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# Frontline Worker Safety in the Age of COVID-19: A Global Perspective

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The third annual Health Watch USA<sup>sm</sup> webinar conference assembled 16 speakers from 4 continents who shared information regarding frontline worker safety in the age of COVID-19. The U.S. Bureau of Labor Statistics reported a nearly 4000% increase in workplace illness in 2020 compared with 2019. It is estimated that 2% of the U.S. workforce is not working because of long COVID. In addition, the impact is growing with each surge. After the acute illness, patients are often described as recovered, when in fact many have only survived and are coping with the multisystem impacts of long COVID. Long COVID, including its late cognitive, cardiovascular, embolic, and diabetic complications, disproportionately impacts frontline workers, many of whom are of lower socioeconomic status and represented by ethnic minorities.

Natural infection and current vaccines do not provide durable protection for reinfection. Herd immunity is not possible at this time. Although SARS-CoV-2 is unlikely to be eliminated, decreasing spread is imperative to slow the rate of mutations, decrease the number of reinfections, and lower the chances of developing long COVID. The primary mode of spread is through aerosolization. Both routine breathing and talking aerosolizes the virus. With the extremely high infectivity of SARS-CoV-2, it is unlikely that central building ventilation alone will be enough to satisfactorily mitigate spread. Additional safe active air cleaning technology, such as upper-room germicidal UV-C lighting, needs to be deployed.

Misinformation and disinformation have inhibited response effectiveness. Examples include downplaying the benefit of well-fitted masks and the risks that COVID-19 and long COVID pose to children, along with believing children cannot spread the disease. The engagement of local community leaders is essential to educate the community and drive social change to accept vaccinations and other public health interventions. Vaccinations and natural immunity alone are unlikely to adequately prevent community spread and do not provide durable protection against the risk of long COVID.

Frontline workers must keep their immunity as high as possible and work in settings with clean air, along with wearing N95 masks when they are in contact with the public. Finally, there needs to be a financial safety net for frontline workers and their families in the event of incapacitation or death from COVID-19.

**Key Words:** COVID-19, SARS-CoV-2, aerosolization, masks, spread, fomites, disinformation, Sweden, Australia, workplace safety, immunity, vaccination, long COVID, disparities

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**Abbreviations:** HVAC - heating, ventilation, air conditioning, ICU - intensive care unit, UV-C - ultraviolet light in the C spectrum, U.S. - United States, v/v - volume per volume, WHO - World Health Organization

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## CONFERENCE REPORT

On September 14, 2022, experts from across the world came together in the form of a webinar conference to share knowledge on promoting frontline worker safety in the age of COVID-19 (Table 1).<sup>1</sup> COVID-19 has had a profound impact on worker safety. The Brookings Institute estimates that up to 4 million workers or 2% of the U.S. workforce are not working because of long COVID.<sup>2</sup> According to the U.S. Bureau of Labor Statistics, in the United States, there was almost a 4000% increase in workplace illness in 2020 compared with 2019, with the highest in healthcare.<sup>3</sup> Nursing care has been especially negatively impacted during the pandemic. The median tenure for nurses working 12-hour shifts in March 2022 was 2.78 years, decreased 19.5% from the previous year. The number of new nurses within the last year filling 12 hour shifts rose by 55%.<sup>4</sup>

Researchers reported in the *Lancet* online survey responses from 3762 suspected and confirmed cases of long COVID; 45.2% of patients reported requiring a reduced work schedule compared with preillness. An additional 22.3% were not currently working because of illness. There was no difference between suspected and confirmed cases regarding dropping out of the workforce.<sup>5</sup>

Among the industrialized nations, the United States has not implemented a reliable, accurate, and transparent case reporting system. Similarly, the U.S. healthcare system does not have a mechanism to accurately track healthcare worker deaths.<sup>6</sup> Kaiser Health News and the Guardian in April 2020 reported that 3607 healthcare workers have died of COVID-19,<sup>7</sup> but as of September 2, 2022, the Centers for Disease Control and Prevention only listed 2307 healthcare worker deaths.<sup>8</sup> There is no mandatory reporting in the United States, and what reports are received are often incomplete and inconsistent across states.

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Videos of the conference presentations can be viewed at: <https://www.healthwatchusa.org/conference2022/index.html> and at <https://healthconference.org>.

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**TABLE 1.** Faculty and Presentations, Frontline Worker Safety in the Age of COVID-19: A Global Perspective, September 14, 2022

Name of Expert	Main Affiliation*	Presentation Topic
Matthias Maiwald, MD	Associate Professor and Senior Consultant in Microbiology, KK Women's and Children's Hospital, Singapore	COVID-19: Singapore update
Imogen Mitchell, MBBS, PhD	Professor and Executive Director, Research and Academic Partnerships, Intensive Care Specialist, Canberra Health Services, Australia	Australia's experience of COVID-19 workplace safety
Lidia Morawska, PhD, MSc	Professor, Queensland University of Technology, Australia; University of Surrey, UK	Airborne infection transmission and impact on frontline workers
Nele Brusselaers, MD, PhD	Professor, Global Health Institute, Antwerp University, Belgium Centre for Translational Microbiome Research, Karolinska Institutet, Sweden	Evaluation of science advice during the COVID-19 pandemic in Sweden
Laith Abu-Raddad, PhD	Professor of Population Health Sciences at Weill Cornell Medicine-Qatar; Infectious Disease Epidemiology Group, WHO Collaborating Center for Disease Epidemiology Analytics on HIV/AIDS, Sexually Transmitted Infections, and Viral Hepatitis; Doha, Qatar.	Immune protection of COVID-19 vaccination and natural infection
Eike Steinmann, PhD	Professor, Department for Molecular and Medical Virology, Ruhr-University Bochum, Germany	Transmission and inactivation of SARS-CoV-2
Joycelyn Elders, MD	Past Surgeon General, United States	Public health key to stopping infectious disease
Frazier Beatty, PhD, MPH	Program Director, Master of Public Health, School of Health Sciences, Regis College, Weston, MA, United States	Impact of healthcare disparities on the frontline
Ziyad Al-Aly, MD	Chief, Research and Development Service, VA Saint Louis Health Care System, United States	An overview of long COVID
Mengyi "Zed" Zha, MD	Underserved Dermatology Fellow, University Health Systems, San Antonio, TX, United States	Workplace violence against healthcare workers
Deborah Bix, MD	Ambassador Deborah Bix, MD, Senior Fellow Bush Institute, United States	COVID-19 USA—lessons and new tools to improve workplace safety
Jeannie Cimiotti, RN, PhD	Nell Hodgson Woodruff School of Nursing, Emory University, United States	Panel discussion: "the normalization of workarounds in health care: an ongoing American crisis"
Chris Pontus, MS, RN	Associate Director of the Division of Health and Safety, Massachusetts Nurses Association, United States	
Betty Sparks, RN, CNOR, ADN	Board of Directors, Massachusetts Nurses Association, United States	
Janet Hass, PhD, RN	Principal Consulting Epidemiologist at Innovative Infection Prevention, New York City Metropolitan Area, United States New York City Metropolitan Area, United States	
Omid Razmpour, BSN, RN, PHN	Nell Hodgson Woodruff School of Nursing, Emory University, United States	
Kevin Kavanagh, MD, MS	Chairman, Health Watch USA, Kentucky, United States	Conference introduction and closing remarks

\*Full affiliations, speaker biographical sketches and further details are available on the conference Web site at: <https://www.healthwatchusa.org/conference2022/index.html>.

The United States, as a whole, has become numb to the devastation and deaths resulting from COVID-19. There are deaths occurring every day, which exceed the crashing of 2 large aircraft, but there has been a muted and incomplete governmental response, with relatively little public support for the utilization of effective public health interventions.<sup>9</sup>

However, several countries in Asia Pacific have continued to take the pandemic seriously. For example, Australia progressively increased masking requirements as the knowledge regarding SARS-CoV-2 spread increased. Initially, N95 masks, or respirators, were only used with procedures likely to produce aerosols. In August 2020, the State of Victoria reported that 73% of cases in nursing home workers and 54% of cases in nurses were healthcare-acquired COVID-19 infections.<sup>10</sup> It was also noted that the chances of catching SARS-CoV-2 in the high transmission risk ICU setting, where N95 masks were worn, were lower than other settings. As evidence mounted and viral infectivity increased, there was increased awareness that wearing N95 masks was of critical importance. In Canberra, Australia, at the height of the pandemic, N95

masks plus face shields were recommended facility-wide for all frontline workers. During the height of the pandemic, Canberra also restricted its borders to other states, only reopening them when 98% of the eligible population was vaccinated.

### Natural and Vaccine Immunity

No one can predict the future of a community's immunological protection to COVID-19. Dr Abu-Raddad,<sup>11</sup> and Dr Deborah Bix<sup>9</sup> stressed the important differences between communities, states, and countries in the variables of age, vaccination rates, and prior exposure to variants.

In Qatar, more than 90% of the population is less than 50 years of age and the country was exposed to a large Beta surge. In this country, Dr Abu-Raddad presented data that showed immunity elicited by infection was greater than that elicited from vaccination and could last up to 3 years.

Then, the Omicron variant hit Qatar. The effectiveness against symptomatic infection for natural immunity dropped to 38% at

1 year and a 2-dose mRNA vaccine provided virtually no protection greater than 6 months after the second dose, but a 3-dose vaccine was superior to natural immunity, and by far, hybrid immunity (three dose vaccine plus previous infection) was best with an effectiveness of 77.3%.<sup>12</sup>

The United States experienced a large Omicron surge resulting in more deaths than the Delta variant. However, the U.S. population is much older, with 36% of the population above the age of 50 years.<sup>13</sup> As one ages, immunity wanes faster.<sup>9</sup> However, most importantly, the United States did not have a Beta variant wave.<sup>14</sup> The Beta variant elicited cross immunity to the Omicron variant,<sup>14,15</sup> but the Ancestral and Delta variants offered lower protection to Omicron.<sup>16</sup>

Dr Deborah Birx also presented epidemiological data, which showed continuing surges caused immunological escape variants, predicted by the excellent testing and viral sequencing in South Africa, a country with an extensive history of COVID-19 infections. Dr Birx concluded that “Natural COVID19 infection does not induce long lived immunity against reinfection” and “there is no durable herd immunity induced by natural infection with SARS-CoV-2 or its variants.”<sup>9</sup>

It is of utmost importance, as new immune escape variants emerge, that we maintain our immunity at the highest possible level. Vaccination and additional dose rates vary widely between countries, with the United States having some of the lowest among both developed and undeveloped nations. The United States also has an aging population with one of the highest rates of obesity in the world, both risk factors contributing to the U.S. high rate of COVID-19 deaths (Table 2). Qatar and Singapore have low rates of COVID-19 deaths associated with high rates of vaccination. In addition, Qatar also has a young population and Singapore has low rates of obesity.

### LONG COVID

Early in the pandemic a milestone in medicine was reached. A patient-lead research team documented persistent symptoms after even mild COVID-19 infections and coined the term “long COVID” and inflicted patients were referred to as “long haulers.”<sup>17,18</sup> In addition, with that observation, it has become apparent that the metric we need to be concerned about is the avoidance of infection. All too often, when a patient leaves the hospital, they have not recovered but merely survived COVID-19. This is also all too common even for infections considered “mild,” as potential post infection sequelae are unrecognized.

In the United States, there are estimated to be 5 to 15 million cases of long COVID and the risk of development increases with each reinfection.<sup>9</sup> As many as 4 million workers are currently not working because of long COVID and long COVID is significantly increasing the incidence of depression.<sup>9</sup>

In a study of Veterans Health Administration outpatients, Dr Ziyad Al-Aly estimated the incidence of long COVID to be between 4% and 7%. The magnitude of risk is higher with severe disease, but it is also occurring even in those who do not require hospitalization. Several other studies have reported a higher incidence, depending on the definition used for long COVID and the population studied. For example, a controlled study from the Netherlands found that 12% of patients developed long COVID<sup>19</sup> but did not study symptoms of cognition such as memory loss and brain fog.<sup>20</sup> In another recent study from the City University of New York, researchers found as many as 21% of COVID-19 survivors had persistent symptoms 4 weeks or more after their acute infection.<sup>21</sup> The United Kingdom’s census data found 45% of patients who self-reported long COVID had their acute infection at least 1 year previously.<sup>22</sup> Long COVID can affect almost any organ of the body, up to 70% complain of brain fog and problems with cognition.<sup>20,23</sup> Other organ systems commonly affected are the heart,<sup>24</sup> kidney,<sup>25</sup> and endocrine<sup>26</sup> with an increase incidence of diabetes. The exact cause of long COVID is not known. Possibilities include permanent tissue damage, autoimmunity, viral reservoirs, and detrimental changes in a patient’s microbiome.<sup>18</sup>

Long COVID means we can no longer assure public safety with strategies that primarily rely on vaccines to avoid hospitalization and death. We need to mitigate our chance of becoming infected and avoid developing even “mild” disease. The United States will face a second wave of illness from COVID-19, one of protracted disability and reduced life expectancy. In nonhospitalized patients, COVID-19 has been associated with 8.39 excess deaths per 1000 patients, almost equaling the death rate caused acutely by severe disease.<sup>23</sup> Dr Deborah Birx emphasized that a priority is to adequately study the incidence and effects of long COVID on healthcare workers and that long COVID is a threat to the U.S. workforce.<sup>9</sup> As stated by Dr Ziyad Al-Aly “Governments and health systems must adapt quickly and establish post-COVID care strategies.”<sup>18</sup>

### Prevention of Spread

Modern epidemiology was born in 1849 when John Snow established that a cholera outbreak in England was spread by surfaces and contaminated water and not through foul smelling air or “miasma.”<sup>27</sup> Since that time, the spread of disease by air has too often been discounted. In the beginning of the SARS-CoV-2 pandemic, there was little emphasis regarding airborne spread with the primary focus on spread by droplets, fomites, and surfaces. This focus persisted despite early case reports of transmission within choirs and restaurants as well as laboratory evidence to the contrary.

**TABLE 2.** Vaccination Status and SARS-CoV-2 Infections, Obesity, and Deaths in Nations Represented at the Health Watch USA<sup>sm</sup> Webinar

	Australia	Germany	Qatar	Singapore	Sweden	United States
Total cases per 1 million population	395,074	416,732	166,018	346,547	254,607	295,619
Rate of death per 1 million population	595	1,807	244	279	2,004	3,261
Population fully vaccinated	86%	76%	>99%	90%	74%	68%
Additional vaccine dose	56%	74%	67%	78%	71%	34%
Population older than 65 y	15.88%	22.99%	1.19%	10.89%	20.59%	16.85%
Obesity in adult population*	30.4%	25.7%	33.9%	6.6%	22.1%	37.3%

Data Sources: Worldometer, Coronavirus; Wikipedia, List of Countries by Age Structure; New York Times, Tracking Coronavirus Vaccinations Around the World; Our World in Data, Obesity. Data as of October 24, 2022.

\*Obesity in adult population 18 years and older; defined as body mass index greater than or equal to 30 (data for year 2016).

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With the dangers of long COVID and immune escape variants lessening the protection against infections provided by vaccines and natural immunity, it is imperative that additional measures be enacted to control the spread of SARS-CoV-2. This is to lower the risk of airborne transmission, which numerous studies demonstrated to be the most significant mode for many respiratory infections.<sup>28,29</sup> For this reason, we must improve indoor air quality, use of N95 masks and respirators, and focus more attention on spread by surfaces.

### Spread by Infectious Respiratory Particles

Dr Lidia Morawska described a predicament that in aerosol science, aerosols are an assembly of liquid or solid particles suspended in a gaseous medium long enough to enable observation or measurement, and droplets are liquid particles.<sup>29</sup> However, in medical science, aerosols are considered small particles and droplets are considered large particles. It is believed that infectious respiratory particles and droplets can be filtered successfully with surgical masks. However, this is a false assumption, because particle size is a continuum, and many respiratory particles (which includes droplets) are small and can aerosolize.

Infectious respiratory particles are generated by COVID-19 patients. Small particles are produced by breathing and talking, have a propensity to aerosolize, and overall carry a high concentration of SARS-CoV-2. Larger particles, produced in the mouth, have lower concentrations of SARS-CoV-2.<sup>29</sup>

It is strongly suggested that facility protocols that only require N95 masks to be used during the performance of aerosolizing procedures should consider breathing and talking as aerosolizing procedures. The National Academies of Sciences concluded that particles the size of 5 to 100 microns can aerosolize and that an important mode of spread for SARS-CoV-2 is airborne transmission.<sup>30</sup>

### Improving Indoor Air Quality

For many pathogens, 5 air exchanges per hour can reduce transmission risk by 50% or more in indoor public venues.<sup>31</sup> With air conditioning, many buildings have become nearly airtight and are deemed unhealthy.

Monitoring of indoor air quality can be performed by patrons using portable CO<sub>2</sub> monitors. The American Society of Heating, Refrigerating, and Air-Conditioning Engineers recommends a steady-state indoor CO<sub>2</sub> concentration of approximately 870 ppm.<sup>32</sup> A study from Harvard University found large differences in cognition when CO<sub>2</sub> levels increased from 550 to 1400 ppm.<sup>33</sup>

In hospital settings, attention to airflow and quality is of utmost importance in preventing the spread of disease. In Australia, COVID-19 patients are placed in negative pressure rooms, and when these rooms are unavailable, portable air purifiers and medihoods are used. With the infectivity of new variants exceeding that of measles, the most infectious pathogen known to mankind, the required ventilation rates to mitigate the spread of SARS-CoV-2 are higher than current standards for centralized HVAC systems.<sup>34,35</sup> Germicidal UV-C lighting is required to obtain a high-enough rate of equivalent complete air exchanges to prevent spread. Upper room UV-C lighting is based on old technology.<sup>36</sup> It is inexpensive both to install and operate and has a high degree of safety established to prevent interaction with the skin and eyes.

### Masks

Masking has been used for centuries to combat the spread of disease. Currently, masks are often a subject of disinformation. The history of changing guidance in the United States regarding masks has also amplified public confusion and resistance to wearing masks. However, the changing guidance was in response to

mask shortages and the changing characteristics of emerging strains of the virus.

The infectivity of SARS-CoV-2 has progressively increased. Many regard the current variants as the most infectious pathogens known to mankind. The filtration and masking requirements have also risen. During the Omicron surge, Canberra, Australia, increased masking requirements and required N95 masks or respirators plus face shields for all frontline healthcare workers.<sup>10</sup> Singapore went through different phases, with mandatory mask-wearing anywhere outside the own home since April 2020 and throughout all of 2021. Since then, requirements were eased, and at the time of the conference, mask-wearing was only mandatory for public transportation and healthcare facilities.<sup>37</sup>

A recent report from the Colton Foundation, COVID Collaborative, and The Rockefeller Foundation compared the effectiveness of different types of masks.<sup>38</sup> A fit-tested N95 mask was found to be twice as effective as a nonfit tested N-95 mask. However, a nonfit tested N95 mask was found to be 2 1/2 times more effective than a surgical mask and 3 1/2 times more effective than a cloth mask. The infective dosage may differ between variants but the comparative effectiveness in protection would be expected to be similar.

The use of N95 masks are an integral and critical part of the successful pandemic response of Singapore and in large parts of Australia,<sup>10,37</sup> and their continued use is supported by the work of Dr Lidia Morawska regarding aerosolization of SARS-CoV-2 and the ineffectiveness of clearing or inactivating airborne viruses in many indoor venues.

### Spread by Surfaces

At the beginning of the pandemic, SARS-CoV-2 was believed to be primarily spread by large droplets or surfaces. An increase in handwashing and wiping packages was the cornerstone of the U.S. initial response. However, as data continued to accumulate, it became apparent that the major route of spread was by aerosolization. A study of an outbreak at a hospital in Hong Kong concluded that up to 63% of the transmission was by the airborne route. The authors stated "SARS-CoV was less probable to transmit via the fomite route alone."<sup>28</sup> In the case study, spread by fomites was estimated to be between 37% and 60%.

Both direct contact and fomite spread can occur with SARS-CoV-2. Because of the high viral transmission rate, a significant number of individuals can be infected, even if they comprise a minority of infected individuals. Dr Eike Steinmann discussed the use of antiseptics in healthcare settings, which can be used to deactivate SARS-CoV-2.<sup>39</sup> The WHO recommended hand rub solution, which is suitable for on-site production, uses ethanol at a concentration of 80% plus hydrogen peroxide at 0.125% (v/v) or isopropanol at 75% with hydrogen peroxide at 0.125% (v/v).

Being an enveloped virus, SARS-CoV-2 is inherently unstable and easily inactivated. Dr Steinmann presented data that showed that both ethanol and isopropyl alcohol readily inactivates the virus at concentrations of 30% to 40%. In nonhospital or home settings, soap and water can also be used. Soap and water not only mechanically removes the virus, but a new study confirms that soap also deactivates the virus by disrupting its lipid-protein envelope.<sup>40</sup>

SARS-CoV-2 has been reported to be viable for up to 16 hours in aerosols.<sup>41</sup> On surfaces, the virus seems viable on plastic and stainless steel for 2 to 3 days but only lives for approximately 4 to 8 hours on copper and cardboard, respectively. Dr Steinman reported that infectivity measured by the Touch Transfer Assay failed to demonstrate viral transmission from surfaces which have been dry for 30 minutes.<sup>42</sup> He also presented data that suggests there is a low-risk of transmission from surfaces exposed to

coughing or aerosolized particles. He concluded that SARS-CoV-2 transmission from surfaces is not a major factor in the spread of the virus.

### Misinformation and Disinformation

Disinformation has been a major impediment to widespread adoption of public health strategies, including vaccinations and masking. Early in the pandemic, the European Union warned of a Russian disinformation campaign using “contradictory, confusing and malicious reports to make it harder for the EU to communicate its response to the pandemic.”<sup>43</sup>

Dr Nele Brusselselaers made a compelling case regarding data integrity problems and disinformation embedded in the Swedish COVID-19 response.<sup>44</sup> She expressed concern that other countries were using Swedish strategies as examples of success when many epidemiologists viewed them as failures. Sweden apparently failed in their strategy to achieve herd immunity. Masks were often described as dangerous and were discouraged in healthcare settings. Healthcare workers were not allowed to use masks in some facilities and one worker was even fired for wearing one. Overall, Sweden had more deaths, hospitalizations, and ICU admissions than the neighboring Nordic countries of Denmark, Norway, Iceland, and Finland.<sup>45</sup> However, many continue to view Sweden as a success.

The failed strategy was also evident in Sweden’s schools, where all too often, the wearing of masks was discouraged or not allowed, and “The (Swedish) Public Health Agency denied or downgraded the fact that children could be infectious, develop severe disease, or drive the spread of the infection in the population; while their internal emails indicate their aim to use children to spread the infection in society.”<sup>46</sup>

Disinformation from Sweden has seemed to influence policy in other countries. During a U.S. Senate Hearing, results from Sweden were used to argue that schools should not be closed and that Sweden had excellent results stating, “I don’t think there’s anybody arguing that what happened in Sweden is an unacceptable result.”<sup>47</sup> Many uninformed segments of the population and people unfavorable to masking continue and people unfavorable to masking continue to view Sweden’s response as a success.

However, as articulated by Dr Joycelyn Elders, getting children back to school is a priority. This needs to be done safely, by encouraging vaccinations, and providing safe ventilation, an intervention which would also decrease the transmission of other airborne illnesses and improve cognition. Finally, proactive testing and masking needs to be used in times of SARS-CoV-2 surges.

One of the biggest future concerns of Dr Deborah Bix is that COVID, Respiratory Syncytial Virus, and influenza cases may rise in children in the Fall, which will lead to community spread and rising rates of hospitalizations among vulnerable Americans.<sup>9</sup> She also described how the seasonality of COVID-19 surges differs between different regions in the United States, making population-based protection more difficult to control community spread.

One possible strategy would be for schools to vary their schedules to avoid surges and to hold classes during the months when windows can be opened, thus increasing ventilation.

COVID-19 disinformation has also augmented violence against frontline workers, especially when parents of students or patrons decline to follow public health advice regarding masking and social distancing.

Dr Mengyi “Zed” Zha, discussed a large prepandemic meta-analysis, which found that 61% of healthcare workers reported either nonphysical (42.5%) or physical (24.4%) workplace violence.<sup>48</sup> The most common cause was dissatisfaction with care. One can easily imagine how a family’s insistence to use disproven

therapies and ineffective drugs can result in significant conflicts in the workplace.

### CONCLUSIONS

In 2022, the United States faced a triple threat of monkeypox, polio, and SARS-CoV-2. Public health recommendations are not readily followed by the public, and elimination of these pathogens from our communities is in doubt. The conference delineated several areas, which should be improved to promote healthcare safety, and this includes expansion of testing and use of N95 masks, along with improvements in ventilation. These interventions can mitigate airborne pathogens, including seasonal influenza which patients and staff are exposed to. In addition, healthcare staff should be provided with a healthcare and economic safety net, including an established leave policy.

It is imperative that we invest in our healthcare infrastructure and abandon the cost-driven strategy of lean staffing and just-in-time supply chains. In some areas of the United States, facilities furloughed nurses during the early days of the pandemic, causing nurses to leave their community and go to New York City where they were offering salaries of \$10,000 a week.<sup>49</sup> When nurses were needed in community hospitals, few were available. This led to the employment of temporary and agency nurses who had little if any experience with the hospital’s protocols, electronic medical records system, or equipment. In some regions of our nation, on any given day, more than half of the nurses are contract nurses.<sup>49</sup>

It is of paramount importance that we engage community businesses to upgrade ventilation and install germicidal ultraviolet air disinfection, along with providing high-quality protective gear for workers. As stated by past Surgeon General Joycelyn Elders and Dr Frazier Beatty, the most effective way to motivate a community is to engage trusted community leaders who can educate and persuade their citizens to adopt public health strategies. Community leaders are also an extremely important voice in combating the rampant COVID-19 disinformation, which is hobbling our pandemic response.

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