more flexible when public health guidelines change.
- 8) August 27, 2021: Public Standards Board COVID stakeholder subcommittee meeting via video conference. The Standards Board staff presented information from CDC, federal OSHA, and other states on prevention of COVID-19 transmission. Cal/OSHA presented and information on current U.S. and California COVID-19 statistics. The public provided input on alternatives to prescriptive COVID-19 regulations such as modeling alternatives based on what other states have implemented that are simpler and more performance oriented or using the Injury and Illness Program instead of a prescriptive regulation.
- 9) September 9, 2021: Public Standards Board COVID stakeholder subcommittee meeting via video conference. The Standards Board staff presented an update on actions taken by other states to prevent or minimize workplace COVID-19 transmission. The public provided input on using the Injury and Illness Prevention Program as an alternative to prescriptive COVID-19 regulations. Cal/OSHA presented on the following:
  - a) how public input during the subcommittee process would help in developing regulatory language for the regular COVID-19 regulatory proposal,
  - b) Appeals Board decisions on using the Injury and Illness Prevention Program to enforce COVID-19 protections.
  - c) COVID-19 Cal/OSHA Enforcement statistics
  - d) Using a tiered approach using community transmission rates in a future version of the COVID-19 regulation as an alternative; previously proposed during stakeholder input.
  - e) Using a risk based approach in a future version of the COVID-19 regulation as an alternative; previously proposed during stakeholder input.
  - f) Other alternatives to prescriptive COVID-19 regulations proposed during stakeholder input.
- 10) September 23, 2021: Cal/OSHA convened a Public Advisory Committee Meeting via video conference to discuss proposal for Non-Emergency (regular) COVID regulation. Stakeholders and public were asked to provide alternatives on 1) criteria to terminate the regulation, 2) how to incentivize vaccination, 3) use of the Injury and Illness Prevention Program, and 4) prescriptive requirements. The public provided input on how the non-emergency regulation should be different and simpler than the California ETS and possible regulatory alternatives including a performance based regulation.
- 11) October 19, 2021: Public web posting of proposal for the California 2nd ETS re-adoption and request for comments. Written comments from the public were received and reviewed by Cal/OSHA.

- 12) October 21, 2021. Public Standards Board Meeting via video conference. The public provided input on the California ETS and non-emergency COVID-19 prevention regulatory proposal. Public input on the non-emergency COVID-19 proposal included: reinstatement of exclusion pay, reinstatement of prescriptive protections, alternatives to make the proposal more flexible to enable it to track changing public health recommendations, alternatives to better incentivize vaccination, and enforcement of existing Injury and Illness Prevention Program requirements as an alternative to a COVID-19 regulation.
- 13) November 18, 2021. Public Standards Board Meeting via video conference. The public provided input on the California ETS and non-emergency COVID-19 prevention regulatory proposal. Public input on the non-emergency COVID-19 proposal included: reinstatement of exclusion pay, changes to the outbreak and major outbreak sections, alternatives that simplify the regulatory language, alternatives that would delegate authority for workplace COVID-19 prevention measures to CDPH, an alternative of using the existing Injury and Illness Prevention Program in lieu of COVID-19 prevention regulations.
- 14) December 16, 2021. Public Standards Board Meeting via video conference. The public provided input on the California ETS and non-emergency COVID-19 prevention regulatory proposal. Public input on the non-emergency COVID-19 proposal included: reinstatement of exclusion pay, increased flexibility in the regulatory language, enforcement of existing Injury and Illness Prevention Program requirements as an alternative to a COVID-19 regulation, and alternatives to better incentivize vaccination.
- 15) February 17, 2022. The public provided input on the California ETS and alternatives to a non-emergency COVID-19 prevention regulatory proposal.
- 16) March 17, 2022. Public Standards Board Meeting via video conference. The public provided input on the California ETS and alternatives to a non-emergency COVID-19 prevention regulatory proposal.
- 17) April 21, 2022. Public Standards Board Meeting via video conference. The public provided input on the California ETS and non-emergency COVID-19 prevention regulatory proposal. Public input on the non-emergency COVID-19 proposal included: alternatives that would delegate authority for workplace COVID-19 prevention measures to CDPH and an alternative of using the existing Injury and Illness Prevention Program in lieu of COVID-19 prevention regulations.

Information on Cal/OSHA COVID-19 Advisory Meetings at: <https://www.dir.ca.gov/dosh/doshreg/covid-19-emergency-standards/>. In addition to public meetings and web postings, mass emails went out to everyone on the Cal/OSHA email listserv.

Information on Standards Board COVID-19 subcommittee and subcommittee meetings at <https://www.dir.ca.gov/oshsb/mtgsch2021.html> and <https://www.dir.ca.gov/oshsb/mtgsch.html>

## 2. Direct Costs

The proposed regulation will require certain employers and employees to undertake measures to reduce the risk of transmission of COVID-19 in the workplace. In this SRIA, the incremental costs of the proposed regulation for businesses and individuals to comply with the requirements to reduce the risk of COVID-19 transmission in the workplace are estimated relative to a projected *no regulatory action* baseline (i.e., a legal baseline without the California ETS in place). The many additional costs that businesses and individuals have faced during the pandemic and are likely to continue to bear as a result of COVID-19 (e.g., compliance with existing public health orders and federal/local regulations, employee inability to work due to severe illness, business disruptions due to COVID-19 related labor shortages and supply chain issues, changes in consumer spending) are not calculated in this SRIA—as these costs would be incurred until COVID-19 infection rates substantially decline whether or not the proposed regulation is enacted.

The proposed regulation is anticipated to be implemented in January 2023. There is no phase-in period—the proposed regulation will be fully implemented upon enactment. The proposed regulation will then expire after two years, on January 1, 2025. Section 2.1 summarizes the general assumptions used in this analysis, including labor costs, COVID-19 case rates, and COVID-19 outbreaks. Section 2.2 reports the direct costs of the regulation to businesses in the first 12 months after it is enacted. Section 2.3 reports the direct costs of the regulation to individuals in the first 12 months after it is enacted. Section 2.4 summarizes the total direct costs of the proposed regulation in the first year. Section 2.5 discusses a potential range of costs in the second year of the regulation, recognizing substantial uncertainty regarding COVID-19 case projections for 2024.

### 2.1. General Assumptions

As a general approach, the upfront costs due to the proposed regulation are assumed to be incurred in the first 12 months after the proposed regulation is promulgated in January 2023. The direct costs of complying with the proposed regulation vary by provision. The assumptions underlying the estimated costs of compliance actions associated with each provision are described in Section 2.2.

Recurring costs are also estimated for calendar year 2024. As further described below, modeled estimates of future COVID-19 cases are highly speculative and specific projections have not been made for 2024. Therefore, DIR reports a range of recurring cost estimates under two alternative scenarios: (1) assuming the same annual number of cases as 2023, and (2) assuming a 50 percent reduction in all COVID-19 cases. All costs are reported in 2021 dollars.

#### 2.1.1. Labor Costs

For all labor costs, DIR applied standard wage rates for all workers and for managers. The U.S. Bureau of Labor Statistics reports the mean hourly wage rate is \$32.94 for all California workers, \$57.39 for health and safety engineers, and \$68.00 for managers.<sup>32</sup> These figures are multiplied by a factor of 1.42 to account for benefits (e.g., paid leave, supplemental pay, insurance, and retirement and savings).<sup>33</sup>

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<sup>32</sup> U.S. Bureau of Labor Statistics, May 2021 State Occupational Employment and Wage Estimates – California, accessed at [https://www.bls.gov/oes/current/oes\\_ca.htm](https://www.bls.gov/oes/current/oes_ca.htm) on April 6, 2022.

<sup>33</sup> This is calculated based on the ratio of average total benefits to average wages and salaries among private industry workers in the Pacific West,  $\$13.18 \div \$31.45 = 0.42$ . U.S. Bureau of Labor Statistics, Employer Costs for

Therefore, the fully-loaded hourly labor cost is \$47.64 for all workers, \$81.44 for health and safety engineers, and \$96.50 for managers. DIR notes these estimates may overestimate the wages of workers affected by the regulation if higher wage earners are more likely to be working remotely and therefore are not subject to the proposed regulation.

### 2.1.2. Modeling COVID-19 Transmission in the Workforce

To determine the number of COVID-19 cases, hospitalizations, and fatalities within the population of employees covered by the proposed regulation, DIR relied on projections provided to Cal/OSHA by the California Department of Public Health (CDPH).<sup>34</sup> Projections for 2023 were provided upon DIR's request in April 2022 for the purpose of conducting this SRIA and may not reflect CDPH's most recent or most likely estimates. As described below, there is considerable uncertainty inherent in forecasting infectious disease transmission rates. Public health experts generally agree that models forecasting transmission rates more than a few weeks into the future are inherently unreliable. As such, the 2023 COVID-19 projections are extremely uncertain, and unanticipated events (such as the emergence of new variants) could easily result in higher or lower case counts or distributions of disease severity. The level of uncertainty is too great to make assumptions about 2024 case rates; CDPH did not provide projections for 2024.

#### 2.1.2.1 COVID-19 Models

Existing COVID-19 models generally use one of two mathematical approaches for projections: statistical models that rely largely on data and curve fitting methods such as autoregressive integrated moving average, and mechanistic models grounded in epidemiological micro-foundations and causal mechanisms.<sup>35</sup> Purely data-driven statistical models (including those based on machine learning algorithms) generally have better short-term predictive performance but limited capacity to explain counterfactual conditions and policy interventions. To explore and compare trade-offs of different policies and "what if" scenarios relative to each other, models need to be grounded in causal epidemiological theory and data.<sup>36</sup> Mechanistic models can be used for this purpose and to inform the design of policies that maximize public health benefits and minimize economic disruptions to businesses.

California policymakers have relied on the California COVID-19 Assessment Tool (CalCAT) in developing specific public health recommendations, orders, and regulations. CalCAT provides estimates of critical COVID-19 metrics from a collection of established simulation models using a variety of approaches.<sup>37</sup> However, the public version of the CalCAT tool does not provide estimates sufficiently far into the future to support this analysis. For the COVID-19 case projections developed for this analysis, CDPH relied on estimates based on the COVID-19 "Scenario Modeling Hub". For studying infectious diseases, synergizing results from multiple models has been shown to give more reliable projections than any one model

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Employee Compensation, Table 7. Private industry workers by census region and division, December 2021, accessed at <https://www.bls.gov/news.release/ecec.t07.htm> on April 6, 2022.

<sup>34</sup> Estimates provided to DIR staff by the CDPH COVID-19 Modeling Team on April 8, 2022.

<sup>35</sup> Manheim, David, Margaret Chamberlin, Osonde A. Osoba, Raffaele Vardavas, and Melinda Moore, *Improving Decision Support for Infectious Disease Prevention and Control: Aligning Models and Other Tools with Policymakers' Needs*. Santa Monica, CA: RAND Corporation, 2016, accessed at [https://www.rand.org/pubs/research\\_reports/RR1576.html](https://www.rand.org/pubs/research_reports/RR1576.html) on April 13, 2022.

<sup>36</sup> Pearl, Judea. *Causality* (2nd ed.). Cambridge: Cambridge University Press, 2009.

<sup>37</sup> For additional information, see: <https://calcat.covid19.ca.gov/cacovidmodels/>.

alone.<sup>38</sup> The COVID-19 Scenario Modeling Hub combines the results of dozens of models. The Scenario Modeling Hub has contributors from around the country, including at Johns Hopkins University, Northeastern University, Columbia University, the University of North Carolina at Charlotte, the University of Southern California, the University of Virginia, and the Institute for Health Metrics and Evaluation (IHME).

An alternative set of long-term scenarios for California are based on the Local Epidemic Modeling for Management and Action (LEMMA) model.<sup>39</sup> LEMMA is primarily an effort of UC San Francisco and UC Berkeley and is more focused on California than the Scenario Modeling Hub. It provides county and city level data within California. During conversations with COVID-19 modeling experts, DIR learned that the LEMMA models had more closely tracked California than the national Scenario Hub models. However, at the time of this analysis, CDPH projections based on LEMMA estimates were not available for 2023.

As discussed above, all COVID-19 transmission models have a high degree of uncertainty. Forecasts produced by the simulation models are affected by uncertainties in the future values of model input parameters.<sup>40</sup> Well-characterized uncertainties include the length of disease states and calibrated parameters, such as virus transmissibility, seasonal variation, and changing public health orders and their efficacies. Deep uncertainties include effects that cannot easily be accounted for, such as how new emerging strains may change the virus transmissibility, changes in the behavioral mixing response to vaccination and other measures, and the duration of immunity.

#### *2.1.2.2 Projections of Future COVID-19 Cases*

Figure 2.1 shows reported COVID-19 cases in California in 2021, and low, median, and high estimates of COVID-19 cases in California in 2022 and 2023. These estimates were provided by CDPH in response to DIR's request in April 2022 for the purpose of conducting this SRIA that may change in the future. The estimates are based on the COVID-19 "Scenario Modeling Hub." The 2023 projections consider some fraction of the 2021 and 2022 burden based on assumptions and crowd-sourced expert opinion from the CDPH Modeling and Advanced Analytics Team. CDPH states that the results are highly approximate and the number of cases in the future is strongly dependent on testing behavior and whether results are reported to local public health officials.

Historically, measures of the number of cases are known to underestimate the actual number of infections by a factor of 3 to 4 (i.e., there are 3 to 4 times as many infections as PCR-confirmed documented cases). The shift to antigen and at-home testing may further influence official statistics, depending on whether these results are reported.

When considering hospitalizations and deaths projections noted in Table 2.1, CDPH also notes that ideally the hospitalizations and deaths estimates could be decreased in the future by increasing development and availability of effective treatments that mitigate the severity of disease caused by COVID-19 infection (in addition to any increasing or sustained immunity from vaccinations and prior infections).

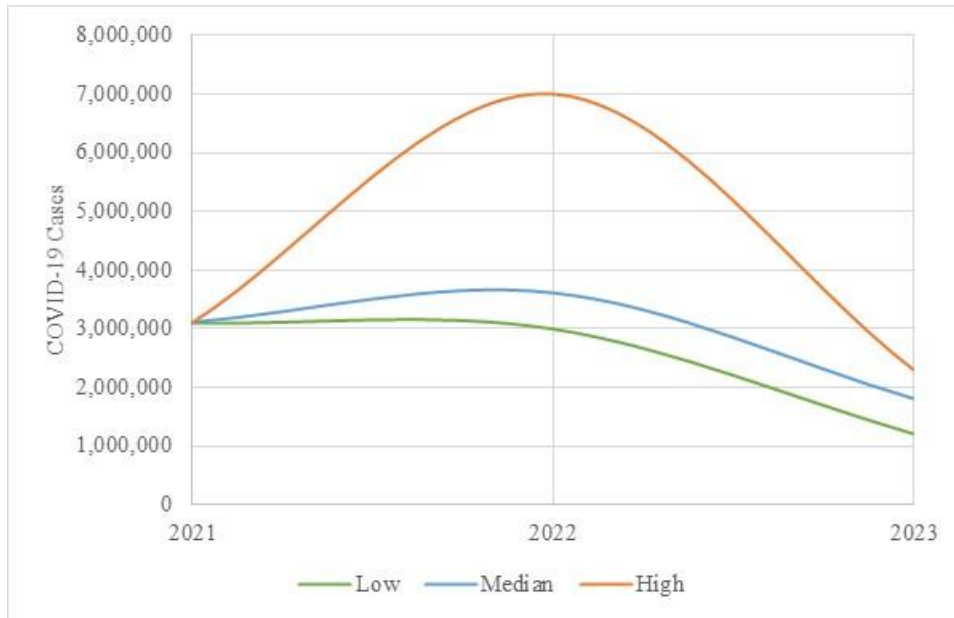
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<sup>38</sup> COVID-19 Scenario Modeling Hub, accessed at <https://covid19scenariomodelinghub.org/> on April 13, 2022.

<sup>39</sup> Additional information is available at <https://localepi.github.io/LEMMA/>.

<sup>40</sup> Nascimento de Lima, Pedro, Robert Lempert, Raffaele Vardavas, Lawrence Baker, Jeanne Ringel, Carolyn M. Rutter, Jonathan Ozik, and Nicholson Collier, Reopening California: Seeking robust, non-dominated COVID-19 exit strategies, PLOS ONE 16(10), October 26, 2021.

**Figure 2.1 Reported and Projected COVID-19 Cases in California**



Source: CDPH Modeling and Advanced Analytics Team.

Table 2.1 reports the projected cases, hospitalizations, and deaths for 2023.

**Table 2.1 COVID-19 Projections for 2023**

Cases			Hospitalizations			Deaths		
Low	Median	High	Low	Median	High	Low	Median	High
1,200,000	1,800,000	2,300,000	70,000	110,000	210,000	7,000	11,000	20,000

Source: CDPH Modeling and Advanced Analytics Team.

For 2022, the burden from the Omicron surge already caused recorded cases as of April 5, 2022 (2,900,000) to almost reach the low estimate for the year of 2022 (3,000,000). For this reason, CDPH recommends using the median or high estimates for this analysis. DIR decided to use the median projections as a basis for the primary estimates for this analysis. Since the number of COVID-19 infections may be 3 to 4 times higher than documented cases, DIR also presents a high-end estimate that is four times the median case projections.

The number of cases is expected to decrease in 2023, although there may be seasonal surges. CDPH projects there will be between 1.2 million (low estimate) to 2.3 million (high estimate) total cases in 2023, or approximately 3,300 to 6,300 cases per day.



### 2.1.2.3 Projections of Future COVID-19 Cases by Industry

The California Department of Finance projected that the state population in 2021 to be 39,953,269.<sup>41</sup> DIR used this population projection to estimate the annual transmission rate of COVID-19 in 2023. DIR then assumed the COVID-19 annual transmission rate among workers would be the same as this general population rate. Applying the annual rate of COVID-19 transmission using the median case projections to the number of employees covered by the proposed regulation, DIR estimated there would be approximately 560,000 COVID-19 infections among covered employees.<sup>42</sup> For the high-end estimate, assuming the actual number of COVID-19 infections were four times as large, DIR estimated there would be approximately 2.2 million COVID-19 infections among covered employees.

The projected number of COVID-19 infections among covered employees in 2023 by industry are listed below. Note, however, that the projected COVID-19 transmission rate for all industries covered by the proposed regulation is based on the transmission rate in the general population, and industry specific transmission rates were not estimated because this information was unavailable. The projected number of infections by industry is provided solely for transparency to illustrate the impact of DIR’s assumptions regarding the distribution of COVID-19 cases, and costs, and is not meant to imply that different transmission rates are known for each industry. Multiple factors, including whether work is primarily indoors or outdoors, airflow/ventilation, and physical proximity of workers, among other things, differ between industries and occupations, making workers in the listed industries more or less likely to become ill relative to each other and California’s population at large.

**Table 2.2 Overall Projected COVID-19 Infection Rate in 2023, as Applied to the Number of Employees by Industry**

NAICS	Description	Covered Employees	COVID-19 Infections (Primary Estimate)	COVID-19 Infections (High-end Estimate)
11	Agriculture, Forestry, Fishing and Hunting	407,790	18,372	73,488
21	Mining	14,850	669	2,676
22	Utilities	83,621	3,767	15,069
23	Construction	765,734	34,498	137,993
31-33	Manufacturing	1,046,114	47,130	188,521
42	Wholesale Trade	424,310	19,116	76,465
44-45	Retail Trade	1,366,767	61,576	246,306
48-49	Transportation and Warehousing	645,628	29,087	116,349
51	Information	386,739	17,424	69,695
52	Finance and Insurance	306,149	13,793	55,171
53	Real Estate and Rental and Leasing	202,065	9,104	36,414
54	Professional and Technical Services	816,935	36,805	147,220

<sup>41</sup> California Department of Finance, Demographic Research Unit, Demographics – Data – Projections, State Population Projections, accessed at <https://dof.ca.gov/forecasting/Demographics/projections/> on April 8, 2022.

<sup>42</sup> DIR calculated the COVID-19 transmission rate as 1.8 million cases (median) ÷ 39,953,269 total population = 4,505 cases per 100,000 individuals on an annual basis.

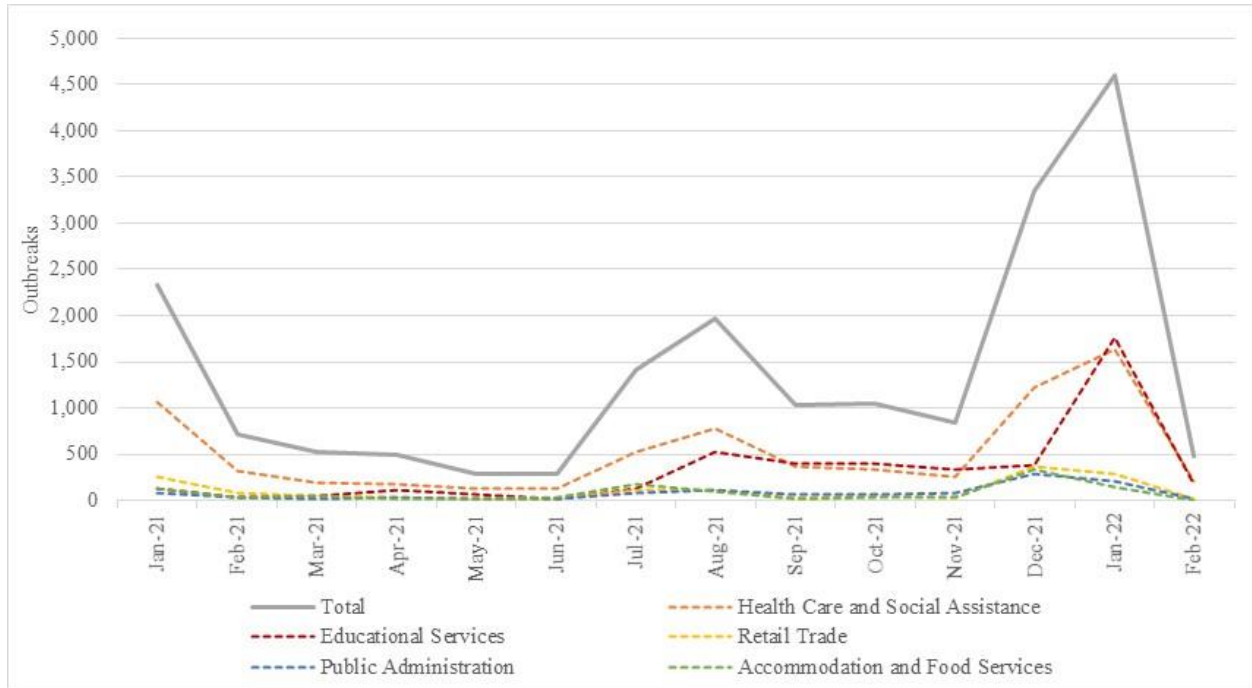
NAICS	Description	Covered Employees	COVID-19 Infections (Primary Estimate)	COVID-19 Infections (High-end Estimate)
55	Management of Companies and Enterprises	130,409	5,875	23,501
56	Administrative and Waste Services	911,060	41,046	164,183
61	Educational Services	1,343,489	60,528	242,111
62	Health Care and Social Assistance	1,180,088	53,166	212,664
71	Arts, Entertainment, and Recreation	228,289	10,285	41,140
72	Accommodation and Food Services	1,372,871	61,851	247,406
81	Other Services, excluding Public Administration	357,400	16,102	64,407
92	Public Administration	431,469	19,439	77,755
	<b>Total</b>	<b>12,421,775</b>	<b>559,634</b>	<b>2,238,535</b>

Note: Totals may not sum due to rounding.

### 2.1.3. Projected COVID-19 Outbreaks

In the proposed regulation, an outbreak is defined as three or more COVID-19 cases detected in an exposed group within a 14-day period. An “exposed group” means all employees at a work location, working area, or a common area at work, where an employee COVID-19 case was present at any time during the infectious period, as defined by CDPH. A major outbreak is defined as 20 or more COVID-19 cases in an exposed group within a 30-day period. DIR learned from CDPH that the overall number of outbreaks in California have been generally tracking the overall number of infections. DIR noted the number of outbreaks surged in December 2021 and January 2022 due to the omicron variant. To account for seasonal variation and surges, DIR used CDPH outbreak data for a full calendar year. CDPH reported a total of 16,288 outbreaks from March 2021 to February 2022 (the most recent data available). The largest percentage of outbreaks occurred in health care and social assistance (37%), educational services (27%), retail trade (7%), public administration (6%), and accommodation and food services (6%). Figure 2.2 shows the number of outbreaks by month and includes detail for the most impacted industries.

**Figure 2.2 COVID-19 Outbreaks in California by Month of Onset, Including Detail for the Most Impacted Industries (Jan. 2021 to Feb. 2022)**



Source: CDPH, COVID-19 Outbreak Data, accessed at <https://data.chhs.ca.gov/dataset/covid-19-outbreak-data> on April 7, 2022.

Within health care and social assistance, some outbreaks affected employees already covered by 5199. Table 2.3 reports the DIR’s assumptions about the percentage of outbreaks that were already covered by 5199 based on its experience with that regulation and with investigating COVID-19 outbreaks.

**Table 2.3 Outbreaks in Industries Covered by 5199**

NAICS	Description	Number of Outbreaks (Mar-21 to Feb-22)	Percent of Outbreaks Covered by 5199	Estimated Number of Outbreaks Covered by 5199 (Mar-21 to Feb-22)
6212	Offices of dentists	15	10%	2
6214	Outpatient care centers	137	100%	137
622	Hospitals	359	100%	359
6231	Nursing care facilities (skilled nursing facilities)	1,379	100%	1,379
6232-6239	Residential care facilities, except skilled nursing facilities	2,378	50%	1,189
6241	Individual and family services	193	10%	19
6242	Community services, including homeless shelters	483	35%	169
<b>Total</b>		<b>4,944</b>		<b>3,254</b>

Note: Totals may not sum due to rounding.

Accounting for health care and other industries covered by section 5199, DIR estimated that there were approximately 13,000 outbreaks among workers not already covered by 5199. Nonetheless, the reported totals may be lower than the actual figures due if there is extensive underreporting of outbreaks to local public health agencies and inconsistent reporting from some local public health agencies to CDPH. DIR remains concerned that outbreaks will continue in communities with low vaccination rates.

As shown in Figure 2.1, CPDH recorded 3.1 million confirmed documented cases in 2021. CPDH projected this figure would drop to 1.8 million in 2023 under the median case projections, a decline of approximately 42 percent. Since outbreaks generally track transmission rates, DIR adjusted downward the number of outbreaks over the most recent 12-month period by 42 percent to estimate the number of future outbreaks. As outbreaks are identified based on reported COVID-19 cases, if the actual number of COVID-19 infections were higher due to unreported cases—as considered in the high-end scenario—the number of reported outbreaks wouldn’t necessarily increase. However, to account for a potentially higher number of outbreaks in the high-end scenario, DIR used the number of outbreaks over the most recent 12-month period without any adjustment. Table 2.4 reports the projected number of outbreaks in 2023.

**Table 2.4 Projected Outbreaks in 2023 by Industry**

NAICS	Description	Outbreaks not Covered by 5199 (Mar 21-Feb 22)	Projected Outbreaks in 2023 (Primary Estimate)
11	Agriculture, Forestry, Fishing and Hunting	66	38
21	Mining	8	5
22	Utilities	129	75
23	Construction	268	156
31-33	Manufacturing	668	388
42	Wholesale Trade	144	84
44-45	Retail Trade	1,136	660
48-49	Transportation and Warehousing	456	265
51	Information	85	49
52	Finance and Insurance	157	91
53	Real Estate and Rental and Leasing	128	74
54	Professional and Technical Services	240	139
55	Management of Companies and Enterprises	21	12
56	Administrative and Waste Services	114	66
61	Educational Services	4,331	2,515
62	Health Care and Social Assistance	2,702	1,569
71	Arts, Entertainment, and Recreation	193	112
72	Accommodation and Food Services	940	546
81	Other Services, excluding Public Administration	233	135
92	Public Administration	1,015	589
<b>Total</b>		<b>13,034</b>	<b>7,568</b>

Note: Totals may not sum due to rounding.

## 2.2 Direct Costs to Businesses

The direct cost impacts of the proposed regulation to businesses include the following:

- Injury and Illness Prevention Plan
- Testing close contacts
- Face coverings
- Respirators
- Ventilation
- Reporting and recordkeeping
- Exclusion of COVID-19 cases
- Exclusion of close contacts
- COVID-19 outbreaks
  - Testing
  - Ventilation
  - HEPA filters
  - Face coverings
  - Respirators
  - Review of COVID-19 policies
- COVID-19 prevention in employer-provided housing
  - Ventilation
  - HEPA units
  - Face coverings
- COVID-19 prevention in employer-provided transportation

The assumptions and cost estimates for each provision are presented in the following sections. Additionally, the proposed regulation includes several cost-generating provisions that could be overridden if CDPH issues a regulation or order changing the definition of those terms. CDPH regulations or orders could override the definitions of “close contact,” “infectious period,” and “outbreak.” CDPH regulations or orders could also override the proposed regulation on the issue of when face coverings are required. As a result, costs associated with these provisions may be subject to fluctuation depending on the content of unknown future CDPH regulations or orders: if CDPH regulations or orders are more permissive than the proposed regulation, then costs associated with these provisions would likely decrease, while if CDPH regulations or orders require more action by covered employers, the costs associated with these provisions would likely increase. Any attempt to calculate the decrease or increase in costs that would result from unknown future CDPH regulations or orders would be speculative; these fluctuations are thus unquantifiable.

### 2.2.1. Injury and Illness Prevention Plan

Subsection 3205(c) requires employers to establish, implement, and maintain an effective written Injury and Illness Prevention Plan (IIPP) that addresses COVID-19 as workplace hazard. Under existing section 3203, employers in California are already required to have a written and effective IIPP that expressly requires, among other things, a system for ensuring that employers comply with safe and healthy work practices; a system for communicating with employees on matters relating to occupational safety and health; procedures for identifying and evaluating workplace hazards including scheduled periodic

inspections; a procedure to investigate occupational injury or occupational illness; methods and/or procedures for correcting unsafe or unhealthy conditions; and training and instruction.

All of these requirements already apply to the hazard of COVID-19; indeed, Cal/OSHA has already issued citations to employers related to COVID-19 hazards based on section 3203. Cal/OSHA has also issued guidance and conducted outreach to warn employers that COVID-19 is a workplace hazard under section 3203. Aside from occupational safety and health regulations, employers were previously required to establish written policies and procedures related to COVID-19 during the pandemic in order to meet state and local reopening requirements. These requirements would continue in a *no regulatory action* baseline.

Subsection 3205(c) provides information about how to apply section 3203 in the specific context of COVID-19. Much of that subsection merely makes explicit actions that are already required under section 3203, such as creating COVID-19 prevention policies, or local government orders issued in response to the pandemic. Subsections (c)(1) and (2) provide clarity about how COVID-19 should be addressed under an employer's IIPP—for instance, treating the virus as airborne and transmissible by anyone, and reviewing state and local COVID-19 guidance when developing plans. The proposed subsections also provide a list of controls that reduce transmission—without mandating any of them. These subsections are therefore performance standards which provide information about how an “effective” program can be developed without imposing specific requirements and costs. Subsection (c)(3) serves as reminder that COVID-19 is subject to the same training requirements under the IIPP regulation as any other hazard, thereby improving compliance with the existing IIPP requirement without imposing additional cost. However, DIR has attempted to quantify the costs of the proposed regulation that are more specific than the requirements under section 3203, and which are not already broadly required by local government entities.

Because businesses had to comply with public health requirements in order to reopen due to Executive Orders issued by Governor Newsom and local public health requirements, detailed COVID-19 plans have already been created, even aside from the requirement under existing section 3203.<sup>43</sup> DIR has verified the existence of many such plans during its investigations. Nonetheless, employers will likely review their plans to ensure compliance with the proposed regulation. DIR recognizes that this will likely impose a non-negligible cost given the large number of employers covered by the proposed regulation. However, the time required will vary dramatically, not only between industries but also between individual employers.

Although Cal/OSHA has conducted COVID-19 investigations, DIR does not know the length or sophistication of the average employer's written COVID-19 policies. The time needed for each review will depend in part on how recently employers have updated their written plans, which is unknown. In general, however, the proposed regulations will be less prescriptive and impose fewer requirements than employers have needed to address earlier in the pandemic before vaccination became widespread. For instance, the proposed regulation does not mandate physical distancing or cleaning/disinfection, which were addressed by employers' written procedures earlier in the pandemic. Many employers will

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<sup>43</sup> Executive Order N-25-20 (March 4, 2020) <https://www.gov.ca.gov/wp-content/uploads/2020/03/3.12.20-EO-N-25-20-COVID-19.pdf>, and Executive Order N-33-20 (March 19, 2020) <https://covid19.ca.gov/img/Executive-Order-N-33-20.pdf>.

therefore be able to reduce the complexity of their written plans, which is significantly less time-consuming than drafting additional requirements.

For the estimated 92 percent of covered employers with fewer than 20 workers, review of existing COVID-19 prevention plans should be quite brief. Larger employers are likely to have COVID-19 prevention policies that are longer and more detailed, addressing larger and more complex facilities, and their review of written plans will require more time. DIR assumed employers with less than 20 employees will spend, on average, approximately 20 minutes per location and employers with 20 or more employees will spend, on average, approximately 1 hour per location to review their IIPP. The average cost burden estimates are relatively small because (1) employers are already required to have an effective IIPP; (2) employers were previously required to establish written COVID-19 procedures during the pandemic; (3) employers that own or operate multiple locations will be able to use similar language in their prevention plans; and (4) establishments that are working entirely remotely and work locations with one employee who does not have contact with other persons are exempt from the proposed regulation.<sup>44</sup>

DIR conservatively assumed that employers would need to review IIPP's for 1,632,500 work locations, although some of these establishments are likely exempt from the proposed regulation. Using the fully-loaded hourly wage rate of \$96.50 for a manager, DIR estimated that the average cost to review an IIPP would be approximately \$37.36 per establishment. Therefore, the total estimated cost is approximately \$61.0 million.<sup>45</sup> No additional costs are anticipated in 2024.

### 2.2.2. Testing of Close Contacts

Subsection 3205(d) requires testing of close contacts. California has partnered with OptumServe to provide free, confidential testing statewide, with no copays or other out-of-pocket cost. Local agencies also provide free testing locations. Employers are free to direct employees to use these testing sites. If employees have private health insurance, their insurance will be billed—but close contacts would have to be offered tests from their medical providers anyway, based on medical need, regardless of the proposed regulation. Health care providers currently recommend testing after a close contact to all their patients, regardless of vaccination status.

Some stakeholders have reported paying for surveillance testing to protect their workforce. While this is commendable, it is not required by this regulation. However, in the interest of transparency, DIR requested information about testing costs from the CDPH. In September 2021, based on information from the CDPH Testing Task Force, the cost of PCR testing for SARS-CoV-2 was estimated at \$55 per test—a significant reduction in cost from the October 2020 estimate of \$80 to \$250 per test. As of September 2021, the average cost of antigen tests was \$4.20 to \$8.50 per test.<sup>46</sup> Though not required

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<sup>44</sup> The number of establishments working entirely remotely or that have only one employee is uncertain. Based on information in Table 1.4, 73.6 percent of work locations have less than 5 employees. While many of these establishments will have at least one employee come into contact with other persons for work, it is reasonable to assume that a number of establishments are exempt from the proposed regulation.

<sup>45</sup> This is calculated as  $\$96.50 \times (0.33 \text{ hours} \times 0.92 + 1 \text{ hours} \times 0.08) = \$37.36$  of average cost in management time per establishment, with  $\$37.36 \times 1,632,500$  establishments yielding a total cost estimate of \$61.0 million.

<sup>46</sup> At the Advisory Committee Meeting, some speakers expressed concern about test availability. Around September 2020, there was a nationwide shortage BinaxNow antigen tests, but that was expected to continue for only about six more weeks, and other antigen tests were still available.

by the proposed regulation, some employers may choose to pay for tests themselves for convenience/avoidance of lost productivity, to better protect their employees, to increase the speed of results, and/or to improve employees' use of testing.

To estimate the cost of testing close contacts, DIR made assumptions about the average number of close contacts in the workplace. Survey data collected in the U.S. in September 2020 showed a median of two non-household close contacts per person, around 1.5 of which occurred at work.<sup>47</sup> Feehan and Mahmud (2021) also found that the number of close contacts increased as the early 2020 pandemic-related restrictions eased. It seems likely that this trend will continue as precautions are relaxed. DIR assumed the number of contacts at work per COVID-19 case would roughly triple—to an average of 4.5 workplace close contacts—relative to September 2020, a time when people were taking more precautions than the present but were not yet facing the hazards posed by the 2020 winter surge, which had not yet begun. Based on OSHA's estimates, the average number of employees teleworking has decreased by more than 10 percent since that time, consistent with a higher estimated number of close contacts in the workplace.<sup>48</sup>

Under the proposed regulation, tests must be offered to close contacts on paid time. Though the time required for each test itself is minimal, DIR recognizes that some employees may need to travel to a testing location. Distances will of course vary depending on location. DIR assumed an average of 0.5 hours per test to account for travel and testing time and used an average loaded hourly wage rate of \$46.74 for all employees.

Given the annual number of close contacts estimated above, DIR estimated an average cost of approximately \$36 to \$144 per establishment for testing close contacts, or \$58.9 million to \$235.4 million in total.

### 2.2.3. Face Coverings

Subsection 3205(f) allows face covering requirements already mandated by a CDPH public health order to be enforced by Cal/OSHA. There are no specific costs anticipated for employers. CDPH mandates face coverings in homeless shelters, emergency shelters, cooling and heating centers, healthcare settings, correctional facilities and detention centers, long term care settings, and adult and senior care facilities.<sup>49</sup> However, DIR cannot predict what CDPH public health orders will look like in the future. DIR notes that some individual municipalities are currently imposing *more* stringent face covering rules than CDPH.

Under this subsection, if an employer chooses to take advantage of one of the exceptions to the face covering provision, or if an employee cannot wear a face covering for specified reasons, the employer shall assess COVID-19 hazards and take actions as necessary. This is a performance standard and does not mandate specific compliance actions.

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<sup>47</sup> Feehan, Dennis M. and Ayesha S. Mahmud, "Quantifying population contact patterns in the United States during the COVID-19 pandemic," *Nature Communications*, February 9, 2021, accessed at: <https://www.nature.com/articles/s41467-021-20990-2> on April 8, 2022.

<sup>48</sup> OSHA, *Analytic Spreadsheets in Support of the COVID-19 Vaccination and Testing ETS*, October 2021.

<sup>49</sup> California Department of Public Health. *Guidance for the Use of Face Masks*. April 20, 2022.



#### 2.2.4. Respirators for Employees that Request Them

Subsection 3205(g) requires employers to provide respirators to employees that request them. DIR reviewed a number of direct-to-customer retailers' prices for NIOSH-approved disposable respirators and found a median price of \$0.93 per unit.<sup>50</sup> This price may be lower for large employers, who would be able to make large bulk purchases.

Based on Cal/OSHA's extensive experience with respirators and situational awareness through the pandemic, and in light of informational advisory group meetings with representatives from industry that did not yield supplemental data, DIR estimates that 5 percent of employees will request respirators from their employers. Respirators are much more uncomfortable to wear than face coverings and some at-risk individuals prefer to wear non-NIOSH certified KN95 masks. For those employees who request respirators, DIR expects that they will do so during local upswings in cases rather than throughout the year. DIR therefore assumed that each employee would request 45 respirators per year. Therefore, DIR estimated that approximately 621,000 employees would request a total of 28 million respirators at a total cost of \$26.0 million per year.

#### 2.2.5. Ventilation

Subsection 3205(h) requires employers with indoor workplaces to review specified guidance on ventilation measures. Based on Cal/OSHA's experience conducting investigations, DIR assumed that 65 percent of all employers have indoor work environments. CDPH guidance on ventilation is widely available and has been recommended and promoted by local public health agencies. Based on its investigation and consultation activity, combined with information from stakeholders, DIR estimated that about 20 percent of employers with indoor workplaces will need additional time to familiarize themselves with this guidance. DIR assumed it will take an additional 20 minutes for a health and safety engineer to review the existing guidance. Using the fully-loaded hourly wage rate of \$81.44, DIR estimated that the average cost would be approximately \$27 per work location for approximately 212,000 establishments that have not already reviewed the guidance. Therefore, DIR estimated the total cost would be approximately \$5.8 million. No additional costs are anticipated in 2024.

Employers are also required to evaluate whether their existing ventilation is adequate to reduce the risk of transmission if a COVID-19 case enters the workplace, and where it is not adequate, implement changes as necessary. The proposed regulation lists options for addressing this issue but does not require employers to undertake specific actions. Because this is a performance standard that will vary from workplace to workplace, no cost can be quantified. Indeed, in many workplaces existing ventilation will be adequate; in others, the only requirement is opening the windows whenever the weather and air quality permits. Likewise, although employers are required to maximize the supply of outside air in vehicles to the extent feasible, with some exceptions, this only requires lowering the windows when feasible to do so.

Establishments that had a previous outbreak must continue to implement ventilation protections; these costs are addressed below in the section on outbreaks.

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<sup>50</sup> Based on DIR's review of vendor list prices as of October/November 2021.

### 2.2.6. Aerosolizing Procedures

This requirement mainly applies to dental offices that meet the requirements necessary to be exempt from 5199. It alerts those employers to the fact that they may need to undertake compliance actions under existing section 5144. However, it is assumed to have no cost because it does not change or expand existing law.

### 2.2.7. Reporting and Recordkeeping

Labor Code section 6409.6 already requires employers to report potential COVID-19 exposures to local public health agencies; therefore, this requirement would impose no additional cost if Labor Code section 6409.6 is extended until January 1, 2025 as proposed in AB 2693.<sup>51</sup> Currently, existing law would repeal those provisions January 1, 2023. If AB 2693 is not passed and there is no successor to Labor Code section 6409.6, there will be no additional costs associated with reporting and recordkeeping, because the reporting and recordkeeping requirements of the proposed regulation are primarily tied to the requirements of Labor Code section 6409.6 or a successor law.

Subsection 3205(c)(4) also clarifies requirements in existing section 3203(a) by stating that employers must conduct effective investigations into COVID-19 illnesses in the workplace and encourage employees with COVID-19 symptoms to stay home to ensure employee compliance with safe and healthy work practices. In the case of COVID-19, effective procedures to investigate workplace illnesses necessarily require employers to determine the infected person's exposure to other persons at the worksite, to alert all potentially exposed persons so they can take the necessary precautions, and to investigate whether any workplace condition contributed to the illness. Without these steps, an investigation would not be adequate, because it would not aid the employer in its efforts to arrest the spread of the virus. Since subsection 3205(c)(4)(A) specifies particular information that must be gathered by the employer when the illness being investigated is COVID-19, this imposes an additional cost.

Specifically, businesses will have to ask for and record additional information such as the employee's last day at the site and the date of any positive COVID-19 test and/or onset of symptoms. Businesses will also have to record the names and contact information of close contacts learned through the illness investigation described above. Employers must also notify close contacts, which is currently required under Labor Code section 6409.6. Although the proposed regulations will, in some circumstances, require broader or more prompt notification, written notice is not mandated after the sunset of Labor Code section 6409.6, so the costs associated only with the proposal and not with the statute should be minimal and a natural part of the contact tracing process for which costs have been estimated. Costs associated with the recordkeeping provisions in subsection 3205(j)(2) are estimated to be minimal; this data is already required to be collected and maintained under Labor Code section 6409.6, so the only costs that would continue after the expiration of Labor Code section 6409.6 would be data storage.

DIR estimated that this increased specificity would require an additional 0.8 hours per COVID-19 case over and above the investigation and hazard correction required by existing section 3203. This does not mean that each investigation of a COVID-19 case will require only 0.8 hours, rather it means that the proposed regulation may increase the level of detail during investigations that should already occur

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<sup>51</sup> California Legislature, 2021-2022 regulation session, Assembly Bill No. 2693, accessed at [https://leginfo.ca.gov/faces/billTextClient.xhtml?bill\\_id=202120220AB2693](https://leginfo.ca.gov/faces/billTextClient.xhtml?bill_id=202120220AB2693) on April 25, 2022.

under existing law. As with other estimates, the added cost will be greater for employers with large and complicated operations, especially if employees regularly work in multiple areas of a particular facility. The incremental cost for the 92 percent of employers with fewer than 20 employees is unlikely to be much greater than the investigations already being conducting under existing law. The requirement does not require extensive additional investigation, but it will require a few more questions and some additional data entry.

Using the projected annual COVID-19 cases for the primary estimate and high-end scenario, DIR estimated an additional cost of \$20.9 million to \$83.7 million. The primary estimate assumed the number of COVID-19 infections would be equal to the number of PCR-confirmed cases. To the extent that antigen and at-home testing is used and depending on whether or not these are reported to local health officials and included in the official statistics, the actual costs may be higher. The high-end scenario assumed the actual number of COVID-19 infections was four times as high.

#### 2.2.8. Exclusion of and Protective Measures for COVID-19 Cases

Subsection 3205(c)(5)(A) requires employers to exclude workers with COVID-19 from the workplace for a prescribed number of days, consistent with current CDPH guidance. Under existing section 3203(a)(6), employers must have effective “methods and/or procedures for correcting unsafe or unhealthy conditions...in a timely manner based on the severity of the hazard.” When the hazard is the presence of a person who has COVID-19, certain minimum requirements must be met in order for an employer’s actions to be considered “effective,” under existing law. For instance, an employer that allows an employee to return to work immediately after a positive COVID-19 test has certainly violated existing section 3203, since the employer would be allowing its employees to be exposed to a known hazard—a person who is presently infectious and could easily spread COVID-19—without taking any action to correct the unhealthy condition. Likewise, an employer violates section 3203 if it takes no steps at all to protect employees from the hazard posed by individuals who had a recent close contact with a confirmed COVID-19 case and could therefore be infectious themselves.<sup>52</sup>

Subsection 3205(c) does not expand employers’ obligations to correct the hazard of COVID-19—but it does codify CDPH recommendations specifying the particular number of days employers must exclude COVID-positive and potentially infectious employees from the workplace. In general, CDPH recommendations for this exclusion period should be considered the minimum required for “effective” hazard correction, since CDPH is the relevant authority in California and its guidance is followed by local public health authorities as well. California officials have not provided an alternative schedule for exclusion periods. The proposed regulation simply reaffirms that employers are required to follow the time period already recommended by CDPH, easing compliance and enforcement. Nonetheless, DIR recognizes that such reaffirmation is an indication that some costs may be perceived as attributable to the proposed regulation.

The regulation states that COVID-19 cases must be excluded for five calendar days if an individual tests negative on day five or later and no fever or symptoms are present.<sup>53</sup> COVID-19 cases who develop

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<sup>52</sup> The proposed regulation defines a “close contact” as someone who has been exposed to a known COVID-19 case for 15 minutes or more within 24 hours. Such individuals may have contracted COVID-19 themselves.

<sup>53</sup> Asymptomatic employees who become a COVID-19 case (as defined) when they receive positive test results must then be excluded for 5 days after the tested sample was taken. Symptomatic cases may be out for longer if

COVID-19 symptoms must be excluded until 10 days have passed after symptoms first appeared (or through day five if testing negative on day five or later), and 24 hours have passed with no fever, without the use of fever-reducing medications, and symptoms have improved. However, the requirements of the proposed regulation would change along with any revisions to CDPH recommendations. DIR cannot predict whether CDPH guidance may change, in which case the costs (and benefits) estimated in this SRIA may also change.

DIR assessed that an employer who allowed a symptomatic employee to return in less than the CDPH-recommended time would have no reasonable argument that they were “effectively” correcting the hazard. On the other hand, without a specific exclusion period, employers might allow asymptomatic employees to return to work after only a few days. This does not mean that such employers would be compliant with section 3203.

DIR assumed that all COVID-19 cases that resulted in a positive test would not be allowed to return to work the same day due to the existing requirements in section 3203, because employees may not be exposed to a known, potentially deadly hazard under that section. DIR has already issued many COVID-19 citations under section 3203, including willful citations, because it is clear that the hazard of COVID-19 must be addressed effectively under that section like any other occupational hazard. However, for the purpose of estimating the economic and fiscal effects of the proposed regulation, DIR assumed that some asymptomatic employees might return to work in between one and five days in the absence of a clearly defined isolation period, which is now specified in the proposed regulation. Symptomatic employees are unlikely to return to work during the exclusion period, even under section 3203 alone, either because they feel too unwell or because their symptoms would attract the attention of their employer and coworkers—and, as part of an employer’s “effective” injury and illness prevention program, an employer has an obligation to “investigate” occupational illness (3203(a)(5)) and to correct an unhealthy condition whenever “observed or discovered” (3203(a)(6)(A)). Asymptomatic employees, in contrast, will feel well, and their COVID-19 infection cannot be detected by an employer except by testing.

If the average asymptomatic COVID-19 case were to return to work in five days under existing law, no additional costs would be attributable to the proposed regulation. If the average asymptomatic COVID-19 case were to return to work after one day of isolation under existing law, the majority of the costs of the exclusion period would be attributable to the proposed regulation. Based on Cal/OSHA’s experience in conducting inspections, few employers were encouraging workers to return to work this quickly in light of current public health orders and employer health and safety policies. However, DIR also determined it would be appropriate to attribute some portion of the costs to the proposed regulation because the reaffirmation of requirements may be perceived as imposing an additional burden to some employers.

Thus, DIR conservatively attributed to the proposed regulation the cost of two additional days of the exclusion period in which an asymptomatic employee might otherwise return—that is, DIR has estimated the costs that would be associated with the regulation if employers in the *no regulatory action* baseline followed a three-day exclusion period, on average, rather than the five days currently

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they recognize their symptoms immediately. Symptomatic cases who have not recovered in five days likely have a severe illness—in which case they would not be able to work for reasons unrelated to the proposed regulation.

recommended by CDPH. This does not imply a three-day exclusion would qualify as “effective” correcting a hazard in the *no regulatory action* baseline but is calculated only to assess the extent to which this reaffirmation of requirements may be viewed by some employers as an additional cost burden. Using an estimate of four additional days instead of two viewed by some employers an additional cost attributable to the reaffirmation of requirements would double the estimated costs.

Given broad awareness of CDPH recommendations and local health guidance, DIR felt this attribution to the proposed rule likely overestimates the perceived cost of the exclusion of COVID-19 cases because employers should already be following existing public health orders, guidelines, and regulations. No generally representative information was available on the average length of employer-directed exclusion periods or the extent to which employers have been following existing CDPH recommendations. Cal/OSHA is aware of instances in which employers directed COVID-19 cases or close contacts to return to work immediately, but they have been rare. Such direction would have been a clear and intentional violation of existing section 3203 and, especially after the first stay-at-home were issued, would have constituted a willful violation of 3203 as defined by Title 8 section 334(e).<sup>54</sup> The fact that Cal/OSHA has issued few willful COVID-19 citations under section 3203 demonstrates that this was an unusual occurrence and that most employers have been excluding COVID-19 cases under existing law.<sup>55</sup>

The perception that many employers follow CDPH guidance is also consistent with the comments of employer stakeholders regarding the emergency COVID-19 regulations. Employers stressed their efforts to follow CDPH and CDC guidance and to incorporate them into employers’ own policies. The behavior of individual employees is also relevant: regardless of whether an employer requires its employees to remain off work in compliance with the proposed regulation, the majority of employees with COVID-19 will themselves choose to self-isolate in compliance with public health recommendations, in order to protect others (this may also be true of employees who had a close contact and are recommended to isolate or quarantine).

A meta-analysis found that approximately 35.1 percent of infections were truly asymptomatic.<sup>56</sup> Based on this meta-analysis, DIR assumed that 64.9 percent of COVID-19 cases are symptomatic. Symptomatic individuals would be unable or unwilling to work due to illness. Thus, DIR attributed about 14 percent (35.1 percent of cases that are asymptomatic × 2/5 days in which asymptomatic cases might return to

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<sup>54</sup> The employer “committed an intentional and knowing, as contrasted with inadvertent, violation, and the employer is conscious of the fact that what he is doing constitutes a violation of a safety law; or, even though the employer was not consciously violating a safety law, he was aware that an unsafe or hazardous condition existed and made no reasonable effort to eliminate the condition.”

<sup>55</sup> In federal fiscal year (FFY) 2018, DOSH classified 21 violations as “willful.” In FFY 2019, DOSH issued 28 willful citations. In FFYs 2020 and 2021, the average number of willful citations has been fewer than 10 per year, despite large numbers of COVID-19 related investigations.

<sup>56</sup> This meta-analysis included studies conducted January 1, 2020 through April 2, 2021 and therefore addressed unvaccinated populations. While the percentage of asymptomatic cases in vaccinated groups may be higher, most studies have focused on the efficacy of the vaccines in preventing infection, transmission, serious illness, hospitalization, and/or death, rather than the degree to which the vaccines prevent any symptoms at all. Sah, Pratha, Meagan C. Fitzpatrick, Charlotte F. Zimmer, Elaheh Abdollahi, Lyndon Juden-Kelly, Seyed M. Moghadas, Burton H. Singer, and Alison P. Galvani, “Asymptomatic SARS-CoV-2 infection: A systematic review and meta-analysis,” Sah et al, Proceedings of the National Academy of Sciences of the United States of America, Aug. 24, 2021.

work but for the proposed regulation) of the cost of excluding COVID-19 cases to the proposed regulation rather than existing law.

Employers must provide certain information about benefits to employees who have been excluded as a COVID-19 case or close contact. Because employers had to have specific benefits information on hand, as of January 1, 2021, in order to meet the requirements of Labor Code section 6409.6(a)(3) on January 1, 2021, and provide that information to employees, compiling that information will not result in any additional costs for the purposes of the proposed regulation.

Using the fully-loaded hourly wage rate of \$46.74 for all employees, 14 percent of the total costs of exclusion correspond to an average productivity loss of approximately \$90 to \$360 per establishment. Note that not all establishments will have positive COVID-19 cases. The direct costs of exclusion of COVID-19 cases will be approximately \$146.3 million to \$585.2 million in the first year of the proposed regulation.

### 2.2.9 Exclusion of and Protective Measures for Close Contacts

Subsection 3205(c)(5)(B) requires employers to review current CDPH guidance for employees who had close contact with an infected individual, including any guidance regarding quarantine or other measures to reduce transmission. Employers are then required to develop, implement, and maintain effective policies to prevent transmission of COVID-19 by persons who had close contacts. Employees who tested positive after close contact with an infected individual would be required to follow exclusion and other protective requirements in subsection 3205(c)(5)(A); these costs are already accounted for under exclusion of and protective measures for COVID-19 cases.

Currently, as of April 6, 2022, CDPH recommendations for close contacts are the following:

- Asymptomatic close contacts who are not in high-risk settings to:
  - Not be excluded from the workplace.
  - Test within 3 to 5 days after last exposure (returned cases do not need to test).
  - Wear a face covering for a total of 10 days following the close contact.
- Symptomatic close contacts (regardless of setting) to:
  - Be excluded from the workplace until testing negative.
  - If not tested, be excluded from the workplace for 10 days after symptoms began.
- Asymptomatic close contacts who are not fully vaccinated or are not a returned case in high-risk settings to:
  - Be excluded from the workplace for 5 days after last close contact.
  - Work exclusion can end after Day 5 if symptoms are not present, and a diagnostic specimen collected on Day 5 or later tests negative.
  - If not tested and symptoms are not present, work exclusion can end after day 10.
  - Wear a face covering for 10 days after last close contact.

These requirements are not actually mandated by the proposed regulation, which includes only a broad performance standard. However, this provides a basis for estimating costs, especially given that employers are required to review such CDPH guidance and are likely to use such documents in the formation of their plans. The costs for testing requirements for close contacts are described above. Further, as discussed in the exclusion of COVID-19 cases, DIR assumed that employees who had close

contact with infected individuals and were symptomatic themselves, would already be excluded from the workplace until testing negative. Symptomatic employees are unlikely to return to work during the exclusion period, even under the baseline no regulatory action scenario (section 3203 alone), either because they feel too unwell or because their symptoms would attract the attention of their employer and coworkers—and, as part of an employer’s “effective” injury and illness prevention program, an employer has an obligation to “investigate” occupational illness (section 3203(a)(5)) and to correct an unhealthy condition whenever “observed or discovered” (section 3203(a)(6)(A)). Asymptomatic employees, by contrast, will feel well, and their COVID-19 infection cannot be detected by an employer except by testing. Therefore, the additional costs associate with the requirements for the exclusion of and protective measures for close contacts include: (1) review of CDPH guidance for close contacts, (2) providing face coverings for close contacts in non-high-risk settings for a total of 10 days, and (3) exclusion of close contacts in high-risk settings for 5 days and providing face coverings for 10 days after last close contact.

High-risk settings primarily includes those industries covered by section 5199 (Table 1.1) and excluded from application of the proposed regulations, such as hospitals, emergency shelters, long-term care facilities, and correctional facilities. Based on information from the California EDD’s QCEW and OSHA’s estimates of the percentage of employees who can work remotely, which is summarized at a more aggregate level in Table 1.2, there are approximately 546,000 employees who work in high-risk settings, cannot work remotely, and are not covered by 5199. Table 2.6 reports these estimates by industry.

**Table 2.6 Number of Employees in High-Risk Settings who Cannot Work Remotely and are not Covered by Section 5199**

NAICS	Description	Number of Employees <sup>1,2</sup>
621	Ambulatory Health Care Services	298,641
622	Hospitals	48,549
623	Nursing and Residential Care Facilities	105,541
6242	Community Food and Housing, and Emergency and Other Relief Services	15,345
8122	Death Care Services	1,033
9221	Justice, Public Order, and Safety Activities	76,800
	<b>Total</b>	<b>545,909</b>

Source:

1. California EDD QCEW, 2021 Q2.
2. OSHA, Analytic Spreadsheets in Support of the COVID-19 Vaccination and Testing ETS, October 2021.

DIR assumed it would take approximately 20 minutes of a manager’s time to review current CDPH guidance for close contacts. DIR used an average hourly labor cost of \$96.50 for managers. The estimated cost to implement and maintain effective policies that address COVID-19 as workplace hazard is already described under the IIPP.

Based on the projected number of COVID-19 cases and assuming an average of 4.5 workplace close contacts per COVID-19 case,<sup>57</sup> DIR estimated there would be 2.5 million to 10.1 million close contacts in 2023. DIR assumed the average cost of providing a disposable face covering would be approximately

<sup>57</sup> See discussion in “Testing of Close Contacts.”

\$0.23 per employee per day. On average, employees would be required to wear a face covering for eight workdays following a close contact, assuming that most employees have two days off per week.

Using the number of employees reported in Table 2.6 and applying the COVID-19 transmission rate for the general population and assuming an average of 4.5 workplace close contacts per COVID-19 case, DIR estimated there would be approximately 110,000 to 440,000 close contacts in high-risk settings in 2023. As discussed in the exclusion of COVID-19 cases, an employer would be in violation of section 3203 if they took no steps to mitigate the hazard posed by employees who had close contacts with a confirmed COVID-19 case in a high-risk setting and could therefore be infectious themselves. However, DIR also determined it would be appropriate to attribute some portion of the costs to the proposed regulation because the reaffirmation of requirements may be perceived as imposing an additional burden to some employers. Therefore, DIR attributed about 40 percent of the cost of excluding close contacts in high-risk settings (2 of 5 days) to the proposed regulation rather than existing law.

DIR also accounted for the fact that some employees that had close contact with an infected individual and were not otherwise working remotely will be able to do so for the limited exclusion period, while others will actually contract COVID-19 for which costs are already included estimated. DIR estimated that approximately 11.4 percent of close contacts could continue to work remotely, based on the higher percentage of employees that were teleworking in 2020 relative to August 2021.<sup>58</sup>

DIR also assumed that 7.0 percent of close contacts would test positive themselves; and thus, would already be counted above in the excluded COVID-19 cases. A Chinese study found that the infection risk based on one-hour of close contact with an infected person in a workplace setting was 8.7 percent.<sup>59</sup> A U.S. study of infections found the rolling 7-day average case rate for the general population on January 15, 2021 was 69.80 per 1,000 individuals (with a 95 percent confidence interval of 69.78 to 69.83), suggesting that the value may be close to 7 percent of close contacts leading to infections at the community level.<sup>60</sup>

Thus, DIR attributed 33 percent to the cost of excluding close contacts in high-risk settings to the proposed regulation since the reaffirmation of requirements may be perceived as imposing an additional burden to some employers.<sup>61</sup> Using the fully-loaded hourly wage rate of \$46.74 for all employees, the average cost for requirements for exclusion of and protective measures for close contacts would be approximately \$80 to \$210 per establishment, or \$125.3 million to \$343.9 million in total in 2023.

#### 2.2.10. COVID-19 Outbreaks

The following sections describe compliance actions employers must undertake during outbreaks in the workplace. An outbreak is defined as three or more COVID-19 cases detected in an exposed group within a 14-day period and a major outbreak is defined as 20 or more COVID-19 cases in an exposed group within a 30-day period. What constitutes an outbreak or major outbreak will change if CDPH

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<sup>58</sup> OSHA, Analytic Spreadsheets in Support of the COVID-19 Vaccination and Testing ETS, October 2021.

<sup>59</sup> Miao, Doudou, and Nan Zhang, "Human Close Contact Behavior-Based Interventions for COVID-19 Transmission" Buildings 12, no. 3: 365, 2022.

<sup>60</sup> Nowotny, Kathryn M., Kapriske Seide, and Lauren Brinkley-Rubinstein, Risk of COVID-19 infection among prison staff in the United States. BMC Public Health 21, 1036, 2021.

<sup>61</sup> This is calculated as 40 percent × (100-11.4 percent) excluded due to the ability to work remotely during exclusion period × (100-7.0 percent) excluded due to COVID-19 infection = 33 percent.



changes its definition of these terms in a regulation or order. As described above, DIR estimated there would be 7,586 (primary estimate) to 13,034 (high-end estimate) outbreaks in 2023.

Subsection 3205 defines an “exposed group” in the event of an outbreak. This may be broader than the number of close contacts as it includes all employees who have shared a work area (or employer-provided transportation/housing) with at least three potentially infectious COVID-19 cases within 14 days. The actual size of each exposed group will vary depending on the number of employees at a location, whether they are divided into cohorts or otherwise separated by time or location (for instance, shifts that do not overlap or employees who always remain on different floors of a building). Based on its investigation of large and small outbreaks, DIR estimated an average exposed group of 25 employees.

Based on investigations throughout the pandemic, DIR estimated that 10 percent of outbreaks are likely to be major outbreaks. DIR estimated that the exposed group in a major outbreak would be three times the average exposed group, or approximately 75 employees. Based on this estimate, the average size of an exposed group in a non-major outbreak would be approximately 20 employees.<sup>62</sup> Most employers would never experience a major outbreak as approximately 92 percent of all establishments have fewer than 20 employees in total.

#### *2.2.10.1. Outbreaks: Testing*

Subsection 3205.1 requires testing for all employees in the exposed group, which may be broader than the number of close contacts, as described above. Although many employers will no longer be covered by section 3205.1 after a single round of testing, DIR estimated costs for two rounds of testing on paid time (see assumptions above regarding freely available tests and the estimated time per test in Testing of Close Contacts). In the case of major outbreaks, testing increases from once to twice weekly. DIR estimated that employers that had major outbreaks would continue to be covered by 3205.1 for about 45 days. Therefore, the exposed group would be tested twelve times, on average, per major outbreak.<sup>63</sup>

Using the fully-loaded hourly wage rate of \$46.74 for all employees multiplied by the number of employees in the exposed group and assuming 0.5 hours per employee for testing and travel to/from the testing site, DIR estimated that the cost of testing during outbreaks would be approximately \$2,900 per outbreak.

#### *2.2.10.2. Outbreaks: Ventilation*

Indoors, if there is mechanical ventilation, employers must use at least MERV-13 filters, or the highest level of filter compatible with the existing ventilation system. In determining costs associated with its 2019 update to the California Building Energy Efficiency Standards (Title 24, Part 6) the California Energy Commission calculated an annual incremental cost increase of \$0.03/square foot (sq. ft.) to replace MERV-8 with MERV-13 filters; communication between DOSH staff and the Commission confirmed that this could be considered a “worst case” estimate of cost based on an analysis of a 24,413 sq. ft. building with 18 filters and a 60 ton HVAC system.<sup>64</sup>

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<sup>62</sup> For calculation purposes, DIR used average estimates of 74.5 employees for major outbreaks (10%) and 19.5 employees for non-major outbreaks (90%), which equates to an average of 25 employees for all outbreaks.

<sup>63</sup> This is calculated as two tests per week for six weeks = 12 tests per employee.

<sup>64</sup> Statewide Codes and Standards Enhancement (CASE) Initiative (Sept 2017). *Nonresidential Ventilation & Indoor Air Quality (IAQ) – Final Report*. Measure Number: 2019-NR-ASHRAE62.1-F, “Nonresidential Mechanical,” prepared

No data were available about the percentage of indoor California workplaces with mechanical ventilation or their average square footage. Based on Cal/OSHA’s experience, DIR assumed that 90 percent of indoor outbreaks occur in buildings with existing HVAC systems (a common exception are storage locations and warehouses), and that a reasonable average square footage per outbreak area was 30,000 feet. An outbreak, as defined in the proposed regulations, does not necessarily encompass an entire facility or even an entire floor. Many non-major outbreaks occur in relatively small areas such as stores, childcare facilities, and restaurants. DIR assumed that about 25 percent of existing HVAC systems do not already use MERV-13 or the highest level of compatible filter. While MERV-13 is mandated in newer construction, it has not always been required in commercial buildings.

Based on these assumptions, the average cost of ventilation measures during outbreaks would be approximately \$200 per outbreak.

#### *2.2.10.3. Outbreaks: HEPA Filters*

Employers must use HEPA units in indoor areas “where ventilation is inadequate to reduce the risk of COVID-19 transmission.” Since it will be up to employers to determine the ventilation needs of a given area, DIR cannot precisely estimate about how many outbreaks will require HEPA units. Nonetheless, based on Cal/OSHA experience, DIR assumed that about 10 percent of outbreaks would require HEPA units and that those employers would purchase an average of 8 large units and 8 smaller units. The average cost of HEPA units researched by DIR was approximately \$316 for smaller units and \$1,769 for larger commercial units.<sup>65</sup>

Section 3205 requires that ventilation improvements be continued in locations with outbreaks even after section 3205.1 no longer applies—but HEPA units are only required when ventilation is inadequate and may be removed under some circumstances. Thus, some employers may lease commercial HEPA units and then return them once the outbreak is over and other methods have been implemented to ensure adequate ventilation. In such cases, the cost will be lower than estimated.

Based on these assumptions, the average cost of using HEPA filters during outbreaks would be approximately \$1,700 per outbreak.

#### *2.2.10.4. Outbreaks: Face Coverings*

All employees in the exposed group must wear face coverings when section 3205.1 applies. DIR applied the average cost of providing a disposable face covering, approximately \$0.23, to the entire exposed group for 20 workdays. Most non-major outbreaks can be controlled in this time period; if everyone is tested immediately and all positive cases and close contacts excluded as required by proposed section 3205, the outbreak should end swiftly.

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for California Energy Commission 2019 update to the California Building Energy Efficiency Standards (Title 24, Part 6). Accessed at <https://title24stakeholders.com/wp-content/uploads/2016/12/2081A01.pdf> on November 22, 2021. See p. 20 for prototype 1, a 24,413 sq. ft. building with 18 filters and a 60 ton HVAC system; see p. 90 for estimated annual incremental cost for upgrading from MERV 8 to 13 of \$694.80. The annual incremental cost per sq. ft. is calculated as  $\$694.80/24,413 \text{ sq. ft.} = \$0.03/\text{sq. ft.}$

<sup>65</sup> Listed price for smaller units, as of November 2021: Conway Airmega 250 Smart Air Purifier, recommended for 930 sq. ft.: \$295.65; Honeywell HPA300, recommended for 465 sq. ft., \$249.99; Winix XLC, recommended for 620 sq. ft.: \$499.99; Levoit VeSync Core 400S Smart True, recommended for 403 sq. ft., \$219.99. Larger units: Xpower 2000 CFM Portable 3 Stage Filtration HEPA Air Purifier System, 1,500 sq. ft., \$1,099; Honeywell F115A1064 Commercial Ceiling Mount Air Cleaner, 3,200 sq. ft. \$3,200; AeraMax Pro AM4S, 1,010 sq. ft. \$2,160.

Using these assumptions, DIR estimated an average cost of providing face coverings during outbreaks of approximately \$230 per outbreak.

#### *2.2.10.5. Outbreaks: Respirators*

In major outbreaks, respirators must be provided to the entire exposed group, approximately 75 employees, for voluntary use. DIR found a median price of \$0.93 for NIOSH-approved disposable respirators.<sup>66</sup> DIR estimated that during major outbreaks employees would be covered by 3205.1 for about 45 days. Assuming a five day work week, employees would need approximately 32 respirators each. Using these assumptions, DIR estimated an average cost of providing respirators during major outbreaks of approximately \$2,200 per outbreak.

Physical distancing is required in major outbreaks for employees not wearing mandatory respirators. This cost is not quantifiable and will vary depending on specific characteristics of each workplace including the density of employees and other persons in the work area; how hard it is to adjust procedures or layout; whether the number of individual present can be reduced; whether the location is open to the public; and other factors. In some cases, employers may choose to reduce or suspend work, but that is not mandated by the regulation and there is no way to predict in advance what proportion of employers would take that step during a major outbreak.

Although DIR cannot quantify this cost based on existing information, DIR believes that the overall cost is likely to be limited by the fact that the number of major outbreaks will continue to decline relative to 2020 or 2021, and relative to the overall decline in case numbers, as employers learn to respond more quickly and more effectively to smaller outbreaks before they can expand.

#### *2.2.10.6. Outbreaks: Review of Policies*

After an outbreak, employers must conduct a review of COVID-19 policies, procedures, and controls, which DIR estimated to require 6 hours of a health and safety engineer's time, although the cost of implementing changes in response to this review cannot be quantified, as it would be different in every workplace. Major outbreaks must be reported to Cal/OSHA. DIR estimates it would take approximately 45 minutes of a manager's time to properly document and report a major outbreak to Cal/OSHA.<sup>67</sup> DIR uses an average hourly labor cost of \$96.50 for managers.

Using these assumptions, DIR estimated the cost of reviewing COVID-19 policies to be approximately \$490 for a minor outbreak and \$560 for a major outbreak, or an average of approximately \$500 per outbreak.

#### *2.2.10.7. Outbreaks: Summary*

Based on the analysis described above, DIR estimated the average employer cost for managing an outbreak would be approximately \$5,700 per establishment. These costs correspond with approximately 7,600 to 13,000 outbreaks, including 760 to 1,300 major outbreaks, projected in 2023. Table 2.5 summarizes the direct costs of managing COVID-19 outbreaks in the workplace.

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<sup>66</sup> Based on DIR's review of vendor list prices as of October/November 2021.

<sup>67</sup> This time burden is based on estimates for reporting COVID-19 hospitalizations and fatalities in U.S. Occupational Safety and Health Administration, COVID-19 Vaccination and Testing: Emergency Temporary Standard, Interim Final Rule, 86 FR 212 (61402 – 61555), November 5, 2021.

**Table 2.5 Direct Costs of Managing Outbreaks in 2023**

Number of Outbreaks <sup>68</sup>		Compliance Action	Average cost per outbreak	Total cost in 2023 (\$ Millions)	
Median	High			Primary Estimate	High-end Estimate
7,568	13,034	Testing	\$2,910	\$22.0	\$37.9
		Ventilation	\$200	\$1.5	\$2.6
		HEPA filters	\$1,670	\$12.6	\$21.7
		Face coverings	\$230	\$1.7	\$3.0
		Respirators	\$2,220	\$1.7	\$2.9
		Review policies	\$500	\$3.8	\$6.5
		<b>Total</b>	<b>\$5,730</b>	<b>\$43.4</b>	<b>\$75.7</b>

Note: Totals may not sum due to rounding.

### 2.2.11. COVID-19 Prevention in Employer-Provided Housing

According to information from the Department of Housing & Community Development (DHCD), there are 36,993 employees in employer-provided housing consisting of 9,533 individual structures.<sup>69</sup> This is likely an undercount of housing covered by the proposed section, because not all employers seek permits from DHCD. However, the industry most likely to seek a permit is agriculture, and that is the industry in which employees are most likely to live in multi-household, employer-provided structures. Based on the DHCD data, there were 6,691 employer-provided housing structures with two or more employees per structure. These structures, which house 35,382 employees, are more likely to be multi-household dwellings subject to the proposed regulation.<sup>70</sup> Based on data from the U.S. Census Bureau’s Survey of Construction, the average size of a new multifamily unit in the West region is approximately 1,000 sq. ft.<sup>71</sup> Although this is certainly less than the size of employer-provided housing, which often includes shared motel/hotel rooms and bunkhouses, among other non-standard housing, in the absence of more specific information DIR assumed this was similar to the average size of existing employer-provided housing structures, primarily used to house agricultural workers.

The proposed regulation requires assignment of housing to be done in a manner that prioritizes keeping households, and cohorts that work or travel together, within the same housing unit. DIR assumed this cost would be minimal since employers would have to assign employees to housing absent the proposed regulation.

Employers must maximize the quantity and supply of outdoor air (a minimal cost) and increase filtration efficiency to the highest level compatible with the existing ventilation system. If there is not a MERV-13

<sup>68</sup> Based on investigations throughout the pandemic, DIR estimated that 10 percent of outbreaks are likely to be major outbreaks.

<sup>69</sup> This does not include the immediate family members of the employee when they are living in a single family dwelling. Data based on queries through the DHCD Codes and Standards Automated System, Search for Employee Housing Facilities, accessed at <https://www.hcd.ca.gov/casas/ehFacilityQuery/onlineQuery> on April 6, 2022. Some permitted facilities with structures are currently listed as having no employees, and some are currently listed as having no structures and no employees.

<sup>70</sup> This may be an overcount of permitted multi-household structures, as it includes hotels/motels and circumstances in which employees are assigned their own rooms (which does not always occur).

<sup>71</sup> U.S. Census Bureau, Characteristics of New Housing: Annual Characteristics of New Housing, accessed at <https://www.census.gov/construction/chars/> on April 21, 2022.

or higher filter in use, portable or mounted HEPA filtration units must be used, to the extent feasible, in sleeping areas. DIR assumed that 90 percent of employer-provided structures have an HVAC system. Of these, DIR also assumed that only 20 percent are using MERV-13 or higher filters.

Based on the California Energy Commission's estimated annual cost of \$0.03/sq. ft. to upgrade to MERV-13 or higher filters and assuming an average employer-provided housing structure is 1,000 sq. ft., affected employers would incur costs of approximately \$30 per structure per year to replace filters in the HVAC system. Thus, the cost would be approximately \$140,000 per year for 4,800 housing units.

DIR estimated that the remaining 10 percent of employer-provided structures that do not have an HVAC system would need to purchase two small HEPA filters at an average cost of \$316 per unit.<sup>72</sup> The total cost would be approximately \$420,000 across 700 structures. The useful expected life for a HEPA filter is two to three years, so this SRIA does not consider replacement costs.

The proposed regulation requires employers to provide face coverings in employer-provided housing but does not mandate that they are worn. DIR assumed that face coverings will not be used regularly by people in most employer-provided housing, just as most individuals do not wear face coverings in their own homes. Employees who must share a sleeping area are unlikely to wear a face covering when awake, knowing that they would be exposed at night anyway. DIR assumed that about 10 percent of employees in employer-provided housing will take advantage of the provided face coverings (at an average cost of \$0.23 per mask). This is most likely in housing where employees who do not normally live together share a common area but have bedrooms that are either individual or shared with only one or two other persons. DIR estimated that employees would use about 180 face coverings per person per year, since much employer-provided housing is seasonal. Thus, the cost for employers would be approximately \$150,000.

In total, employers would incur costs for COVID-19 prevention in employer-provided housing of approximately \$710,000 in 2023. These costs would likely decline to \$291,000 in 2024 since employers would not need to immediately replace HEPA filters. There are no known sources of information available on the percentage of employer-provided housing by industry. Exclusively for purposes of allocating these costs across industries, DIR assumed that the vast majority (approximately 80 percent) of employer-provided housing was in agriculture and forestry (NAICS 11), and the remainder was divided proportional to the number of employees in utilities (NAICS 22), construction (NAICS 23), transportation and warehousing (NAICS 48-49), educational services (NAICS 61), recreation (NAICS 71), and accommodation and food services (NAICS 72).

#### 2.2.12. COVID-19 Prevention in Employer-Provided Transportation

As with housing, the proposed regulation sets forth the priority by which people should be assigned to vehicles, but DIR assumed this is a negligible cost since logistics planning and assignment to vehicles must occur anyway. Employers are required to maximize the supply of outside air in vehicles to the extent feasible, with some exceptions, however this only requires lowering the windows when feasible to do so. Therefore, there are no additional anticipated costs for COVID-19 prevention in employer-provided transportation.

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<sup>72</sup> See above discussion in Outbreaks: HEPA Filters.

### 2.2.13. Summary of Direct Costs to Businesses

The direct compliance costs of the proposed regulation will vary considerably across individual workplaces and industries. Table 2.6 summarizes the direct costs of the proposed regulation by compliance action.

**Table 2.6 Summary of Direct Costs to Businesses in 2023 by Compliance Action**

Compliance Action	Total Cost in 2023 (\$ Millions)	
	Primary Estimate	High-end Estimate
IIPP	\$61.0	\$61.0
Testing close contacts	\$58.9	\$235.4
Face coverings	\$0	\$0
Respirators	\$26.0	\$26.0
Ventilation	\$5.8	\$5.8
Aerosolizing procedures	\$0	\$0
Reporting and recordkeeping	\$20.9	\$83.7
Exclusion of COVID-19 cases	\$146.9	\$587.7
Exclusion of close contacts	\$125.3	\$343.9
Managing outbreaks	\$43.4	\$74.7
COVID-19 prevention in employer-provided housing	\$0.7	\$0.7
COVID-19 prevention in employer-provided transportation	\$0	\$0
<b>TOTAL</b>	<b>\$488.8</b>	<b>\$1,418.7</b>

Note: Totals may not sum due to rounding.

Table 2.7 summarizes the direct costs to businesses by NAICS code.

**Table 2.7 Summary of Direct Costs to Businesses in 2023 by NAICS Code**

NAICS	Description	Total Cost in 2023 (\$ Millions)	
		Primary Estimate	High-end Estimate
11	Agriculture, Forestry, Fishing and Hunting	\$10.5	\$33.4
21	Mining	\$0.4	\$1.2
22	Utilities	\$2.3	\$7.3
23	Construction	\$23.3	\$66.7
31-33	Manufacturing	\$27.2	\$87.2
42	Wholesale Trade	\$14.0	\$38.0
44-45	Retail Trade	\$40.0	\$119.1
48-49	Transportation and Warehousing	\$17.4	\$54.5
51	Information	\$10.6	\$32.4
52	Finance and Insurance	\$10.8	\$28.3
53	Real Estate and Rental and Leasing	\$9.2	\$20.8

NAICS	Description	Total Cost in 2023 (\$ Millions)	
		Primary Estimate	High-end Estimate
54	Professional and Technical Services	\$30.1	\$76.3
55	Management of Companies and Enterprises	\$3.1	\$10.5
56	Administrative and Waste Services	\$23.5	\$74.7
61	Educational Services	\$44.9	\$130.3
62	Health Care and Social Assistance	\$139.5	\$387.4
71	Arts, Entertainment, and Recreation	\$7.7	\$20.9
72	Accommodation and Food Services	\$38.1	\$117.1
81	Other Services, excluding Public Administration	\$13.7	\$34.6
92	Public Administration	\$22.7	\$78.0
	<b>TOTAL</b>	<b>\$488.8</b>	<b>\$1,418.7</b>

Note: Totals may not sum due to rounding.

#### 2.2.13.1 Summary of Direct Costs to Small Businesses

As described in Chapter 1, based on EDD data approximately 98.8 percent of privately-held establishments have fewer than 100 employees. Therefore, DIR estimated there are approximately 1,580,000 small businesses. However, a number of small businesses are exempt from the proposed regulation because (1) all employees are working remotely, (2) individual establishments have only one employee who does not come into contact with others for work, or (3) all employees are already covered by existing section 5199. Due to limited available information for privately held companies, the number of exempt businesses cannot be determined.

As the vast majority of businesses affected by the proposed regulation are small businesses, the typical costs for a small business are similar to the average costs for all businesses. However, in two cases, the typical costs for a small business are anticipated to be lower. First, the average costs for reviewing and updating an establishment's IIPP and any additional health and safety policies and procedures after the rule is promulgated and after an outbreak are estimated to be lower due to the average number of employees and average physical size of the workspace for a small business. Second, most small employers would never experience a major outbreak as approximately 74 percent of all establishments have fewer than 5 employees and 92 percent of all establishments have fewer than 20 employees in total. Therefore, the costs for small businesses account for a slightly smaller proportion of the total direct costs of the rule relative to the proportion of establishments estimated to be a small business.

The average direct costs for an individual business are small because most small businesses are not anticipated to experience any COVID-19 cases that are a result of a workplace exposure. In the vast majority of cases, the non-trivial impacts of employee absences due to COVID-19 are attributable to actual symptoms and infections that would prevent individual employees from working or due to existing public health orders and local requirements. Furthermore, most small businesses are already



subject to existing public health orders and local regulations—therefore, only a small percentage of costs for COVID-19 prevention measures are directly attributable to the proposed regulation. Table 2.6 reports the average direct costs of the proposed regulation for a small business.

**Table 2.8 Average Direct Costs for Small Businesses**

Number of Small Establishments	Average Cost in 2023	
	Primary Estimate	High-end Estimate
1,579,472	\$280	\$850

### 2.3 Direct Costs to Individuals

The direct cost to individuals is the exclusion of COVID-19 cases and close contacts from the workplace. Employees may perceive a loss of wages or benefits due to the proposed regulation in cases where they otherwise felt healthy enough to work and were asymptomatic. In some cases, these anticipated losses would be offset by paid sick leave or vacation that employees have accrued through their employment, leaving employees no worse off financially. The potential healthcare costs and other impacts related to a COVID-19 infection are described later in the discussion of benefits.

The estimation of lost wages and benefits to employees directly follows the estimation of lost productivity to employers (described above in Exclusion of COVID-19 Cases). Specifically, DIR attributed about 14 percent of the cost of excluding COVID-19 cases to the proposed regulation rather than existing law. This estimate is based on 35.1 percent of cases that are asymptomatic and an additional two days in which asymptomatic cases might otherwise return to work in the absence of the proposed regulation. For excluded close contacts, DIR attributed about 33 percent of the cost to the proposed regulation.

Using the fully-loaded hourly wage rate of \$46.74 for all employees, DIR estimated that employees would stand to lose wages and benefits equivalent to \$146.9 million to \$587.7 million due to exclusion of COVID-19 cases and \$68.2 million to \$272.8 million due to exclusion of close contacts in high-risk settings. However, many employees would be eligible for paid sick leave or vacation and thus would not incur such costs. According to the Bureau of Labor Statistics, only 5 percent of private employees in the Pacific geographic area (which is largely composed of California) lack access to paid sick leave.<sup>73</sup> Nonetheless, DIR estimated that 25 percent of the direct costs to individuals would not be covered by sick leave, since the average employee may have fewer than 40 hours of paid sick leave per year, which is the minimum length of the exclusion period. However, even employees with more than 40 hours of paid sick leave might have used that leave for other purposes, such as for other illnesses or caregiving for a sick family member, meaning the exclusion period still results in a perception of lost wages or benefits relative to a *no regulatory action* baseline. If one assumed the average employee had extra days of sick leave remaining each year, the incremental cost would be negligible. However, if one assumed the average employee received fewer than 40 hours of sick leave or typically used all of their annual sick leave, significantly more than that 25 percent of employee COVID-19 cases would perceive a loss of wages or benefits due to the proposed regulation. This could increase the perceived cost to individuals

<sup>73</sup> U.S. Bureau of Labor Statistics, “Employee Benefits in the United States – March 2021,” (Sep. 23, 2021), Table 6, p. 18.



by up to a factor of four if annual sick leave did not cover the exclusion period and any additional typical uses throughout the year.

Based on these assumptions, DIR estimated that the direct costs to individuals attributable to the proposed regulation would be approximately \$53.8 million to \$215.1 million.

#### 2.4 Summary of Direct Costs in 2023

Table 2.9 summarizes the total direct costs in the first year of the proposed regulation.

**Table 2.9 Summary of Direct Costs in 2023**

	Total Direct Costs in 2023 (\$ Millions)	
	Primary Estimate	High-end Estimate
Direct Costs to Businesses	\$488.8	\$1,418.7
Direct Costs to Individuals	\$53.8	\$215.1
<b>Total Direct Costs</b>	<b>\$542.6</b>	<b>\$1,633.9</b>

Note: Totals may not sum due to rounding.

#### 2.5 Summary of Direct Costs in 2024

As discussed above, modeled estimates of future COVID-19 infection rates are highly speculative and specific projections have not been made for 2024. Therefore, DIR estimated a potential range of cost estimates for 2024 under two alternative scenarios: (1) assuming the same annual number of cases as 2023 and (2) assuming a 50 percent reduction in all COVID-19 infections and outbreaks.<sup>74</sup> These should not be interpreted as actual projections as they are not based on any set of models or expert opinion.

DIR assumed that the direct costs to businesses and individuals would be similar to the costs incurred during the first 12-months after the regulation is promulgated with the exceptions that upfront fixed costs will not be repeated and recurring costs will only vary with the number of COVID-19 infections and outbreaks. Therefore, the various cost assumptions used in the analysis are the same for 2024 as they are for 2023. These details are documented above in Sections 2.2 and 2.3. Table 2.10 reports the direct costs to businesses by compliance action.

**Table 2.10 Summary of Direct Costs to Businesses in 2024 by Compliance Action**

Compliance Action	Scenario 1: Total Direct Costs in 2024 (\$ Millions)		Scenario 2: Total Direct Costs in 2024 (\$ Millions)	
	Primary Estimate	High-end Estimate	Primary Estimate	High-end Estimate
IIPP	\$0	\$0	\$0	\$0
Testing close contacts	\$58.9	\$235.4	\$29.4	\$117.7
Face coverings	\$0	\$0	\$0	\$0
Respirators	\$26.0	\$26.0	\$26.0	\$26.0
Ventilation	\$0	\$0	\$0	\$0
Aerosolizing procedures	\$0	\$0	\$0	\$0
Reporting and recordkeeping	\$20.9	\$83.7	\$10.5	\$41.9
Exclusion of COVID-19 cases	\$146.9	\$587.7	\$73.5	\$293.8

<sup>74</sup> See Tables 2.2 and 2.4

Compliance Action	Scenario 1: Total Direct Costs in 2024 (\$ Millions)		Scenario 2: Total Direct Costs in 2024 (\$ Millions)	
	Primary Estimate	High-end Estimate	Primary Estimate	High-end Estimate
Exclusion of close contacts	\$72.8	\$291.4	\$36.4	\$145.7
Managing outbreaks	\$43.4	\$74.7	\$21.7	\$37.3
COVID-19 prevention in employer-provided housing	\$0.3	\$0.3	\$0.3	\$0.3
COVID-19 prevention in employer-provided transportation	\$0	\$0	\$0	\$0
<b>TOTAL</b>	<b>\$369.2</b>	<b>\$1,299.1</b>	<b>\$197.7</b>	<b>\$662.7</b>

Note: Totals may not sum due to rounding.

Table 2.11 summarizes the direct costs to businesses by NAICS code.

**Table 2.11 Summary of Direct Costs to Businesses in 2024 by NAICS Code**

NAICS	Description	Scenario 1: Total Direct Costs in 2024 (\$ Millions)		Scenario 2: Total Direct Costs in 2024 (\$ Millions)	
		Primary Estimate	High-end Estimate	Primary Estimate	High-end Estimate
11	Agriculture, Forestry, Fishing and Hunting	\$8.9	\$31.8	\$5.0	\$16.5
21	Mining	\$0.3	\$1.2	\$0.2	\$0.6
22	Utilities	\$2.2	\$7.1	\$1.2	\$3.7
23	Construction	\$16.8	\$60.2	\$9.2	\$30.9
31-33	Manufacturing	\$23.9	\$83.9	\$13.0	\$43.1
42	Wholesale Trade	\$9.3	\$33.3	\$5.1	\$17.1
44-45	Retail Trade	\$32.1	\$111.2	\$17.5	\$57.0
48-49	Transportation and Warehousing	\$14.9	\$52.1	\$8.1	\$26.7
51	Information	\$8.3	\$30.1	\$4.6	\$15.5
52	Finance and Insurance	\$6.9	\$24.3	\$3.8	\$12.5
53	Real Estate and Rental and Leasing	\$4.6	\$16.2	\$2.5	\$8.3
54	Professional and Technical Services	\$17.7	\$63.9	\$9.7	\$32.8
55	Management of Companies and Enterprises	\$2.8	\$10.1	\$1.5	\$5.2
56	Administrative and Waste Services	\$19.3	\$70.4	\$10.6	\$36.2
61	Educational Services	\$42.3	\$127.7	\$22.5	\$65.3
62	Health Care and Social Assistance	\$91.9	\$339.8	\$47.2	\$171.1
71	Arts, Entertainment, and Recreation	\$5.4	\$18.6	\$2.9	\$9.5
72	Accommodation and Food Services	\$31.6	\$110.5	\$17.2	\$56.7
81	Other Services, excluding Public Administration	\$8.3	\$29.2	\$4.5	\$15.0
92	Public Administration	\$21.9	\$77.2	\$11.4	\$39.1
	<b>TOTAL</b>	<b>\$369.2</b>	<b>\$1,299.1</b>	<b>\$197.7</b>	<b>\$662.7</b>

Note: Totals may not sum due to rounding.

DIR estimated the direct costs to individuals in 2024 to be proportional to the number of COVID-19 cases. Therefore, in the first scenario, the direct costs to individuals are equal to the costs incurred in 2023. In the second scenario, the direct costs to individuals are half as large due to the reduction in the notional numbers of COVID-19 infections. Table 2.12 summarizes the total direct costs in the final year of the proposed regulation.

**Table 2.12 Summary of Direct Costs in 2024**

	Scenario 1: Total Direct Costs in 2024 (\$ Millions)		Scenario 2: Total Direct Costs in 2024 (\$ Millions)	
	Primary Estimate	High-end Estimate	Primary Estimate	High-end Estimate
Direct Costs to Businesses	\$369.2	\$1,299.1	\$197.7	\$662.7
Direct Costs to Individuals	\$53.8	\$215.1	\$26.9	\$107.6
<b>Total Direct Costs</b>	<b>\$423.0</b>	<b>\$1,514.2</b>	<b>\$224.6</b>	<b>\$770.3</b>

Note: Totals may not sum due to rounding.

## 2.6 Summary of Direct Costs

Table 2.13 summarizes the total direct costs of the proposed regulation (measured in 2021 dollars). Costs incurred after the first year of the implementation of the proposed regulation are calculated using a discount rate of 3 percent. The net present value (NPV) total is the sum of the discounted stream of costs over time. NPV is the difference between the present dollar value of costs in the first year of the proposed regulation and the present dollar value of costs in future years. The annualized value is the cost that, if it were to occur equally every year, would yield the same NPV as the actual stream of costs. It can be thought of as an average annual cost.

**Table 2.13 Summary of Direct Costs of the Proposed Regulation, using a 3 Percent Discount Rate**

	Direct Costs (\$ Billions)	
	Primary Estimate	High-end Estimate
2023	\$0.54	\$1.63
2024	\$0.22 to \$0.41	\$0.75 to \$1.47
NPV Total	\$0.76 to \$0.95	\$2.38 to \$3.10
Annualized	\$0.39 to \$0.48	\$1.21 to \$1.57

### 3. Direct Benefits

Like costs, direct benefits to businesses and workers accrue from multiple aspects of the proposed regulation, although all benefits attributed to the proposed regulation trace back to avoided COVID-19 illnesses.

This section describes how the benefits of the proposed regulation are estimated.

#### 3.1 General Assumptions

Like the estimation of costs, estimates of benefits related to reductions in cases, hospitalizations, and deaths are all based on projections of those values in the no regulatory action baseline provided to Cal/OSHA by CDPH on April 8, 2022. Table 2.1 provides a summary of the CDPH projections. The estimates in Table 2.1 are approximations and should be treated with caution. These estimates are uncertain, and uncertainty increases as projections go further into the future. Counts of future cases are strongly dependent on testing behavior and reporting. Factors such as the shift to antigen and at-home testing may influence official statistics, and new variants could significantly alter the number of cases. For example, as of April 5, 2022, the Omicron surge has already pushed California total case counts (2,900,000) almost as high as the total for 2021 (3,100,000). Hospitalizations and deaths are presumed to decrease over time as immunity from vaccination and prior infection increases, but future variants could cause more severe disease or reduce immunity.

##### 3.1.1 Estimating the Number of Affected Workers

The estimates in Table 2.1 reflect the state of California as a whole. To estimate the benefits of the proposed regulation, these impacts need to be scaled to reflect the population of covered employees. Table 2.2 provided estimates of the projected number of COVID-19 infections among covered employees in 2023 by industry. As described in Chapter 2, primary estimates are based on the median projections from this table, and high-end estimates are four times these median case projections. Table 3.1, below, scales these estimates by the ratio of California’s covered workforce relative to the total estimated population of California in 2021 as forecast by the California Department of Finance.<sup>75</sup>

$$\begin{aligned}
 & \textit{Affected Workers} \\
 & = \frac{\textit{Annual Cases, Hospitalization, or Deaths}}{\textit{Total Covered Workforce (12,421,775)}} \\
 & \times \frac{\textit{Population (39,953,269)}}{\textit{Population (39,953,269)}}
 \end{aligned}$$

This calculation equates to an assumption that workers are equally likely to become ill as other members of California’s population. Multiple factors, including differences in age, health, exposure, and vaccination rates may make workers more or less likely to become ill than other members of California’s population.

**Table 3.1. Estimated Cases, Hospitalization, and Deaths Among Covered CA Workers in 2023**

Cases		Hospitalizations		Deaths	
Primary	High-end	Primary	High-end	Primary	High-end
559,634	2,238,535	34,200	136,799	3,420	13,680

<sup>75</sup> California Department of Finance, Demographic Research Unit, Demographics – Data – Projections, State Population Projections, accessed at <https://dof.ca.gov/forecasting/Demographics/projections/> on April 8, 2022.

### 3.1.2. Monetizing Avoided Cases

The value of avoided COVID-19 cases come from two primary sources: avoided productivity losses for employers, and avoided wage, health, and broader utility losses for workers.

#### 3.1.2.1 Monetizing the Value of Avoided Cases to Workers

The value of avoided COVID-19 cases depends on the severity of the case. As noted in Chapter 2, DIR assumes 35.1 percent of cases are asymptomatic. The distribution of severity of symptomatic cases is based largely on the counts of hospitalizations and deaths presented in Tables 2.1 and 3.1. DIR conservatively assumes that 35.1 percent of reported cases are asymptomatic, although many asymptomatic cases are likely to go unreported. Cases that are not asymptomatic and do not result in hospitalization or death are assumed to be mild. Hospitalizations are assumed to be either severe or critical. Based the CDC analysis (Taylor et al, 2021), DIR assumes 20 percent of hospitalizations result in an ICU admission and are therefore classified as critical, with the remaining 80 percent being classified as severe.<sup>76</sup> The resulting distribution of case severity is presented in Table 3.2.

**Table 3.2. Estimated Distribution of Case Severity and Associated Average Cost to Workers**

Disease Severity	Percentage of Cases	WTP Estimate
Asymptomatic	35.1%	-
Mild	58.2%	\$5,860
Severe	4.9%	\$13,100
Critical	1.2%	\$1,820,000
Fatal	0.6%	\$11,500,000

Estimates of workers' valuation of avoided COVID-19 cases are based on a willingness to pay (WTP) estimates developed by Robinson et al (2021).<sup>77</sup> Their analysis develops different cost estimates for the different symptomatic severities of COVID-19 presented in Table 3.3. These values are developed by first comparing health-related quality of life (HRQL) estimates with and without COVID-19, then multiplying the difference in HRQL by the an expected illness duration to estimate the total change in quality-adjusted life years (QALY), then monetizing those changes in QALY based on values provided by the U.S. Department of Health and Human Services. Robinson et al (2021) provide different values based on age (20, 40 and 70) and future discount rate (3 percent and 7 percent). The calculation of benefits in this SRIA does not incorporate worker age, and thus assumes the WTP estimates for age 40 best represent the value for an average worker.<sup>78</sup> The calculations of benefits in this SRIA as based on 3 percent discount rates; using 7 percent discount rates instead does not meaningfully change the results because the values for the highest-cost cases (critical cases and fatal cases) do not change between 3 percent and 7 percent discount rates.

<sup>76</sup> Severity of Disease Among Adults Hospitalized with Laboratory-Confirmed COVID-19 Before and During the Period of SARS-CoV-2 B.1.617.2 (Delta) Predominance — COVID-NET, 14 States, January–August 2021 | MMWR (cdc.gov), <https://www.cdc.gov/mmwr/volumes/70/wr/mm7043e1.htm#T1> down (accessed April 28, 2022).

<sup>77</sup> Valuing COVID-19 Mortality and Morbidity Risk Reductions (hhs.gov), <https://aspe.hhs.gov/sites/default/files/2021-08/valuing-covid-risks-july-2021.pdf> (accessed April 28, 2022).

<sup>78</sup> Median age of the labor force, by sex, race, and ethnicity, <https://www.bls.gov/emp/tables/median-age-labor-force.htm> (accessed April 28, 2022).

In addition to these WTP estimates, avoided asymptomatic cases also have benefit for employers through reduced productivity losses, for other workers through reduced transmission, and for the employee themselves through reduced wage loss. DIR assumes the WTP estimates in Robinson et al (2021) are presumed to include the average value of lost wages, and that 25 percent of employees would experience lost wages.

### *3.1.2.2 Monetizing the Value of Avoided Cases to Employers*

Avoided productivity losses requires estimating changes in the number of excluded workers due to the regulation. As discussed in Chapter 2, the exclusion period is not a new requirement of the proposed regulation, and symptomatic workers may be unwilling or unable to return to work regardless. DIR attributes 14 percent of the COVID-19 exclusions to the proposed regulation. Thus, DIR attributes 78,573 exclusions to the proposed regulation in the primary estimate, and 314,290 exclusions to the proposed regulation in the high-end estimate.<sup>79</sup> Estimates of benefits focus on changes relative to these values.

Employees who are unable to work due to illness also represent lost productivity to employers. The benefits of avoiding COVID-19 cases thereby provide two benefits to employers. First, the avoided case averts productivity losses for that employee. Second, the risk of other employees falling ill is reduced, as discussed in the section on testing of close contacts. Both issues are covered in discussions of the direct benefits of the proposed regulation.

Estimating the productivity benefits associated with avoided illness requires assumptions about the extent to which the different severities of illness are associated with absence from work.

Macroeconomic impacts require these absences to be distributed by NAICS code. DIR assumes asymptomatic cases are associated with 5 days of work absence, because asymptomatic employees with positive test results must be excluded for 5 days from the date the sample was taken.

The Bureau of Labor Statistics' Survey of Occupational Injuries and Illnesses (SOII) reported that in 2020, the median days away from work due to "Other diseases due to viruses, not elsewhere classified" was 12 to 14 days, depending on industry sector.<sup>80</sup> DIR assumes that mild cases of COVID-19 involved fewer lost workdays, while severe and critical cases involved a larger number of lost workdays. DIR developed specific assumptions for each severity based on the illustrative description of symptoms associated with each severity category in Robinson et al (2021).<sup>81</sup> Mild cases were assumed to experience eight workdays of absence, based on an assumption of 10 days of mild symptoms. Severe cases were assumed to experience 20 workdays of absence, based on an assumption of 13 days lost in the near term, followed by one lost day per week over the next 50 days. For reference, the median length of hospital stays for COVID-19 was six days (Ohsfeldt et al., 2021).<sup>82</sup> Critical cases were presumed to experience 45

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<sup>79</sup> These calculations were conducted at the industry level, per Table 2.2, so minor differences relative to scaling the total number of affected workers as a whole may occur due to rounding.

<sup>80</sup> How COVID-19 is reflected in the SOII data, <https://www.bls.gov/iif/how-covid-19-is-reflected-in-the-soii-data.htm> (as of April 29, 2022)

<sup>81</sup> Symptom prevalence, duration, and risk of hospital admission in individuals infected with SARS-CoV-2 during periods of omicron and delta variant dominance: a prospective observational study from the ZOE COVID Study, available at [https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(22\)00327-0/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(22)00327-0/fulltext) (accessed April 29, 2022).

<sup>82</sup> Ohsfeldt, Robert L., et al. "Inpatient hospital costs for COVID-19 patients in the United States." *Advances in therapy* 38.11 (2021): 5557-5595.

days of absence, based on an assumption of 13 days lost in the near term, followed by one lost day per week over the next six months, based on the assumption that not all workers become ill at the start of the year. Fatalities are assumed to be replaced with a new worker, potentially drawn from the pool of unemployed workers. It is difficult to know how quickly workers will be replaced; many California industries, such as agriculture, health, and restaurants, have high rates of turnover. We conservatively do not include the small number of fatalities, biasing our estimates of benefits downward. However, Section 3.3 discuss a robustness check in which fatalities are priced at the same productivity loss as critical cases.

Table 3.3 lists the presumed absence durations. The productivity losses associated with severe cases is particularly uncertain, making the productivity benefits correspondingly uncertain. These more severe cases are less common, and DIR assumes the distribution of severity is identical across NAICS codes. The lost workdays presented in Table 3.3 are monetized by using the fully-loaded hourly labor cost of \$47.64 for California workers, as presented in Chapter 2.

**Table 3.3. Estimated Distribution of Case Severity and Associated Average Cost to Businesses**

Disease Severity	Assumed Annual Absence Duration	Monetized Productivity Losses
Asymptomatic	5 workdays	\$1,906
Mild	8 workdays	\$3,049
Severe	20 workdays	\$7,622
Critical	45 workdays	\$17,150
Fatal	-	-

### 3.2. Direct Benefits

Like costs, direct benefits to businesses and workers accrue from multiple aspects of the proposed regulation:

- Injury and Illness Prevention Plan
- Testing close contacts
- Exclusion of COVID-19 cases
- Face coverings
- Respirators
- Ventilation
- Reporting and recordkeeping
- Managing outbreaks
  - Testing
  - Ventilation
  - HEPA filters
  - Face coverings
  - Respirators
  - Review of COVID-19 policies
- COVID-19 prevention in employer-provided housing
  - Ventilation
  - HEPA units
  - Face coverings
- COVID-19 prevention in employer-provided transportation

The assumptions and benefit estimates for each provision are presented in the following sections.

In general, the number of cases averted by these interventions is highly dependent on context. The efficacies of a single measure in preventing transmission depend on a range of factors characterizing the COVID-19 disease variant, including disease transmissibility and progression rates, if/when symptoms manifest, and on the sensitivity and specificity of the range of available testing, including PCR and antigen tests. Moreover, community-level epidemiological indicators such as the current prevalence and the overall immunity level (both naturally acquired by past infections and by vaccination) determine the actual effectiveness of these measures when combined under different conditions. It is thus not possible to perfectly forecast how many cases will be avoided under the proposed regulation. Still, there is a robust literature investigating the effectiveness of specific interventions in specific scenarios, and that literature is used to inform these estimates wherever possible.

### 3.2.1 Injury and Illness Prevention Plan

As noted in Chapter 2, Subsection 3205(c) requires employers to establish, implement, and maintain an effective written Injury and Illness Prevention Plan (IIPP) that addresses COVID-19 as workplace hazard. The effectiveness and benefits of the IIPP are likely to be associated with the provisions described below. While the IIPP is important for planning and implementation of measures to provide safe working conditions, DIR does not attribute any additional benefits to the IIPP separate from those described in the provisions below.

### 3.2.2 Testing close contacts

As noted in Chapter 2, Subsection 3205(d) requires testing of close contacts. DIR assumes each case among covered workers has 4.5 close contacts, for a total of 2,518,352 close contacts in the primary estimate. Of these close contacts, DIR assumes that 7 percent will become infected with COVID-19. Miao and Zhang (2022) found “the infection risk (one-hour close contact with an infected person) of COVID-19 of students, workers, and non-workers/non-students was 3.1%, 8.7%, and 13.6%, respectively.”<sup>83</sup> However, this study is based in China rather than the United States. Nowotny et al (2021) conducted a study of infections in U.S. prisons relative to the general population, and found that “The rolling 7-day average case rates for prison staff, prison population, and general population on January 15, 2021 were 196.04 per 1000 (95%CI 194.81, 197.26), 219.16 (95%CI 218.45, 219.86), and 69.80 (95%CI 69.78, 69.83), respectively.”<sup>84</sup> Based on these studies, DIR assumes that, on average, 7 percent of close contacts lead to infections at the community level.

As discussed in Chapter 2, DIR assumes that of those infected with COVID-19, 35.1 percent will be asymptomatic. DIR further assumes that without the requirement to test close contacts, these asymptomatic cases would return to the workplace, and would each have 4.5 close contacts among covered employees during their infectious period, of whom 7 percent will become infected in turn. DIR conservatively does not calculate the further infections associated with these secondary infections, given the speculative nature of the rate of spread and the prevalence of businesses with a small number

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<sup>83</sup> Buildings | Free Full-Text | Human Close Contact Behavior-Based Interventions for COVID-19 Transmission (mdpi.com), available at <https://www.mdpi.com/2075-5309/12/3/365> (accessed April 28, 2022).

<sup>84</sup> Risk of COVID-19 infection among prison staff in the United States | BMC Public Health | Full Text (biomedcentral.com), available at <https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-021-11077-0> (accessed April 28, 2022).



of employees. This results in an additional 19,491 cases, in the primary estimate, that DIR assumes would not have occurred under the proposed regulation.

Under the assumptions about the distribution of severity and the associated costs, this section of the proposed regulation avoids approximately \$59 million in productivity losses and approximately \$6.8 million in lost wages under the primary estimate, and approximately \$236 million in productivity losses and \$59 million in lost wages under the high-end estimate. This section of the proposed regulation also avoids approximately \$1.9 billion in WTP losses under the primary estimate, or approximately \$7.5 billion under the high-end estimate.

### 3.2.3 Exclusion of and Protective Measures for COVID-19 cases

In addition to testing helping to avoid asymptomatic close contacts infecting secondary workers, benefits also accrue from the exclusion of positive cases preventing initial close contacts from becoming ill in the first place. As discussed in Chapter 2, the exclusion of positive cases is already required in the no regulatory action baseline, but DIR attributes two days of exclusion of asymptomatic cases from the workplace to the proposed regulation. DIR assumes infections among the 4.5 close contacts of these 196,431 asymptomatic carriers would be prevented under the exclusion and protective measures of the proposed regulation. Under the assumption that 7 percent of close contacts contract COVID-19, this corresponds to 61,876 avoided cases.

Under the assumptions about the distribution of severity and the associated costs, this section of the proposed regulation avoids approximately \$187 million in productivity losses and approximately \$47 million in lost wages under the primary estimate, and approximately \$749 million in productivity losses and \$187 million in lost wages under the high-end estimate. This section of the proposed regulation also avoids approximately \$6.2 billion in WTP losses under the primary estimate, or approximately \$24.9 billion under the high-end estimate.

### 3.2.4 Exclusion of and Protective Measures for Close Contacts

As noted in Chapter 2, Subsection 3205(c)(5)(B) requires employers to develop, implement, and maintain effective policies to prevent transmission of COVID-19 by persons who had close contacts. Employees who tested positive after close contact with an infected individual would be required to follow exclusion and other protective requirements in subsection 3205(c)(5)(A); these benefits are already accounted for under exclusion of and protective measures for COVID-19 cases. This section considers the benefits associated with the provision of face coverings for close contacts in non-high-risk settings for a total of 10 days. DIR assumes each initial COVID-19 case has 4.5 close contacts, and 7 percent of initial close contacts become infected with COVID-19, each of which has 4.5 second-order close contacts, of whom 7 percent become infected with COVID-19. The filtration efficiency of masks varies widely depending on design and materials.<sup>85, 86</sup> Twill fabrics can have filtration efficiencies of 20 to 40 percent, while masks that use N95 base fabric can have filtration efficiencies of 90 percent or more depending on particle mobility diameter. The proposed regulation does not require surgical masks or high-filtration fabrics, and workers are likely to make use of different mask types depending on

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<sup>85</sup> Zangmeister, Christopher D., et al. "Filtration efficiencies of nanoscale aerosol by cloth mask materials used to slow the spread of SARS-CoV-2." *ACS nano* 14.7 (2020): 9188-9200.

<sup>86</sup> Konda, A., Prakash, A., Moss, G.A., Schmoldt, M., Grant, G.D., Guha, S., 2020. Aerosol Filtration Efficiency of Common Fabrics Used in Respiratory Cloth Masks. *ACS Nano* 14, 6339–6347. <https://doi.org/10.1021/acsnano.0c03252>

availability and preferences. Given the high variability in the effectiveness of face coverings, DIR assumes that the face covering requirement for close contacts in the proposed regulation reduces infections among second-order close contacts by 45 percent. As a result, DIR attributes 5,309 avoided COVID-19 cases among second-order close contacts to the proposed regulation.

Under the assumptions about the distribution of severity and the associated costs, this section of the proposed regulation avoids approximately \$16 million in productivity losses and approximately \$4 million in lost wages under the primary estimate, and approximately \$64 million in productivity losses and \$16 million in lost wages under the high-end estimate. This section of the proposed regulation also avoids approximately \$514 million in WTP losses under the primary estimate, or approximately \$2.1 billion under the high-end estimate.

Further, as noted in Chapter 2, Subsection 3205(c)(5)(B) requires employers to exclude close contacts in high-risk settings for five days and providing face coverings for 10 days after last close contact. DIR assumes that asymptomatic cases among covered high-risk workers would each have 4.5 close contacts, for a total 110,676 close contacts in high-risk settings in the primary estimate. Of these, DIR assumes that seven percent would be COVID-19 positive and 35.1 percent of those would have been asymptomatic and hence may have returned to the office while contagious. As discussed in Chapter 2, because section 3203 already requires employers to manage such risks in high-risk settings, DIR only attributes 40 percent of these benefits to the proposed regulation. As a result, DIR attributes 343 avoided cases amongst high-risk workers to this exclusion requirement.

Under the assumptions about the distribution of severity and the associated costs, this section of the proposed regulation avoids approximately \$1 million in productivity losses and approximately \$0.26 million in lost wages under the primary estimate, and approximately \$4 million in productivity losses and \$1 million in lost wages under the high-end estimate. This section of the proposed regulation also avoids approximately \$33 million in WTP losses under the primary estimate, or approximately \$133 million under the high-end estimate.

### 3.2.5 Face coverings

As noted in Chapter 2, Subsection 3205(f) allows face covering requirements already mandated by a CDPH public health order to be enforced by Cal/OSHA. Because this is a performance standard and does not mandate specific compliance actions, there are assumed to be no associated costs or benefits.

### 3.2.6 Respirators

As noted in Chapter 2, Subsection 3205(g) requires employers to provide respirators to employees that request them. DIR assumes that five percent of employees will request respirators from their employers during local upswings in cases, and that these employees would be wearing masks in the no regulatory action baseline. Respirators have been measured to block 30 to 60 percent more respiratory aerosols than masks (Konda et al., 2020). DIR assumes that the provision of respirators reduces the annual transmission rate of employees who use them (.045 percent in the primary estimate and 0.180 percent in the high-end estimate) by 50 percent. As a result, DIR calculates that Subsection 3205(g) of the proposed regulation will avoid 13,991 cases in the primary estimate.

Under the assumptions about the distribution of severity and the associated costs, this section of the proposed regulation avoids approximately \$42 million in productivity losses and approximately \$10 million in lost wages under the primary estimate, and approximately \$169 million in productivity losses

and \$42 million in lost wages under the high-end estimate. This section of the proposed regulation also avoids approximately \$1.4 billion in WTP losses under the primary estimate, or approximately \$5.4 billion under the high-end estimate.

### 3.2.7 Ventilation

As noted in Chapter 2, Subsection 3205(h) requires employers with indoor workplaces to review specified guidance on ventilation measures. Because this is a performance standard and does not mandate specific compliance actions, there are assumed to be no associated costs or benefits. Establishments that had a previous outbreak must continue to implement ventilation protections; DIR assumes those benefits are captured within the benefits attributed to requirements regarding outbreaks.

### 3.2.8 Aerosolizing procedures

As noted in Chapter 2, this requirement mainly applies to dental offices that meet the requirements necessary to be exempt from 5199. It alerts those employers to the fact that they may need to undertake compliance actions under existing section 5144. However, it is assumed to have no benefits because it does not change or expand existing law.

### 3.2.9 Reporting and recordkeeping

As noted in Chapter 2, Subsection 3205(c)(4) requires employers to report potential COVID-19 exposures to local public health agencies, and clarifies requirements in existing section 3203(a) by stating that employers must conduct effective investigations into COVID-19 illnesses in the workplace and encourage employees with COVID-19 symptoms to stay home to ensure employee compliance with safe and healthy work practices.

The benefits of reporting and recordkeeping are likely to be associated with the other provisions described in this section. While the reporting and recordkeeping is important for designing and implementation of measures to provide safe working conditions, DIR does not attribute any additional benefits to this requirement separate from those described other provisions.

### 3.2.10 Managing outbreaks

Chapter 2 described the compliance actions employers must undertake during outbreaks in the workplace; these include additional requirements regarding testing, ventilation, HEPA filters, face coverings, respirators, and review of COVID-19 policies. While some literature is available on the implications of each of these factors in isolation and in some cases in combinations, DIR is not aware of studies that examine the protective advantages of employing all of these protections simultaneously.

For example, a numerical investigation of aerosol transport in a classroom setting found that open windows increased the fraction of particles that exit the system by 38 percent compared to the case with closed windows (Abuhegazy et al., 2020). Proper placement of portable HEPA purifiers effectively reduces exposure to infectious aerosols, especially when combined with ventilation and universal masking (Wang et al., n.d.). The use of air cleaners without masks reduces exposure of the receivers by up to 65 percent (range 50 to 65). When used together, the HEPA air cleaners and masks reduced exposure to respiratory aerosols by up to 90 percent (range 83 to 90) (Lindsley, 2021). However, no literature is available on the potential impacts of simultaneously increasing use of testing, ventilation, HEPA filters, face coverings, and respirators.

As such, DIR more generally illustrates the potential benefits of the proposed regulation by estimating the benefits associated with a reduction in outbreaks. As described in Chapter 2, DIR estimated there would be 7,586 (primary estimate) to 13,034 (high-end estimate) outbreaks in 2023 in the *no regulatory action* baseline, with 10 percent of these outbreaks being major outbreaks. DIR assumes that, like other close contacts, seven percent of those tested would be positive. DIR also assumes that under the proposed regulatory action half of the major outbreaks would be reduced to minor outbreaks, in addition to the impacts of the other regulatory actions described in this section. This would result in 3,192 fewer cases in the primary estimate.

Under the assumptions about the distribution of severity and the associated costs, this section of the proposed regulation avoids approximately \$9.7 million in productivity losses and approximately \$2.4 million in lost wages under the primary estimate, and approximately \$16.6 million in productivity losses and \$4.2 million in lost wages under the high-end estimate. This section of the proposed regulation also avoids approximately \$309 million in WTP losses under the primary estimate, or approximately \$532 million under the high-end estimate.

### 3.2.11 COVID-19 prevention in employer-provided housing

As discussed in Chapter 2, Subsection 3205(c)(5)(A) requires employers to exclude workers with COVID-19 from the workplace for a prescribed number of days, consistent with current CDPH guidance. Employers must maximize the quantity and supply of outdoor air (a minimal cost) and increase filtration efficiency to the highest level compatible with the existing ventilation system. If there is not a MERV-13 or higher filter in use, portable or mounted HEPA filtration units must be used, to the extent feasible, in sleeping areas. DIR assumed that 90 percent of employer-provided structures have an HVAC system. Of these, DIR also assumed that only 20 percent are using MERV-13 or higher filters. Further, employers must provide face coverings in employer-provided housing, but there is no mandate that they be worn. DIR assumed that about 10 percent of employees in employer-provided housing will take advantage of the provided face coverings.

Proper placement of portable HEPA purifiers effectively reduces exposure to infectious aerosols, especially when combined with ventilation and universal masking (Wang et al., n.d.). The use of air cleaners without masks reduces exposure of the receivers by up to 65 percent (range 50 to 65). When used together, the HEPA air cleaners and masks reduced exposure to respiratory aerosols by up to 90 percent (range 83 to 90) (Lindsley, 2021). DIR assumes the introduction of air filters reduces the transmission rate by 58 percent, and that the introduction of both air filters and masks reduces the transmission rate by 87 percent. Benefits of exclusion related to employer-provided housing are assumed to already be captured by other sections.

These assumptions would result in 509 fewer cases; this estimate is applied to both the primary estimate and the high-end estimate.

Under the assumptions about the distribution of severity and the associated costs, this section of the proposed regulation avoids approximately \$1.5 million in productivity losses, approximately \$0.39 million in lost wages, and approximately \$49.3 million in WTP losses.

### 3.2.12 COVID-19 prevention in employer-provided transportation

Employers are required to maximize the supply of outside air in vehicles to the extent feasible, with some exceptions, however this only requires lowering the windows when feasible to do so. Cohorts are

required to travel together, but DIR assumes close contacts in employer-provided transportation are already captured in other discussions of close contacts. Therefore, DIR assumes that any benefits for COVID-19 prevention related to employer-provided transportation are already captured within other elements of this subsection.

### 3.3 Summary of Direct Benefits in 2023

DIR estimated the proposed regulation would result in avoiding approximately 105,000 to 410,000 COVID-19 cases, including approximately 640 to 2,500 COVID-19 fatalities per year. Based on the efficacy of the various safety and health preventative measures included in the proposed regulation, DIR estimated that approximately 18 to 19 percent of COVID-19 cases would be avoided each year due to the proposed regulation. As described above, benefits accrue to businesses and individuals through a combination of preventative measures, for example, updating an establishment’s IIPP may help employers identify hazards that may be mitigated through improved ventilation and offer face covering or respirators, when requested, or during spikes in transmission rates. These benefits are calculated for specific provisions (rather than across all provisions) to avoid double-counting and to recognize that the combination of individual preventative measures (when used together) will further improve the efficacy of interventions and reduce the risk of COVID-19 transmission, but the efficacy rates for individual measures are not directly additive. For example, if face coverings can reduce the risk of transmission by 30 percent and ventilation measures can reduce the risk of transmission by 30 percent, the combined efficacy is not necessarily 60 percent. Table 3.4 reports the number and monetized value of COVID-19 cases avoided each year, by severity, based on the assumptions in this SRIA.

**Table 3.4 Number of COVID-19 Cases Avoided Due to the Proposed Regulation**

Disease Severity	Primary Estimate			High-end Estimate		
	Number of COVID-19 Cases in Baseline	Number of COVID-19 Cases Avoided due to Proposed Regulation	Monetized Benefits of Avoided COVID-19 Cases	Number of COVID-19 Cases in Baseline	Number of COVID-19 Cases Avoided due to Proposed Regulation	Monetized Benefits of Avoided COVID-19 Cases
Asymptomatic	196,431	36,753	\$87.5	785,726	143,925	\$342.8
Mild	325,582	60,918	\$589.0	1,302,330	238,554	\$2,306.6
Severe	27,360	5,119	\$116.0	109,439	20,047	\$454.2
Critical	6,840	1,280	\$2,354.1	27,360	5,012	\$9,218.6
Fatal	3,420	640	\$7,367.8	13,680	2,506	\$28,852.0
<b>Total</b>	<b>559,634</b>	<b>104,710</b>	<b>\$10,514.4</b>	<b>2,238,535</b>	<b>410,043</b>	<b>\$41,174.3</b>

Note: Totals may not sum due to rounding.

Table 3.5 summarizes the total direct benefits in the first year of the proposed regulation.

**Table 3.5 Summary of Direct Benefits in 2023**

	Total Direct Benefits in 2023 (\$ Millions)	
	Primary Estimate	High-end Estimate
Monetized Avoided Productivity Loss	\$316.7	\$1,240.4
Avoided Lost Wages	\$79.2	\$310.1
Monetized Avoided WTP	\$10,118.5	\$39,623.8
<b>Total Direct Benefits</b>	<b>\$10,514.4</b>	<b>\$41,174.3</b>

In section 3.1.2.1, this SRIA conservatively excluded avoided fatalities from estimates of productivity losses. Costing fatalities' productivity losses at the same value as critical cases slightly increases but does not significantly affect the estimated total direct benefits.

### 3.4 Summary of Direct Benefits in 2024

As discussed in Chapter 2, modeled estimates of future COVID-19 infection rates are highly speculative and specific projections have not been made for 2024. Similar to the treatment of costs, DIR estimated a potential range of benefit estimates for 2024 under two alternative scenarios: (1) assuming the same annual number of cases as 2023 and (2) assuming a 50 percent reduction in all COVID-19 infections and outbreaks.<sup>87</sup> These should not be interpreted as actual projections as they are not based on any set of models or expert opinion. Table 3.6 reports the direct benefits of the proposed regulation.

**Table 3.6 Summary of Direct Benefits in 2024**

	Scenario 1: Total Direct Benefits in 2024 (\$ Millions)		Scenario 1: Total Direct Benefits in 2024 (\$ Millions)	
	Primary Estimate	High-end Estimate	Primary Estimate	High-end Estimate
Monetized Avoided Productivity Loss	\$316.7	\$1,240.4	\$180.3	\$705.6
Avoided Lost Wages	\$79.2	\$310.1	\$45.1	\$176.4
Monetized Avoided WTP	\$10,118.5	\$39,623.8	\$5,760.0	\$22,540.5
<b>Total Direct Benefits</b>	<b>\$10,514.4</b>	<b>\$41,174.3</b>	<b>\$5,985.2</b>	<b>\$23,422.5</b>

### 3.5 Summary of Direct Benefits

Table 3.7 summarizes the total direct benefits of the proposed regulation (measured in 2021 dollars). Benefits incurred after the first year of the implementation of the proposed regulation are calculated using a discount rate of three percent. The NPV total is the sum of the discounted stream of benefits over time. The annualized value represents the average annual benefits of the proposed regulation.

**Table 3.7 Summary of Direct Benefits of the Proposed Regulation, using a 3 Percent Discount Rate**

	Direct Benefits (\$ Billions)	
	Primary Estimate	High-end Estimate
2023	\$10.5	\$41.2
2024	\$5.8 to \$10.2	\$22.7 to \$40.0
NPV Total	\$16.3 to \$20.7	\$63.9 to \$81.1
Annualized	\$8.3 to \$10.5	\$32.4 to \$41.2

<sup>87</sup> See Tables 2.2 and 2.4

## 4. Fiscal Impacts

This chapter summarizes the costs and benefits to state and local government entities due to the proposed regulation. More than 30,000 state and local government entities may be impacted—these comprise approximately two percent of all establishments affected by the proposed regulation. However, there are nearly 1.8 million state and local government employees, approximately 14 percent of the California workforce, covered by the proposed regulation.

Cal/OSHA may also incur costs related to enforcement of the proposed regulation. However, the number and length of inspections that Cal/OSHA must conduct related to COVID-19 hazards will vary based on the number of COVID-19 infections—and not necessarily due to the proposed regulatory action. Cal/OSHA safety inspectors have conducted numerous site visits and COVID-19 hazards inspections since the start of the pandemic, both under existing authorities prior to the COVID-19 ETS and since then.

Finally, state and local governments may experience additional impacts due to changes in income and sales taxes revenues as well as cost savings from potentially avoidable COVID-19 infections among public employees.

### 4.1 Fiscal Impacts to State Government

Based on information from the California EDD’s QCEW, there are approximately 13,600 state government establishments and more than 360,000 state employees covered by the proposed regulation. Table 4.1 reports the direct costs to state government entities in the first year of the proposed regulation by two-digit NAICS code. The direct costs to state government entities in 2024 are anticipated to be similar to the costs in 2023 if COVID-19 infection rates remain the same; they will be marginally smaller because upfront costs accounting for less than 5 percent of the total costs will not be incurred again. In the second notional scenario given in this SRIA, the direct costs to state government entities would decrease by approximately half in 2024 if COVID-19 infection rates fell by 50 percent.

**Table 4.1 Summary of Direct Costs for State Government Entities by NAICS Code**

NAICS	Description	State Government		Direct Costs in 2023 (\$ Millions)	
		Establishments	Covered Employees	Primary Estimate	High-end Estimate
51	Information	21	96	<\$0.1	<\$0.1
54	Professional and Technical Services	96	3,483	<\$0.1	\$0.3
56	Administrative and Waste Services	31	930	<\$0.1	<\$0.1
61	Educational Services	3,598	213,142	\$6.1	\$19.1
62	Health Care and Social Assistance	1,053	8,729	\$0.7	\$2.5
71	Arts, Entertainment, and Recreation	25	480	<\$0.1	<\$0.1
92	Public Administration	8,789	134,341	\$9.1	\$27.5
	<b>TOTAL</b>	<b>13,613</b>	<b>361,201</b>	<b>\$16.1</b>	<b>\$49.5</b>

Note: Totals may not sum due to rounding.



## 4.2 Fiscal Impacts to Local Governments

Based on information from the California EDD’s QCEW, there are approximately 19,200 local government establishments and more than 1.4 million local employees covered by the proposed regulation. Table 4.2 reports the direct costs to local government entities in the first year of the proposed regulation by two-digit NAICS code. The direct costs to local government entities in 2024 are anticipated to be similar to the costs in 2023 if COVID-19 infection rates remain the same; they will be marginally smaller because upfront costs accounting for less than five percent of the total costs will not be incurred again. In the second notional scenario given in this SRIA, the direct costs to local government entities would decrease by approximately half in 2024 if COVID-19 infection rates fell by 50 percent.

**Table 4.2 Summary of Direct Costs for Local Government Entities by NAICS Code**

NAICS	Description	State Government		Direct Costs in 2023 (\$ Millions)	
		Establishments	Covered Employees	Primary Estimate	High-end Estimate
11	Agriculture, Forestry, Fishing and Hunting	7	79	<\$0.1	<\$0.1
22	Utilities	702	38,438	\$1.0	\$3.2
23	Construction	106	8,769	\$0.2	\$0.7
44-45	Retail Trade	11	253	<\$0.1	<\$0.1
48-49	Transportation and Warehousing	440	46,100	\$1.0	\$3.6
51	Information	188	8,334	\$0.2	\$0.7
52	Finance and Insurance	29	1,955	<\$0.1	\$0.2
53	Real Estate and Rental and Leasing	63	1,379	<\$0.1	\$0.1
54	Professional and Technical Services	66	873	<\$0.1	<\$0.1
56	Administrative and Waste Services	116	3,136	<\$0.1	\$0.2
61	Educational Services	14,192	843,728	\$24.3	\$75.6
62	Health Care and Social Assistance	406	22,819	\$1.6	\$6.3
71	Arts, Entertainment, and Recreation	304	34,590	\$0.7	\$2.7
72	Accommodation and Food Services	136	22,048	\$0.5	\$1.7
81	Other Services, excluding Public Administration	257	3,320	<\$0.1	\$0.3
92	Public Administration	2,224	297,128	\$13.6	\$50.5
	<b>TOTAL</b>	<b>19,247</b>	<b>1,332,950</b>	<b>\$43.4</b>	<b>\$145.9</b>

Note: Totals may not sum due to rounding.

## 4.3 DIR Enforcement

Cal/OSHA staff have been enforcing occupational COVID-19 prevention requirements since February 2020. Cal/OSHA has issued guidance and conducted outreach to warn employers that COVID-19 is a workplace hazard under section 3203. Furthermore, Cal/OSHA staff are currently issuing citations to employers related to COVID-19 hazards based on section 3203. Therefore, while DIR assumed that the



number and relative complexity and length of investigations would vary significantly with COVID-19 transmission rates, it did not anticipate that the level of enforcement activities would change relative to the *no regulatory action* baseline. The agency may realize a cost savings if the proposed regulation effectively reduces transmission rates in the workplace, decreasing the number of complaints that the agency receives and the number of investigations it conducts due to the pandemic.

#### 4.4 Revenue Impacts

Under the proposed regulation businesses are anticipated to increase spending on ventilation and air purification equipment (e.g., MERV-13 or higher rated filters for HVAC systems, HEPA filters) and medical supplies (e.g., surgical masks and respirations). This increase in spending may result in higher revenue for state and local governments because equipment purchased or imported in California will incur a sales tax on top of the purchase price. However, we do not know whether or how spending associated with meeting regulatory requirements will affect other business spending. If businesses financed these expenses by reducing other spending categories that would offset potential increases in sales tax revenue.

In addition, requirements for testing and exclusion of COVID-19 cases and close contacts, will result in business losses due to decreased productivity (i.e., fewer hours worked) and labor income losses due to lost wages during exclusion periods that are not covered by paid sick leave. In general, these losses will be more than offset by gains to businesses and individuals due to reduced COVID-19 transmission rates in workplace settings as a result of the proposed regulation. Since fewer workers will become ill relative to the *no regulatory action* baseline, overall final demand will increase due to fewer worker absences, fewer outbreaks due to COVID-19, and fewer business closures due to staffing shortages, for example.

DIR conducted a macroeconomic analysis using IMPLAN (see discussion in Chapter 5). IMPLAN's fiscal analysis captures all tax revenue in the state across all levels of government for the specific industries and institutions impacted by the proposed regulation. Data are aggregated at a combined state and local level of government; more detailed (e.g., county-level) information is unavailable.

For the primary estimates reported in this SRIA, DIR estimated the total impact on state and local sales tax revenues to be approximately \$1.68 million and the total impact on state and local income tax revenues to be approximately \$0.34 million in 2023. For the high-end estimates reported in this SRIA, DIR estimated the total impact on state and local sales tax revenues to be approximately \$12.3 million and the total impact on state and local income tax revenues to be approximately \$3.3 million in 2023.

The combined state and local tax revenues are anticipated to be similar in 2024 if COVID-19 transmission rates remain the same as 2023 but would decrease by approximately half if COVID-19 transmission rates fall by 50 percent, as described in Scenario 2 for the direct cost and benefit estimates.

#### 4.5 Cost Savings to State and Local Entities

The number of state and local employees that may avoid a mild, severe, critical, or fatal COVID-19 infection due to the proposed regulation is highly uncertain. DIR estimated nearly 1.8 million state and local employees, approximately 14 percent of all affected employees in California, are covered by the proposed regulation. To the extent that the proposed regulation improves the safety and health of public employees – resulting in fewer COVID-19 infections, hospitalizations, and fatalities – the proposed regulation would result in a significant cost savings for public entities. Given that many state and local employers are likely to be following existing public health orders and recommendations, the benefits to

public employees may be smaller relative to the benefits to employees of privately-owned businesses. However, DIR notes that the largest share of local government employees are in public education, which has accounted for one-third of all COVID-19 outbreaks that are not covered by 5199. DIR estimated the proposed regulation would result in avoiding approximately 105,000 to 410,000 COVID-19 cases and 600 to 2,500 COVID-19 fatalities per year. If the benefits of the proposed regulation were distributed proportional to employment between the private and public sectors, as many as 15,000 to 57,000 COVID-19 cases and 90 to 350 COVID-19 deaths of state and local employees could be avoided each year. This level of benefits would yield \$40 million to \$170 million in avoided productivity losses to state and local governments.

## 5. Macroeconomic Impacts

This chapter summarizes the macroeconomic impacts of the proposed regulation on the California economy. The proposed regulation will result in changes in business expenditures, labor productivity (i.e., hours worked), and income earned by employees. These changes will affect employment, investment, and output for businesses that provide goods and services to other businesses directly impacted by the proposed regulation. These impacts will also result in induced effects, such as changes in personal income that affect consumer spending. DIR estimated the incremental macroeconomic impacts relative to the no regulatory action baseline in the first twelve months of the proposed regulation. DIR also estimated a potential range of estimates for the final year of the regulation.

### 5.1 Methodology

DIR conducted a macroeconomic analysis to assess the statewide impacts of the proposed regulation. The analysis was conducted in three steps: (1) creating a list of accounts to represent the industries and households in California and their respective economic activities, (2) distributing the direct economic impacts estimated in this SRIA across all accounts using relative weights, and (3) entering the direct impacts as a “shock” (i.e., input) to the state economy through an input-output (I-O) model, i.e., IMPLAN, to estimate the direct, indirect, and induced economic impacts.

IMPLAN is an I-O model, a virtual representation of the U.S. economy, built around the concept of social accounting matrices (SAM) that is used to assess regional economic impacts.<sup>88</sup> I-O models represent the linkages or interactions between sectors of the economy, capturing the flow of goods and services among industries and to consumers. For any industry to fulfill the demand for its goods and services with production outputs, it needs labor and the outputs of their suppliers as inputs, generating further and indirect demand both up the supply chain and in the labor market. I-O tables map the interdependent relationships between industries by tracking the flow of money and commodities in all such transactions using secondary data from multiple government agencies including the Bureau of Labor Statistics (BLS) and the Bureau of Economic Analysis (BEA). I-O tables are based on the methods developed by Wassily Leontief in the late 1930s for which he received the Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel in 1973.<sup>89</sup>

IMPLAN and other I-O models have been widely used in industry and academia, as well as in other California SRIAs, to estimate the total impact of any shock (e.g., private investment, fiscal spending) to a state or regional economy. Such effects are measured by changes in the number of jobs, value added (GDP), and tax revenue. Due to the linkages across the economy, a one-dollar increase in output in one sector can have more than a one-dollar impact on the overall economy, a concept commonly referred to as the multiplier effect. This modeling framework allows for a relatively simple analysis of economic impacts for a wide variety of policy changes.

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<sup>88</sup> French, Tim, *What is IMPLAN?*, website, last updated August 13, 2018, accessed at <https://blog.implan.com/what-is-implan> on April 21, 2022.

<sup>89</sup> Leontief, Wassily W. (1936). Quantitative input and output relations in the economic systems of the United States. *The review of economic statistics*, 105-125. Leontief, Wassily W. (1941). *The structure of the American economy, 1919-1929*, 1st edition, Harvard University Press: Cambridge, MA. Miller, R. E., & Blair, P. D. (2009). *Input-output analysis: foundations and extensions*. Cambridge University Press.

I-O models analyze how changes in final demand ripple throughout the economy via direct, indirect, and induced effects. Direct economic effects are the changes in expenditures and production that result from the initial purchases and changes made to comply with the proposed regulation. Indirect effects capture the changes in expenditures and production caused in turn by the direct effects, such as the business-to-business transactions that result from the supply chain effects of initial expenditures made to comply with the proposed regulation. Finally, induced effects are the household purchases as a result of changes in wages, after removal of taxes, savings, and commuter income.<sup>90</sup>

## 5.2 Limitations

I-O models provide a virtual representation of a regional economy that relies on built-in assumptions to simplify a set of complex economic interdependencies and interactions. These assumptions result in limitations that are acknowledged below:

- **Static Relationships:** The interdependent relationships between industries are static, providing only a snapshot of the economy in the year captured by the dataset. Furthermore, IMPLAN does not account for price elasticity—the prices of goods and services are not affected by shocks to the economy, e.g., sudden labor shortages.
- **Linearity:** The relationships between industries and institutions in IMPLAN are linear. Therefore, IMPLAN’s estimation of economic outputs assumes constant returns to scale. For example, a private investment that is ten times as large as an otherwise identical investment will generate exactly ten times the economic impact. In reality, such impacts are rarely linear.
- **Timing of Impacts:** IMPLAN does not specify when impacts will be realized. However, timing factors into IMPLAN analysis regarding changes in the dollar value of impacts due to inflation and other changes in commodity prices.
- **Geographic Granularity:** IMPLAN does not identify the location of economic impacts within the defined economic region.
- **Limited Tracking:** There are limitations to how far IMPLAN tracks the flow and circulation of money in the economy. Once money flows into certain accounts, it is considered “lost” to the economy and cannot generate additional economic activities. Such accounts include income tax, sales tax, and retained earnings (i.e., savings) that may be saved in one year and spent in subsequent years.

## 5.3 Modeling Approach

DIR relied on the 2018 IMPLAN dataset for the state of California. Note that the estimates are based on a snapshot in time, in this case reflecting economic conditions in 2018, before COVID-19 significantly transformed the California and U.S. economy. While this may be a limitation for the reliability of the estimates because the linkages in the economy in 2018 may look different in 2023, it is highly uncertain whether 2020 or 2021 data would more appropriately reflect economic conditions in 2023 because

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<sup>90</sup> Demski, Joe, *Understanding IMPLAN: Direct, Indirect, and Induced Effects*, June 18, 2020, accessed at <https://blog.implan.com/understanding-implan-effects> on April 21, 2022.

there were widespread business closures and other economic disruptions (e.g., labor shortages) in 2020 and 2021 that may be much less likely to occur in 2023.

### 5.3.1 Creating Accounts for Affected Industries

IMPLAN’s industry classification system is used to construct accounts for affected industries. Businesses establishments, including government entities, are assigned to 546 industry sectors based on NAICS codes. In this SRIA, economic impacts are aggregated into twenty 2-digit NAICS codes, each with its own account. A “conversion bridge” between IMPLAN sectors and industry NAICS codes is provided by IMPLAN and used to determine which industries are associated with each account. Direct costs and benefits to individuals (i.e., impacts to labor income) are modeled using the same account-based method.

### 5.3.2 Distributing Direct Economic Impacts Across All Accounts

DIR estimated three broad categories of direct costs and benefits associated with compliance actions generated by the proposed regulation. Table 5.1 summarizes the types of economic impacts included in the macroeconomic analysis. The distribution of direct costs and benefits across accounts is based on a set of weights derived from the size of the underlying industries measured in terms of employment.

**Table 5.1 Categories of Benefits included in Macroeconomic Analysis**

Category	Capital expenditures	Business Productivity	Labor Income
<b>Direct Costs</b>	The loss of company profits due to the cost of inputs (i.e., production materials and paid activities to suppliers); this does not result in direct, indirect, or induced effects	The opportunity cost of employee and management compliance actions (e.g., testing, recordkeeping, review of policies) that would otherwise be employed in productive activities	The perceived loss of employees’ wages/salaries and benefits during mandated exclusion periods in which asymptomatic employees are otherwise able to work that are not covered by paid sick leave
<b>Direct Benefits</b>	Economic activity generated by capital expenditures in the form of production of goods and services to fulfill the demand for personal protective equipment (PPE) and ventilation systems (e.g., face coverings, respirators, HVAC system filters, and HEPA filters)	The avoided losses associated with exclusion of COVID-19 cases and close contacts and actual illnesses (i.e., additional hours worked due to a decrease in transmission rates)	The perceived avoided losses of employees’ wages/salaries and benefits due to exclusion requirements or actual illnesses (i.e., additional labor income gained due to a decrease in transmission rates)

### 5.3.3 Calculating Total Economic Impact

To estimate total statewide economic impacts, direct costs and benefits are used as inputs to IMPLAN. In this SRIA, some of the direct impacts are opposing and offsetting—direct expenditures on PPE and ventilation systems, for example, have positive impacts on manufacturing activity in those industries, while business productivity and labor income losses are a drag on statewide economic activity. They are modeled in the same manner in IMPLAN, except for carrying positive and negative signs, respectively.

For direct costs to businesses, IMPLAN sectors (i.e., industries and services) are assigned based on the IMPLAN-to-NAICS conversion bridge to represent each industry account. Direct costs are assigned to

each account to calculate indirect and induced impacts. For direct costs to individuals, the loss of labor income and induced impacts are calculated using the same account-based method.

For all calculations, the key model parameters are set as follows:

- 1) **Local Purchase Percentage (LPP):** this represents the proportion of demand that is met locally (i.e., within the study region), generating impacts within California instead of being fulfilled by out-of-state imports. IMPLAN, by default, sets all industry LPPs to 100 percent, indicating that all impacts are applied within the state. For employment-related impacts (e.g., business productivity and employee income), default values are used. However, for capital expenditures, IMPLAN’s built-in regional purchasing coefficients, representing the proportion of total demand for each commodity used by California businesses supplied by local producers, are used.
- 2) **Full-time equivalent (FTE) jobs:** total employment impacts are measured as FTE jobs. The employment estimates report the results of IMPLAN modeling accounts for both full-time and part-time workers. To standardize this measure, IMPLAN defines one FTE as 2,080 hours, or the equivalent of one person working for a full year.
- 3) **Retail margin:** this reflects the markup to the price of a product when it sold through retail trade; it is calculated as sales receipts less the cost of goods sold. This parameter is set to the default value based on the underlying assumption that all materials and services are purchased by individual businesses directly from retail markets.

#### 5.4 Results of Macroeconomic Assessment

This section reports the results of the macroeconomic assessment. The proposed regulation will be enacted on January 1, 2023 and expire in two years. The macroeconomic impacts are reported for the first 12 months of the proposed regulation. Table 5.2 reports the direct effects of the regulation across the categories described above reflecting the direct costs and benefits summarized in Chapters 2 and 3.

**Table 5.2 Direct Economic Effects in 2023**

Input	Impact	Primary Estimate			High-end Estimate		
		Employment	Labor Income (\$ Millions)	Value Added (\$ Millions)	Employment	Labor Income (\$ Millions)	Value Added (\$ Millions)
Direct Costs	Business capital expenditures	--	--	--	--	--	--
	Business productivity losses	-4,237	--	-\$173.3	-14,176	--	-\$580.6
	Labor income losses	--	-\$53.8	--	N/A	-\$215.1	N/A
Direct Benefits	Demands generated from business capital expenditures	267	\$9.4	\$16.3	397	\$14.0	\$24.3
	Business productivity gains	3,430	--	\$166.9	13,431	--	\$653.4
	Labor income gains	--	\$77.7	--	--	\$304.3	--
<b>Net Direct Effects</b>		<b>-540</b>	<b>\$33.3</b>	<b>\$9.8</b>	<b>-348</b>	<b>\$103.2</b>	<b>\$97.1</b>

Note: Totals may not sum due to rounding.

Table 5.3 reports the overall macroeconomic impacts for California in 2023, including direct, indirect, and induced effects.

**Table 5.3 Macroeconomic Impacts of the Proposed Regulation in 2023**

Impact Type	Primary Estimate			High-end Estimate		
	Employment	Labor Income (\$ Millions)	Value Added (\$ Millions)	Employment	Labor Income (\$ Millions)	Value Added (\$ Millions)
Direct Effects	-540	\$33.3	\$9.8	-348	\$103.2	\$97.1
Indirect Effects	-84	-\$4.1	-\$7.8	361	\$29.6	\$56.5
Induced Effects	122	\$6.8	\$15.1	672	\$37.8	\$83.3
<b>Total</b>	<b>-502</b>	<b>\$36.1</b>	<b>\$17.1</b>	<b>685</b>	<b>\$170.6</b>	<b>\$236.7</b>

Note: Totals may not sum due to rounding.

Since COVID-19 projections are unavailable for 2024, this SRIA presents two notional scenarios of the potential macroeconomic impacts in the final year of the proposed regulation. In the first scenario, COVID-19 transmission rates remain the same as 2023 and the overall macroeconomic impacts will be similar to those reported in Tables 5.2 and 5.3, although the business productivity impacts will be approximately 10 to 20 percent lower as there were certain one-time, upfront costs incurred by businesses in 2023. In the second scenario COVID-19 transmission rates will be half as large as in 2023, thus the overall macroeconomic impacts will be approximately half the values reported in Tables 5.2 and 5.3.

#### 5.4.1 Impacts on Jobs in California

*A priori*, statewide employment impacts of the proposed regulation may be positive or negative due to countervailing macroeconomic impacts. Businesses will increase spending on PPE and ventilation equipment and services, which may cut into corporate profits but will increase final demand in other industries that supply materials and services to those businesses. However, local supply may not be able to meet the increase in demand for these products, and California businesses will import a large share of manufactured goods from other states, resulting in a smaller impact to jobs in the state. Other significant changes in final demand will result from both losses in business productivity due to time spent on compliance activities and worker absences due to requirements for testing and exclusion of COVID-19 cases and close contacts and losses in labor income due to workdays lost as a result of the requirements of the proposed regulation. These impacts will be offset by gains in business productivity and labor income due to reductions in COVID-19 transmission as a result of the proposed regulation (i.e., due to reductions in employee illnesses and absences and reductions in outbreaks), which will increase hours worked, benefitting business productivity and wages earned. The efficacy of the various safety and prevention measures will impact the reduction in COVID-19 transmission rates and reduction in the number of workdays lost due to illnesses, thus boosting the overall economy. A key limitation of this analysis is that it does not account for benefits associated with the avoided loss of workers due to COVID-19 deaths (see discussion in Chapter 3). That number is significantly higher than the employment impacts estimated here. Therefore, DIR estimated that there will be a temporary change in employment that may be either positive or negative depending on the rate of COVID-19 transmission and the number of workdays missed due to illness or mandated exclusion periods. The estimated magnitude of the impact to jobs ranges from a loss of approximately 500 jobs to a gain of approximately 690 jobs in the



first 12 months of the proposed regulation. In 2024, the estimated employment impacts range from a loss of approximately 250 to 500 jobs to a gain of approximately 340 to 680 jobs.

#### 5.4.2 Creation of New Businesses or the Elimination of Existing Businesses within the State

DIR does not anticipate the elimination of any existing businesses in California as a result of the proposed regulation. In contrast, reductions in COVID-19 transmission rates may reduce the number of infections, outbreaks, and temporary business closures due to employee illnesses. Furthermore, increases in business productivity and labor income due to avoided employee illnesses (and worker absences) may result in an increase in demand for suppliers of products and services to these industries. However, IMPLAN cannot directly estimate the creation or elimination of businesses within the state.

#### 5.4.3 Competitive Advantages or Disadvantages for California Businesses

The proposed regulation is unlikely to have a significant impact on competitive advantages or disadvantages for businesses operating in California. A recent study found that California was one of the safest states for COVID-19.<sup>91</sup> California has one of the highest vaccination rates in the country—more than 75 percent of the population aged 5 and up is fully vaccinated and another 8.9 percent of the population is partially vaccinated.<sup>92</sup> While the additional testing requirements and performance standards will add to the cost of doing business in California, the average cost to most businesses is relatively small and the anticipated reduction in workplace COVID-19 cases and outbreaks will likely more than offset this burden.

#### 5.4.4 Investment in the State

California businesses have already undertaken a number of preventative measures due to existing public health orders or as a conditioning of re-opening during the pandemic. The proposed regulation is likely to increase investment in ventilation systems by some businesses; however, these expenditures are likely to be relatively insignificant in comparison to the overall size of the California economy. The majority of indoor establishments in California have HVAC systems and would only need to upgrade to MERV-13 or higher rated filters. The proposed regulation will expire in two years, so it is unlikely to have a long-term impact on investment in the state; however, it is anticipated that a proposed regulation with the effect of reducing COVID-19 cases in California might increase investment in the short term, because this would make California a more reliable place to do business.

#### 5.4.5. Incentives for Innovation in Products, Materials, or Processes

The proposed regulation provides an incentive for employers to prevent or significantly reduce COVID-19 infections due to the costly requirements for testing, exclusion of COVID-19 cases, and monitoring close contacts. This incentive to avoid more costly regulatory requirements is in addition to pre-existing incentives to mitigate COVID-19 hazards in workplace to reduce the risk of COVID-19 transmission and employee absences that result in lost productivity, staffing shortages, and other disruptions. Although many businesses already have preventative measures in place due to existing public health orders and local regulations, the proposed regulation will likely increase the demand for higher-rated filtration for air-conditioning and ventilation systems, such as MERV-13 and portable air filtration systems. Increased use of higher rated filtration system can promote competition and innovation in this sector. Some

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<sup>91</sup> McCann, Adam, “Safest States During COVID-19,” WalletHub, April 21, 2022, accessed at <https://wallethub.com/edu/safest-states-during-covid/86567> on April 22, 2022.

<sup>92</sup> California for All, Vaccination data, accessed at <https://covid19.ca.gov/vaccination-progress-data/> on April 22, 2022.



manufacturers could have incentives to invest in new technologies in order to improve their productivity and obtain a larger market share. In addition, the proposed regulation could increase the demand for respirators and other response to COVID-19 to reduce workplace contacts, such as automation of certain processes. As a result, there could be incentives for innovation in new respirator technology and other related industries.

## 6. Regulatory Alternatives

### 6.1 Alternative 1: New Regulation Mandating that Employers Comply with All State Public Health Officer Orders Regarding COVID-19.

Under Alternative #1, employers would be required to comply with all CDPH orders regarding COVID-19. Employers are already legally bound to follow mandatory CDPH orders, but Alternative 1 would allow the Division to enforce those orders in the occupational context, during site inspections. Currently, however, while there are many guidance documents that set forth recommendations from CDPH, there are relatively few mandatory orders. Specifically, CDPH has issued State Public Health Officer Orders regarding vaccination requirements for healthcare workers, including in state and local correctional facilities and detention centers; vaccination requirements for workers in schools; requirements for visitors in acute healthcare and long-term care settings; reporting of COVID-19 results by healthcare providers; and face covering requirements in emergency shelters, cooling and heating centers, homeless shelters, long-term care settings, adult and senior care facilities. Alternative #1 would give the Division additional enforcement authority by making the Division an enforcement arm for CDPH orders.

#### 6.1.1. Comparison to the Proposed Regulation

Costs and benefits for Alternative #1 are unquantifiable, because Alternative #1 does not change employers' legal obligations to comply with existing CDPH orders. However, Alternative #1 is not identical to a baseline of no regulation, despite economic and fiscal similarities. Without a regulation specifically allowing the Division to enforce CDPH orders, the Division could not issue citations against employers for violating those orders. This would not change employers' legal obligations—and thus would not have an economic effect relative to existing law—but as a practical matter, this alternative would likely improve compliance, particularly in areas of the state in which local public health authorities initiated fewer enforcement actions of their own.

#### 6.1.2. Reason for Rejecting

The Division works closely with CDPH and uses CDPH guidelines in the development of regulations. Further, the Division's regulations can be written to reference changing public health orders and regulations; indeed, the proposed amendment incorporates current CDPH guidance on Isolation and Quarantine, and also defers to CDPH regulations or orders if the timelines change. However, as discussed above, despite the extensive library of CDPH guidance and recommendations, there are relatively few formal, mandatory CDPH orders that the Division could enforce; CDPH recommendations are generally directed to the public and do not always address occupational hazards. It is, of course, possible that CDPH could issue formal mandatory orders in the future that would be enforceable by the Division. But a regulation cannot rely on speculative future orders from a sibling agency. The Division does not have the authority to issue a citation for failure to follow a CDPH requirement; instead, the Division must rely on the general obligation of section 3203. The IIPP regulation does not provide sufficient detail to employers and employees regarding the particular context of COVID-19, which reduces employer compliance. Alternative 1 was rejected because it was insufficiently protective of worker safety and health.

## 6.2 Alternative 2: Requirements on Employers with 100 or More Employees Relating to Vaccination, Testing, and Face Covering.

Under Alternative #2, employers with 100 or more employees would be required to develop, implement, and enforce a mandatory COVID-19 vaccination policy, with an exception for employers that instead adopt a policy requiring employees to either get vaccinated or elect to undergo regular COVID-19 testing and wear a face covering at work in lieu of vaccination. Alternative #2 is similar to the Emergency Temporary Standard proposed by Federal OSHA, which was eventually blocked by the United States Supreme Court. After the Supreme Court's ruling, Federal OSHA then withdrew the vaccination and testing ETS as an enforceable emergency temporary standard. Despite this, several Standards Board members have urged the Division to adopt vaccinate or test requirements that would apply to California's workplaces, and a recent bill (AB 1993) was submitted mirroring these requirements.

### 6.2.1. Costs

To estimate the cost of requirements in Alternative #2, DIR relied on estimates in OSHA's feasibility study for the COVID-19 Vaccination and Testing ETS.<sup>93</sup> OSHA's methodology for estimating costs is describe in detail in OSHA's feasibility study and analytic spreadsheets in support of the COVID-19 vaccination and testing ETS.<sup>94</sup> For brevity, DIR does not reproduce those methods in full in this SRIA. The direct costs of the ETS were estimated on a per firm basis for the entire United States. Specifically, Table IV.B.13 of the feasibility study reports the average cost per entity (i.e., firm) at the 3-digit NAICS code level for all industries covered by the ETS. Note that a single firm can operate multiple establishments across multiple states.

OSHA estimated that the average cost per firm was \$11,298 and the total cost of the ETS was approximately \$3.0 billion for all covered entities in the United States. However, there are notable differences between the economy of California and the United States as a whole. These differences include the distribution of firms and establishments across industries and the size of the private versus public sector. Therefore, DIR applies the average cost per firm, by industry, to the number of firms and establishments, by industry, in California based on data from the U.S. Census 2019 Statistics of U.S. Businesses.<sup>95</sup>

The economy of California also differs in other regards, including in demographic characteristics of the workforce, including the age, gender, race, ethnicity, level of educational attainment, and household income level of workers, for example. For simplicity—and due to the complexity in re-mapping industry and occupational groups for the entire United States to the California economy—DIR assumed characteristics of the California workforce were similar to the U.S. workforce overall for this analysis. However, DIR noted a major difference in the California workforce in one key trait.

Based on recent vaccination data by age group from the CDC's COVID Data Tracker, OSHA estimated that 61.3 percent of the U.S. workforce (excluding certain healthcare settings) was fully or partially

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<sup>93</sup> U.S. Occupational Safety and Health Administration, COVID-19 Vaccination and Testing: Emergency Temporary Standard, Interim Final Rule, 86 FR 212 (61402 – 61555), November 5, 2021.

<sup>94</sup> OSHA, Analytic Spreadsheets in Support of the COVID-19 Vaccination and Testing ETS, October 2021.

<sup>95</sup> U.S. Census Bureau, 2019 Statistics of U.S. Businesses (SUSB), 2019 SUSB Annual Data Tables by Establishment Industry, accessed at <https://www.census.gov/data/tables/2019/econ/susb/2019-susb-annual.html> on April 25, 2022.

vaccinated, and 38.7 percent was unvaccinated.<sup>96</sup> The CDC data further suggested that that 13.8 percent of the U.S. population will “probably or definitely will not” get the vaccine, while the remainder of the unvaccinated population was not “vaccine-hesitant,” but were not yet vaccinated. In California, as of April 22, 2022, approximately 75.2 percent of the population aged five and up is fully vaccinated and 8.9 percent is partially vaccinated. Therefore, the vaccine-hesitant population is likely much lower in California than the United States as a whole. DIR assumed that as much as 90 percent of the workforce would get vaccinated if there were a vaccine requirement (compared with about 86.2 percent nationally). This implies that the incremental impact of Alternative #2 relative to the baseline would be to increase the statewide vaccination rate among workers by up to 5.9 percentage points, or about 90,200 workers. Thus, under this alternative set of us assumptions the incremental costs of Alternative #2 would be approximately half as large as under OSHA’s assumptions regarding vaccination rates.

Table 6.1 reports the average cost per firm and cost per establishment based on OSHA’s analytical spreadsheets using the vaccination rates for the U.S. and California, respectively. The U.S. Census reported that there approximately 26,300 firms in California with 100 or more employees operating about 174,000 establishments (excluding agricultural production, railroad transportation, and public administration). This represents approximately 3 percent of firms and 18 percent of establishments in California. This implies that large employers own or operate, on average, six to seven establishments per firm. These data are used to estimate the average cost per establishment (derived from the average cost per firm) in California.

**Table 6.1 Average Cost of Alternative #2 per firm and per establishment based on Average U.S. and California Vaccination Rates**

NAICS	Description	California Entities <sup>1</sup>		Based on U.S. Average Vaccination Rate		Based on California Vaccination Rate	
		Number of Firms	Number of Est.	Cost per Firm <sup>2</sup>	Cost per Est.	Cost per Firm <sup>2</sup>	Cost per Est.
11	Agriculture, Forestry, Fishing and Hunting	1,949	1,995	\$4,926	\$3,252	\$2,443	\$1,613
21	Mining	488	652	\$13,040	\$4,638	\$6,059	\$2,155
22	Utilities	558	1,261	\$29,281	\$2,371	\$13,083	\$1,059
23	Construction	78,384	79,551	\$8,074	\$4,481	\$3,846	\$2,135
31-33	Manufacturing	34,360	36,909	\$11,566	\$6,302	\$5,493	\$2,993
42	Wholesale Trade	49,156	57,394	\$6,834	\$1,872	\$3,323	\$910
44-45	Retail Trade	69,128	105,624	\$31,625	\$1,662	\$14,929	\$785
48-49	Transportation and Warehousing	22,727	27,193	\$46,996	\$10,841	\$21,058	\$4,857
51	Information	19,287	27,180	\$23,297	\$3,039	\$10,310	\$1,345
52	Finance and Insurance	29,344	51,070	\$28,554	\$1,567	\$12,868	\$706
53	Real Estate and Rental and Leasing	47,127	59,837	\$6,510	\$426	\$3,207	\$210
54	Professional and Technical Services	122,914	132,596	\$12,407	\$3,185	\$5,961	\$1,530

<sup>96</sup> U.S. Centers for Disease Control and Prevention. Trends in COVID-19 Vaccine Confidence in the US. <https://covid.cdc.gov/covid-data-tracker/#vaccine-confidence> (as of October 2021).

NAICS	Description	California Entities <sup>1</sup>		Based on U.S. Average Vaccination Rate		Based on California Vaccination Rate	
		Number of Firms	Number of Est.	Cost per Firm <sup>2</sup>	Cost per Est.	Cost per Firm <sup>2</sup>	Cost per Est.
55	Management of Companies and Enterprises	3,034	5,123	\$6,321	\$3,117	\$3,201	\$1,579
56	Administrative and Waste Services	39,661	46,291	\$13,785	\$3,259	\$6,929	\$1,638
61	Educational Services	13,841	15,401	\$19,897	\$7,930	\$9,452	\$3,767
62	Health Care and Social Assistance	96,064	117,299	\$11,972	\$1,439	\$8,217	\$988
71	Arts, Entertainment, and Recreation	28,068	29,810	\$7,251	\$1,886	\$3,594	\$935
72	Accommodation and Food Services	70,322	92,203	\$12,612	\$1,204	\$7,682	\$734
81	Other Services, excluding Public Administration	70,550	77,466	\$6,415	\$984	\$3,239	\$497
<b>Total</b>		<b>796,962</b>	<b>964,855</b>	<b>\$11,298</b>	<b>\$1,710</b>	<b>\$5,897</b>	<b>\$893</b>

Source:

1. U.S. Census Bureau, 2019 Statistics of U.S. Businesses (SUSB), 2019 SUSB Annual Data Tables by Establishment Industry, accessed at <https://www.census.gov/data/tables/2019/econ/susb/2019-susb-annual.html> on April 25, 2022. Note: excludes agricultural production, railroad transportation, and public administration.
2. OSHA, Analytic Spreadsheets in Support of the COVID-19 Vaccination and Testing ETS, October 2021.

To estimate the direct costs of Alternative #2, DIR applied the average cost per establishment based on the California vaccination rate from Table 6.1 to the number of California establishments reported in the baseline population estimate from Chapter 1. Costs were only estimated for 2023 because there was insufficient information on recurring future costs in OSHA’s analysis since the federal ETS was only intended to last for 6 months. Establishments in most Healthcare and Social Assistance Industries (NAICS 62), with the exception of Individual and Family Services (NAICS 624), were excluded due to CDPH’s mandatory vaccination requirement for workers in healthcare settings. Table 6.2 reports the direct costs of Alternative #2 in 2023. It was not feasible to estimate costs for 2024.

**Table 6.2 Direct Costs of Alternative #2 in 2023**

NAICS	Description	Number of Est.	Percent of Est. owned by Firms with 100+ Employees <sup>1</sup>	Number of Est. owned by Firms with 100+ Employees	Direct Costs (\$ Millions)
11	Agriculture, Forestry, Fishing and Hunting	17,095	5.2%	883	\$1.4
21	Mining	799	36.7%	293	\$0.6
22	Utilities	2,189	58.8%	1,286	\$1.4
23	Construction	89,433	2.9%	2,587	\$5.5
31-33	Manufacturing	44,894	13.3%	5,978	\$17.9
42	Wholesale Trade	64,550	16.7%	10,798	\$9.8
44-45	Retail Trade	107,895	32.4%	34,990	\$27.5
48-49	Transportation and Warehousing	33,548	19.5%	6,541	\$31.8
51	Information	30,925	31.7%	9,812	\$13.2

NAICS	Description	Number of Est.	Percent of Est. owned by Firms with 100+ Employees <sup>1</sup>	Number of Est. owned by Firms with 100+ Employees	Direct Costs (\$ Millions)
52	Finance and Insurance	54,255	43.1%	23,360	\$16.5
53	Real Estate and Rental and Leasing	62,489	19.6%	12,268	\$2.6
54	Professional and Technical Services	169,611	8.3%	14,081	\$21.5
55	Management of Companies and Enterprises	4,723	79.4%	3,752	\$5.9
56	Administrative and Waste Services	57,922	17.5%	10,131	\$16.6
61	Educational Services	35,373	12.7%	4,506	\$17.0
62	Health Care and Social Assistance	549,640	16.9%	92,943	\$91.8
71	Arts, Entertainment, and Recreation	31,308	6.9%	2,156	\$2.0
72	Accommodation and Food Services	89,423	22.3%	19,979	\$14.7
81	Other Services, excluding Public Administration	73,152	8.0%	5,881	\$2.9
92	Public Administration	11,013	10.2%	1,121	\$1.0
<b>Total</b>		<b>1,530,237</b>	<b>17.2%</b>	<b>263,348</b>	<b>\$301.6</b>

**Source:**

1. U.S. Census Bureau, 2019 Statistics of U.S. Businesses (SUSB), 2019 SUSB Annual Data Tables by Establishment Industry, accessed at <https://www.census.gov/data/tables/2019/econ/susb/2019-susb-annual.html> on April 25, 2022.

No specific information could be found on the rate of severance from the workforce due to vaccine requirements. California was the first state in the nation to announce that all health care workers must be fully vaccinated—many hospital systems in California indicated that they had vaccination rates of 90 percent or higher prior to the effective date for CDPH’s public health order.<sup>97</sup> Employers would potentially face additional costs due to employee turnover due to severance if employees chose to remain unvaccinated and voluntarily left or were terminated. Not all unvaccinated employees would exit the workforce under Alternative #2. For example, OSHA estimated that 4 percent of employees would seek a religious exemption and 1 percent of workers would seek a medical exemption.<sup>98</sup>

### 6.2.2. Benefits

COVID-19 mRNA vaccines and non-mRNA COVID-19 vaccines, including Janssen’s (Johnson & Johnson), provide strong protection against severe COVID-19 that can result in hospitalization or death. The CDC found the vaccine effectiveness of mRNA vaccines against severe COVID-19 resulting in hospitalization was 86 percent overall (with a 95 percent confidence interval (95% CI) of 82 to 88 percent) and 90

<sup>97</sup> Kristen Hwang, “California vaccine mandate: Most health care workers are complying, hospitals say,” Cal Matters, <https://calmatters.org/health/coronavirus/2021/09/california-vaccine-hospital-workers-mandate/>

<sup>98</sup> U.S. Occupational Safety and Health Administration, COVID-19 Vaccination and Testing: Emergency Temporary Standard, Interim Final Rule, 86 FR 212 (61402 – 61555), November 5, 2021.

percent (95% CI: 87 to 92 percent) among adults without immunocompromising conditions.<sup>99</sup> Vaccine effectiveness was also sustained among groups at risk for severe COVID-19. A study in Israel found the vaccine efficiency of the Pfizer-BioNTech mRNA COVID-19 vaccine against COVID-19-related death was 96.7 percent.<sup>100</sup> However, researchers have determined that the SARS-CoV-2 Omicron (B.1.1.529) variants BA.1 and BA.2 evade much of the protection that mRNA vaccines offer against mild-to-moderate disease. A study in Qatar found that the vaccine efficiency of the Pfizer-BioNTech mRNA COVID-19 vaccine against symptomatic BA.1 infection was highest at 46.6 percent (95% CI: 33 to 57 percent) in the first three months after the second dose, but then declined to 10 percent or below thereafter. Vaccine effectiveness rebounded to 59.9 percent (95% CI: 51 to 67 percent) in the first month after the booster dose.<sup>101</sup> Vaccine effectiveness against symptomatic BA.2 infection was highest at 51.7 percent (95% CI: 43 to 59 percent) in the first three months after the second dose, but then declined to 10 percent or below thereafter. Vaccine effectiveness rebounded to 43.7 percent (95% CI: 37 to 50 percent) in the first month after the booster dose, but then declined again. Assuming that the impacted population of employees continues to remain boosted, this analysis assumed a vaccine effectiveness of 51 percent against mild symptomatic infections.

Strongly encouraging vaccination among California workers will likely increase the overall vaccination rate in the state by a small amount. Overall, about 61.3 percent of the U.S. workforce (excluding certain healthcare settings) was fully or partially vaccinated as of October 2021. Based on CDC surveys, OSHA estimated that 13.8 percent of the U.S. population will “probably or definitely will not” get the vaccine, even with a vaccine mandate.<sup>102</sup> In California, about 84.1 percent of the population aged five and up is fully or partially vaccinated. Given the higher vaccination rates, DIR assumed that roughly 10 percent of California workers are vaccine-hesitant and unlikely to get the vaccine, slightly below than the national average. This assumption is based on the much higher vaccination rates overall in California. Therefore, DIR assumed that a vaccine mandate could increase the statewide vaccination rate among workers by up to 5.9 percentage points, or approximately 90,200 additional workers.

Based on the COVID-19 projections in this SRIA, assuming an annual transmission rate of 0.045 (4,505 per 100,000), there would be approximately 4,067 COVID-19 cases in the baseline. On April 26, 2021, CDPH was reporting that case data from late March 2022 showed that unvaccinated people were 13.0 times more likely to be infected with COVID-19, 12.5 times more likely to be hospitalized with COVID-19 and 6.0 times more likely to die than people who were vaccinated.<sup>103</sup> That is, if there two identical cohorts of 90,200 unvaccinated workers that had close contact with a confirmed COVID-19 case, and

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<sup>99</sup> Tenforde, Mark W., Wesley H. Self, Eric A. Naioti, *et al.* Sustained Effectiveness of Pfizer-BioNTech and Moderna Vaccines Against COVID-19 Associated Hospitalizations Among Adults — United States, March–July 2021. *MMWR Morb Mortal Wkly Rep* 2021;70:1156-1162, accessed at <https://www.cdc.gov/mmwr/volumes/70/wr/mm7034e2.htm> on April 22, 2022.

<sup>100</sup> Haas, Eric J., Frederick J. Angulo, John M. McLaughlin, *et al.* Impact and effectiveness of mRNA BNT162b2 vaccine against SARS-CoV-2 infections and COVID-19 cases, hospitalisations, and deaths following a nationwide vaccination campaign in Israel: an observational study using national surveillance data. *Lancet* 2021;397:1819–29.

<sup>101</sup> Chemaitelly, Hiam, Houssein H. Ayoub, Sawsan AlMukdad, *et al.* Duration of mRNA vaccine protection against SARS-CoV-2 Omicron BA.1 and BA.2 subvariants in Qatar, medRxiv, March 13, 2022.

<sup>102</sup> U.S. Occupational Safety and Health Administration, COVID-19 Vaccination and Testing: Emergency Temporary Standard, Interim Final Rule, 86 FR 212 (61402 – 61555), November 5, 2021.

<sup>103</sup> CDPH, Tracking COVID-19 in California. “Today’s Update,” update for April 26, 2022, accessed at <https://covid19.ca.gov/state-dashboard/> on April 26, 2022.



one group was highly-vaccinated and one group was unvaccinated, the unvaccinated group would be expected to have approximately 52,400 COVID-19 cases compared to 4,067 COVID-19 for the highly-vaccinated group. Adjusting the baseline cases by these figures to account for unvaccinated workers, DIR estimated there would be approximately 52,400 COVID-19 cases among unvaccinated workers since the overall cases projected were based on a highly-vaccinated population. This may slightly overestimate the total since the baseline projection presumably includes both vaccinated and unvaccinated workers. Table 6.3 reports the distribution of cases by severity.

**Table 6.3 Distribution of COVID-19 Cases and Projections Among Unvaccinated Workers**

Projected COVID-19 Cases	Disease Severity	Percent of Cases <sup>1</sup>	Number of Cases	Adjustment for Unvaccinated Workers <sup>2</sup>	Number of Cases Among Unvaccinated Workers
4,067	Asymptomatic	35.1%	1,428	13.0	18,491
	Mild	58.2%	2,367	13.0	30,660
	Severe	4.9%	199	12.5	2,491
	Critical	1.2%	49	12.5	610
	Fatal	0.6%	24	6.0	146
	<b>Total</b>		<b>100.0%</b>	<b>4,067</b>	<b>--</b>

Source:

1. See Chapter 3.
2. CDPH, Tracking COVID-19 in California. “Today’s Update,” update for April 26, 2022, accessed at <https://covid19.ca.gov/state-dashboard/> on April 26, 2022.

Monetary values for avoided COVID-19 cases are discussed earlier in this SRIA (see details in Chapter 3). They are reproduced here for calculation purposes. Note that DIR only estimated benefits for potentially avoidable mild to fatal cases since the monetary values for asymptomatic cases were relatively inconsequential and the overall case projections are highly uncertain. Furthermore, DIR did not estimate productivity losses or lost wages for fatalities (see discussion in Chapter 3). Table 6.4 reports the monetary values for COVID-19 cases avoided due to the regulatory alternative.

**Table 6.4 Monetary Values for Avoided COVID-19 Cases**

Disease Severity	Number of Cases among Unvaccinated Workers	Vaccine Effectiveness <sup>1</sup>	Cases Avoided due to Regulation	Average Number of Lost Workdays <sup>2</sup>	Productivity Losses per Case <sup>2</sup>	Lost Wages per Case <sup>2</sup>	Willingness to Pay per Case (3%) <sup>2</sup>
Mild	30,660	51.0%	15,637	8	\$2,992	\$748	\$5,900
Severe	2,491	86.0%	2,142	20	\$7,479	\$1,870	\$13,000
Critical	610	86.0%	525	45	\$16,828	\$4,207	\$1,800,000
Fatal	146	96.7%	142	--	--	--	\$11,500,000
<b>Total</b>	<b>33,908</b>	<b>--</b>	<b>18,446</b>				<b>--</b>

Source:

1. See discussion in text above for citations.
2. See Chapter 3.



Table 6.5 reports the direct benefits of Alternative #2 based on the per case values reported above.

**Table 6.5 Direct Benefits of Alternative #2 in 2023**

Disease Severity	Number of Cases among Unvaccinated Workers	Cases Avoided due to Regulation	Productivity Losses (\$ Millions)	Lost Wages (\$ Millions)	Willingness to Pay (3%) (\$ Millions)	Total Direct Benefits (\$ Billions)
Mild	30,660	15,637	\$46.8	\$11.7	\$91.6	\$0.15
Severe	2,491	2,142	\$16.0	\$4.0	\$28.1	\$0.05
Critical	610	525	\$8.8	\$2.2	\$953.9	\$0.96
Fatal	146	142	\$0.0	\$0.0	\$1,630.3	\$1.63
<b>Total</b>	<b>33,908</b>	<b>18,446</b>	<b>\$71.6</b>	<b>\$17.9</b>	<b>\$2,703.9</b>	<b>\$2.79</b>

Note: Totals may not sum due to rounding.

### 6.2.3. Comparison to the Proposed Regulation

Table 6.6 reports the direct costs and benefits of Alternative #2 relative to the proposed regulation in 2023. DIR only reported values based on the primary estimate as the high-end estimate (which assumes four times the rate of COVID-19 infections) would scale similarly for both regulatory alternatives. It was not feasible to estimate costs and benefits for 2024 for Alternative #2.

**Table 6.6 Direct Costs and Benefits of Alternative #2 Compared to the Proposed Regulation in 2023**

	Alternative #2 (\$ Billions)	Proposed Regulation (\$ Billions)	Difference (\$ Billions)
Benefits	\$2.79	\$10.51	-\$7.72
Costs	\$0.30	\$0.49	-\$0.19
Net Benefits	\$2.49	\$10.03	-\$7.53

Note: Totals may not sum due to rounding.

### 6.2.4. Reason for Rejecting

Alternative #2 was rejected for several reasons. First, it would cost significantly more per entity than the proposed regulation, with new costs associated with documentation of vaccination status as well as enforcement of testing and face covering by both employers and, through citations and investigations, the Division. Overall, it would cost nearly as much as the proposed regulation (\$0.3 billion vs. \$0.5 billion) and yield a considerably lower level of benefits (\$2.5 billion vs \$10.0 billion). Further, potentially large (but unquantifiable) costs would have been incurred in connection with severance from the workforce; employers were already concerned that employee would quit rather than get vaccinated. Second, California already enjoys a relatively high rate of vaccination: as of April 22, 2022, approximately 75.2 percent of the population aged five and up is fully vaccinated and 8.9 percent is partially vaccinated.<sup>104</sup> Finally, the political and social climate across the State varies widely with respect to vaccination against COVID-19. Significant opposition to this alternative would be expected, due to a perception, albeit an incorrect one, that this alternative would impose a “vaccine mandate” for workers.

<sup>104</sup> Statewide vaccination data as of April 22, 2022, accessed at <https://covid19.ca.gov/vaccination-progress-data/#overview> on April 22, 2022.

## 7. Summary of Economic Results

COVID-19 is a pandemic disease, found in every county in California, every state in the United States, and nearly every country in the world. While a high percentage of individuals affected by COVID-19 will experience mild to moderate flu-like symptoms, some will have more serious symptoms and will require hospitalization, particularly individuals who are elderly or have underlying medical conditions.<sup>105</sup> Serious symptoms of COVID-19 include shortness of breath, difficulty breathing, pneumonia, and organ failure, and COVID-19 can result in death.<sup>106</sup> The virus can damage the lungs, heart, and brain, and can cause long-term health problems.<sup>107</sup>

As of April 19, 2022, there have been 8,550,657 cases of COVID-19 and 89,054 COVID-19 deaths in California.<sup>108</sup> The case numbers represent an undercount, as the data include only cases identified by a positive PCR test and exclude cases identified by a positive antigen test.<sup>109</sup> Data for the number of cases of COVID-19 infection and number of hospitalizations and deaths attributable to workplace exposure to COVID-19 is not currently available; however, the numbers are likely substantial, particularly among essential workers and other employees who interact with the public, due to workers' prolonged exposure to persons outside of one's household, along with the close proximity among persons practiced in some industries. Employees infected with COVID-19 at work can transmit the infection to persons in their homes and communities, resulting in an increase in infection rates.

Occupational safety and health standards within title 8 of the California Code of Regulations protect workers from hazards in general. However, other than those employees who are covered under section 5199, there is currently no specific regulation that protects all workers from exposure to airborne diseases such as COVID-19.

This SRIA analyzes the potential economic impacts of the proposed regulation for COVID-19 prevention in the workplace.

Chapter 2 describes the anticipated direct costs associated with the compliance actions required by the proposed regulation relative to the *no regulatory action* baseline. The total direct compliance costs of the proposed regulation will vary across industries and based on employer size; additionally, the costs will vary over time, as many requirements contemplate upfront investments in COVID-19 prevention measures, while other requirements call for recurring investments and potential recordkeeping

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<sup>105</sup> CDC. Evidence used to update the list of underlying medical conditions that increase a person's risk of severe illness from COVID-19, updated February 15, 2022. Accessed on April 21, 2022.

<https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/evidence-table.html>

<sup>106</sup> Wiersinga WJ, Rhodes A, Cheng AC, Peacock SJ, Prescott HC. Pathophysiology, Transmission, Diagnosis, and Treatment of Coronavirus Disease 2019 (COVID-19): A Review. JAMA. 2020; 324(8):782–793. doi:10.1001/jama.2020.12839. Accessed April 21, 2022.

<https://jamanetwork.com/journals/jama/fullarticle/2768391>

<sup>107</sup> CDC. Post-COVID Conditions, updated September 16, 2021. Accessed 4-21-22.

<https://www.cdc.gov/coronavirus/2019-ncov/long-term-effects/index.html>

<sup>108</sup> CDPH. Tracking COVID-19 in California. "Today's Update," updated April 19, 2022. Accessed April 20, 2022.

<https://covid19.ca.gov/state-dashboard/>

<sup>109</sup> California Health and Human Services (CHHS). COVID-19 Cases Deaths Tests Data Dictionary, updated March 20, 2021; accessed February 10, 2022. [https://data.chhs.ca.gov/dataset/f333528b-4d38-4814-bebb-12db1f10f535/resource/e6667716-5ec6-499f-aeab-0e085020135a/download/covid-19\\_cases\\_deaths\\_tests\\_data\\_dictionary.xlsx](https://data.chhs.ca.gov/dataset/f333528b-4d38-4814-bebb-12db1f10f535/resource/e6667716-5ec6-499f-aeab-0e085020135a/download/covid-19_cases_deaths_tests_data_dictionary.xlsx)

activities. Overall, our primary estimate of the total direct compliance costs of the proposed regulation is \$0.5 billion in 2023, and \$0.2 to \$0.4 billion in 2024. (See Table 7.1 below.)

Chapter 3 describes the anticipated benefits of the proposed regulation to both individuals and businesses. Individuals are anticipated to benefit from reduced risk of infection, symptoms, serious disease, and death, as well as missed work and lost wages. Businesses are anticipated to benefit from avoided loss of worker productivity and avoided work stoppages in outbreak situations. Overall, our primary estimate of the total direct benefits of the proposed regulation is \$10.5 billion in 2023, and \$5.8 to \$10.2 billion in 2024. (See Table 7.1 below.)

Chapters 4 and 5 describe the fiscal and macroeconomic impacts of the proposed regulation on state and local government entities and on the California economy, respectively. For certain state and local government entities, the proposed regulation would result in increased costs due to mandated compliance activities. State and local governments would also benefit from increased in sales tax and income tax revenues as well as cost savings from potentially avoidable COVID-19 infections among public employees. For the California economy, the proposed regulation would result in changes in business expenditures, labor productivity, and income earned by employees.

Chapter 6 analyzes two regulatory alternatives considered by DIR, evaluating the costs and benefits for each alternative relative to the *no regulatory action* baseline, comparing these against the proposed regulation, and providing DIR's justification for rejecting those alternatives in favor of the proposed regulatory action. Based on considerations of the overall efficiency of the requirements, DIR selected the proposed regulation in favor of the regulatory alternatives. The net benefits of the proposed regulation are greater than either of the regulatory alternatives.

The proposed regulation is necessary to combat the spread of COVID-19 in California workers. The proposed regulation would significantly reduce the number of COVID-19 related illnesses, disabilities, and deaths in California's workforce. COVID-19 vaccination has been shown to reduce the incidence of serious illness or death among those infected with COVID-19.<sup>110</sup> However, a serious hazard to employees remains, as evidenced by the emergence of the Delta and Omicron variants of SARS-CoV-2. Following recommended prevention strategies, therefore, is critical to preventing infections, severe illness, or death from COVID-19. Worker protections continue to be urgently needed in the event another variant emerges which can compete successfully with Omicron.

Due to changes in social norms and in federal, state, and local requirements that make mask-wearing and physical distancing voluntary, it is likely that there will be a continued decline in the prevalence of taking such precautions.<sup>111</sup> As COVID-19 vaccination has been shown to reduce the incidence of serious illness or death among those infected with COVID-19, unvaccinated employees will be particularly at risk

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<sup>110</sup> Tenforde MW, Self WH, Adams K, et al. Association Between mRNA Vaccination and COVID-19 Hospitalization and Disease Severity. *JAMA*. 2021;326(20):2043–2054. Accessed on April 21, 2022. doi:10.1001/jama.2021.19499

<sup>111</sup> Bokemper SE, Cucciniello M, Rotesi T, et al. Experimental evidence that changing beliefs about mask efficacy and social norms increase mask wearing for COVID-19 risk reduction: Results from the United States and Italy, 2021; 16(10): e0258282, available at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8504748/> (accessed April 29, 2022).

Published online 2021 Oct 11. Accessed April 21, 2022. doi: [10.1371/journal.pone.0258282](https://doi.org/10.1371/journal.pone.0258282)

for serious illness or death, especially given the spread of highly contagious SARS-CoV-2 variants, unless protective measures are taken.

**Table 7.1 Summary of Benefits and Costs of the Proposed Regulation by Year, Using a 3 Percent Discount Rate**

	Primary Estimate			High-end Estimate		
	Direct Benefits (\$ Billions)	Direct Costs (\$ Billions)	Net Benefits (\$ Billions)	Direct Benefits (\$ Billions)	Direct Costs (\$ Billions)	Net Benefits (\$ Billions)
2023	\$10.5	\$0.54	\$10.0	\$41.2	\$1.63	\$39.5
2024	\$5.8 to \$10.2	\$0.22 to \$0.41	\$5.6 to \$9.8	\$22.7 to \$40.0	\$0.75 to \$1.47	\$22.0 to \$38.5
NPV Total	\$16.3 to \$20.7	\$0.76 to \$0.95	\$15.6 to \$19.8	\$63.9 to \$81.1	\$2.38 to \$3.10	\$61.5 to \$78.0
Annualized	\$8.3 to \$10.5	\$0.39 to \$0.48	\$7.9 to \$10.0	\$32.4 to \$41.2	\$1.21 to \$1.57	\$31.2 to \$39.6