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Via Federal Register

April 22, 2022

The Honorable Martin Walsh, Secretary of Labor
U.S. Department of Labor
Attn: Douglas Parker, Assistant Secretary of Labor for Occupational Safety and Health
Occupational Safety and Health Administration
200 Constitution Ave., NW
Washington, DC 20210

RE: Comments in Response to "Occupational Exposure to COVID-19 in Healthcare Settings" 86 Fed. Reg. 16,426 (March 23, 2022) (Docket No. OSHA-2020-0004)

Dear Secretary Walsh and Assistant Secretary Parker:

On behalf of over 175,000 registered nurse (RN) members across the country, National Nurses United (NNU) submits these comments and materials to the Occupational Safety and Health Administration (OSHA) in response to the notice, "Occupational Exposure to COVID-19 in Healthcare Settings" 86 Fed. Reg. 16,426 (March 23, 2022), of a reopened public comment period on the "Occupational Exposure to COVID-19; Emergency Temporary Standard," 86 Fed. Reg. 32,376 (Jun. 21, 2021) (Docket No. OSHA-2020-0004) (hereinafter "Covid-19 Health Care ETS"). NNU strongly urges OSHA to promptly issue a rigorous permanent standard to protect health care workers from the ongoing significant occupational risk posed by Covid-19.

NNU submitted comments on the Covid-19 Health Care ETS on August 20, 2021, and a letter urging the swift promulgation of a final standard on November 3, 2021.[1] NNU urges OSHA to refer to those previous comments for recommendations on how to strengthen protections for health care workers in a final standard, based on detailed scientific analysis and the experience of NNU nurses fighting for protections. For ease of reference, a list summarizing NNU's recommendations for improvements to the ETS in a final standard is included in Appendix A of these comments. The following comments respond to OSHA's specific questions posed in the March 23, 2022 notice and provide updated scientific analysis, which continues to support NNU's previous recommendations.

[1] "Comments from Deborah Burger, National Nurses United (NNU)," August 31, 2021, Comment ID: OSHA-2020-0004-1444; "Comments from Deborah Burger, National Nurses United," November 3, 2021, Comment ID: OSHA-2020-0004-1521, Docket ID: OSHA-2020-0004.

I. A permanent Covid-19 Standard is a necessary and urgent response to the ongoing significant risk that Covid-19 poses to health care workers.

OSHA must issue a permanent standard to protect health care workers from infection by Covid-19 as rapidly as possible and resume enforcement of the Covid-19 Health Care ETS until a final standard is issued.

While no government agency nationally tracks health care worker infections and deaths from Covid-19, as of April 19, 2022, NNU has recorded nearly one and a half million health care worker cases and the deaths of at least 5,104 health care workers from Covid-19, with at least 492 deaths of registered nurses from Covid-19 in the United States since the Covid-19 pandemic began.

On March 4, 2020, NNU petitioned OSHA to promulgate an emergency temporary standard (ETS) on emerging infectious diseases in response to the rapidly spreading Covid-19 threat. OSHA finally issued an ETS over a year later on June 21, 2021. The Covid-19 Health Care ETS represented an important step forward in protecting nurses and other health care workers from Covid-19. The protections in the ETS made a difference for the safety of NNU's members. Employers at some facilities improved access to N95s previously kept under lock and key.[2] At other facilities, nurses were allowed to see a written Covid-19 plan for the first time and to use the requirements in the Covid-19 Health Care ETS to hold their employers accountable for protecting worker health.[3]

On August 20, 2021, NNU submitted comments on the ETS, urging improvements to the ETS and the rapid creation of a permanent standard in light of the rising Delta variant. On November 3, 2021, NNU wrote to OSHA again to urge the rapid promulgation of a permanent standard and that OSHA update and reissue the Covid-19 Health Care ETS in the meantime. OSHA failed to issue a permanent standard and left health care workers with limited and uncertain protections while the SARS-CoV-2 B.1.1.529 (Omicron) surge led to the highest case counts the country had seen yet, overwhelmed hospitals, and resulted in the massive infection of health care workers, many of whom were required to come into work sick despite risks to their health, their coworkers, and their patients.[4] The pandemic still is not over. OSHA must not leave health care workers unprotected again. OSHA should protect health care workers with a strong permanent Covid-19 standard before the next surge in cases and hospitalizations.

OSHA should issue a permanent Covid-19 standard for health care workers as quickly as possible and continue development of a broader infectious disease standard. OSHA has already

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[2] See "Late Comments from Godfrey, Eleanor; National Nurses United (NNU)" December 19, 2021. Comment ID: OSHA-2020-0004-1523.

[3] *Id.*

[4] Shammas B, Knowles H, "Stressed hospitals are asking workers with covid to return — even if they may be infectious," Washington Post, January 23, 2022, https://www.washingtonpost.com/health/2022/01/23/hospital-workers-covid-isolation-cdc/.

completed the required collection of public comments for a Covid-19 standard by issuing and collecting comments on the Covid-19 Health Care ETS. It is collecting further comments currently. It can, and should, move directly to the issuance of a Covid-19 specific standard quickly. Any future infectious disease standard can incorporate and expand upon the protections that a Covid-19 standard provides for aerosol-transmitted diseases and the processes for developing plans and recording cases that it requires.

The alternatives for protecting health care workers from Covid-19 in the absence of a permanent standard or enforcement of the Covid-19 Health Care ETS are insufficient. As OSHA itself explained in the Covid-19 Health Care ETS, the agency's ability to enforce Covid-19 protections under the General Duty Clause of the Occupational Safety and Health Act of 1970 (OSH Act), existing statutes, and regulations is inadequate to protect health care workers from the occupational hazard of Covid-19. In the period since OSHA announced that it planned to rescind the ETS and adopted a non-enforcement policy, NNU member nurses have filed complaints about dangerous violations of the ETS — including comingling of Covid-19 patients with previously uninfected patients, a lack of screening upon arrival at the facility, no negative pressure rooms, and failures to fit test N95s — and, for some complaints, have been told by OSHA offices that the agency cannot enforce protections that were required under the ETS.[5]

Health care workers still face a significant risk from exposure to Covid-19 and will continue to face such risk for the foreseeable future. While vaccination is important, neither vaccination nor prior infection confer long-lasting immunity to infection.[6] Covid-19 evolves rapidly, leading to successive surges of infections as new variants evade immunity created by vaccines and previous infection. As explained further below in Sections II.E and II.G, the BA.2 variant of Omicron has caused substantial Covid-19 surges in Europe and is leading to a resurgence of cases in some U.S. regions. Health care workers have been exposed to dangerous conditions in successive surges while waiting for OSHA to promulgate a strong permanent standard to protect them. OSHA must ensure that a full, enforceable standard is in place before the current resurgence results in preventable health care worker infections and deaths. The standard should be based on the precautionary principle, which states that taking action to protect people's health should not await scientific certainty of harm.

Since OSHA first promulgated the Covid-19 Health Care ETS, the United States public health authorities have all but abandoned the attempt to limit Covid-19 transmission. As explained further below, the February 2022 Centers for Disease Control and Prevention (CDC) community transmission metrics rely almost exclusively on hospitalization numbers to govern whether the CDC recommends any measures whatsoever to prevent the spread of Covid-19. States and cities have abandoned indoor masking requirements. Increases in hospitalizations lag several weeks behind increases in cases during a surge. That means that it is the explicit policy of the United States public health authority to do nothing to curb infections among the public until

[5] *See, e.g.*, Correspondence between NNU and OSHA Re: OSHA questions for Complaint Osceola Regional Medical Center, March 4, 2022. Attachment 5.

[6] *See* Section II.E and citations in Appendix B.

after hospitals — and health care workers — become overwhelmed with Covid-19 patients. Health care workers are our first and last line of defense against the ongoing pandemic. OSHA must protect health care workers by swiftly issuing a strong, multilayered, Covid-19 standard.

II. NNU responses to OSHA's proposed changes to the COVID-19 ETS and requests for additional information.

OSHA should implement a strong, protective, permanent Covid-19 standard with consistent rules that health care workers can rely on to protect themselves from the ongoing threat of Covid-19 exposure and the health effects of Covid-19 infection. The permanent standard should not rely on CDC guidance or grant flexibility or safe harbor to employers. The standard should have a wide scope and maintain consistent protections for all workers, which are not based on interactions with people designated as suspected Covid-19 cases using flawed screening techniques, unreliable community level metrics, or vaccines that offer limited protection against transmission. The following sections explain the importance of these features of a permanent standard and provide the evidence requested by OSHA to demonstrate the scientific basis of NNU's recommendations.

A. OSHA should not align its final rule with CDC guidance. *A.1 – Alignment with CDC Recommendations for Healthcare Infection Control Practices*

OSHA should not align its final rule with any of the CDC guidance on Covid-19 as the CDC guidance frequently falls short in vital ways: CDC guidance fails to recognize the precautionary principle and ignores some available scientific evidence regarding Covid-19. NNU urges OSHA to ensure that the permanent Covid-19 standard follows the precautionary principle and the most up-to-date science on Covid-19 at the time of issuance, fully recognizing aerosol transmission and going beyond CDC guidance.

For over two years of the pandemic, permissive and weak CDC guidance on Covid-19 health care infection control has led to dangerous working conditions and high rates of Covid-19 infection for nurses and other health care workers.[7] In March 2020, the CDC rolled back vital PPE and other infection control guidance under pressure from the health care industry.[8] In December 2021, the CDC shortened its quarantine and isolation guidance to ensure that health

[7] "Testimony of Pascaline Muhindura, RN On Behalf of National Nurses United Before the Subcommittee on Workforce Protections Committee on Education and Labor," March 11, 2021, https://edlabor.house.gov/imo/media/doc/MuhinduraPascalineTestimony03112021.pdf.

[8] Burger D, RN, "Letter to Committee on Homeland Security," March 11, 2020, https://www.nationalnursesunited.org/sites/default/files/nnu/graphics/documents/COVID19_Homeland_Security_Letter_Burger.pdf (Accessed July 27, 2021).

Gollan and Shogren, "31,000 and counting," Reveal, May 12, 2020, https://revealnews.org/article/31000-and-counting/ (Accessed July 27, 2021).

care employers and other businesses have a supply of workers.[9] For health care workers with SARS-CoV-2 infections, the new guidance shortened the period of medical removal from 10 days to 5 days, if asymptomatic or "mild to moderate illness," for facilities with "contingency" staffing shortages and to no work restriction whatsoever under "crisis" conditions.

The CDC's dangerous current isolation guidance is not based on the science regarding Covid-19 transmission and has resulted in, and will continue to result in, health care worker and hospital-acquired Covid-19 infections.[10] Several studies have found that the period of infectiousness for Omicron is the same as other SARS-CoV-2 variants, beyond the CDC's five-day isolation time period for the general public.[11] It is very common for a person with Covid-19 to still be infectious after five days.[12] NNU has submitted several letters to the CDC on various changes to Covid-19 guidance, which are attached here as Attachment 1: NNU Letters to the Centers for Disease Control and Prevention on Covid-19.

OSHA must make independent decisions tailored to its mission of protecting workers. It must not surrender that responsibility to another agency with different priorities. The CDC makes frequent changes that have often been much more responsive to political pressure than to the science of Covid-19 transmission. By contrast, OSHA has an enduring responsibility to reduce significant risks to worker safety and health in the workplace. OSHA is also obliged to follow procedural requirements when creating and updating standards that do not apply to the issuance of CDC guidance. Tying the standard to future CDC guidance would also cause confusion among employers due to frequent changes in recommendations, none of which include instructions for designing a workplace health and safety program. Similarly, tying the standard to current CDC guidance may cause confusion when CDC guidance invariably changes. OSHA should include strong, comprehensive Covid-19 protections in a permanent standard without reference to CDC guidance.

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[9] U.S. Centers for Disease Control and Prevention, "Interim Guidance for Managing Healthcare Personnel with SARS-CoV-2 Infection or Exposure to SARS-CoV-2," last updated January 21, 2022, https://www.cdc.gov/coronavirus/2019-ncov/hcp/guidance-risk-assesment-hcp.html.

[10] See Letter from National Nurses United to Dr. Rochelle P. Walensky, December 22, 2021, https://www.nationalnursesunited.org/sites/default/files/nnu/documents/NNU_letter_to_CDC_Omicron_and_Isolation_Periods_12-22-2021.pdf.

[11] Landon et al., "High Rates of Rapid Antigen Test Positivity After 5 days of Isolation for COVID-19," medRxiv, February 2, 2022, DOI: https://doi.org/10.1101/2022.02.01.22269931.

National Institute of Infectious Diseases Disease Control and Prevention Center, National Center for Global Health and Medicine, "Active epidemiological investigation on SARS-CoV-2 infection caused by Omicron variant (Pango lineage B.1.1.529) in Japan: preliminary report on infectious period," January 5, 2022, https://www.niid.go.jp/niid/en/2019-ncov-e/10884-covid19-66-en.html.

Lefferts et al., "Antigen Test Positivity After COVID-19 Isolation — Yukon-Kuskokwim Delta Region, Alaska, January–February 2022," MMWR Morb Mortal Wkly Rep 2022;71:293–298. DOI: http://dx.doi.org/10.15585/mmwr.mm7108a3.

Boucau et al., "Duration of viable virus shedding in SARS-CoV-2 omicron variant infection," medRxiv, March 2, 2022, DOI: https://doi.org/10.1101/2022.03.01.22271582.

[12] Ibid.

B. OSHA should retain detailed requirements for multilayered protections and enforce the standard without a safe harbor provision for compliance with CDC guidance. *A.2 – Additional Flexibility for Employers*

OSHA must retain and build on the clear requirements for multilayered protections in the Covid-19 Health Care ETS, not leave gaps in worker safety by allowing "flexibility" for employers or safe harbor based on compliance with CDC guidance.

1. Retain Detailed Requirements to Protect Workers.

The experience of NNU members and other health care workers during the Covid-19 pandemic has demonstrated that employers will abuse flexibility to take away key protections for workers. Covid-19 and its variants have been circulating in the United States for over two years and we have learned the specific multilayered approach to infection control that is critical to protect health care workers and patients and combat the Covid-19 pandemic. A multilayered approach to protecting health care workers from Covid-19 exposure and infection must not be optional for health care employers. OSHA should maintain and improve upon the various provisions of the Covid-19 Health Care ETS, prioritizing the health and safety of health care workers.

If employers could be trusted to protect employee safety at their own discretion, Congress would not have passed the OSH Act. While the several programmatic requirements of the Covid-19 Health Care ETS, which require employers to develop a Covid-19 plan and communicate it to employees, are strong and should be retained, specific detailed hazard mitigation measures to protect workers from Covid-19 are also necessary.

As patient advocates and fierce defenders of the public's health, NNU members have advocated for optimal mitigation measures in health care to protect the health and safety of nurses, other health care workers, and our patients. Since the beginning of the pandemic, nurses and other health care workers have been placed at significant risk by health care employers' failure to prepare for and respond to the Covid-19 pandemic. Nurses have been exposed to and infected with Covid-19 because their employers withheld lifesaving personal protective equipment (PPE), failed to properly screen patients for Covid-19, neglected to inform nurses of exposures, denied nurses Covid-19 tests, and prioritized profits over infection control and patient safety.

NNU surveyed registered nurses in June and July 2021, at a time when hospitals had access to information about effective Covid-19 control practices but were only beginning to implement the Covid-19 Health Care ETS. The results of this survey show that employers cannot

be relied upon to implement safe practices without detailed requirements in an OSHA standard.[13] During that period, only 61 percent of RNs reported wearing a respirator for every Covid-positive patient encounter and only 40 percent reported wearing respirators when caring for patients suspected of having Covid-19 or whose tests results were not completed. Only 23 percent of hospital RNs reported being notified of exposure to Covid-19 by their employer in a timely manner. 58 percent of hospital RNs reported that only staff who had symptoms had access to testing, even though approximately half of Covid-19 transmissions are from asymptomatic or pre-symptomatic infected individuals. Health care workers were not protected from transmission when employers had the flexibility to make their own decisions on protections.

NNU's latest survey of over 2,500 registered nurses, surveyed in February and March of 2022, showed employers still need to do much more to provide worker safety and health protections.[14] Only 71.8 percent of hospital RNs reported wearing a respirator for every Covid-positive patient encounter. 62 percent of hospital RNs reported having to reuse single-use PPE, an unsafe practice. After over two years of Covid-19 variants and surges, hospital employers still are not preparing to address surges safely. A mere 32 percent of hospital nurses reported that their employer has sufficient PPE stock to protect staff from a rapid Covid-19 surge, and just 24 percent reported that their employer has an overflow plan to place additional, trained staff to safely care for Covid-19 patients in isolation. Similar to the previous survey, 24 percent of hospital RNs reported that their employer notifies them of Covid-19 exposures in a timely manner, while 29 percent reported that they are informed of exposure but not in a timely fashion that permits effective infection control. Only 56.8 percent of hospital RNs reported that every patient is screened for recent exposure history to Covid-19. Only 48.6 percent reported that all visitors are screened for Covid-19 signs and symptoms and even fewer, 23.8 percent, reported that all visitors are screened for exposure history. In seven NNU surveys of RNs since the beginning of the Covid-19 pandemic, included in Attachment 2, results have been consistent: employers are not doing enough to protect workers.

We have enough information on Covid-19 transmission for OSHA to prescribe specific protection measures, instead of leaving the choice up to each employer. At this stage of the Covid-19 pandemic, substantial research has shown the necessary measures to protect workers from Covid-19 infection. The policies in the Covid-19 Health Care ETS on medical removal and return to work, cleaning, and ventilation should be strengthened not discarded. Employers should not be allowed to ignore the specific protection measures that the scientific evidence shows are necessary in favor of other options that will save them money in the short term. Employers have not done enough to act on ventilation and medical removal. More flexibility for employers would

[13] National Nurses United, "National nurse survey reveals that health care employers need to do more to comply with OSHA emergency temporary standard," September 27, 2021, https://www.nationalnursesunited.org/press/national-nurse-survey-reveals-health-care-employers-need-to-do-more-to-protect-workers.

[14] National Nurses United, "National nurse survey reveals significant increases in unsafe staffing, workplace violence, and moral distress," April 14, 2022, https://www.nationalnursesunited.org/press/survey-reveals-increases-in-unsafe-staffing-workplace-violence-moral-distress.

not improve the situation for workers and may ultimately result in health care workers' continued exposure to Covid-19 but leave OSHA with little ability to enforce protections where employers exploit flexibility in the standard.

As explained in the next section, aerosol transmission is the primary way Covid-19 is spread. Ventilation is an essential tool to combat aerosol transmission. As outlined in NNU's August 2021 comments to OSHA, the final standard should strengthen ventilation requirements in several ways, including requiring employers to improve ventilation systems and place and maintain high efficiency particulate air filter units in areas with confirmed or suspected Covid-19 patients.

2. Do not grant impunity to employers based on CDC guidance.

Allowing a "safe harbor" for employers violating the standard based on compliance with CDC guidance would grant impunity to employers who flout their obligations to protect workers. A safe harbor enforcement policy must not be incorporated into the final rule. As explained in the above answer to question A.1, the CDC's Healthcare Infection Control guidelines have consistently fallen short of what is needed to protect workers by lagging behind the science on aerosol transmission, allowing unsafe reuse of PPE, excessively deferring to employers, and failing to incorporate the precautionary principle. Deference to CDC guidance means making worker safety optional.

OSHA is the agency charged with protecting the health and safety of workers. It must not surrender that responsibility to another agency with different priorities. Allowing employers to avoid OSHA enforcement of the Covid-19 standard based on CDC guidance would, in effect, make the standard optional. It would mean that employers could pick and choose between rules and guidance promulgated by different agencies, based on whatever is cheapest and most convenient instead of being held to one standard designed to protect workers. Employers who did not want to follow the OSHA standard could instead lobby for changes to the CDC guidance, which can be made quickly without the opportunity for all stakeholders to have input through the notice and comment process.

Health and safety complaints filed with OSHA by NNU member nurses and employer responses, summarized in Appendix 4 and included in Attachment 7, show a pattern throughout the pandemic of employers failing to provide workers with critical protections against Covid-19 infection and justifying their neglect by reference to CDC guidance.

The danger of providing employer flexibility on medical removal or allowing employers to escape standard enforcement if the employer follows CDC guidance was exemplified when the CDC and states allowed crisis standards of care that loosened quarantine and isolation requirements for health care workers during the Omicron wave of Covid-19 infections. Enabled by the CDC guidance, employers pressured health care workers to report to work with active

Covid-19 infections, even when they were symptomatic and in the infectious period.[15] While the December 2021 CDC guidance rolling back worker isolation periods was dangerous as written, employers went even further, using the guidance to pressure employees to return to work before their symptoms began to improve.[16] This endangered the health of the infected workers, their coworkers, and their patients. OSHA should retain strict standards for medical removal and medical removal protection benefits and expand the list of symptoms that result in medical removal and testing to the full list of symptoms congruent with Covid-19. It is unacceptable to continue to allow workers' safety and health to be compromised with crisis standards two years into the Covid-19 pandemic.

A safe harbor would also cause confusion for workers and employers about what requirements apply. Competing authorities make it harder for workers to hold their employers accountable for obeying the standard and harder for employers to be confident in their compliance. Regulations work best when they are clear, consistent, and enforceable.

C. The final Covid-19 health care standard should include all health care settings and all workers in health care settings regardless of screening procedures or interaction with suspected or confirmed Covid-19 cases.

A.3 Removal of Scope Exemptions (e.g., ambulatory care facilities where Covid-19 patients are screened out, home healthcare) and A.4 Tailoring Controls to Address Interactions with People Suspected or Confirmed Covid-19

OSHA should remove scope exemptions and avoid tailoring controls based on suspected or confirmed Covid-19 infection because screening procedures based on symptoms or vaccinations status are not sufficient to determine that any patient or worker does not have an infectious Covid-19 infection and Covid-19 can easily spread between different parts of facilities due to short and long-range aerosol transmission, leaving all health care workers at significant risk of Covid-19 infection.

1. OSHA should eliminate exemptions to the scope of the Covid-19 Health Care ETS in the final standard.

As NNU argued in our original comments, OSHA should remove all exemptions to the scope of the Covid-19 Health Care ETS when issuing a permanent Covid-19 standard. The Covid-19 Health Care ETS exempts facilities where all employees are fully vaccinated and all non-employees are screened for Covid-19 prior to entry and individuals who have or may have Covid-19 are not allowed to enter the facility. Studies subsequent to the Covid-19 Health Care ETS's promulgation affirm what NNU's August 2021 comments stated: neither employee vaccination nor symptom-based screening of patients and visitors provides adequate assurance

[15] Shammas B, Knowles H, "Stressed hospitals are asking workers with covid to return — even if they may be infectious," Washington Post, January 23, 2022, https://www.washingtonpost.com/health/2022/01/23/hospital-workers-covid-isolation-cdc/.
[16] Ibid.

that all SARS-CoV-2 infections will be identified. Therefore, all health care workers need optimal workplace protections including respiratory protection, precautionary screening and testing, universal masking, physical distancing, and other measures.

a. OSHA should not exempt employers from the standard's scope solely on the basis of symptom-based screening because asymptomatic transmission of Covid-19 is common.

Studies have shown that symptom-based screening for Covid-19 misses between half and 100 percent of cases.[17] Screening based on Covid-19 symptoms should be part of a multi-measure approach to reducing Covid-19 transmission risk, but it is not sufficient on its own to prevent a significant risk that workers will contract Covid-19 because the virus is commonly spread by people who are not displaying any symptoms. Asymptomatic and pre-symptomatic individuals can spread infectious SARS-CoV-2 aerosols during breathing and speaking, without coughing or other respiratory symptoms. Scientific evidence suggests that asymptomatic and pre-symptomatic cases play a significant role in the spread of Covid-19.

- Asymptomatic and pre-symptomatic infected individuals can shed infectious virus and transmit SARS-CoV-2, regardless of vaccination status.[18]
- Approximately half of transmission events are due to asymptomatic and pre-symptomatic transmission.[19] Even the CDC's current best estimate is that 50 percent of transmission occurs prior to symptom onset.[20]

Combining symptom-based screening with testing using a reliable diagnostic test for SARS-CoV-2 for patients and visitors and implementing weekly surveillance testing of workers, as recommended in NNU's August 2022 comments, would be an improvement to screening requirements under the standard but would still not justify exempting facilities from all other forms of protection. Diagnostic tests, including polymerase chain reaction (PCR) and antigen tests, for SARS-CoV-2 are important but not perfect. False negatives can occur with all diagnostic tests. Several factors that can impact both PCR and antigen test results include poor sample collection, swab site, and timing of the sample. SARS-CoV-2 may not be present in high enough numbers at the swab site to register as a positive test even though the individual is infected and infectious. Timing of specimen collection with respect to symptom onset is also

[17] Letizia et al., "SARS-CoV-2 Transmission among Marine Recruits during Quarantine," New England Journal of Medicine, December 17, 2020, https://www.nejm.org/doi/full/10.1056/NEJMoa2029717.

Ng et al., "SARS-CoV-2 seroprevalence and transmission risk factors among high-risk close contacts: a retrospective cohort study," The Lancet Infectious Diseases, November 2, 2020, https://doi.org/10.1016/S1473-3099(20)30833-1.

[18] See Appendix B for citations.

[19] See Appendix B for citations.

[20] U.S. Centers for Disease Control and Prevention, "COVID-19 Pandemic Planning Scenarios," Updated March 19, 2021, https://www.cdc.gov/coronavirus/2019-ncov/hcp/planning-scenarios.html.

important as viral load can change over the course of infection.[21] Therefore, a negative diagnostic test result is not reliable by itself in ruling out a Covid-19 infection.

Antigen tests are also not as sensitive as PCR tests. This means that positive results from antigen tests are highly accurate, but there is a higher chance of false negatives, particularly for asymptomatic or pre-symptomatic infections.[22] For example, one study compared PCR tests and an authorized antigen test for SARS-CoV-2 and found that antigen tests detected 79 percent of symptomatic infections but only 44 percent of asymptomatic infections.[23] Negative results from antigen tests may need to be confirmed with a PCR test prior to making treatment decisions or to prevent possible spread of the virus due to a false negative test result.

Identification and isolation of all SARS-CoV-2 infections among patients, visitors, and staff is paramount to preventing transmission within health care facilities. NNU urges OSHA to require precautionary screening and testing of all patients and visitors entering health care facilities. Precautionary screening and testing include screening for symptoms of Covid-19 combined with reliable diagnostic testing and screening for recent exposure history.[24] Additionally, health care workers should be tested and screened for Covid-19, including for asymptomatic infections. Testing and screening for health care workers should include at least weekly surveillance testing for SARS-CoV-2 and proactive monitoring of all staff exposures to Covid-19, in addition to screening health care workers for symptoms of Covid-19 prior to each shift.[25] Testing should be provided for all health care workers regardless of symptoms and vaccination status. Multilayered protection is crucial.

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[21] Mackenzie, Hareza, et al., "Clinical Characteristics of False Negative SARS-CoV-2 Test Results Amongst Hospitalized Patients," Infection Control & Hospital Epidemiology, April 19, 2021, https://www.cambridge.org/core/journals/infection-control-and-hospital-epidemiology/article/clinical-characteristics-of-false-negative-sarscov2-test-results-amongst-hospitalized-patients/ACEAC918B019EB8C9234A5E5BBEC5D93.

Dugdale, C.M., M.N. Anahtar, et al., "Clinical, Laboratory, and Radiologic Characteristics of Patients with Initial False-Negative Severe Acute Respiratory Syndrome Coronavirus 2 Nucleic Acid Amplification Test Results," Open Forum Infectious Diseases, January 2021, 8(1), https://doi.org/10.1093/ofid/ofaa559.

[22] Pray et al., "Performance of an Antigen-Based Test for Asymptomatic and Symptomatic SARS-CoV-2 Testing at Two University Campuses — Wisconsin, September–October 2020," MMWR Morb Mortal Wkly Rep 2021;69:1642–1647. DOI: http://dx.doi.org/10.15585/mmwr.mm695152a3.

[23] Ford et al., "Epidemiologic Characteristics Associated with Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) Antigen-Based Test Results, Real-Time Reverse Transcription Polymerase Chain Reaction (rRT-PCR) Cycle Threshold Values, Subgenomic RNA, and Viral Culture Results from University Testing," Clinical Infectious Diseases, April 12, 2021, https://doi.org/10.1093/cid/ciab303.

[24] National Nurses United, "Covid Testing and Screening in Health Care Settings: A Science-Driven Approach to Protecting Patient, Health Care Worker, and Public Health," June 11, 2021, https://www.nationalnursesunited.org/sites/default/files/nnu/documents/0621_Covid19_IssueBrief_TestingScreening.pdf.

[25] Ibid.

b. Exempting facilities and areas with all vaccinated employees from protections is unsafe because vaccination alone does not prevent the transmission of Covid-19.

Covid-19 vaccines, while an important element of a public health response to this pandemic, do not prevent transmission on their own. Studies have shown that fully vaccinated and boosted individuals can readily transmit the virus and that vaccine-induced immunity wanes over time.[26] Recent SARS-CoV-2 variants, particularly Omicron and its subvariants, have been shown to evade vaccine protection.[27] Studies have also shown that even asymptomatic and mild Covid-19 infections can end up causing serious neurological, cardiovascular, and other sequelae,[28] underlining the need to maintain workplace precautions to prevent the spread of this virus.

While OSHA and employers should encourage and facilitate vaccination as one layer of protection against Covid-19, being vaccinated does not prevent a worker from getting infected, experiencing serious health consequences, or infecting other workers and patients. Studies since OSHA issued the Covid-19 Health Care ETS confirm what NNU argued in our August 2022 comments: vaccination cannot justify exemption from the Covid-19 health care standard or reductions in the other layers of protection needed. Workers are still at significant risk of being infected by Covid-19 in areas where everyone present is vaccinated.

2. OSHA should not limit protections to interactions with people with confirmed or suspected Covid-19 because methods to determine who has Covid-19 are unreliable and aerosol transmission means Covid-19 particles can move throughout the facility.

For the same reasons that screening procedures alone do not eliminate significant risk for health care workers, it is also ineffective to tailor controls to workers who interact with people who have confirmed or suspected Covid-19 infections. Moreover, Covid-19 is transmissible through short and long-range aerosol transmission which makes it impractical to treat separate areas of a single facility as containing different levels of exposure or infection risk. Additionally, in practice, hospital employers are not taking effective steps to screen for suspected or confirmed Covid-19 infections, which means that all workers in the facility must be presumed to be

[26] See Appendix B for citations.
[27] See Appendix B for citations.
[28] Xie et al., "Long-term cardiovascular outcomes of COVID-19," Nature Medicine, February 7, 2022, https://www.nature.com/articles/s41591-022-01689-3.
Douaud et al., "SARS-CoV-2 is associated with changes in brain structure in UK Biobank," Nature, March 7, 2022, https://www.nature.com/articles/s41586-022-04569-5.
Xie and Al-Aly, "Risks and burdens of incident diabetes in long COVID: a cohort study," The Lancet Diabetes & Endocrinology, March 21, 2022, https://doi.org/10.1016/S2213-8587(22)00044-4.
National Nurses United, "Scientific Brief: Long Covid and Its Implications," June 25, 2021, https://www.nationalnursesunited.org/sites/default/files/nnu/graphics/documents/0621_Covid19_HS_ScientificBrief_LongCovid.pdf.

interacting with people who have suspected Covid-19 infections. Moreover, in addition to universal protections, OSHA should require specific protections related to suspected or confirmed Covid-19 cases, including isolation in negative pressure rooms and optimal PPE for workers.

a. Long-range aerosol transmission means that workers are vulnerable to infection by patients, visitors, or workers with Covid-19 in other parts of the facility.

Scientific evidence is clear that aerosol transmission is the significant and predominant mode for SARS-CoV-2, the virus that causes Covid-19.[29] SARS-CoV-2 is transmitted via infectious aerosols emitted when infected individuals breathe, speak, sing, cough, or sneeze. These aerosol particles can travel through the air to distances farther than six feet and can remain suspended in the air for long periods of time.[30] One study collected viable (infectious) SARS-CoV-2 virus in the air 6.5 to 15.7 feet away from Covid-19 patients in hospital rooms.[31] Another study found SARS-CoV-2 in ventilation exhaust filters located at least 50 meters (164 feet) from patient room vent openings within wards.[32] Given the inadequate screening and testing for Covid-19 in health care settings, coupled with the large proportion of asymptomatic individuals and the rapidity and distance with which the virus spreads via aerosols, the scope and application of OSHA's permanent Covid-19 standard must include all health care workers. Because individuals who do not know they are infected can emit infectious virus into the air and, in light of the spread of more transmissible variants in the United States and around the world, effective prevention of SARS-CoV-2 transmission remains of paramount importance for the protection of the health and safety of all health care workers.

Workplace health is patient and public health. Protecting every worker in health care is foundational to providing safe patient care and combatting the Covid-19 pandemic. NNU urges OSHA to ensure that the scope of the final standard covers all employers, regardless of screening procedures for non-employees and/or vaccination status of employees, so that that all workers are protected from Covid-19 through a multilayered approach.

b. Hospitals and other health care employers are not effectively screening for suspected or confirmed Covid-19 infections.

NNU survey data shows that health care facilities are not taking effective steps to screen for Covid-19 infections which means that limiting protections to health care workers who work with suspected or confirmed Covid-19 cases will not be effective.

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[29] See Appendix B for citations.

[30] See Appendix B for citations.

[31] Lednicky et al., "Viable SARS-CoV-2 in the air of a hospital room with COVID-19 patients," International Journal of Infectious Diseases, September 15, 2020, https://doi.org/10.1016/j.ijid.2020.09.025.

[32] Nissen et al., "Long-distance airborne dispersal of SARS-CoV-2 in COVID-19 wards," Scientific Reports, November 11, 2020, https://www.nature.com/articles/s41598-020-76442-2.

NNU has conducted seven Covid-19 surveys with more than 82,000 responses from registered nurses across the country to track trends in health care employers' preparedness and response to the pandemic. NNU's Covid-19 surveys document the consistent failures of health care employers to properly screen patients and visitors for Covid-19 and to adequately test health care workers and notify them of workplace exposures. In May 2020, only 16 percent of nurses reported that they had been tested for Covid-19.[33] In July 2020, only 23 percent of nurses reported being tested and only 31 percent of nurses reported that every patient is screened for Covid-19.[34] In November 2020, only 43 percent of nurses who work in hospitals reported that all patients are screened for Covid-19, while less than half reported that they have ever been tested for Covid-19 and more than 70 percent of nurses reported that their employers do not inform them of exposures in a timely manner.[35] In March 2021, slightly more than half of nurses who work in hospitals reported that all patients are screened for Covid-19 and only 54 percent reported that they have ever been tested for Covid-19.[36]

In NNU's Covid-19 survey conducted in June and July of 2021 and published in September 2021:[37]

- Only 41 percent of RNs at hospitals reported that that any staff who asks for testing has access, nearly 20 percent said access to testing is limited at their facility, and 7 percent said testing is not available where they work. Of the nurses who answered additional questions on employer testing, 58 percent said that only staff who are symptomatic can get tested.
- Only two-thirds of hospital RNs report that all patients are screened for Covid-19 signs and symptoms before or upon arrival at the facility. Less than a third of hospital RNs reported that every patient is tested for Covid-19 before or upon arrival at the facility.
- Only 53 percent of hospital RNs reported that every visitor is screened for Covid-19 signs and symptoms before or upon arrival at the facility and a mere 4 percent of RNs reported that all visitors are tested for Covid-19 before or upon arrival.

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[33] National Nurses United, "New survey of nurses provides frontline proof of widespread employer, government disregard for nurse and patient safety, mainly through lack of optimal PPE," May 2020, https://www.nationalnursesunited.org/press/new-survey-results.

[34] National Nurses United, "National nurse survey reveals devastating impact of reopening too soon," July 2020, https://www.nationalnursesunited.org/press/national-nurse-survey-reveals-devastating-impact-reopening-too-soon.

[35] National Nurses United, "National nurse survey exposes hospitals' knowing failure to prepare for a Covid-19 surge during flu season," November 2020, https://www.nationalnursesunited.org/press/national-nurse-survey-4-exposes-hospitals-knowing-failure-prepare-covid-19-surge.

[36] National Nurses United, "National RN survey highlights continued hospital failures to prioritize nurse and patient safety during pandemic," March 2021, https://www.nationalnursesunited.org/press/fifth-survey-of-national-nurses-highlights-continued-hospital-failures.

[37] National Nurses United, "National nurse survey reveals that health care employers need to do more to comply with OSHA emergency temporary standard," September 2021, https://www.nationalnursesunited.org/press/national-nurse-survey-reveals-health-care-employers-need-to-do-more-to-protect-workers.

In NNU's most recent Covid-19 survey, conducted in February and March of 2022 and published in April 2022:[38]

- Nearly a quarter (24 percent) of hospital RNs reported that their employer notifies them of Covid-19 exposures in a timely manner, while 29 percent of hospital RNs reported that nurses are informed of exposures but not in a timely fashion. Prompt notification is essential for infection control.
- Access to testing is still an issue at some hospitals: 17.8 percent of RNs report that access to testing has declined since the beginning of the pandemic.
- Only 56.8 percent of hospital RNs report that every patient is screened for recent exposure history to Covid-19, down from 61.7 percent in our September survey. Screening of visitors has also gone down since our last survey: 48.6 percent of hospital nurses reported that all visitors are screened for Covid signs and symptoms at their facility, down from 52.7 percent in our September 2021 survey.
- Only 23.8 percent of hospital RNs report that every visitor is screened for recent Covid exposure history at their facility, down from 38.5 percent in our September survey.

Screening for Covid-19 symptoms, in combination with reliable diagnostic testing and screening for recent exposure history, is necessary to effectively identify and isolate individuals who may be infectious and to prevent spread of the virus within health care facilities. Yet, as NNU's survey results demonstrates, employers have not consistently implemented the screening and testing measures that are necessary, as part of a multiple measures approach, to effectively prevent worker exposure to Covid-19.

c. <u>OSHA should require employers to isolate suspected and confirmed Covid-19 patients and provide optimal PPE to workers exposed to these patients in addition to providing universal protections to all workers.</u>

The ETS should include, at a minimum, the following additional protections in the standard for health care workers who interact with suspected or confirmed Covid-19 cases:

- Optimal PPE, including a powered air-purifying respirator,
- Requiring the availability of sufficient negative air pressure rooms or airborne infection isolation rooms to promptly isolate all suspected and confirmed Covid-19 patients, and
- A prohibition on mixing Covid-positive patients, patients who may have Covid-19, and patients who do not have Covid-19 in the same units or for a single health care worker assignment.

[38] National Nurses United, "National nurse survey reveals significant increases in unsafe staffing, workplace violence, and moral distress," April 14, 2022, https://www.nationalnursesunited.org/press/survey-reveals-increases-in-unsafe-staffing-workplace-violence-moral-distress.

Even though NNU supports these additional protections for workers who care for suspected or confirmed Covid-19 cases, the unreliability of confining Covid-19 exposure and infection risk to particular areas means that all health care workers will still need multiple measures of workplace protections under the standard, including respiratory protection, precautionary screening and testing, universal masking, physical distancing, and other measures.

Promptly isolating patients who may have Covid or are confirmed to have Covid and establishing dedicated Covid-19 units in negative pressure rooms or airborne infection isolation rooms are essential to preventing transmission within health care facilities. Negative pressure rooms or airborne infection isolation rooms are essential engineering controls to reduce the risk of the SARS-CoV-2 virus spreading through health care settings in the air. However, by themselves, negative pressure rooms are not enough to prevent worker exposure to Covid-19 — personal protective equipment is necessary to enter the rooms safely. Additionally, some studies have also documented positive air samples outside negative pressure rooms where Covid-positive patients are isolated.[39] Every time a negative pressure room door is opened, the airflow and the isolation are disrupted.

Thus, given that workers in a Covid-19 unit may be exposed to Covid-19, establishing dedicated Covid-19 units and ensuring no mixed assignments is also essential to protecting patients and other health care facility staff. When Covid-positive and non-Covid-19 patients are mixed on the same unit or for the same worker's assignment, there is an increased potential for transmission, both through the air and through health care workers moving around the unit and caring for multiple patients.

D. OSHA should retain provisions requiring employer support for employee vaccination and extend the requirement to support for boosters. *A.5.2 Employer Support of Employee Vaccination*

The OSHA Health Care ETS included provisions requiring employers to support Covid-19 vaccination for employees by making reasonable time and paid leave available to the employee for vaccination and recovery from any side effects. OSHA should retain this provision in all cases and extend it to require support for employees staying up to date with booster doses recommended or permitted by the CDC. OSHA should also clarify that paid time of up to 4 hours, including travel time, should be required for each vaccine dose and each booster with additional paid sick leave beyond the initial 4 hours required to recover from side effects.

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[39] Stern, Al-Hemoud, et al., "Levels and Particle Size Distribution of Airborne SARS-CoV-2 at a Healthcare Facility in Kuwait," Science of The Total Environment, March 27, 2021, https://doi.org/10.1016/j.scitotenv.2021.146799.

Marshall et al., "Use of portable air cleaners to reduce aerosol transmission on a hospital COVID-19 ward," Infection, Disease & Health, November 1, 2021, https://doi.org/10.1016/j.idh.2021.09.014.

Santarpia et al., "Aerosol and surface contamination of SARS-CoV-2 observed in quarantine and isolation care," Scientific Reports, July 29, 2020, https://doi.org/10.1038/s41598-020-69286-3.

Vaccination is an important part of a multi-measure approach to combatting Covid-19. While the Centers for Medicare and Medicaid Services (CMS) vaccination rule requires vaccination for health care workers in certain settings regulated by CMS, it does not provide equivalent support to facilitate vaccination. Employees should not have to pay the costs for keeping themselves and their patients safe and their employers legally compliant by getting vaccinated. The cost to employers covered by the CMS rule to provide support for the initial two vaccine doses will be minimal, as their current employees are already required to be vaccinated and most future employees who have already been working in the health care field will be vaccinated.[40] This support requirement will be particularly important to incentivize booster doses, which are not currently required by CMS and provide substantial additional protection against Covid-19 infection, transmission, and severe disease compared to the original vaccination doses alone.

Scientific data is clear that Covid-19 vaccine boosters are necessary as vaccine-induced immunity wanes over time, most notably against the immune-evasive Omicron variant.[41] Gruell et al. reported a near-complete lack of neutralizing activity against the Omicron variant after two doses of mRNA vaccine.[42] Another study found that vaccine efficacy against Omicron-associated hospitalization was only 57 percent six months after receipt of two mRNA Covid-19 vaccines, whereas a booster dose increased vaccine effectiveness to 90 percent.[43] Finally, the U.K. Health Security Agency found that, without a booster dose, effectiveness against symptomatic Omicron infection dropped from 65 to 70 percent to about 15 percent by 25 weeks after the second dose.[44] The agency also found that a booster dose restored protection against mortality to 95 percent compared to only 60 percent with two doses.[45]

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[40] *See* "CMS Omnibus Covid-19 Health Care Staff Vaccination Rule —Implementation Timeline," https://www.cms.gov/files/document/health-care-staff-vaccination-rule-implementation-timeline.pdf (showing that deadlines for first and second vaccination dose have already passed in all states).

[41] See Appendix B for citations.

[42] Gruell et al., "mRNA booster immunization elicits potent neutralizing serum activity against the SARS-CoV-2 Omicron variant," Nature Medicine, January 19, 2022, https://doi.org/10.1038/s41591-021-01676-0.

[43] Thompson et al., "Effectiveness of a Third Dose of mRNA Vaccines Against COVID-19–Associated Emergency Department and Urgent Care Encounters and Hospitalizations Among Adults During Periods of Delta and Omicron Variant Predominance — VISION Network, 10 States, August 2021–January 2022," MMWR Morb Mortal Wkly Rep 2022;71:139–145. DOI: http://dx.doi.org/10.15585/mmwr.mm7104e3.

[44] UK Health Security Agency, "COVID-19 vaccine surveillance report Week 15," last updated April 14, 2022, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1069256/Vaccine_surveillance_report_-_week_15.pdf.

[45] Ibid.

E. OSHA should not base workplace protections on employee or community vaccination rates. *A.5.3 – Requirements for Vaccinated Workers; A.9 – Evolution of SARS-CoV-2 into a Second Novel Strain; B.1 – The average number of days health care workers have taken away from work resulting from a Covid infection or quarantine and the percentage of HCWs who have taken days away from work due to a Covid infection or quarantine; B.2 – The health effects for fully vaccinated employees, and fully vaccinated and boosted employees, who test positive for Covid-19, including data on days away from work, hospitalizations, long Covid, and fatalities; B.5 – The health effects and transmission rate of new and emerging variants and sublineages of variants, including Omicron BA.2.; B.7 – The clinical indicators that will reliably predict the degree of protection afforded by prior infection (i.e., infection-acquired immunity), and how long such protection lasts.; B.8 – Vaccine efficacy and how such efficacy decreases over time.*

OSHA should not base the application of the final Covid-19 standard on either employee or community vaccination rate. Rather, OSHA's final Covid-19 standard should require optimal, layered workplace protections for nurses and other health care workers, irrespective of workers' vaccination status. Exemptions for protections, such as wearing facemasks, observing physical distancing, exposure notification and medical removal and testing after an exposure to Covid-19, should not be made based on vaccination status.

1. ***Vaccinated employees can infect others because Covid-19 variants are able to escape immune-protection offered by vaccines and previous infection.***

Since the beginning of the pandemic, National Nurses United has advocated for a comprehensive, multilayered approach to infection control to protect both worker and public health — even after the implementation of Covid-19 vaccines. While Covid-19 vaccines are important public health tools, a singular focus on vaccines will always be insufficient to combat the spread of disease. Multiple SARS-CoV-2 variants of concern continue to emerge and spread rapidly nationwide and around the world.[46]

Even prior to the Omicron variant, at least three variants of concern — B.1.351 (Beta), P.1 (Gamma) and B.1.617.2 (Delta) — acquired immune escape mutations.[47] In addition to the

[46] U.S. Centers for Disease Control and Prevention, "SARS-CoV-2 Variant Classifications and Definitions," last updated December 1, 2021, https://www.cdc.gov/coronavirus/2019-ncov/variants/variant-classifications.html.

[47] Wang et al., "Antibody resistance of SARS-CoV-2 variants B.1.351 and B.1.1.7," Nature, March 8, 2021, https://doi.org/10.1038/s41586-021-03398-2.

McEwen et al., "Variants of concern are overrepresented among post-vaccination breakthrough infections of SARS-CoV-2 in Washington State," medRxiv, May 25, 2021, https://www.medrxiv.org/content/10.1101/2021.05.23.21257679v1.

Jones, J, "COVID-19 Vaccine Effectiveness for Moderna and Janssen Vaccines," CDC Advisory Committee on Immunization Practices (ACIP), October 20-21, 2021 Meeting, https://www.cdc.gov/vaccines/acip/meetings/downloads/slides-2021-10-20-21/10-COVID-jones-508.pdf

Delta variant's ability to escape immune system recognition, Delta also demonstrated increased transmissibility and disease severity compared to previous variants.[48] Data indicating that vaccinated individuals with breakthrough infections can readily transmit the virus and that infection results in similarly high viral loads in vaccinated and unvaccinated people first emerged with the Delta variant and resulted in the CDC reinstating masking in indoor public settings.[49] Subsequent studies found higher rates of breakthrough infection with Delta compared to previous variants.[50] One study documented multiple vaccine breakthrough cases and transmissions of the Delta variant between family members associated with events surrounding an outdoor wedding.[51] Bart et al. found that a SARS-CoV-2 Delta outbreak that occurred in a Connecticut nursing home was likely initiated by a fully vaccinated staff member and propagated by fully vaccinated persons.[52] Kislaya et al. found significantly higher odds of vaccine breakthrough infection in Delta-infected patients than in Alpha-infected patients.[53] Wang et al. found a significantly larger proportion of hospitalized Covid-19 patients had severe or critical breakthrough infections during the Delta dominant period compared to an earlier period when the Delta variant accounted for less than 20 percent of Covid-19 cases.[54]

The most recent SARS-CoV-2 variant of concern, B.1.1.529 (Omicron), rapidly replaced the highly transmissible Delta variant globally in January 2021.[55] The Delta variant is estimated to be 60 percent more transmissible than the Alpha variant, which is estimated to be 50 percent

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[48] Li et al., "Viral infection and transmission in a large well-traced outbreak caused by the Delta SARS-CoV-2 variant," Virological, July 2021, https://virological.org/t/viral-infection-and-transmission-in-a-large-well-traced-outbreak-caused-by-the-delta-sars-cov-2-variant/724.

Linsenmeyer et al., "Cryptic Transmission of the Delta Variant AY.3 Sublineage of SARS-CoV-2 among Fully Vaccinated Patients on an Inpatient Ward," medRxiv, August 10, 2021, https://www.medrxiv.org/content/10.1101/2021.08.05.21261562v1

Fisman and Tuite, "Evaluation of the relative virulence of novel SARS-CoV-2 variants: a retrospective cohort study in Ontario, Canada," Canadian Medical Association Journal, October 25, 2021, https://doi.org/10.1503/cmaj.211248.

[49] "Statement from CDC Director Rochelle P. Walensky, MD, MPH on Today's MMWR," October 9, 2021, https://www.cdc.gov/coronavirus/2019-ncov/science/science-briefs/vaccine-induced-immunity.html.

Brown et al., "Outbreak of SARS-CoV-2 Infections, Including COVID-19 Vaccine Breakthrough Infections, Associated with Large Public Gatherings — Barnstable County, Massachusetts, July 2021," MMWR Early Release, August 6, 2021, https://www.cdc.gov/mmwr/volumes/70/wr/mm7031e2.htm?s_cid=mm7031e2_w.

[50] See Appendix B for citations.

[51] Farinholt et al., "Transmission event of SARS-CoV-2 delta variant reveals multiple vaccine breakthrough infections," BMC Medicine, October 1, 2021, https://bmcmedicine.biomedcentral.com/articles/10.1186/s12916-021-02103-4.

[52] Bart et al., "Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) Delta Outbreak Among Fully Vaccinated Nursing Home Residents Likely Initiated by a Fully Vaccinated Staff Member – Connecticut, July–August 2021," Clinical Infectious Diseases, December 10, 2021, https://doi.org/10.1093/cid/ciab1025

[53] Kislaya et al., "Comparative Effectiveness of Coronavirus Vaccine in Preventing Breakthrough Infections among Vaccinated Persons Infected with Delta and Alpha Variants," Emerging Infectious Diseases, December 7, 2021, DOI: 10.3201/eid2802.211789

[54] Wang et al., "Severe breakthrough COVID-19 cases in the SARS-CoV-2 delta (B.1.617.2) variant era," The Lancet, December 3, 2021, DOI: https://doi.org/10.1016/S2666-5247(21)00306-2

[55] Viana et al., "Rapid epidemic expansion of the SARS-CoV-2 Omicron variant in southern Africa," Nature, January 7, 2022. https://doi.org/10.1038/s41586-022-04411-y

more transmissible than preexisting strains.[56] Strikingly, the Omicron variant is estimated to be at least three times more infectious than the Delta variant.[57] Omicron is also significantly better at evading immune protection than Delta and previous variants, which has contributed to its exponential spread worldwide.[58] Omicron is highly divergent from the wild-type strain and is the most heavily mutated variant to emerge so far with over 30 mutations in the spike glycoprotein alone and additional mutations in other regions of the virus.[59] Its large number of mutations enables it to adhere to human cells more efficiently than previous variants and can infect those with either vaccine- or infection-derived immunity.[60] Studies have shown that Omicron has a higher risk of reinfection compared to previous variants of concern. Researchers at the Imperial College of London estimated a 5.4-fold higher risk of reinfection with Omicron compared to Delta.[61] A report from the U.K. Office of National Statistics found that the risk of reinfection was 10 times higher in the Omicron dominant period than the Delta dominant period.[62] A recent study from the CDC documented reinfections from Omicron following an initial Delta infection within 90 days, with the shortest interval being 23 days. The majority of the cases were children 11 years and younger, with one fully vaccinated health care worker whose reinfection resulted in hospitalization.[63]

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[56] Allen et al., "Increased household transmission of Covid-19 cases associated with SARS-CoV-2 Variant of Concern B.1.617.2: a national case-control study," Public Health England, June 2021, https://khub.net/documents/135939561/405676950/Increased+Household+Transmission+of+COVID-19+Cases+-+national+case+study.pdf/7f7764fb-ecb0-da31-77b3-b1a8ef7be9aa.

[57] U.S. Centers for Disease Control and Prevention, "What We Know About Quarantine and Isolation," February 25, 2022, https://www.cdc.gov/coronavirus/2019-ncov/if-you-are-sick/quarantine-isolation-background.html.

Ito et al., "Relative instantaneous reproduction number of Omicron SARS-CoV-2 variant with respect to the Delta variant in Denmark," Journal of Medical Virology, December 30, 2021, https://doi.org/10.1002/jmv.27560.

Baker et al., "SARS-CoV-2 B.1.1.529 (Omicron) Variant Transmission Within Households — Four U.S. Jurisdictions, November 2021–February 2022," MMWR Early Release, February 25, 2022, https://www.cdc.gov/mmwr/volumes/71/wr/mm7109e1.htm.

[58] World Health Organization, "Enhancing response to Omicron SARS-CoV-2 variant: Technical brief and priority actions for Member States," last updated January 21, 2022, https://www.who.int/docs/default-source/coronaviruse/2022-01-21-global-technical-brief-and-priority-action-on-omicron-sars-cov-2-variant.pdf.

[59] Viana et al., "Rapid epidemic expansion of the SARS-CoV-2 Omicron variant in southern Africa," Nature, January 7, 2022, https://doi.org/10.1038/s41586-022-04411-y

[60] National Institutes of Health, "COVID-19 vaccines induce immune response to Omicron," February 15, 2022, https://www.nih.gov/news-events/nih-research-matters/covid-19-vaccines-induce-immune-response-omicron.

[61] Ferguson et al., "Report 49 - Growth, population distribution and immune escape of Omicron in England," Imperial College of London, December 16, 2021, https://www.imperial.ac.uk/mrc-global-infectious-disease-analysis/covid-19/report-49-omicron/.

[62] Office for National Statistics, "Coronavirus (COVID-19) Infection Survey, characteristics of people testing positive for COVID-19, UK: 30 March 2022," March 30, 2022, https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/conditionsanddiseases/bulletins/coronaviruscovid19infectionsurveycharacteristicsofpeopletestingpositiveforcovid19uk/30march2022.

[63] Roskosky et al., "*Notes from the Field*: SARS-CoV-2 Omicron Variant Infection in 10 Persons Within 90 Days of Previous SARS-CoV-2 Delta Variant Infection — Four States, October 2021–January 2022," MMWR Morb Mortal Wkly Rep 2022;71:524–526. DOI: http://dx.doi.org/10.15585/mmwr.mm7114a2external icon

Vaccine effectiveness against symptomatic disease with the Omicron variant is also significantly lower than against previous variants, with rapid waning even with a booster dose.[64] For example, the latest data from the U.K. Health Security Agency found that two to four weeks after an mRNA Covid-19 booster dose during the Omicron surge, vaccine effectiveness dropped from around 60 to 75 percent to almost no effect 20 weeks and after.[65] A recent study from Israel found significant reduction in neutralizing antibodies five months after the third mRNA Covid-19 vaccine. Researchers also found low vaccine efficacy against infections in health care workers as well as relatively high viral loads, suggesting that those who were infected were infectious.[66] A recent Morbidity and Mortality Weekly Report found that booster protection against Covid-associated emergency department and urgent care visits and hospitalizations among adults declined within four months during Omicron predominance.[67] Another study also found that booster protection against Omicron hospitalization declines from 91 percent to 67 percent after 105 days among adults aged 18 to 64 years of age.[68]

In recent weeks, the Omicron subvariant BA.2 quickly began displacing the dominant lineage, BA.1, in several countries. The U.K. estimates a 75 percent greater relative growth rate for BA.2 compared to BA.1.[69] Researchers from Denmark found that BA.2 is associated with higher susceptibility of infection among households, regardless of vaccination status, and is better at infecting vaccinated and boosted individuals, indicating greater immune-evasive properties compared to BA.1.[70] Reinfection with BA.2 following a previous BA.1 infection can occur with an interval time as short as 20 days.[71] In the United States, the BA.2 variant of concern nearly tripled from 26.3 percent in early March to 71.9 percent of sequenced cases four weeks later in early April.[72] Strikingly, the recently identified BA.2.12.1 sublineage is now

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[64] See Appendix B for citations.

[65] U.K. Health Security Agency, "COVID-19 vaccine surveillance report Week 15," last updated April 14, 2022, available at https://www.gov.uk/government/publications/covid-19-vaccine-weekly-surveillance-reports

[66] Regev-Yochay et al., "Efficacy of a Fourth Dose of Covid-19 mRNA Vaccine against Omicron," The New England Journal of Medicine, March 16, 2022, DOI: 10.1056/NEJMc2202542

[67] Ferdinands et al., "Waning 2-Dose and 3-Dose Effectiveness of mRNA Vaccines Against COVID-19–Associated Emergency Department and Urgent Care Encounters and Hospitalizations Among Adults During Periods of Delta and Omicron Variant Predominance — VISION Network, 10 States, August 2021–January 2022," MMWR Early Release, February 11, 2022, https://www.cdc.gov/mmwr/volumes/71/wr/mm7107e2.htm.

[68] U.K. Health Security Agency, "COVID-19 vaccine surveillance report Week 12," last updated March 24, 2022, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1063023/Vaccine-surveillance-report-week-12.pdf.

[69] U.K. Health Security Agency, "SARS-CoV-2 variants of concern and variants under investigation in England Technical briefing 39," last updated March 25, 2022, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1063424/Tech-Briefing-39-25March2022_FINAL.pdf.

[70] Lyngse et al., "Transmission of SARS-CoV-2 Omicron VOC subvariants BA.1 and BA.2: Evidence from Danish Households," medRxiv, January 30, 2022, https://www.medrxiv.org/content/10.1101/2022.01.28.22270044v1.

[71] Stegger et al., "Occurrence and significance of Omicron BA.1 infection followed by BA.2 reinfection," medRxiv, February 22, 2022, https://www.medrxiv.org/content/10.1101/2022.02.19.22271112v1.

[72] U.S. Centers for Disease Control and Prevention, "COVID Data Tracker" last updated April 5, 2022, https://covid.cdc.gov/covid-data-tracker/#variant-proportions.

outcompeting BA.2, accounting for nearly one in five infections.[73] Data from the New York State Department of Health estimates a 23 to 27 percent growth advantage over the Omicron BA.2 subvariant.[74]

2. ***New variants of concern will continue to emerge, some of which may be more severe and evade vaccine protection. The Covid-19 standard should apply to new coronavirus strains with similar transmission and effects.*** *A.9 – Evolution of SARS-CoV-2 into a Second Novel Strain.*

The SARS-CoV-2 coronavirus continues to evolve. Multiple variants of concern have emerged rapidly, none of which have originated from the prevailing lineage.[75] Newly designated recombinant lineages have also emerged in various countries.[76] Additionally, multiple spillover events from humans to white-tailed deer and other animals have occurred.[77] Animal-to-human transmission among captive minks and pet hamsters has also been documented. Adaptation in animals is one route by which new variants are likely to emerge, posing an elevated risk for human populations.[78] As a result of abandoned public health infection control protections, SARS-CoV-2 is set for continuous circulation, further evolution, and an array of potential zoonotic reservoirs. As such, ongoing rapid antigenic evolution is likely to produce new variants of concern that may be more severe and evade vaccine protection.[79] OSHA's permanent Covid-19 standard should apply not only to Covid-19 but also to subsequent related strains of the virus that are transmitted through aerosols. OSHA should operate according to the precautionary principle and presume that subsequent novel coronaviruses are aerosol transmissible until proven otherwise. OSHA must require health care employers to provide optimal workplace protections,

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[73] U.S. Centers for Disease Control and Prevention, "COVID Data Tracker," last updated April 19, 2022, https://covid.cdc.gov/covid-data-tracker/#variant-proportions.

[74] New York State Department of Health, "New York State Department of Health Announces Emergence of Recently Identified, Highly Contagious Omicron Subvariants in New York and Urges Continued Vigilance Against COVID-19," April 13, 2022, https://www.health.ny.gov/press/releases/2022/2022-04-13_covid-19.htm.

[75] Markov et al., "Antigenic evolution will lead to new SARS-CoV-2 variants with unpredictable severity," Nature Reviews Microbiology, March 14, 2022, https://doi.org/10.1038/s41579-022-00722-z.

[76] U.K. Health Security Agency, "SARS-CoV-2 variants of concern and variants under investigation in England Technical briefing 40," last updated April 8, 2022, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1067672/Technical-Briefing-40-8April2022.pdf.

World Health Organization, "Weekly epidemiological update on COVID-19 - 5 April 2022," last updated April 5, 2022, https://www.who.int/publications/m/item/weekly-epidemiological-update-on-covid-19---5-april-2022.

[77] World Organisation for Animal Health, "SARS-COV-2 IN ANIMALS–SITUATION REPORT 10," last updated February 28, 2022, https://www.oie.int/app/uploads/2022/03/sars-cov-2-situation-report-10.pdf.

U.S. Department of Agriculture, "Questions and Answers: Results of Study on SARS-CoV-2 in White-Tailed Deer," August 2021, https://www.aphis.usda.gov/publications/animal_health/qa-covid-white-tailed-deer-study.pdf.

[78] Oude Munnink et al., "Transmission of SARS-CoV-2 on mink farms between humans and mink and back to humans," Science, November 10, 2020, https://www.science.org/doi/10.1126/science.abe5901.

Yen et al., "Transmission of SARS-CoV-2 delta variant (AY.127) from pet hamsters to humans, leading to onward human-to-human transmission: a case study," The Lancet, March 10, 2022, https://doi.org/10.1016/S0140-6736(22)00326-9.

[79] Markov et al., "Antigenic evolution will lead to new SARS-CoV-2 variants with unpredictable severity," Nature Reviews Microbiology, March 14, 2022, https://doi.org/10.1038/s41579-022-00722-z.

regardless of workers' vaccination status, to protect health care workers and patients and to help prevent future variants of concern from emerging.

F. OSHA should retain and strengthen recordkeeping requirements and require that the Covid-19 log be kept for five years. *A.7 – Recordkeeping and Reporting: New Cap for Covid-19 Log Retention Period*

The Covid-19 Health Care ETS sets forth certain requirements for recordkeeping and retention, including the requirement that employers with more than 10 employees maintain a Covid-19 log with a record for each instance of an employee testing positive for, or being diagnosed by a health care provider with, Covid-19, whether or not the infection resulted from exposure to Covid-19 in the workplace. This is an essential tool to allow employers to determine and notify employees who have been exposed to Covid-19 and to allow employers, employees, and their representatives to determine the effectiveness of employer polices to combat the spread of Covid-19 in the workplace.

OSHA should retain strong recordkeeping requirements like those in the Covid-19 Health Care ETS and add a five-year retention period. OSHA should not adopt a one-year retention period since the last Covid-19 case among workers. OSHA requires injury and illness 300 logs and incident report forms on occupational injuries and illnesses to be retained for five years following the end of the calendar year that the records cover.[80] An equivalent five-year retention period would be appropriate for the Covid-19 log. As health care employers already must retain logs on occupational injuries and illnesses, compliance would be simpler with an equivalent period. A longer retention period would also permit workers and OSHA to review the track record of an employer when reviewing the employer's performance on Covid-19 protections.

Moreover, because 301 incident reporting standards only require reporting fatalities and in-patient hospitalizations to OSHA, OSHA should consider including in the final standard requirements that employers report, at a minimum, Covid-19 outbreaks and regular reporting of Covid-19 logs that include the occupation or job titles exposed and infected workers to OSHA.

G. OSHA should not base its mitigation measures on the CDC's metrics for community transmission or other measures of local risk. *A.8 – Triggering Requirements Based on the Level of Community Transmission*

OSHA should not link its regulatory requirements to measures of local risk, such as the CDC's Covid-19 Community Level metric. OSHA's permanent Covid-19 standard should require health care employers to provide optimal workplace protections for nurses and other health care workers, irrespective of community transmission, as employers have a legal and moral obligation to provide a safe and healthful workplace for employees. Reductions in the availability of PCR testing in the larger community mean that there is no reliable data source for

[80] 29 CFR 1904.33(a).

adjustments based on local risk. Moreover, local risk measures will not accurately capture the exposure risk presented by non-employees at health care facilities. Relying on employers to watch local risk measures and adjust protections accordingly, informing staff each day what they must do in accordance to changing community levels of transmission, is impractical. The risk that Covid-19 poses to health care workers is ongoing, and the protections to keep them safe must be incorporated into the daily routine of every health care facility, like with other protective standards, not pulled together last minute after a region enters crisis conditions, as hospitals have done so disastrously for the past two years.

1. ***The CDC's Covid-19 Community Level metric allows high levels of Covid-19 transmission based on incorrect assumptions about the danger of Covid-19 infections.***

CDC's Covid-19 Community Level metric is both harmful and antithetical to public health. The CDC based this metric on the idea that it was safe to allow high levels of community transmission of Covid-19 because high levels of population immunity and less severe recent variants meant the risk of serious disease and death was "greatly reduced for most people."[81] This idea relies on fatally flawed assumptions: that future SARS-CoV-2 variants will only lessen in severity, that the U.S. has widespread population immunity, and that this immunity will not wane over time.[82] These assumptions are not based on science and dangerously minimize the impact of the Covid-19 pandemic.

a. <u>The CDC's Community Level metric incorrectly assumes that future variants will cause less severe disease.</u>

For example, wishful narratives about the lessening severity of future variants assume that Covid-19 has become a stable and predictable disease. However, the Omicron BA.1 variant recently caused record-breaking infections, hospitalizations, and deaths around the world.[83] Barely two months since the Omicron BA.1 wave peaked in the United Kingdom and other countries, the Omicron subvariant BA.2 caused a new wave of infections, with nearly 5 million people testing positive for the virus in the U.K. in the week ending March 26.[84] The REACT-1

[81] Centers for Disease Control and Prevention, "Covid-19 Community Levels," updated March 24, 2022, https://www.cdc.gov/coronavirus/2019-ncov/science/community-levels.html.

[82] See Attachment 1: NNU Letters to CDC. "Nurses challenge new CDC metric on latest Covid-19 safety rollback," February 8, 2022, https://www.nationalnursesunited.org/press/nurses-challenge-new-cdc-metric-on-latest-covid-19-safety-rollback.

[83] National Public Radio, "Omicron causes record-breaking COVID cases in the U.S. and globally," December 30, 2021, https://www.npr.org/2021/12/30/1069027394/omicron-causes-record-breaking-covid-cases-in-the-u-s-and-globally.

[84] The Guardian, "Covid experts call for return of free tests as UK cases hit new high," April 1, 2022, https://www.theguardian.com/world/2022/apr/01/covid-infections-at-all-time-high-in-england-ons-data-reveals.

Office for National Statistics, "Coronavirus (COVID-19) Infection Survey, UK: 1 April 2022," April 1, 2022, https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/conditionsanddiseases/bulletins/coronaviruscovid19infectionsurveypilot/latest.

survey, England's largest population Covid-19 surveillance study, performed 110,000 tests of randomly-selected participants between March 8 and March 31and recorded 1 Covid-19 infection for every 16 tests, which is 40 percent higher than the first Omicron peak in January and the highest prevalence recorded since the survey began in May 2020.[85] Covid-associated hospitalizations from the BA.2 subvariant in the U.K. reached the same level as the first Omicron BA.1 peak.[86] These variants were neither predicted nor stable. In fact, a recent study found that Omicron-induced immunity provides reduced protection against reinfection or infection from future, more pathogenic SARS-CoV-2 variants.[87] Multiple SARS-CoV-2 variants of concern have emerged rapidly throughout the pandemic, with new variants and sub-variants continuing to evolve.[88] Strikingly, SARS-CoV-2 variants have emerged independently from one another, with the Omicron variant being the most antigenically divergent from previous variants and the ancestral Wuhan-Hu-1 strain.[89] Independent emergence of variants means that it is incorrect to assume that future variants will be less virulent or cause less severe illness than previous variants. For example, unlike SARS-CoV-2, seasonal influenza viruses undergo a pattern of antigenic drift or minor changes where variants are typically a direct descendant from previous variants.[90] Additionally, emergence of a highly transmissible and more virulent strain of the HIV virus identified recently proves that viruses can evolve to become more virulent over time.[91] The long-term evolutionary trajectory of human coronaviruses remains unknown.[92]

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[85] Elliot et al., "Twin peaks: the Omicron SARS-CoV-2 BA.1 and BA.2 epidemics in England," Imperial College London, April 6, 2022, https://spiral.imperial.ac.uk/handle/10044/1/96170.

[86] Pagel C, "Why is the UK seeing near-record Covid cases? We still believe the three big myths about Omicron," The Guardian, March 30, 2022, https://www.theguardian.com/commentisfree/2022/mar/30/uk-near-record-covid-cases-three-myths-omicron-pandemic.

U.K. Health Security Agency, "UK Summary," last updated April 1, 2022, https://coronavirus.data.gov.uk/details/healthcare.

[87] Servellita et al., "Neutralizing immunity in vaccine breakthrough infections from the SARS-CoV-2 Omicron and Delta variants," Cell, March 17, 2022, DOI: https://doi.org/10.1016/j.cell.2022.03.019

[88] U.S. Centers for Disease Control and Prevention, "SARS-CoV-2 Variant Classifications and Definitions," last updated December 1, 2021, https://www.cdc.gov/coronavirus/2019-ncov/variants/variant-classifications.html.

World Health Organization, "Weekly epidemiological update on COVID-19 - 29 March 2022," last updated March 29, 2022, https://www.who.int/publications/m/item/weekly-epidemiological-update-on-covid-19---29-march-2022.

[89] Markov et al., "Antigenic evolution will lead to new SARS-CoV-2 variants with unpredictable severity," Nature Reviews Microbiology, March 14, 2022, https://doi.org/10.1038/s41579-022-00722-z.

U.K. Health Security Agency, "Long term evolution of SARS-CoV-2, 26 July 2021," July 20, 2021, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1055746/S1512_220201_Long_term_evolution_of_SARS-CoV-2.pdf.

[90] U.S. Centers for Disease Control and Prevention, "How Flu Viruses Can Change: "Drift" and "Shift,"" last updated September 21, 2021, https://www.cdc.gov/flu/about/viruses/change.htm.

[91] Wymant et al., "A highly virulent variant of HIV-1 circulating in the Netherlands," Science, February 3, 2022, https://www.science.org/doi/10.1126/science.abk1688.

[92] U.K. Health Security Agency, "Long term evolution of SARS-CoV-2, 26 July 2021," July 20, 2021, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1055746/S1512_220201_Long_term_evolution_of_SARS-CoV-2.pdf.

b. The CDC's Community Level metric incorrectly assumes that the United States has a high level of Covid-19 immunity that will not wane over time.

CDC's Community Level metric also falsely assumes that SARS-CoV-2 infection-induced and vaccine-induced immunity will not wane over time. Several studies have found that immunity wanes across all ages with increasing time since Covid-19 vaccination or prior infection.[93] Data from the U.K. found that booster vaccine effectiveness against Omicron hospitalization declined from 91 percent to 67 percent after 105 days among 18–64-year-old.[94] A CDC Morbidity and Mortality Weekly Report found that booster protection against Covid-associated emergency department and urgent care visits and hospitalizations among adults declined within four months during Omicron predominance.[95]

Covid-19 vaccinations in the United States also lag behind other high-income countries.[96] According to the CDC, only two-thirds of the U.S. population have been fully vaccinated and only 45.4 percent have received their first booster dose.[97] Immunocompromised individuals are also less likely or unable to mount a sufficient immune response and children under five are ineligible for vaccination, leaving a significant proportion of the population constantly at great risk for contracting Covid-19 and experiencing severe illness, hospitalization, or death.

c. The CDC's Covid-19 Community Level metric fails to recommend protections against transmission until hospitalizations rise, which is too late to stop a surge.

Disturbingly, the CDC's Covid-19 Community Level metric relies on lagging indicators, placing Covid-19 policies in a dangerously reactive position, allowing uncontrolled spread of

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[93] Tartof et al., "Effectiveness of mRNA BNT162b2 COVID-19 vaccine up to 6 months in a large integrated health system in the USA: a retrospective cohort study," The Lancet, October 4, 2021, DOI: https://doi.org/10.1016/S0140-6736(21)02183-8

U.K. Health Security Agency, "COVID-19 vaccine surveillance report Week 6," February 10, 2022, https://www.gov.uk/government/publications/covid-19-vaccine-weekly-surveillance-reports.

U.S. Centers for Disease Control and Prevention, "Science Brief: SARS-CoV-2 Infection-induced and Vaccine-induced Immunity," last updated October 29, 2021, https://www.cdc.gov/coronavirus/2019-ncov/science/science-briefs/vaccine-induced-immunity.html.

[94] U.K. Health Security Agency, "COVID-19 vaccine surveillance report Week 12," March 24, 2022, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1063023/Vaccine-surveillance-report-week-12.pdf.

[95] Ferdinands et al., "Waning 2-Dose and 3-Dose Effectiveness of mRNA Vaccines Against COVID-19–Associated Emergency Department and Urgent Care Encounters and Hospitalizations Among Adults During Periods of Delta and Omicron Variant Predominance — VISION Network, 10 States, August 2021–January 2022," MMWR Early Release, February 11, 2022, https://www.cdc.gov/mmwr/volumes/71/wr/mm7107e2.htm.

[96] "U.S. Has Far Higher Covid Death Rate Than Other Wealthy Countries," The New York Times, Feb. 1, 2022, https://www.nytimes.com/interactive/2022/02/01/science/covid-deaths-united-states.html.

[97] U.S. Centers for Disease Control and Prevention, "COVID Data Tracker," last updated March 13, 2022, https://covid.cdc.gov/covid-data-tracker/#vaccinations_vacc-total-admin-rate-total.

Covid-19 in communities before universal masking or other measures are required. Unlike the previous CDC metric of community transmission that was based on new Covid-19 cases and positivity rates over the last seven days,[98] the CDC's new Covid-19 Community Level metric now relies largely on Covid-19 admissions and hospital capacity as well as a tremendously higher case threshold.[99] According to the previous CDC metric, fewer than 10 new cases per 100,000 population were considered "low" levels of community transmission. But under the CDC's Covid-19 Community Level metric, anything up to 200 new cases per 100,000 could still be considered "low" so long as Covid-19 admissions and hospital capacity are low enough. A determination of "low" community level using the Covid-19 Community Level metric has the potential to be twenty times higher than the previous "low" community level indicator. Moreover, reliance on lagging indicators will miss critical windows to act as severe disease and hospitalizations rise weeks after Covid-19 infections.

Unchecked transmission of Covid-19 under the CDC community metric ultimately places the public health burden on communities that are already at increased risk for severe Covid-19 illness, including people with disabilities and children who are not vaccinated or not yet eligible for a Covid-19 vaccine. The CDC fails to recognize that the risk for severe Covid-19 outcomes is not limited to medically diagnosed immunocompromised individuals. One's health status and risk level changes over time, and medical conditions that place people at increased risk for severe Covid-19 outcomes expansively range from pregnancy, physical inactivity, and being a former smoker to chronic liver or kidney disease, cancer, cystic fibrosis and other conditions.[100] According to the CDC, "a person with one or more of these conditions who gets very sick from Covid-19 (has severe illness from COVID-19) is more likely to be hospitalized, need intensive care, require a ventilator to help them breathe, or die."[101] Yet many people lack consistent access to health care and may not have accurate knowledge of their health status.

d. Elimination of community protections under the CDC's Covid-19 Community Level metric will lead to repeated Covid-19 surges and frequent reinfection, endangering health care workers.

By significantly increasing the case thresholds and by using lagging indicators, such as severe disease and hospitalization, CDC's Covid-19 Community Level metric inappropriately alters the current understanding of Covid-19 risk and narrows the critical window during which public health agencies can respond to and prevent the next surge — further prolonging the

[98] U.S. Centers for Disease Control and Prevention, "COVID Data Tracker," last updated April 2, 2022, https://covid.cdc.gov/covid-data-tracker/#county-view?list_select_state=all_states&list_select_county=all_counties&data-type=Risk&null=Risk.

[99] U.S. Centers for Disease Control and Prevention, "Science Brief: Indicators for Monitoring COVID-19 Community Levels and Making Public Health Recommendations," last updated March 4, 2022, https://www.cdc.gov/coronavirus/2019-ncov/science/science-briefs/indicators-monitoring-community-levels.html.

[100] U.S. Centers for Disease Control and Prevention, "People with Certain Medical Conditions," last updated February 25, 2022, https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/people-with-medical-conditions.html.

[101] Ibid.

pandemic. More Covid-19 infections mean more hospitalizations and deaths and more opportunities for variants of concern to emerge. More Covid-19 infections also mean more debilitating chronic complications and societal disruption due to school absences and missed work days. Repeated surges in Covid-19 infections, hospitalizations, and deaths put nurses at heightened and perpetual risk from infection and moral injury.

Repeated or continual reinfections also raise serious concerns for health care workers who have worked on the frontlines of the pandemic for over two years.[102] One study found that hospitalization was more common at reinfection than the initial Covid-19 infection.[103] Another study found that patients discharged from Covid-19 hospitalization and surviving at least a week had more than double the risk of subsequent hospitalization or death and a 4.8-fold higher risk of all-cause mortality compared to the general population. Discharged Covid-19 patients were also more likely than influenza patients to be readmitted or die and to experience mental health or cognitive-related admission or death.[104] This means that reinfections can result in worse outcomes[105] and those who get reinfected can spread the virus to others and, more critically, to those who are medically vulnerable.

2. Use of any local risk metric to reduce protections puts health care workers in danger.

While the CDC's Community Level metrics are a particularly atrocious measure for triggering public health responses to Covid-19, OSHA should also not connect protections to the community transmission rates used for the CDC's guidance for health care workers or any other metric of local risk. Health care workers will continue to face significant risk from Covid-19 exposure for the foreseeable future, even during the lulls between surges when community transmission rates are relatively low. The widespread use of the CDC's Community Level metrics to determine protections in the wider community means that protections are even more important in health care facilities, where health care workers are relied on to test and treat the Covid-19 cases resulting from unmitigated spread. Reliance on local risk measures is impractical because the quality of data about case rates is degrading over time and changing the rules that

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[102] Amorim et al., "Respiratory Viral Shedding in Healthcare Workers Reinfected with SARS-CoV-2, Brazil, 2020," Emerging Infectious Diseases, April 19, 2021, https://wwwnc.cdc.gov/eid/article/27/6/21-0558_article

Roskosky et al., "Notes from the Field: SARS-CoV-2 Omicron Variant Infection in 10 Persons Within 90 Days of Previous SARS-CoV-2 Delta Variant Infection — Four States, October 2021–January 2022," MMWR Morb Mortal Wkly Rep 2022;71:524–526. DOI: http://dx.doi.org/10.15585/mmwr.mm7114a

[103] Slezak et al., "Rate and severity of suspected SARS-Cov-2 reinfection in a cohort of PCR-positive COVID-19 patients," Clinical Microbiology and Infection, August 18, 2021, https://doi.org/10.1016/j.cmi.2021.07.030.

[104] Bhaskaran et al., "Overall and cause-specific hospitalisation and death after COVID-19 hospitalisation in England: A cohort study using linked primary care, secondary care, and death registration data in the OpenSAFELY platform," PLOS Medicine, January 25, 2022, https://doi.org/10.1371/journal.pmed.1003871.

[105] Cavanaugh et al., "Suspected Recurrent SARS-CoV-2 Infections Among Residents of a Skilled Nursing Facility During a Second COVID-19 Outbreak — Kentucky, July–November 2020," MMWR, February 26, 2021, https://www.cdc.gov/mmwr/volumes/70/wr/mm7008a3.htm?s_cid=mm7008a3_w

Wang et al., "COVID-19 reinfection: a rapid systematic review of case reports and case series," Journal of Investigative Medicine, May 18, 2021, https://jim.bmj.com/content/69/6/1253.

apply over time makes it difficult for facilities to create and consistently implement a safety program. It is also important to remember that the people health care facilities treat are often sick. There is no reason to believe that the risk among patients, who may be immunocompromised, older, or otherwise more vulnerable to infection, matches the risk among the local community.

a. Reductions in the availability of Covid-19 testing means there is no reliable data source for local risk levels.

Levels of Covid-19 testing are at their lowest point since June 2020, with 80 percent fewer tests reported officially than at the peak in January — half a million tests compared to 2.5 million.[106] Part of the reduction in reported testing is due to the wider availability of rapid antigen tests for Covid-19, which permit people to test for Covid-19 infection at home without reporting results to local health authorities. States have also closed public testing sites, reduced the frequency of data reporting, and changed how they report Covid-19 data such that they reduce official counts of Covid-19 hospitalizations.[107] Additionally, diminished federal funding means that uninsured patients can no longer access free Covid-19 tests in some places.[108] Wastewater surveillance can be a useful tool to predict Covid-19 surges, but it is not done in all regions and does not capture the approximately 20 percent of homes on septic systems and facilities that are not connected to wastewater treatment facilities where sampling occurs.[109] As public messaging tells the public that Covid-19 is no longer a concern and testing becomes harder to access, the trends that are reducing the quality and quantity of local risk data are likely to increase. Without trustworthy measures of local case prevalence, there is no reliable way to adjust protective measures based on local risk.

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[106] Mitropoulos A, "US likely 'dramatically undercounting' current COVID-19 resurgence, experts say," ABC News, April 13, 2022, https://abcnews.go.com/Health/us-dramatically-undercounting-current-covid-19-resurgence-experts/story?id=84012793.

[107] Ibid.

[108] Simons-Duffin S, "Free COVID tests and treatments no longer free for uninsured, as funding runs out," NPR, March 29, 2022, https://www.npr.org/sections/health-shots/2022/03/29/1089355997/free-covid-tests-and-treatments-no-longer-free-for-uninsured-as-funding-runs-out.

[109] Kirby AE, et al, "Using Wastewater Surveillance Data to Support the COVID-19 Response — United States, 2020–2021," MMWR Morb Mortal Wkly Rep 2021;70:1242–1244. DOI: http://dx.doi.org/10.15585/mmwr.mm7036a2external icon.

U.S. Centers for Disease Control and Prevention, "National Wastewater Surveillance System (NWSS)," last reviewed March 21, 2022, https://www.cdc.gov/healthywater/surveillance/wastewater-surveillance/wastewater-surveillance.html.

U.S. Centers for Disease Control and Prevention, "COVID Data Tracker: Wastewater Surveillance," last accessed April 20, 2022, https://covid.cdc.gov/covid-data-tracker/#wastewater-surveillance.

U.S. Government Accountability Office, "Science & Tech Spotlight: Wastewater Surveillance," GAO-22-105841, April 11, 2022, https://www.gao.gov/products/gao-22-105841.

b. Local risk measures do not accurately capture the risks at health care facilities.

Health care facilities treat the sick. While not everyone who comes into a health care facility is ill, the patient population in many facilities will be disproportionately made up of older people, people with chronic conditions that require frequent treatment, and people in the midst of an acute health crisis. Vaccine-acquired immunity to Covid-19 is weaker and wanes more rapidly in immunocompromised people and people over 50.[110] Health care workers spend their days interacting with patients whose immune systems are less likely to be able to resist infection by Covid-19 than the average member of the public. The Covid-19 prevalence level in the local community cannot be assumed to represent the risk level at health care facilities.

c. OSHA should not create triggers within the standard based on local risk or community transmission levels because shifting tiers of mitigation measures based on local risk will prevent employers from establishing a routine, predictable plan for protections.

Health care employers have a legal and moral obligation to invest and prioritize the health and safety of their employees. Hospitals and health care facilities play a critical function in caring for individuals with suspected or confirmed Covid-19 and in preventing the spread of infection. SARS-CoV-2 spreads easily from person to person via aerosol transmission when an infected person breathes, speaks, coughs, or sneezes, regardless of symptoms or vaccination status. Nurses and other health care workers provide the hands-on care for our communities in hospitals and health care facilities, facing a significant risk of Covid-19 exposure because of their professional duties to provide patient care. Even for health care workers who do not directly interact with suspected or confirmed Covid-19 patients, the frequency of asymptomatic transmission and the aerosolized mode of Covid-19's transmission will result in significant risk to all workers in health care settings.

Thus, to effectively protect health care workers from the significant risk of Covid-19, employers must proactively anticipate occupational exposure to Covid-19 by implementing multiple protective measures to prevent transmission of the virus within facilities and to protect workers from exposures before community transmission levels rise. Conversely, workplace protections implemented based on risk place hospitals and health care facilities in a reactive state of unpreparedness, endangering health care workers and their patients. Covid-19 surges can grow very quickly, particularly with highly transmissible variants like the Omicron SARS-CoV-2 variant and subvariants. The upswing of a Covid-19 surge is a poor time for health care facilities to have to implement substantial changes to their procedures. In other words, health care employers must proactively prevent exposures and transmissions of Covid-19 among health care workers and must not wait until another outbreak in the community occurs and must not wait

[110] See U.S. Centers for Disease Control and Prevention, "Interim Clinical Considerations for Use of COVID-19 Vaccines Currently Approved or Authorized in the United States," last updated March 30, 2022, https://www.cdc.gov/vaccines/covid-19/clinical-considerations/interim-considerations-us.html.

until a crisis emerges to act. OSHA should provide clear requirements that health care employers can incorporate into their work every day and clear requirements that health care employers provide workers the tools to prevent transmissions and exposures in the first place. OSHA should not leave employers and workers on the frontline of our health care system scrambling to get safety measures in place while also facing increasing numbers of Covid-19 patients who need urgent, safe care.

d. OSHA should follow the example of the California Aerosol Transmissible Disease Standard, which is not based on community transmission levels.

The California Division of Occupational Safety and Health's ("Cal/OSHA") Aerosol Transmissible Diseases (ATD) Standard should serve as the framework and as the minimum standard of protection for the OSHA ETS on Covid-19 to protect nurses and other health care workers.[111] The Cal/OSHA ATD Standard is clear in its requirement of health care employers to protect employees from aerosol transmissible diseases such as Covid-19, "using clearly defined procedures," free of any conditional application of the standard.[112] For example, health care employers are required to establish procedures to identify aerosol transmitted disease cases, including work practice controls that prevent or limit occupational exposures to such diseases.[113] In other words, employers are required to implement written programs and procedures, airborne precautions, hazard controls, disinfection methods, communication methods, medical services, and other measures, notwithstanding transmission levels in the community.

Moreover, the Cal/OSHA ATD standard has been in effect since 2009, demonstrating that the multilayered precautions within the standard are feasible. Health care facilities, services, and operations are presumed to have employees with some extent of occupational exposure to aerosol transmissible disease and, thus, fall under the scope of the standard.

[111] Calif. Code of Regulations, Title 8, Section 5199: https://www.dir.ca.gov/title8/5199.html.
[112] Ibid.
[113] Ibid.

H. Health care workers are at elevated risk of infection, long Covid, hospitalization, and death. *B.3 – The percentage of health care workers who are at elevated risk of severe Covid-19 infections (e.g., resulting in hospitalization or extended days away from work), including for age-related or immunocompromised reasons (not based solely on vaccination status); B.4 – The rate of infection, long Covid, hospitalization, and death among health care workers compared to those rates among the general population.*

When the Covid-19 pandemic began, despite consistent advocacy by NNU nurses,[114] health care employers in the United States failed to prepare, a failure that is ongoing. Instead of protecting nurse and patient health and safety, health care employers resolutely prioritized profits and have continued to do so throughout the pandemic. Employers locked up and rationed lifesaving PPE, canceled nurse shifts while Covid-19 units were dangerously short staffed, embraced unproven and dangerous decontamination methods and reuse of N95 respirators, and neglected to test and notify health care workers of Covid-19 exposures. More than two years into the pandemic, health care workers continue to face high risks of contracting Covid-19 on the job due to lack of protections from employers. Specifically, the lack of optimal workplace protections for nurses and other health care workers have resulted in staggering rates of preventable infections and deaths.

Tracking and reporting of Covid-19 exposure, morbidity, and mortality among health care workers is insufficient in the United States but studies from around the world show the increased danger faced by health care workers. Workers employed in health care consistently constitute the greatest percentage of positive Covid-19 cases by occupation in the U.S. and around the world. In Italy, 20 percent of all health care workers responding to the Covid-19 pandemic were infected,[115] while a survey of nurses in Spain found a staggering 32 percent of nurses who were tested for Covid-19 were positive.[116] In the U.K. and the United States, the risk of testing positive for Covid-19 was nearly 12 times higher among frontline health care workers compared with the general community.[117] Mutambudzi et al. found that health care workers in the U.K had more than a seven-fold higher risk of severe Covid-19 compared to non-essential workers.[118] A study comparing Covid-19 rates among U.S. health care workers to rates among

[114] National Nurses United, "Survey of Nation's Frontline Registered Nurses Shows Hospitals Unprepared For COVID-19," March 5, 2020, https://www.nationalnursesunited.org/press/survey-nations-frontline-registered-nurses-shows-hospitals-unprepared-covid-19.

[115] "COVID-19: Protecting Health-Care Workers," The Lancet, vol 395, no. 10228, 2020, p. 922, DOI: https://doi.org/10.1016/S0140-6736(20)30644-9

[116] Kollmeyer B, "Nearly a Third of Spain's 255,000 Nurses May Be Infected with Coronavirus, Study Indicates," MarketWatch, April 15, 2020, https://www.marketwatch.com/story/nearly-a-third-of-spains-255000-nurses-may-be-infected-with-coronavirus-study-indicates-2020-04-15

[117] Nguyen et al., "Risk of COVID-19 among front-line health-care workers and the general community: a prospective cohort study," The Lancet Public Health, July 2020, https://doi.org/10.1016/S2468-2667(20)30164-X

[118] Mutambudzi et al., "Occupation and risk of severe COVID-19: prospective cohort study of 120 075 UK Biobank participants," Occupational & Environmental Medicine, December 9, 2020, https://oem.bmj.com/content/78/5/307.

those working outside of health care found higher rates among health care workers, with 7.3 percent of health care workers testing positive compared to 0.4 percent of non–health care workers.[119] Moreover, the study found that, among health care workers, nurses had both the highest rate of infections and the highest number of infections.[120] Specifically, nurses constituted 63 percent of cases, with rates of infection among nurses at 11.1 percent compared to rates of infection of 1.8 percent in attending physicians and 3.1 percent in residents and nonattending physicians.[121] The high rates of infection among nurses compared to other health care workers may also relate to the nature of their work. Registered nurses tend to interact with patients more intimately and for longer periods of time than most other health care workers.[122] For example, registered nurses perform or participate in aerosol generating procedures — especially with Covid-19 patients, who may require cardiopulmonary resuscitation, intubation, extubation, and other treatments. Respiratory events such as coughing, sneezing, and breathing from Covid-19 patients also frequently expose registered nurses with infectious aerosols. Studies have shown that breathing and speaking produces more aerosol particles than most aerosol-generating procedures.[123] Breathing, speaking, coughing, and sneezing are aerosol-generating. This is what it means to be on the frontlines as a direct care registered nurse.

Despite the risks nurses face being on the frontlines of the pandemic, local, state, and federal governments have failed to track and report data on Covid-19 infections and deaths among nurses and other health care workers. In March 2020, when it became clear that the federal and state governments were not effectively tracking health care worker Covid-19 infections, NNU began using public data sources to track health care worker Covid-19 infections and deaths. As of April 19, 2022, NNU has identified nearly one and a half million health care worker Covid-19 cases and at least 5,104 health care workers who have died from Covid-19.[124] This is almost certainly an undercount, since many deaths do not appear in obituaries or other

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[119] Barrett et al., "Prevalence of SARS-CoV-2 infection in previously undiagnosed health care workers in New Jersey, at the onset of the U.S. COVID-19 pandemic," BMC Infectious Diseases, November 16, 2020, https://bmcinfectdis.biomedcentral.com/articles/10.1186/s12879-020-05587-2.

[120] Ibid.

[121] Ibid.

[122] Ibid.

[123] Brown et al., "A quantitative evaluation of aerosol generation during tracheal intubation and extubation," Anaesthesia, February 2021, https://doi.org/10.1111/anae.15292

Coleman et al., "Viral Load of SARS-CoV-2 in Respiratory Aerosols Emitted by COVID-19 Patients while Breathing, Talking, and Singing," Clinical Infectious Diseases, August 6, 2021,https://doi.org/10.1093/cid/ciab691

Stadnytskyi et al., "The airborne lifetime of small speech droplets and their potential importance in SARS-CoV-2 transmission," PNAS, May 13, 2020, https://doi.org/10.1073/pnas.2006874117

Wilson et al., "The effect of respiratory activity, ventilatory therapy and facemasks on total aerosol emissions," Anaesthesia, March 30, 2021, https://doi.org/10.1111/anae.15475

[124] For methodology, see National Nurses United, "Sins of Omission: How Government Failures to Track Covid-19 Data Have Led to More Than 3,200 Health Care Worker Deaths and Jeopardize Public Health," Updated March 2021, https://www.nationalnursesunited.org/sites/default/files/nnu/documents/0321_Covid19_SinsOfOmission_Data_Report.pdf. In contrast, as of April 15, 2022, the CDC reports just 1,076,505 health care worker infections and 4,120 health care worker deaths from Covid-19. U.S. Centers for Disease Control and Prevention, "COVID Data Tracker: Cases & Deaths among Healthcare Personnel," last updated April 15, 2022, https://covid.cdc.gov/covid-data-tracker/#health-care-personnel.

public sources that contain the person's profession and cause of death. Of the RNs who have died from Covid-19, 48 percent are nurses of color, reflecting the broader disproportionate impact of Covid-19 on communities of color.[125] Just over a quarter (25.1 percent) of registered nurses in the United States are people of color.[126]

Accompanying this high risk of Covid-19 infection is the risk of post-acute sequelae of SARS-CoV-2 infection (PASC or "long Covid"). Nurses and other health care workers diagnosed with Covid-19 face lasting symptoms, though systematic tracking of PASC among nurses, other essential workers, or patients currently does not exist in the United States. Recent studies estimate that 10 to 30 percent of Covid-19 survivors in the United States develop chronic health impacts, which means 7.7 million to 23 million individuals may have developed PASC as of February 2022.[127] But this is likely a conservative estimate and may grow, as there are no laboratory tests or treatment for long Covid. Haverall et al. investigated Covid-related long-term symptoms among healthy health care workers, aged 33 to 56, in Sweden from April 2020 to January 2021. They found that just over one in ten health care workers who had initial mild illness were still coping with at least one moderate to severe symptom eight months later, which negatively affected their work and/or personal lives.[128]

Colloquially known as "long Covid" or "long hauler syndrome," PASC refers to symptoms that can persist for several weeks or months following initial infection and can occur among previously healthy individuals and across all age groups. It can affect most major organ systems including respiratory, cardiovascular, metabolic, musculoskeletal, pulmonary, gastrointestinal, nervous, and regulatory processes.[129] NNU's September 2021 Covid-19 survey

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[125] The Covid-19 pandemic has illuminated longstanding systemic and racial disparities in health care. People of color, immigrant, and other underserved populations are disproportionately impacted by Covid-19 as they have inequitably borne the burden of the pandemic. For instance, Black people are 1.1 times more likely to contract the virus and 2.4 times more likely to be hospitalized compared to white, non-Hispanic people. Likewise, Hispanic/Latinx and Native Americans are one and a half times more likely to contract the virus and nearly two and a half and three times more likely to be hospitalized, respectively, compared to white people.

U.S. Centers for Disease Control and Prevention, "Risk for COVID-19 Infection, Hospitalization, and Death By Race/Ethnicity," last updated March 25, 2022, https://www.cdc.gov/coronavirus/2019-ncov/covid-data/investigations-discovery/hospitalization-death-by-race-ethnicity.html.

National Nurses United, "Sins of Omission: How Government Failures to Track Covid-19 Data Have Led to More Than 3,200 Health Care Worker Deaths and Jeopardize Public Health," Updated March 2021, https://www.nationalnursesunited.org/sites/default/files/nnu/documents/0321_Covid19_SinsOfOmission_Data_Report.pdf.

[126] Ibid.

U.S. Bureau of Labor Statistics, "Labor Force Statistics from the Current Population Survey," January 20, 2022, https://www.bls.gov/cps/cpsaat11.htm.

[127] U.S. Government Accountability Office, "Science & Tech Spotlight: Long COVID," March 2, 2022, https://www.gao.gov/assets/gao-22-105666.pdf.

[128] Havervall et al., "Symptoms and Functional Impairment Assessed 8 Months After Mild COVID-19 Among Health Care Worker," JAMA, April 7, 2021, https://jamanetwork.com/journals/jama/fullarticle/2778528.

[129] Al-Aly, Z., Xie, Y. & Bowe, B., "High-dimensional characterization of post-acute sequelae of COVID-19.," Nature 594**,** 259–264, 2021, https://doi.org/10.1038/s41586-021-03553-9.

found that nearly a quarter of nurses who contracted SARS-CoV-2 reported experiencing post-Covid symptoms lasting from zero to three months, one-third had symptoms lasting three to nine months, 12 percent had symptoms lasting nine to 12 months, and 12 percent reported lasting symptoms longer than a year.[130] The most common symptoms reported included tiredness and fatigue, joint and muscle pain, memory and concentration difficulties, headaches and migraines, and difficulty breathing and shortness of breath.

One study of 6,061 health care workers in Canada found that 46.2 percent of the non-hospitalized cases reported persistent symptoms ≥4 weeks later and 40 percent had persistent symptoms ≥ 12 weeks later. Persistent symptoms at 4 to 7 weeks post-Covid-19 onset were reported by half of non-hospitalized health care workers compared to 37 percent at 24 to 27 weeks. In addition, 68 percent of health care workers who required hospitalization reported lingering health issues after three months.[131] Another study of health care workers with a documented Covid-19 infection found that 45 percent reported persistent symptoms and 32 percent reported struggling to cope three to four months following infection.[132]

Studies have also found that even asymptomatic and mild infections can result in long Covid symptoms that have profound health impacts and disrupt individuals' personal and work lives. A U.S. Department of Veterans Affairs cohort study of more than 8.5 million people found that Covid-19 survivors had a 40 percent increased risk of new onset diabetes at least one year after infection. The risk was evident even among those who had mild infections and no previous risk factors for developing diabetes.[133] A U.K. Biobank brain imaging study of 400 individuals who had mild to moderate or asymptomatic Covid-19 had significant reduction in grey matter thickness in several regions of the brain, reduction in global brain size, and larger cognitive decline.[134] A study of more than 11 million U.S. veterans' health records found that veterans who had Covid-19 one year earlier faced higher risk of stroke, cerebrovascular disease and dysrhythmia compared with those who were never infected. Veterans that had Covid-19 faced a 72 percent higher risk of heart failure after 12 months than those in the control group.

Jiang et al., "Postacute Sequelae of Severe Acute Respiratory Syndrome Coronavirus 2 Infection: A State-of-the-Art Review," JACC, Sept 15, 2021, https://www.jacc.org/doi/10.1016/j.jacbts.2021.07.002

Chertow et al., "SARS-CoV-2 infection and persistence throughout the human body and brain," Research Square, December 20, 2021, https://www.researchsquare.com/article/rs-1139035/v1.

[130] National Nurses United, "National nurse survey reveals that health care employers need to do more to comply with OSHA emergency temporary standard," September 2021, https://www.nationalnursesunited.org/press/national-nurse-survey-reveals-health-care-employers-need-to-do-more-to-protect-workers.

[131] Carazo et al., "Physical, psychological and cognitive profile of post-COVID condition in healthcare workers, Quebec, Canada, medRxiv, March 10, 2022, https://www.medrxiv.org/content/10.1101/2022.03.08.22272057v1.

[132] Gaber et al., "Persistent post-covid symptoms in healthcare workers," Occupational Medicine, Volume 71, Issue 3, April 2021, Pages 144–146, https://doi.org/10.1093/occmed/kqab043.

[133] Xie and Al-Aly, "Risks and burdens of incident diabetes in long COVID: a cohort study," The Lancet Diabetes & Endocrinology, March 21, 2022, https://doi.org/10.1016/S2213-8587(22)00044-4.

[134] Douaud, G., Lee, S., Alfaro-Almagro, F. et al., "SARS-CoV-2 is associated with changes in brain structure in UK Biobank," Nature, March 7, 2022, https://doi.org/10.1038/s41586-022-04569-5.

Heightened risks were seen even in people who had mild to moderate Covid-19 symptoms, and in those who did not have a known cardiovascular condition prior to infection.[135]

While preliminary studies have found that Covid-19 vaccines may reduce the risk of developing long Covid,[136] evidence on its protective effect remains inconclusive. For example, a U.K. study of more than 10,000 breakthrough infections found that vaccination did not protect against long Covid.[137] Another study found that 19 percent of infected vaccinated health care workers had persistent symptoms longer than 6 weeks.[138] A study of 16,035 breakthrough infections at 6 months found that the risk of post-acute sequelae in pulmonary and extrapulmonary organ systems was higher in individuals with breakthrough infections than those with no Covid-19.[139]

Preventing the risk of Covid-19 infection will effectively prevent the risk of long Covid. As the CDC explicitly states, "All patients with SARS-CoV-2 infection in the hospital pose a risk to health care workers and other patients, even if the patient has mild illness or is asymptomatic and the infection is incidental."[140] Yet the CDC weakened the isolation period for nurses and other workers who have tested positive for Covid-19 from 10 days to seven days. No longer requiring exposed vaccinated and boosted health care workers to quarantine will result in more hospital-acquired infections and debilitating long Covid.[141] CDC's isolation guidance is not based on science but on ensuring that health care employers and other businesses have a supply of workers. Several studies have found that the period of infectiousness for Omicron is the same

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[135] Xie et al., "Long-term cardiovascular outcomes of COVID-19," Nature Medicine, February 7, 2022, https://doi.org/10.1038/s41591-022-01689-3.

[136] Office for National Statistics, "Self-reported long COVID after two doses of a coronavirus (COVID-19) vaccine in the UK: 26 January 2022," last updated January 26, 2022, https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/conditionsanddiseases/bulletins/selfreportedlongcovidaftertwodosesofacoronaviruscovid19vaccineintheuk/26january2022.

Simon et al., "Reduced Incidence of Long-COVID Symptoms Related to Administration of COVID-19 Vaccines Both Before COVID-19 Diagnosis and Up to 12 Weeks After," medRxiv, November 18, 2021, https://www.medrxiv.org/content/10.1101/2021.11.17.21263608v1.

[137] Taquet et al., "Six-month sequelae of post-vaccination SARS-CoV-2 infection: a retrospective cohort study of 10,024 breakthrough infections," medRxiv, November 8, 2021, Six-month sequelae of post-vaccination SARS-CoV-2 infection: a retrospective cohort study of 10,024 breakthrough infections | medRxiv.

[138] Bergwerk et al., "Covid-19 Breakthrough Infections in Vaccinated Health Care Workers," New England Journal of Medicine, October 14, 2021, https://www.nejm.org/doi/full/10.1056/NEJMoa2109072.

[139] Al-Aly et al., "Long Covid after Breakthrough COVID-19: the post-acute sequelae of breakthrough COVID-19," Research Square, November 15, 2021, https://www.researchsquare.com/article/rs-1062160/v1.

[140] U.S. Centers for Disease Control and Prevention, "Science Brief: Indicators for Monitoring COVID-19 Community Levels and Making Public Health Recommendations," last updated March 4, 2022, https://www.cdc.gov/coronavirus/2019-ncov/science/science-briefs/indicators-monitoring-community-levels.html.

[141] U.S. Centers for Disease Control and Prevention, "Interim Guidance for Managing Healthcare Personnel with SARS-CoV-2 Infection or Exposure to SARS-CoV-2," last updated January 21, 2022, https://www.cdc.gov/coronavirus/2019-ncov/hcp/guidance-risk-assesment-hcp.html.

National Nurses United, "Nurses condemn CDC's dangerous decision to weaken isolation guidance for employers," December 23, 2021, https://www.nationalnursesunited.org/press/nurses-condemn-cdcs-decision-to-weaken-isolation-guidance.

as other SARS-CoV-2 variants, beyond the CDC's current isolation time period for nurses and other workers.[142]

The risk of long Covid and the high rate of infections among health care workers means that every health care worker is at elevated risk of severe Covid-19 outcomes. The risk for severe Covid-19 outcomes is not limited to medically diagnosed immunocompromised individuals or people over 65 years of age. One's health status and risk level changes over time, and medical conditions that place people at increased risk for severe Covid-19 outcomes expansively range from pregnancy, physical inactivity, and being a former smoker to chronic liver or kidney disease, cancer, cystic fibrosis, and other conditions.[143] According to the CDC, "a person with one or more of these conditions who gets very sick from Covid-19 (has severe illness from COVID-19) is more likely to be hospitalized, need intensive care, require a ventilator to help them breathe, or die."[144] From one day to the next, a health care worker can develop a condition that puts them at higher risk of severe disease from Covid-19 infection.

The impacts of long Covid demonstrate the need for full and optimal protections for nurses and other health care workers as determined by the precautionary principle. The precautionary principle states that "when an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause-and-effect relationships are not fully established scientifically."[145] Following the precautionary principle is necessary for protecting health care workers from the hazards posed by a still emerging infectious disease like Covid-19 where we are still learning about the disease. Protection of nurses and other essential workers is fundamental to limiting the spread of Covid-19. If more and more health care workers suffer from long Covid, the impact on safe patient care and worker safety will be disastrous.

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[142] Landon et al., "High Rates of Rapid Antigen Test Positivity After 5 days of Isolation for COVID-19," medRxiv, February 2, 2022, doi: https://doi.org/10.1101/2022.02.01.22269931.

National Institute of Infectious Diseases Disease Control and Prevention Center, National Center for Global Health and Medicine, "Active epidemiological investigation on SARS-CoV-2 infection caused by Omicron variant (Pango lineage B.1.1.529) in Japan: preliminary report on infectious period," Jan 5, 2022, https://www.niid.go.jp/niid/en/2019-ncov-e/10884-covid19-66-en.html.

Lefferts et al., "Antigen Test Positivity After COVID-19 Isolation — Yukon-Kuskokwim Delta Region, Alaska, January–February 2022," MMWR Morb Mortal Wkly Rep 2022;71:293–298, DOI: http://dx.doi.org/10.15585/mmwr.mm7108a3.

Boucau et al., "Duration of viable virus shedding in SARS-CoV-2 omicron variant infection," *medRxiv*, March 2, 2022, doi: https://doi.org/10.1101/2022.03.01.22271582.

[143] U.S. Centers for Disease Control and Prevention, "People with Certain Medical Conditions," last updated February 25, 2022, Pehttps://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/people-with-medical-conditions.html.

[144] Ibid.

[145] Hayes A. The precautionary principle. Arh Hig Rada Toksikol. 2005 Jun;56(2):161-6. PMID: 15968832

I. A comprehensive Covid-19 standard with optimal protections will increase staffing retention and decrease negative mental health impacts on health care workers. *B.10 – Unintended consequences, such as decreases in staffing retention, or other impacts, such as increases in staffing retention, due to the potential alternatives raised in this notice.*

Research by National Nurses United and others shows that unsafe conditions in the hospital industry have driven registered nurses away from the bedside, leading to an unsafe staffing crisis. A strong Covid-19 permanent standard can be expected to increase staffing retention, whereas reductions in worker protections is likely to decrease retention and increase costs to employers due to staff turnover. RN turnover is extremely expensive for employers. OSHA has reported the estimated cost of replacing a single nurse as $27,000 to $103,000.[146]

A lack of Covid-19 protections has also had a significant negative impact on the mental health of nurses, which OSHA should consider both as a negative consequence of a weak or missing Covid-19 standard and as a factor likely to contribute to decreased staff retention.

OSHA should refer to NNU's report, "Protecting our Front Line: Ending the Shortage of Good Nursing Jobs and the Industry-created Unsafe Staffing Crisis," which is attached to these comments as Attachment 6, and the research cited for information and data about the effects of Covid-19 safety measures on staffing retention.[147] The report analyzes data and research to show that there is no shortage of registered nurses. Rather, there is a shortage of good, permanent nursing jobs where RNs are fully valued for their work at the bedside through safe patient staffing levels, strong union protections, and safe and healthy workplaces.

Over the course of decades, the hospital industry has deliberately deprioritized patient care and nursing health and safety in order to maximize profits. Hospitals' ongoing failures to take protective measures to prevent workplace exposure to SARS-CoV-2 exacerbated poor working conditions created by their failures to maintain safe staffing levels and protect nurses from injuries and workplace violence. During the pandemic, nurses have experienced high levels of distress due to fears of contracting Covid-19 or infecting their family members. Nurses have also experienced moral distress because crisis standards of care implemented by their employers prevent them from providing optimal patient care. For example, throughout the pandemic, employer policies of PPE rationing have led to care rationing, forcing nurses to provide care in unsafe practice conditions in conflict with their professional obligations to provide safe, therapeutic care to their patients. OSHA should refer to NNU's report "Deadly Shame:

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[146] OSHA, "Workplace Violence in Healthcare," December 2015, https://www.osha.gov/sites/default/files/OSHA3826.pdf. See also Bland-Jones, Cheryl, "Revisiting Nurse Turnover Costs, Adjusting for Inflation," Journal of Nursing Administration, 2008; 38(1): 11-18, 12. (Finding that the total RN turnover costs for fiscal year 2007 were between $7,875,000 and $8,449,000, and estimating an RN annual turnover rate at 18.5 percent.)

[147] National Nurses United, "Protecting our Front Line: Ending the Shortage of Good Nursing Jobs and the Industry-created Unsafe Staffing Crisis," December 2021, https://www.nationalnursesunited.org/protecting-our-front-line-report.

Redressing the Devaluation of Registered Nurse Labor Through Pandemic Equity" for more on the moral distress and moral injury faced by nurses during the pandemic, which is attached to these comments as Attachment 4. Unsafe staffing and unsafe working conditions have resulted in nurses leaving bedside care at acute-care hospitals for nursing work in other settings, other types of work, or retirement.

A more recent NNU survey of registered nurses published in April 2022 confirms the deep impact of Covid-19 on the mental health of hospital nurses, who continue to face moral distress and moral injury at work, which is included in Attachment 2a. This survey, conducted in February and March of 2022, shows significant increases in fear, stress, anxiety, depression, trauma, and pandemic-related mental health conditions reported by nurses compared to the survey conducted in June and July of 2021 and published in September 2021.

From NNU's February and March 2022 survey results, RNs reported the following:

- 66.8 percent of hospital RNs fear they will contract Covid, a 59.4 percent increase from September.
- Nearly three-quarters (74.6 percent) are afraid they will infect a family member, a 47.4 percent increase from September.
- Nearly 60 percent (58.4 percent) are having more difficulty sleeping, a 66.4 percent increase from September.
- 83.5 percent feel stressed more often than before the pandemic, a 56.1 percent increase.
- 77.2 percent feel anxious more often than they did before the pandemic, a 53.2 percent increase from September.
- 68.7 percent feel sad or depressed more often than they did before the pandemic, a 64.6 percent increase from September.
- More than half (56 percent) feel traumatized by their experiences caring for patients, a 65.7 percent increase from September.
- 23 percent sought treatment for a mental health condition related to caring for patients during the pandemic, a whopping 87 percent increase from September.

While a single OSHA standard will not completely reverse the industry-created unsafe staffing crisis, it can reasonably be expected to improve staffing retention which will save turnover costs and reduce dangers to workers and patients from unsafe staffing levels.

III. NNU response to OSHA's questions on economic analysis

A. OSHA should craft the standard based on its statutory duty to protect workers from significant risk to their health and safety in the workplace, not by placing dollar values on their lives. *C. Economic Analysis*

No amount of hospital industry profit is worth a health care worker's life or health. NNU objects to the practice of assigning monetary value to lives and making regulatory choices by weighing the cost of lives against the benefits of profits, with no regard for who pays the cost and who gets the benefit.

Thankfully, OSHA is not legally permitted to make regulatory decisions about worker safety and protections in its standards development based on a cost-benefit analysis. OSHA has a statutory duty to protect workers from significant risks to safety and health as long as it is feasible to do so. Through the OSH Act, Congress mandated the prioritization of the safety and health of workers and the prevention of occupational injury and illness and created an obligation by employers to provide a workplace free from recognized hazards.[148] As OSHA explained in the preamble to the Covid-19 Health Care ETS, "the OSH Act, as interpreted by the courts, prohibits OSHA from using cost-benefit analysis as a basis for regulatory decisions. See, *e.g., Pub. Citizen Health Research Grp.* v. *U.S. Dept. of Labor,* 557 F.3d 165, 177 (3d Cir. 2009) (''the Supreme Court has conclusively ruled that economic feasibility does not involve a cost-benefit analysis''), *citing Am. Textile Mfrs. Inst., Inc.* v. *Donovan,* 452 U.S. 490, 513 (1981)."

B. OSHA should use a range of data sources to calculate the benefits of the standard and account for systemic undercounting in CDC data. *C.3 Benefits Data Sources*

Though we emphasize that OSHA should not determine the necessity of a safety and health standard based on a cost-benefit analysis, we acknowledge that OSHA must prepare one to aid the Office of Information and Regulatory Affairs in its regulatory review under E.O. 12866. When calculating the benefits of deaths and infections avoided by the Covid-19 standard, OSHA should account for the systemic undercounting of health care worker deaths and infections in CDC data sources and continue to use a variety of sources to reach as complete a count as possible.

The CDC data tracker of cases and deaths among health care personnel is incomplete. As the CDC explains in a footnote on the tracker, the counts are based on a subset of individuals where case level data are reported by state and territorial jurisdictions and cannot be treated as fully representative of the entire population of healthcare personnel with Covid-19.[149] Only 42

[148] 29 U.S.C. § 651 (1970).

[149] U.S. Centers for Disease Control and Prevention, "COVID Data Tracker: Cases & Deaths among Healthcare Personnel," April 19, 2022, https://covid.cdc.gov/covid-data-tracker/?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcoronavirus%2F2019-ncov%2Fcases-updates%2Fcases-in-us.html#health-care-personnel.

out of 56 jurisdictions had reported Covid-19 cases or death among health care personnel to the CDC by June 2021, which varies in completeness and availability over time. This means that one in four jurisdictions are providing no data, while others are reporting incomplete data.

As of April 12, 2022, the CDC Covid Data tracker reported 1,076,505 Healthcare Personnel infections and 4,120 deaths. As of the same date, NNU has documented 1,464,559 Healthcare Personnel infections and 5,098 deaths using the methodology outlined in NNU's "Sins of Omission" report, Attachment 3. This methodology incorporates state reporting and other public data sources to reach a more comprehensive figure. However, as explained further in the report, we still believe the methodology NNU uses to result in a significant undercount of health care worker infections and deaths.

There are several sources that OSHA should include in its analysis, which may not be consistently incorporated into the CDC data:

- The Nursing Home COVID-19 Public File includes data reported by nursing homes including staff Covid-19 cases and deaths.[150]
- The Department of Veterans Affairs Summary of VA Employee COVID-19 Related Deaths includes Covid-19 related deaths of VA employees based on self-reporting by Veterans Integrated Service Networks.[151]
- State-level reporting of health care worker deaths and infections by California,[152] Georgia,[153] New Hampshire,[154] and Utah,[155] and of health care worker infections by Arkansas,[156] Idaho,[157] Ohio,[158] and Wisconsin.[159] Colorado does not report health care worker infections, but it does provide establishment-level reporting of worker infections

[150] Covid-19 Nursing Home Data. https://data.cms.gov/covid-19/covid-19-nursing-home-data.

[151] U.S. Department of Veterans Affairs, "Department of Veterans Affairs Summary of VA Employee COVID-19 Related Deaths," last updated April 15, 2022, https://www.accesstocare.va.gov/Healthcare/COVID19EmployeeDeaths.

[152] California Department of Public Health, "CDPH News Releases 2022," https://www.cdph.ca.gov/Programs/OPA/Pages/News-Releases-2022.aspx (Health care worker infections and deaths are reported in press releases on Fridays).

[153] Georgia Department of Public Health, "COVID-19 Status Report," https://dph.georgia.gov/covid-19-daily-status-report.

[154] New Hampshire Covid-19 Response, "Case Summary," https://www.covid19.nh.gov/dashboard/case-summary.

[155] Utah Department of Public Health, "Overview of Covid-19 Surveillance," https://coronavirus.utah.gov/case-counts/.

[156] Arkansas Department of Health, "The Arkansas Department of Health COVID-19 Update," https://experience.arcgis.com/experience/633006d0782b4544bd5113a314f6268a/.

[157] Idaho Division of Public Health. "Idaho Department of Health and Welfare's Covid-19 Dashboard," https://public.tableau.com/app/profile/idaho.division.of.public.health/viz/DPHIdahoCOVID-19Dashboard/Home.

[158] Ohio Department of Public Health, "Covid-19 Dashboard," https://coronavirus.ohio.gov/dashboards/key-metrics/cases.

[159] Wisconsin Department of Public Health, "COVID-19: Hospitals," https://www.dhs.wisconsin.gov/covid-19/hosp-data.htm#herc.

and deaths for businesses in its state, which can be used to view data on outbreaks at health care facilities in the state.[160]

C. OSHA should include the long-term effects of Covid-19 infections in its economic analysis. *C.5.2 Frequency, Severity, and Distribution of Infections*

OSHA should not limit its calculation of the benefits of avoiding a Covid-19 infection to the hospitalizations and fatalities avoided. There is now substantial evidence of high rates of long-term effects stemming from Covid-19 infections, known as long Covid. OSHA should account for these effects in the analysis. OSHA should also account for breakthrough cases and fatalities in vaccinated employees, which we now know to be common, including the risk of long Covid in those cases.

The following is a restatement of the research on long Covid from Section II.H, above: Accompanying this high risk of Covid-19 infection is the risk of post-acute sequelae of SARS-CoV-2 infection (PASC or "long Covid"). Nurses and other health care workers diagnosed with Covid-19 face lasting symptoms, though systematic tracking of PASC among nurses, other essential workers, or patients currently does not exist in the United States. Recent studies estimate that 10 to 30 percent of Covid-19 survivors in the United States develop chronic health impacts, which means 7.7 million to 23 million individuals may have developed PASC as of February 2022.[161] But this is likely a conservative estimate and may grow, as there are no laboratory tests or treatment for long Covid. Haverall et al. investigated Covid-related long-term symptoms among healthy health care workers, aged 33 to 56, in Sweden from April 2020 to January 2021. They found that just over one in ten health care workers who had initial mild illness were still coping with at least one moderate to severe symptom eight months later, which negatively affected their work and/or personal lives.[162]

Colloquially known as "long Covid" or "long hauler syndrome," PASC refers to symptoms that can persist for several weeks or months following initial infection and can occur among previously healthy individuals and across all age groups. It can affect most major organ systems, including respiratory, cardiovascular, metabolic, musculoskeletal, pulmonary, gastrointestinal, nervous, and regulatory processes.[163] NNU's September 2021 Covid-19 survey

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[160] Colorado Department of Public Health and Environment, "Outbreak data," https://covid19.colorado.gov/covid19-outbreak-data.

[161] U.S. Government Accountability Office, "Science & Tech Spotlight: Long COVID," March 2, 2022, https://www.gao.gov/assets/gao-22-105666.pdf.

[162] Havervall et al., "Symptoms and Functional Impairment Assessed 8 Months After Mild COVID-19 Among Health Care Worker," JAMA, April 7, 2021, https://jamanetwork.com/journals/jama/fullarticle/2778528

[163] Al-Aly, Z., Xie, Y. & Bowe, B., "High-dimensional characterization of post-acute sequelae of COVID-19.," Nature 594**,** 259–264, 2021, https://doi.org/10.1038/s41586-021-03553-9.

Jiang et al., "Postacute Sequelae of Severe Acute Respiratory Syndrome Coronavirus 2 Infection: A State-of-the-Art Review," JACC, Sept 15, 2021, https://www.jacc.org/doi/10.1016/j.jacbts.2021.07.002.

Chertow et al., "SARS-CoV-2 infection and persistence throughout the human body and brain," Research Square, December 20, 2021, https://www.researchsquare.com/article/rs-1139035/v1.

found that nearly a quarter of nurses who contracted SARS-CoV-2 reported experiencing post-Covid symptoms lasting from zero to three months, one-third had symptoms lasting three to nine months, 12 percent had symptoms lasting nine to 12 months, and 12 percent reported lasting symptoms longer than a year.[164] The most common symptoms reported included tiredness and fatigue, joint and muscle pain, memory and concentration difficulties, headaches and migraines, and difficulty breathing and shortness of breath.

One study of 6,061 health care workers in Canada found that 46.2 percent of the non-hospitalized cases reported persistent symptoms ≥4 weeks later and 40 percent had persistent symptoms ≥ 12 weeks later. Persistent symptoms at 4 to 7 weeks post-Covid-19 onset were reported by half of non-hospitalized health care workers compared to 37 percent at 24 to 27 weeks. In addition, 68 percent of health care workers who required hospitalization reported lingering health issues after three months.[165] Another study of health care workers with a documented Covid-19 infection found that 45 percent reported persistent symptoms and 32 percent reported struggling to cope three to four months following infection.[166]

Studies have also found that even asymptomatic and mild infections can result in long Covid symptoms that have profound health impacts and disrupt individuals' personal and work lives. A U.S. Department of Veterans Affairs cohort study of more than 8.5 million people found that Covid-19 survivors had a 40 percent increased risk of new onset diabetes at least one year after infection. The risk was evident even among those who had mild infections and no previous risk factors for developing diabetes.[167] A U.K. Biobank brain imaging study of 400 individuals who had mild to moderate or asymptomatic Covid-19 had significant reduction in grey matter thickness in several regions of the brain, reduction in global brain size, and larger cognitive decline.[168] A study of more than 11 million U.S. veterans' health records found that veterans who had Covid-19 one year earlier faced higher risk of stroke, cerebrovascular disease and dysrhythmia compared with those who were never infected. Veterans that had Covid-19 faced a 72 percent higher risk of heart failure after 12 months than those in the control group. Heightened risks were seen even in people who had mild to moderate Covid-19 symptoms, and in those who did not have a known cardiovascular condition prior to infection.[169]

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[164] National Nurses United, "National nurse survey reveals that health care employers need to do more to comply with OSHA emergency temporary standard," September 2021, https://www.nationalnursesunited.org/press/national-nurse-survey-reveals-health-care-employers-need-to-do-more-to-protect-workers.

[165] Carazo et al., "Physical, psychological and cognitive profile of post-COVID condition in healthcare workers, Quebec, Canada, medRxiv, March 10, 2022, https://www.medrxiv.org/content/10.1101/2022.03.08.22272057v1.

[166] Gaber et al., "Persistent post-covid symptoms in healthcare workers," Occupational Medicine, Volume 71, Issue 3, April 2021, Pages 144–146, https://doi.org/10.1093/occmed/kqab043

[167] Xie and Al-Aly, "Risks and burdens of incident diabetes in long COVID: a cohort study," The Lancet Diabetes & Endocrinology, March 21, 2022, https://doi.org/10.1016/S2213-8587(22)00044-4

[168] Douaud, G., Lee, S., Alfaro-Almagro, F. et al., "SARS-CoV-2 is associated with changes in brain structure in UK Biobank," Nature, March 7, 2022, https://doi.org/10.1038/s41586-022-04569-5

[169] Xie et al., "Long-term cardiovascular outcomes of COVID-19," Nature Medicine, February 7, 2022, https://doi.org/10.1038/s41591-022-01689-3

While preliminary studies have found that Covid-19 vaccines may reduce the risk of developing long Covid,[170] evidence on its protective effect remains inconclusive. For example, a U.K. study of more than 10,000 breakthrough infections found that vaccination did not protect against long Covid.[171] Another study found that 19 percent of infected vaccinated health care workers had persistent symptoms longer than 6 weeks.[172] A study of 16,035 breakthrough infections at 6 months found that the risk of post-acute sequelae in pulmonary and extrapulmonary organ systems was higher in individuals with breakthrough infections than those with no Covid-19.[173]

Preventing the risk of Covid-19 infection will effectively prevent the risk of long Covid. As the CDC explicitly states, "All patients with SARS-CoV-2 infection in the hospital pose a risk to health care workers and other patients, even if the patient has mild illness or is asymptomatic and the infection is incidental."[174] Yet, the CDC weakened the isolation period for nurses and other workers who have tested positive for Covid-19 from 10 days to seven days. No longer requiring exposed vaccinated and boosted health care workers to quarantine will result in more hospital-acquired infections and debilitating long Covid.[175] CDC's isolation guidance is not based on science but on ensuring that health care employers and other businesses have a supply of workers. Several studies have found that the period of infectiousness for Omicron is the same as other SARS-CoV-2 variants, beyond the CDC's current isolation time period for nurses and other workers.[176]

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[170] Office for National Statistics, "Self-reported long COVID after two doses of a coronavirus (COVID-19) vaccine in the UK: 26 January 2022," last updated January 26, 2022, https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/conditionsanddiseases/bulletins/selfreportedlongcovidaftertwodosesofacoronaviruscovid19vaccineintheuk/26january2022.

Simon et al., "Reduced Incidence of Long-COVID Symptoms Related to Administration of COVID-19 Vaccines Both Before COVID-19 Diagnosis and Up to 12 Weeks After," medRxiv, November 18, 2021, https://www.medrxiv.org/content/10.1101/2021.11.17.21263608v1.

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[172] Bergwerk et al., "Covid-19 Breakthrough Infections in Vaccinated Health Care Workers," New England Journal of Medicine, October 14, 2021, https://www.nejm.org/doi/full/10.1056/NEJMoa2109072.

[173] Al-Aly et al., "Long Covid after Breakthrough COVID-19: the post-acute sequelae of breakthrough COVID-19," Research Square, November 15, 2021, https://www.researchsquare.com/article/rs-1062160/v1.

[174] U.S. Centers for Disease Control and Prevention, "Science Brief: Indicators for Monitoring COVID-19 Community Levels and Making Public Health Recommendations," last updated March 4, 2022, https://www.cdc.gov/coronavirus/2019-ncov/science/science-briefs/indicators-monitoring-community-levels.html.

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National Nurses United, "Nurses condemn CDC's dangerous decision to weaken isolation guidance for employers," December 23, 2021, https://www.nationalnursesunited.org/press/nurses-condemn-cdcs-decision-to-weaken-isolation-guidance.

[176] Landon et al., "High Rates of Rapid Antigen Test Positivity After 5 days of Isolation for COVID-19," medRxiv, February 2, 2022, doi: https://doi.org/10.1101/2022.02.01.22269931.

The risk of long Covid and the high rate of infections among health care workers means that every health care worker is at elevated risk of severe Covid-19 outcomes. The risk for severe Covid-19 outcomes is not limited to medically diagnosed immunocompromised individuals or people over 65 years of age. One's health status and risk level changes over time, and medical conditions that place people at increased risk for severe Covid-19 outcomes expansively range from pregnancy, physical inactivity, and being a former smoker to chronic liver or kidney disease, cancer, and cystic fibrosis.[177] According to the CDC, "a person with one or more of these conditions who gets very sick from Covid-19 (has severe illness from COVID-19) is more likely to be hospitalized, need intensive care, require a ventilator to help them breathe, or die."[178] From one day to the next, a health care worker can develop a condition that puts them at higher risk of severe disease from Covid-19 infection.

The impacts of long Covid demonstrate the need for full and optimal protections for nurses and other health care workers as determined by the precautionary principle. The precautionary principle states that "when an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause-and-effect relationships are not fully established scientifically."[179] Following the precautionary principle is necessary for protecting health care workers from the hazards posed by a still emerging infectious disease like Covid-19 where we are still learning about the disease. Protection of nurses and other essential workers is fundamental to limiting the spread of Covid-19. If more and more health care workers suffer from long Covid, the impact on safe patient care and worker safety will be disastrous.

IV. Conclusion

Covid-19 continues to evolve and spread. Nurses and other health care workers have been treating patients infected with Covid-19 for more than two years despite significant risk to themselves and their families. As the United States has dropped the protections that limited Covid-19 spread among the public, health care workers are left to bear an even greater share of the burden of the pandemic. Protecting health care workers protects us all. Two years into the

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National Institute of Infectious Diseases Disease Control and Prevention Center, National Center for Global Health and Medicine, "Active epidemiological investigation on SARS-CoV-2 infection caused by Omicron variant (Pango lineage B.1.1.529) in Japan: preliminary report on infectious period," Jan 5, 2022, https://www.niid.go.jp/niid/en/2019-ncov-e/10884-covid19-66-en.html.

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[178] Ibid.

[179] Hayes A, "The precautionary principle." Arh Hig Rada Toksikol, June 2005, 56(2):161-6. PMID: 15968832.

pandemic, we know what measures are necessary to prevent infection. We have a solid supply chain for PPE. It is long past time for every health care employer to make protecting workers from Covid-19 part of the routine of their facilities, every day. For these reasons and all of the reasons detailed above, OSHA must enact a strong permanent Covid-19 standard for health care settings as quickly as possible so nurses and other health care workers can rely on being fully protected as they care for their patients.

NNU appreciates the opportunity to provide additional comments to OSHA on the "Occupational Exposure to COVID-19; Emergency Temporary Standard," 86 Fed. Reg. 32,376 (Jun. 21, 2021) (Docket No. OSHA-2020-0004).

Sincerely,

Michelle Grisat
National Director of Health and Regulatory Policy
National Nurses United

Appendix A:
Necessary Updates OSHA to the Covid-19 Health Care ETS
(Excerpt from Comments from National Nurses United to OSHA, November 3, 2021, Comment ID: OSHA-2020-0004-1521, Docket ID: OSHA-2020-0004)

NNU urges OSHA to make the following updates to the Covid-19 Health Care ETS and to include these updates when issuing a permanent standard (scientific evidence and reasoning are provided in more detail [in the November 3 comments]):

1. OSHA should not rely on weak guidance from the U.S. Centers for Disease Control and Prevention (CDC). OSHA's updated Covid-19 Health Care ETS and permanent standard should require optimal workplace protections for nurses and other health care workers, based on the available scientific evidence and the precautionary principle.
2. OSHA should require employers to proactively establish plans for surge preparation, including plans to expand isolation beds with negative pressure ventilation and HEPA air filtration, plans to provide safe staffing during a surge in Covid-19 patients, and establishment of a PPE stockpile.
3. OSHA should remove all exemptions to the scope of the Covid-19 Health Care ETS when updating the ETS and issuing a permanent standard. The Covid-19 Health Care ETS currently allows exemptions where all employees are fully vaccinated, and all non-employees are screened for Covid-19 prior to entry and individuals who have or may have Covid-19 are not allowed to enter the facility.
4. OSHA should ensure that fully vaccinated individuals and individuals recovered from Covid-19 in the previous 90 days are not exempted from medical removal and medical removal protection benefits.
5. OSHA should require precautionary screening and testing of all patients, visitors, and others entering the facility, including screening for Covid-19 symptoms and recent exposure history to Covid-19 as well as testing using a reliable diagnostic test for SARS-CoV-2.
6. OSHA should update requirements so that screening of nurses and other health care workers for Covid-19 includes weekly surveillance testing in addition to existing requirements for symptom screening and exposure surveillance. Testing should occur regardless of vaccination status. OSHA should also expand the list of symptoms that trigger medical removal and testing to the full list of symptoms congruent with Covid-19, not the extremely limited symptoms specified in the Covid-19 Health Care ETS.
7. OSHA should require optimal PPE for nurses and other health care workers caring for patients with suspected or confirmed Covid-19. Optimal PPE includes a powered air-purifying respirator (PAPR), virus impervious coveralls that

incorporate head and shoe coverings, and medical-grade gloves. NNU urges OSHA to fully ban reuse of single use PPE and to ban the use of decontamination methods to reuse PPE.

8. OSHA should strengthen the definition of close-contact exposure in the updated Covid-19 Health Care ETS and in issuing a permanent standard to reflect the available scientific evidence regarding aerosol transmission. The CDC's definition of close contact exposure for health care workers (within six feet for cumulative total 15 minutes or more over a 24-hour period) is based on arbitrary assumptions and fails to account for up-to-date scientific data and the precautionary principle.
    - NNU commends OSHA on already improving on the CDC's definition of close contact exposure for health care workers in the Covid-19 Health Care ETS by not considering a facemask to be equivalent protection to a respirator. We urge OSHA to maintain this protection in an updated ETS and a permanent standard.
    - OSHA should remove the exemption for exposure notification to staff due to the presence of a Covid-positive patient in areas where suspected and confirmed Covid-19 patients are normally cared for. All staff have the right to be informed of a hazardous exposure that occurs at the worksite, and OSHA should ensure an updated Covid-19 Health Care ETS and permanent standard provides that right to all employees.
9. OSHA should strengthen ventilation and patient isolation requirements, including:
    - Requiring employers to establish dedicated Covid-19 units in the permanent Covid-19 standard and prohibiting mixing Covid-positive patients, patients who may have Covid-19, and patients who do not have Covid-19 in the same units or on the same assignment.
    - Requiring employers to make improvements to ventilation systems to reduce the risk of aerosol transmission in both patient care and non-patient care areas, such as by increasing outdoor air proportion and filtration levels for recirculated air or by placing and maintaining portable high efficiency particulate air (HEPA) filter units.
    - Requiring employers to convert patient rooms to negative pressure/airborne infection isolation ventilation if there is a need for more rooms than exist.

Appendix B:
Citations

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- The study looked at 158 Covid cases in Taiwan; an estimated 55 percent of transmission occurred during pre-symptomatic stage.

- Wu, Liu, et al., "Assessing asymptomatic, pre-symptomatic and symptomatic transmission risk of SARS-CoV-2," Clinical Infectious Diseases, March 2021, https://doi.org/10.1093/cid/ciab271.

Scientific evidence underlining the significant and primary role aerosol transmission plays in the spread of SARS-CoV-2.

1. **Infected individuals emit infectious aerosol particles.**
   - **a.** Infectious SARS-CoV-2 virus was readily isolated from upper respiratory tract samples of patients hospitalized with Covid-19, even in the absence of a cough. High viral loads were also found to be more than 1,000 times higher for SARS-CoV-2 compared to SARS-CoV-1.[180]
   - **b.** Researchers collected exhaled breath condensate from 57 Covid-19 patients, four hospitalized non-Covid-19 patients, and 15 healthy individuals in Beijing. Exhaled breath samples had the highest positive rate; Covid-19 patients emitted millions of SARS-CoV-2 particles into the air per hour.[181]
   - **c.** Researchers recovered viable SARS-CoV-2 virus in the air from hospital rooms with Covid-19 patients, collected 6.5 to 15.7 feet away from the patients.[182]
   - **d.** SARS-CoV-2 was detected in respired aerosols <5 µm in diameter around six patients, collected beyond 6 feet, produced through normal breathing, vocalization, and coughing. This study also showed infectious, replicating virions in aerosol samples <1 µm in diameter.[183]
   - **e.** Researchers detected SARS-CoV-2 in air samples taken greater than 6 feet from isolated Covid-19 patients and in air samples worn by sampling personnel, in the absence of a cough.[184]
   - **f.** Researchers detected viral presence in exhaled breath, even without cough, for seasonal coronaviruses, influenza viruses, and rhinoviruses in both respiratory droplet (>5 µm) and aerosol (<5 µm) particles.[185]

[180] Wölfel, R., V.M. Corman, et al., "Virological assessment of hospitalized patients with COVID-2019," Nature, April 1, 2020, https://www.nature.com/articles/s41586-020-2196-x

[181] Ma, J., X. Qi, et al., "COVID-19 patients in earlier stages exhaled millions of SARS-CoV-2 per hour," Clinical Infectious Diseases, Aug 28, 2020, https://pubmed.ncbi.nlm.nih.gov/32857833/.

[182] Lednicky et al., "Viable SARS-CoV-2 in the air of a hospital room with COVID-19 patients," International Journal of Infectious Diseases, September 15, 2020, https://doi.org/10.1016/j.ijid.2020.09.025.

[183] Santarpia, J.L., V.L. Herrera, et al., "The Infectious Nature of Patient-Generated SARS-CoV-2 Aerosol," medRxiv, July 21, 2020, https://www.medrxiv.org/content/10.1101/2020.07.13.20041632v2.

[184] Santarpia, J.L., D.N. Rivera, et al., "Aerosol and surface contamination of SARS-CoV-2 observed in quarantine and isolation care," Scientific Reports, July 2020, https://www.nature.com/articles/s41598-020-69286-3.

[185] Leung, N.H.L., D.K.W. Chu, et al., "Respiratory virus shedding in exhaled breath and efficacy of face masks," Nature Medicine, April 3, 2020, https://www.nature.com/articles/s41591-020-0843-2.

g. Researchers found that recovering Covid-19 patients still exhaled thousands of SARS-CoV-2 per minute. The virus was also detected in hospital air samples, and surface swabs.[186]

2. **SARS-CoV-2 virus has been found in a range of aerosol particle sizes, including less than 5 microns and less than 1 micron.**
   - **a.** Air sampling of two Covid-19 patients detected SARS-CoV-2 aerosol particles in >4μm and 1 - 4 μm in diameter.[187]
   - **b.** SARS-CoV-2 was detected in respired aerosols <5 μm in diameter around six patients, collected beyond 6 feet, produced through normal breathing, vocalization, and coughing. This study also showed infectious, replicating virions in aerosol samples <1 μm in diameter.[188]
   - **c.** SARS-CoV-2 was recovered in air samples from a hospital setting, including in size- fractionated samples 2.5 microns or less, 2.5 to 10 microns, and greater than 10 microns.[189]

3. **SARS-CoV-2 can survive and remain infectious when suspended in aerosol particles.**
   - **a.** Researchers found that SARS-CoV-2 can remain infectious for up to 16 hours suspended in aerosols.[190]
   - **b.** Researchers found that SARS-CoV-2 can survive in aerosols suspended in the air for at least 3 hours and on surfaces for several days.[191]

4. **When infected individuals breathe, cough, sneeze, or vocalize, they emit aerosol particles in a wide range of sizes. These aerosol particles can travel through the air to distances farther than 6 feet and can remain suspended in the air for long periods of time.**
   - **a.** Pathogen-carrying gas clouds emitted when people breathe, cough, and sneeze can travel up to 23 – 27 feet.[192]

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[186] Zhou, L., M. Yao, et al., "Breath-, air- and surface-borne SARS-CoV-2 in hospitals," Journal of Aerosol Science, February 2021, Vol 152: 105693, https://doi.org/10.1016/j.jaerosci.2020.105693.

[187] Chia, P.Y., K.K. Coleman, et al., "Detection of air and surface contamination by SARS-CoV-2 in hospital rooms of infected patients," Nature Communications, May 29, 2020, https://www.nature.com/articles/s41467-020-16670-2.

[188] Santarpia, J.L., et al.medRxiv, July 21, 2020.

[189] Stern, Koutrakis, et al., "Characterization of hospital airborne SARS-CoV-2," Respiratory Research, February 26, 2021, https://respiratory-research.biomedcentral.com/articles/10.1186/s12931-021-01637-8.

[190] Fears, A.C., W.B. Klimstra, et al., "Persistence of Severe Acute Respiratory Syndrome Coronavirus 2 in Aerosol Suspensions," Emerging Infectious Diseases, Sept 2020, Vol 26, No 9, https://wwwnc.cdc.gov/eid/article/26/9/20-1806_article.

[191] van Doremalen et al., "Aerosol and Surface Stability of SARS-CoV-2 as Compared with SARS-CoV-1," New England Journal of Medicine, April 16, 2020, https://www.nejm.org/doi/full/10.1056/nejmc2004973.

[192] Bourouiba, L., "Turbulent Gas Clouds and Respiratory Pathogen Emissions: Potential Implications for Reducing Transmission of COVID-19," JAMA, March 26, 2020, https://jamanetwork.com/journals/jama/fullarticle/2763852.

b. Researchers found that a diner (index case) in South Korea infected two other people after five minutes of exposure from a distance of 4.8 meters (15 feet) and 6.5 meters (21 feet). Interviews, credit card records, cell phone location data, CCTV footage and PCR testing were collected.[193]

c. Researchers found that normal conversations can create a turbulent, jet-like airflow that can transport exhaled breath over two meters (6.5 feet) in front of the speaker, potentially further, within 30 seconds.[194]

d. Researchers found that the time-of-flight to reach 6.5 feet is only a few seconds resulting in a viral dose above the minimum required for Covid-19 infection, implying that physical distance alone in the absence of ventilation and respiratory protection is insufficient to provide safety for long exposure times.[195]

5. Multiple outbreak investigations have found that aerosol transmission is the only explanation for the outbreak.

a. An epidemiological investigation determined that a correctional officer in Vermont contracted SARS-CoV-2 after multiple brief encounters with six asymptomatic incarcerated individuals. Each interaction lasted about one minute, totaling 17 minutes of exposure over an eight-hour shift. The officer wore a microfiber cloth mask, gown, goggles, and gloves, and maintained six feet from the infected inmates the entire time. The officer had no known contact with anyone else with Covid-19 and coronavirus cases were low in his home county and in the rest of the correctional facility at the time, leading researchers to conclude that his exposure most likely came from the brief encounters.[196]

b. An outbreak investigation in an Israeli pediatric hospital identified six health care worker nosocomial infections from an asymptomatic patient that tested negative for Covid-19 upon admission. All six health care workers became infected despite wearing surgical masks at all times after providing routine patient care, which lasted less than 10 minutes. Three of the six health care workers had no contact

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[193] Kwon, K.S., J.I. Park, et al., "Evidence of Long-Distance Droplet Transmission of SARS-CoV-2 by Direct Air Flow in a Restaurant in Korea," Journal of Korean Medical Science, November 30, 2020, https://jkms.org/DOIx.php?id=10.3346/jkms.2020.35.e415.

[194] Abkarian, M., S. Mendez, et al., "Speech can produce jet-like transport relevant to asymptomatic spreading of virus," Proceedings of the National Academy of Sciences, Sept 25, 2020, https://www.pnas.org/content/117/41/25237/tab-article-info.

[195] de Oliveira, P.M., L.C.C. Mesquita, et al., "Evolution of spray and aerosol from respiratory releases: theoretical estimates for insight on viral transmission," Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences, January 20, 2021, https://royalsocietypublishing.org/doi/10.1098/rspa.2020.0584.

[196] Pringle, J.C., J. Leikauskas, et al., "COVID-19 in a Correctional Facility Employee Following Multiple Brief Exposures to Persons with COVID-19 — Vermont, July–August 2020," MMWR Early Release, Oct 30, 2020, https://www.cdc.gov/mmwr/volumes/69/wr/mm6943e1.htm.

with the patient and maintained physical distance. Note that this study underlines the faultiness of CDC's focus on "droplet" transmission.[197]

c. Detailed investigation of the Skagit Valley Chorale outbreak found that SARS-CoV-2 transmission was dominated by inhalation of respiratory aerosols generated by one index case. After evaluating several influential factors such as ventilation rate, duration of event, and deposition onto surfaces, researchers determined that aerosol transmission was the only explanation for the outbreak.[198]

d. A SARS-CoV-2 outbreak investigation of a large meat processing complex in Germany found that a single index case led to 1,500 worker infections. SARS-CoV-2 virus was transmitted between workers more than 26 feet away from each other who had no other points of contact.[199]

e. A cluster investigation from Brigham and Women's Hospital found that 15 patients and 42 health care workers became infected with Covid-19 from a patient whose isolation was removed after testing negative for the virus. Whole-genome sequencing confirmed that some health care workers were infected despite wearing surgical masks and eye protection.[200] Note that this study underlines the faultiness of CDC's focus on "droplet" transmission.

f. An epidemiological investigation in a department store in China identified 43 Covid-19 cases. After analyzing interviews and surveillance footage, researchers found that 12 out of 43 patients were infected at distances beyond reach of droplets, making aerosol transmission likely.[201]

g. Investigation into an outbreak in a church in Sydney, Australia. Case patient sang in the choir, had no close physical contact with other attendees, 12 of whom became infected. Secondary cases were 1-15 meters away from the case patient, and in a section below the case patient (who was in the choir loft). Case patient was facing away from this section, indicating aerosol transmission was at play.[202]

h. This study documents transmission from gym instructor to class participants in an indoor cycling class and kickboxing class in Hawaii. Ventilation was poor; this is

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[197] Goldberg, L., Y. Levinsky, et al., "SARS-CoV-2 Infection Among Health Care Workers Despite the Use of Surgical Masks and Physical Distancing—the Role of Airborne Transmission ," Open Forum Infectious Diseases, Jan 27, 2021, https://doi.org/10.1093/ofid/ofab036.

[198] Miller, S.L., W.W. Nazaroff, et al., "Transmission of SARS-CoV-2 by inhalation of respiratory aerosol in the Skagit Valley Chorale superspreading event," Indoor Air, Sept 26, 2020, https://onlinelibrary.wiley.com/doi/full/10.1111/ina.12751.

[199] Günther, et al., "SARS-CoV-2 outbreak investigation in a German meat processing plant," EMBO Molecular Medicine, Oct 27, 2020, https://www.embopress.org/doi/full/10.15252/emmm.202013296.

[200] Klompas, M., M.A. Baker, et al., "A SARS-CoV-2 Cluster in an Acute Care Hospital," Annals of Internal Medicine, Feb 9, 2021, https://www.acpjournals.org/doi/full/10.7326/M20-7567.

[201] Jiang, G., C. Wang, et al., "Aerosol transmission, an indispensable route of COVID-19 spread: case study of a department-store cluster," Frontiers of Environmental Science & Engineering, Dec 25, 2020, https://pubmed.ncbi.nlm.nih.gov/33391845/.

[202] Katelaris, Wells, et al., "Epidemiologic Evidence for Airborne Transmission of SARS-CoV-2 during Church Singing, Australia, 2020," Emerging Infectious Diseases, April 5, 2021, https://wwwnc.cdc.gov/eid/article/27/6/21-0465_article.

a case of aerosol transmission. Only a few class participants wore masks (instructors did not), but they were infected even with mask wearing.[203]

i. Researchers detected SARS-CoV-2 in central ventilation systems of three Covid-19 wards in a Swedish hospital. Viral SARS-CoV-2 RNA was detected in ventilation exhaust filters located at least 50 meters (164 feet) from patient room vent openings within wards, indicating long-distance aerosol transmission.[204]

j. Mathematical modelling using case data from the Diamond Princess cruise ship outbreak found: "Our results show that airborne transmission by small aerosols containing SARS- CoV-2 was most likely the dominant mode of COVID-19 transmission aboard the ship, even with assumptions of a very high ventilation rate (9 to 12 air changes per hour) and no air recirculation, which are both conservative assumptions that favor against long-range airborne transmission. The long range and short-range transmission routes had similar contributions to the total number of infected cases. However, aerosol transmission across both short- and long-range distances accounted for >50 percent of disease transmission overall, which is contrary to the prevailing positions on how COVID-19 is spread held by organizations like WHO and CDC but is consistent with emerging evidence for airborne transmission."[205]

6. Wide scientific consensus has been established regarding the need to recognize aerosol transmission of SARS-CoV-2 and for that science to inform decisions about protections.

a. On March 23, 2022, the White House Office of Science and Technology Policy published a blog post titled, "Let's Clear the Air on COVID," describing the virus as primarily transmitted through aerosols or "through tiny airborne particles of the virus hanging in indoor air for minutes or hours after an infected person has been there.[206]

b. On March 29, 2022, Dr. Alondra Nelson, Director of the White House Office of Science and Technology Policy, explicitly stated that "COVID-19 is transmitted through the air during a virtual event on Covid-19 and clean indoor air.[207]

c. Experts, professional associations, and other organizations have urged the CDC and the rest of the U.S. government to fully recognize aerosol transmission of SARS-CoV-2.

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[203] Groves, Usagawa, "Community Transmission of SARS-CoV-2 at Three Fitness Facilities — Hawaii, June–July 2020," MMWR, March 5, 2021, https://www.cdc.gov/mmwr/volumes/70/wr/mm7009e1.htm.

[204] Nissen, K., J. Krambrich, et al., "Long-distance airborne dispersal of SARS-CoV-2 in COVID-19 wards," Scientific Reports, Nov 11, 2020, https://www.nature.com/articles/s41598-020-76442-2.

[205] Azimi, P., Z. Keshavarz, et al., "Mechanistic transmission modeling of COVID-19 on the Diamond Princess cruise ship demonstrates the importance of aerosol transmission," PNAS, Feb 23, 2021, https://www.pnas.org/content/118/8/e2015482118.

[206] Nelson, Alondra, "Let's Clear The Air On COVID," White House Office of Science and Technology Policy Blog, March 23, 2022, https://www.whitehouse.gov/ostp/news-updates/2022/03/23/lets-clear-the-air-on-covid/

[207] White House Virtual Event – "Let's Clear the Air on COVID: An OSTP Discussion on Clean Indoor Air," March 29, 2022, https://www.whitehouse.gov/ostp/events-webinars/past-events/

i. A group of experts sent a letter on February 15, 2021, urging the White House, CDC, and National Institutes of Health (NIH) to take immediate action to address SARS-CoV-2 inhalation exposure.[208]
ii. National Nurses United and 44 allied unions and organizations sent a petition urging the CDC to update its Covid-19 guidance to fully reflect the latest scientific evidence regarding SARS-CoV-2 transmission through aerosols that infected people emit when they breathe, speak, cough, sneeze, or sing.[209] Over 12,000 individuals signed this petition.
iii. The American Industrial Hygiene Association published a joint consensus statement[210] to call on the CDC and OSHA to issue guidance preventing occupational exposures due to aerosol transmission of SARS-CoV-2. Below are co-sponsors of the statement.
    - American Conference of Governmental Industrial Hygienists
    - American Association of Aerosol Research
    - Association of Occupational Health Professionals in Healthcare
    - American Thoracic Society
    - Association of Schools & Programs of Public Health
    - National Association of Occupational Health Professionals
    - Occupational Health Clinics for Ontario Workers, Inc.
    - Organization for Safety Asepsis and Prevention
    - Society of Critical Care Medicine

iv. The American Society of Heating, Refrigerating and Air-Conditioning Engineering (ASHRAE) released new guidance on January 6, 2021, to address control of airborne infectious aerosol exposure.[211]
v. Representatives Robert C. "Bobby" Scott, Rosa L. DeLauro, Frank Pallone, Jr., James E. Clyburn, and Alma S. Adams sent a letter on March 1, 2021, to the White House, CDC, and the Department of Labor commending the Biden Administration's strong, science-based action and

[208] Bright, R., L.M. Brosseau, L.R. Goldman, C. Gounder, J. Jimenez, Y. Kawaoka, L. Marr, D. Michaels, D.K. Milton, M. Osterholm, K. Prather, R.T. Schooley, and P. Seminario to J. Zients, R.P. Walensky, and A.S. Fauci, "Re: Immediate Action is Needed to Address SARS-CoV-2 Inhalation Exposure," Feb 15, 2021, https://aiha- assets.sfo2.digitaloceanspaces.com/AIHA/uploads/PressReleases/Immediate-Action-to-Address-Inhalation- Exposure-to-SARS-CoV-2_2142021.pdf.

[209] National Nurses United, "Nurses, Unions, Allies Urge CDC to Acknowledge Covid-19 Aerosol Transmission to Help Bring Virus Under Control," Feb 23, 2021, https://www.nationalnursesunited.org/press/nurses-unions-allies-urge-cdc-to-acknowledge-covid-19- aerosol-transmission.

[210] Brosseau, L.M., A.H. Mitchell, and J. Rosen, "Joint Consensus Statement on Addressing the Aerosol Transmission of SARS CoV-2 and Recommendations for Preventing Occupational Exposures," American Industrial Hygiene Association, Feb 1, 2021, https://aiha- assets.sfo2.digitaloceanspaces.com/AIHA/resources/Fact-Sheets/Joint-Consensus-Statement-on-Addressing- the-Aerosol-Transmission-of-SARS-CoV-2-Fact-Sheet.pdf.

[211] ASHRAE Epidemic Task Force, "Core Recommendations for Reducing Airborne Infectious Aerosol Exposure," Jan 6, 2021, https://www.ashrae.org/file%20library/technical%20resources/covid-19/core-recommendations-for-reducing-airborne-infectious-aerosol-exposure.pdf.

expressing "serious questions about the adequacy of the current CDC Guidance regarding protections from aerosol transmission of the virus.[212]

vi. The House Education and Labor Committee, Workforce Protections Subcommittee held a hearing on March 11, 2021, titled: "Clearing the Air: Science-Based Strategies to Protect Workers from COVID-19 Infections." At this hearing, experts testified to the importance and necessity of recognizing aerosol transmission of the coronavirus to ensuring an effective pandemic response, including the importance of the CDC updating its guidance and OSHA issuing strong, enforceable standards.[213]

vii. Chairman Bobby Scott released a statement on March 10, 2021, urging the CDC "to follow the evidence and research and direct its energies into improving protections for health care workers, not into eroding them."[214] Chairman Scott also emphasized the "there is no evidence that surgical masks are adequate to prevent exposure of frontline health workers to the virus that causes Covid-19."

viii. The American Public Health Association (APHA) sent a letter to the U.S. Subcommittee on Workforce Protections on March 10, 2021, urging the CDC to update its guidelines that are consistent with the scientific evidence of inhalation risk. "The best scientific evidence indicates that inhalation is the primary route of transmission of SARS-CoV-2. OSHA standards and CDC guidelines must be updated to fully recognize the significant risk of exposure to virus through inhalation."

ix. Senator Alex Padilla sent a letter to the U.S. Department of Labor, the White House, and the CDC on March 27, 2021, urging the CDC "to take additional steps regarding protections from aerosol transmission of the virus."

x. Similar communications have been sent to governments around the world. Dr. Lisa Brosseau – national expert on respiratory protection and infectious diseases and professor (retired), University of Illinois at Chicago – has collected selected letters and posted them here: https://drive.google.com/drive/u/0/folders/16gIPk7UXTu6onIXggM96D5iql07U0wMY

7. Literature reviews and editorials regarding the importance of recognizing aerosol transmission of SARS-CoV-2 have been published by experts.

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[212] Scott, R.C., R.L. DeLauro, F. Pallone, Jr., J.E. Clyburn, and A.S. Adams to J. Zients, R.P. Walensky, and A. Stewart, March 1, 2021.

[213] House Education & Labor Committee, Workforce Protections Subcommittee, "Clearing the Air: Science-Based Strategies to Protect Workers from COVID-19 Infections," March 11, 2021, https://edlabor.house.gov/hearings/clearing-the-air-science-based-strategies-to-protect-workers-from-covid-19-infections.

[214] Scott, B., "Scott Statement on CDC Decision to Weakening Coronavirus Protections for Frontline Health Care Workers," House Education & Labor Committee, March 10, 2020, https://edlabor.house.gov/media/press-releases/scott-statement-on-cdc-decision-to-weakening- coronavirus-protections-for-frontline-health-care-workers.

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b. Samet, J.M., K. Prather, et al., "Airborne Transmission of SARS-CoV-2: What We Know," Clinical Infectious Diseases, Jan 18, 2021, https://academic.oup.com/cid/advance- article/doi/10.1093/cid/ciab039/6103221
c. Tang, J.W., W.P. Bahnfleth, et al., "Dismantling myths on the airborne transmission of severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2)," J Hosp Infection, Jan 12, 2021, https://www.journalofhospitalinfection.com/article/S0195- 6701(21)00007-4/fulltext
d. Jones, R., "Droplets, aerosols and COVID-19: updating the disease transmission paradigm," OUPblog, Jan 11, 2021, https://blog.oup.com/2021/01/droplets-aerosols-and-covid-19-updating-the-disease-transmission-paradigm/.
e. Jarvis, M.C., "Aerosol Transmission of SARS-CoV-2: Physical Principles and Implications," Front Public Health, Nov 23, 2020, https://www.frontiersin.org/articles/10.3389/fpubh.2020.590041/full
f. Prather, K., L.C. Marr, et al., "Airborne transmission of SARS-CoV-2," Science, Oct 16, 2020, https://science.sciencemag.org/content/370/6514/303.2.full
g. Tang, S., Y. Mao, et al., "Aerosol transmission of SARS-CoV-2? Evidence, prevention and control," Environ Int, Aug 7, 2020 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7413047/
h. Milton, D. "A Rosetta Stone for Understanding Infectious Drops and Aerosols," J Pediatric Infectious Diseases Society, July 24, 2020 https://academic.oup.com/jpids/article/9/4/413/5875939
i. Morawska, L. and D.K. Milton, "It Is Time to Address Airborne Transmission of Coronavirus Disease 2019 (COVID-19)," Clinical Infectious Diseases, July 6, 2020, https://academic.oup.com/cid/article/71/9/2311/5867798?login=true
j. Zhang, R., Y. Li, et al., "Identifying airborne transmission as the dominant route for the spread of COVID-19," Proceedings of the National Academy of Sciences, June 30, 2020, https://www.pnas.org/content/117/26/14857
k. Dancer, S.J., J.W. Tang, et al., "Putting a balance on the aerosolization debate around SARS-CoV-2," J Hospital Infection," May 13, 2020, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7219351/
l. Marr, L. and J. Jimenez, "Bibliography on Transmission of COVID-19," (unpublished), July 3, 2020, https://docs.google.com/document/d/13s6QyHyF6Pqfr2_R_4ilmzmjYHRmrWE0Ez wHvxvyRL4/edit?usp=sharing.

Vaccinated and boosted individuals can contract and transmit SARS-CoV-2, irrespective of symptoms.

- Bart, Harizaj, et al., "SARS-CoV-2 Delta outbreak among fully vaccinated nursing home residents likely initiated by a fully vaccinated staff member – Connecticut, July–August 2021," Clinical Infectious Diseases, December 10, 2021, https://doi.org/10.1093/cid/ciab1025
- Wang, Juthani, et al., "Severe breakthrough COVID-19 cases in the SARS-CoV-2 delta (B.1.617.2) variant era," The Lancet Microbe, December 3, 2021, https://doi.org/10.1016/S2666-5247(21)00306-2.
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- Susky, Hota, et al., "Hospital Outbreak of the SARS-CoV-2 Delta Variant in Partially and Fully Vaccinated Patients and Healthcare Workers in Toronto, Canada," Infection Control & Hospital Epidemiology, October 28, 2021, https://doi.org/10.1017/ice.2021.471
- Acharya et al., "No Significant Difference in Viral Load Between Vaccinated and Unvaccinated, Asymptomatic and Symptomatic Groups When Infected with SARS-CoV-2 Delta Variant," medRxiv, October 5, 2021, No Significant Difference in Viral Load Between Vaccinated and Unvaccinated, Asymptomatic and Symptomatic Groups When Infected with SARS-CoV-2 Delta Variant | medRxiv

Several studies have found reduced neutralization and reduced vaccine efficacy against Omicron and its subvariants.

- Pulliam, et al., "Increased risk of SARS-CoV-2 reinfection associated with emergence of Omicron in South Africa," Science, March 15, 2022, Increased risk of SARS-CoV-2 reinfection associated with emergence of Omicron in South Africa (science.org)
- Schubert, M., Bertoglio, F., Steinke, S. et al. Human serum from SARS-CoV-2-vaccinated and COVID-19 patients shows reduced binding to the RBD of SARS-CoV-2 Omicron variant. BMC Med 20, 102 (2022). https://doi.org/10.1186/s12916-022-02312-5
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- Nemet et al., "Third BNT162b2 Vaccination Neutralization of SARS-CoV-2 Omicron Infection," New England Journal of Medicine, February 3, 2022, https://www.nejm.org/doi/10.1056/NEJMc2119358
- Lyngse et al., "Transmission of SARS-CoV-2 Omicron VOC subvariants BA.1 and BA.2: Evidence from Danish Households," medRxiv, January 30, 2022, https://doi.org/10.1101/2022.01.28.22270044
- Gruell, H., Vanshylla, K., Tober-Lau, P. et al., "mRNA booster immunization elicits potent neutralizing serum activity against the SARS-CoV-2 Omicron variant," Nature Medicine, January 19, 2022, https://doi.org/10.1038/s41591-021-01676-0

- Kuhlmann et al., "Breakthrough infections with SARS-CoV-2 omicron despite mRNA vaccine booster dose," The Lancet, January 18, 2022, https://doi.org/10.1016/S0140-6736(22)00090-3
- Yu, Wei, et al., "Reduced sensitivity of SARS-CoV-2 Omicron variant to booster-enhanced neutralization," medRxiv, December 26, 2021, https://doi.org/10.1101/2021.12.17.21267961
- Liu, L., Iketani, S., Guo, Y. et al., "Striking antibody evasion manifested by the Omicron variant of SARS-CoV-2," Nature, December 23, 2021, https://doi.org/10.1038/s41586-021-04388-0
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Appendix C:
List of Attachments

1. NNU Letters to the Centers for Disease Control and Prevention on Covid-19
    a. National Nurses United Letter to Dr. Rochelle P. Walensky, MD, MPH, Director, Centers for Disease Control and Prevention, Re: New Covid-19 Community Levels Metric, March 1, 2022.
    b. National Nurses United Letter to Dr. Rochelle P. Walensky, MD, MPH, Director, Centers for Disease Control and Prevention, December 22, 2021.
    c. National Nurses United Letter to Dr. Rochelle P. Walensky, MD, MPH, Director, Centers for Disease Control and Prevention, July 12, 2021.
    d. National Nurses United, "CDC's Recognition of Aerosol Transmission of Covid-19 is Essential to an Effective and Successful Pandemic Response," March 31, 2021.
2. NNU Surveys of Registered Nurses on Covid-19 Experiences at Work
    a. National Nurses United, "National nurse survey reveals significant increases in unsafe staffing, workplace violence, and moral distress," April 14, 2022.
    b. National Nurses United, "National nurse survey reveals that health care employers need to do more to comply with OSHA emergency temporary standard," September 27, 2021.
    c. National Nurses United, "National RN survey highlights continued hospital failures to prioritize nurse and patient safety during pandemic," March 2021.
    d. National Nurses United, "National nurse survey exposes hospitals' knowing failure to prepare for a Covid-19 surge during flu season," November 2020.
    e. National Nurses United, "National nurse survey reveals devastating impact of reopening too soon," July 2020.
    f. National Nurses United, "New survey of nurses provides frontline proof of widespread employer, government disregard for nurse and patient safety, mainly through lack of optimal PPE," May 20, 2020.
    g. National Nurses United, "Survey of nation's frontline registered nurses shows hospitals unprepared for Covid-19," March 5, 2020.

3. National Nurses United, "Sins of Omission: How Government Failures to Track Covid-19 Data Have Led to More Than 3,200 Health Care Worker Deaths and Jeopardize Public Health," Updated Mar 2021.
4. National Nurses United, "Deadly Shame: Redressing the Devaluation of Registered Nurse Labor Through Pandemic Equity," December 2020.
5. Correspondence between NNU and OSHA Re: OSHA questions for Complaint Osceola Regional Medical Center, March 4, 2022.
6. National Nurses United, "Protecting our Front Line: Ending the Shortage of Good Nursing Jobs and the Industry-created Unsafe Staffing Crisis," December 2021.
7. Health care worker complaints to OSHA and responses
    a. Corpus Christi Medical Center – Doctor's Regional Medical Center (Corpus Christi, TX)
    b. HCA Fawcett (Port Charlotte, FL)
    c. Valley Regional Medical Center (Brownsville, TX)
    d. HCA Multifacility
    e. Research Medical Center (Kansas City, MO)
    f. University of Chicago Medical Center (Chicago, IL)
    g. Hospitals of Providence East and Sierra Campuses (El Paso, TX)
    h. Largo Medical Center (Largo, FL)
8. NNU Scientific Briefs and Factsheets
    a. National Nurses United, "National Nurses United's Standards for Hospital Safety During the Covid-19 Pandemic," April 2022.
    b. National Nurses United, "Droplet vs. Airborne: How is Sars-Cov-2 Transmitted?," February 14, 2022.
    c. National Nurses United, "Scientific Brief: Post-Exposure Isolation Period for Omicron SARS-CoV-2 Variant," January 10, 2022.
    d. National Nurses United, "Negative Pressure Rooms, Dedicated Covid-19 Units, and No Mixed Assignments: Supporting Literature," 2021.
    e. National Nurses United, "Scientific Brief: Multiple Measures, Including Masks, Needed to Curb Covid-19," May 17, 2021.
    f. National Nurses United, "Scientific Brief: Long Covid and Its Implications," June 25, 2021.
    g. National Nurses United, "Covid Testing and Screening in Health Care Settings: A Science-Driven Approach to Protecting Patient, Health Care Worker, and Public Health," June 11, 2021.
9. CA Aerosol Transmissible Disease Standard
10. Bhaskaran et al., "Overall and cause-specific hospitalisation and death after COVID-19 hospitalisation in England: A cohort study using linked primary care, secondary care, and death registration data in the OpenSAFELY platform," PLOS Medicine, January 25, 2022.
11. Douaud et al., "SARS-CoV-2 is associated with changes in brain structure in UK Biobank," Nature, March 7, 2022.

12. Lednicky et al., "Viable SARS-CoV-2 in the air of a hospital room with COVID-19 patients," International Journal of Infectious Diseases, September 15, 2020.
13. Markov et al., "Antigenic evolution will lead to new SARS-CoV-2 variants with unpredictable severity," Nature Reviews Microbiology, March 14, 2022.
14. Slezak et al., "Rate and severity of suspected SARS-Cov-2 reinfection in a cohort of PCR-positive COVID-19 patients," Clinical Microbiology and Infection, August 18, 2021.
15. Xie and Al-Aly, "Risks and burdens of incident diabetes in long COVID: a cohort study," The Lancet Diabetes & Endocrinology, March 21, 2022.
16. Xie et al., "Long-term cardiovascular outcomes of COVID-19," Nature Medicine, February 7, 2022.

Appendix D:
Summary of Complaints to OSHA and responses (Complaint Responses Attached in Attachment 7)

Facility	Date of Complaint	Complaint	Response	Document Description
Corpus Christi Medical Center – Doctor's Regional Medical Center (Corpus Christi, TX) Att. 7a	Oct 5, 2021	Hazards: Covid written plan is incomplete and did not involve nurses; Covid-19 patients not isolated; failure to fit-test nurses for N95s; passive screening of visitors.	The employer responded that its policies followed CDC guidance and the Respiratory Protection Program, and OSHA concluded that a hazard did not exist.	Responses from OSHA and employer to complaint. Demonstrates the danger of relying on CDC guidance and the inadequacy of the respirator protection standard alone to protect workers.
HCA Fawcett (Port Charlotte, FL) Att. 7b	Aug 2020	Hazards: lack of accurate Covid-19 exposure records; lack of testing of exposed employees; lack of contact tracing; employer permitting workers with suspected and confirmed Covid-19 exposures to work without quarantine.	OSHA rejected complaints due to employer adherence to CDC guidance.	Responses from OSHA and employer to complaint. Demonstrates the danger of relying on CDC guidance to protect workers.
Valley Regional Medical Center (Brownsville, TX) Att. 7c	Oct 5, 2021	Hazards: Covid-19 written plan is incomplete and did not involve nurses; failure to fit-test nurses for N95s; passive screening of visitors.	The employer responded that its policies followed CDC guidance and the Respiratory Protection Program, and OSHA concluded that a hazard did not exist.	Responses from OSHA and employer to complaint. Demonstrates the danger of relying on CDC guidance and the inadequacy of the respirator protection standard alone to protect workers.
HCA Multifacility (FL, MO, TX, KS) Att. 7d	Aug 2020	Hazards: workers who are or may be Covid-19-positive return to work; failure to notify employees of exposures; failure to test asymptomatic workers; workers with positive Covid-19 tests were instructed to return to work without a negative test.	OSHA rejected complaints due to employer adherence to CDC guidelines.	Response from OSHA on multiple complaints. Demonstrates the danger of relying on CDC guidance to protect workers.

Facility	Date of Complaint	Complaint	Response	Document Description
Research Medical Center (Kansas City, MO) Att. 7e	March 2020	Hazards: lack of fit testing; lack of PPE for worker caring for patient with Covid-19 symptoms; nurses provided with only a single surgical mask when treating suspected or confirmed Covid-19 patients.	OSHA rejected complaints because there was no applicable standard and the employer complied with CDC guidance.	Response from OSHA on multiple complaints. Demonstrates the danger of relying on CDC guidance to protect workers and the importance of a Covid-19 standard. Celia Yap-Banago, a nurse mentioned in this complaint who cared for a patient with Covid-19 symptoms without adequate PPE, died of Covid-19 soon after.[215]
University of Chicago Medical Center (Chicago, IL) Att. 7f	Dec 2021	Hazards: Employees with positive Covid-19 tests and suspected exposure returned to work without quarantine.	Employer response claims that their policies meet or exceed CDC guidance.	Employer response to complaint. Demonstrates that employers institute unsafe policies when following CDC guidance.
Hospitals of Providence East and Sierra Campuses (El Paso, TX) Att. 7g	Inspection: Sept 24, 2021; Oct 4, 2021 Citation: Feb 2, 2022	OSHA cited these hospitals for failure to screen and triage all non-employees entering direct patient care settings for symptoms of Covid-19.	OSHA citation.	These citations show that employers will not enact safe practices without clear, enforced, standards, and that an active Covid-19 standard allows OSHA to enforce safe practices.
Largo Medical Center (Largo, FL) Att. 7h	Sept 23, 2021	Hazards: numerous hazards related to lack of screening, PPE, planning, exposure notifications, isolation, and ventilation.	Employer responded in part by justifying use of passive screening by reference to CDC guidelines.	Response from Employer. Demonstrates that employers change policies in response to weakened CDC guidance and leave workers at risk.

[215] Smith A, "A Kansas City Nurse Who Raised Concerns About A Lack Of Protective Equipment Dies Of COVID-19," KCUR, April 22, 2020, https://www.kcur.org/2020-04-22/a-kansas-city-nurse-who-raised-concerns-about-a-lack-of-protective-equipment-dies-of-covid-19.