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**Breaking Doctrinal Silos Between
Environmental Law, Disability Law, and Torts
to Stop the Spread of Infectious Disease
Through Contaminated Indoor Air**

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INTRODUCTION AND STATEMENT OF THE PROBLEM

*We accept respiratory diseases right now, like colds and flu, as a way of life—but maybe we don't have to. Maybe if we do start paying more attention to cleaning our indoor air, we could reduce the burden that it places on our health and society.*¹

—Particle scientist Dr. Linsey Marr

In the early days of the COVID-19 pandemic in Wuhan, China, when the virus claimed the first lives,² a seismic shift occurred in our understanding of how viruses spread among humans.³ Public health authorities had long believed that the transmission of viruses was limited to close contact, within three to six feet, through large droplets expelled when an infected person sneezed, talked, or coughed.⁴ However, this conventional wisdom was shattered by evidence that COVID-19 was spreading over long distances by people breathing

¹ Maya Rodriguez, *Nationwide Research Looks to Figure Out How to Stop Spread of Flu*, SCRIPPS NEWS (Sept. 4, 2023), <https://scrippsnews.com/stories/nationwide-research-looks-to-figure-out-how-to-stop-spread-of-flu/> [<https://perma.cc/7W7B-6CBH>].

² Norihiro Kokudo & Haruhito Sugiyama, *Hospital Capacity During The COVID-19 Pandemic*, 3 GLOBAL HEALTH MED. 56 (2021) (looking at data from eight tertiary centers across the globe showed that none of the centers reduced emergency room activity even at the peak of the pandemic although treatment of patients without COVID decreased); Erin Durkin, *Mass Burials Surge As New York City Set to Hit 100,000 Coronavirus Cases*, POLITICO (Apr. 10, 2020, 7:21 PM), <https://www.politico.com/states/new-york/albany/story/2020/04/10/mass-burials-surge-as-new-york-city-set-to-hit-100-000-coronavirus-cases-1274835>.

³ Jesse Sharratt, *3 Years Ago Today, the Way We Work Underwent a Seismic Shift*, DIMENSIONS (Mar. 15, 2023), <https://blog.lauft.work/dimensions/3-years-ago-today-the-way-we-work-underwent-a-seismic-shift> [<https://perma.cc/3KZE-NL69>]; Huijun Chen et al., *Clinical Characteristics and Intrauterine Vertical Transmission Potential of COVID-19 Infection in Nine Pregnant Women: A Retrospective Review of Medical Records*, 395 LANCET 809 (2020).

⁴ For a comparison between the old and the new theory, see Mahesh Jayaweera et al., *Transmission of COVID-19 Virus by Droplets and Aerosols: A Critical Review on the Unresolved Dichotomy*, 188 ENV'T RSCH. 109819 (2020) (“The World Health Organization (WHO) and Centers for Disease Control and Prevention (CDC) postulate that the particles of more than 5 μm as droplets, and those less than 5 μm as aerosols or droplet nuclei”); Megan Molteni, *The 60-Year-Old Scientific Screwup That Helped Covid Kill*, WIRED (May 13, 2021), <https://www.wired.com/story/the-teeny-tiny-scientific-screwup-that-helped-covid-kill/>; see also 60 Minutes, *Indoor Air Systems Crucial to Curbing Spread of Viruses, Aerosol Researchers Say | 60 Minutes*, YOUTUBE (Oct. 30, 2023), <https://www.youtube.com/watch?v=WxEssOeEsVk> [<https://perma.cc/6S7T-R4ML>] (segment on Dr. Marr's work). What sparked the archival research that led to discovering the mistake was that while the 5 micron number was often repeated, Dr. Marr and her team could not find a citation.

normally.⁵ This real-world evidence supported the work of aerosol scientists who had long argued that the information biomedical scientists and public health experts were using about how infectious particles were passed from person to person was wrong.⁶ In addition to viruses traveling from person to person in “sputum droplets” that “are generated . . . during violent expiratory events like coughing and sneezing,” they “are also generated during routine respiratory activities like speaking, singing, and breathing.”⁷

The story of how a chemist from an oceanography institute, and the physicists and chemists who joined with her to lobby for change, came to know more about disease transmission than the global public health community is worthy of becoming a compelling medical thriller.⁸

The implications of this discovery for reducing the burden of infectious diseases around the globe are nothing short of monumental.⁹ Writing in retrospect about the consequences of the U.K.’s response to the pandemic, which was based on the droplet theory, Oxford University physician Dr. Trisha Greenhalgh concluded that “[a]t the root of the UK’s limited success in controlling transmission of SARS-CoV-2 lie flawed droplet-but-not-airborne and situationally airborne narratives.”¹⁰ She explained further that “[t]hese narratives, and the false certainty with which they were conveyed, produced ineffective public health measures, contributed to shocking levels of care home

⁵ See, e.g., Chen et al., *supra* note 3; Trisha Greenhalgh et al., *How Covid-19 Spreads: Narratives, Counter Narratives, and Social Dramas*, *BMJ* (Aug. 31, 2022), <https://www.bmj.com/content/378/bmj-2022-069940> [<https://perma.cc/9FUW-74ZJ>].

⁶ See Greenhalgh et al., *supra* note 5. (“Aerosol scientists study how fluids and particles travel in the air. Some specialize in how respiratory pathogens—including tuberculosis, influenza, and other coronaviruses such as SARS and MERS—travel. They have shown, using laboratory studies, real world case studies, and computer modelling, that these pathogens are transmitted by aerosols and require airborne mitigation measures and that coughs and sneezes generate turbulent gas clouds of different sized particles that can travel long distances.”).

⁷ Rahul Bale et al., *Quantifying the COVID19 Infection Risk Due to Droplet/Aerosol Inhalation*, 12 *SCI. REP.* 11186 (2022), <http://dx.doi.org/10.1038/s41598-022-14862-y> [<https://perma.cc/L32U-U4V3>].

⁸ Molteni, *supra* note 4; see also Tara Parker-Pope, *The Scientist, the Air and the Virus*, *N.Y. TIMES* (June 12, 2020), <https://www.nytimes.com/2020/06/12/well/live/Coronavirus-aerosols-linsey-marr.html> (“Most of us had never heard of aerosol science before the pandemic.”).

⁹ See Ajith N. Nair et al., *A Review of Strategies and Their Effectiveness in Reducing Indoor Airborne Transmission and Improving Indoor Air Quality*, 213 *ENV'T RSCH.* 113579 (2022) (“[C]onfirmed that aerosolized SARS-CoV-2 virus stays infectious in the air for hours. Hence, SARS-CoV- virus spread through aerosol and fomite is possible since the virus can remain infectious in the form of aerosols for hours and on surfaces for days.”).

¹⁰ Greenhalgh et al., *supra* note 5.

deaths, exacerbated toxic discourse on masking, and justified withholding adequate protection from most health and care staff.”¹¹

While monumental, the likelihood of U.S. Congress translating the discovery into new laws or incorporating them into existing ones remains slim. The exhaustion stemming from the early years of the COVID-19 pandemic and the current Supreme Court’s skepticism toward federal regulations further diminish the prospects for a federal response.¹² As a nonsignatory to Article 15 of the International Covenant on Economic, Social, and Cultural Rights,¹³ the United States lacks the legal standing to demand the “right to enjoy scientific progress” from our legislative authorities.¹⁴ Converting such groundbreaking findings into enforceable regulations has always been a formidable challenge.¹⁵ However, even within the legal framework, the timing of this revelation on ventilation’s role in curbing disease transmission could not be worse for implementing new public health measures.¹⁶

¹¹ *Id.*

¹² See, e.g., John C. Coffee, Jr. et al., *The Two-Front War on the Administrative State: How Far Will the Supreme Court Go?*, CLS BLUE SKY BLOG (July 5, 2022), <https://clsbluesky.law.columbia.edu/2022/07/05/the-two-front-war-on-the-administrative-state-how-far-will-the-supreme-court-go/> [<https://perma.cc/H2R7-U8VP>] (“New risks would become less easy to regulate because they require new remedies that Congress would have to specifically delegate to the agency and constantly update.”).

¹³ Ann M. Piccard, *The United States’ Failure to Ratify the International Covenant Economic, Social and Cultural Rights: Must the Poor Be Always with Us*, 13 SCHOLAR 1, 7 (2010), <https://commons.stmarytx.edu/thescholar/vol13/iss2/3> [<https://perma.cc/8E22-6DUC>] (“The United States remains one of only half a dozen U.N. member states that have yet to ratify the International Covenant on Economic, Social and Cultural Rights”); *The Right to Benefit from Scientific Progress and Its Applications*, U.N. HUM. RTS., <https://www.ohchr.org/en/special-procedures/sr-cultural-rights/right-benefit-scientific-progress-and-its-applications> (last visited Feb. 20, 2024).

¹⁴ U.N. HUM. RTS., *supra* note 13.

¹⁵ Micah L. Berman & Annice E. Kim, *Bridging the Gap Between Science and Law: The Example of Tobacco Regulatory Science*, 43 J. L. MED. ETHICS 95 (2015), <http://dx.doi.org/10.1111/jlme.12227> [<https://perma.cc/95M8-ZHF5>] (“Most of the significant advances in public health (e.g., vaccinations, water fluoridation) required the combined effort of scientists and attorneys. Scientists identified public health threats and the means of controlling them, but attorneys and policymakers helped convert those scientific discoveries into laws that could change the behavior of industries or individuals at a population level.”).

¹⁶ James G. Hodge et al., *The Model State Indoor Air Quality Act*, JOHNS HOPKINS CTR. FOR HEALTH SEC., Oct. 2023, at 16 (“Despite these clear benefits [of air filtration], there is little federal legal support to protect peoples’ health through improved IAQ or to incentivize IAQ improvements. Consequently, major public health interventions have been left to states to implement . . .”).

While the newfound understanding of combatting viral disease offers hope for global health improvements, it presents a daunting task for those advocating its implementation. Current U.S. environmental protection laws exclusively target chemical pollutants emitted into outdoor air.¹⁷ In contrast, indoor air quality standards, where they exist, apply primarily to chemical hazards, not biological ones.¹⁸

In the face of rapidly evolving scientific knowledge about infectious disease dangers, transmission methods, and mitigation measures, this Article delves into the intersection of laws that establish safety standards for all (such as indoor air quality regulations),¹⁹ such as laws like the Americans with Disabilities Act (which mandates removing access barriers for individuals with qualifying disabilities)²⁰ and common law negligence actions, which both compensate individuals for the careless behavior of others and deter future harmful actions.²¹ Additionally, it explores air purification technologies that can operate discreetly without relying on individual cooperation, potentially aligning with the prevailing sentiment against regulatory intervention in the public, government, and judiciary.

This Article introduces a practical legal strategy for immediately implementing new scientific discoveries concerning disease transmission to improve indoor air quality and reduce infectious

¹⁷ Aleyna Rentz & Aliza Rosen, *How States Can Better Regulate Indoor Air Quality*, JOHNS HOPKINS BLOOMBERG SCH. PUB. HEALTH (Aug. 18, 2023), <https://publichealth.jhu.edu/2023/regulating-indoor-air-quality> [<https://perma.cc/5UNC-K838>] (advocating for states to pass indoor air quality acts because “[w]hile federal law regulates outdoor air pollution, ‘there is little federal legal support to protect peoples’ health through improved IAQ or to incentivize IAQ improvements,’ reads the preface of the act. As a result, IAQ measures that have been put in place at the state, tribal, and local levels are not comprehensive or consistent.”).

¹⁸ Yuguo Li et al., *The COVID-19 Pandemic Is a Global Indoor Air Crisis That Should Lead to Change: A Message Commemorating 30 Years of Indoor Air*, 31 INDOOR AIR 1683 (2021) (“Scientists of different disciplines have now joined forces on further mechanistic studies of expired flows, respiratory droplets, their transformation and dispersion, deposition in lungs, survival of virus in the evaporating droplets and aerosols, and human behavior in close contact, among other key topics.”).

¹⁹ *Id.*

²⁰ *The ADA at 30: The Importance of Law and Health Policy in Expanding Equity*, U.S. DEPT. OF HEALTH & HUM. SERVICES (July 24, 2020), <https://health.gov/news/202007/ada-30-importance-law-and-health-policy-expanding-equity> [<https://perma.cc/99KU-QUNJ>].

²¹ Russell M. Gold, *Compensation’s Role in Deterrence*, 91 NOTRE DAME L. REV. 1997 (2016) (“[C]ompensating victims deters more wrongdoing than the same amount of relief in other forms. . .”).

disease spread. This strategy transcends traditional legal silos²² and bridges these gaps by integrating three disciplines that seldom collaborate: disability law,²³ negligence law, and state environmental law.²⁴ In so doing, it assembles a toolkit of legal instruments to alleviate the burden of infectious diseases for all Americans in their daily lives—whether they are working, traveling, shopping, worshiping, attending school, or seeking health care.

I

GETTING TO VENTILATION: HOW SCIENTIFIC OPINION ON THE SPREAD OF AIRBORNE DISEASE CHANGED

The World Health Organization (WHO), Centers for Disease Control (CDC), and all other sources of advice for controlling the spread of infection based their advice on an assumption that viral particles traveled from one host to another through coughing or sneezing.²⁵ Once expelled, these particles would fall to the ground within three to six feet of the person expelling and become inert within several hours. That meant only direct physical touch between an infected individual and a “susceptible host” or “indirect contact with infectious secretions” on the surfaces where they fell could result in “contact transmission.”²⁶

²² See, e.g., Justin Simard, *The Recurrent Current Crisis in Legal Education*, 56 WILLAMETTE L. REV. 407, 418 (2020) (“By operating in silos, professors missed important opportunities to share responsibility for developing the skills their students need.”) (citing Karl N. Llewellyn, *On What Is Wrong with So-Called Legal Education*, 35 COLUM. L. REV. 651, 677 (1935)). For a definition of the “silo effect,” see Richard E. Levy & Robert L. Glicksman, *Agency-Specific Precedents*, 89 TEX. L. REV. 499, 510 (2011) (“The isolated silo rising above the plains is an evocative metaphor for the propensity of departments or divisions within a large organization to become isolated, with a resulting failure to communicate and pursue common goals.”).

²³ Americans with Disabilities Act of 1990, 42 U.S.C.A. § 12101 *et seq.*

²⁴ See, e.g., *Coronavirus and Climate Change, C-CHANGE*, HARVARD T.H. CHAN SCH. PUB. HEALTH, <https://www.hsph.harvard.edu/c-change/subtopics/coronavirus-and-climate-change/> [<https://perma.cc/2UJB-X39L>] (last visited Feb. 21, 2024) (“The separation of health and environmental policy is a dangerous delusion. Our health entirely depends on the climate and the other organisms we share the planet with. We need to bring these communities together,” quoting Dr. Aaron Bernstein, Former Director of Harvard T.H. Chan C-CHANGE).

²⁵ Tanya Lewis, *We Need to Improve Indoor Air Quality: Here’s How and Why*, SCI. AM. (June 8, 2022), <https://www.scientificamerican.com/article/we-need-to-improve-indoor-air-quality-here-s-how-and-why/> [<https://perma.cc/E4RP-GQ6K>].

²⁶ Jayaweera et al., *supra* note 4; Chen et al., *supra* note 3.

This was an incorrect assumption, however, because as Dr. Kim Prather, director of the National Science Foundation Center for Aerosol Impacts on Chemistry of the Environment at UC San Diego's Scripps Institution of Oceanography explains, it “neglect[ed] the fact that aerosol transmission also occurs at short distances, because the concentration of exhaled aerosols is higher when one is closer to the infected person emitting them.”²⁷

This mistake turned out to be lethal as the virus quickly spread across the globe, and the number of deaths overwhelmed the health care and burial infrastructure in every country it reached. For several reasons, this mistake about how far viral particles could travel and how long they could remain was substantial and turned out to be very significant.

Correcting the mistaken belief provided to be challenging for the U.S. government. First, current U.S. environmental laws, both state and federal, are intended to provide safe levels of clean air by targeting chemical particles emitted by industrial polluters into the atmosphere we all breathe, not virus-laden particles emitted by human beings close to each other.²⁸ The second challenge with implementing this very new science is that no building has been designed to meet the CDC's air quality standards. That means almost all public spaces are inaccessible to people with a qualified disability that makes them more susceptible to harm from catching COVID-19.

Making the problem more complex is the larger question of whether a system of regulations intended to remove barriers for people with

²⁷ Robert Monroe, *It's Not Just SARS-CoV-2: Most Respiratory Viruses Spread by Aerosols*, SCRIPPS INST. OCEANOGRAPHY (Aug. 26, 2021), <https://scripps.ucsd.edu/news/its-not-just-sars-cov-2-most-respiratory-viruses-spread-aerosols> [<https://perma.cc/FJT4-GSTS>]; Jenessa Duncombe, *Aerosol Scientists Try to Clear the Air About COVID-19 Transmission*, EOS (Mar. 31, 2021), <https://eos.org/articles/aerosol-scientists-try-to-clear-the-air-about-covid-19-transmission> [<https://perma.cc/TDW3-V7Z9>]; Kimberly A. Prather et al., *Airborne Transmission of SARS-CoV-2*, 370 SCIENCE 303 (2020).

²⁸ *Summary of the Clean Air Act*, ENV'T PROT. AGENCY (Sept. 6, 2023), <https://www.epa.gov/laws-regulations/summary-clean-air-act> [<https://perma.cc/NWJ9-G222>] (“The Clean Air Act (CAA) is the comprehensive federal law that regulates air emissions from stationary and mobile sources”); Lewis, *supra* note 25 (“It is now widely acknowledged that SARS-CoV-2, the virus that causes COVID, is frequently transmitted by airborne droplets called aerosols that hang in the air and can travel over short and long distances. ‘This is a virus that spreads through the air almost exclusively indoors. If we start there, then the building matters,’ says Joseph Allen, an associate professor at the Harvard T. H. Chan School of Public Health and director of its Healthy Buildings program.”). (“Much attention is paid to the quality of outdoor air—that is one of the main roles of the U.S. Environmental Protection Agency. But people spend much more time indoors, where we are routinely exposed not just to environmental pollutants but to indoor ones ranging from pathogens to cooking fumes to chemicals released by furniture.”).

disabilities can be accessed when the barrier affects everyone. For example, a public building with steep steps can be made more accessible by a ramp for people with disabilities, enabling mobility, but what law prevents a public building from being locked so it is not accessible to anyone? Although the new understanding of how to stop the viral disease spread has brought great hope for substantial improvements in global health, it has left a challenging task for those seeking to mandate its implementation.²⁹ In brief, existing U.S. federal and state environment protection law focuses entirely on toxins emitted by polluters into ambient or outdoor air.³⁰ Other federal and state laws that set indoor air quality standards are limited to specific kinds of buildings, such as factories, and focus on controlling chemical, not biological, hazards.

In the face of a rapidly evolving scientific understanding of the danger of infectious disease, how it is transmitted, and what the law can do to mitigate that risk, this Article is the first to examine closely the border between laws that set safety standards for everyone, such as the laws that set quality standards for outdoor air, and laws like the Americans with Disabilities Act that require the removal of barriers to access public places for people with a qualifying disabling condition.³¹ Finally, air cleaning technologies can operate unobtrusively without demanding individuals to cooperate.³² New laws may also be more likely to succeed in the current hostility to regulatory intervention that

²⁹ Micah L. Berman & Annice E. Kim, *Bridging the Gap Between Science and Law: The Example of Tobacco Regulatory Science*, J. L. MED. ETHICS 95 (2015) (“Most of the significant advances in public health (e.g., vaccinations, water fluoridation) required the combined effort of scientists and attorneys. Scientists identified public health threats and the means of controlling them, but attorneys and policymakers helped convert those scientific discoveries into laws that could change the behavior of industries or individuals at a population level.”).

³⁰ Rentz & Rosen, *supra* note 17 (advocating for states to pass indoor air quality acts because “[w]hile federal law regulates outdoor air pollution, ‘there is little federal legal support to protect peoples’ health through improved IAQ or to incentivize IAQ improvements. . . .’ As a result, IAQ measures that have been put in place at the state, tribal, and local levels are not comprehensive or consistent.”).

³¹ Americans with Disabilities Act of 1990, 42 U.S.C. § 12101.

³² Sahil Kapur, *Democrats Turn Against Mask Mandates as COVID Landscape and Voter Attitudes Shift*, NBC NEWS (Mar. 1, 2022, 3:03 AM), [https://www.nbcnews.com/politics/politics-news/democrats-turn-mask-mandates-covid-landscape-voter-attitudes-shift-rcna18043 \[https://perma.cc/2DV4-JVX3\]](https://www.nbcnews.com/politics/politics-news/democrats-turn-mask-mandates-covid-landscape-voter-attitudes-shift-rcna18043 [https://perma.cc/2DV4-JVX3]).

permeates the public, government, and judiciary.³³ The pressure to understand and combat the rapidly spreading COVID-19 demanded scientists from different fields work together, often for the first time.³⁴

A. The COVID-19 Pandemic as an Engine for Scientific Discovery

The urgency of addressing the COVID-19 pandemic spurred one of the most improbable but important collaborations.³⁵ As of August 2023, more people in the United States had died directly from the coronavirus than in all previous wars.³⁶ Despite early hopes it might disappear or transform into a less dangerous strain, the start of the 2023–2024 school year marked the spread of yet another wave of a new and equally serious mutation.³⁷ But unlike at the terrifying beginning

³³ For an overview of the current Supreme Court's decisions suggesting a disinclination to extend new powers to federal administrative agencies, see Coffee, Jr., *supra* note 12 ("New risks would become less easy to regulate because they require new remedies that Congress would have to specifically delegate to the agency and constantly update.").

³⁴ See Anil K. Rustgi, *How the Pandemic Ignited a New Wave of Scientific Collaboration*, COLUMBIA NEWS (Sept. 14, 2020), <https://news.columbia.edu/how-pandemic-COVID19-cancer-scientific-collaboration> [<https://perma.cc/BG4R-EWYR>] ("In the face of the pandemic, traditional barriers around science have been broken down. Researchers are quickly collaborating with others who are working on the same problems, and with local, state, and national government agencies.").

³⁵ See, e.g., Daniel Susskind, *How Will the World Be Different After COVID-19*, INT'L MONETARY FUND, <https://www.imf.org/en/Publications/fandd/issues/2020/06/how-will-the-world-be-different-after-COVID-19> [<https://perma.cc/4GN2-GLB6>] (last visited Feb. 21, 2024) ("In March 2020, Rabbi Jonathan Sacks, an influential figure in British intellectual life, described the COVID-19 catastrophe as 'the nearest we have to a revelation for atheists.' At the time I thought the comparison was apt. It captured the biblical sense of shock that many of us felt in the face of such a sudden, extreme, and swiftly accelerating crisis. We 'have been coasting along for more than half a century,' he remarked, and all at once 'we are facing the fragility and vulnerability of the human situation.'"). For an overview of the disruption caused to global supply chains, see Susan Helper & Evan Soltas, *Why the Pandemic Has Disrupted Supply Chains*, THE WHITE HOUSE (June 17, 2021), <https://www.whitehouse.gov/cea/written-materials/2021/06/17/why-the-pandemic-has-disrupted-supply-chains/> [<https://perma.cc/6AMK-NRKG>]. For information about the disruption to global health services, see *COVID-19 Continues to Disrupt Essential Health Services in 90% of Countries*, WORLD HEALTH ORG. (Apr. 23, 2021), <https://www.who.int/news/item/23-04-2021-COVID-19-continues-to-disrupt-essential-health-services-in-90-of-countries> [<https://perma.cc/CC6F-7NYT>].

³⁶ *Excess Deaths Associated with COVID-19*, CTR. FOR DISEASE CONTROL & PREVENTION (Sept. 27, 2023), https://www.cdc.gov/nchs/nvss/vsrr/COVID19/excess_deaths.htm [<https://perma.cc/KKL5-SXF9>].

³⁷ See Tom Tapp, *Los Angeles COVID Cases Rise Nearly 35% in Past Week, Test Positivity Close to Last Summer's Peak*, DEADLINE (Aug. 24, 2023, 6:09 PM), <https://deadline.com/2023/08/los-angeles-COVID-cases-rise-35-in-past-week-test-positivity-nearing-peak-of-last-summer-1235527763/> [<https://perma.cc/3YC5-A8BL>]; Zenebou Sylla, *Kentucky School Districts Cancel Classes Less Than 2 Weeks Into School Year Due To COVID-19*,

of the pandemic there is now a new understanding of how it, and most other viruses, travel from person to person.³⁸ There is also now a clear pathway to blocking transmission by removing the germ-carrying particles exhaled by an infected host before they can reach a new one.³⁹ By the time President Trump issued what was to be the first of three COVID-19 Public Health Emergency (CPHE) declarations,⁴⁰ there were already concerns the United States' health care infrastructure response was insufficient to meet the potential future threat, and the legal infrastructure was also struggling.⁴¹ If these findings about how viruses travel are to be translated, which offer remarkable hope for reducing the burden of all forms of disease that travel from human to human, it will require the cooperation of several different legal disciplines that sometimes, but not always, work together.

Using the droplet theory model, only those in close contact with the droplets, such as medical personnel performing procedures, needed to

Viruses and Strep Outbreaks, CNN (Aug. 24, 2023, 5:59 PM), <https://www.cnn.com/2023/08/24/us/kentucky-schools-covid-19-strep-outbreaks/index.html> [<https://perma.cc/U3SA-ZDW9>]; Isabella Volmert, *Texas School District Closes For Week Following Staff COVID-19 Infections*, DALLAS MORNING NEWS (Aug. 24, 2023, 1:17 PM), <https://www.dallasnews.com/news/texas/2023/08/24/texas-school-district-closes-for-week-following-staff-COVID-19-infections/>; Norihiro Kokudo & Haruhito Sugiyama, *Hospital Capacity During the COVID-19 Pandemic*, 3 GLOBAL HEALTH & MED. 56 (2021) (looking at data from 8 tertiary centers across the globe showed that none of the centers reduced emergency room activity even at the peak of the pandemic although treatment of patients without COVID decreased); Erin Durkin, *Mass Burials Surge as New York City Set to Hit 100,000 Coronavirus Cases*, POLITICO (Apr. 10, 2020, 7:21 PM), <https://www.politico.com/states/new-york/albany/story/2020/04/10/mass-burials-surge-as-new-york-city-set-to-hit-100-000-coronavirus-cases-1274835>.

³⁸ Carolyn Barber, *Protecting Against COVID's Aerosol Threat*, SCI. AM. (Oct. 1, 2020), <https://www.scientificamerican.com/article/protecting-against-COVIDs-aerosol-threat/> [<https://perma.cc/NSD5-8CSU>].

³⁹ *Id.*; see also Miyu Moriyama et al., *Seasonality of Respiratory Viral Infections*, 7 ANN. REV. VIROL. 83 (2020) (“[W]e might consider controlling the indoor environment to combat respiratory infections.”).

⁴⁰ See, e.g., Patricia Anderson Pryor et al., *Ending of Federally Mandated COVID-19 Vaccination Requirements, COVID-19 Public Health Emergency*, JACKSON LEWIS (May 3, 2023), <https://www.jacksonlewis.com/publication/ending-federally-mandated-COVID-19-vaccination-requirements-COVID-19-public-health-emergency> (“The removal of the CMS requirement will allow healthcare employers to make their own decisions about whether to continue a COVID-19 vaccination requirement”); Michael D. Shear & Noah Weiland, *White House Will End Most COVID Vaccine Mandates*, N.Y. TIMES (May 1, 2023), <https://www.nytimes.com/2023/05/01/us/politics/us-covid-vaccine-mandates.html?smid=url-share>.

⁴¹ Jennifer S. Bard, *Consider the Fundamentals of Viruses when Crafting Law and Policy Responses*, BILL OF HEALTH (Mar. 18, 2021), <https://blog.petrieflom.law.harvard.edu/2021/03/18/fundamentals-viruses-law-policy-covid/> [<https://perma.cc/8GWT-E5M6>].

worry about direct infection. Everyone else simply had to avoid infecting themselves by not touching their eyes, nose, or mouth after contact with infected particles on surfaces.⁴² The consequences of this misunderstanding are deeply embedded in now very familiar calls for “handwashing” and “deep cleaning.”

This understanding of how viruses are transmitted turned out to be dangerously wrong. Rather than dropping quickly to the ground, viruses and bacteria embedded in particles up to 100 microns when exhaled could spread like smoke covering long distances indoors on invisible air currents.⁴³ Worse, not only could they travel, but they could remain active within what turned out to be a protective “shell” formed by droplets and, therefore, able to infect new hosts over long distances. The story of how medical archivists could trace back and prove the understanding of how particles spread was incorrect will likely one day be a compelling medical detective story.⁴⁴ They discovered the three to six-foot range in which individuals were presumed to be in danger of infection came from an initial misreading of a report drafted seventy years ago by a CDC scientist who died before he could see or correct the error.⁴⁵ Their ongoing efforts to convince regulatory authorities to change decades-old infection control practices convert the detective story into a thriller and these scientists into heroes.⁴⁶

But similar to the skepticism first expressed by challenges to other received wisdom, such as the discovery of the hazards from secondhand smoke, the particle scientists faced considerable resistance from the biomedical scientists at CDC and WHO, with whom they had previously had almost no contact.⁴⁷ Over the next two years, as the initial studies were replicated and the evidence for long-range aerosol transmission became clearer, scientists and public health advocates

⁴² *Id.*

⁴³ Jayaweera et al., *supra* note 4.

⁴⁴ See Molteni, *supra* note 4; see also Parker-Pope, *supra* note 8.

⁴⁵ Jayaweera et al., *supra* note 4.

⁴⁶ See Molteni, *supra* note 4; see also Parker-Pope, *supra* note 8.

⁴⁷ Joshua Gans, *5 Microns, Seriously?*, JOSHUA GANS' NEWSL. (May 17, 2021), <https://joshuagans.substack.com/p/5-microns-seriously> [<https://perma.cc/5C6K-EZ3L>]; see also Annie Schroeder, *Virginia Tech Professor Testifies Before Congress on COVID-19 Spread*, WSLs 10 (Mar. 11, 2021, 8:25 PM), <https://www.wsls.com/news/local/2021/03/11/virginia-tech-professor-testifies-before-congress-on-covid-19-spread/> [<https://perma.cc/2Y9L-MRUR>].

continued to press for a shift in infection control policy. Then, with no public explanation for the shift, the CDC changed its mind.⁴⁸

Unfortunately, while many countries have moved quickly to implement these technologies, the United States is notable in its reluctance. As this Article will discuss, a toxic combination of the long neglect of indoor air pollution, public mistrust of public health interventions, and a Supreme Court with a fierce antiregulatory agenda creates barriers to implementation. As a result, the chances that the groundbreaking scientific discoveries described in the Article will be translated into comprehensive regulation are slim to none. However, in the absence of such legislation, there are opportunities to use existing standards for safe, clean, indoor air to achieve similar results using existing pathways to change.

The public health implications of the mistaken old view are enormous.⁴⁹ Under the old view, most infectious particles, those weighing more than five microns, could be stopped by blocking direct exposure to coughs and sneezes and then cleaning the surfaces where the particles fell.⁵⁰ Now, however, the reverse is known to be true. Particles weighing up to 100 microns, expelled not just by coughing and sneezing but by normal breathing spread infection directly through the air.⁵¹ This means a person does not have to actively cough or sneeze to transmit infectious particles.⁵² The positive aspect of this substantial

⁴⁸ Caroline Shannon Karasik, *CDC Recognizes COVID-19 Can Be Airborne: Here's What That Means*, VERYWELL HEALTH (Oct. 9, 2020), <https://www.verywellhealth.com/cdc-COVID-19-airborne-transmission-5081242> [<https://perma.cc/2WFP-9KV5>].

⁴⁹ For an overview of the cost this mistake has caused, see Linsey Marr & Jose-Luis Jimenez, *Our Early Confusion About Airborne COVID-19 Transmission Still Haunts Us*, TIME (Mar. 29, 2022), <https://time.com/6162065/COVID-19-airborne-transmission-confusion/> [<https://perma.cc/R3XA-UEQ7>].

⁵⁰ Renyi Zhang et al., *Identifying Airborne Transmission as the Dominant Route for the Spread of COVID-19*, 117 PROC. NATL. ACAD. SCI. U.S.A. 14857 (2020). For a recent overview of the state of knowledge about COVID-19 including its mode of transmission, see Kenneth McIntosh, *COVID-19: Epidemiology, Virology, and Prevention*, UPTODATE (Jan. 31, 2024), <https://www.uptodate.com/contents/covid-19-epidemiology-virology-and-prevention> [<https://perma.cc/2XQS-ZZ4M>]; Byron Erath et al., *Aerosols May Play a Larger Role in COVID-19 Transmission than Previously Thought*, PBS NEWSHOUR (July 10, 2020, 12:15 PM), <https://www.pbs.org/newshour/health/aerosols-may-play-a-larger-role-in-COVID-19-transmission-than-previously-thought> [<https://perma.cc/2DAQ-7F8L>].

⁵¹ Jayaweera et al., *supra* note 4.

⁵² Amit Chaturvedi, *The Research That Led WHO to Change Stand That COVID-19 Is Airborne*, NDTV (Oct. 29, 2022), <https://www.ndtv.com/world-news/the-research-that-led-who-to-change-stand-that-COVID-19-is-airborne-3471372> [<https://perma.cc/6FHK>].

change in understanding was there were existing protocols to prevent the spread of particles under five microns that involved reducing the volume of particles in the air using readily available HEPA filters.⁵³

On May 12, 2023, the same day the Biden Administration allowed the “National Emergency Concerning the Novel Coronavirus Disease (COVID-19) Outbreak” (“the COVID-19 National Emergency”)⁵⁴ to expire, the CDC issued guidance warning of the danger of airborne transmission and setting specific and measurable standards for indoor air quality.⁵⁵ The legal consequence of waiting until the declaration, declared by President Trump on March 12, 2020, to expire is that without the special regulatory powers granted to the CDC during the pandemic, its guidance no longer had any force of law.⁵⁶ But the public health implications of their decision to set measurable indoor air quality standards were revolutionary.⁵⁷

As things stand now, the need for implementing standards for indoor air is greater than it was at any time in the pandemic. COVID-19 isn't

-9RYW]. For an illustration of what these particles look like, see *COVID Gets Airborne – Expert Explains How Viruses Travel Through the Air*, SCITECHDAILY (Jan. 15, 2022), https://scitechdaily.com/COVID-gets-airborne-expert-explains-how-viruses-travel-through-the-air/?expand_article=1 [<https://perma.cc/3JTA-GVCA>].

⁵³ *How to Prevent Measles Outbreaks in Healthcare Facilities*, HEPACART (July 24, 2019), <https://www.hepacart.com/blog/how-to-prevent-measles-outbreaks-in-healthcare-facilities> [<https://perma.cc/J6DT-L2W7>].

⁵⁴ For the purposes of this Article's legal analysis, I will use the phrase “COVID-19 National Emergency” or “National Emergency” to refer to the period of time between March 12, 2020, when President Trump first declared a national emergency, and May 11, 2023, the date the Biden administration allowed it to expire. See *Proclamation on Declaring a National Emergency Concerning the Novel Coronavirus Disease (COVID-19) Outbreak*, THE WHITE HOUSE (Mar. 13, 2020), <https://trumpwhitehouse.archives.gov/presidential-actions/proclamation-declaring-national-emergency-concerning-novel-coronavirus-disease-covid-19-outbreak/> [<https://perma.cc/7UCN-A5KU>]; see *End of Public Health Emergency (PHE) Declaration*, CTRS. FOR DISEASE CONTROL & PREVENTION (Sept. 12, 2023), <https://www.cdc.gov/coronavirus/2019-ncov/your-health/end-of-phe.html> [<https://perma.cc/86DQ-FWTU>].

⁵⁵ *Improving Ventilation in Buildings*, CTRS. FOR DISEASE CONTROL & PREVENTION (May 11, 2023), <https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/improving-ventilation-in-buildings.html> [<https://perma.cc/C28D-DTPJ>].

⁵⁶ Bryant Furlow, *US CDC Announces Indoor Air Guidance For COVID-19 After 3 Years*, 11 LANCET RESPIR MED 587 (2023) (“A day after the U.S. Government formally lifted the COVID-19 public health emergency order on May 11—and 3 years into the pandemic—the [CDC] announced long awaited new ventilation guidance aimed at reducing indoor transmission of the SARS-CoV-2 virus.”).

⁵⁷ Joseph G. Allen, *We Might Be on the Verge of an Indoor Air Quality Revolution*, WASH. POST (May 15, 2023, 3:39 PM), <https://www.washingtonpost.com/opinions/2023/05/15/cdc-indoor-air-ventilation-recommendation-ashrae/> [<https://perma.cc/EW9D-Y2TE>].

going anywhere.⁵⁸ The infection range continues to extend further in distance and time. In February 2022, the Department of Energy’s Pacific Northwest National Laboratory reported that virus “droplets encased in mucus could remain moist for up to 30 minutes and travel up to about 200 feet.”⁵⁹ The virus continues to mutate in ways that make it even more infectious. Perhaps most significantly, although deaths within thirty-five days of diagnosis from COVID-19 seem to have fallen, evidence of the long-term damage left behind continues to mount.⁶⁰

There is good reason to think that, like many other viruses, COVID-19 leaves behind extensive organ damage that may or may not be permanent. Unlike other viruses, like polio and measles, COVID-19 continues to mutate so quickly neither vaccines nor infections with one variant offer protection from infection from the next.⁶¹

But getting the ear of regulators, like the CDC and WHO, and urging them to issue public guidance reflecting this new understanding of the risk are very different things. Responding to an open letter, the CDC stated it “continues to believe, based on current science, that people are more likely to become infected the longer and closer they are to a person with COVID-19.”⁶²

⁵⁸ Sam Jones, *Will COVID Ever Be Eradicated?*, SCI. AM. (Nov. 15, 2022), <https://www.scientificamerican.com/article/will-COVID-ever-be-eradicated/> [<https://perma.cc/2S2W-CAGD>]; Nicky Phillips, *The Coronavirus Is Here To Stay—Here’s What That Means*, NATURE (Feb. 16, 2021), <http://dx.doi.org/10.1038/d41586-021-00396-2> [<https://perma.cc/4KHH-W8DX>].

⁵⁹ Tom Rickey, *Beset in Mucus, Coronavirus Particles Likely Travel Farther Than Once Thought*, PAC. NW. NAT’L LAB’Y (Feb. 15, 2022), <https://www.pnnl.gov/news-media/beset-mucus-coronavirus-particles-likely-travel-farther-once-thought> [<https://perma.cc/9FKC-RNQJ>].

⁶⁰ *Large Study Provides Scientists with Deeper Insight into Long COVID Symptoms*, NAT’L INSTS. HEALTH (May 25, 2023), <https://www.nih.gov/news-events/news-releases/large-study-provides-scientists-deeper-insight-into-long-covid-symptoms> [<https://perma.cc/9EUI-KZRC>]; Tanayott Thaweethai et al., *Development of a Definition of Postacute Sequelae of SARS-CoV-2 Infection*, 329 JAMA 1934 (2023), <https://jamanetwork.com/journals/jama/fullarticle/2805540> [<https://perma.cc/N56B-4YW3>].

⁶¹ See *Sterilizing Immunity*, CANCER IMMUNOTHERAPY, <https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/sterilizing-immunity> [<https://perma.cc/BGB5-HBF3>] (last visited Mar. 19, 2024). For a discussion of why the current vaccines targeting SARS-CoV are not “sterilizing,” see Daniele Focosi et al., *Mucosal Vaccines, Sterilizing Immunity, and the Future of SARS-CoV-2 Virulence*, 14 VIRUSES 187 (2022).

⁶² *CDC Updates “How COVID Is Spread,”* CTRS. FOR DISEASE CONTROL & PREVENTION (Oct 5, 2020), https://stacks.cdc.gov/pdfjs/web/viewer.html?file=https://stacks.cdc.gov/view/cdc/94889/cdc_94948_DS1.pdf [<https://perma.cc/954M-F7VJ>].

But with the bad news that viral particles could travel much farther than anticipated came the good news that widely existing technology was highly effective in stopping them. In combination, the same techniques used to exchange stale air for fresh air were built into every commercial building, and most homes were very effective in reducing the number of virus particles in the air if run at higher rates and retrofitted with higher quality filters.⁶³ Other technologies, also widely available, such as stand-alone air filtration fans clear the air of smoke and animal dander as well as more sophisticated Far-Ultra-violet technology that are safely and effectively deployed in a variety of commercial settings, could add additional layers of protection, making the risk of inhaling a disease-carrying particle quite small.⁶⁴ Finally, this information could mark a dramatic improvement in hospital infection control by demonstrating that while traditional “baggy blue” surgical masks designed to protect patients from liquid spray did not fit tightly enough to stop airborne particles, the disposable N-95 respirators in common use by the building trades did so at high rates of efficiency.⁶⁵

***B. Setting the Scene for Scientific Discovery:
The Arrival of SARS-CoV-2***

On January 6, 2020, CNN reported that “Chinese health authorities have not been able to identify a mysterious strain of pneumonia that has infected dozens of people and put the rest of Asia on alert—although they have ruled out a return of the deadly severe acute respiratory syndrome (SARS).”⁶⁶ The report was partially correct. This was a new virus, not a “return” of the original SARS virus, which had

⁶³ *Do HEPA Filters Remove Viruses and Combat COVID-19?*, FILTERBUY, <https://filterbuy.com/resources/health-and-wellness/hepa-filter-against-covid-19/> [<https://perma.cc/EU55-8TTM>] (last visited Mar. 19, 2024).

⁶⁴ *Air Cleaners, HVAC Filters, and Coronavirus (COVID-19)*, U.S. ENV'T PROT. AGENCY, <https://www.epa.gov/coronavirus/air-cleaners-hvac-filters-and-coronavirus-covid-19> [<https://perma.cc/E7QT-TYP4>] (last updated Sept. 28, 2023).

⁶⁵ *Transmission of SARS-Cov-2: Implications for Infection Prevention Precautions*, WORLD HEALTH ORG. (July 9, 2020), <https://www.who.int/news-room/commentaries/detail/transmission-of-sars-cov-2-implications-for-infection-prevention-precautions> [<https://perma.cc/S4FT-2R9E>].

⁶⁶ Nectar Gan, *A Mysterious Virus Is Making China (and the Rest of Asia) Nervous. It's not SARS, So What Is It?*, CNN (Jan. 7, 2020, 2:18 AM), <https://www.cnn.com/2020/01/06/health/china-pneumonia-intl-hnk/index.html> [<https://perma.cc/9QFV-KCJQ>].

emerged in 2002.⁶⁷ It was, however, a member of the same family and was soon designated SARS-CoV-2.⁶⁸ This identification was bad news because, as a piece in the American Society for Microbiology explained in an October 28, 2020 article, “[o]ne of the most remarkable features of coronaviruses” was their ability to “mutate” without “detrimental effect” on their ability to cause illness and transmit themselves to new hosts.⁶⁹ On March 30, 2020, President Donald J. Trump was criticized as callous for saying that holding the total to 100,000 American deaths would mean “we all, together, have done a very good job.”⁷⁰ It soon turned out he was right. That would have been a very good job. But that is not what happened.

At first, it seemed the most serious threat from the disease caused by the new SARS virus, now called COVID-19, was the damage it did to the lungs of its victims, similar to the original SARS.⁷¹ Not only could the virus not be stopped, but for many people, previous interventions to support patients through an aggressive respiratory virus, such as drugs to reduce swelling and mechanical ventilation, did not work either.⁷² But in the four years since its emergence, lung damage may be only a sign of its real threat: the ability to invade the blood vessels that run throughout the human body and harm all internal organs, including the brain.⁷³

⁶⁷ CNN Editorial Research, *SARS Fast Facts*, CNN HEALTH (June 26, 2022), <https://www.cnn.com/2013/09/02/health/sars-fast-facts/index.html> [https://perma.cc/JS4P-3WHG].

⁶⁸ Fan Wu et al., *A New Coronavirus Associated with Human Respiratory Disease in China*, 579 NATURE 265 (2020); Peera Hemarajata, *SARS-CoV-2 Sequencing Data: The Devil Is in the Genomic Detail*, AM. SOC’Y FOR MICROBIOLOGY (Oct. 28, 2020), <https://asm.org/articles/2020/october/sars-cov-2-sequencing-data-the-devil-is-in-the-gen> [https://perma.cc/6PY2-4UA5] (“In January 2020, when an RNA virus was identified as the etiologic agent of the disease soon to be named COVID-19, scientists immediately sequenced its genome.”).

⁶⁹ Hemarajata, *supra* note 68.

⁷⁰ Dana Milbank, *What Kind of Person Calls 100,000-Plus Dead a ‘Very Good Job’?*, WASH. POST (Mar. 30, 2020, 6:52 PM), <https://www.washingtonpost.com/opinions/2020/03/30/what-kind-person-calls-100000-plus-dead-very-good-job/> [https://perma.cc/YK5B-SU89].

⁷¹ See Nectar Gan, *What Is Pneumonia?*, CNN, <https://www.cnn.com/videos/health/2016/09/12/pneumonia-explainer-cohen-orig.cnn> [https://perma.cc/JS2R-LYR4] (last visited Mar. 19, 2024).

⁷² Arjen M. Dondorp, et al., *Respiratory Support in COVID-19 Patients, with a Focus on Resource Limited Settings*, 102 AM. J. TROPICAL MED. & HYGIENE 1191 (2020).

⁷³ Mary Van Beusekom, *COVID’s Aftermath: Persistent Organ Damage at 1 Year, Lung Abnormalities at 2*, CIDRAP (Feb. 15, 2023), <https://www.Cidrap.Umn.Edu/COVID>

While the future of the pandemic is unknowable, as the pandemic goes into its fourth year, it is already the deadliest biological threat the United States has faced in the last 100 years.⁷⁴ In March 2022, the U.S. Census Bureau reported that “[d]eaths in the United States increased by 19% between 2019 and 2020 . . . the largest spike in mortality in 100 years.”⁷⁵ By October 2022, the “excess death rate,” the number of deaths over what would be expected in the same period, increased to a point where experts believe COVID-19 will be a leading cause of death in the United States for decades.⁷⁶

C. What Changed the Received Understanding of Viral Transmission?

The sudden emergence of a new, lethal, and rapidly spreading viral disease in the late fall of 2019 has come to affect almost every aspect of daily life worldwide.⁷⁷ At the start of what was going to be the global

-19/COVIDs-Aftermath-Persistent-Organ-Damage-1-Year-Lung-Abnormalities-2 [https://perma.cc/L4BD-7BE3].

⁷⁴ Shannon Sabo & Sandra Johnson, *Pandemic Disrupted Historical Mortality Patterns, Caused Largest Jump in Deaths in 100 Years*, U.S. CENSUS BUREAU (Mar. 24, 2022), <https://www.census.gov/library/stories/2022/03/united-states-deaths-spiked-as-covid-19-continued.html> [https://perma.cc/9K9C-DSMD].

⁷⁵ *Id.*

⁷⁶ Aria Bendix & Shannon Pettypiece, *SARS-CoV Will Be a Leading Cause of Death in the U.S. Indefinitely Whether or Not the Pandemic Is “Over,”* NBC NEWS (Sept. 19, 2022, 4:45 PM), <https://www.nbcnews.com/health/health-news/SARS-CoV-will-leading-cause-death-indefinitely-us-rcna48374> [https://perma.cc/HX78-ANMC].

⁷⁷ For an ongoing timeline of major events from the start of the pandemic through the present day, see *COVID-19 Timeline*, CTRS. FOR DISEASE CONTROL & PREVENTION, <https://www.cdc.gov/museum/timeline/COVID19.html> [https://perma.cc/P5QG-R9VF] (last visited Mar. 19, 2024). As often happens with a new virus, the name used to describe the outbreak of a novel corona virus in 2019 has changed many times over the course of its existence and different forms are still used in different contexts. The U.S. CDC classifies the current virus as a form of “[s]evere acute respiratory syndrome (SARS)” which it describes as “a viral respiratory illness caused by a coronavirus called SARS-associated coronavirus (SARS-CoV)”; see *SARS*, CTRS. FOR DISEASE CONTROL & PREVENTION, <https://www.cdc.gov/sars/index.html> (last visited Mar. 19, 2024). The CDC calls the current iteration of this virus, “SARS-CoV-2” and the disease it causes COVID-19. This Article therefore refers to the virus itself as SARS-coV-2 and the disease COVID-19, but retains original nomenclature when quoting other sources. Ted Piccone, *Rule of Law Takes a Big Hit During COVID-19*, BROOKINGS (Oct. 18, 2021), <https://www.brookings.edu/articles/rule-of-law-takes-a-big-hit-during-COVID-19/> [https://perma.cc/E54W-DPCR] (“The global pandemic has dramatically impaired the lives of millions of people around the world”); see also Osea Giuntella et al., *Lifestyle and Mental Health Disruptions During COVID-19*, 118 PROC. NAT’L ACAD. SCIS. (2021) (“The COVID-19 pandemic has upended much of society in unprecedented ways. The measures adopted to mitigate the public health emergency, such as border closures, travel restrictions, and lockdowns, have affected labor markets, consumption patterns, and economic activities all over the world.”).

COVID-19 pandemic, everything that the scientific community thought it knew about how infectious particles spread from person to person was, to disastrous consequences, wrong.⁷⁸ There was never any doubt that COVID-19 is a disease you get from others.⁷⁹ But how that happened was based on a significant, and what has turned out to be a deadly, misunderstanding of a tuberculosis study conducted seventy years ago by a government scientist who died before the results could be published.

As a result, there was little or no concern about stopping the spread of the virus by altering the composition of the air shared by infected hosts and uninfected potential victims.⁸⁰ Rather than rapidly falling to the ground in a three to six-foot radius from where they had been expelled, particles as heavy as 100 microns can float freely on air currents, indoors and outdoors, like smoke.⁸¹ The virus exits an infected

⁷⁸ Molteni, *supra* note 4; Nell Greenfieldboyce, *For Scientists Who Study Virus Transmission, 2020 Was a Watershed Year*, NPR (Dec. 26, 2020), <https://www.npr.org/sections/health-shots/2020/12/26/946901965/for-scientists-who-study-virus-transmission-2020-was-a-watershed-year> [<https://perma.cc/GGL2-9HVT>]. (“Back in January, the understanding of how viruses spread through the air was really primitive and incorrect It’s been pretty wild to see airborne transmission of viruses become big news.”); *see also* *Aerosols vs. Particles - Differences and Behavioural Characteristics*, EMW, <https://www.emw.de/en/filter-campus/what-is-an-aerosol.html> [<https://perma.cc/PXM8-7MX7>] (last visited Mar. 19, 2024).

⁷⁹ For an explanation from the World Health Organization on how COVID spreads, *see Coronavirus Disease (COVID-19): How Is It Transmitted?*, WORLD HEALTH ORG. (Dec. 23, 2021), <https://www.who.int/news-room/questions-and-answers/item/coronavirus-disease-COVID-19-how-is-it-transmitted> [<https://perma.cc/56MW-BVHZ>]. This is in contrast to diseases transmitted by mosquitos or spores. *See Vector-borne Diseases*, WORLD HEALTH ORG. (Mar. 2, 2020), <https://www.who.int/news-room/fact-sheets/detail/vector-borne-diseases> [<https://perma.cc/8HEH-LDSK>] (“Vectors are living organisms that can transmit infectious pathogens between humans, or from animals to humans.”).

⁸⁰ *See* Jose L. Jimenez et al., *Systematic Way to Understand and Classify the Shared-Room Airborne Transmission Risk of Indoor Spaces*, 32 *INDOOR AIR* 13025 (2022) (“The COVID-19 pandemic has brought a new appreciation of the importance of airborne disease transmission.”).

⁸¹ *See* Caroline Hopkins, *What COVID Taught Scientists and the Public About the Flu*, NBC NEWS (Nov. 21, 2022), <https://www.nbcnews.com/health/health-news/what-COVID-taught-us-about-flu-rcna57524> [<https://perma.cc/2E6T-26RF>]; Robert Monroe, *It’s Not Just SARS-CoV-2: Most Respiratory Viruses Spread by Aerosols*, SCRIPPS INST. OF OCEANOGRAPHY (Aug. 26, 2021), <https://scripps.ucsd.edu/news/its-not-just-sars-cov-2-most-respiratory-viruses-spread-aerosols> [<https://perma.cc/8CEA-VRNH>].

person's body by hitching a ride on the particles they exhale into the air with every breath.⁸²

The path from the efforts of particle scientists in 2020 to the CDC's adoption of indoor air quality standards in 2023 was long and, for many, frustrating.⁸³ On July 1, 2020, in an open letter, 240 scientists from around the world “[a]ppeal[ed] to the medical community and to the relevant national and international bodies to recognize the potential for airborne spread of coronavirus disease 2019 (COVID-19).”⁸⁴ They explained that “[t]here is significant potential for inhalation exposure to viruses in microscopic respiratory droplets (microdroplets) at short to medium distances (up to several meters, or room scale), and we are advocating for the use of preventive measures to mitigate this route of airborne transmission.”⁸⁵

On October 5, 2020, the CDC “acknowledged” the “existence” of the letter announcing it had updated the portion of its website on “How COVID-19 Spreads” to “include[] information about the potential for airborne spread of the virus that causes COVID-19.”⁸⁶ But in the same statement, the CDC minimized the significance of this new information by describing the studies as “showing limited, uncommon circumstances where people with COVID-19 infected others who were more than six feet away or shortly after the COVID-19-positive person left an area.”⁸⁷ It also reaffirmed that the “CDC continues to believe,

⁸² For an account of how disease spreads directly from person to person, see *Lesson 1: Introduction to Epidemiology*, CTRS. FOR DISEASE CONTROL & PREVENTION, <https://archive.cdc.gov/#/details?q=https://www.cdc.gov/csels/dsepd/ss1978/lesson1/section10.html&start=0&rows=10&url=https://www.cdc.gov/csels/dsepd/ss1978/lesson1/section10.html> (last visited Mar. 19, 2024).

⁸³ Edward A. Nardell & Ruvandhi R. Nathavitharana, *Airborne Spread of SARS-CoV-2 and a Potential Role for Air Disinfection*, 324 JAMA 141 (2020).

⁸⁴ Lidia Morawska & Donald K. Milton, *It Is Time to Address Airborne Transmission of Coronavirus Disease 2019 (COVID-19)*, 71 CLINICAL INFECTIOUS DISEASES 2311 (2020).

⁸⁵ *Id.* For further explanation of “droplets,” see Jayaweera et al., *supra* note 4 (“Bigger globs of viral particles ‘encapsulated in globs of mucus, saliva and water’ fall faster than they evaporate so that they splash down nearby in the form of droplets”). For further explanation of the “droplet” transmission theory, see *Modes of Transmission of Virus Causing COVID-19: Implications for IPC Precaution Recommendations*, WORLD HEALTH ORG. (Mar. 29, 2020), <https://www.who.int/news-room/commentaries/detail/modes-of-transmission-of-virus-causing-COVID-19-implications-for-ipc-precaution-recommendations> [<https://perma.cc/PY73-9VD8>].

⁸⁶ *CDC Updates “How COVID Is Spread” Webpage*, CTRS. FOR DISEASE CONTROL & PREVENTION (Oct. 5, 2020), https://stacks.cdc.gov/pdfjs/web/viewer.html?file=https://stacks.cdc.gov/view/cdc/94889/cdc_94948_DS1.pdf [<https://perma.cc/4WCV-ER52>].

⁸⁷ *Id.* (“Today’s update acknowledges the existence of some published reports showing limited, uncommon circumstances where people with COVID-19 infected others who were more than 6 feet away or shortly after the COVID-19-positive person left an area.”).

based on current science, that people are more likely to become infected the longer and closer they are to a person with COVID-19.”⁸⁸ WHO was even less receptive.⁸⁹ As a commentator in the preeminent scientific journal *Nature* wrote in April of 2022, “Early in the pandemic, the World Health Organization stated that SARS-CoV-2 was not transmitted through the air. That mistake and the prolonged process of correcting it sowed confusion and raises questions about what will happen in the next pandemic.”⁹⁰ As part of their effort to convince a skeptical and complacent biomedical community, Dr. Linsey C. Marr, a distinguished professor of civil and environmental engineering, engaged in archival research to locate the origin of the “5-micron rule.” Dr. Marr’s team was able to trace it back to a long-ignored transcription error involving the work of a scientist who had been dead for over seventy years.⁹¹ What fueled their efforts to be heard was not an interest in being recognized as right. Rather, it was to adopt the correct understanding of how COVID-19 was spreading to see if it could be stopped by cheap and effective air filtration devices.⁹²

Another factor contributing to the failure to take immediate steps to stop the airborne transmission of COVID-19 was the reluctance of the WHO to acknowledge the scientific findings of how far the particles could actually travel.⁹³ Although the WHO has no regulatory authority,

⁸⁸ *Id.*

⁸⁹ Dyani Lewis, *Why the WHO Took Two Years to Say COVID Is Airborne*, *NATURE* (Apr. 6, 2022), <https://www.nature.com/articles/d41586-022-00925-7> [<https://perma.cc/XTV4-6RB4>].

⁹⁰ *Id.*

⁹¹ Molteni, *supra* note 4. See also Parker-Pope, *supra* note 8.

⁹² Joseph G. Allen & Andrew M. Ibrahim, *Indoor Air Changes and Potential Implications for SARS-CoV-2 Transmission*, 325 *JAMA* 2112 (2021) (“With respect to engineering controls, an important flaw exists in how most buildings operate in that the current standards for ventilation and filtration for indoor spaces, except for hospitals, are set for bare minimums and not designed for infection control.”).

⁹³ For a discussion of early mistakes related to adopting the new science, see Trisha Greenhalgh et al., *How Covid-19 Spreads: Narratives, Counter Narratives, and Social Dramas*, 378 *BMJ* (2022), <https://www.bmj.com/content/378/bmj-2022-069940> [<https://perma.cc/T3G5-YVQK>] (“At a press conference on 11 February 2020, WHO’s director general announced that COVID-19 was airborne. After a prompt, he corrected himself and declared that the virus was transmitted by droplets (coughs, sneezes, and contaminated objects). The reasons for this hasty correction are not fully known but might have included a desire to prevent public panic and to avoid exacerbating a major supply chain issue with personal protective equipment in the face of known international shortages. WHO’s early public information campaign promoted droplet measures—handwashing, respiratory

it was also resistant to change its indoor air quality guidance to incorporate the spread of infectious diseases.⁹⁴ On March 8, 2020, the WHO tweeted, “FACT: #COVID19 is NOT airborne.”⁹⁵ Writing in the prestigious journal *Nature*, Dyani Lewis noted that it was not until “23 December [2021], [that] the World Health Organization (WHO) uttered the one word it had previously seemed incapable of applying to the virus SARS-CoV-2: ‘airborne.’”⁹⁶

D. The Biden Administration’s Path to Adoption of Needed IAQ Standards

Historians will have a difficult task reconciling the inconsistent positions taken by the Biden Administration related to controlling the spread of COVID-19 from its first days in January 2020 to late summer 2023 when this Article was completed. On the one hand, the White House Office of Science and Technology Policy (OSTP), then chaired by Dr. Alondra Nelson, seemed in February and March 2022 to be leading an all-White House effort to stop the spread of COVID-19 by improving indoor air quality, but on the other, the CDC failed to adopt the Indoor Air Quality (IAQ) standards OSTP was citing. Two months before the CDC took action to set IAQ standards, Dr. Nelson’s office issued a fact sheet titled *Effort to Improve Ventilation and Reduce the Spread of COVID-19 in Buildings*.⁹⁷

hygiene, and disinfection of surfaces and objects—and firmly reassured the public that the virus was not airborne.”).

⁹⁴ See *WHO Guidelines for Indoor Air Quality: Selected Pollutants*, WORLD HEALTH ORG. (Jan. 1, 2010), <https://www.who.int/publications/i/item/9789289002134> [<https://perma.cc/2LEB-8AHM>]; *National Air Quality Standards*, WORLD HEALTH ORG., <https://www.who.int/tools/air-quality-standards> [<https://perma.cc/AR3A-L6DP>] (last visited Mar. 19, 2024).

⁹⁵ World Health Organization (@WorldHealthOrganization), X (Mar. 28, 2020, 11:44 AM), <https://twitter.com/who/status/1243972193169616898> [<https://perma.cc/ZLF6-HQVZ>]; see, e.g., Lewis, *supra* note 89 (“Throughout much of 2020, the World Health Organization (WHO) held tight to the idea that SARS-CoV-2, the virus that causes COVID-19, spreads through relatively large ‘respiratory’ droplets that are expelled by infected people while coughing, sneezing or speaking. These droplets contaminate nearby surfaces or get breathed in, so the WHO stressed the importance of washing hands and disinfecting surfaces.”).

⁹⁶ Lewis, *supra* note 89 (“Casting the negative in capital letters as if to remove any doubt.”).

⁹⁷ *FACT SHEET: Biden Administration Launches Effort to Improve Ventilation and Reduce the Spread of COVID-19 in Buildings*, THE WHITE HOUSE (Mar. 17, 2022), <https://www.whitehouse.gov/briefing-room/statements-releases/2022/03/17/fact-sheet-biden-administration-launches-effort-to-improve-ventilation-and-reduce-the-spread-of-COVID-19-in-buildings/> [<https://perma.cc/Q43W-BM7G>].

E. CDC on a Different Track than the White House Regarding Air Filtration

At the same time Dr. Nelson was making public statements that “COVID-19 spreads in the air”⁹⁸ and “indoor air is shared air,”⁹⁹ the CDC was making unprecedented efforts to discourage the use of personal air filtration devices (i.e., masks) by ending its practice of reporting areas of high transmission of the disease.

Yet it is apparent the White House knew the virus was airborne even as the CDC and WHO refused to act. On April 8, 2020, the White House was advised by a report they solicited from the National Academies of Sciences, Engineering, and Medicine that “available studies are consistent with the potential aerosol spread of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), not only through coughing and sneezing, but by normal breathing.”¹⁰⁰ But despite this report requested by the White House from the National Academies, it was not until a year later that Dr. Anthony Fauci, chief medical advisor to the president from 2021 to 2022, expressed support for air filtration to prevent the spread from asymptomatic persons with infection, who may be sources of transmission in public settings.¹⁰¹

⁹⁸ See *Let's Clear the Air on COVID*, THE WHITE HOUSE (Mar. 23, 2022), <https://www.whitehouse.gov/ostp/news-updates/2022/03/23/lets-clear-the-air-on-covid> [<https://perma.cc/6MM2-DALJ>] (“The most common way COVID-19 is transmitted from one person to another is through tiny airborne particles of the virus hanging in indoor air for minutes or hours after an infected person has been there”); Kristen K. Coleman et al., *Viral Load of Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) in Respiratory Aerosols Emitted by Patients with Coronavirus Disease 2019 (SARS-COV-19) While Breathing, Talking, and Singing*, 74 *CLINICAL INFECTIOUS DISEASES* 1722–28 (2022).

⁹⁹ See *Let's Clear the Air on COVID*, THE WHITE HOUSE (Mar. 23, 2022), <https://www.whitehouse.gov/ostp/news-updates/2022/03/23/lets-clear-the-air-on-covid> [<https://perma.cc/6MM2-DALJ>].

¹⁰⁰ Edward A. Nardell & Ruvandhi R. Nathavitharana, *Airborne Spread of SARS-CoV-2 and a Potential Role for Air Disinfection*, 324 *JAMA* 141 (2020); *COVID-19 Timeline*, CTRS. FOR DISEASE CONTROL & PREVENTION, <https://www.cdc.gov/museum/timeline/COVID19.html> (last visited Mar. 19, 2024).

¹⁰¹ Kelly Schmitt, *Dr. Anthony Fauci Talks to WaPo's Dan Diamond on the Pandemic and Where We Go from Here*, CTR. FOR HEALTH JOURNALISM (Oct. 6, 2022), <https://centerforhealthjournalism.org/our-work/insights/dr-anthony-fauci-talks-wapos-dan-diamond-pandemic-and-where-we-go-here> [<https://perma.cc/VEW6-TVHW>] (“[I]f public health officials had known early on about [SARS-COV’s] airborne and asymptomatic transmission, they may have made different recommendations early on, when there were just a handful of known cases in the United States”); Michaela Zee, *Dr. Fauci Admits He Should've Been “Much More Careful” on Early SARS-COV Messaging*, *VARIETY* (Oct. 5, 2022, 11:44 AM), <https://variety.com/2022/biz/news/dr-fauci-SARS-CoV-pandemic>

The CDC's public guidance regarding infection control measures was marked by what many have described as consistent efforts to minimize the prevalence of COVID-19 and the risks of contracting it. In January 2022, before President Biden's first State of the Union Address, the CDC announced it was reducing "indoor masking recommendations."¹⁰² A few weeks later, the CDC went further announcing that "over 90% of the U.S. population" no longer had to wear masks indoors.¹⁰³

Yet, as the CDC was backing away from masking, the White House focused on the importance of clean indoor air. On March 2, 2021, the White House released the *National COVID-19 Preparedness Plan*, which laid "the roadmap to help us fight COVID-19 in the future as we begin to get back to our more normal routines."¹⁰⁴ The White House announced it would "work with Congress to secure the necessary funding" to "[g]ive schools and businesses guidance, tests, and supplies to stay open, including tools to improve ventilation and air filtration."¹⁰⁵ Expanding on this goal, it announced two specific commitments. The first was that "[t]he U.S. government will also provide a Clean Air in Buildings Checklist that all buildings can use to improve indoor ventilation and air filtration and will encourage uptake of ventilation improvements."¹⁰⁶ The second, was a pledge that "[t]he Administration will also provide technical assistance that encourages

-monkeypox-1235393328/ [https://perma.cc/F9F7-NQB5] (noting that the failure to appreciate how effectively people without symptoms transmitted SARS-CoV- accounted for its rapid spread).

¹⁰² Nat Malkus & Tracey Schirra, *Biden's State of the Union Unmasks the Politics of the CDC*, AM. ENTER. INST. (Mar. 4, 2022), <https://www.aei.org/op-eds/bidens-state-of-the-union-unmasks-the-politics-of-the-cdc/> [https://perma.cc/3GW5-86HB] ("Late last Friday, the CDC released new guidance that drastically reduced indoor masking recommendations. Prior guidance recommended more than 90 percent of Americans and 100 percent of public school students mask indoors. Under the new guidance, the CDC recommends just 29 percent of Americans and just 31 percent of public school students do so.").

¹⁰³ Cecelia Smith-Schoenwalder, *CDC Guidance: Over 90% of U.S. Population Can Drop Masks*, U.S. NEWS & WORLD REP. (Mar. 4, 2022), <https://www.usnews.com/news/health-news/articles/2022-03-04/cdc-guidance-over-90-of-u-s-population-can-drop-masks>.

¹⁰⁴ *National COVID-19 Preparedness Plan*, THE WHITE HOUSE, <https://www.whitehouse.gov/COVIDplan> [https://perma.cc/VTD9-UEKH] (last visited Mar. 19, 2024); see Betsy Klein & Kate Sullivan, *White House Unveils Plan to Move America to a New Stage of the COVID Pandemic*, CNN (Mar. 3 2022), <https://www.cnn.com/2022/03/02/politics/new-COVID-plan-white-house/index.html> [https://perma.cc/T6YZ-PMPH]; see also Jeremy Diamond, *White House Will Roll Out Next Phase of COVID-19 Response Wednesday*, CNN (Mar. 1, 2022), <https://www.cnn.com/2022/03/01/politics/biden-next-phase-COVID-response/index.html> [https://perma.cc/54G6-8LEM].

¹⁰⁵ THE WHITE HOUSE, *supra* note 104.

¹⁰⁶ *Id.*

schools, public buildings, and state, local, and Tribal governments to make ventilation improvements and upgrades using American Rescue Plan funds.”¹⁰⁷

The following week, the White House issued a statement that it was launching “the Clean Air in Buildings Challenge,” which was described as “a key component of the President’s Plan . . . [calling] on all building owners and operators, schools, colleges and universities, and organizations of all kinds to adopt key strategies to improve indoor air quality in their buildings and reduce the spread of COVID-19.”¹⁰⁸

Later that month, on March 22, 2022, Dr. Alondra Nelson, head of the OSTP, announced an upcoming event, *Let’s Clear the Air On SARS-COV*.¹⁰⁹ This “virtual White House event,” she explained, “will be bringing experts from the fields of public health, the social sciences, engineering, and journalism.”¹¹⁰ In this announcement, Dr. Nelson stated,

The most common way COVID-19 is transmitted from one person to another is through tiny airborne particles of the virus hanging in indoor air for minutes or hours after an infected person has been there. While there are various strategies for avoiding breathing that air—from remote work to masking—we can and should talk more about making indoor environments safer by filtering or cleaning the air.¹¹¹

She also referred to guidance issued the previous year by the Environmental Protection Agency (EPA) as a source of reliable information.¹¹² Despite the White House’s very public commitment to

¹⁰⁷ *Id.*

¹⁰⁸ *FACT SHEET: Biden Administration Launches Effort to Improve Ventilation and Reduce the Spread of COVID-19 in Buildings*, THE WHITE HOUSE (Mar. 17, 2022), <https://www.whitehouse.gov/briefing-room/statements-releases/2022/03/17/fact-sheet-biden-administration-launches-effort-to-improve-ventilation-and-reduce-the-spread-of-covid-19-in-buildings/#:~:text=The%20American%20Rescue%20Plan%20provided,making%20ventilation%20and%20filtration%20upgrades> [https://perma.cc/E6WA-AN3C].

¹⁰⁹ See *Let’s Clear the Air on COVID*, THE WHITE HOUSE (Mar. 23, 2022), <https://www.whitehouse.gov/ostp/news-updates/2022/03/23/lets-clear-the-air-on-covid/> [https://perma.cc/4XJK-NHLY].

¹¹⁰ *Id.*

¹¹¹ *Id.*

¹¹² *Indoor Air and Coronavirus (COVID-19)*, ENV’T PROT. AGENCY, <https://www.epa.gov/coronavirus/indoor-air-and-coronavirus-COVID-19> [https://perma.cc/XL99-SQPS] (last updated Mar. 18, 2024). For a video and transcript of the event, see The White House, *Let’s Clear the Air: An OSTP Discussion on COVID and Clean Indoor Air*, YOUTUBE (Apr. 5, 2022), <https://www.youtube.com/watch?v=QBSQumZ4PsY> [https://perma.cc/66GS

improving indoor air quality to prevent the spread of disease, it did not propose any measurable indoor air quality standards.¹¹³ Also, while the OSTP could use its platform to share information and encourage discussion, it had no authority to make policy or mandate action.¹¹⁴ Nor, apparently, did the CDC, which eventually issued nonbinding guidance acknowledging the importance of indoor air quality but continued to resist quantifying its advice to “reduce the concentration of and exposure time to infectious aerosols.”¹¹⁵ Even when Congress did respond to the White House’s efforts by authorizing an enormous amount of money to help schools reduce the number of virus particles in the air inside a school that children breathed, it left schools to their own devices in terms of deciding how much the school would attempt to improve air quality or, if the school would even take any action at all.¹¹⁶ The CDC’s continued refusal to adopt standards left schools on their own. On April 27, 2023, the CDC issued a report evaluating the spending program, noting “[t]hat none of the four ventilation strategies was reported by more than approximately one half of school districts underscores the ongoing opportunity to improve indoor air quality among K-12 school buildings in the United States.”¹¹⁷

-M2KD]. For a transcript of the event, see Alondra Nelson, *Transcript of Let’s Clear the Air: An OSTP Discussion on COVID and Clean Indoor Air*, THE WHITE HOUSE (Mar. 29, 2022), <https://www.whitehouse.gov/wp-content/uploads/2022/04/03-2022-Transcript-Lets-Clear-the-Air-on-COVID-An-OSTP-Discussion-on-Clean-Indoor-Air.pdf> [<https://perma.cc/65ZW-JYC9>].

¹¹³ Furlow, *supra* note 56.

¹¹⁴ *Office of Science and Technology Policy*, THE WHITE HOUSE, <https://www.whitehouse.gov/ostp/> [<https://perma.cc/C2ZY-DN2U>] (last visited Mar. 19, 2024) (explaining the mission of the OSTP is to “provid[e] advice to the President and the Executive Office of the President on matters related to science and technology”).

¹¹⁵ Miguella Mark-Carew et al., *Ventilation Improvements Among K-12 Public School Districts - United States, August-December 2022*, 72 MORBIDITY & MORTALITY WKLY. REP. 372 (2023) (“Because transmission of SARS-CoV-2 occurs through inhalation of infectious viral particles, it is important to reduce the concentration of and exposure time to infectious aerosols.”).

¹¹⁶ Zeynep Tufekci, *Why Haven’t We Made It Safer to Breathe in Classrooms?*, N.Y. TIMES (Aug. 9, 2023), <https://www.nytimes.com/2023/08/09/opinion/air-filter-covid-smoke-schools.html> (“In March 2021, Congress allocated \$122 billion for schools to cope with the COVID pandemic and its aftermath—to hire tutors, retain teachers or improve their facilities. Public health and clean air advocates hoped that this would lead to widespread improvements in classroom ventilation and air quality to help ward off future pathogenic threats and reduce problems like dust, allergens and wildfire smoke. But only about 34 percent of school districts said they used any of the money to upgrade their heating ventilation and air-conditioning systems.”).

¹¹⁷ Denise-Marie Ordway, *How Indoor Air Quality in Schools Affects Student Learning and Health*, JOURNALIST’S RES. (Apr. 12, 2023), <https://journalistsresource.org/education>

II

ACCEPTANCE OF THE NEW SCIENCE

In 2019, at the start of the pandemic, the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) had no air quality standards relevant to preventing the spread of respiratory viruses indoors in schools or offices.¹¹⁸ On June 24, 2023, ASHRAE issued new standards for “airborne infection risk mitigation standard for buildings, bringing numerous benefits to occupants and promoting healthier environments.”¹¹⁹ The organization states that this standard is different because it “makes people be aware of and accept airborne disease transmission.”¹²⁰

/indoor-air-quality-schools-student-learning-health/ [https://perma.cc/J6UW-5VV4] (citing Miguella Mark-Carew et al., *Ventilation Improvements Among K-12 Public School Districts - United States, August-December 2022*, 72 MORBIDITY & MORTALITY WKLY. REP. 372 (2023)). Finally, on March 22, 2024, the CDC issued guidance describing “improving ventilation” as “one of the core strategies that can reduce our risk of catching or spreading respiratory viruses” and identifying effective methods to “improve the flow of air in our home or other buildings.” *Ventilation Can Reduce Exposure to Respiratory Viruses in Indoor Spaces*, CTRS. FOR DISEASE CONTROL & PREVENTION (Mar. 22, 2024, 4:30 PM), <https://www.cdc.gov/ncird/whats-new/ventilation-respiratory-viruses.html> [https://perma.cc/DWN4-6EB7].

¹¹⁸ *Mission and Vision*, AM. SOC’Y HEATING, REFRIGERATING & AIR-CONDITIONING ENGINEERS, <https://www.ashrae.org/about/mission-and-vision> [https://perma.cc/JT45-5URJ] (last visited Mar. 19, 2024) (“[A] global society advancing human well-being through sustainable technology for the built environment.”).

¹¹⁹ Press Release, Am. Soc’y of Heating, Refrigerating & Air-Conditioning Eng’rs, ASHRAE Approves Groundbreaking Standard to Reduce the Risk of Disease Transmission in Indoor Spaces (Jun. 24, 2023), <https://www.ashrae.org/about/news/2023/ashrae-approves-groundbreaking-standard-to-reduce-the-risk-of-disease-transmission-in-indoor-spaces> [https://perma.cc/J9S3-AGDX].

¹²⁰ Mary Van Beusekom, *New Standard on Cutting Risk of Infectious Aerosol Spread Sets High Bar for Building Ventilation but Is Work in Progress*, CTR. FOR INFECTIOUS DISEASE RSCH. & POL’Y (Aug. 15, 2023), <https://www.cidrap.umn.edu/covid-19/new-standard-cutting-risk-infectious-aerosol-spread-sets-high-bar-building-ventilation> [https://perma.cc/ZF5A-N3FA] (“Airborne transmission is a very complicated subject, and it intimidates a lot of people. Because it intimidates a lot of people, they don’t want to deal with it and would rather dismiss it. Now 241 shows them how to take actions in order to reduce it when levels may rise again in the fall and winter months.”). For an analysis of ASHRAE and other guidelines, see *Proposed Non-infectious Air Delivery Rates (NADR) for Reducing Exposure to Airborne Respiratory Infectious Diseases*, THE LANCET COVID-19 COMMISSION, <https://static1.squarespace.com/static/5ef3652ab722df11fcb2ba5d/t/637740d40f35a9699a7fb05f/1668759764821/Lancet+Covid+Commission+TF+Report+Nov+2022.pdf> [https://perma.cc/ZXX3-RW64] (last visited Mar. 19, 2024) (noting “the ASHRAE minimum ventilation recommendations were not developed as infection control strategies.”).

A. From Droplets to Aerosols

The primary difference between past and current understanding of how viral particles travel from host to host through the air is a change in understanding around the distance the particles can travel once expelled and how long they can remain active while making the trip.¹²¹ But the SARS-CoV-2 virus behaved like measles, even though it was much bigger.¹²²

With the droplet theory, the process of infection was like one person dumping a bucket of water over the head of another—very quickly at high volume. Now, however, scientists understand viruses can attach themselves to smaller particles that leave their host bodies through speaking or breathing and linger in the air for hours, much like smoke.¹²³ This much slower process of infection means there is time to prevent infection by removing these particles from the air before a new host can inhale them.¹²⁴

Historically, the biomedical community had never questioned the droplet explanation for disease spread, even though engineers and physicists who studied aerosol particles did. But no one was listening.¹²⁵ While experts were working on generating knowledge

¹²¹ See Jayaweera et al., *supra* note 4 (“Bigger globs [of viral particles encapsulated in globs of mucus, saliva and water] fall faster than they evaporate so that they splash down nearby in the form of droplets”); *Modes of Transmission of Virus Causing COVID-19: Implications for IPC Precaution Recommendations*, WHO (Mar. 29, 2020), <https://www.who.int/news-room/commentaries/detail/modes-of-transmission-of-virus-causing-COVID-19-implications-for-ipc-precaution-recommendations> [https://perma.cc/7JCC-7ZPY] (further explanation of “droplet” transmission theory).

¹²² For a comparison between SARS-CoV-2, influenza A, and Measles, see Cameron Lee, *Small Viral Particle Aerosol Transmission of SARS-Cov-2, Influenza and Measles: Dual Pandemics, Outbreaks and Public Health Protection with the Use of Face Shields and Face Coverings*, 6 J. INFECTIOUS DISEASE EPIDEMIOLOGY 179 (2020); see also Nair, *supra* note 9.

¹²³ See Jayaweera et al., *supra* note 4 (“Smaller globs evaporate faster in the form of aerosols, and linger in the air, and drift farther away than the droplets do.”).

¹²⁴ See Hiroshi Ueki et al., *Effectiveness of HEPA Filters at Removing Infectious SARS-CoV-2 from the Air*, MSPHERE, <http://dx.doi.org/10.1128/msphere.00086-22> (last visited Mar. 19, 2024) (“Air filtration was found to substantially remove SARS-CoV-2 in experimental room air when viral RNA was measured by using quantitative reverse transcription-PCR (qRT-PCR).”).

¹²⁵ Parker-Pope, *supra* note 8 (quoting Richard Corsi, Dean of engineering and computer science at Portland State University, “It’s a frustration for people who understand aerosols and air pollution particles that this hasn’t received more attention. There are about a half-dozen people screaming about this from the rooftops.”). To hear Dr. Marr discuss her findings directly, see *Air and the Virus with Prof. Linsey Marr*, N.Y. TIMES, <https://timesevents.nytimes.com/livingwell0615> [https://perma.cc/LRR4-7RVE] (last visited Mar. 19, 2024).

about the virus,¹²⁶ legal systems in the United States and worldwide were challenged with the need to make rapid changes.¹²⁷ New scientific collaborations prompted by the rush to understand COVID-19 forced the biomedical community to reassess its opinion, which led to a breakthrough in understanding how COVID-19 and many viruses transmit through the air.¹²⁸

With this new understanding came the need to develop an entirely different method of stopping the virus's spread by using existing ventilation methods to physically remove the small particles from the air before reaching new targets. Until this new understanding, the biomedical and public health community considered indoor air filtration, at best, a fringe science of interest to the HVAC industry and people with indoor allergies.¹²⁹ Now, removing germ particles from the air is considered as important to everyone's health as removing toxic chemical particles from the air and water.¹³⁰

This rapid shift in knowledge about the ability of viruses to spread widely indoors and the efficacy of existing air filtration methods to stop them caught the world by surprise.¹³¹ At a global level, concerns about dangers to the public's health from toxins in the air were focused on reducing the emissions of factories that generated them. The United States, like most other countries, had no laws to prevent the spread of disease-bearing particles in the air because no one knew it was possible. Rather, the scientific community, and the general public, accepted cold and flu season as an unpleasant but unavoidable feature of life in

¹²⁶ Nell Greenfieldboyce, *For Scientists Who Study Virus Transmission, 2020 Was a Watershed Year*, NPR (Dec. 26, 2020, 7:01 AM), <https://www.npr.org/sections/health-shots/2020/12/26/946901965/for-scientists-who-study-virus-transmission-2020-was-a-watershed-year> [https://perma.cc/R4G6-FY5E].

¹²⁷ See, e.g., *Essential Protections During the COVID-19 Pandemic*, U.S. DEP'T LABOR, <https://www.dol.gov/agencies/whd/pandemic> (last visited Mar. 19, 2024) (detailing workplace protections during the declared public health emergency); see also *About the CARES Act and the Consolidated Appropriations Act*, U.S. DEP'T OF THE TREASURY, <https://home.treasury.gov/policy-issues/coronavirus/about-the-cares-act> [https://perma.cc/6HG3-V53M] (last visited Mar. 19, 2024).

¹²⁸ Greenfieldboyce, *supra* note 126 (quoting Dr. Lindsey Marr, "In the past year, we've come farther in understanding airborne transmission, or at least kind of beyond just the few experts who study it, than we have in decades.").

¹²⁹ *Id.*

¹³⁰ *The Inside Story: A Guide to Indoor Air Quality*, U.S. CONSUMER PROD. SAFETY COMM'N, <https://www.cpsc.gov/Safety-Education/Safety-Guides/Home/The-Inside-Story-A-Guide-to-Indoor-Air-Quality> [https://perma.cc/4WP5-RRL6] (last visited Mar. 19, 2024).

¹³¹ *Id.*

modern society. In the same way, skin cancer was always considered a serious disease, but before discovering which specific rays caused the damage and how chemicals could block them, people gave little or no thought to sun exposure.¹³²

B. International Air Quality Standards

Countries worldwide have been quick to implement policies and programs responsive to the new information about how to stop the spread of viral disease indoors. At the start of the COVID-19 pandemic, only fifteen countries had national standards for IAQ, and none were intended to protect against the spread of infectious diseases. However, discoveries about how effectively the threat of infectious disease can be reduced through setting indoor air quality standards have triggered new initiatives all over the globe. In January 2023, Ireland attracted considerable attention by adopting mandatory indoor air quality standards for all workplaces to reduce the spread of infectious diseases.¹³³ Since then, many other countries have acted quickly to leap ahead by setting comprehensive national standards to reduce the risk of spreading infectious diseases indoors.¹³⁴ In March 2023, the Ontario Society of Professional Engineers also issued standards for indoor viral disease prevention.¹³⁵

¹³² See *Understanding UV and Skin Cancer—Timeline*, SCI. LEARNING HUB POKAPŪ AKORANGA PŪTAIAO (July 29, 2008), <https://www.sciencelearn.org.nz/resources/1737-understanding-uv-and-skin-cancer-timeline> [https://perma.cc/74JE-GCR3]; Vito W. Rebecca et al., *A Brief History of Melanoma: From Mummies to Mutations*, 22 MELANOMA RSCH. 114 (2012), <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3303163> [https://perma.cc/USU4-K9X4].

¹³³ *Ireland's Ambition to Move Towards the Health-Based WHO Air Quality Guidelines Will Be Challenging, but Will Have a Significantly Positive Impact on Health*, ENV'T PROTECTION AGENCY (Sept. 24, 2023), <https://www.epa.ie/news-releases/news-releases-2023/irelands-ambition-to-move-towards-the-health-based-who-air-quality-guidelines-will-be-challenging-but-will-have-a-significantly-positive-impact-on-health.php> [https://perma.cc/4WCJ-DBBW].

¹³⁴ See also *New WHO Global Air Quality Guidelines Aim to Save Millions of Lives from Air Pollution*, WORLD HEALTH ORGANIZATION (Sept. 22, 2021), <https://www.who.int/news/item/22-09-2021-new-who-global-air-quality-guidelines-aim-to-save-millions-of-lives-from-air-pollution> [https://perma.cc/HHE4-3NKT] (“New WHO Global Air Quality Guidelines (AQGs) provide clear evidence of the damage air pollution inflicts on human health, at even lower concentrations than previously understood. The guidelines recommend new air quality levels to protect the health of populations, by reducing levels of key air pollutants, some of which also contribute to climate change.”).

¹³⁵ Lia Forgiione, *OSPE Supports Adoption of ASHRAE Standard 241 in the Canadian National Building Code*, ONT. SOC'Y PRO. ENG'RS (July 5, 2023), <https://ospe.on.ca/advocacy/ospe-supports-adoption-of-ashrae-standard-241-in-the-canadian-national-building-code/> [https://perma.cc/8D3H-3QJV].

On March 25, 2021, the European Parliament adopted a resolution on implementing ambient air quality directives, which called for the European Commission to regulate indoor air quality as well. This resolution was based on a European Parliament report examining the relationship between indoor air quality and COVID-19. Australia and New Zealand have also promoted measures to clean the air indoors, which helps to reduce the amount of virus in indoor spaces, including distributing air purifiers to schools.¹³⁶

1. Architectural Standards

Another approach to reducing the spread of indoor infection has been incorporating new indoor air quality standards into architectural specifications.¹³⁷ This is similar to work environmental advocates have already done to reduce the impact of carbon emissions on the environment.¹³⁸ For new buildings, this would mean setting ventilation criteria.¹³⁹ Modifying occupancy limits in existing buildings would also improve indoor air quality by making them less crowded.¹⁴⁰ This could result in voluntary compliance, like the globally recognized voluntary LEED certification system, which “provides a framework for healthy, highly efficient, and cost-saving green buildings, which offer environmental, social and governance,” does.¹⁴¹ Groups like Architecture 2030 advocate both for the adoption of new standards to

¹³⁶ Nair et al., *supra* note 9.

¹³⁷ See *Design for Indoor Air Quality and Infection Control*, U.S. GREEN BLDG. COUNCIL (Mar. 25, 2021), <https://www.usgbc.org/credits/safety-first-155-v4.1> [<https://perma.cc/SP3R-QP7U>].

¹³⁸ Rob Taboada, *How Buildings Will Save the World: Using Building Energy Regulation and Energy Use Disclosure Requirements to Target Greenhouse Gas Emissions*, 66 HASTINGS L.J. 519, 530–31 (2015) (discussing the movement to improve the environment through setting new standards for buildings and noting that “the American Institute of Architects, the American Institute of Interior Designers, ASHRAE, the National Governor’s Association, the U.S. Conference of Mayors, and a significant number of national home builders and general contractors currently endorse these goals”).

¹³⁹ See RICHARD CORSI ET AL., LANCET COVID-19 COMM’N, DESIGNING INFECTIOUS DISEASE RESILIENCE INTO SCHOOL BUILDINGS THROUGH IMPROVEMENTS TO VENTILATION AND AIR CLEANING, <https://uvresources.com/wp-content/uploads/2021/05/SafeWorkTFDesigninginfectiousdiseaseresilienceApril2021.pdf> [<https://perma.cc/LU2S-S3LU>] (last visited Feb. 23, 2024).

¹⁴⁰ See Will Ing, ‘Poor Building Design Sped Up COVID Spread,’ Says Academic, ARCHITECTS’ J. (Sept. 10, 2021), <https://www.architectsjournal.co.uk/news/poor-building-design-sped-up-COVID-spread-says-academic> [<https://perma.cc/4ZZX-ZYNZ>].

¹⁴¹ *What Is LEED Certification*, U.S. GREEN BLDG. COUNCIL, <https://www.usgbc.org/leed/benefits-leed> (last visited Feb. 23, 2024).

reduce carbon emissions and retrofitting older buildings at natural “intervention points” such as “point-of-sale; major renovations; building systems, materials and equipment replacements” when they are already being upgraded.¹⁴²

2. *The Role of Hospital Regulators (the Joint Commission)*

Hospitals are regulated through several overlapping local, state, and federal laws. These laws often defer to standards set by recognized accrediting agencies.¹⁴³ The main agency for hospitals is the Joint Commission, which describes its mission as being to

continuously improve health care for the public, in collaboration with other stakeholders, by evaluating health care organizations and inspiring them to excel in providing safe and effective care of the highest quality and value. [Its] vision is that all people always experience the safest, highest quality, best-value health care across all settings.¹⁴⁴

Congress has authorized the Joint Commission to evaluate hospitals' eligibility for participation in the federal Medicare and Medicaid payment programs.¹⁴⁵ Also, the American Society of Health Care Engineering publishes a handbook for healthcare facilities that includes a chapter on how to design a healthcare facility to address common concerns regarding IAQ.¹⁴⁶

¹⁴² *Existing Building Actions*, ARCHITECTURE 2030, <https://www.architecture2030.org/existing-building-actions/> [<https://perma.cc/T9UB-XKT7>] (last visited Feb. 23, 2024).

¹⁴³ *Infection Prevention and Control*, JOINT COMM'N, <https://www.jointcommission.org/resources/patient-safety-topics/infection-prevention-and-control/> [<https://perma.cc/6XTH-M6PQ>] (last visited Feb. 3, 2024).

¹⁴⁴ *Who We Are*, JOINT COMM'N, <https://www.jointcommission.org/about-us/> [<https://perma.cc/Q8KW-8R9Q>] (last visited Feb. 23, 2024).

¹⁴⁵ Medicare and Medicaid Programs; Approval of Application by the Joint Commission (TJC) for Continued CMS-Approval of Its Hospital Accreditation Program, 87 Fed. Reg. 25642, 25644 (May 2, 2022), <https://www.federalregister.gov/d/2022-09361> [<https://perma.cc/C97U-XK6H>].

¹⁴⁶ Ed Avis, *Hospital Mechanical and Electrical Systems*, HEALTH FACILITIES MGMT. (May 6, 2015), <https://www.hfmmagazine.com/articles/1542-hospital-mechanical-and-electrical-systems> [<https://perma.cc/XH52-SGC8>] (“The Mechanical Systems Handbook, written by Ronald G. Holdaway, PE, and J. Robin Barrick, PE, provides an overview of a hospital’s heating, ventilation, air conditioning and related systems. Likewise, the Electrical Systems Handbook, written by Hugh O. Nash Jr., PE, FIEEE, FASHE, covers the essential elements of a health care facility’s electrical systems.”).

C. The Central Role of the CDC's May 11, 2023, Guidance to Schools in Developing Legal Strategies for Cleaner Air

The CDC, a division of the Department of Health and Human Services, describes itself as the “nation’s health protection agency” that “saves lives and protects people from health threats.”¹⁴⁷ As with other agencies that had been granted emergency powers, the CDC’s ended with the end of the COVID public health emergency.¹⁴⁸ Once the emergency declaration ended, CDC guidance became just binding advice.¹⁴⁹

Before it began issuing guidance related to the COVID-19 pandemic, the CDC’s primary guidance on indoor air quality was concerned with the risk HVAC units could become contaminated with bacteria.¹⁵⁰ It also issued guidance for ventilation to “dilute pollutants that are released by equipment, building materials, furnishings, products, and people.”¹⁵¹

The CDC’s decision on May 11, 2023, (the “May 11, 2023, Guidance” or the “Guidance”) to delay setting specific, measurable IAQ until after the expiration of the COVID-19 public health emergency created an opportunity to deploy three legal strategies that do not depend on new federal legislation.¹⁵² These strategies are repurposing aspects of the Americans with Disabilities Act (which mandates the removal of barriers to access), deploying the power of civil negligence actions to motivate voluntary compliance with nonbinding safety standards, and taking advantage of the federal

¹⁴⁷ *Mission, Role and Pledge*, CTRS. FOR DISEASE CONTROL & PREVENTION, <https://www.cdc.gov/about/organization/mission.htm> [<https://perma.cc/ZY5A-UTZV>] (last visited Mar. 17, 2024).

¹⁴⁸ Juliette Cubanski et al., *What Happens When COVID-19 Emergency Declarations End? Implications for Coverage, Costs, and Access*, KFF (Jan. 31, 2023), <https://www.kff.org/coronavirus-COVID-19/issue-brief/what-happens-when-COVID-19-emergency-declarations-end-implications-for-coverage-costs-and-access/> [<https://perma.cc/Y9E2-3LLF>].

¹⁴⁹ *End of Public Health Emergency*, CTRS. FOR DISEASE CONTROL & PREVENTION, <https://www.cdc.gov/coronavirus/2019-ncov/your-health/end-of-phe.html> [<https://perma.cc/KUV6-WFQ7>] (last updated Sept. 12, 2023).

¹⁵⁰ CTRS. FOR DISEASE CONTROL & PREVENTION, *supra* note 55.

¹⁵¹ *A Guide to Indoor Air Quality for Building Owners*, HUNTON SERVS., <https://huntonservices.com/a-guide-to-indoor-air-quality-for-building-owners/> [<https://perma.cc/X8W4-WQAW>] (last visited Mar. 17, 2024).

¹⁵² CTRS. FOR DISEASE CONTROL & PREVENTION, *supra* note 55.

government's complete lack of indoor air quality legislation to advocate for strong state initiatives that might otherwise be preempted.

The CDC's May 11, 2023, Guidance uses the word "ventilation" to refer to their recommendation of three different methods of removing virus-carrying particles from the air.¹⁵³ These are "[i]ndoor air movement and dilution of viral particles through mechanical or nonmechanical ('natural ventilation'); filtration through central heating, ventilation, and air conditioning (HVAC) systems and/or in-room air cleaners, and air treatment with Ultraviolet Germicidal Irradiation (UVGI) systems ('germicidal ultraviolet' or 'GUV')."¹⁵⁴

***D. Analyzing the CDC's May 11, 2023, Guidance for Schools:
What Changed?***

The CDC's May 11, 2023, Guidance to schools plays an important and foundational role in developing legal strategies to improve indoor air quality, even though it has no binding authority.¹⁵⁵ For the first time, it sets specific standards for indoor air quality and identifies acceptable methods of achieving them.¹⁵⁶ The Guidance, therefore, creates a benchmark that can be used by states that wish to pass their own laws or private entities developing their policies. It can also be used as a standard for reasonableness in a claim for an accommodation under the Americans with Disabilities Act and as evidence of negligence in a personal injury action. It also removes these air standards from the constraint of COVID-19 exceptionalism by stating that "[t]hrough this guidance is written for COVID-19 prevention, many of the layered prevention strategies described in this guidance can help prevent the spread of other infectious diseases, such as influenza (flu), respiratory syncytial virus (RSV), and norovirus, and support healthy learning environments for all."¹⁵⁷ This is particularly valuable in

¹⁵³ *Id.*

¹⁵⁴ *Id.*; *Upper-Room Ultraviolet Germicidal Irradiation (UVGI)*, CTRS. FOR DISEASE CONTROL & PREVENTION (Apr. 9, 2021), <https://www.cdc.gov/coronavirus/2019-ncov/community/ventilation/UVGI.html> [<https://perma.cc/4S4R-Y4LX>].

¹⁵⁵ *Operational Guidance for K-12 Schools and Early Care and Education Programs to Support Safe in-Person Learning*, CTRS. FOR DISEASE CONTROL & PREVENTION, <https://www.cdc.gov/coronavirus/2019-ncov/community/schools-childcare/k-12-childcare-guidance.html> [<https://perma.cc/N7LX-AUXC>] (last updated Oct. 4, 2023) [hereinafter *CDC School Guidance*].

¹⁵⁶ See Furlow, *supra* note 56 (quoting Joseph G. Allen, a Director of the Healthy Buildings Program Harvard University T H Chan School of Public Health "[i]t's the first time that the CDC has released a health-based ventilation target specific to respiratory pathogens").

¹⁵⁷ *CDC School Guidance*, *supra* note 155.

allowing claimants to repurpose the helpful findings and case holdings decided during the pandemic emergency that would otherwise be superseded or invalidated now that the Guidance has been allowed to expire.¹⁵⁸

One significant change the Guidance made was explicitly stating that schools must provide “[r]easonable modifications or accommodations, when necessary . . . to ensure equal access to in-person learning for students with disabilities.”¹⁵⁹ Another significant change was its direct instruction that “[s]chools . . . can optimize ventilation and maintain improvements to indoor air quality to reduce the risk of germs and contaminants spreading through the air.”¹⁶⁰ It then explicitly detailed how schools could use funds provided by an array of federal and state programs to “support improvements to ventilation; repairs, upgrades, and replacements in Heating, Ventilation, and Air Conditioning (HVAC) systems; purchase of MERV-13 air filters, portable air cleaners, and upper-room germicidal ultraviolet irradiation systems.”¹⁶¹ The Guidance referred schools directly to the EPA, which “provides specific steps schools and other buildings can take to improve indoor air quality and reduce the risk of airborne spread of viruses and other contaminants.”¹⁶² Finally, it endorsed the recommendations of the ASHRAE schools and universities guidance.¹⁶³

¹⁵⁸ For an overview of how an emergency declaration affects existing agency powers, see Pratik A. Shah et al., *COVID-19: Emergency Powers and Constitutional Limits*, AKIN GUMP STRAUSS HAUER & FELD LLP (Mar. 23, 2020), <https://www.akingump.com/en/insights/alerts/COVID-19-emergency-powers-and-constitutional-limits> [https://perma.cc/BCT8-56K3].

¹⁵⁹ *CDC School Guidance*, *supra* note 155. The Guidance also referred directly to need for schools to take measures to address “groups disproportionately affected by COVID-19. People living in rural areas, people with disabilities, immigrants, and people who identify as American Indian/Alaska Native, Black or African American, and Hispanic or Latino have been disproportionately affected by COVID-19. These disparities have also emerged among children. School and ECE administrators and public health officials can promote equity in learning and health by demonstrating to families, teachers, and staff that comprehensive prevention strategies are in place to keep students, staff, families, and school communities safe and provide supportive environments for in-person learning.”

¹⁶⁰ *Id.*

¹⁶¹ *Id.*

¹⁶² *Id.*

¹⁶³ For a helpful summary of the ASHRAE guidance, see *Updated ASHRAE Recommendations for COVID-19*, TRANE, https://www.tranehk.com/files/News/EngrNewsletter/Trane%20Engineers%20Newsletter_vol49_2.pdf [https://perma.cc/9MHJ

The new guidelines are explicitly not limited to the prevention of COVID-19. However, they have specific guidance for protection: “When COVID-19 hospital admission levels increase or in response to an outbreak, schools . . . can take additional steps to increase outdoor air intake and improve air filtration.”¹⁶⁴ These steps are not, however, different from the ones recommended for general infection control.¹⁶⁵ Finally, the CDC ends by clarifying that these guidelines do not supersede either accommodations for disabilities or any existing state or federal laws.¹⁶⁶

1. The Legal Significance of the CDC’s Standard Setting

On May 12, 2023, the Centers for Disease Control issued what it described as a “summary of recent changes” to “reduce the spread of disease” by “lower[ing] the concentration” of “viral particles” present indoors.¹⁶⁷ As explained, these changes included “ventilation mitigation strategies . . . [to] help reduce viral particle concentration” so that it would be “less likely viral particles can be inhaled into the lungs (potentially lowering the inhaled dose); contact eyes, nose, and mouth; or fall out of the air to accumulate on surfaces.”¹⁶⁸ Specifically, it recommended that buildings aim to completely exchange the indoor air with fresh outdoor air five times an hour.¹⁶⁹ What distinguished these guidelines from the dozens of others the CDC had issued throughout the pandemic was that they dropped one day after the White House declared the end of the “public health emergency” and that, for the first time, they set specific, measurable standards for indoor air

-4G7B] (last visited Mar. 17, 2024); *CDC School Guidance*, *supra* note 155. The Guidance specifically mentions funding “through the U.S. Department of Education’s Elementary and Secondary Schools Emergency Relief (ESSER) Programs and the Governor’s Emergency Education Relief (GEER) Programs, and the Department of Health and Humans Services’ Head Start and Child Care American Rescue Plan.”

¹⁶⁴ *CDC School Guidance*, *supra* note 155.

¹⁶⁵ *Id.* (“For example, safely opening windows and doors, including on school buses and ECE transportation vehicles, and using portable air cleaners with HEPA filters, are strategies to improve ventilation. Schools and ECE programs may also consider holding some activities outside if feasible when the COVID-19 hospital admission level is high.”).

¹⁶⁶ *Id.* Note, the CDC’s language in this and earlier guidance documents is so tangled it often defies paraphrase. Anyone seeking to use this Guidance in a legal action should, of course, go directly to the CDC’s website to quote directly from the text posted at that time.

¹⁶⁷ *Ventilation in Buildings*, CTRS. FOR DISEASE CONTROL & PREVENTION (May 12, 2023), <https://www.cdc.gov/coronavirus/2019-ncov/community/ventilation.html> [https://perma.cc/T3AY-J4WQ].

¹⁶⁸ *Id.*

¹⁶⁹ *Id.*

quality.¹⁷⁰ As Joseph G. Allen explained in an op-ed welcoming the guidelines, these marked a significant change from CDC's calls throughout the pandemic for "higher ventilation rates" without "a specific ventilation standard."¹⁷¹ This failure to set a standard, explained Dr. Allen, caused "confusion and a lack of accountability" because the question "Did you improve ventilation?" is very different from "Did you improve it by a specific amount?"¹⁷² This setting of standards has important legal significance because it has now, for the first time possible, deployed existing legal remedies to reduce the risk of infectious disease on a population and individual level and effectively advocate for new ones.

E. Reducing Infection by Removing Virus Particles from the Air: Cleaning the Air

1. Measuring Air Quality

There are several ways to measure the levels of indoor air pollution. The most direct is to use a device that detects specific kinds of pollutants such as radon or mold.¹⁷³ Until recently, however, there was no readily available, reliable way to measure the presence of COVID-19 or other viruses in the air.¹⁷⁴ So when scientists first realized that viruses the size of the coronavirus were entering rooms with the air exhaled as the viruses' hosts, they speculated that measuring the amount of exhaled air would be a proxy measure of the amount of

¹⁷⁰ *Id.* ("Airborne viral particles spread between people more readily indoors than outdoors. Indoors, the concentration of viral particles is often higher than outdoors. Protective indoor ventilation practices can reduce the airborne viral concentrations and the overall viral exposure to occupants.")

¹⁷¹ Allen, *supra* note 57.

¹⁷² *Id.*

¹⁷³ Sari Paavanen-Huhtala et al., *Biomonitoring of Indoor Air Fungal or Chemical Toxins with Caenorhabditis Elegans Nematodes*, 12 *PATHOGENS* 161 (2023).

¹⁷⁴ *Id.* There have long been methods of measuring biotoxins but they were not available for home use. *See, e.g.*, INST. OF MED., CHEMICAL AND BIOLOGICAL TERRORISM: RESEARCH AND DEVELOPMENT TO IMPROVE CIVILIAN MEDICAL RESPONSE, CH. 6 (1999), <https://www.ncbi.nlm.nih.gov/books/NBK230679/> [<https://perma.cc/434T-HUPJ>].

exhaled virus.¹⁷⁵ This proxy is carbon dioxide (CO₂).¹⁷⁶ CO₂ is “produced by the body’s metabolism and is always present in the body at about 6% concentration. An average adult human will produce more than 500 g of carbon dioxide daily under resting conditions and will produce much more when active.”¹⁷⁷ Although naturally produced by the human body, CO₂ can cause health problems can be caused by exposure to CO₂ levels as low as 1,000 parts per million (ppm).¹⁷⁸ Because outdoor air has little or no byproducts of exhalation, it is rich in oxygen and quickly displaces the CO₂ and replenishes the supply.¹⁷⁹ Scientists have long known that rising levels of CO₂ are a health hazard because they reduce the amount of oxygen available in the room. Many studies have documented increased rates of learning and productivity in environments have improved the quality of their air by increasing the rate of outdoor air flowing into the room.¹⁸⁰ This kind of improvement alone would lower the risk of infection by exhaled virus particles because they, too, would be displaced by the outdoor air.¹⁸¹

¹⁷⁵ See Dyani Lewis, *Why Indoor Spaces Are Still Prime SARS-COV Hotspots*, NATURE (Mar. 30, 2021), <http://dx.doi.org/10.1038/d41586-021-00810-9> (“[T]he use of inexpensive CO₂ monitors as a rough measure of whether ventilation is adequate or not. As virus-carrying aerosols are exhaled, so too is CO₂. And when ventilation is poor, CO₂ accumulates along with the virus.”).

¹⁷⁶ *CO₂ Monitors*, CLEAN AIR CREW, <https://cleanaircrew.org/co2/> [<https://perma.cc/P2J8-V4M6>] (last visited Feb 23, 2024); Dan Mottola, *Can Air Purifiers Provide Protection Against COVID-19?*, ALEN (Jan. 30, 2024), <https://alen.com/blogs/articles/air-purifiers-and-coronavirus> [<https://perma.cc/5K5D-3PX3>].

¹⁷⁷ *Carbon Dioxide*, NAT’L LIBR. OF MED., <https://pubchem.ncbi.nlm.nih.gov/compound/Carbon-Dioxide> [<https://perma.cc/944B-LZVF>] (last visited Jan. 25, 2024).

¹⁷⁸ Nigel J. Langford, *Carbon Dioxide Poisoning*, 24 TOXICOLOGICAL REV. 229 (2005), <http://dx.doi.org/10.2165/00139709-200524040-00003> [<https://perma.cc/D2QF-CVTV>] (“At low concentrations, gaseous carbon dioxide appears to have little toxicological effect. At higher concentrations it leads to an increased respiratory rate, tachycardia, cardiac arrhythmias and impaired consciousness. Concentrations >10% may cause convulsions, coma and death.”).

¹⁷⁹ Shivani Patel et al., *Physiology, Carbon Dioxide Retention*, NAT’L LIBR. MED., <https://www.ncbi.nlm.nih.gov/books/NBK482456/> [<https://perma.cc/3634-ZUP3>] (last updated Dec. 26, 2022).

¹⁸⁰ Jonathan Levy & Patricia Fabian, *Investing in Indoor Air Quality Improvements in Schools Will Reduce COVID Transmission and Help Students Learn*, CONVERSATION (Oct. 7, 2022, 8:20 AM), <http://theconversation.com/investing-in-indoor-air-quality-improvements-in-schools-will-reduce-SARS-CoV-transmission-and-help-students-learn-191410> [<https://perma.cc/P2U9-XU3R>].

¹⁸¹ *Ruan v. United States*, 142 S. Ct. 2370 (2022); Wanda Phipatanakul et al., *Effect of School Integrated Pest Management or Classroom Air Filter Purifiers on Asthma Symptoms in Students with Active Asthma: A Randomized Clinical Trial*, 326 JAMA 839 (2021), <http://dx.doi.org/10.1001/jama.2021.11559> [<https://perma.cc/R88E-DXCW>]; Perdita Permaul et al., *Allergens in Urban Schools and Homes of Children with Asthma*, 23 PEDIATRIC ALLERGY & IMMUNOLOGY 543 (2012).

Monitoring CO₂ has proven to be a very effective tool for reducing the spread of COVID-19 and other viruses by indicating the need to bring in more air from the outside by opening a window or activating the fan in an existing HVAC system.¹⁸²

2. Adding Fresh Air: Natural Ventilation

Because CO₂ is light and pervasive enough to permeate any structure not specially built to keep it out, it is not necessary to add additional oxygen to indoor spaces. This also explains why stale indoor air will eventually be replaced by fresh outdoor air. However, this exchange happens faster if the doors and windows to a room are open; bringing in “fresh” outdoor air to displace “stagnant” indoor air is often called “natural” ventilation.¹⁸³ The exchange between fresh air and stale air happens more quickly when pushed by a fan.¹⁸⁴ A recent article in *Scientific American* explained that “[a] building’s ventilation level refers to how much fresh outdoor air is being brought in.”¹⁸⁵ This fresh air does not remove virus particles from the air nor kill them, but rather “dilutes the concentration of virus-laden particles in the air.”¹⁸⁶

¹⁸² See Zhe Peng & Jose L. Jimenez, *Exhaled CO₂ as a COVID-19 Infection Risk Proxy for Different Indoor Environments and Activities*, 8 ENV’T SCI. & TECH. LETTERS 392, 396 (2021) (“[O]ur study suggests that simply keeping the CO₂ level and the physical intensity and vocalization level of the activities as low as practically feasible in indoor environments will still reduce the risk”); Hayley Dunning, *CO₂ Monitoring Recommended to Manage COVID-19 Spread in Schools and Offices*, IMPERIAL NEWS (Oct. 5, 2021), <https://www.imperial.ac.uk/news/230878/co2-monitoring-recommended-manage-COVID-19-spread/> [<https://perma.cc/2Q7J-2ZSU>]; Angela Eykelbosh, *Can CO₂ Sensors Be Used to Assess COVID-19 Transmission Risk?*, NAT’L COLLABORATING CTR. FOR ENV’T HEALTH (Jan. 15, 2021), <https://ncceh.ca/content/blog/can-co2-sensors-be-used-assess-COVID-19-transmission-risk> (“CO₂ monitoring is an established means to assess whether ventilation is adequate for the number of people occupying the space . . .”).

¹⁸³ Markham Heid, *The Germ-Cleaning Power of an Open Window*, ELEMENTAL (Apr. 8, 2020), <https://elemental.medium.com/the-germ-cleaning-power-of-an-open-window-a0ea832934ce> [<https://perma.cc/CMS7-LCRD>].

¹⁸⁴ *Indoor Air in Homes and Coronavirus (COVID-19)*, ENV’T PROT. AGENCY, <https://www.epa.gov/coronavirus/indoor-air-homes-and-coronavirus-covid-19> [<https://perma.cc/TY6V-MX7E>] (last updated Nov. 15, 2023) (“Consider using indoor fans in combination with open doors or windows to further increase ventilation. In addition to specialized window fans, box fans or tower fans can be placed in front of a window. Fans can face toward the window (blowing air out of the window) or away from the window (blowing air into the room.”).

¹⁸⁵ Tanya Lewis & Tulika Bose, *How to Improve Indoor Air Quality*, SCI. AM. (Aug. 29, 2022), <https://www.scientificamerican.com/video/how-to-improve-indoor-air-quality/> [<https://perma.cc/U7PT-93H9>].

¹⁸⁶ *Id.*

Mechanical circulation devices can make this process of replacing stale indoor air with fresh outdoor air faster.

3. *Removing Virus Particles: Air Filtration*

Unlike natural ventilation, which replaces stale air with fresh, air filtration is a process that traps toxic particles like dust, allergens, and viruses.¹⁸⁷ Both personal respirators, which filter the air breathed in and out by the individual wearing it, and machines, which use fans to draw in air from a room, use the same filters to trap toxic particles such as dust, allergens, and pesticides.¹⁸⁸

Studies continue to confirm the effectiveness of personal and room wide air filtration devices in reducing not just the amount of virus-carrying particles but also the number of infections caused by them.¹⁸⁹ The air that leaves the device is not “fresh” because it has not been replaced with oxygenated outdoor air, but it has fewer toxins or germ-carrying particles.¹⁹⁰ Air filtration devices support rather than replace ventilation because they do different things.¹⁹¹ Technology for improving air quality by filtering out particles dates back centuries.¹⁹²

The history of developing effective air filtration materials can be followed through patents for vacuum cleaners,¹⁹³ electrostatic

¹⁸⁷ See, e.g., Wanda Phipatanakul et al., *Effect of School Integrated Pest Management or Classroom Air Filter Purifiers on Asthma Symptoms in Students with Active Asthma: A Randomized Clinical Trial*, 326 JAMA 839 (2021), <http://dx.doi.org/10.1001/jama.2021.11559> [<https://perma.cc/3VDR-UFQ9>]; Perdita Permaul et al., *Allergens in Urban Schools and Homes of Children with Asthma*, 23 PEDIATRIC ALLERGY & IMMUNOLOGY 543 (2012), <http://dx.doi.org/10.1111/j.1399-3038.2012.01327.x>.

¹⁸⁸ Phipatanakul et al., *supra* note 187.

¹⁸⁹ M. Ward et al., *The Effectiveness of Stand Alone Air Cleaners for Shelter-In-Place*, 15 INDOOR AIR 127 (2005), <http://dx.doi.org/10.1111/j.1600-0668.2004.00326.x>; *Putting the Tesla HEPA Filter and Bioweapon Defense Mode to the Test*, TESLA (May 2, 2016), <https://www.tesla.com/blog/putting-tesla-hepa-filter-and-bioweapon-defense-mode-to-the-test> [<https://perma.cc/55RQ-NWNJ>]; Graham Rapier, *Tesla Drivers Are Using Bioweapon Defense Mode to Escape Wildfire Smoke — Here's How It Works*, BUSINESS INSIDER (June 8, 2023), <https://www.businessinsider.com/tesla-owners-use-air-filter-bioweapon-defense-mode-wildfire-smoke-2023-6> [<https://perma.cc/KTT2-ZN2F>].

¹⁹⁰ Ward et al., *supra* note 189.

¹⁹¹ Press Release, Healthcare Facilities Today, *What's the Difference Between Ventilation and Air Filtration?* (Feb. 21, 2018), <https://www.healthcarefacilitiestoday.com/posts/Whats-the-Difference-Between-Ventilation-and-Air-Filtration—17698> [<https://perma.cc/A6UH-T9KM>].

¹⁹² See generally *The History of Air Filters*, AIR QUALITY CAN. (Dec. 2, 2020), <https://www.airqualitycanada.ca/news/the-history-of-air-filters> [<https://perma.cc/JZ3V-P3Z4>].

¹⁹³ Mary Bellis, *The Invention and History of the Vacuum Cleaner*, THOUGHTCO. (Jan. 13, 2020), <https://www.thoughtco.com/invention-and-history-of-vacuum-cleaners-1992594> [<https://perma.cc/742Q-JZFK>].

precipitators,¹⁹⁴ and air conditioners.¹⁹⁵ The military, which had since World War I been interested in personal protection against gas attacks, is credited with developing the “gold standard” of effective filtration devices, the High Efficiency Particulate Air (HEPA) filter.¹⁹⁶ A HEPA filter “is a type of pleated mechanical air filter” that “can theoretically remove at least 99.97% of dust, pollen, mold, bacteria, and any airborne particles with a size of 0.3 microns (µm).”¹⁹⁷

HEPA is now considered the gold standard for air filtration standard for commercial, military, and industrial uses.¹⁹⁸ Whether as part of a personal respirator or an air filtration machine, HEPA filters stop the spread of COVID-19 because they “catch particles that contain coronaviruses.”¹⁹⁹ When breathing, coughing, and talking, “[p]eople expel droplets of respiratory fluid, saliva, and possibly viruses into the air.”²⁰⁰ But HEPA filters are not just “sieves, and snagging a virus is not like panning for gold. Particles either flow past or stick to the fibers in a filter based on their inertia or ability to diffuse toward the fiber.”²⁰¹ By combining a HEPA filter and a fan to draw in room air, homemade or commercial air filters, both circulate the air and remove particles by

¹⁹⁴ Danny Ashton, *The History of the Air Purifier – 11 Steps to Modern Day*, HOUSEFRESH (Dec. 15, 2022), <https://housefresh.com/history-air-purifier/#:~:text=Electrostatic%20Precipitator%20%E2%80%93%201908&text=Cottrell%20inven%20the%20electrostatic%20precipitator,could%20be%20collected%20and%20eliminated> [https://perma.cc/46HS-4EX8].

¹⁹⁵ Mary Bellis, *The History Behind the Invention of the Gas Masks*, THOUGHTCO (July 1, 2019), <https://www.thoughtco.com/history-of-gas-masks-1991844> [https://perma.cc/4QDY-NXJU].

¹⁹⁶ Gerard J. Fitzgerald, *Chemical Warfare and Medical Response during World War I*, 98 AM. J. PUBLIC HEALTH 611 (2008), <http://dx.doi.org/10.2105/AJPH.2007.11930>.

¹⁹⁷ *What Is a HEPA Filter?*, ENV'T PROT. AGENCY, <https://www.epa.gov/indoor-air-quality-iaq/what-hepa-filter> [https://perma.cc/W2TH-9V9C] (last updated Mar. 13, 2023).

¹⁹⁸ Ulrike Gehring & Mireia Gascon, *Invited Perspective: HEPA Filters-An Effective Way to Prevent Adverse Air Pollution Effects on Neurodevelopment?*, 130 ENV'T HEALTH PERSP. 61302 (2022), <https://ehp.niehs.nih.gov/doi/full/10.1289/EHP11224> (explaining HEPA is universally acknowledged as so effective that randomized clinical trials exposing people to toxins without HEPA filtration are unethical).

¹⁹⁹ Kim Martineau, *Do HEPA Filters Really Catch Coronavirus Particles?*, COLUM. NEWS (Nov. 11, 2021), <https://news.columbia.edu/news/do-hepa-filters-really-catch-coronavirus-particles> [https://perma.cc/UDH6-YJB9].

²⁰⁰ *Id.*

²⁰¹ *Id.*; see also *Air Cleaners, HVAC Filters, and Coronavirus (COVID-19)*, U.S. ENV'T PROT. AGENCY, <https://www.epa.gov/coronavirus/air-cleaners-hvac-filters-and-coronavirus-covid-19> [https://perma.cc/E7QT-TYP4] (last updated Sept. 28, 2023).

trapping them in filters.²⁰² After trapping the particles, these filters release the uncontaminated air back into the room.²⁰³

4. *Do-It-Yourself Air Filtration: The Development of the Corsi-Rosenthal Box*

HEPA filters are at the core of three different air filtration methods. One is the personal mask or respirator. The second is a stand-alone device that filters the air in a specific room, and the third is a building-wide filtration system integrated into a ventilation system that also brings in fresh air from the outside. One of the very public actions taken by the White House OSTP to promote improving IAQ occurred on September 9, 2022, when it received, on the President's behalf, what looked like a cardboard box constructed by Connecticut school children in the distinctive red, white, and blue style of Air Force One.²⁰⁴ The box was a homemade air filtration device made from a box fan and four furnace filters and devised by two air quality engineers, Dr.'s Corsi and Rosenthal.²⁰⁵

²⁰² *Air Cleaners, HVAC Filters, and Coronavirus (COVID-19)*, U.S. ENV'T PROT. AGENCY, <https://www.epa.gov/coronavirus/air-cleaners-hvac-filters-and-coronavirus-covid-19> [https://perma.cc/E7QT-TYP4] (last updated Sept. 28, 2023); see also Hiroshi Ueki et al., *Effectiveness of HEPA Filters at Removing Infectious SARS-CoV-2 from the Air*, 7 *MSPHERE* 8622 (Aug. 10, 2022), <http://dx.doi.org/10.1128/msphere.00086-22> ("Air filtration simulation experiments quantitatively showed that an air cleaner equipped with a HEPA filter can continuously remove SARS-CoV-2 from the air. The capture ratios for SARS-CoV-2 in the air when the air cleaner was equipped with an antiviral-agent-coated HEPA filter were comparable to those with the conventional HEPA filter, and there was little effect on SARS-CoV-2 in the air that passed through the antiviral-reagent-coated HEPA filter"); Tosin Thompson, *Real-World Data Show That Filters Clean COVID-Causing Virus from Air*, *NATURE* (Oct. 6, 2021), <http://dx.doi.org/10.1038/d41586-021-02669-2> ("Research at a hospital swamped by people with COVID-19 has confirmed that portable air filters effectively remove SARS-CoV-2 particles from the air—the first such evidence in a real-world setting. The results suggest that air filters could be used to reduce the risk of patients and medical staff contracting SARS-CoV-2 in hospitals.").

²⁰³ *3M Scientists: This Corsi-Rosenthal Box Movement Is Legit*, 3M NEWS CTR. (Feb. 24, 2022), <https://news.3m.com/2022-02-24-3M-scientists-This-Corsi-Rosenthal-box-movement-is-legit> [https://perma.cc/UUZ6-QFC7]; see also U.S. ENV'T PROT. AGENCY, *supra* note 201.

²⁰⁴ Emerson Dameron & Michelle Franklin, *UC San Diego Professor Presents Air Filtration Fan to the White House to Help Fight COVID-19*, U.C. SAN DIEGO TODAY (Sept. 22, 2022), <https://today.ucsd.edu/story/uc-san-diego-professor-presents-air-filtration-fan-to-the-white-house-to-help-fight-COVID> [https://perma.cc/D8PY-6AJW].

²⁰⁵ *Id.*; Christopher DeFrancesco, *White House's Office of Science and Technology Policy Recognizes UConn's Indoor Air Quality Initiative Fighting COVID-19*, UCONN TODAY (Sept. 12, 2022), <https://today.uconn.edu/2022/09/white-houses-office-of-science-and-technology-policy-recognizes-uconns-indoor-air-quality-initiative-fighting-COVID-19>

The box created by the children has come to play an important role in the implementation of improving indoor air quality.²⁰⁶ It was “a do-it-yourself air filtration device” designed by two engineers early in the pandemic who were looking for a low cost and accessible “alternative to traditional air purifiers on the market.”²⁰⁷

a. Sterilization: Killing Virus Particles with Ultraviolet Light

Justice Louis Brandeis’s famous comment “sunlight is said to be the best disinfectants” reflected a belief that can be traced back millennia.²⁰⁸ Far-UVC, the third method of stopping the spread of

/# [https://perma.cc/3ZK3-BGWW]. See U.C. Davis Coll. Eng’g, *How to Build a Corsi-Rosenthal Box*, YOUTUBE (Apr. 15, 2022), https://www.youtube.com/watch?v=hIuH-2naoZI [https://perma.cc/54S4-SPSA] (video instructions on making a Corsi-Rosenthal Box).

²⁰⁶ Defrancesco, *supra* note 205. As word spread that removing infected particles from the air was an effective way of reducing the spread of COVID-19, two engineers also proved it could be done cheaply using a homemade device consisting of furnace filters taped to a basic box fan. Dr. Richard Corsi, whose Ph.D. is in Civil and Environmental Engineering, and industry experts like Jim Rosenthal, chairman and CEO of Tex-Air Filters have stepped forward to offer their expertise in the movement of particles through the air to propose practical and low cost immediate interventions that block the spread of airborne contaminants without otherwise altering the composition of air and without requiring any effort by individuals in the room.

The product of their work, which has come to be known as a “Corsi-Rosenthal Box,” was made of readily available and inexpensive materials: “duct tape, air filters, and a box fan.” As word spread, individuals and groups began making these devices for their homes, schools, offices, and places of worship. By early 2022 so many furnace filters had been purchased to make a Corsi-Rosenthal box that 3M, the leading U.S. manufacturer of HEPA filters, took notice. In February 2022, they reported the results of their testing, which led them to “conclude[e][that] the boxes were effective at capturing unwanted airborne particles, including viruses.” As the 3M engineer conducting the study explained, “[m]any viruses like COVID-19 are airborne and can become highly concentrated in poorly ventilated spaces. I’m heartened to see so many people advocating for the importance of clean air, especially in schools.” 3M NEWS CTR., *supra* note 203.

²⁰⁷ 3M NEWS CTR., *supra* note 203.

²⁰⁸ Andrew Berger, *Brandeis and the History of Transparency*, SUNLIGHT FOUND. (May 26, 2009, 10:47 AM), https://sunlightfoundation.com/2009/05/26/brandeis-and-the-history-of-transparency [https://perma.cc/KL4Y-5AKX] (for accounts of origins of that phrase); *The History of UV-C Disinfection*, UV TECH., https://www.uvtglobal.com/what-is-uv-c/the-history-of-uv-c/?v=79cba1185463 [https://perma.cc/LN26-Y257] (last visited Feb. 12, 2024) (explaining “germicidal lamps” have “been used since the late 1800s to kill the types of micro-organisms that typically cause indoor air quality (IAQ) problems—bacteria, mold, yeast and viruses.”).

COVID-19 identified by the CDC, is a safe²⁰⁹ and effective²¹⁰ modern version of a very old technique.²¹¹ Of the three methods identified by the CDC for improving indoor air quality, Far-UVC is the most direct because rather than simply replacing or filtering out disease-carrying particles, Far-UVC devices kill the germs they are carrying.²¹²

Westinghouse developed commercial air disinfection devices in the 1940s and was a leader in producing products for both home and hospital settings.²¹³ By the 1950s, UV light was used routinely in

²⁰⁹ Manuela Buonanno et al., *Far-UVC light (222 nm) Efficiently and Safely Inactivates Airborne Human Coronaviruses*, 10 SCI. REP. 10285 (2020), <http://dx.doi.org/10.1038/s41598-020-67211-2> [<https://perma.cc/W32X-WDYS>]; see also *The History of UV-C Disinfection*, UV TECH., <https://www.uvtglobal.com/what-is-uv-c/the-history-of-uv-c/?v=79cba1185463> (last visited Mar 15, 2023); see Yehuda Shurpin, *Is Tzaraat Leprosy?*, CHABAD.ORG, https://www.chabad.org/library/article_cdo/aid/4714280/jewish/Is-Tzaraat-Leprosy.htm (last visited Mar 15, 2023).

²¹⁰ See Laurel Wamsley & Maria Godoy, *Coronavirus FAQs: Can Sunlight Kill the Virus? How Risky Is an Elevator Ride?*, NPR (Apr. 17, 2020, 3:57 PM), <https://www.npr.org/sections/goatsandsoda/2020/04/17/836830157/coronavirus-faqs-can-sunlight-kill-the-virus-how-risky-is-an-elevator-ride> [<https://perma.cc/LA3M-6M27>] (explaining sunlight itself cannot effectively kill COVID viruses); see also *The History of UV-C Disinfection*, UV TECH., <https://www.uvtglobal.com/what-is-uv-c/the-history-of-uv-c/?v=79cba1185463> [<https://perma.cc/DB5Q-FLJ4>] (last visited Mar. 11, 2024); see Yehuda Shurpin, *Is Tzaraat Leprosy?*, CHABAD.ORG, https://www.chabad.org/library/article_cdo/aid/4714280/jewish/Is-Tzaraat-Leprosy.htm (last visited Mar 15, 2023).

²¹¹ See Allison Marsh, *We've Been Killing Deadly Germs with UV Light for More Than a Century*, IEEE SPECTRUM (Aug. 25, 2020), <https://spectrum.ieee.org/weve-been-killing-deadly-germs-with-uv-light-for-more-than-a-century> [<https://perma.cc/3R2R-TS93>]; see also UV TECH., *supra* note 210.

²¹² CTRS. FOR DISEASE CONTROL & PREVENTION, *supra* note 55; CTRS. FOR DISEASE CONTROL & PREVENTION, *supra* note 154.

²¹³ AMER. SOC. HEATING, REFRIGERATING, AND AIR-CONDITIONING ENG'RS, ASHRAE HANDBOOK—HVAC APPLICATIONS 62.1-62.14 (2019), https://www.ashrae.org/file%20library/technical%20resources/COVID-19/i_p_a19_ch62_uvairandsurfacetreatment.pdf [<https://perma.cc/B2M3-KQ6L>]; see also Pratibha Sharma et al., *Design Considerations for a Surface Disinfection Device Using Ultraviolet-C Light-Emitting Diodes*, 126 J. RSCH. NATL. INST. STANDARDS & TECH. 126045 (2021), <http://dx.doi.org/10.6028/jres.126.045> [<https://perma.cc/4GJR-NF8X>] (“Germicidal ultraviolet-C (UV-C) radiation, with wavelengths ranging from 200 nm to 280 nm, has been proven to be effective against viruses, bacteria, and other pathogens by damaging their genetic material and obstructing pathogenic multiplication.”).

tuberculosis wards.²¹⁴ It is already integrated into many commercial HVAC systems to combat mold.²¹⁵

b. Developing a Layered Response That Includes Personal Air Filtration Devices and Respirators

Personal air filtration devices have a long history in the United States.²¹⁶ The CDC defines a “respirator” as a mask that fits more closely to the face and is more effective in screening airborne toxins than surgical masks that fit loosely.²¹⁷ At the start of the COVID-19

²¹⁴ For more information about the historic and current threat from tuberculosis, see *The Infectious Disease That Nobody Ever Thinks About*, HARV. T.H. CHAN (Mar. 23, 2022), <https://www.hsph.harvard.edu/news/features/the-infectious-disease-that-nobody-ever-thinks-about> [https://perma.cc/MY2R-5ADB]; *The Quick History of UV Disinfection*, AM. ULTRAVIOLET (Nov. 17, 2015), <https://auvco.blogspot.com/2015/11/the-quick-history-of-uv-disinfection.html> [https://perma.cc/EPP3-KZ23]; David Kearns, *Vaccines Alone Cannot End This - Oireachtas Committee Hears Good Ventilation Key to Suppressing COVID-19*, UNIV. COLL. DUBLIN (May 25, 2021), <https://www.ucd.ie/newsandopinion/news/2021/may/25/vaccinesalonecannotendthis-oireachtascommitteehearsgoodventilationkeytosuppressingcovid-19/#:~:text=The%20committee%20%2C%20which%20met%20to,%2C%20hotels%2C%20and%20sports%20venues> [https://perma.cc/NWE4-GZDN]; *HEPA Filters Are “Great Interim Solution” for Schools, Expert Says*, RTÉ (Dec. 2, 2021), <https://www.rte.ie/news/coronavirus/2021/12/02/1264395-COVID-schools/> [https://perma.cc/7PL2-6NCC]; Harry McGee, *Ventilation of Buildings Neglected in Fight Against COVID, Expert Says*, IRISH TIMES (Nov. 22, 2021), <https://www.irishtimes.com/news/politics/ventilation-of-buildings-neglected-in-fight-against-COVID-expert-says-1.4734873> [https://perma.cc/HL8S-QZSJ]; Bruce Rolfsen, *Worker, Business Groups Push to Influence Health-Care COVID Rule*, BLOOMBERG L. (Jan. 3, 2023, 2:40 AM), <https://news.bloomberglaw.com/safety/worker-business-groups-push-to-influence-health-care-COVID-rule> [https://perma.cc/6CEV-3T62]; Lia Forgione, *OSPE Supports Adoption of ASHRAE Standard 241 in the Canadian National Building Code*, ONTARIO SOC’Y OF PRO. ENG’RS (July 5, 2023), <https://ospe.on.ca/advocacy/ospe-supports-adoption-of-ashrae-standard-241-in-the-canadian-national-building-code/> [https://perma.cc/K76R-QUF2].

²¹⁵ UVC – *A Comprehensive Approach to Protecting Our Schools*, AM. ULTRAVIOLET, <https://www.americanultraviolet.com/germicidal-healthcare-solutions/UVC-solutions-for-educational-facilities.html> [https://perma.cc/9KJ8-4Z7J] (last visited Feb. 24, 2024).

²¹⁶ See U.S. Patent No. 6,529 (filed June 12, 1849), <https://patents.google.com/patent/US6529A/en?q=4-2013.pdf>; see also Prabha Shankar, *All About Air Purification – Need, Origin & Trend Analysis*, SAGACIOUS IP, <https://sagaciousresearch.com/blog/air-purification-need-origin-trend-analysis/> [https://perma.cc/4WS7-Z43V] (last visited Jan. 25, 2024); *For 50 Years, the Safety Behind Your Success*, 3M, https://www.3m.com/3M/en_US/worker-health-safety-us/safety-resources-training-news/science-of-safety/safety-anniversary/#:~:text=Introduced%20the%20United%20States'%20first,at%20hand%20in%20challenging%20environments [https://perma.cc/P6FJ-BEKU] (last visited Jan. 25, 2024).

²¹⁷ *Respirators vs. Masks, and the Role of Filtrete Air Quality Solutions*, FILTRETE, https://www.filtrete.com/3M/en_US/filtrete/home-tips/full-story/~respirators-vs-masks/?storyid=ffb60ce0-685f-4f63-8253-2412c77d8663 [https://perma.cc/G2YQ-3X4L] (last visited Feb. 24, 2024).

pandemic, there had been very little research on the effectiveness of respirators for preventing the spread of a virus the size of COVID-19 because, again, it was assumed not to travel far from the infected host.

But the first evidence of using such a device to prevent the spread of infection concerns Dr. Johann Mikulicz, who is credited with wearing “a face mask in 1897, which he described as ‘a piece of gauze tied by two strings to the cap, and sweeping across the face to cover the nose and mouth and beard’” following his discovery that “respiratory droplets carried culturable bacteria.”²¹⁸ By the 1918 flu pandemic, cotton masks were widely recommended for the public to prevent infection.²¹⁹ The next significant use of “respiratory protection in the healthcare setting came to the forefront of concern with the outbreak of tuberculosis in the 1990s” when the “use of respirators in the health care setting was described as a relatively new but important step forward in the efforts to prevent the transmission of tuberculosis (TB).”²²⁰ “Air-purifying respirators provide a barrier to prevent health care workers from inhaling mycobacterium tuberculosis.”²²¹ They were also deployed in response to threats of bioterrorism after 9-11 and in caring for Ebola patients.²²² However, as discussed *infra*, when the COVID-19 virus became the focus of public attention, they were initially not recommended for those not in close contact with infectious patients.²²³

²¹⁸ Bruno J. Strasser & Thomas Schlich, *A History of the Medical Mask and the Rise of Throwaway Culture*, 396 LANCET 19 (2020).

²¹⁹ Lisa M. Brosseau et al., *COMMENTARY: Wear a Respirator, Not a Cloth or Surgical Mask, to Protect Against Respiratory Viruses*, CIDRAP (Feb. 23, 2023), <https://www.cidrap.umn.edu/covid-19/commentary-wear-respirator-not-cloth-or-surgical-mask-protect-against-respiratory-viruses> [<https://perma.cc/CXJ7-5NS3>].

²²⁰ *100 Years of Respiratory Protection History*, CDC, <https://www.cdc.gov/niosh/npptl/Respiratory-Protection-history.html> [<https://perma.cc/P7JV-SVC7>] (last visited Mar 11, 2024).

²²¹ *Id.*

²²² Megan Molteni et al., *How Masks Went from Don't-Wear to Must-Have*, WIRED (July 2, 2020), <https://www.wired.com/story/how-masks-went-from-dont-wear-to-must-have/>.

²²³ *Id.*

F. Why IAQ Remains Vital in a Post-COVID-19 Emergency World

1. COVID Is Still Very Much with Us

While COVID-19 may no longer be a public health emergency, it remains a serious threat to public health.²²⁴ The SARS-CoV-2 virus and the illness it creates, still called COVID-19 even after thousands of significant mutations, remains a serious threat to human health, both in the harm it causes on initial infection and the damage it leaves behind.²²⁵ It still accounts for a global increase in excess mortality the World Health Organization attributes directly to COVID-19.²²⁶

Above all, the virus that causes COVID-19 is new.²²⁷ Any hope it would be a self-limiting event or would naturally diminish in severity as more people became infected is gone.²²⁸ Instead, it mutates into equally serious varieties and remains the third leading cause of death in adults in the United States.²²⁹ Worse news is the increasing evidence that, because the virus is not limited to the lungs but rather attacks the body's circulatory system, it can damage any organ, whether the

²²⁴ Jennifer Rigby & Bhanvi Satija, *WHO Declares End to COVID Global Health Emergency*, REUTERS (May 7, 2023, 11:43 PM), [https://www.reuters.com/business/health-care-pharmaceuticals/covid-is-no-longer-global-health-emergency-who-2023-05-05/#:~:text=LONDON%2C%20May%205%20\(Reuters\),along%20with%20other%20infectious%20diseases](https://www.reuters.com/business/health-care-pharmaceuticals/covid-is-no-longer-global-health-emergency-who-2023-05-05/#:~:text=LONDON%2C%20May%205%20(Reuters),along%20with%20other%20infectious%20diseases).

²²⁵ See, e.g., *I Like to Be Safe, the COVID-19 Pandemic Is Not Over Yet*, WORLD HEALTH ORG., <https://www.who.int/southeastasia/outbreaks-and-emergencies/COVID-19/What-can-we-do-to-keep-safe/protective-measures/pandemic-not-over> [<https://perma.cc/KY6L-32RP>] (last visited Feb. 24, 2024); David Cox, *The Pandemic Isn't Over. Here's How to Stay Safe*, WIRED (Feb. 24, 2024), <https://www.wired.com/story/covid-19-isnt-over-how-to-stay-safe/>.

²²⁶ William Msemburi et al., *The WHO Estimates of Excess Mortality Associate with the COVID-19 Pandemic*, 613 NATURE 130 (2023), <https://www.nature.com/articles/s41586-022-05522-2> [<https://perma.cc/T3L2-JDT9>].

²²⁷ Yixuan Wang et al., *Unique Epidemiological and Clinical Features of the Emerging 2019 Novel Coronavirus Pneumonia (COVID-19) Implicate Special Control Measures*, 92 J. MED. VIROLOGY 568 (2020); Gloria Rosado, *What Makes This Coronavirus So Unique? A Look at the Virology of SARS-CoV-2*, BENCH PRESS (Apr. 9, 2020), <https://mgriblog.org/2020/04/09/what-makes-this-coronavirus-so-unique-a-look-at-the-virology-of-sars-cov-2/> [<https://perma.cc/7HDJ-J6CG>] (COVID-19 is both highly prevalent and highly transmissible).

²²⁸ Apoorva Mandavilli, *Reaching "Herd Immunity" Is Unlikely in the U.S., Experts Now Believe*, N.Y. TIMES (May 3, 2021), <https://www.nytimes.com/2021/05/03/health/covid-herd-immunity-vaccine.html>.

²²⁹ Bendix & Pettypiece, *supra* note 76.

initial infection was serious or not.²³⁰ In other words, even people with asymptomatic cases can have significant post-COVID damage to their brains, lungs, and kidneys.²³¹ Moreover, current mutations can infect those who have been vaccinated or infected by previous variants.²³² The situation regarding treating COVID-19 is equally grim. One by one, previously targeted effective treatments have become useless, leaving very few options beyond supportive care for millions of people infected in the United States and worldwide.²³³ Also, as people are infected with variant after variant, their immune system becomes depleted, leaving them vulnerable to other serious infections.²³⁴ There is growing evidence as well that infection with COVID-19 may accelerate diseases like cancer²³⁵ and multiple sclerosis.²³⁶ This evidence has become so strong many refer to infection's consequences as a mass disabling event.²³⁷ So, while the CDC continues to identify a long list of conditions that make people susceptible to severe harm, it seems increasingly likely that severe harm can come to anyone.²³⁸

²³⁰ Andrea Dennis et al., *Multi-Organ Impairment and Long COVID: A 1-Year Prospective, Longitudinal Cohort Study*, 116 J. ROYAL SOC'Y. MED. 97 (2023).

²³¹ *Id.*

²³² Focosi et al., *supra* note 61.

²³³ *Id.*

²³⁴ Anthony J. Leonardi et al., *Understanding the Effects of Age and T-Cell Differentiation on COVID-19 Severity: Implicating a Fas/FasL-Mediated Feed-Forward Controller of T-Cell Differentiation*, 13 FRONTIERS IMMUNOLOGY 1 (2022) (discussing how Covid-19's depletion of T cells, part of the immune system may account for long term suppression of the immune system, "[t]his mechanism may also, in part, describe an insidious lymphocyte depletion where there is chronic activation and loss of T populations in chronic infections with substantial bystander activation.").

²³⁵ Don Rauf, *Study Links Severe COVID-19 to Undetected Cancer*, EVERYDAY HEALTH (June 5, 2023), <https://www.everydayhealth.com/coronavirus/study-links-severe-covid-19-to-undetected-cancer/> [<https://perma.cc/Z9ZA-RNYB>]; Carolyn Barber, *Inside Long COVID's War on the Body: Researchers Are Trying to Find out Whether the Virus Has the Potential to Cause Cancer*, FORTUNE (Nov. 23, 2023), <https://fortune.com/2023/11/23/inside-long-covids-war-body-researchers-trying-find-out-virus-potential-cancer-carolyn-barber/> [<https://perma.cc/5NQV-6VB2>].

²³⁶ Chinta Sidharthan, *Does COVID-19 Accelerate the Worsening of Clinical Disabilities in Multiple Sclerosis Patients?*, NEWS MED. & LIFE SCI. (Feb. 24, 2023), <https://www.news-medical.net/news/20230224/Does-COVID-19-accelerate-the-worsening-of-clinical-disabilities-in-multiple-sclerosis-patients.aspx> [<https://perma.cc/FHJ5-5R6T>] (Overall, the findings suggested the occurrence and severity of SARS-CoV-2 infections significantly accelerated the worsening of neurological disabilities in multiple sclerosis patients).

²³⁷ Sabrina Moreno, *Long COVID Is Still Disabling Millions of Americans*, AXIOS (Oct. 6, 2022), <https://www.axios.com/2022/10/06/long-covid-cdc-data-disabling>.

²³⁸ Focosi et al., *supra* note 61.

Also, as COVID-19 continues to evolve, infection with one variant does not protect against being infected with another.²³⁹ The other feature that makes COVID-19 different from past threats is the high likelihood of causing serious disease. Also, there are few effective treatments.²⁴⁰ These features make COVID-19 a greater threat to individuals than other viruses, and their preexisting conditions make some more vulnerable.²⁴¹

The CDC, however, included a long list of conditions, extending far beyond immunocompromising conditions, that made people susceptible to severe harm from COVID-19.²⁴² The longer the coronavirus continues to infect people, the more evidence there is of long-term harm.²⁴³ As a result, more is known about the risk of being infected or reinfected with COVID-19 than was understood during the pandemic emergency when the focus was on the consequences of the initial illness.

2. Airborne Viruses Are on the Rise in the United States

Since the 2023–2024 school year began in the United States, there have been growing concerns that many serious viruses almost completely removed from circulation over the past sixty years are making a significant comeback. With the demonstrated drop in

²³⁹ Sarah C.P. Williams, “Natural Immunity” from Omicron Is Weak and Limited, *Study Finds*, GLADSTONE INST. (May 18, 2022), <https://gladstone.org/news/natural-immunity-omicron-weak-and-limited-study-finds> [<https://perma.cc/XS5S-Q7MY>].

²⁴⁰ Alexander James Spicer & Sirpa Jalkanen, *Why Haven’t We Found an Effective Treatment for COVID-19?*, 12 *FRONTIERS IMMUNOLOGY* 1 (2021); Salim S. Abdool Karim & Nikita Devnarain, *Time to Stop Using Ineffective COVID-19 Drugs*, 387 *NEW ENG. J. MED.* 654 (2022).

²⁴¹ Melody Schreiber, *Who Is Dying from COVID Now and Why?*, *SCI. AM.* (Nov. 16, 2022), <https://www.scientificamerican.com/article/who-is-dying-from-COVID-now-and-why/> [<https://perma.cc/TP2R-Q9SV>].

²⁴² *People with Certain Medical Conditions*, *CTRS. FOR DISEASE CONTROL & PREVENTION*, <https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/people-with-medical-conditions.html> [<https://perma.cc/QQC7-SLEK>] (last updated May 11, 2023).

²⁴³ *TODAY: Young People Are More Likely to Die of Heart Attacks Post-COVID, Study Finds. But Why?*, *CEDARS SINAI* (Mar. 3, 2023), <https://www.cedars-sinai.org/newsroom/today-young-people-are-more-likely-to-die-of-heart-attacks-post-COVID-study-finds-but-why/>; see also Press Release, Eur. Soc’y Cardiology, COVID-19 Patients Retain Elevated Risk of Death for at Least 18 Months After Infection (Jan. 19, 2023), <https://www.escardio.org/The-ESC/Press-Office/Press-releases/COVID-19-patients-retain-elevated-risk-of-death-for-at-least-18-months-after-inf> [<https://perma.cc/WCR6-Q8DB>]; Saima May Sidik, *Heart-Disease Risk Soars After COVID—Even with a Mild Case*, *NATURE* (Feb. 10, 2022), <http://dx.doi.org/10.1038/d41586-022-00403-0> [<https://perma.cc/C9TM-48QQ>].

vaccination rates among children, diseases like measles, whooping cough, mumps, rubella, and even chickenpox will inevitably be more prevalent in the air everyone breathes.²⁴⁴

This can also happen with viruses that can cause immediate damage. Measles, for example, directly damages the optic and auditory nerves and remains “the leading cause of blindness among children in low income countries, accounting for an estimated 15,000 to 60,000 cases of blindness per year.”²⁴⁵ But recently, scientists discovered it also permanently resets the immune system, leaving people vulnerable to infections from which they were permanently immune.²⁴⁶ Similarly, mumps can leave sterile up to 10% of boys who are infected before puberty.²⁴⁷

The case fatality rate of COVID-19, measured by the number of people who die within twenty eight days of diagnosis, varies considerably from country to country and according to characteristics of individuals, such as their vaccination status and underlying health.²⁴⁸ The CDC reports that in the United States, from April through June 2022, the overall death rate among those hospitalized for COVID-19 was 4.9%.²⁴⁹ But at the same time, it is increasingly evident that people who clear their initial infection may find themselves left with damage to an alarmingly large number of organs, including the brain.²⁵⁰ This means that even if they survive the initial infection, they may never

²⁴⁴ *Dispersion of Droplets in Environmental Transmission and Intervention Studies*, INST. OF HIGH PERFORMANCE COMPUTING (Jan. 1, 2021), <https://www.a-star.edu.sg/ihipc/ihipc-tech-hub/features/hhp/dispersion-of-droplets-in-environmental-transmission-and-intervention-studies> [<https://perma.cc/Q2UY-XPEM>].

²⁴⁵ Richard D. Semba & Martin W. Bloem, *Measles Blindness*, 49 SURV. OPHTHALMOLOGY 243 (2004).

²⁴⁶ Zaria Gorvett, *Measles: The Race to Understand “Immune Amnesia,”* BBC (Feb. 14, 2021), <https://www.bbc.com/future/article/20211112-the-people-with-immune-amnesia> [<https://perma.cc/Z7DR-2PAD>].

²⁴⁷ *Mumps – Complications*, NHS, <https://www.nhs.uk/conditions/mumps/complications/> [<https://perma.cc/E4YS-XGXE>] (last visited Feb. 24, 2024); Rajesh Verma & Rajarshi Chakraborty, *Post-Mumps Extrapyramidal Syndrome in a Young Child*, 24 ANNALS INDIAN ACAD. NEUROLOGY 593 (2021).

²⁴⁸ Edouard Mathieu et al., *Coronavirus Pandemic (COVID-19)*, OUR WORLD IN DATA, <https://ourworldindata.org/coronavirus> [<https://perma.cc/H426-TNNL>] (last visited Feb. 24, 2024).

²⁴⁹ Stacey Adjei et al., *Mortality Risk Among Patients Hospitalized Primarily for COVID-19 During the Omicron and Delta Variant Pandemic Periods – United States, April 2020 – June 2022*, 71 CTRS. FOR DISEASE CONTROL & PREVENTION 1182 (2022), https://www.cdc.gov/mmwr/volumes/71/wr/mm7137a4.htm?s_cid=mm7137a4_w [<https://perma.cc/Q3M2-JFND>] (“The risk for COVID-19-associated mortality increases with age, disability, and underlying medical conditions.”).

²⁵⁰ Dennis et al., *supra* note 230.

regain their previous levels of health.²⁵¹ COVID-19 causes harm long after it is no longer detectable.²⁵²

Yet another challenge is that there is still little consensus among the general public at this stage in the pandemic regarding their own risk of catching COVID-19 or suffering significant harm from infection.²⁵³ This is similar to denialism during the early days of the AIDS epidemic.²⁵⁴ Opinion polls show that people have developed their belief systems, supported by the information they choose or are led to see on social media, about who is and is not at risk.²⁵⁵ Another significant barrier to effectively stopping the spread of COVID-19 is the extent of

²⁵¹ Anthony N. van den Pol, *Viral Infection Leading to Brain Dysfunction: More Prevalent than Appreciated?*, 64 NEURON 17 (2009).

²⁵² Nicola Davis et al., *More than 1m People Report Long Covid in UK a Year After Infection*, THE GUARDIAN (Oct. 6, 2022), <https://www.theguardian.com/society/2022/oct/06/more-than-1m-people-report-long-covid-in-uk-a-year-after-infection> [<https://perma.cc/R8C6-E3FH>]; Ed Yong, *Long COVID Has Forced a Reckoning for One of Medicine's Most Neglected Diseases*, THE ATLANTIC (Sept. 26, 2022), <https://www.theatlantic.com/health/archive/2022/09/mecfs-chronic-fatigue-syndrome-doctors-long-SARS-CoV/671518/> [<https://perma.cc/CPE2-3XTJ>]; Moreno, *supra* note 237.

²⁵³ Sarah Dryhurst et al., *Risk Perceptions of COVID-19 Around the World*, 7 SPECIAL ISSUE J. RISK RSCH. 994 (2020).

²⁵⁴ In contrast, there was a persistent narrative in the early days of AIDS that it did not exist and the HIV virus did not cause disease. See, e.g., Noel King, *40 Years Later: The Denialism That Shaped the AIDS Epidemic*, NPR (May 18, 2021), <https://www.npr.org/2021/05/18/997783457/40-years-later-the-denialism-that-shaped-the-aids-epidemic> [<https://perma.cc/7W3K-FK49>]; see also Seth C. Kalichman et al., *"There Is No Proof That HIV Causes AIDS": AIDS Denialism Beliefs Among People Living with HIV/AIDS*, 33 J. BEHAV. MED. 432 (2010).

²⁵⁵ *Coronavirus Rumor Control*, FED. EMERGENCY MGMT. AGENCY, <https://www.fema.gov/disaster/coronavirus/rumor-control> [<https://perma.cc/CED7-WKRD>] (last updated May 15, 2023); Arthur E. Attema et al., *Beliefs and Risk Perceptions About COVID-19: Evidence from Two Successive French Representative Surveys During Lockdown*, 12 FRONT. PSYCHOL. 1 (2021); Mark É. Czeisler et al., *Public Attitudes, Behaviors, and Beliefs Related to COVID-19, Stay-at-Home Orders, Nonessential Business Closures, and Public Health Guidance - United States, New York City, and Los Angeles, May 5-12, 2020*, 69 MMWR MORB. MORTAL. WKLY. REP. 751 (2020); King, *supra* note 254; Kalichman et al., *supra* note 254.

deliberate disinformation.²⁵⁶ This includes ongoing disputes about its origin.²⁵⁷

Even a sterilizing vaccine's eventual existence is likely insufficient to bring a quick end to ongoing spread.²⁵⁸ Nor is there any expectation the virus will disappear on its own.²⁵⁹ So, given the reality COVID-19 is here to stay for the foreseeable future, it is important to understand the characteristics critical to developing an effective strategy to mitigate harm.

Another factor contributing to the challenge of controlling the spread of COVID-19 is that people exhale infectious particles before they feel symptoms or even test positive.²⁶⁰ In an October 2022 interview, Dr. Anthony Fauci cited the delay in recognizing the prevalence of asymptomatic spread as a major factor in its rapid spread.²⁶¹

²⁵⁶ *UN Tackles "Infodemic" of Misinformation and Cybercrime In COVID-19 Crisis*, UNITED NATIONS (Mar. 31, 2020), <https://www.un.org/en/un-coronavirus-communications-team/un-tackling-%E2%80%98infodemic%E2%80%99-misinformation-and-cybercrime-COVID-19> [<https://perma.cc/675Y-FY5Y>]; see also Tiffany Hsu, *As COVID-19 Continues to Spread, So Does Misinformation About It*, N.Y. TIMES (Dec. 28, 2022), <https://www.nytimes.com/2022/12/28/technology/covid-misinformation-online.html>; Erum Salam, *Majority of COVID Misinformation Came from 12 People, Report Finds*, THE GUARDIAN (July 17, 2021), <https://www.theguardian.com/world/2021/jul/17/COVID-misinformation-conspiracy-theories-ccdh-report> [<https://perma.cc/5MJQ-BZVV>].

²⁵⁷ *Updated Assessment on COVID-19 Origins*, NAT'L INTELLIGENCE COUNCIL, <https://www.dni.gov/files/ODNI/documents/assessments/Declassified-Assessment-on-COVID-19-Origins.pdf> [<https://perma.cc/V7FY-J7LQ>] (last visited Jan. 25, 2024); see also Elżbieta Kuźelewska & Mariusz Tomaszuk, *Rise of Conspiracy Theories in the Pandemic Times*, 35 INT'L J. SEMIOTICS L. 2373 (2022).

²⁵⁸ Scott Neuman, *Fauci Says COVID-19 Won't Go Away Like Smallpox, but Will More Likely Become Endemic*, NPR (Jan. 18, 2022), <https://www.npr.org/sections/coronavirus-live-updates/2022/01/18/1073802431/fauci-says-COVID-19-wont-go-away-like-smallpox> [<https://perma.cc/3CLJ-CJ9J>]; see also Charmaine Nero, *Several SARS-COV-19 Outbreaks Reported at Youth Camps Across the Country*, KARE (July 13, 2021, 5:30 PM), <https://www.kare11.com/article/news/health/coronavirus/several-SARS-CoV-19-outbreaks-reported-at-youth-camps-across-country/89-ef1536b9-7afb-4f19-b5af-d675ff8e0ec4> [<https://perma.cc/6FVC-ZBGF>]; Melissa Jenco, *CDC Confirms 226 Cases of Myocarditis After COVID-19 Vaccination in People 30 and Under*, AM. ASS'N PEDIATRICS (June 10, 2021), <https://publications.aap.org/aapnews/news/17152?autologincheck=redirected>.

²⁵⁹ Jeffery K. Taubenberger & David M. Morens, *Influenza: The Once and Future Pandemic*, 125 PUB. HEALTH REPS. 16 (2010); see also Beth Mole, *COVID May Have Pushed a Leading Seasonal Flu Strain to Extinction*, ARS TECHNICA (Sept. 30, 2022, 4:08 PM), <https://arstechnica.com/science/2022/09/COVID-may-have-pushed-a-leading-seasonal-flu-strain-to-extinction/> [<https://perma.cc/Q2VS-D68Y>]; *From Pandemic to Endemic: Why COVID-19 May Be Here to Stay*, NOVAVAX, <https://www.novavax.com/insights/pandemic-endemic-why-COVID-19-may-be-here-stay> [<https://perma.cc/LT48-LNSV>] (last visited Feb. 24, 2024).

²⁶⁰ Allyson M. Pollock & James Lancaster, *Asymptomatic Transmission of COVID-19*, 371 BMJ 1 (2020).

²⁶¹ Schmitt, *supra* note 101; Zee, *supra* note 101.

3. Novel Airborne Pathogens Remain an Ongoing Threat

The arrival of the virus that causes COVID-19 has brought renewed attention to a very old idea: the health of the nation as a whole has always played a vital role in maintaining national security.²⁶² This burden includes the threat to national security. On April 7, 2022, Professor Oona Hathaway pointed out the nation's health was generally a national security issue such that "we should recognize that U.S. national security is put at risk by our inadequate health care system."²⁶³ Pointing to the already rising death rates, lost hours of employment, and delay in seeking care for other chronic illnesses resulting from COVID-19, she argued that "we should broaden the lens of national security [beyond Terrorism] to think about 'more pressing threats to American lives'" such as the "serious global threats to human life" from "[p]andemics, other public health threats, and climate change."²⁶⁴ Aftereffects of COVID-19 can impair the ability of individual soldiers to return to active duty.²⁶⁵ In the long term, it may ripple effect throughout the veteran's health system.²⁶⁶

Another area of uncertainty is the health of potential future recruits.²⁶⁷ Preventing infectious disease has been a core function of the U.S. government since the nation's founding. The U.S. Army Medical Research and Development Command (USAMRDC) traces the military's involvement: "George Washington's Continental Army Soldiers were inoculated against smallpox in 1777, setting a precedent

²⁶² Colin P. Clarke & Louis Klarevas, *COVID-19 Is a Threat to National Security. Let's Start Treating It as Such*, JUST SECURITY (Aug. 6, 2020), <https://www.justsecurity.org/71870/SARS-CoV-19-is-a-threat-to-national-security-lets-start-treating-it-as-such/> [https://perma.cc/V663-4V5A].

²⁶³ Oona Hathaway, *COVID-19 Shows How the U.S. Got National Security Wrong*, JUST SECURITY (Apr. 7, 2020), <https://www.justsecurity.org/69563/covid-19-shows-how-the-u-s-got-national-security-wrong/> [https://perma.cc/Y4T4-6JBX].

²⁶⁴ *Id.*

²⁶⁵ Giovanni Andrea Gerardo Cramer et al., *Reduced Maximal Aerobic Capacity After COVID-19 in Young Adult Recruits, Switzerland, May 2020*, 25 *EUROSURVEILLANCE* 10 (2020).

²⁶⁶ *Whole Health System Approach to Long COVID*, U.S. DEPT OF VETERANS AFFS. (Aug. 1, 2022), https://www.publichealth.va.gov/n-coronavirus/docs/Whole-Health-System-Approach-to-Long-COVID_080122_FINAL.pdf [https://perma.cc/PZ4V-Z65D].

²⁶⁷ Meghann Myers, *The Ban on COVID-19 Survivors Joining up Has Lifted, But Some Cases Could Still Be Denied*, *MILITARY TIMES* (May 21, 2020), <https://www.militarytimes.com/news/your-military/2020/05/21/the-ban-on-covid-19-survivors-joining-up-has-lifted-but-some-cases-could-still-be-denied/> [https://perma.cc/22MA-CKAS].

for future mass immunizations.”²⁶⁸ It further describes its mission as “[e]nsuring our armed forces remain in optimal health and are equipped to protect themselves from disease and injury, particularly on the battlefield.”²⁶⁹ It is only one of many divisions within the U.S. military devoted to maintaining the force’s and the public’s health. For example, the USAMRIID was founded in 1969 to support “disease outbreak investigations across the nation and around the globe.”²⁷⁰ COVID-19 has negatively affected troop fitness beyond the number of individuals infected.²⁷¹ COVID-19 outbreaks have hit Navy ships particularly hard, requiring sailors to leave active service.²⁷² The USAMRDC is also tracking the consequences of COVID-19 infection for active duty sailors.²⁷³

²⁶⁸ *Command History*, USAMRDC, <https://mrdc.health.mil/index.cfm/about/history> [<https://perma.cc/JJ5S-RTU6>] (last visited Feb. 24, 2024). For more information about George Washington’s Smallpox inoculation program, see Janet A. Aker, *Gen. George Washington Ordered Smallpox Inoculations for All Troops*, MIL. HEALTH SYS. (Aug. 16, 2021), <https://www.health.mil/News/Articles/2021/08/16/Gen-George-Washington-Ordered-Smallpox-Inoculations-for-All-Troops> [<https://perma.cc/5894-ZXHZ>]; see also *Smallpox, Inoculation, and the Revolutionary War*, U.S. NAT’L PARK SERV., <https://www.nps.gov/articles/000/smallpox-inoculation-revolutionary-war.htm> [<https://perma.cc/EL5B-6ZP2>] (last visited Feb. 24, 2024).

²⁶⁹ *Employment*, USAMRDC, <https://mrdc.health.mil/index.cfm/resources/employment> [<https://perma.cc/PPG2-V5BD>] (last visited Feb. 24, 2024).

²⁷⁰ *Infectious Disease Response*, USAMRIID, <https://usamriid.health.mil/> (last visited Feb. 29, 2023); see also Sylvie McNamara, *Inside the High-Security Lab Where Scientists Are Fighting the Next Pandemic*, WASHINGTONIAN (Jan. 10, 2023), <https://www.washingtonian.com/2023/01/10/fighting-the-next-pandemic-inside-usamriid/> [<https://perma.cc/H26Z-RCL2>]. For a memo outlining the military’s public health response resources, see *Dod Instruction 6200.03 Public Health Emergency Management (Phem) within the Dod*, DEP’T OF DEFENSE, <https://www.esd.whs.mil/Portals/54/Documents/DD/issuances/dodi/620003p.pdf> [<https://perma.cc/U4K6-56B4>] (last visited Feb. 24, 2024).

²⁷¹ *COVID-19 Presents Challenges to Heart Health, Physical Fitness*, MILITARY HEALTH (Feb. 1, 2021), <https://www.health.mil/News/Articles/2021/02/01/COVID-19-presents-challenges-to-heart-health-and-physical-fitness> (“Due to on-again, off-again shutdowns [sic] resulting from the COVID-19 pandemic, the overall health of both military personnel and beneficiaries has taken a hit over the last year.”).

²⁷² Gina Harkins, *Navy Is Hardest-Hit Military Service in Coronavirus Outbreak*, MILITARY.COM (Mar. 25, 2020), <https://www.military.com/daily-news/2020/03/25/navy-hardest-hit-military-service-coronavirus-outbreak.html> [<https://perma.cc/C3U7-TCRT>].

²⁷³ Mary Anne Dunkin, *Navy Study Suggests Post COVID-19 Symptoms Can Affect Military Readiness*, U.S. MED. (Oct. 19, 2021), <https://www.usmedicine.com/clinical-topics/cardiology/navy-study-suggests-post-COVID-19-symptoms-can-affect-military-readiness/> [<https://perma.cc/WC98-78XP>].

4. *Vaccines Are Not Enough to Prevent Transmission of the COVID-19 Virus*

While the COVID-19 virus' extraordinary ability to mutate faster than new vaccines could be developed, it is particularly concerning that vaccination alone is seldom an effective solution for stopping the spread of any infectious disease.²⁷⁴ By March 2020, it was becoming apparent that earlier views of how far the virus could transmit from person to person were underestimating its transmissibility and ability to travel.²⁷⁵

III

CREATING A FRAMEWORK FOR ADVOCACY: STRATEGIES TO STOP THE SPREAD OF AIRBORNE INFECTIOUS DISEASE – TURNING SCIENTIFIC DISCOVERIES INTO LAW

This Section provides an overview of the federal legislative schema that points out how much change would have to happen for federal legislation to incorporate indoor air quality standards to prevent infection.

Even the most dramatic scientific breakthrough requires developing deliberate legal strategies before it can be deployed in ways that benefit the population. Recent examples from product safety, such as limiting the use of pesticides in apple juice²⁷⁶ or mandating the inclusion of airbags in cars, show us that there is always a period between discovering a health hazard and its eventual mitigation.²⁷⁷ However, these examples of dramatic adoption of sweeping public health reforms are from an era where both Congress and the U.S. Supreme Court had very different views about the role of the government in protecting the

²⁷⁴ *Sterilizing Immunity*, SCIEDIRECT, <https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/sterilizing-immunity> [<https://perma.cc/LBD3-LETA>] (last visited Feb. 24, 2024). Focosi et al., *supra* note 61.

²⁷⁵ Leonardo Setti et al., *Airborne Transmission Route of COVID-19: Why 2 Meters/6 Feet of Inter-Personal Distance Could Not Be Enough*, 17 INT'L J. ENVT'L RSCH. PUB. HEALTH 8 (2020).

²⁷⁶ Elliot Negin, *The Alar Scare Was Real*, PBS, <https://www.pbs.org/tradesecrets/docs/alarscarenegin.html> [<https://perma.cc/9WE4-N8X6>] (last visited Feb. 24, 2024).

²⁷⁷ *Federal Legislation Makes Airbags Mandatory*, HISTORY, <https://www.history.com/this-day-in-history/federal-legislation-makes-airbags-mandatory> [<https://perma.cc/YEG6-EAS3>] (last visited Feb. 24, 2024).

public's health.²⁷⁸ While the Court's jurisprudence is still developing, these last two terms have made it deeply skeptical of federal power.²⁷⁹ This means the Court will scrutinize both Congress' authority to implement laws intended to protect health and safety and all agency action that exceeds whatever authority those laws delegate.²⁸⁰

A. Historical Examples of Federal Standard Setting in the Absence of Legislation

While some public health reforms, like the environmental laws discussed *infra*, did come directly from public advocacy, the federal government has exerted considerable influence by setting standards without enforcing them.²⁸¹ While it may seem as if earlier public health reform movements, such as those that led to the ban on smoking, brought regulatory change, that is not the case.²⁸² Surgeon General Luther L. Terry's issued the now famous Surgeon General's report linking smoking to cancer was issued on June 11, 1964.²⁸³ But it was not until June 2009 that Congress finally gave the Food and Drug Administration (FDA) authority "to regulate the manufacture, distribution, and marketing of tobacco products."²⁸⁴ Almost thirty-four

²⁷⁸ See Joshua N. Auerbach & Joshua M. Sharfstein, *The Supreme Court's New Direction and the Public's Health*, 3 JAMA HEALTH FORUM e222978 (2022); *Two Centuries of Law Guide Legal Approach to Modern Pandemic*, AM. BAR ASS'N, <https://www.americanbar.org/news/abanews/publications/youraba/2020/youraba-april-2020/law-guides-legal-approach-to-pandemic/> (last visited Feb. 24, 2024).

²⁷⁹ Jennifer S. Bard, *The Bind We're In—and How the Supreme Court Put Us There*, BILL OF HEALTH (Mar. 14, 2022), <https://blog.petrieflom.law.harvard.edu/2022/03/14/supreme-court-overreach-COVID-pandemic/> [<https://perma.cc/39T2-NH3F>].

²⁸⁰ *Id.*

²⁸¹ *Regulatory Quality and COVID-19: Managing the Risks and Supporting the Recovery*, OECD, [https://www.oecd.org/regreform/regulatory-policy/Regulatory-Quality-and-Coronavirus%20-\(COVID-19\)-web.pdf](https://www.oecd.org/regreform/regulatory-policy/Regulatory-Quality-and-Coronavirus%20-(COVID-19)-web.pdf) [<https://perma.cc/V637-59NT>] (last visited Feb. 24, 2024).

²⁸² Jean C. O'Connor et al., *Preemption of Local Smoke-Free Air Ordinances: The Implications of Judicial Opinions for Meeting National Health Objectives*, 36 J.L. MED. & ETHICS 403 (2008) (recounting the slow process of implementing state and municipal indoor smoking bans).

²⁸³ *History of the Surgeon General's Reports on Smoking and Health*, CDC, <https://www.cdc.gov/tobacco/sgr/history/index.htm> [<https://perma.cc/3BT6-8R5B>] (last visited Aug 16, 2023).

²⁸⁴ *Family Smoking Prevention and Tobacco Control Act – an Overview*, U.S. FOOD & DRUG ADMIN. (June 30, 2022), <https://www.fda.gov/tobacco-products/rules-regulations-and-guidance/family-smoking-prevention-and-tobacco-control-act-overview>. See also *Remarks by the President at the Signing of the Family Smoking Prevention and Tobacco Control Act*, THE WHITE HOUSE (June 22, 2009), <https://obamawhitehouse.archives.gov/the-press-office/remarks-president-signing-family-smoking-prevention-and-tobacco-control-act> [<https://perma.cc/6RT3-M4E7>].

years later, in 1993, the EPA issued its first statement that secondhand (or passive smoking) was a “known human carcinogen.”²⁸⁵ Today, the American Lung Association has convinced only twenty-eight out of fifty states to pass smoke-free air laws.²⁸⁶ Another example of the federal government’s success in improving health using voluntary guidelines is the FDA’s food fortification program.²⁸⁷ The program began in 1920 with regulations requiring the addition of iodine to commercially available salt.²⁸⁸ But after a report identifying “the poor nutritional status of many young adults” drafted into the military in 1940, President Franklin D. Roosevelt called on “nutritionists and other health professionals to initiate unified programs that would improve the national nutritional status.”²⁸⁹ Today, the FDA identifies the “maintenance of a desirable level of nutritional quality in the nation’s food supply” as “an important public health objective.”²⁹⁰ While not all of the FDA’s recommendations are mandatory, some are in that they are incorporated into the legal standard for that product.²⁹¹ The nonbinding status of FDA food fortification guidelines means that

²⁸⁵ Press Release, U.S. Env’t Prot. Agency, EPA Designates Passive Smoking a “Class A” or Known Human Carcinogen (Jan. 7, 2013), <https://www.epa.gov/archive/epa/aboutepa/epa-designates-passive-smoking-class-or-known-human-carcinogen.html> [<https://perma.cc/Z8YC-SU3M>].

²⁸⁶ *What Makes Indoor Air Unhealthy*, AM. LUNG ASS’N, <https://www.lung.org/clean-air/at-home/indoor-air-pollutants> [<https://perma.cc/L6J6-QCNC>] (last visited Feb 24, 2024). See, e.g., *STATE System E-Cigarette Fact Sheet, Ctrs. for Disease Control and Prevention* (Mar. 31, 2023), <https://www.cdc.gov/statesystem/factsheets/ecigarette/ECigarette.html> [<https://perma.cc/2CF2-4A7H>] (The “CDC defines a state smokefree air law as comprehensive if it prohibits smoking in indoor areas of private worksites, restaurants, and bars.”).

²⁸⁷ *Questions and Answers on FDA’s Fortification Policy: Guidance for Industry*, U.S. FOOD & DRUG ADMIN., <https://www.fda.gov/media/94563/download> (last visited Feb. 24, 2024).

²⁸⁸ David Bishai & Ritu Nalubola, *The History of Food Fortification in The United States: Its Relevance for Current Fortification Efforts in Developing Countries*, 51 *ECON. DEV. CULT. CHANGE* 37 (2002). See also *Overview of Food Fortification in The United States and Canada*, NAT’L LIB. OF MED., <https://www.ncbi.nlm.nih.gov/books/NBK208880/> [<https://perma.cc/S78D-UFWJ>] (last visited Feb. 24, 2024).

²⁸⁹ JUDITH A. QUICK & ELIZABETH W. MURPHY, *THE FORTIFICATION OF FOODS: A REVIEW* 4 (1962), <https://naldc.nal.usda.gov/download/CAT87209052/pdf>.

²⁹⁰ 21 C.F.R. § 104.20(a) (2019).

²⁹¹ For example, 21 C.F.R. § 137.165 specifies the amount of thiamin, riboflavin, niacin, iron, and folic acid that must be contained in order for a product to be labeled as “enriched flour.”

they are not as successful as possible.²⁹² However, they are credited with dramatic improvements in public health, like decreasing the number of babies born with neural tube defects “by 35% in the United States, since folic acid fortification was required in 1998.”²⁹³

B. Constitutional Limits on the Federal Government’s Ability to Protect the Public’s Health

The 2022–2023 Supreme Court term, the first with its current composition, has been marked by a continuation of its agenda to undermine the federal administrative state.²⁹⁴ The Court has consistently rejected actions by federal agencies citing never before used doctrines of its creation.²⁹⁵

Throughout the COVID-19 public health emergency, the Supreme Court has blocked the federal government’s efforts to use its executive branch powers to prevent the spread of disease and support those affected by the pandemic. By the time a federal district court judge in Florida struck down the CDC’s requirement for wearing masks on public transportation, the administration’s recognition of its powerlessness was demonstrated by its decision not to file what should have been a routine appeal. As a result, individual airlines made their own decisions about whether to require masking.²⁹⁶ Almost all U.S. carriers acted quickly to drop the requirement, many while in midair.²⁹⁷

²⁹² See Cristina Marago Franco & Eva Greenthal, *Failure to Fortify*, CTR. FOR SCIENCE IN THE PUB. INT., https://www.cspinet.org/sites/default/files/2023-02/CSPI_FailureToFortify_Eng_2023_final.pdf (last visited Feb. 24, 2024) (Food companies thwarting success of FDA fortification policy by not adding folic acid to corn flour products).

²⁹³ *Key Findings: Folic Acid Fortification Continues to Prevent Neural Tube Defect*, CTRS. FOR DISEASE CONTROL & PREVENTION (June 17, 2022), <https://www.cdc.gov/nceh/ncbddd/folicacid/features/folicacid-prevents-ntds.html> [<https://perma.cc/W6Q3-3PP6>].

²⁹⁴ Adam Liptak, *Supreme Court Strips Federal Government of Crucial Tool to Control Pollution*, N.Y. TIMES (July 1, 2022), <https://www.nytimes.com/live/2022/06/30/us/supreme-court-epa> [<https://perma.cc/FY6L-WTB8>] (last visited Jul 19, 2022).

²⁹⁵ See, e.g., Coffee, Jr. et al., *supra* note 12.

²⁹⁶ See Timothy S. Jost, *Federal Judge Eliminates the CDC’s Public Transportation Mask Mandate* (Apr. 27, 2022), <https://www.commonwealthfund.org/blog/2022/federal-judge-eliminates-cdcs-public-transportation-mask-mandate> [<https://perma.cc/AVT9-QPU2>]; Jonathan Franklin & Bill Chappell, *These Airlines Are Dropping Mask Mandates After a Federal Judge’s Ruling*, NPR (Apr. 18, 2022), <https://www.npr.org/2022/04/18/1093451075/masks-optional-airlines-travel> [<https://perma.cc/EY2U-VRUB>].

²⁹⁷ For information on countries still require masking on airlines, see Michelle Baran, *These Are the Airlines That Still Require Masks Onboard*, AFAR MEDIA (Feb. 3, 2023), <https://www.afar.com/magazine/which-airlines-require-masks> [<https://perma.cc/5LU5-E25Q>].

In addition to the many divisions of the Department of Health and Human Services, Congress has scattered the responsibility for creating and enforcing health standards throughout the entire federal government. Sometimes, an agency oversees a specific location, such as the workplace and schools. In other instances, an agency has responsibility for specific hazards from agriculture,²⁹⁸ radiation,²⁹⁹ bioterrorism,³⁰⁰ or material from outer space.³⁰¹ The White House has recently taken the lead in bringing together resources from different parts of the federal government responsible for some aspects of indoor air quality.³⁰² The Biden administration has consistently supported efforts to prevent the spread of COVID-19 by adopting air filtration.³⁰³ The EPA has issued guidance with recommended school air quality standards.³⁰⁴

²⁹⁸ *USDA Agricultural Air Quality Task Force*, U.S. DEP'T OF AGRIC. NAT. RES. CONSERVATION SERV., <https://www.nrcs.usda.gov/conservation-basics/natural-resource-concerns/air/usda-agricultural-air-quality-task-force> [<https://perma.cc/K45Z-CE4M>] (last visited Feb. 24, 2024).

²⁹⁹ *Policies, Standards, Guidance, and Statutes*, U.S. DEP'T OF ENERGY, <https://www.energy.gov/ehss/policies-standards-guidance-and-statutes> [<https://perma.cc/DG6X-EJWG>] (last visited Feb. 24, 2024).

³⁰⁰ *Homeland Security and the Indoor Environment*, ENV'T PROT. AGENCY, <https://www.epa.gov/indoor-air-quality-iaq/homeland-security-and-indoor-environment> [<https://perma.cc/H9EN-94JA>] (last updated Aug. 15, 2023).

³⁰¹ *Planetary Protection*, NAT'L AERONAUTICS & SPACE ADMIN., <https://sma.nasa.gov/sma-disciplines/planetary-protection> [<https://perma.cc/PP9E-76C2>] (last visited Feb. 24, 2024) (NASA's office of Planetary Protection is responsible for "[p]rotecting solar system bodies from contamination by Earth life and protecting Earth from possible life forms that may be returned from other solar system bodies.").

³⁰² *Fact Sheet: Departments and Agencies Commit to Cleaner Indoor Air Across the Nation*, THE WHITE HOUSE (Dec. 8, 2022), <https://www.whitehouse.gov/ostp/news-updates/2022/12/08/fact-sheet-departments-and-agencies-commit-to-cleaner-indoor-air-across-the-nation/> [<https://perma.cc/UJ44-V9CS>].

³⁰³ Jennifer S. Bard, *Providing Clean Air in Indoor Spaces: Moving Beyond Accommodations Towards Barrier Removal*, BILL OF HEALTH (Apr. 1, 2022), <https://blog.petrieflom.law.harvard.edu/2022/04/01/clean-air-ada-barrier-removal/> [<https://perma.cc/5LGP-EFLQ>].

³⁰⁴ *Improving Ventilation in Schools, Colleges, and Universities to Prevent COVID-19*, U.S. DEPT. OF EDUC., <https://www.ed.gov/improving-ventilation-schools-colleges-and-universities-prevent-covid-19> [<https://perma.cc/M54M-ZS3E>] (last visited Feb. 24, 2024).

*1. Setting Standards for Schools and Hospitals as Workplaces:
OSHA's Role*

In addition to their role as service providers, hospitals are also workplaces.³⁰⁵ However, Congress has never explicitly authorized the Occupational Health and Safety Act of 1970 to pass air quality standards to protect employees from infection in the hospitals where they work.³⁰⁶ This gap was exploited during the pandemic emergency when the U.S. Supreme Court rejected the Biden administration's attempt to implement a policy that would protect all workers covered by OSHA by requiring their fellow employees either wear a respirator or be vaccinated against COVID-19.³⁰⁷

Before COVID-19, OSHA standards for indoor air quality addressed issues specific to toxins generated by the employer's activities.³⁰⁸ The arrival of COVID-19, however, triggered new concerns about the spread of disease among employees in workplaces that did not deliver health care or routinely manage biohazards.

On June 21, 2021, early in the pandemic, "OSHA published an interim final rule establishing an emergency temporary standard (ETS) to protect healthcare and healthcare support service workers from occupational exposure to COVID-19 in settings where people with COVID-19 are reasonably expected to be present."³⁰⁹ Then, on April

³⁰⁵ Bruce Rolfsen, *Worker, Business Groups Push to Influence Health-Care Covid Rule*, BLOOMBERG L. (Jan. 3, 2023), <https://news.bloomberglaw.com/safety/worker-business-groups-push-to-influence-health-care-COVID-rule> [<https://perma.cc/H6W2-ZDEC>].

³⁰⁶ See, e.g., *Law and Regulations*, OCCUPATIONAL SAFETY & HEALTH ADMIN., <https://www.osha.gov/laws-regs> [<https://perma.cc/82KK-KJGW>] (last visited Feb. 24, 2024); Occupational Safety and Health Act of 1970, Pub. L. No. 91-596, 84 Stat. 1590 (OSHA's mission is "to assure safe and healthful working conditions for working men and women; by authorizing enforcement of the standards developed under the Act; by assisting and encouraging the States in their efforts to assure safe and healthful working conditions; by providing for research, information, education, and training in the field of occupational safety and health. . . .").

³⁰⁷ *Nat'l Fed'n of Indep. Bus. v. DOL*, 595 U.S. 109 (2022) (The Court found OSHA's power to protect workers from airborne hazards was limited to those of the employer's own creation).

³⁰⁸ *Indoor Air Quality – Overview*, OCCUPATIONAL SAFETY & HEALTH ADMIN., <https://www.osha.gov/indoor-air-quality#:~:text=The%20quality%20of%20indoor%20air,%2C%20nose%2C%20throat%20and%20lungs> [<https://perma.cc/TU3W-K7WV>] (last visited Feb. 24, 2024).

³⁰⁹ *COVID-19 Healthcare Rulemaking*, OCCUPATIONAL SAFETY & HEALTH ADMIN., <https://www.osha.gov/coronavirus/healthcare/rulemaking> [<https://perma.cc/FXD4-H3B4>] (last visited Feb. 24, 2024). See also *Nat'l Fed'n of Indep. Bus.*, 595 U.S. at 117. See generally *Supreme Court Stays OSHA Vaccine-or-Testing Mandate*, GIBSON DUNN (Jan. 13, 2022), <https://www.gibsondunn.com/supreme-court-stays-osha-vaccine-or-testing>

27, 2022, OSHA held a hearing to consider implementing its rules to protect healthcare workers from exposure to COVID-19.³¹⁰ At that hearing, OSHA heard testimony reflecting current scientific opinions that while healthcare workers faced greater risks because of more consistent exposure to COVID-19, they also faced the same risks as other employers from airborne particles emitted by patients, staff, and visitors.³¹¹ The standoff between OSHA and the CDC regarding establishing indoor air standards was broken when the CDC announced its first indoor air quality standards on May 11, 2023.

C. Gaps in Federal Environmental Law

There is not now, nor has there ever been, any federal law targeting indoor air quality (IAQ). Addressing threats to health from the environment has always and continues to require public support. The federal laws that today create a “comprehensive regulatory infrastructure to protect the environment” were passed in “a veritable avalanche of public interest legislation” between 1970–1990.³¹² This link to public opinion is exemplified by the very existence of the EPA, which implements, interprets, and enforces existing federal laws. Congress created it based on a proposal by then President Richard Nixon to administer these newly passed laws.³¹³

-mandate/ [https://perma.cc/3BR9-7VQJ] (“The vaccine-or-testing mandate should be stayed because OSHA likely lacks the statutory authority to adopt the vaccine-or-test mandate in the absence of an unmistakable delegation from Congress.”).

³¹⁰ SCOTT D. SZYMENDERA, CONG. RSCH. SERV., R46288, OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA): COVID-19 EMERGENCY TEMPORARY STANDARDS (ETS) ON HEALTH CARE EMPLOYMENT AND VACCINATIONS AND TESTING FOR LARGE EMPLOYERS (2022).

³¹¹ *Transcripts from Day 1 of OSHA’s Informal Rulemaking Hearing for Occupational Exposure to COVID-19 in Healthcare Settings*, REGULATIONS.GOV (Apr. 27, 2022), https://www.regulations.gov/document/OSHA-2020-0004-2153 [https://perma.cc/UV6B-BPQP].

³¹² Robert V. Percival, *Environmental Legislation and the Problem of Collective Action*, 9 DUKE ENV’T L. & POL’Y F. 9 (1998).

³¹³ See *Reorganization Plan No. 3 of 1970*, ENV’T PROT. AGENCY (July 9, 1970), https://www.epa.gov/archive/epa/aboutepa/reorganization-plan-no-3-1970.html [https://perma.cc/3ZW2-W7LV] (The laws it passed related to the environment are administered by an agency created at the suggestion of President Richard Nixon who on July 9, 1970, in response to growing concerns about the threat to human health from industrial pollutants, sent to Congress a plan to consolidate many environmental responsibilities of the federal government under one agency, a new Environmental Protection Agency); *EPA History*, ENV’T PROT. AGENCY, https://www.epa.gov/history [https://perma.cc/Q3SV-RJJP] (last visited Feb. 24, 2024). For an account of the historical events triggering an increased

New scientific discoveries do not automatically trigger new health and safety standards.³¹⁴ For example, concern about the increasing presence of toxic per- and polyfluoroalkyl substances (PFAS) in drinking water began in the 1970s, and no legislation has been passed to limit its presence in drinking water directly.³¹⁵ In the same way, growing scientific evidence of the link between burning fossil fuels and global warming has not been translated into federal law.³¹⁶ Moreover, in the current antiregulatory climate, it is unlikely the EPA could adopt rules or regulations that in any way extend the authority specifically given to it by Congress.³¹⁷ Specifically, the Supreme Court in *West Virginia v. EPA* nullified a regulation to encourage clean energy. It was “highly unlikely that Congress would leave” to “agency discretion . . . balancing the many vital considerations of national policy implicated in deciding how Americans will get their energy.”³¹⁸ This hostility to

national concern about the environment, see *Environment*, TIME, Feb. 9, 1970, at 47, <https://time.com/vault/issue/1970-02-09/page/48/> [<https://perma.cc/XES2-XS9S>]. For a detailed first-hand account of the factors leading to President Nixon’s actions, see Press Release, Env’t Prot. Agency, EPA’s First Administrator on the Establishment of EPA (Dec. 16, 1970), <https://www.epa.gov/archive/epa/aboutepa/epas-first-administrator-establishment-epa.html> [<https://perma.cc/Z7PW-H4TQ>]. For an explanation of the role of federal agencies in implementing congressional intent, see SCOTT BURRIS ET AL., THE NEW PUBLIC HEALTH LAW: A TRANSDISCIPLINARY APPROACH TO PRACTICE AND ADVOCACY 138–39 (2nd ed. 2023).

³¹⁴ EPA Announces New Drinking Water Health Advisories for PFAS Chemicals, \$1 Billion in Bipartisan Infrastructure Law Funding to Strengthen Health Protections, ENV’T PROT. AGENCY (June 15, 2022), <https://www.epa.gov/newsreleases/epa-announces-new-drinking-water-health-advisories-pfas-chemicals-1-billion-bipartisan> [<https://perma.cc/UE4V-8WJD>].

³¹⁵ See Nicole Marie Brennan et al., *Trends in the Regulation of Per- and Polyfluoroalkyl Substances (PFAS): A Scoping Review*, 18 INT’L. J. ENV’T. RSCH. PUB. HEALTH (2021).

³¹⁶ For a perspective on why the United States has been so slow to adopt laws addressing climate change, see Jeffrey Pierre & Scott Neuman, *How Decades of Disinformation About Fossil Fuels Halted U.S. Climate Policy*, NPR (Oct. 27, 2021, 10:35 AM), <https://www.npr.org/2021/10/27/1047583610/once-again-the-u-s-has-failed-to-take-sweeping-climate-action-heres-why> [<https://perma.cc/T8Y9-3RGV>]. See also *Climate Change Regulatory Actions and Initiatives*, ENV’T PROT. AGENCY, <https://www.epa.gov/climate-change/climate-change-regulatory-actions-and-initiatives> [<https://perma.cc/9DWR-VT7Z>] (last updated Feb. 1, 2024).

³¹⁷ See Adam Liptak, *Supreme Court Limits E.P.A.’s Ability to Restrict Power Plant Emissions*, N.Y. TIMES (June 30, 2022), <https://www.nytimes.com/2022/06/30/us/epa-carbon-emissions-scotus.html?smid=url-share> [<https://perma.cc/5JPQ-PYRC>].

³¹⁸ *W. Va. v. EPA*, 142 S. Ct. 2587, 2612–13 (2022) (“There is little reason to think Congress assigned such decisions to the Agency” or that “Congress implicitly tasked it, and it alone, with balancing the many vital considerations of national policy implicated in deciding how Americans will get their energy We also find it highly unlikely that Congress would leave [to] agency discretion the decision of how much coal based generation there should be over the coming decades.”).

an agency's attempt to extend the authority given to it by Congress was confirmed in *Biden v. Nebraska*, where the Court again rejected the EPA's regulatory initiative, writing that "the question here is not whether something should be done; it is who has the authority to do it."³¹⁹ Congress has given the EPA both civil and criminal authority to enforce the laws for which it is responsible.³²⁰

While invoking federal laws that regulate the presence of harmful particles in the air may seem to be the most effective way of improving indoor air quality, federal laws are nearly useless because they specifically exclude indoor air regulation and have been consistently interpreted to exclude natural phenomena. Without legislation specific to indoor air quality and infection control, the EPA, as part of the executive branch of government, cannot act without congressional authority to generate binding standards, but it can provide guidance.³²¹ For the EPA to implement enforceable regulations mandating compliance with the CDC's IAQ standards, it would have to pass a new law specifically granting EPA authority over indoor air.³²²

1. The Distinction Between "Indoor" and "Ambient" Air

No federal law enforced by the EPA establishes or enforces any indoor air quality standards. The federal government still has no comprehensive indoor air legislation.³²³

³¹⁹ *Biden v. Neb.*, 600 U.S. 477, 501 (2023).

³²⁰ *Criminal Enforcement*, ENV'T PROT. AGENCY, <https://www.epa.gov/enforcement/criminal-enforcement> [<https://perma.cc/G7L8-3W45>] (last updated Feb. 12, 2024).

³²¹ *The Basics of the Regulatory Process*, ENV'T PROT. AGENCY, <https://www.epa.gov/laws-regulations/basics-regulatory-process> [<https://perma.cc/XJ6U-LHKL>] (last updated Sept. 6, 2023).

³²² For an example of a new environmental law that expanded the authority of the EPA, see 15 U.S.C. §§ 2601–2697.

³²³ Arnold W. Reitze & Sheryl-Lynn Carof, *The Legal Control of Indoor Air Pollution*, 25 B.C. ENV'T. AFFS. L. REV. 247, 249, 254 (1998) ("Indoor air pollution may pose a greater danger to health than pollution of ambient air because people spend up to ninety percent of their time indoors") ("The CAA provides very little protection for those exposed to indoor air pollution. The CAA improves indoor air indirectly through its programs to lower the concentrations of air pollution in the outdoor or ambient air"). There are more than 20 federal agencies with some responsibility for indoor air quality, some because of their statutory responsibilities and some because they are included among the regulated entities. An Interagency Committee of Indoor Air Quality (CIAQ) coordinates activities. It is co-chaired by EPA, the Consumer Product Safety Commission, the Department of Energy, the National Institute for Occupational Safety and Health, and the Occupational Safety and Health Administration. See Bob Axelrad, *Improving IAQ: EPA's Program*, 19 EPA J. 14, 17 (1993).

The first comprehensive federal law related to air quality was the 1963 Clean Air Act, which “established a federal program within the U.S. Public Health Service and authorized research into techniques for monitoring and controlling air pollution.”³²⁴ Today, issues involving air quality are regulated by the 1990 Clean Air Act (CAA).³²⁵ The CAA authorizes the EPA to establish a base for all air quality that sets limits on those who engage in activities that emit air pollutants.³²⁶ These limits set maximum levels of concentrations of various pollutants.³²⁷ They apply to “that portion of the atmosphere, external to buildings, to which the general public has access.”³²⁸ Once the EPA sets these limits, they are enforced by local environmental protection agencies in the individual states.³²⁹

Because of the CAA, everyone anywhere in the United States is guaranteed that when they are inside a building, the air entering from the outside meets federally enforced limits on the presence of “any physical, chemical, biological, radioactive” airborne hazard to human health.³³⁰ Although these standards are national, they are enforced at the source of pollution by the individual states.³³¹

³²⁴ *Evolution of the Clean Air Act*, ENV'T PROT. AGENCY, <https://www.epa.gov/clean-air-act-overview/evolution-clean-air-act> [<https://perma.cc/2MD4-ML8F>] (last visited Feb. 24, 2024).

³²⁵ 42 U.S.C. § 7409(b)(1). The Clean Air Act (the “Act”) established a nationwide policy for limiting air pollution on the state and local level. 42 U.S.C. § 7410. For a history of environmental regulation in the United States, see *EPA and a Brief History of Environmental Law in the United States*, ENV'T PROT. AGENCY, https://cfpub.epa.gov/si/si_public_record_report.cfm?Lab=NERL&dirEntryId=319430 [<https://perma.cc/DV6Y-GCBW>] (last updated June 17, 2016).

³²⁶ *W. Va. v. EPA*, 142 S. Ct. 2587 (2022); 40 C.F.R. § 50.1(e) (2022); Clean Air Act, 42 U.S.C. § 7602(g) (defining “air pollutant” as “any air pollution agent or combination of such agents, including any physical, chemical, biological, radioactive . . . substance or matter which is emitted into or otherwise enters the *ambient air*” (emphasis added)). EPA regulations define “ambient air” as “that portion of the atmosphere, *external to buildings*, to which the general public has access.” 40 C.F.R. § 50.1(e) (emphasis added).

³²⁷ National Ambient Air Quality Standards (NAAQS), 42 U.S.C. § 7409.

³²⁸ 40 C.F.R. § 50.1(e) (2022) (emphasis added).

³²⁹ Sanne H. Knudsen, *The Exoskeleton of Environmental Law: Why the Breadth, Depth, and Longevity of Environmental Law Matters for Judicial Review*, 1 UTAH L. REV. 1, 17 (2023) (“[T]he Clean Air Act utilizes a variety of tactics ranging from permits to planning, from health-based to technology-forcing standards, from mobile source to stationary source regulations, from end-of-pipe controls to ambient air quality standards. . .”).

³³⁰ 42 U.S.C. § 7602(g).

³³¹ DAVID M. BEARDEN ET AL., CONG. RSCH. SERV., RL30798, ENVIRONMENTAL LAWS: SUMMARIES OF MAJOR STATUTES ADMINISTERED BY THE ENVIRONMENTAL PROTECTION AGENCY (2013) (“Like most federal environmental statutes, the Clean Air Act is enforced primarily by states or local governments; they issue most permits, monitor

2. *The CAA Does Not Regulate Natural Events*

Federal laws like the CAA are unlikely to be helpful to those seeking to improve indoor air quality because “[w]hile air quality outdoors is monitored and regulated by the federal government, that’s not the case indoors—where the average American spends at least 90% of their time.”³³² Also, the CAA is explicitly designed to reduce man-made toxic emissions, not naturally occurring toxins.³³³ More specifically, the CAA does not protect a “natural event . . . in which human activity pays little or no direct causal role.”³³⁴ In a series of cases involving a labor statute that requires employers to give employees notice before closing a factory, a federal district court in Florida found that “COVID-19 may be a natural disaster.”³³⁵ Although these standards are national, they are enforced at the source of pollution by the individual states.³³⁶

compliance, and conduct the majority of inspections. The federal government functions as a backstop, with authority to review state actions. The agency may act independently or may file its own enforcement action in cases where it concludes that a state’s response was inadequate.”).

³³² Aleya Rentz & Aliza Rosen, *How States Can Better Regulate Indoor Air Quality*, JOHNS HOPKINS BLOOMBERG SCH. OF PUB. HEALTH (Aug. 18, 2023), <https://publichealth.jhu.edu/2023/regulating-indoor-air-quality> [<https://perma.cc/NX9R-W22D>] (last visited Feb. 24, 2024).

³³³ RICHARD K. LATTANZIO, CONG. RSCH. SERV., RL30853, CLEAN AIR ACT: A SUMMARY OF THE ACT AND ITS MAJOR REQUIREMENTS (2023) (“The [clean air] act establishes federal standards for mobile sources of air pollution and their fuels and for sources of 187 hazardous air pollutants, and it establishes a cap-and-trade program for the emissions that cause acid rain.”).

³³⁴ Emily Williams, *Reimagining Exceptional Events: Regulating Wildfires Through the Clean Air Act*, 96 WASH. L. REV. 765, 781 (2021) (discussing exemption of wildfire smoke from CAA, “[t]he Environmental Protection Agency (EPA), which administers the CAA, broadly designates wildfire smoke as an ‘exceptional event’ under the CAA. This means that wildfire smoke is usually exempt from the CAA’s national air quality standards, despite the fact that land managers can take measures to reduce the severity of wildfires”); Joshua Partlow, *Wildfire Smoke Is Eroding Decades of Air Quality Improvements, Study Finds*, WASH. POST (Sept. 20, 2023, 11:32 AM), <https://www.washingtonpost.com/climate-environment/2023/09/20/america-air-quality-wildfire-smoke-warming-climate/> [<https://perma.cc/U5R4-PJCQ>] (“Wildfire smoke is not directly regulated by the Clean Air Act and is often harder to manage than other types of air pollution.”).

³³⁵ *Easom v. U.S. Well Servs., Inc.*, 527 F. Supp. 3d 898, 907 (S.D. Tex. 2021), *rev’d and remanded*, 37 F.4th 238 (5th Cir. 2022) (“Only two courts so far have addressed the WARN Act’s natural-disaster exception. One court assumed, without deciding, that COVID-19 is a natural disaster.”).

³³⁶ This method of enforcement is the same for air and water pollution. See Tord Kjellstrom et al., *Air and Water Pollution: Burden and Strategies for Control*, in DISEASE CONTROL PRIORITIES IN DEVELOPING COUNTRIES (2nd ed. 2006).

3. *The CAA Does Not Regulate Indoor Air*

In a document that has not been updated to include the latest information on viral transmission, the EPA defines “indoor air quality” as the products of sources of “pollution” that release gases or particles into the air people breathe.³³⁷ These include

[c]ombustion sources such as oil, gas, kerosene, coal, wood, and tobacco products; building materials and furnishings as diverse as deteriorated, asbestos-containing insulation, wet or damp carpet, and cabinetry or furniture made of certain pressed wood products; products for household cleaning and maintenance, personal care, or hobbies; central heating and cooling systems and humidification devices.³³⁸

Indoor air pollution also includes toxins that come in from outdoor sources such as “radon, pesticides, and outdoor air pollution.”³³⁹ The CDC further explains that “if too little outdoor air enters a home, pollutants can accumulate to levels that can pose health and comfort problems.”³⁴⁰

Existing indoor air standards are not designed to protect against biohazards.³⁴¹ Instead, federal law in the United States is so focused on controlling pollutants emitted outdoors that its relevance to addressing pollutants generated indoors can fairly be described as “non-existent.”³⁴² Federal law prioritizes controlling the level of toxins emitted into the open or “ambient” air by industrial polluters.³⁴³

³³⁷ *The Inside Story: A Guide to Indoor Air Quality*, ENV'T PROT. AGENCY, <https://www.epa.gov/indoor-air-quality-iaq/inside-story-guide-indoor-air-quality> [<https://perma.cc/5LYB-SHDE>] (last updated Sept. 6, 2023).

³³⁸ *Id.*

³³⁹ *The Inside Story: A Guide to Indoor Air Quality*, U.S. CONSUMER PROD. SAFETY COMM'N, <https://www.cpsc.gov/Safety-Education/Safety-Guides/Home/The-Inside-Story-A-Guide-to-Indoor-Air-Quality> [<https://perma.cc/HXC4-4RZ4>] (last visited Feb. 29, 2024).

³⁴⁰ *Id.*

³⁴¹ Yuguo Li et al., *The COVID-19 Pandemic Is a Global Indoor Air Crisis That Should Lead to Change: A Message Commemorating 30 Years of Indoor Air*, 31 INDOOR AIR 1683 (2021) (“Scientists of different disciplines have now joined forces on further mechanistic studies of expired flows, respiratory droplets, their transformation and dispersion, deposition in lungs, survival of virus in the evaporating droplets and aerosols, and human behavior in close contact, among other key topics.”).

³⁴² See Maia Foster, *Legal Strategies to Minimize Subway Air Pollution in the United States*, 72 DUKE L.J. 1345, 1355 (2023) (“The United States does not have a comprehensive federal IAQ law.”).

³⁴³ EPA regulations define “ambient air” as “that portion of the atmosphere, *external to buildings*, to which the general public has access.” 40 C.F.R. § 50.1(e) (2022) (emphasis added).

So, while the EPA is aware of health hazards specific to the air breathed inside buildings, it has no authority to generate or enforce regulations to address them.³⁴⁴ The White House Office of Science and Technology's leadership in focusing on the link between indoor air quality and the spread of infectious disease has brought attention to the work of EPA and other agencies in documenting indoor air quality hazards.³⁴⁵

What particularly frustrates the aerosol scientists attempting to convince health organizations and regulators that COVID-19 floated in the air like the pathogens that spread measles and tuberculosis is there were, and continue to be, existing protocols for effectively addressing that risk.³⁴⁶

The CDC has always tracked respiratory infections.³⁴⁷ But in 2019, at the pandemic's start, no applicable standards addressed the aerosolized spread of viruses.³⁴⁸ This seems inconsistent with longstanding measures to prevent infection in tuberculosis hospitals,

³⁴⁴ *Indoor Air Quality Exposure and Characterization Research*, ENV'T PROT. AGENCY, <https://www.epa.gov/air-research/indoor-air-quality-exposure-and-characterization-research#:~:text=EPA%20does%20not%20have%20Congressional,Support%20Remediation%20Following%20Natural%20Disasters> [https://perma.cc/9VK9-97NN] (last updated Dec. 5, 2023).

³⁴⁵ *Fact Sheet: Departments And Agencies Commit to Cleaner Indoor Air Across the Nation*, THE WHITE HOUSE (Dec. 8, 2022), <https://www.whitehouse.gov/ostp/news-updates/2022/12/08/fact-sheet-departments-and-agencies-commit-to-cleaner-indoor-air-across-the-nation/> [https://perma.cc/PPF4-8U9C].

³⁴⁶ See, e.g., Miller-Leiden et al., *Effectiveness of In-Room Air Filtration and Dilution Ventilation for Tuberculosis Infection Control*, 46 J. AIR WASTE MGMT. ASS'N. 869 (1996); R. L. Riley et al., *Aerial Dissemination of Pulmonary Tuberculosis a Two-Year Study of Contagion in a Tuberculosis Ward*, 70 AM. J. EPIDEMIOLOG. 185 (1959).

³⁴⁷ *The National Respiratory and Enteric Virus Surveillance System*, CTRS. FOR DISEASE CONTROL & PREVENTION, <https://www.cdc.gov/surveillance/nrevss/index.html> [https://perma.cc/FL32-8CA9] (last updated Jan. 18, 2024); see, e.g., Dianna M. Blau et al., *Deaths Attributed to Respiratory Syncytial Virus in Young Children in High-Mortality Rate Settings: Report from Child Health and Mortality Prevention Surveillance (CHAMPS)*, 73 CLINICAL INFECTIOUS DISEASES S218 (2021) (noting that RSV was leading cause of death for children under six months); Jeffrey J. Van Wormer et al., *Influenza and Workplace Productivity Loss in Working Adults*, 59 J. OCCUPATIONAL ENV'T. MED. 1135 (2017) (respiratory viruses are responsible for thousands of hours of missed work and school every year); Martin Keech & Paul Beardsworth, *The Impact of Influenza on Working Days Lost: A Review of the Literature*, 26 PHARMACOECONOMICS 911 (2008).

³⁴⁸ See L. Clifford McDonald et al., *SARS in Healthcare Facilities, Toronto and Taiwan*, 10 EMERGING INFECTIOUS DISEASES 777 (2004). See also Donald E. Low, *Sars: Lessons from Toronto*, in LEARNING FROM SARS: PREPARING FOR THE NEXT DISEASE OUTBREAK (Stacey Knobler et al. eds., 2004).

biocontainment treatment, and research facilities. The CDC also recommends patients be treated in rooms that “have negative pressure relative to other parts of the facility” that prevents air from the room from escaping.³⁴⁹ Even the extensive attention to the spread of the 2002 SARS outbreak in Toronto left healthcare workers “unprepared” in 2019.³⁵⁰ Rather than implement the protective measures it had created in 2002, “public health authorities were blindsided” by the rapidity of COVID-19’s spread.³⁵¹ Some commentators speculate this is because the hard-won knowledge of the first COVID-19 outbreak focused on the perceived most significant entry point of the virus, hospital emergency rooms, rather than extending enhanced infection control measures to prevent community spread.³⁵² As a result, when COVID-19 returned to Canada, it spread unchecked in “institutions—such as long-term care facilities” and transmitted quickly “in the wider community” among individuals who may have never visited a hospital emergency room.³⁵³

D. Harnessing the Plenary Power of the States

Given the unlikelihood of Congress passing new environmental laws and the impossibility of the EPA’s developing indoor air quality regulations without it, the most fruitful strategy is to advocate for these laws in state legislatures. Not only are state legislatures much quicker to address new hazards, but there has already been significant progress in updating or adopting new indoor air quality standards. State legislatures can also allocate money directly to schools to support classroom level improvements such as air filtration devices.

³⁴⁹ *Airborne Infection Isolation (All) Room*, CTRS. FOR DISEASE CONTROL & PREVENTION, [https://www.cdc.gov/infectioncontrol/guidelines/isolation/glossary.html#:~:text=Airborne%20infection%20isolation%20room%20\(AIIR\).&text=Environmental%20factors%20are%20controlled%20in,or%20aerosolization%20of%20contaminated%20fluids](https://www.cdc.gov/infectioncontrol/guidelines/isolation/glossary.html#:~:text=Airborne%20infection%20isolation%20room%20(AIIR).&text=Environmental%20factors%20are%20controlled%20in,or%20aerosolization%20of%20contaminated%20fluids) [<https://perma.cc/QA93-KD7D>] (last visited Feb. 24, 2024); Miller-Leiden et al., *supra* note 346, at 869.

³⁵⁰ Rosemary Barton, *In 2003, Canada Failed the Pandemic Test. Here’s What We’ve Learned Since*, CBC NEWS (Mar. 11, 2020, 4:00 AM), <https://www.cbc.ca/news/politics/sars-toronto-coronavirus-pandemic-1.5492807> [<https://perma.cc/GJU5-VDYP>].

³⁵¹ Allison Daniel, *Coronavirus in Toronto—Lessons Lost on a Second SARS*, COUNCIL ON FOREIGN RELATIONS (July 22, 2020), <https://www.thinkglobalhealth.org/article/coronavirus-toronto-lessons-lost-second-sars> [<https://perma.cc/GQ37-Z65F>].

³⁵² *Id.*

³⁵³ *Id.*

1. *The Tenth Amendment*

The Tenth Amendment to the United States Constitution protects individual states' plenary power to regulate health and safety matters within their borders.³⁵⁴ So long as a law does not infringe on an enumerated federal power and is not discriminatory and therefore does not impair the fundamental rights protected by the Equal Protection Clauses of the Fourteenth Amendment, states are free to pass whatever health and safety laws they believe to be in their best interest.³⁵⁵ Also, as a general matter, unlike the U.S. Congress, which can move very slowly, many state legislatures are very efficient in passing laws in response to emerging needs.

2. *State Action in the Absence of Preemption*

The silver lining of the federal government's complete absence of indoor air quality legislation is that there is no concern the federal government preempts a state's ability to pass its laws.³⁵⁶ This is because, without any claim by the federal government over indoor air regulation, states can use their full plenary ability to regulate up to the point there is a direct conflict with federal law related to ambient air quality.³⁵⁷ But until the intensified focus on controlling the spread of COVID-19, few states had exercised its power to create indoor air

³⁵⁴ See generally KENNETH R. THOMAS, CONG. RSCH. SERV., RL30315, FEDERALISM, STATE SOVEREIGNTY, AND THE CONSTITUTION: BASIS AND LIMITS OF CONGRESSIONAL POWER (2013). See also Lydia B. Hoover, *The Commerce Clause, Federalism and Environmentalism: at Odds After Olin?*, 21 WM. & MARY ENV'T L. & POL'Y REV. 735, 752 (1997) ("States historically have exercised their police power in regulating many areas that are now considered part of 'environmental law,' such as air quality, water quality, and solid waste disposal.").

³⁵⁵ Benjamin Briggs et al., *NYC to Consider Indoor Air Quality Regulations*, JD SUPRA, <https://www.jdsupra.com/legalnews/nyc-to-consider-indoor-air-quality-5981919/> [<https://perma.cc/Q66W-HHRF>] (last visited Feb. 25, 2024).

³⁵⁶ See generally Robert R. M. Verchick & Nina A. Mendelson, *Preemption and Theories of Federalism*, in PREEMPTION CHOICE: THE THEORY, LAW, AND REALITY OF FEDERALISM'S CORE QUESTION 13–32 (W. Buzbee ed., 2009) (providing an overview of the role preemption plays in individual state's ability to make environmental protection laws).

³⁵⁷ *Guidance for Ventilation and Air Filtration Systems*, SANTA CLARA CNTY. PUB. HEALTH, <https://COVID19.sccgov.org/sites/g/files/exjcpb766/files/Guidance-for-Ventilation-and-Air-Filtration.pdf> [<https://perma.cc/K8HR-TAHL>] (last visited Feb. 25, 2024).

quality standards.³⁵⁸ While these standards would not have been directed at infection control, there have been unsuccessful campaigns to improve indoor air, especially in schools.³⁵⁹ The National Education Association recently explained in a January 2023 report that indoor air quality has been “a longstanding problem in many U.S. classrooms: [a]ir pollution, ranging from pet dander and paint fumes to mold, trace metals, and formaldehyde.”³⁶⁰

3. State Action to Improve Indoor Air Quality

There are already many signs that states are interested in moving forward with indoor air quality standards.³⁶¹ For example, Utah provides stand-alone air filtration devices to all public schools.³⁶² Other states, like Minnesota, have created standards for indoor air quality that reference those identified by the CDC.³⁶³ Large cities have also signaled interest in passing indoor air quality legislation. For example,

³⁵⁸ Alenya Rentz & Aliza Rosen, *How States Can Better Regulate Indoor Air Quality*, JOHNS HOPKINS BLOOMBERG SCH. OF PUB. HEALTH, <https://publichealth.jhu.edu/2023/regulating-indoor-air-quality> [https://perma.cc/J679-57ZE] (last visited Feb. 25, 2024).

³⁵⁹ See generally Sophie Rosenblum & Michael Bailey, *Poor Air Filtration in Schools Is Driving Absences and Tanking Productivity, but the Fix Is Simple*, SALON (June 25, 2023, 1:59 PM), <https://www.salon.com/2023/06/25/poor-air-filtration-in-schools-is-driving-absences-and-tanking-productivity-but-the-fix-is-simple/> [https://perma.cc/VP86-AVQU]; see also *Addressing Indoor Air Quality in Schools*, NAT'L EDUC. ASS'N. (Jan. 4, 2023), <https://www.nea.org/resource-library/addressing-indoor-air-quality-schools> [https://perma.cc/XFE2-8SA5].

³⁶⁰ *How Indoor Air Quality in Schools Affects Student Learning and Health*, EDUC. WRITERS ASS'N (Dec. 16, 2022), <https://ewa.org/data-research-tips/how-indoor-air-quality-in-schools-affects-student-learning-and-health#:~:text=The%20COVID-19%20pandemic%20has,mold%20trace%20metals%20and%20formaldehyde> [https://perma.cc/EQ8D-CARM] (“For many years, schools facing funding shortfalls put off costly projects that would improve indoor air quality and ventilation—replacing roofs, for example, and updating their heating and air conditioning systems.”).

³⁶¹ *Infection Prevention and Control in the School Setting*, MINN. DEP'T OF HEALTH, <https://www.health.state.mn.us/people/childreneyouth/schoolhealth/infection.html> [https://perma.cc/F9E6-5YPB] (last visited Feb. 24, 2024). See also John D. Moran, *School Indoor Air Quality Standards for Neighboring States*, OFFICE OF LEGIS. RSCH, CONN. GEN. ASSEMBLY (Sept. 21, 2022), <https://www.cga.ct.gov/2022/rpt/pdf/2022-R-0216.pdf> [https://perma.cc/4LAU-8N6A] (“Although there are no federal requirements for IAQ in public schools, the EPA provides this guidance to states.”).

³⁶² Nichole Whiteley, *Free Air Purifiers Available for All Utah Schools, Daycares Until July 31*, DAILY HERALD (Jul. 7, 2023), <https://www.heraldextra.com/news/local/2023/jul/07/free-air-purifiers-available-for-all-utah-schools-daycares-until-july-31/> [https://perma.cc/U3AK-ZFEN].

³⁶³ MINN. DEP'T OF HEALTH, *supra* note 361. See, e.g., SANTA CLARA CNTY. PUB. HEALTH, *supra* note 357; *Indoor Air Quality in Schools*, OHIO DEP'T OF EDU., <https://education.ohio.gov/Topics/Student-Supports/Student-Health-and-Medication-Supports/Indoor-Air-Quality-in-Schools> (last visited Jun 27, 2023).

New York City, which has no indoor air quality standards for buildings, is considering a bill that will “require the Department of Health and Mental Hygiene (“DOHMH”) to set standards regarding indoor air quality in city buildings, and engage in outreach and education regarding indoor air quality.”³⁶⁴ This bill would also “require the DOHMH, in collaboration with the Department of Environmental Protection, to issue real-time and annual reports on the DOHMH website regarding air quality in city buildings.”³⁶⁵

Building on this movement, the Center for Health Security at Johns Hopkins University recently released *The Model State Indoor Air Quality Act (MSIAQA)*, which “is intended to be adapted and adopted by state legislatures as a legal framework for good IAQ in public spaces.”³⁶⁶ The model act is intended to “outline[e] best practices for [] monitor[ing] implementation, inform the public about the quality of indoor air and the benefits of good IAQ.”³⁶⁷

E. Repurposing the Americans with Disabilities Act to Improve the Public’s Health

The May 11, 2023, CDC Guidance has direct and indirect implications for using the Americans with Disabilities Act to improve IAQ for everyone.³⁶⁸ It removes the roadblocks created by the often helpful but highly inconsistent cases brought under the ADA for school access during the public health emergency. Rather than framing its Guidance regarding COVID-19 prevention, the new Guidance specifically addresses general precautions that all schools “should put in place a core set of infectious disease prevention strategies as part of their normal operations.”³⁶⁹ The ventilation and air quality standards in the Guidance are not specific to COVID-19.³⁷⁰ Current CDC guidelines to schools are “provid[ing] specific steps schools and other buildings

³⁶⁴ Briggs et al., *supra* note 355.

³⁶⁵ *Id.*

³⁶⁶ James G. Hodge et al., *Model State Indoor Air Quality Act*, JOHN HOPKINS BLOOMBERG SCH. OF PUB. HEALTH, <https://centerforhealthsecurity.org/sites/default/files/2023-08/230801-msiaqa-final.pdf> [<https://perma.cc/DVQ2-2KVA>] (last visited Feb. 24, 2024).

³⁶⁷ *Id.*

³⁶⁸ *CDC School Guidance*, *supra* note 155.

³⁶⁹ *Id.*

³⁷⁰ *Id.*

can take to improve indoor air quality and reduce the risk of airborne spread of viruses and other contaminants.”³⁷¹

Also, in recommending additional protections directly related to COVID-19, the Guidance instructs schools to consult the CDC’s assessment of the threat of infection based on the occupancy of hospitals in the area. However, as the CDC warns, hospitals have no obligation to report this data to them, and many states do not share this information with the CDC.

The Americans with Disabilities Act (ADA) is a group of laws that prevent discrimination based on race, sex, national origin, or gender and remove barriers to inclusion.³⁷² Its focus has always been on removing barriers to grant people with disabilities the same access to places of public accommodation as people without disabilities.³⁷³ Although not a public health statute, its provisions for preventing discrimination by removing barriers to access can protect not just individuals bringing those claims but also those breathing the same air. One of the primary methods of achieving the ADA’s objectives is removing access barriers.³⁷⁴ The ADA’s purpose is, according to its preamble, to protect “the rights of individuals with disabilities to independence and full inclusion in American Society.”³⁷⁵ This protection extends to “any program or activity receiving Federal financial assistance” and private entities that provide public accommodation.³⁷⁶ Unlike individuals seeking protection against race

³⁷¹ *Id.*

³⁷² *Chapman v. Pier 1 Imports (U.S.) Inc.*, 631 F.3d 939, 945 (9th Cir. 2011) (“The concept of ‘discrimination’ under the ADA does not extend only to obviously exclusionary conduct—such as a sign stating that persons with disabilities are unwelcome or an obstacle course leading to a store’s entrance. Rather, the ADA proscribes more subtle forms of discrimination—such as difficult-to-navigate restrooms and hard-to-open doors—that interfere with disabled individuals’ ‘full and equal enjoyment’ of places of public accommodation.”).

³⁷³ *Id.*; 42 U.S.C. § 12182(b)(2)(A)(iv) (identifying the “failure to remove architectural, communication and transportation barriers” as a form of discrimination). *See also* Jasmine Harris, *Disability and the Right to Move in the World*, THE REGULATORY REVIEW (Mar. 27, 2023), <https://www.theregreview.org/2023/03/27/harris-disability-and-the-right-to-move-in-the-world/> [<https://perma.cc/BP8G-FJMB>] (arguing that “Mobility Justice” first advanced by Professor Jacobus tenBroek in 1966, reflects the concept that “state regulation of disability ought to emphasize a ‘right to live in the world.’” Which includes “the right to move in it.”).

³⁷⁴ 42 U.S.C. § 12182(b)(2)(A)(iv) (identifying the failure to remove architectural, communication, and transportation barriers as a form of discrimination).

³⁷⁵ *Berardelli v. Allied Servs. Inst. of Rehab. Med.*, 900 F.3d 104, 109–10 (3d Cir. 2018).

³⁷⁶ *Berardelli*, 900 F.3d at 114 (citing the Rehabilitation Act of 1973 § 504(a), “[n]o otherwise qualified individual with a disability . . . shall, solely by reason of her or his

or gender discrimination, there is no requirement to prove deliberate exclusion to seek protection under the ADA.³⁷⁷

The ADA's current framework is based on the regulations developed by the predecessor to the Department of Education to implement Section 504 of the Civil Rights Act, which have "serve[d] as guidelines for all other federal agencies."³⁷⁸ Title II of the ADA prohibits all public entities, including schools, from "exclud[ing] from participation in" or "den[ying] the benefits of the services, programs, or activities of a public entity, or subject[ing] [a person] to discrimination by any [such] entity."³⁷⁹ Title I covers discrimination in employment,³⁸⁰ Title II prohibits discrimination by public entities,³⁸¹ and Title III of the ADA prohibits discrimination by private entities that offer public accommodations.³⁸² Title III specifically identifies twelve categories of

disability, be excluded from the participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance.").

³⁷⁷ *Chapman v. Pier 1 Imports (U.S.) Inc.*, 631 F.3d 939, 955 (9th Cir. 2011) (plaintiffs with knowledge of an ADA violation at a place of public accommodation can establish a sufficient future injury for standing by either (1) showing that they are currently deterred from returning to the place of public accommodation because of a barrier, or (2) showing that they were previously deterred and intend to return to the noncompliant place of public accommodation). *See, e.g., Jones v. Billionaire Burgers, Inc.*, No. 22-cv-00110(PVCx), 2023 WL 1107866, at *8 (C.D. Cal. Jan. 26, 2023) ("Underlying the ADA is the Congressional recognition of the fact that "physical or mental disabilities in no way diminish a person's right to fully participate in all aspects of society, yet many people with physical or mental disabilities have been precluded from doing so because of discrimination; others who have a record of a disability or are regarded as having a disability also have been subjected to discrimination"); 42 U.S.C. § 12101(1).

³⁷⁸ *See* Arlene B. Mayerson, *The History of the Americans with Disabilities Act*, DISABILITY RIGHTS EDUC. & DEF. FUND, <https://dredf.org/about-us/publications/the-history-of-the-ada/> [<https://perma.cc/PWX5-UTRY>] (last visited Feb. 25, 2024) ("After Section 504 established the fundamental civil right of nondiscrimination in 1973, the next step was to define what nondiscrimination meant in the context of disability. How was it the same or different from race and sex discrimination? The Department of Health, Education and Welfare (HEW) had been given the task of promulgating regulations to implement Section 504, which would serve as guidelines for all other federal agencies.").

³⁷⁹ 42 U.S.C. § 12132. *See also* *Cohen v. City of Culver*, 754 F.3d 690, 694–95 (9th Cir. 2014) (explaining a significant difference between Title II and Title III is that it requires only "program access" not Title III's requirement for access to every individual location).

³⁸⁰ 42 U.S.C. § 12101(a)(3).

³⁸¹ 42 U.S.C. § 12132. *See also* *Tennessee v. Lane*, 541 U.S. 509, 511 (2004) ("Title II is an appropriate response to this history and pattern of unequal treatment.").

³⁸² 42 U.S.C. § 12182(a) ("No individual shall be discriminated against on the basis of disability in the full and equal enjoyment of the goods, services, facilities, privileges, advantages, or accommodations of any place of public accommodation by any person who owns, leases (or leases to), or operates a place of public accommodation."). *See also*

public accommodation that are sufficiently broad to cover almost every workplace, store, house of worship, school, and mode of mass transportation.³⁸³ Medical offices, also covered under Title III, are expressly prohibited from disability based discrimination under Section 1550 of the Affordable Care Act.³⁸⁴ Further, Title IV, which covers telecommunications services also prohibits disability-based discrimination.³⁸⁵ Within these general categories are specific provisions prohibiting discrimination in health care,³⁸⁶ housing,³⁸⁷ and education.³⁸⁸

While different sections have slightly different language, in general, the prohibition against discrimination is described as including “the denial of the opportunity to participate or allow participation in a manner that is not equal to the manner afforded to other individuals³⁸⁹ to provide a benefit that is “different or separate from that provided to other individuals unless such action is necessary” to make the benefit as effective as that provided to others.³⁹⁰ To access the protection of the ADA, an individual must prove that they have “a physical or mental impairment that substantially limits a major life activity.”³⁹¹ Illness is

Berardelli v. Allied Servs. Inst. of Rehab. Med., 900 F.3d 104, 115 (3d Cir. 2018) (“Title III of the ADA also codified the concept of ‘reasonable accommodations’ that the Supreme Court had recognized for the RA in *Choate*. There, the Court established that liability could be premised on a failure to make ‘reasonable accommodations,’ a standard that turned on (1) whether the requested accommodation to the program was ‘reasonable’; (2) whether it was necessary ‘to assure meaningful access’; and (3) whether it would represent ‘a fundamental alteration in the nature of [the] program.’”) (citing *Alexander v. Choate*, 469 U.S. 287 (1985)).

³⁸³ 42 U.S.C. § 12181.

³⁸⁴ 42 U.S.C. § 12181(7)(F) (“The following private entities are considered public accommodations for purposes of this subchapter, if the operations of such entities affect commerce . . . a laundromat, dry-cleaner, bank, barber shop, beauty shop, travel service, shoe repair service, funeral parlor, gas station, office of an accountant or lawyer, pharmacy, insurance office, professional office of a health care provider, hospital, or other service establishment”); 42 U.S.C. § 18116(a) (“Except as otherwise provided for in this title . . . an individual shall not . . . be excluded from participation in, be denied the benefits of, or be subjected to discrimination under, any health program or activity, any part of which is receiving Federal financial assistance, including credits, subsidies, or contracts of insurance, or under any program or activity that is administered by an Executive Agency or any entity established under this title. The enforcement mechanisms provided for and available under such title . . . shall apply for purposes of violations of this subsection.”).

³⁸⁵ 47 U.S.C. § 225.

³⁸⁶ 42 U.S.C. § 12181(7)(F).

³⁸⁷ *Id.* at (A).

³⁸⁸ *Id.* at (J).

³⁸⁹ 42 U.S.C. § 12182(b)(1)(A)(i)–(iii).

³⁹⁰ 42 U.S.C. § 12182(b)(2)(A)(iv).

³⁹¹ *Id.*

protected as a disabling condition under the ADA so long as it “substantially limits one or more major life activities” or “major bodily functions.”³⁹²

I. How Individuals Can Invoke the ADA’s Protection

In addition to the ADA, individual states also have laws prohibiting disability-based discrimination that often extend protection beyond those required by federal law.³⁹³ To be entitled to ADA’s protection against discrimination, a plaintiff must prove “the alleged injury” is particular to them.³⁹⁴ The harm from which individuals seek protection cannot be “undifferentiated and common to all members of the public.”³⁹⁵ Nor does the ADA protect an abstract “generalized grievance” common to all members of the public.³⁹⁶ On the other hand, the fact those without a qualifying disability might also experience harm does not prevent recovery so long as the barrier “also has a personal and individual impact on each of the named Plaintiffs.”³⁹⁷ Moreover, a plaintiff does not have to prove they have been prevented from accessing a building but only a “defendant’s failure to comply

³⁹² 42 U.S.C. § 12102.

³⁹³ *Federal, State, and Local Laws: Conflicts or Complements?*, MID-ATL. ADA CTR., <https://www.adainfo.org/article-archive/federal-state-and-local-laws-conflicts-or-complements/> [<https://perma.cc/JK3B-KYEG>] (last visited Feb. 25, 2024) (most commonly, states have expanded the definition of who is “disabled” more broadly than the federal regulations).

³⁹⁴ *See Chapman v. Pier 1 Imports (U.S.) Inc.*, 631 F.3d 939, 946 (9th Cir. 2011) (“Though its purpose is ‘sweeping,’ and its mandate ‘comprehensive’ the ADA’s reach is not unlimited. Rather, as with other civil rights statutes, to invoke the jurisdiction of the federal courts, a disabled individual claiming discrimination must satisfy the case or controversy requirement of Article III by demonstrating his standing to sue at each stage of the litigation.”).

³⁹⁵ *Lujan v. Defs. of Wildlife*, 504 U.S. 555, 575 (1992) (citing *U.S. v. Richardson*, 418 U.S. 166, 171 (1974)).

³⁹⁶ *Id.* (citing *U.S. v. Richardson*, 418 U.S. 166, 171 (1974)).

³⁹⁷ *Spokeo, Inc. v. Robbins*, 578 U.S. 330, 340 n.7 (Yet “[t]he fact that an injury may be suffered by a large number of people does not of itself make that injury a nonjusticiable generalized grievance.” Rather, for an injury to be particularized within the meaning of Article III, it need only “affect the plaintiff in a personal and individual way”); *Fed. Election Comm’n v. Akins*, 524 U.S. 11, 24 (1998) (“[W]here a harm is concrete, though widely shared, the Court has found ‘injury in fact.’”).

with the ADA deters her from making use of the defendant's facility."³⁹⁸

Now that the CDC has set specific standards for air quality that reduce the risk of infection, individuals seeking accommodation can claim buildings that do not meet those standards are not providing them "equal access."³⁹⁹ Therefore, the failure to achieve established air quality standards becomes a barrier to access. This claim is supported by the Supreme Court's 2023 unanimous decision in *Perez v. Sturgis Public Schools*, which affirmed its holding in *Fry* that barriers to accessing education could be the basis for a claim of disability-based discrimination.⁴⁰⁰ What is particularly notable about the unanimous *Perez* decision is that its author, Justice Gorsuch, declined the school board's invitation to interpret the regulation in the school's favor because, as he summarized,

[t]he school district worries that our understanding of § 1415(l) would frustrate Congress's wish to route claims about educational services to administrative agencies with "special expertise" in such matters. But "it is . . . our job to apply faithfully the law Congress has written," and "we cannot replace the actual text with speculation as to Congress' intent."⁴⁰¹

Instead, he explained "it is . . . our job to apply faithfully the law Congress has written," and "[w]e cannot replace the actual text with speculation as to Congress's intent."⁴⁰² This is astonishing in the context of a Court that has repeatedly held an agency's actions invalid because the consequences would be so significant that it could not reflect Congress's intent. While the Supreme Court has no obligation to follow its precedents, it should be reassuring to litigants that it is not inherently distrustful of agency action advancing the goals of the ADA.

³⁹⁸ *Gastelum v. Canyon Hosp. LLC*, No. CV-17-02792-PHX-GMS, 2018 WL 2388047 at 6* (D. Ariz. May 25, 2018) (citing *Civ. Rts. Educ. & Enf't Ctr. v. Hosp. Properties Tr.*, 867 F.3d 1093, 1098 (9th Cir. 2017)).

³⁹⁹ See also *Haynes v. Dunkin' Donuts LLC*, 741 F. App'x 752, 753 (11th Cir. 2018) (reversing District Court's granting of a motion to dismiss and holding that a blind plaintiff who could not access the website operated on behalf of Dunkin Donuts stated "a plausible claim for relief under Title III of the ADA"). For further discussion of how Title III applies to the accessibility of websites, see generally Ella G. Clifford, *Remaining Barriers to Accessibility: Americans with Disabilities Act and Websites*, B.C. INTEL. PROP. & TECH. F. (Jan. 17, 2023), <https://lira.bc.edu/work/sc/68895889-a387-4079-bbb8-7ecc12524875> [<https://perma.cc/PRZ5-DAPQ>].

⁴⁰⁰ *Perez v. Sturgis Pub. Sch.*, 143 S. Ct. 859, 865 (2023).

⁴⁰¹ *Id.*

⁴⁰² *Id.* (quoting *Magwood v. Patterson*, 561 U.S. 320, 334 (2010)).

In characterizing the plaintiff's claim in *Perez* as being about "access" to education, not the quality of education, the Court reaffirmed its 2017 decision in *Fry v. Napoleon Cmty. Schs.*⁴⁰³ In *Fry*, a parent complained their child, who had a qualified disability, could not bring a service dog to school.⁴⁰⁴ Quoting from the parents' complaint, Justice Sotomayor, writing for the majority, noted that their claim was for denial of access to a public facility, not the denial of an adequate education.⁴⁰⁵ Justice Sotomayor wrote the school district's "refusal to allow Wonder to act as a service dog" denied the plaintiff, "a person with disabilities," equal access to public facilities."⁴⁰⁶ These two cases create a strong foundation for claims that failure to maintain established air quality standards is also an illegal denial of equal access.⁴⁰⁷ With vaccine mandates no longer at issue, the focus now is on mitigating the risk of infection by controlling air quality.⁴⁰⁸

a. Characterizing Both the Risk of Infection and Risk of Severe Outcome as Qualifying Disability

Both increased susceptibility to infectious disease because of an impaired immune system and increased consequences from infection had been recognized as disabling conditions under the ADA before the COVID-19 pandemic.⁴⁰⁹ However, "employees whose chronic

⁴⁰³ *Fry v. Napoleon Cmty. Sch.*, 580 U.S. 154 (2017).

⁴⁰⁴ *Id.* at 174 (The Frys' complaint alleges only disability-based discrimination, without making any reference to the adequacy of the special education services E.F.'s school provided. The school districts' "refusal to allow Wonder to act as a service dog," the complaint states, "discriminated against [E.F.] as a person with disabilities . . . by denying her equal access to public facilities.").

⁴⁰⁵ *Id.*

⁴⁰⁶ *Id.*

⁴⁰⁷ *Id.*

⁴⁰⁸ Bard, *supra* note 303.

⁴⁰⁹ *Workplace Accommodations for the Immunocompromised as Pandemic Wanes*, IMMUNE DEFICIENCY FOUNDATION (Mar. 30, 2022), <https://primaryimmune.org/resources/news-articles/workplace-accommodations-immunocompromised-pandemic-wanes> [<https://perma.cc/RLV9-USGV>] ("The ADAAA explicitly mentions major bodily functions, including the immune system, as examples of 'one or more major life activities.' So, if your diagnosis or condition substantially limits the function of your immune system, legally, it is considered a disability and you are entitled to ADA and ADAAA protections"); William D. Goren, *EEOC Final Update on COVID-19?*, UNDERSTANDING THE ADA (May 16, 2023), <https://www.understandingtheada.com/blog/2023/05/16/eec-update-covid-19/> [<https://perma.cc/U4AL-X9X6>]; Devjani H. Mishra, *Disability Accommodation and COVID-19: Ten Emerging Issues to Consider*, LITTLER (Apr. 28, 2022), <https://www.littler.com>

conditions were well-controlled by mitigating measures rarely have needed to invoke the ADA if their conditions were not substantially limiting.”⁴¹⁰ Entities covered by the ADA “must use the most current medical and public health information available” when deciding whether to grant a requested accommodation.⁴¹¹ The source these courts used for “the most current medical and public health information” was the CDC for the decisions being made during the pandemic public health emergency.⁴¹²

Also, although there were no air filtration standards during the pandemic public health emergency, CDC guidance identified wearing respirators and increasing indoor ventilation as effective means of preventing infection.⁴¹³

b. Environmental Toxins as a Barrier to Access

Both the government agencies charged with implementing the ADA and the federal courts overseeing their work have long recognized that for some people with qualifying disabilities, the risk of environmental harm can be a significant barrier to access. There had been guidance before the COVID-19 emergency about the needs of immunocompromised people, such as those undergoing chemotherapy for accommodations that limited their exposure to infection. For example, in *G v. Fay School*, Judge Hillman of the District of Massachusetts accepted that a student in a private school had Electromagnetic Hypersensitivity Syndrome (EHS) and that it was a

/publication-press/publication/disability-accommodation-and-covid-19-ten-emerging-issues-consider [https://perma.cc/T23M-KK4D].

⁴¹⁰ Mishra, *supra* note 409 (“Given how much is still unknown about the long-term effects of COVID-19 infection and its interaction with these conditions, it is foreseeable that many individuals who never disclosed such conditions to their employers will now seek accommodation to reduce their risk of contracting COVID-19 and experiencing long-term complications.”). *See also* Goren, *supra* note 409 (identifying the CDC’s most recent guidance as the source of information for meeting the ADA’s “‘business necessity’ standard requires that employers utilize the most current medical and public health information to determine what inquiries/medical examinations are appropriate.”).

⁴¹¹ Goren, *supra* note 409.

⁴¹² *What You Should Know About COVID-19 and the ADA, the Rehabilitation Act, and Other EEO Laws*, U.S. EQUAL EMP. OPPORTUNITY COMM’N, <https://www.eeoc.gov/wysk/what-you-should-know-about-covid-19-and-ada-rehabilitation-act-and-other-eeo-laws> (last visited Feb. 19, 2024) [https://perma.cc/Z8LF-JVHK] (“CDC has updated its guidance over the course of the pandemic and may continue to do so as the pandemic evolves and as CDC acquires more information about the virus and different variants.”).

⁴¹³ *E.g.*, *CDC School Guidance*, *supra* note 155.

disabling condition that made him sensitive to radio frequencies (RFs) in Wi-Fi networks.⁴¹⁴

c. Quantifying Likelihood of Harm

In *Post-Public Health Doe 1 v. Perkiomen Valley Sch. Dist.*, the court held that it was not enough for at-risk students to wear masks.⁴¹⁵ Rather, the parents proved that an “optional masking policy will directly contribute to an increased likelihood of contracting COVID-19, as other students in the school district will choose to no longer wear masks in school in the absence of a directive requiring them to do so.”⁴¹⁶

Establishing a test for whether dropping the mask mandate was an “access-based” suit as defined by the Supreme Court in *Fry*, the District Court wrote that “the students may have brought essentially the same claim if they alleged that the conduct (failure to impose a mask mandate) occurred at a public facility that was not a school, because they are alleging that they are being excluded from these facilities due to their underlying health issues.”⁴¹⁷

The court also took the important step of identifying a school building as a workplace so “an adult at the school—for example, a teacher—could have brought the same claim.”⁴¹⁸ In that way, the court concluded that this was not a case about “accessing the curriculum” but “Plaintiffs’ alleged inability to access on-site school learning, due to the optional masking policy, at its core, it involves accessing the facility rather than accessing the curriculum.”⁴¹⁹

The court further explained that “Plaintiffs contend that optional masking during periods of substantial or high transmission of the virus

⁴¹⁴ *G v. Fay Sch., Inc.*, 282 F. Supp. 3d 381 (D. Mass. 2017). The Court dismissed the parents’ claims, however, because they did not make a sufficient causal link between the child’s symptoms and the Wi-Fi to which he was exposed in school. Judge Hillman also accepted that this sensitivity could be the legitimate basis of a claim under the ADA. In so doing, he explained though “the FCC has declined to regulate RFs with respect to biological (non-thermal) effects, especially any impact to those that might be hypersensitive, the ADA provides a legitimate remedy to any unusual harm that might be caused to a small subset of individuals exposed to something that is generally, genuinely, and legitimately accepted as safe for the wider population.”

⁴¹⁵ *Doe 1 v. Perkiomen Valley Sch. Dist.*, 585 F. Supp. 3d 668 (E.D. Pa. 2022).

⁴¹⁶ *Id.* at 681.

⁴¹⁷ *Id.* at 683.

⁴¹⁸ *Id.*

⁴¹⁹ *Id.*

'disparately impacts Plaintiffs' medically fragile children by preventing their in-person access to education and other services at the District's facilities without incurring a substantially increased risk of severe illness or death.'⁴²⁰ Therefore, the Plaintiffs contend, optional masking prevents "[their] children, and similarly situated disabled students, from accessing the school building on equal terms as students without disabilities."⁴²¹

During the COVID-19 public health emergency, plaintiffs claiming that the risk of infection was a barrier to access demonstrated this risk by referencing the CDC's assessment of the prevalence of COVID-19 based on the number of cases in their location.⁴²² Even when the CDC shifted its basis for identifying high-risk areas from the number of cases to the availability of hospital beds, courts could use that information to assess the likelihood that a plaintiff would contract COVID-19.⁴²³ Now that the COVID-19 public health emergency is over, this kind of official information about prevalence is no longer available,⁴²⁴ nor are private entities continuing to publish data linking the risk of catching COVID-19 to a specific location. Yet there are many sources of information supporting a finding that the risk remains high for people with disabling conditions.⁴²⁵

A plaintiff does not, however, have to prove the harm is "literally certain" to constitute an injury for purposes of standing.⁴²⁶ Rather, it is

⁴²⁰ *Id.* at 689.

⁴²¹ *Id.*

⁴²² *Id.*

⁴²³ Spencer Kimball, *CDC Will Have Less Data to Track COVID and New Variants After Public Health Emergency Ends*, CNBC (May 5, 2023, 11:00 AM), <https://www.cnbc.com/2023/05/05/covid-cdc-will-have-less-data-after-emergency-ends.html> [<https://perma.cc/HQF5-5NDC>].

⁴²⁴ Doug Donovan, *Johns Hopkins COVID-19 Data Hub Ends After Three Years*, THE HUB (Mar. 10, 2023), <https://hub.jhu.edu/2023/03/10/coronavirus-resource-center-data-hub-ends/> [<https://perma.cc/5J5P-DMUP>].

⁴²⁵ Heather Landi, *How Johns Hopkins Medicine Became an Information Powerhouse During the COVID-19 Pandemic*, FIERCE HEALTHCARE (May 24, 2021, 11:00 AM), <https://www.fiercehealthcare.com/tech/johns-hopkins-medicine-became-information-powerhouse-during-covid-19-pandemic-here-s-how> (specifying it was "cited by U.S. federal agencies and major news sources including The Washington Post and The Wall Street Journal"). See also Simon Torkington, *The World's Leading COVID-19 Tracker Is Closing Down – Here's Why*, WORLD ECON. F. (Mar. 9, 2023), <https://www.weforum.org/agenda/2023/03/COVID-tracker-closing-down-johns-hopkins/>. In 2020, Time magazine awarded the tool they developed to report data on Corona cases as one of the best "inventions of the year." See *2020's Go-To Data Source*, TIME (Nov. 19, 2020), <https://time.com/collection/best-inventions-2020/5911434/johns-hopkins-coronavirus-resource-center/> [<https://perma.cc/2ZZM-FZS9>].

⁴²⁶ *Clapper v. Amnesty Int'l USA*, 568 U.S. 398, 415 n.5 (2013).

sufficient to prove the presence of the barrier means there is a “substantial risk that the harm will occur.”⁴²⁷ Speaking directly to the risk of contracting COVID-19, quoting *Thole v. U.S. Bank, NA*, the judge contended that a plaintiff claiming the protection of the ADA may have suffered an injury where the defendant’s conduct “substantially increased the risk” of harm to the plaintiff.⁴²⁸

Moreover, now that the CDC has recognized ventilation as a method of reducing exposure to all airborne infectious diseases, it is no longer necessary to specifically link the risk to COVID-19.⁴²⁹ There is, unfortunately, likely to be substantial proof for both claims. For many people, the risk of being infected with COVID-19 has affected all areas of their lives by creating a barrier to accessing schools, offices, stores, doctors’ offices, and places of entertainment.⁴³⁰ These people and their families continue actively avoiding infection at the cost of self-enforced isolation.⁴³¹

2. Reframing Cleaning Air as Removing a Barrier

The ADA’s core mandate requires that entities providing public access must take action to remove barriers to access for people with qualifying disabilities.⁴³² As Justice Ginsberg explained in *Olmstead v. L.C.*, Congress “not only required all public entities to refrain from discrimination . . . [it] explicitly identified ‘segregation’ of persons with disabilities as a ‘form of discrimination.’”⁴³³

⁴²⁷ *Doe 1 v. Perkiomen Valley Sch. Dist.*, 585 F. Supp. 3d 668, 680 (E.D. Pa. 2022) (citing *Clapper*, 568 U.S. at 398, finding that although plaintiffs had not proved a sufficient risk of the future harm of surveillance that would be grounds for standing had they done so).

⁴²⁸ *Thole v. U.S. Bank N.A.*, 140 S. Ct. 1615, 1622 (2020).

⁴²⁹ *Id.*

⁴³⁰ For further discussion of the kinds of public accommodations affected by the presence of COVID-19, see Frank Griffin, *COVID-19 and Public Accommodations Under the Americans with Disabilities Act: Getting Americans Safely Back to Restaurants, Theaters, Gyms, and “Normal,”* 65 ST. LOUIS U. L.J. 251 (2021).

⁴³¹ See *Broken Sociality: Isolation, Social Murder, & the Process of Depoliticization w/ Nate Holdren*, LAST BORN IN THE WILDERNESS (May 12, 2023), <https://www.lastborninthewilderness.com/episodes/nate-holdren> [<https://perma.cc/SM8R-BE2A>].

⁴³² See *G. v. Fay Sch.*, 931 F.3d 1, 8 (2019) (explaining “[t]he ADA is a comprehensive disability rights statute; its subchapters, known as ‘titles,’ protect persons with disabilities in a variety of settings”).

⁴³³ *Olmstead v. L.C. ex rel. Zimring*, 527 U.S. 581, 600 (1999) (citing § 12101(a)(2)) (“[H]istorically, society has tended to isolate and segregate individuals with disabilities, and, despite some improvements, such forms of discrimination against individuals with disabilities continue to be a serious and pervasive social problem.”).

Title I covers discrimination in employment,⁴³⁴ Title II prohibits discrimination by public entities,⁴³⁵ and Title III of the ADA prohibits discrimination by private entities that offer public accommodations.⁴³⁶ Title III identifies explicitly twelve categories of public accommodation that are sufficiently broad to cover almost every workplace, store, house of worship, school, and mode of mass transportation.⁴³⁷ Medical offices, also covered under Title III, are specifically prohibited from disability-based discrimination under Section 1550 of the Affordable Care Act.⁴³⁸

While different sections have slightly different language, in general, the prohibition against discrimination is described as including “[the] denial of the opportunity of the individual or class to participate in or benefit from the goods, services, facilities, privileges, advantages, or accommodations of an entity”⁴³⁹ to provide a benefit that is “different or separate from that provided to other individuals, unless such action is necessary” to make the benefit “as effective as that provided to

⁴³⁴ 42 U.S.C. § 12101.

⁴³⁵ 42 U.S.C. § 12132 (“No qualified individual with a disability shall, by reason of such disability, be excluded from participation or denied the benefits of the services, programs or activities of a public entity”). *See also* *Tenn. v. Lane*, 541 U.S. 509, 530 (2004) (“Title II is an appropriate response to this history and pattern of unequal treatment.”).

⁴³⁶ 42 U.S.C. § 12182(a) (“No individual shall be discriminated against on the basis of disability in the full and equal enjoyment of the goods, services, facilities, privileges, advantages, or accommodations of any place of public accommodation by any person who owns, leases (or leases to), or operates a place of public accommodation”). *See also* *Berardelli v. Allied Servs. Inst. of Rehab. Med.*, 900 F.3d 104, 115 (3d Cir. 2018) (“Title III of the ADA also codified the concept of ‘reasonable accommodations’ the Supreme Court had recognized for the RA in *Choate*. There, the Court established liability could be premised on a failure to make ‘reasonable accommodations,’ a standard that turned on (1) whether the requested accommodation to the program was ‘reasonable’; (2) whether it was necessary ‘to assure meaningful access’; and (3) whether it would represent ‘a fundamental alteration in the nature of [the] program.’”).

⁴³⁷ 42 U.S.C. § 12181.

⁴³⁸ *Id.* at (7)(F) (“The following private entities are considered public accommodations for purposes of this title, if the operations of such entities affect commerce . . . a laundromat, dry-cleaner, bank, barber shop, beauty shop, travel service, shoe repair service, funeral parlor, gas station, office of an accountant or lawyer, pharmacy, insurance office, professional office of a health care provider, hospital, or other service establishment”); 42 U.S.C. § 18116(a) (“Except as otherwise provided for in this title . . . an individual shall not . . . be excluded from participation in, be denied the benefits of, or be subjected to discrimination under, any health program or activity, any part of which is receiving Federal financial assistance, including credits, subsidies, or contracts of insurance, or under any program or activity that is administered by an Executive Agency or any entity established under this title. The enforcement mechanisms provided for and available under such title VI, title IX, section 504, or such Age Discrimination Act shall apply for purposes of violations of this subsection.”).

⁴³⁹ 42 U.S.C. § 12182(b)(1)(A)(i).

others.”⁴⁴⁰ To access the protection of the ADA, an individual must prove they have “a physical or mental impairment that substantially limits one or more major life activities.”⁴⁴¹ Illness is protected as a disabling condition under the ADA so long as it “substantially limits one or more major life activities” or “major bodily functions.”⁴⁴²

In March 2022, the Department of Education issued guidance stating that “schools must consider the health and safety needs of their students in order to safely attend in-person.”⁴⁴³ This is in accord with a decision by a judge in Virginia recognizing that the risk of infection was a barrier to accessing education and therefore holding a school could accommodate at-risk students by adopting universal mask wearing policies even when this practice was prohibited by executive order.⁴⁴⁴

The ADA’s purpose in removing barriers is to allow everyone equal access to every public space, not just provide some access to some places.⁴⁴⁵ But what is a “barrier to access?” CDC defines barriers as “[f]actors in a person’s environment that, through their absence or presence, limit functioning and create disability.”⁴⁴⁶ This can include a

⁴⁴⁰ *Id.* at (b)(1)(A)(iii).

⁴⁴¹ *Introduction to the Americans with Disabilities Act*, ADA.GOV, <https://www.ada.gov/topics/intro-to-ada/> [<https://perma.cc/9HFT-F9GV>] (last visited Feb. 17, 2024).

⁴⁴² 42 U.S.C. § 12102.

⁴⁴³ *Letter to Educators and Parents Regarding New CDC Recommendations and Their Impact on Children with Disabilities*, INDIVIDUALS WITH DISABILITIES EDUC. ACT (Mar. 24, 2022), <https://sites.ed.gov/idea/idea-files/letter-to-educators-and-parents-regarding-new-cdc-recommendations-and-their-impact-on-children-with-disabilities-march-24-2022/> [<https://perma.cc/4EXG-GBAQ>].

⁴⁴⁴ *Parents of Students with Disabilities File Suit to Stop Youngkin’s No Mask Mandate*, ACLU OF VIRGINIA (Jan. 31, 2022), <https://www.acluva.org/en/press-releases/parents-students-disabilities-file-suit-stop-youngkins-no-mask-mandate> [<https://perma.cc/JD44-LWK4>]; Judy Stone, *Bans on Mask Mandates to Protect Against Covid Endanger Students with Disabilities*, FORBES (Feb. 6, 2022), <https://www.forbes.com/sites/judystone/2022/02/06/bans-on-mask-mandates-to-protect-against-covid-endanger-students-with-disabilities/?sh=357459c46d2f> [<https://perma.cc/J2MG-ZUJS>]. *But see Christopher Seaman, et al. v. Commonwealth of Virginia, et al.*, ACLU VIRGINIA, <https://www.acluva.org/en/cases/seamanvvirginia> [<https://perma.cc/D4CP-MWEL>] (last visited Mar. 11, 2023). *See also* Joi Bass, *Federal Judge Gives Partial Victory to ACLU In Mask Lawsuit*, WWBT (Mar. 24, 2022, 3:23 AM), <https://www.nbc12.com/2022/03/24/federal-judge-gives-partial-victory-aclu-mask-lawsuit/> [<https://perma.cc/8VXW-KF5X>].

⁴⁴⁵ This emphasis on universal accessibility is what makes the ADA so different from other countries laws which might, for example, give people with a mobility disability the right to a ground floor dorm room but would not require elevator access to the entire building.

⁴⁴⁶ *Common Barriers to Participation Experiences by People with Disabilities*, CTRS. FOR DISEASE CONTROL & PREVENTION, <https://www.cdc.gov/ncbddd/disabilityandhealth>

physical object but also a failure to provide the equipment needed to communicate online.

Even individuals with a qualified disability who can prove a barrier to participation are not guaranteed to receive the accommodation they request. Rather, in determining whether disabled students have been granted meaningful access to the benefits of education, “courts should be mindful of the need to strike a balance between the rights of the student and [their] parents and the legitimate financial and administrative concerns of the school district.”⁴⁴⁷

3. *Characterizing Air Filtration Devices as a Mitigating Measure*

When the Americans with Disabilities Act was amended in 2008, one of the most substantial changes was to broaden the Supreme Court’s increasingly narrow interpretation of what qualified as a “mitigating measure” to remove a barrier to access.⁴⁴⁸ Specifically, the amended ADA stated a “mitigating measure” includes “[m]edication, medical supplies, equipment, or appliances, low-vision devices . . . (not including ordinary eyeglasses or contact lenses), prosthetics, including limbs and devices, hearing aids and cochlear implants, or other implantable hearing devices, mobility devices, or oxygen therapy equipment and supplies.”⁴⁴⁹

a. Characterizing Air Filtration as a Required Auxiliary Aid or Service

The Department of Justice’s guide to compliance with the ADA defines “auxiliary aids and services” to include “accessible electronic and information technology” or “other effective methods of making visually delivered materials available to individuals who are blind or have low vision.”⁴⁵⁰ These steps include providing “auxiliary aids and services” that make this access possible.⁴⁵¹ The ADA defines “auxiliary

/disability-barriers.html [https://perma.cc/6ZMF-DR57] (adopting WHO definition) (last visited Feb. 27, 2024).

⁴⁴⁷ *Ridley Sch. Dist. v. M.R.*, 680 F.3d 260, 281 (3d Cir. 2012) (*internal quotation marks omitted*) (*quoting J.D. ex rel. J.D. v. Pawlet Sch. Dist.*, 224 F.3d 60, 70-71 (2d Cir. 2000)).

⁴⁴⁸ *ADA Amendments Act of 2008 Frequently Asked Questions*, DEP’T OF LABOR, <https://www.dol.gov/agencies/ofccp/faqs/americans-with-disabilities-act-amendments> [https://perma.cc/FEA8-MYGF] (last visited Feb. 27, 2024).

⁴⁴⁹ 29 C.F.R. § 1630.2(j)(5)(i). *See also* DEP’T OF LABOR, *supra* note 448.

⁴⁵⁰ 28 C.F.R. § 36.303(b)(2).

⁴⁵¹ For standards regarding auxiliary aids in health care, see Office for Civil Rights (OCR), *Section 1557: Ensuring Effective Communication with and Accessibility for Individuals with Disabilities*, U.S. DEP’T OF HEALTH AND HUM. SERVS, <https://www>

aids and services” as “qualified interpreters or other effective methods of making aurally delivered materials available to individuals with hearing impairments; qualified readers, taped texts, or other effective methods of making visually delivered materials available to individuals with visual impairments; acquisition or modification of equipment or devices; and other similar services and actions.”⁴⁵²

These obligations not just provide aids and services but also create an environment compatible with their use, as the Ninth Circuit clarified in *Robles v. Domino’s Pizza*, where the Ninth Circuit held that a restaurant was obligated to make the ordering software on their website as accessible as would be required for customers ordering in the restaurant’s “physical store.”⁴⁵³

As Christopher Danielsen, a representative for the National Federation of the Blind, explained, “[i]f businesses are allowed to say, ‘[w]e do not have to make our websites accessible to blind people,’ that would be shutting blind people out of the economy. . . .”⁴⁵⁴ In 2019, that definition was upheld and expanded when the Supreme Court declined to hear a challenge to a decision by the Ninth Circuit Court of Appeals finding that a pizza store whose online ordering software was not compatible with a screen reader that allowed a person with a visual impairment to access printed violated the ADA.⁴⁵⁵ In doing so, it wrote

.hhs.gov/civil-rights/for-individuals/section-1557/fs-disability/index.html [https://perma.cc/M796-DAAW] (last updated Aug. 25, 2016). For standards applying to public entities, see *Auxiliary Aids and Services*, L.A. DEP’T ON DISABILITY, <https://disability.lacity.org/services/auxiliary-aids-and-services> [https://perma.cc/PC76-B94L] (last visited Feb. 27, 2024).

⁴⁵² 42 U.S.C. § 12103(1).

⁴⁵³ *Robles v. Domino’s Pizza, LLC*, 913 F.3d 898, 904 (9th Cir. 2019) (citing 42 USC § 12182(b)(2)(A)(iii)). See also *Haynes v. Dunkin’ Donuts, LLC*, 741 F. App’x 752 (11th Cir. 2018) (not selected for publication) (reversing District Court’s granting of a motion to dismiss and holding that a blind plaintiff who could not access the website operated on behalf of Dunkin’ Donuts stated “a plausible claim for relief under Title III of the ADA”). For further discussion of how Title III applies to the accessibility of websites, see generally Ella G. Clifford, *Remaining Barriers to Accessibility: Americans with Disabilities Act and Websites*, 1 B.C. INTELL. PROP. & TECH. F. (2022). See also *Olmstead v. L.C. ex rel. Zimring*, 527 U.S. 581 (1999).

⁴⁵⁴ Lexi Lonas, *Blind Man Sues Domino’s Over Non-Handicap Accessible Website, the Supreme Court Might Hear the Case*, DAILY CALLER (Aug. 8, 2019, 4:05 AM), <https://dailycaller.com/2019/08/02/blind-man-sues-dominos-supreme-court/> [https://perma.cc/GGW7-F3CF].

⁴⁵⁵ *Domino’s Pizza, LLC v. Robles*, 140 S. Ct. 122 (2019); *Robles v. Domino’s Pizza, LLC*, 913 F.3d 898, 902 (9th Cir. 2019) (“On at least two occasions, Robles unsuccessfully attempted to order online a customized pizza from a nearby Domino’s. Robles contends that

the ADA expressly provides that a place of public accommodation, like Domino's, engages in unlawful discrimination if it fails to "take such steps as may be necessary to ensure that no individual with a disability is excluded, denied services, segregated or otherwise treated differently than other individuals because of the absence of auxiliary aids and services."⁴⁵⁶ It then held providing a website compatible with the defendant's screen reader met DOJ regulations that require a public accommodation "furnish appropriate auxiliary aids and services where necessary to ensure *effective communication* with individuals with disabilities."⁴⁵⁷

The ADA requires schools to provide students with "necessary auxiliary aids and services to individuals with disabilities . . . but they do not require institutions to provide all requested auxiliary aids and services."⁴⁵⁸ One of the many negative consequences of the politicization of efforts to stop the spread of COVID-19 has been prohibitions on respirators or air filtration devices.⁴⁵⁹ CDC's adoption of indoor air quality standards and designation of conditions that put people at particular risk of harm from COVID-19 will now make these bans difficult, if not impossible, to enforce against people who can prove a qualifying disability. The fast-food chain In-N-Out Burger has effectively conceded that point when announcing their employees will be banned from wearing face coverings without "a valid medical note 'exempting him or her from this requirement.'"⁴⁶⁰ Although there has not, as of the writing of this Article, been a reported case in which an individual claimed the right to a portable air filtration device, disability advocate Mathew Cortland notes the EEOC's guidance to employers

he could not order the pizza because Domino's failed to design its website and app so his software could read them.").

⁴⁵⁶ 42 U.S.C. § 12182(b)(2)(A)(iii).

⁴⁵⁷ *Robles v. Domino's Pizza, LLC*, 913 F.3d 898, 904 (9th Cir. 2019) (citing 28 C.F.R. § 36.303(c)(1) (emphasis added); see *Bragdon v. Abbott*, 524 U.S. 624, 646 (holding DOJ's administrative guidance on ADA compliance is entitled to deference). See also 42 U.S.C. § 12182(b)(2)(A)(iii) ("[I]ndividual with a disability is excluded, denied services, segregated or otherwise treated differently than other individuals because of the absence of auxiliary aids and services.").

⁴⁵⁸ *Argenyi v. Creighton Univ.*, 703 F.3d 441, 448 (8th Cir. 2013).

⁴⁵⁹ For examples of schools refusing to allow the use of air filtration devices, see Georgina Quach, *Schools Rejecting Offers of Air Filters That Limit COVID Spread, Say Parents*, THE GUARDIAN (Jan. 17, 2022), <https://www.theguardian.com/education/2022/jan/17/schools-rejecting-offers-to-buy-air-filters-that-limit-covid-parents-say> [https://perma.cc/KF7B-MJ2E] (last visited Feb. 27, 2024).

⁴⁶⁰ Jonathan Franklin, *In-N-Out Burger Bans Employees in 5 States from Wearing Masks*, NPR (July 19, 2023, 5:57 PM), <https://www.npr.org/2023/07/19/1188706519/in-n-out-burger-bans-employees-from-wearing-masks> [https://perma.cc/HK49-GQD2].

writes that such a device should be considered under the same criteria applied to respirators.⁴⁶¹ Specifically, he quotes Section G.5 of the EEOC guidance advising employers that

[r]easonable accommodations also may include additional or enhanced protective measures, such as High Efficiency Particulate Air (HEPA) filtration systems/units or other enhanced air filtration measures, erecting a barrier that provides separation between an employee with a disability and coworkers/the public, or increasing the space between an employee with a disability and others.⁴⁶²

The core requirement of the ADA is access. If the federal government adopts the CDC's indoor air quality standard as a prerequisite for making a building accessible to people with qualifying disabilities, it will be up to the covered entities to meet that obligation. It will be up to the Department of Justice to establish specific guidelines for compliance as they do with website access.⁴⁶³

The most direct and effective way of assuring that devices required to meet CDC IAQ standards are recognized as auxiliary aids would be to amend the ADA. However, Congress has had little success in passing bills addressing gaps in Title VI's standards for web-based communication, so a legislative expansion is unlikely.⁴⁶⁴

One particularly promising avenue for success is characterizing air filtration and other devices that remove virus-bearing particles as

⁴⁶¹ Mathew Cortland, *Are Air Filters a Reasonable Accommodation?*, PATREON (Sept. 30, 2022), <https://www.patreon.com/posts/are-air-filters-72710898> (citing *What You Should Know About COVID-19 and the ADA, the Rehabilitation Act, and Other EEO Laws*, U.S. EEOC, <https://www.eeoc.gov/wysk/what-you-should-know-about-covid-19-and-ada-rehabilitation-act-and-other-eeo-laws> [<https://perma.cc/27DF-TESE>] (last visited Feb. 27, 2024)).

⁴⁶² *What You Should Know About COVID-19 and the ADA, the Rehabilitation Act, and Other EEO Laws*, U.S. EEOC, <https://www.eeoc.gov/wysk/what-you-should-know-about-covid-19-and-ada-rehabilitation-act-and-other-eeo-laws> [<https://perma.cc/27DF-TESE>] (last visited Feb. 27, 2024).

⁴⁶³ *Justice Department Issues Web Accessibility Guidance Under the Americans with Disabilities Act*, U.S. DEP'T OF JUSTICE (Mar. 18, 2022), <https://www.justice.gov/opa/pr/justice-department-issues-web-accessibility-guidance-under-americans-disabilities-act> [<https://perma.cc/9NVE-FL7E>].

⁴⁶⁴ For an explanation of the disruption caused by Congress' inability to amend Title VI, see generally Amelia Hensel, *Disability Law-from Stair Flights to Websites: An Argument for Amending the Americans with Disabilities Act to Include Title VI That Applies to Online Spaces*, 45 U. ARK. LITTLE ROCK L. REV. 509 (2023).

“auxiliary aids or services.”⁴⁶⁵ Although this term has been used in the context of assisting communication, there is a strong argument a device that reduces the risk of infection serves the same purpose.⁴⁶⁶ In contrast to the slow process of waiting for the Justice Department to issue new construction standards, courts have, on their own, recognized new technology as meeting the definition of an “auxiliary aid and services” so long as there is sufficient evidence of both its effectiveness and the plaintiff’s need.⁴⁶⁷

4. Characterizing Meeting Air Quality Standards as Removing an Architectural Barrier

Although the ADA’s protection against barriers to access extends well beyond physical impediments,⁴⁶⁸ removing what is described as “architectural barriers” is one of its most visible achievements.⁴⁶⁹

Title III of the ADA prohibits discrimination “bas[ed] [on] disability in the full and equal enjoyment of the goods, services, facilities, privileges, advantages, or accommodations of any place of public accommodation by any person who owns, leases (or leases to), or operates a place of public accommodation.”⁴⁷⁰ Title III of the ADA also specifically states that for public accommodations, discrimination includes “failure to remove architectural barriers . . . in existing facilities” unless it can be shown that removing a barrier is “not readily achievable” or accommodations cannot be provided through other means.⁴⁷¹

⁴⁶⁵ 42 U.S.C. § 12182(b)(2)(A)(iii). For an overview of the law as applied to providing individual assistive devices in schools, see Rosemary Queenan, *Amplifying Their Voices: Equity and Assistive Technology for Children with Disabilities*, 127 DICK. L. REV. 1 (2022).

⁴⁶⁶ *ADA Requirements: Effective Communication*, ADA.GOV (Feb. 28, 2020), <https://www.ada.gov/resources/effective-communication/> [<https://perma.cc/M3LS-WCTU>] (“The ADA uses the term ‘auxiliary aids and services’ to refer to the ways to communicate with people who have communication disabilities.”).

⁴⁶⁷ *Id.* See also *2010 ADA Standards for Accessible Design*, ADA.GOV (Sept. 15, 2010), <https://www.ada.gov/law-and-regs/design-standards/2010-stds/> [<https://perma.cc/Q4HF-D64X>].

⁴⁶⁸ For an historic account of the nonphysical barriers to access addressed by the ADA, see Allen Smith, *The ADA at 30: Looking Back and Ahead*, SOC’Y FOR HUM. RES. MGMT. (May 27, 2020), <https://www.shrm.org/hr-today/news/hr-magazine/summer2020/pages/the-ada-at-30-looking-back-and-ahead.aspx> [<https://perma.cc/V6T5-KAA8>].

⁴⁶⁹ See also Yochai Eisenberg et al., *Are Communities in the United States Planning for Pedestrians with Disabilities? Findings from a Systematic Evaluation of Local Government Barrier Removal Plans*, 102 CITIES 1 (2020) (comparing U.S. and global strategies for removing physical barriers to access).

⁴⁷⁰ 42 U.S.C. § 12182(a).

⁴⁷¹ 42 U.S.C. § 12182(b)(2)(iv)–(v).

Even if a plaintiff can prove there is a substantial likelihood of their experiencing harm from attending school and that risk is a barrier to access, they would still have to prove air filtration is a reasonable method of removing that barrier.

Therefore, another way of using the ADA to obtain indoor air quality standards that reduce the risk of infectious disease is to argue air quality below those standards creates a barrier to access for people who are “uniquely at risk by virtue of their individual medical conditions and disabilities”⁴⁷² Once such a barrier is identified, the covered entity must “take [such] steps that may be necessary to ensure that no individual with a disability is excluded, denied services, segregated or otherwise treated differently”⁴⁷³ Depending on the nature of the barrier, these steps may be required even when a person with a qualifying disability is not present.⁴⁷⁴ Doing so requires a commitment to “universal design” that extends beyond “compliance with standards” but rather requires “developing solutions to meet the needs of all users, with and without disabilities.”⁴⁷⁵

If indoor air quality is a barrier to access, then the burden shifts to the Department of Justice to develop and enforce regulations that set accessibility standards for public buildings and those that offer public services.⁴⁷⁶ Once these standards are set, public buildings must remove barriers unless doing so is “structurally impracticable.”⁴⁷⁷ Private entities offering public accommodations are held to a lower standard because they are only required to remove barriers “where such removal is readily achievable.”⁴⁷⁸ The ADA has defined “readily achievable” as something that is “easily accomplishable and able to be carried out without much difficulty or expense.”⁴⁷⁹

⁴⁷² Doe v. Perkiomen Valley Sch. Dist., 585 F. Supp. 3d 668, 680–81 (E.D. Pa. 2022).

⁴⁷³ 28 C.F.R. § 36.303(a).

⁴⁷⁴ *Universal Design and Accessibility*, GEN. SERV. ADMIN., <https://www.section508.gov/develop/universal-design/> [<https://perma.cc/P598-YU9F>] (last visited Feb. 27, 2024).

⁴⁷⁵ *Id.*

⁴⁷⁶ *2010 ADA Standards for Accessible Design*, DEP’T OF JUST. CIV. RTS. DIV. (Sept. 15, 2010), <https://www.ada.gov/law-and-regs/design-standards/2010-stds/> [<https://perma.cc/DCP5-HNP8>].

⁴⁷⁷ *Id.*

⁴⁷⁸ 42 U.S.C. § 12182(b)(2)(A)(iv); 28 C.F.R. § 36.304(a); 42 U.S.C. § 12181(9); 28 C.F.R. §§ 36.104, 36.304(a).

⁴⁷⁹ 42 U.S.C. § 12181(9); *Colo. Cross Disability Coal. v. Hermanson Fam. Ltd.*, 264 F.3d 999, 1002 (10th Cir. 2001) (A plaintiff seeking removal of architectural barriers under Americans with Disabilities Act (ADA) provision forbidding discrimination in the

One of the very challenging aspects of conducting an ADA analysis is that even when the plaintiff can identify a barrier to their access, the extent of the obligation to remove that barrier depends on the title of the ADA under which the location falls. The easiest case is always access to a place under the control of a city, state, or federal government. Under Title II, public entities must provide “access . . . comparable to that available to employees and members of the public without disabilities.”⁴⁸⁰ The obligations of a private entity that provides public accommodation, like a store or a private school, are somewhat less.⁴⁸¹

I believe the risk of contracting an infectious disease is so high and the cost of meeting CDC indoor air standards so relatively low that plaintiffs are likely to meet even the lower criteria of Title II.

In contrast, cases brought interpreting the right to “a free appropriate public education” (FAPE) as mandated by the IDEA are highly nuanced.⁴⁸²

By distinguishing between cases challenging the quality of education and those challenging access to education, the Supreme Court has created two helpful sources of precedent. First, it frees cases seeking access to schools from the more restrictive standards and procedural requirements of cases brought under IDEA regarding the quality of education. Second, including access to education in the larger category of access to all public spaces creates an opportunity to confirm the Court’s support for regulations promulgated under the ADA promoting access to public spaces.⁴⁸³

construction of places of public accommodation “bears initial burden of production to present evidence tending to show that the suggested method of barrier removal” is readily achievable under the circumstances . . . if plaintiff [does so], defendant then bears the ultimate burden of persuasion on affirmative defense that barrier removal is not readily achievable . . .”).

⁴⁸⁰ *Section 508 Home Page*, DEP’T OF JUST. (Feb. 27, 2023), <https://www.justice.gov/crt/section-508-home-page-0> [<https://perma.cc/F7YT-SG6U>].

⁴⁸¹ 42 U.S.C. § 12181(7)(J); *See, e.g.*, *G. v. Fay Sch.*, 931 F.3d 1, 9 (1st Cir. 2019) (explaining that under Title II of the ADA “‘public accommodation’ is expansively defined and includes twelve categories of places, ranging from ‘service establishment[s],’ such as a ‘dry-cleaner’ or ‘bank,’ to ‘places of public display or collection,’ such as a ‘museum or library.’ Of particular relevance to this case, the term includes ‘places of education,’ such as private secondary schools”).

⁴⁸² The Individuals with Disabilities Education Act, 20 U.S.C. §§ 1400–1482; 34 C.F.R. § 300.101.

⁴⁸³ Nina Totenberg, *Supreme Court Hands Victory to Public School Students with Disabilities*, NPR (Mar. 21, 2023, 4:54 PM), <https://www.npr.org/2023/03/21/1165072110/supreme-court-hands-victory-to-public-school-students-with-disabilities> [<https://perma.cc>].

At least one case affirming the right of students to require others to wear masks was dismissed as moot based on the CDC's assessment that there was less risk of catching or experiencing serious harm from COVID-19.⁴⁸⁴

The Eighth Circuit gave a particularly detailed explanation when it dismissed a challenge of Iowa's antimask rule as "moot" because

current conditions differ vastly from those prevailing when the district court addressed it. COVID-19 vaccines are now available to children and adolescents over the age of four, greatly decreasing Plaintiffs' children's risk of serious bodily injury or death from contracting COVID-19 at school. Further, when the Plaintiffs sought a preliminary injunction, delta was the dominant variant, producing high transmission rates and [caseloads] throughout the country. Now, omicron has become dominant and subsided, leaving markedly lower transmission rates and [caseloads] throughout Iowa and the country.⁴⁸⁵

The growing consensus that schools can use air filtration, ventilation, and UV sterilization to achieve the CDC's standards for indoor air quality brings the welcome option of bypassing what has become highly contentious disputes over mask-wearing.

One of the most immediate public health responses to the spread of COVID-19 cases in the United States in February and March of 2020 was the preemptive closing of school buildings.⁴⁸⁶ When most schools reopened in the fall of 2021, many families with children with disabilities found policies that recommended, but did not require, mask-wearing, while others lived in districts that did not allow masks.⁴⁸⁷ The results were mixed because the circumstances differed

/83PS-F2A4]; *The U.S. Supreme Court Expands the Rights of Disabled Students to Seek Relief Against School Districts*, JD SUPRA (Mar. 29, 2023), <https://www.jdsupra.com/legalnews/the-u-s-supreme-court-expands-the-5845254/> [<https://perma.cc/GH26-W3VQ>].

⁴⁸⁴ G.S. v. Lee, 560 F. Supp. 3d 1113 (W.D. Tenn. 2021).

⁴⁸⁵ *Arc of Iowa v. Reynolds*, 33 F.4th 1042, 1044 (8th Cir. 2022); *COVID Data Tracker: COVID-19 Integrated County View*, CTRS. FOR DISEASE CONTROL & PREVENTION (June 10, 2022), <https://stacks.cdc.gov/view/cdc/118234> (listing 97 Iowa counties as "low" COVID-19 community-level areas, and two as "medium").

⁴⁸⁶ J. Matt Jameson et al., *Free Appropriate Public Education in the Time of COVID-19*, 39 RURAL SPECIAL EDUC. Q. 181 (2020).

⁴⁸⁷ It is important to remember there was never a federal order to close all schools. Instead, individual states made their own decisions based on CDC guidance on when to close their schools to in-person learning and then when to reopen them. For an account of school closings due to COVID-19 in 2020 and 2021, see Nicole Zviedrite et al., *COVID-19-associated School Closures and Related Efforts to Sustain Education and Subsidized Meal*

in every case. Some parents prevailed, while others did not.⁴⁸⁸ Finally, some states have laws preventing disability discrimination that provide more protection than the ADA.⁴⁸⁹

When disability discrimination claims arise in a school setting, they are usually analyzed under the provisions of Title II, as recipients of federal funding, and Section 504 of the Rehabilitation Act.⁴⁹⁰ This is because Title II of the ADA “incorporates the non-discrimination principles of section 504 of the Rehabilitation Act and extends them to state and local governments.”⁴⁹¹

The first round of litigation involving efforts by states to prevent the spread of COVID-19 by requiring students to cover their mouth and nose with a respirator when in school, often called “mask mandates,” was brought by parents claiming a violation of their individual rights.⁴⁹²

Programs, United States, February 18-June 30, 2020, 16 PLOS ONE 1 (2021). For accounts of these disputes, see Elizabeth Pendo et al., *Resolving Tensions Between Disability Rights Law and COVID-19 Mask Policies*, 80 MD. L. REV. ONLINE 1 (2020); Madeleine M. Plasencia, *COVID-19, Lying, Mask-Less Exposures and Disability During a Pandemic*, 11 U. MIAMI RACE & SOC. JUST. L. REV. 119 (2021).

⁴⁸⁸ See, e.g., *L.E. v. Superintendent of Cobb Cnty. Sch. Dist.*, 55 F.4th 1296 (11th Cir. 2022) (reversing District Court and finding that students with qualified respiratory disabilities had a “reasonable likelihood of success” in their claim that the school’s refusal to adopt “the multi-layered approach to COVID-19 precautions” but instead offered “remote education” was unreasonable).

⁴⁸⁹ See, e.g., 9 CRR-NY § 466.14(c) (1) (Covering all employers, whereas the ADA only covers private employers with more than 15 employees and applies to housing providers); NJ Rev. Stat. § 10:5–12 (Covering all employers, defines disability broadly without the requirement that it cause a substantial limitation in major life activity). This is also true in the case of state laws that provide more protection against pregnancy discrimination than federal laws. See generally Stephen Joyce, *State Laws Protecting Pregnant Workers Fill Gaps in Federal Law*, BLOOMBERG L. (Oct. 26, 2022), <https://news.bloomberglaw.com/daily-labor-report/state-laws-protecting-pregnant-workers-fill-gaps-in-federal-law> [<https://perma.cc/9KAC-QMRN>].

⁴⁹⁰ 29 U.S.C. § 794(a).

⁴⁹¹ *Doe 1 v. Perkiomen Valley Sch. Dist.*, 585 F. Supp. 3d 668, 686 (E.D. Pa. 2022) (citing *Helen L. v. DiDario*, 46 F.3d 325, 331 (3d Cir. 1995) (“Not surprisingly therefore, the language of Section 504 reverberates through the ADA”); 42 U.S.C. § 12132; 28 C.F.R. § 35.130 (2016) (ADA Title II regulations). Thus, case law on Section 504” is an appropriate guide to interpret the ADA” and vice versa. HENRY H. PERRITT JR., *AMERICANS WITH DISABILITIES ACT HANDBOOK* § 1.02 (5th ed. 2018); see also *Berardelli v. Allied Servs. Inst. of Rehab. Med.*, 900 F.3d 104, 110 (2018) (observing that the ADA and Section 504” have been constant companions in our case law as it has developed to effect those rights”); *Helen L. v. DiDario*, 46 F.3d 325, 334–35 (applying the Supreme Court’s analysis of Section 504 to the ADA).

⁴⁹² See, e.g., Amanda Garrett, *5 Things We Know About Parents Suing over Mask Mandates at Northeast Ohio Schools*, AKRON BEACON J. (Oct. 5, 2021), <https://www.beaconjournal.com/story/news/2021/10/05/trump-supporter-other-northeast-ohio-parents-sue-over-mask-mandates/5993717001/> [<https://perma.cc/28ZN-RNTV>]; Joseph Choi,

These were routinely unsuccessful.⁴⁹³ However, once states began passing laws or governors began issuing executive orders prohibiting mask mandates, the legal claims came from parents who wanted the protection of mask mandates for their children.⁴⁹⁴ These parents were not making Constitutional claims, but rather argued these prohibitions on masking were in direct violation of the ADA. As Kaitlin Banner, representing the Virginia chapter of the ACLU explained, an executive order that prohibited mask wearing in schools showed a “reckless disregard for students with disabilities across Virginia.”⁴⁹⁵ She explained further that the executive order violated the provisions of the ADA and Section 504 of the Rehabilitation Act, which prohibited public schools from excluding students with disabilities, denying them equal access to their education, or segregating them unnecessarily.⁴⁹⁶

Anti-Mask Parents Not Constitutionally Allowed to Change School Rules, Says Federal Judge, THE HILL (Dec. 23, 2021), <https://thehill.com/regulation/court-battles/587197-anti-mask-parents-not-constitutionally-allowed-to-change-school/> [<https://perma.cc/CFG8-V9HU>]; Scott Bomboy, *The Constitutional Issues Related to COVID-19 Mask Mandates*, NAT'L CONST. CTR. (Aug. 13, 2021), <https://constitutioncenter.org/blog/the-constitutional-issues-related-to-covid-19-mask-mandates> [<https://perma.cc/WG9L-8S8S>].

⁴⁹³ Jacob Monty, *ADA and Face Mask Policies: A Step-By-Step Response*, MONTY & RAMIREZ LLP (Aug. 6, 2020), <https://www.montyramirezlaw.com/ada-and-face-mask-policies-a-step-by-step-response/> [<https://perma.cc/QC62-8TA3>] (“To limit the risk of harm to employees brought on by the COVID-19 pandemic, private businesses may impose legitimate safety requirements necessary for safe operation.”).

⁴⁹⁴ Erica L. Green, *For Parents of Disabled Children, School Mask Wars Are Particularly Wrenching*, N.Y. TIMES (Sept. 23, 2021), <https://www.nytimes.com/2021/09/23/us/politics/disabled-students-mask-mandate.htm> [<https://perma.cc/5LNF-HLP2>]. See also William Morris, *Iowa Must Permit School Districts to Require Masks in Some Cases, Court Rules; Iowa to Appeal*, DES MOINES REG. (Nov. 1, 2022), <https://www.desmoinesregister.com/story/news/crime-and-courts/2022/11/01/iowa-school-mask-mandate-ban-kim-reynolds-americans-disabilities-act-federal-judge/69611238007/> [<https://perma.cc/MS8C-RMXZ>].

⁴⁹⁵ Patrick Wilson, *Parents of Students with Disabilities Sue Youngkin in Federal Court Over Masks-Optional Order*, DAILY PROGRESS (Feb. 1, 2022), https://dailyprogress.com/article_9a64c21b-4c80-5025-85aa-3eaf57d31d4d.html; *Parents of Students with Disabilities File Suit to Stop Youngkin's No Mask Mandate*, ACLU VIRGINIA (Jan. 31, 2022), <https://www.acluva.org/en/press-releases/parents-students-disabilities-file-suit-stop-youngkins-no-mask-mandate> [<https://perma.cc/SK7P-ZNVT>].

⁴⁹⁶ ACLU VIRGINIA, *supra* note 495 (noting the state had failed in its obligation “to provide reasonable modifications to policies, practices, and procedures to give students with disabilities an equal opportunity to benefit from their public education.”).

F. Using CDC Standards as Basis for Negligence Claims in Civil Litigation

Tort litigation has always been an important nongovernmental goal in advancing public health.⁴⁹⁷ Negligence actions are almost always governed by the state law in which the harm occurred. In general, they share a framework that requires plaintiffs to prove by a preponderance of the evidence that they have experienced harm based on the unreasonable behavior of another.⁴⁹⁸ When the person causing harm is the owner or operator of a building that is either open to the public or to which the public is invited, the negligence law of most states imposes an obligation to make the premises reasonably safe.⁴⁹⁹

There are precedents for proving harm from exposure to toxins. For example, plaintiffs have successfully recovered based on “sick building syndrome.”⁵⁰⁰ Defining “reasonable” is often a torts suit’s major point of contention. One of the most powerful methods of proving that an action results in the release of harmful substances is to prove the action is not just careless but illegal.⁵⁰¹ But torts suits can effectively control behavior even when there are no binding legal standards if the behavior can be linked to nonbinding industry standards or even academic statements of best practice.⁵⁰²

⁴⁹⁷ ELIZABETH WEEKS LEONARD, TORT LITIGATION FOR THE PUBLIC’S HEALTH, RECONSIDERING LAW AND POLICY DEBATES: A PUBLIC HEALTH PERSPECTIVE (2010).

⁴⁹⁸ For an overview of establishing a prima facie case based on the release of a toxic substance, see Tiega-Noel Varlack, *Gearing up for Toxic Torts*, in TRIAL 50 (2023).

⁴⁹⁹ For an overview of premises liability, see Roy Alan Cohen & Jeffrey M. Pypcznski, *Defending Property Owners in Toxic and Hazardous Substances-Related Premises Liability Litigation*, 74 DEF. COUNS. J. 35 (2007); *Premises Liability, Explained*, PROVIDENT PROTECTION PLUS (Jan. 14, 2019), <https://www.providentprotectionplus.com/premises-liability-explained/> [<https://perma.cc/7DKD-T246>]. For an overview of litigation related to “Sick Building Syndrome,” see KAREN GOTTLIEB, TOXIC TORTS PRAC. GUIDE § 3:22 (2nd ed. 2023).

⁵⁰⁰ For a definition of “sick building syndrome,” see *Indoor Air Facts No.4 Sick Building*, U.S. ENV’T PROT. AGENCY, https://www.epa.gov/sites/default/files/2014-08/documents/sick_building_factsheet.pdf [<https://perma.cc/WU7T-MUB8>] (last visited Feb. 26, 2024).

⁵⁰¹ For more information about criminal enforcement of environmental laws in the United States, see Joshua Ozymy & Melissa L. Jarrell, *Does the Criminal Enforcement of Federal Environmental Law Deter Environmental Crime? The Case of The U.S. Resource Conservation and Recovery Act*, 11 ENV’T AND EARTH L.J. 65 (2021); *Environmental Crimes Section*, U.S. DEP’T OF JUSTICE, <https://www.justice.gov/enrd/environmental-crimes-section> [<https://perma.cc/QG3G-H5VA>] (last visited Feb. 27, 2024).

⁵⁰² See Elizabeth A. Weeks, *Beyond Compensation: Using Torts to Promote Public Health*, 10 J. HEALTH CARE L. & POL’Y 27 (2007). See also Tara Ramanathan, *Law as a Tool to Promote Healthcare Safety*, 19 CLIN GOV’T 172, 177 (2014) (“In tort law, providers and facilities connected to a preventable harm can be named in a suit as defendants based

It is also possible for individuals harmed by exposure to environmental toxins to use these laws as proof of negligence on behalf of the responsible party. The individual or group of individuals harmed can sue directly for damages.⁵⁰³

Setting specific standards for indoor air quality will, therefore, directly improve air quality by giving the EPA enforcement authority and creating a pathway for those directly harmed by the failure to comply.⁵⁰⁴ In most jurisdictions, proving a responsible party violated a binding law provides a substantial advantage in proving negligence and recovering damages.⁵⁰⁵ Proof a responsible party has violated industry standards is always strong evidence of a breach of the standard of care, even if not legally binding.⁵⁰⁶

1. Negligence

The civil tort of negligence is a fundamental doctrine that seeks to hold individuals accountable for their failure to exercise reasonable care, thereby causing harm to others.⁵⁰⁷ “A mass tort involves numerous plaintiffs filing civil lawsuits against one or a few corporate defendants” who “allege that they were harmed by exposure to

on their respective roles and duties; accordingly, employers may be vicariously liable for employees’ actions, corporate entities can be held liable.”).

⁵⁰³ Albert C. Lin, *Beyond Tort: Compensating Victims of Environmental Toxic Injury*, 78 S. CA. L. REV. 1439 (2005).

⁵⁰⁴ Ronen Perry, *Who Should Be Liable for the COVID-19 Outbreak?*, 58 HARV. J. ON LEGIS. 253 (2021). See also Jonathan S. Martel et al., *How to Defend Air Pollution Torts After Bell v. Cheswick*, ARNOLD & PORTER LLP (Sept. 27, 2013), https://www.arnoldporter.com/~media/files/perspectives/publications/2013/09/how-to-defend-air-pollution-torts-after-bell-v-c_/files/publication/fileattachment/arnoldporterllpenvironmentallaw360092713.pdf [<https://perma.cc/Q4CK-96KG>].

⁵⁰⁵ KAREN GOTTLIEB, TOXIC TORTS PRAC. GUIDE § 6:6 (2nd ed. 2023). (“Negligence per se is a separate subcategory of the common law negligence doctrine. Where the state or federal government has adopted a statute establishing a mandatory duty of care which the defendant has allegedly violated, and the plaintiff is in the class of persons intended to be protected by that law, the plaintiff may assert that breach of the duty is negligence per se.”).

⁵⁰⁶ LAWRENCE G. CETRULO, TOXIC TORTS LITIGATION GUIDE § 2:4 (2023) (“Industry standards and practices are also factors to be considered in ascertaining what constitutes reasonable conduct on the part of a manufacturer of a toxic substance. A majority of jurisdictions allow juries to consider evidence of compliance (or non-compliance) with applicable industry-wide safety standards or practices when deciding if a defendant’s conduct in a given case comports with that of a reasonable manufacturer. Such evidence of custom is not dispositive, however, and the facts and circumstances of each case must be considered when evaluating the reasonableness of any conduct.”).

⁵⁰⁷ DAN B. DOBBS ET AL., HORNBOOK ON TORTS § 9.5.

products produced by the defendants.”⁵⁰⁸ They would have to prove by a preponderance of the evidence that the defendant had control over the air quality in a building where they knew the plaintiff could be exposed and acted below the standard of reasonable care in failing to control the amount of virus in the air.⁵⁰⁹

In the fall of 2020, these lawsuits seemed likely to be a major source of liability. As one law firm’s newsletter explained, “[p]laintiffs’ attorneys are advertising for plaintiffs infected by COVID-19, and new COVID-19 personal injury lawsuits are being filed at a steady clip.”⁵¹⁰ But the initial expectations that such suits would be common were thwarted when the federal government and individual states quickly passed laws providing broad protection against torts suits for exposure to COVID-19.⁵¹¹ Although there remains discussion in some cases of extending this immunity, the trend is for them to be allowed to expire.⁵¹²

⁵⁰⁸ Michelle J. White, *Mass Tort Litigation: Asbestos*, in *ENCYCLOPEDIA L. & ECON.* 1 (Alain Marciano & Giovanni Battista Ramello eds., 2020).

⁵⁰⁹ *Id.*

⁵¹⁰ Sarah L. Brew et al., *Frequently Asked Questions on COVID-19 Personal Injury Litigation*, FAEGRE DRINKER (Sept. 23, 2020), <https://www.faegredrinker.com/en/insights/publications/2020/9/faq-on-COVID19-personal-injury-litigation> [https://perma.cc/XW59-WQ3J]. For an example of such advertising, see 7 *COVID-19 Lawsuits That May Become Common*, DAILEY L. FIRM, <https://daileylawyers.com/blog/7-COVID-19-lawsuits-that-may-become-common/> [https://perma.cc/9SY2-P6B5] (last visited Feb. 27, 2024).

⁵¹¹ Paul F. Dowdell, *Immunity from Liability in the Age of COVID-19: A New Reality for Trial Lawyers?*, SACKS TIERNEY (Aug. 31, 2020), <https://www.sackstierney.com/blog/immunity-from-liability-in-the-age-of-covid-19-a-new-reality-for-trial-lawyers/> [https://perma.cc/V6UZ-K2WM]. For an overview of the statutes and their effect on liability claims, see Sierra Stubbs & John Fabian Witt, *Tort Law’s New Quarantinism: Race and Coercion in the Age of a Novel Coronavirus*, 71 *DEPAUL L. REV.* 613, 619 (2022) (“The arrival of the SARS-CoV-2 virus in the United States sparked a new wave of coercively redistributive enactments in the form of tort immunity legislation.”).

⁵¹² *COVID-19: Understanding Liability Immunity Under the PREP Act*, MARSH (Aug. 11, 2021), <https://www.marsh.com/us/services/casualty/insights/covid-19-liability-immunity-under-prep-act.html#:~:text=The%20declaration%20provides%20liability%20immunity,of%20COVID%2D19%20medical%20countermeasures%20> [https://perma.cc/33FM-WB6B]; KEVIN J. HICKEY, CONGRESSIONAL RSCH. SERV., LSB10443, *THE PREP ACT AND COVID-19, PART 1: STATUTORY AUTHORITY TO LIMIT LIABILITY FOR MEDICAL COUNTERMEASURES* (Apr. 13, 2022). See also Paula M. Bagger, *The Impact of COVID Emergency Orders on the Tolling of Civil Statutes of Limitations*, A.B.A. (Nov. 15, 2021), <https://www.americanbar.org/groups/litigation/committees/commercial-business/practice/2021/impact-of-COVID-emergency-orders-statute-of-limitations/>; KEVIN M. LEWIS & JOSHUA T. LOBERT, CONGRESSIONAL RSCH. SERV., R46540, *COVID-19 LIABILITY: TORT, WORKPLACE SAFETY, AND SECURITIES LAW* (2020).

a. Proving the Elements of Negligence

Assuming defendants are not immune from negligence actions, plaintiffs will bear the burden of proving the tort's four elements: duty, breach, causation, and damages.⁵¹³

The most important consequence of bringing a negligence action in a state that has adopted its indoor air quality standards mirroring those of the CDC's guideline is that plaintiffs can use the negligence per se doctrine to prove a breach of duty.⁵¹⁴ This is because "[t]he idea that underlies the doctrine is that legislative bodies can define the contours of state tort law and substitute legislative standards for the common law reasonable person standard."⁵¹⁵

The presence of the CDC's indoor air quality standards cannot itself set the standard of care for a negligence action because the standards are not binding laws. However, one of the benefits of advocating for states to adopt these standards is that once codified, they are available for plaintiffs to use as proof of negligence under the doctrine of negligence per se.⁵¹⁶ Although there is variety among the states in exactly how this doctrine is applied and defined, in general, most states adopt a version of the Third Restatement of Torts's definition that "[a]n actor is negligent if, without excuse, the actor violates a statute that is designed to protect against the type of accident the actor's conduct causes, and if the accident victim is within the class of persons the statute is designed to protect."⁵¹⁷

⁵¹³ See, e.g., Peter Moffett & Gregory Moore, *The Standard of Care: Legal History and Definitions: The Bad and Good News*, 12 W. J. EMERG. MED. 109 (2011); Tara Ramanathan, *Law as a Tool to Promote Healthcare Safety*, 19 CLINICAL GOVERNANCE: AN INT'L J. 172 (2014); RESTATEMENT (THIRD) OF TORTS: LIABILITY FOR PHYSICAL AND EMOTIONAL HARM § 14 (AM. L. INST. 2010).

⁵¹⁴ For a critical overview of the Negligence Per Se doctrine, see Barry L. Johnson, *Why Negligence Per Se Should Be Abandoned*, 20 N.Y.U. J. LEGIS. & PUB. POL'Y 247, 256 (2017) ("A court invoking the negligence per se doctrine borrows the specific standard of conduct delineated in the statute, substituting that presumably more specific standard for the general, open-ended obligation on the part of the defendant to behave as a reasonable and prudent person under the circumstances.").

⁵¹⁵ Barbara Kritchevsky, *Tort Law Is State Law: Why Courts Should Distinguish State and Federal Law in Negligence-Per-Se Law*, 60 AM. UNIV. L. REV. 72, 87 (2010).

⁵¹⁶ As with all things involving Torts, there is variety among the states as to whether violation of an ordinance, such as that set by a school board, has the weight of a statute. See *id.* at 86.

⁵¹⁷ RESTATEMENT (THIRD) OF TORTS § 14 (AM. L. INST. 2020).

b. Negligence Per Se

Using the negligence per se doctrine, a plaintiff could prove that a defendant responsible for the air quality of a building who does not comply with state statutes that set the standards for indoor quality has, by definition, acted unreasonably.⁵¹⁸

Having proven breach of duty of care, the next challenge for plaintiffs in bringing toxic exposure cases is to prove that the exposure caused whatever harm they suffered.⁵¹⁹ To prevail in an action alleging harm from a toxic substance, a plaintiff must prove the substance to which they were exposed was capable of causing the harm that they suffered and that they did, indeed, suffer that harm.⁵²⁰ Earlier in the pandemic, there were concerns that it would be difficult to prove the extent of harm from an initial infection, but the weight of evidence of future harm is growing stronger.⁵²¹ While defendants are likely to dispute a link between exposure in their building and a plaintiff's illness, their failure to achieve minimum air quality makes proving their acts increased the risk of infection much easier.⁵²²

⁵¹⁸ Johnson, *supra* note 514, at 256 (“[O]perating within the common law negligence framework negligence per se substitutes the statutory standard for the standard of ordinary care and replaces evaluation of breach of ordinary care with determination of violation of the statute.”).

⁵¹⁹ Enjoliqué Aytch Lett & Akiesha Gilcrist Sainvil, *Businesses Must Prepare to Defend Against COVID-19 Lawsuits Despite Shields*, BLOOMBERG L. (May 21, 2021, 1:01 AM), <https://news.bloomberglaw.com/us-law-week/businesses-must-prepare-to-defend-against-covid-19-lawsuits-despite-shields> [<https://perma.cc/TLZ6-VN9J>] (“There are other litigations, such as toxic torts, in which causation presented a challenge to plaintiffs but they overcame it in many instances.”).

⁵²⁰ The challenge of proving causation from exposure to toxic substances is exemplified in *Merrell Dow Pharms., Inc. v. Havner*, 953 S.W.2d 706, 714 (Tex. 1997) (“General causation is whether a substance is capable of causing a particular injury or condition in the general population, while specific causation is whether a substance caused a particular individual’s injury.”). *See also* *Terry v. Caputo*, 875 N.E.2d 72, 77 (“[T]o present a prima facie case involving an injury caused by exposure to mold or other toxic substance, a claimant must establish: (1) that the toxin is capable of causing the medical condition or ailment (general causation), and (2) that the toxic substance in fact caused the claimant’s medical condition (specific causation).”).

⁵²¹ I expressed this concern on November 11, 2022, when it seemed as if there would not be sufficient evidence of long-term harm. Jennifer S. Bard, *How the Unpredictable Long-Term Effects of COVID-19 Infection Pose a Challenge That Tort Law Cannot Meet*, BILL OF HEALTH (Nov. 7, 2022), <https://blog.petrieflom.law.harvard.edu/2022/11/07/long-covid-tort-liability/> [<https://perma.cc/7Z58-YRUR>].

⁵²² *See* Nina A. Kohn, *COVID-19 and the Problem of Multiple Sufficient Causes*, BILL OF HEALTH (Oct. 12, 2022), <https://blog.petrieflom.law.harvard.edu/2022/10/12/COVID-multiple-sufficient-causes/> [<https://perma.cc/ZH5Y-ZABG>].

c. Mold Litigation

Litigation brought in the 1990s seeking compensation for harm from the newly recognized health threat of black mold⁵²³ in residential buildings offers a helpful template for complaints alleging harm from failure to comply with CDC's indoor air quality guidelines.⁵²⁴ The genesis of mold related lawsuits is usually traced back to an article in the *New York Times* telling the story of a family in Texas who claimed they had suffered serious health consequences because of negligently repaired water damage in their home.⁵²⁵ Their claim eventually resulted in a \$34 million jury verdict against their home insurance company.⁵²⁶ In response, states began passing laws setting minimum standards for mold remediation.⁵²⁷ Plaintiffs could then use the statutes against property owners and their insurance companies for not meeting established standards.⁵²⁸ Insurance companies responded by excluding mold damage from the coverage they provided builders.⁵²⁹ Consequently, builders changed their practices to avoid the

⁵²³ See Gregory A. Goodman, *Insurance Triggers as Judicial Gatekeepers in Toxic Mold Litigation*, 57 VAND. L. REV. 241 (2004).

⁵²⁴ For very impressive original research showing the relative infrequency of mold toxin lawsuits before 1995, see Jeffrey J. Hayward, *The Same Mold Story?: What Toxic Mold Is Teaching Us About Causation in Toxic Tort Litigation*, 83 N.C. L. REV. 518 (2005).

⁵²⁵ Lisa Belkin, *Haunted by Mold*, N.Y. TIMES (Aug. 12, 2001), <https://www.nytimes.com/2001/08/12/magazine/haunted-by-mold.html> [<https://perma.cc/N3J8-P8Z5>].

⁵²⁶ Allison v. Fire Ins. Exch., 98 S.W.3d 227 (Tex. App. 2002); Fire Ins. Exch. v. Ballard, No. 03-0312, 2004 WL 7352503 (Tex. Mar. 26, 2004).

⁵²⁷ Walter G. Wright, Jr. & Stephanie M. Irby, *The Transactional Challenges Posed by Mold: Risk Management and Allocation Issues*, 56 ARK. L. REV. 295, 341 (2003) ("Neither the federal nor the state governments have developed mandatory standards applicable to the presence of mold in structures. Instead, the governmental efforts have focused on research and guidance, although unsuccessful steps were taken to enact federal mold legislation in 2002.").

⁵²⁸ Jessica Seger, *Toxic Mold in Texas: Will Recent Insurance Reforms Clean It Up for Good?*, 11 CONN. INS. L.J. 169, 175 (2005) ("Mold litigation is often brought against those in the construction, real estate, and property management industries. Common causes of action in mold litigation include breach of contract or warranty of habitability, negligence, and misrepresentation.").

⁵²⁹ Kent Holland, *Where Mold Damage Was Expressly Excluded from Coverage, the Fact It Resulted from a Covered Concurrent Cause Did Not Bring It Back within Coverage*, CONSTRUCTION RISK (Dec. 31, 2010), <https://www.constructionrisk.com/2010/12/mold-not-covered-in-policy/> [<https://perma.cc/V7DG-8DNJ>] ("The mold exclusion in a builder's risk insurance policy was held to be applicable to mold damage that resulted from covered watered damages that resulted when vandals turned on water taps of a new house just after substantial construction had been completed. Although the water damage was a covered loss and was the concurrent cause of the mold damage, the mold was nevertheless barred from

accumulation of water that their insureds claimed caused harmful black mold.⁵³⁰ What makes the substantial changes in building practices in response to the mold litigation so interesting is that they took place before any proof mold was a human health hazard.⁵³¹

But if mold was not a proven indoor air pollutant, other substances such as lead and asbestos certainly were. Rather than risk another round of lawsuits, federal lending agencies began to take the lead in setting due diligence standards for residential housing.⁵³² “For example, the Federal National Mortgage Association (Fannie Mae) . . . developed ‘Environmental Hazards Management Procedures’ for multifamily housing, which list specific standards and levels of care . . . [for] ‘indoor hazards’ as ‘lead paint and asbestos insulation, old pipes, boilers, and furnaces.’”⁵³³ Around the same time, the “Federal Home Loan Mortgage Corporation (Freddie Mac) . . . established guidelines for appraisers which specify asbestos, urea-formaldehyde foam, and other types of insulation as potential sources of indoor air pollution risk.”⁵³⁴ The structure created by the now discredited mold litigation for bringing claims based on exposure to indoor toxins is a strong basis for cases claiming harm from exposure to COVID-19. Not only is the link between exposure indoors and harm caused by COVID-19 well documented, but there is increasing evidence that the duration of exposure is a substantial risk factor for infection.

d. Public Nuisance

Another possible civil cause of action to enforce the CDC’s IAQ standards is for public nuisance.⁵³⁵ Because the federal government has

coverage due to a clearly stated anticoncurrent causation clause of the policy. The anticoncurrent causation clause excluded coverage for mold even where the mold resulted from an otherwise covered loss such as water damage from vandalism.”).

⁵³⁰ Gary Ransone, *How to Reduce the Risk of Mold Claims*, JLC ONLINE (Mar. 1, 2008), https://www.jlconline.com/business/legal/how-to-reduce-the-risk-of-mold-claims_o [<https://perma.cc/4DBU-3NJY>].

⁵³¹ Press Release, Indoor Mold, Building Dampness Linked to Respiratory Problems and Require Better Prevention, Evidence Does Not Support Links to Wider Array of Illnesses, The Nat’l Acad. (May 25, 2004).

⁵³² Mary Rose Kornreich, *Minimizing Liability for Indoor Air Pollution*, 4 TUL. ENV’T. L.J. 61, 62 (1990) (noting a “dramatic increase in the number and types of indoor pollution claims” related to exposure to asbestos and formaldehyde).

⁵³³ *Id.* at 66.

⁵³⁴ *Id.*

⁵³⁵ Kyra G. Bradley, *Environmental Justice Class Action Rises Above the Rubbish: The Third Circuit Revives Common-Law Nuisance Remedies in Baptiste v. Bethlehem Landfill Co.*, 32 VILL. ENV’T. L.J. 209, 232 n.175 (2021) (discussing the Third Circuit’s broadening

no indoor air quality standards, states are not barred from allowing nuisance claims against indoor polluters.⁵³⁶ This ancient doctrine allows individuals and governments to act against those who create conditions that interfere with the safety or enjoyment of property rights of those living in their vicinity.⁵³⁷ One of the strongest defenses to a complaint that an activity constitutes a “nuisance” is proof of compliance with applicable government standards.⁵³⁸ But just as “compliance” with existing standards can be used as evidence rebutting negligence, noncompliance may raise the presumption of negligence.⁵³⁹ A defendant not complying with a standard bears a heavy burden of proving why such noncompliance is reasonable.⁵⁴⁰

The public nuisance doctrine has a long history in American jurisprudence as a way of improving air quality by restricting the emission of various toxic substances.⁵⁴¹ It creates a mechanism for individuals affected by poor air quality to seek a judicial order enjoining polluters.⁵⁴² By invoking this doctrine, individuals,

definition of public nuisance as applicable to “other urgent legal issues in which class action suits may be especially impactful, including toxic tort liability, gun control, and COVID-19 litigation.”).

⁵³⁶ See *Am. Elec. Power Co. v. Connecticut*, 564 U.S. 410 (2011) (holding the Clean Air Act prevented states from taking action for violations of federal air pollution standards); *North Carolina ex rel. Cooper v. Tenn. Valley Auth.*, 615 F.3d 291, 311–12 (4th Cir. 2010) (“[No] matter how lofty the goal, we are unwilling to sanction the least predictable and the most problematic method for resolving interstate emissions disputes, a method which would chaotically upend an entire body of clean air law and could all too easily redound to the detriment of the environment itself.”).

⁵³⁷ See Albert C. Lin, *Public Trust and Public Nuisance: Common Law Peas in a Pod?*, 45 U.C. DAVIS L. REV. 1075, 1082 (2012) (“[P]ublic nuisance may encompass a wide variety of conduct ranging from actions harmful to public health to behavior deemed damaging to public morals.”).

⁵³⁸ *Id.*

⁵³⁹ See Betsy J. Grey & Samantha Orwoll, *Tort Immunity in the Pandemic*, 96 IND. L.J. SUPP. 66, 66–67 (2020) (arguing that liability shields were not necessary because of the strength of the defense enjoyed by defendants who complied with government safety measures). See also *Massey v. McDonald’s Corp.*, 2020 WL 5700874 (Ill. Cir. Ct. 2020).

⁵⁴⁰ Grey & Orwoll, *supra* note 539, at 66–67. See also *Massey v. McDonald’s Corp.*, No. 20CH4247, 2020 WL 5700874 (Ill. Cir. Ct. June 24, 2020).

⁵⁴¹ For an analysis of the use of public and private nuisance doctrine to improve air quality, see generally Michael C. Blumm, *A Dozen Landmark Nuisance Cases and Their Environmental Significance*, 62 ARIZ. L. REV. 403, 443–47 (2020). See also Lin, *supra* note 537, at 1082.

⁵⁴² See generally Kate Markey, Commentary, *Air Pollution as Public Nuisance: Comparing Modern-Day Greenhouse Gas Abatement with Nineteenth-Century Smoke Abatement*, 120 MICH. L. REV. 1535, 1537 (2022) (“Public nuisance actions are the

communities, or public authorities can take legal action against those responsible for conditions that contribute to indoor COVID-19 transmission. These actions can seek injunctions to stop or limit polluting activities, compel polluters to adopt cleaner technologies, or seek damages for the harm caused by pollution.

The public nuisance doctrine is already being used “[in] the absence of a strong federal response [by] state and local governments, environmental groups, and concerned citizens . . . to address the harm of climate change.”⁵⁴³

One prominent application of the doctrine relates to businesses or establishments that fail to implement adequate safety measures. For instance, a crowded indoor space without proper ventilation or adherence to social distancing guidelines can be deemed a public nuisance.⁵⁴⁴ Plaintiffs can bring legal action against such establishments, seeking court orders to enforce safety measures, close down the premises, or recover damages for the harm caused by the public nuisance.

As immunity statutes are allowed to expire, plaintiffs can use the CDC’s May 11 standards as a basis for public nuisance actions.⁵⁴⁵ Also, the new findings of the long-term harm from contracting COVID-19 will make it easier to prove causation and therefore recover damages even if the initial infection did not require hospitalization.⁵⁴⁶

‘common law of the police power,’ a manner of protecting the people against violations of their health, welfare, and safety through the courts.”).

⁵⁴³ *Id.* at 1159.

⁵⁴⁴ *See id.*

⁵⁴⁵ *The End of an Era: How Will Terminating the COVID-19 Public Health Emergency Affect Life Sciences Companies?*, ROPES & GRAY (Feb. 7, 2023), <https://www.ropesgray.com/en/newsroom/alerts/2023/02/the-end-of-an-era-how-will-terminating-the-COVID-19-public-health-emergency-affect-life-sciences> [https://perma.cc/U6VQ-6WHY].

⁵⁴⁶ For a discussion of plaintiff’s burden to prove causation when claiming harm from exposure to a toxin, see Note, *Causation in Environmental Law*, 128 HARV. L. REV. 2256, 2274 (2015) (noting the need for plaintiffs to prove through scientific evidence the defendant’s release of a toxic substance “could create the type of harm suffered by the plaintiff—suggests that there is at least a possibility that the action *did* cause the harm, and thus, whether the action specifically caused the harm is a controversy suitable for adjudication”). *See also* Danielle Conway-Jones, *Factual Causation in Toxic Tort Litigation: A Philosophical View of Proof and Certainty in Uncertain Disciplines*, 35 U. RICH. L. REV. 875, 878 (2002) (“[T]he only clear observation in toxic tort litigation is the unparalleled dilemma of establishing a cause and effect relationship between a toxin and a plaintiff’s injury.”).

e. Exerting Pressure on Insurance Companies to Promote IAQ

One direct effect of bringing successful negligence claims against buildings that fail to meet indoor air quality standards will be to put pressure on the companies that insure them. Although in the pandemic's early years insurance companies avoided paying claims for infection because of immunity and successful efforts to characterize COVID-19 as "an extraordinary force of nature," neither is available going forward.⁵⁴⁷ This is because the "force of nature defense" against liability is based on a finding that the harm has been caused by natural phenomena beyond human control, like a snowstorm or hurricane.⁵⁴⁸

In the early years of the pandemic, it seemed as if this defense would be available to insurance companies as a reason for rejecting liability claims. As one expert wrote then,

[g]iven this overall uncertainty as to the nature and effects of the virus, one year later, the COVID-19 pandemic is not only an extraordinary event but has the nature of a continuous, ongoing event, and so it can be argued that the application of the doctrine should equitably follow this ongoing uncertainty.⁵⁴⁹

However, with the CDC's acknowledgment of ventilation as an effective method of reducing disease spread, these defenses are unlikely to be successful.

CONCLUSION

This Article has identified legal tools that can be used immediately to implement the CDC's new indoor air quality standards. These standards, which reflect groundbreaking new scientific findings that respiratory viruses can be filtered out of indoor air before infecting a new host, have the potential to substantially reduce the burden of infectious disease from every person in the United States. However, as I have explained, because they have no authority and are unlikely to be quickly incorporated into federal law, it will be necessary to bring together areas of the law that have not always worked together to improve the public's health. First, I have identified opportunities for states to pass indoor air quality standards without any preemptive

⁵⁴⁷ Chad G. Marzen, *The Extraordinary Force of Nature Defense as a Defense to Coronavirus (COVID-19) Pandemic Liability*, 14 N.Y.U. J. L. & LIBERTY 709 (2021).

⁵⁴⁸ *Id.* at 729.

⁵⁴⁹ *Id.* at 730.

federal law. Second, I have suggested repurposing the Americans with Disabilities Act to characterize virus-laden air as a barrier to access and identify air filtration methods as necessary accommodations. Although, like all ADA accommodations, these would be for the direct benefit of specific individuals, any improvement in indoor air quality would benefit everyone in the vicinity. Finally, I advocate that the standards become the predicate for individual and collective negligence actions. Although civil liability was stayed during the active period of the public health emergency, the door has reopened at the state and federal levels. Using the CDC standards as proof of negligence under the negligence per se doctrine will result in individual recovery and, on the population level, encourage air filtration as a matter of risk management. While none of these tools alone are enough to guarantee clean indoor air, they can launch the process of what someday will be regarded as important, a public health improvement as pure food and clean water were in decades past.