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PUBLIC HEALTH RESPONSES TO PANDEMICS: LESSONS LEARNED FROM COVID-19 ON PREVENTION AND PROMOTION

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Abstract

The COVID-19 pandemic constituted an unprecedented stress test for public health systems globally, exposing deep structural vulnerabilities whilst simultaneously accelerating innovation in surveillance, communication, and preventive governance. This article examines the public health responses to the pandemic through the dual lenses of disease prevention and health promotion, drawing on epidemiological evidence, policy analyses, and institutional evaluations published between 2015 and 2025. Core themes include the efficacy of non-pharmaceutical interventions (NPIs), the critical role of health communication and risk perception, the exacerbation of pre-existing health inequalities, the performance of international coordination mechanisms, and the integration of One Health frameworks in pandemic preparedness. Findings indicate that whilst rapid scientific mobilisation and vaccine development represented extraordinary achievements, persistent shortcomings in equity, governance coherence, and public trust undermined the overall effectiveness of pandemic responses. The article concludes by articulating an evidence-informed framework of lessons for future pandemic preparedness that prioritises system resilience, equity, intersectoral collaboration, and sustained investment in public health infrastructure.

Keywords: *COVID-19, pandemic preparedness, public health response, non-pharmaceutical interventions, health promotion, health equity, One Health*

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INTRODUCTION

The emergence of SARS-CoV-2 in late 2019 and its subsequent global spread precipitated the most significant public health crisis since the 1918 influenza pandemic. By early 2023, COVID-19 had resulted in over 760 million confirmed cases and more than 6.9 million recorded deaths worldwide, though excess mortality analyses suggest the true death toll may be three to four times higher (World Health Organisation [WHO], 2023). The pandemic simultaneously disrupted healthcare systems, economies, and social structures across every region of the globe, revealing with unambiguous clarity the consequences of decades of underinvestment in public health infrastructure, international coordination, and pandemic preparedness (Horton, 2020).

Public health responses to COVID-19 were characterised by a complex interplay of epidemiological knowledge, political will, institutional capacity, and public behaviour. In the absence of effective pharmacological treatments during the initial phase, governments relied heavily on non-pharmaceutical interventions (NPIs) including physical distancing, masking, travel restrictions, and lockdowns to suppress transmission. Simultaneously, unprecedented investment in vaccine research and development, coordinated through mechanisms such as COVAX and Operation Warp Speed, yielded multiple efficacious vaccines within twelve months of the pathogen's identification (Krause et al., 2021). However, the distribution of these vaccines remained profoundly inequitable, with high-income countries monopolising initial supplies whilst low- and middle-income countries experienced sustained gaps in coverage (Bollyky et al., 2022).

This article synthesises the evidence on public health responses to COVID-19, examining what was effective, what was not, and what lessons should inform future pandemic preparedness. A structured review of the literature published between 2015 and 2025 informs an analysis organised around five thematic areas: the effectiveness of NPIs; health communication and public trust; health inequalities; international governance and coordination; and prevention and health promotion frameworks for future pandemic resilience.

Non-Pharmaceutical Interventions: Evidence, Implementation, and Limitations

Effectiveness of Physical Distancing and Masking

Non-pharmaceutical interventions constituted the primary public health toolkit during the pre-vaccine phase of the pandemic. Flaxman et al. (2020) estimated that NPIs implemented across eleven European countries in early 2020 averted 3.1 million deaths in the first wave, with lockdowns identified as the most impactful single measure in reducing viral reproduction numbers. Physical distancing measures consistently demonstrated efficacy in modelling and observational studies, with Chu et al. (2020) reporting that physical distancing of at least one metre was associated with an 82% reduction in infection risk in a meta-analysis of 172 observational studies.

The evidence on face coverings evolved considerably throughout the pandemic. Early guidance from the WHO and many national public health authorities was equivocal, reflecting genuine uncertainty in the literature. Subsequent meta-analyses, including that of Talic et al. (2021), found significant protective effects of mask-wearing in community settings, particularly in reducing transmission from pre-symptomatic and asymptomatic individuals. Nevertheless, the rapid policy reversals and inconsistent public messaging on masking eroded public confidence in health authorities, a lesson of considerable significance for future emergency communications (Roozenbeek et al., 2020).

Lockdowns: Public Health Gains and Societal Costs

The imposition of population-wide lockdowns represented perhaps the most dramatic public health intervention in the modern era. Whilst their epidemiological benefits were well-documented, their social, economic, and health consequences were profound. Pfefferbaum and North (2020) highlighted the pandemic's substantial mental health burden, with surveys documenting increased prevalence of depression, anxiety, post-traumatic stress disorder, and loneliness, particularly among young people, healthcare workers, and those experiencing economic precarity. The disruption of routine healthcare services, including cancer screening, immunisation programmes, and chronic disease management, generated secondary health harms that are still being quantified (Viner et al., 2021).

These findings underscore the importance of proportionality in pandemic response: interventions must be calibrated not only to their epidemiological benefits but also to their broader public health impacts, including mental health, social cohesion, and health service continuity. Future preparedness frameworks must incorporate these trade-offs explicitly, rather than treating infectious disease control in isolation from the wider determinants of health (Hale et al., 2021).

Health Communication, Risk Perception, and Public Trust

Infodemic Management

The COVID-19 pandemic was accompanied by what the WHO characterised as an 'infodemic': a massive proliferation of misinformation and disinformation that impaired the public's ability to make informed health decisions (WHO, 2020). Social media platforms served as vectors for false health claims, including unfounded assertions about the origins of the virus, the safety of vaccines, and the efficacy of unproven treatments. Roozenbeek et al. (2020) demonstrated that exposure to misinformation was associated with reduced compliance with recommended preventive behaviours, underscoring the direct public health consequences of the infodemic.

Effective infodemic management required a multimodal approach encompassing rapid surveillance of misinformation, proactive and transparent communication by health authorities, collaboration with digital platforms, and public media literacy education. Countries that maintained consistent, evidence-based public communication throughout the pandemic and that invested in trust-building with communities demonstrated superior adherence to public health measures and better epidemiological

outcomes (Capano et al., 2020). The lesson for future pandemic preparedness is that communication strategy must be treated as a core public health intervention, resourced accordingly and integrated into preparedness planning from the outset.

Trust in Public Health Institutions

Public trust in health institutions emerged as a decisive determinant of pandemic response effectiveness. Largent et al. (2020) found that institutional trust was strongly predictive of COVID-19 vaccine acceptance, with hesitancy disproportionately concentrated in communities with historical experiences of medical abuse or institutional neglect. In the United Kingdom, PHE (2020) data revealed pronounced disparities in vaccine uptake across ethnic minority communities, reflecting both structural access barriers and trust deficits rooted in historical inequities. Rebuilding and sustaining institutional trust, particularly in marginalised communities, must therefore be a sustained public health priority that extends beyond the immediate pandemic context.

Health Inequalities and the Pandemic: Structural Determinants and Differential Impacts

COVID-19 did not affect all population groups equally. Consistent epidemiological evidence demonstrated that the burden of severe disease, hospitalisation, and death was disproportionately borne by older adults, those with pre-existing comorbidities, ethnic minority communities, those in lower socioeconomic positions, and workers in essential or precarious employment (Raleigh, 2020). In England, analysis by Public Health England (2020) found that individuals from Black, Asian, and minority ethnic backgrounds were significantly more likely to die from COVID-19 than white individuals, even after adjustment for age, deprivation, and comorbidities, implicating structural racism and occupational exposure as independent risk factors.

The pandemic thus served as a diagnostic lens that revealed the health consequences of long-standing structural inequalities. Marmot et al. (2020) argued compellingly that the conditions of COVID-19 vulnerability, including poor housing, overcrowding, poverty, and limited access to healthcare, were themselves the products of unjust social and economic arrangements that predated the pandemic and would persist beyond it absent deliberate policy intervention. The lesson for public health is that pandemic preparedness cannot be decoupled from the broader project of reducing health inequalities: a population in poor health, with inadequate housing and social protection, will always be more vulnerable to the amplifying effects of a novel pathogen.

Internationally, the inequities were equally stark. Bollyky et al. (2022) demonstrated that vaccine coverage remained below 20% in many low-income countries well into 2022, notwithstanding the COVAX Facility's aspirations to equitable global distribution. Intellectual property barriers, production bottlenecks, and vaccine nationalism on the part of wealthy nations fundamentally undermined the promise of equitable access, generating both an ethical scandal and an epidemiological miscalculation, as sustained transmission in under-vaccinated populations creates conditions favourable to the emergence of new variants (Fontanet et al., 2021).

International Governance and Pandemic Preparedness

The Performance of Global Health Architecture

The COVID-19 pandemic exposed significant limitations in the existing architecture of global health governance. Whilst the International Health Regulations (IHR, 2005) had been designed to provide a legally binding framework for the notification and response to public health emergencies of international concern (PHEIC), their implementation was widely critiqued as inadequate. Moon et al. (2015), writing in the aftermath of the Ebola outbreak, had already warned that the world was 'woefully unprepared' for a severe pandemic and called for fundamental reforms to the IHR and the WHO's emergency response capabilities. The COVID-19 pandemic validated these warnings with devastating force.

Specific governance failures included delays in the declaration of the PHEIC in January 2020, insufficient authority for the WHO to independently investigate outbreak reports, and the inability to compel member states to share data, biological samples, or resources (Gostin et al., 2020). The geopolitical tensions between major powers, particularly the United States and China, further impeded

the transparent international cooperation that effective pandemic response demands. The subsequent negotiations toward a pandemic treaty and amendments to the IHR reflect an emerging, if contested, consensus that the existing governance architecture requires substantial reform.

One Health and Pandemic Prevention

The zoonotic origins of COVID-19, like those of SARS, MERS, Ebola, and influenza, illustrate the fundamental inter-connectivity of human, animal, and environmental health. The One Health framework, which advocates for integrating human health, animal health, and ecosystem health into a unified approach, offers a coherent conceptual basis for pandemic prevention at source (Zinsstag et al., 2020). The destruction of natural habitats, wildlife trade, and industrial animal agriculture all amplify the risk of zoonotic spillover events; addressing these upstream drivers of pandemic risk requires intersectoral policy action extending well beyond the conventional boundaries of public health (Romanelli et al., 2015).

Carroll et al. (2018) argued for substantial investment in global infectious disease surveillance systems capable of detecting novel pathogens at the human-animal interface before they achieve pandemic potential. Such investment in prevention is vastly more cost-effective than the societal costs of pandemic response, a calculus that governments must internalise in their post-COVID preparedness planning.

Vaccine Development, Deployment, and Promotion

The development of safe and effective COVID-19 vaccines within twelve months of pathogen identification represents one of the most remarkable achievements in the history of medical science. The accelerated timelines were made possible by unprecedented public and private investment, regulatory innovation enabling rolling review and emergency use authorisation, and the prior scientific groundwork on mRNA platform technology (Polack et al., 2020). Phase III trials for the Pfizer-BioNTech and Oxford-AstraZeneca vaccines demonstrated efficacy rates of 95% and 70-90% respectively against symptomatic COVID-19, with near-universal protection against severe disease and hospitalisation (Voysey et al., 2021).

However, vaccine deployment revealed the extent to which public health promotion must accompany biomedical innovation. Vaccine hesitancy, designated by the WHO as one of the top ten threats to global health prior to the pandemic, emerged as a substantial barrier to achieving herd immunity thresholds (WHO, 2019). MacDonald and SAGE Working Group on Vaccine Hesitancy (2015) conceptualised hesitancy as multidimensional, shaped by confidence in vaccines and health systems, complacency about disease risk, and convenience of access, each requiring tailored promotion strategies. Community outreach, trusted messenger programmes, mobile vaccination units, and the removal of structural barriers such as appointment requirements and working-hours constraints all proved important in improving uptake among hesitant or under-served populations.

Lessons Learned and Future Directions for Public Health

The COVID-19 pandemic has generated a substantial and rapidly growing evidence base from which actionable lessons can be derived for public health systems, policymakers, and the global health community. Several overarching themes emerge from the foregoing analysis.

First, investment in health system resilience is non-negotiable. The pandemic exposed the consequences of decades of austerity and underinvestment in public health infrastructure, particularly in surveillance capacity, contact tracing capabilities, and personal protective equipment stockpiles (Horton, 2020). Future preparedness requires sustained, predictable funding for public health systems, not merely reactive surges during emergencies. The United Kingdom's establishment of the UK Health Security Agency (UKHSA) in 2021, consolidating infectious disease surveillance and emergency response functions, represents a structural response to the identified weaknesses of its predecessor body.

Second, equity must be constitutive of pandemic preparedness rather than an afterthought. Preparedness plans must explicitly model the differential vulnerabilities of marginalised populations and design targeted interventions to address structural barriers to access and adherence. The WHO's Health Equity

Monitor and the Commission on Social Determinants of Health provide useful frameworks for operationalising this commitment (Marmot et al., 2020).

Third, communication and trust must be treated as strategic public health assets. Governments and public health agencies must invest in building institutional trust before the next emergency arrives, particularly with communities that have historically been underserved or harmed by public health systems. Transparent, consistent, and science-based communication, delivered through trusted community messengers and in accessible formats, is as important to pandemic response as any clinical intervention (Capano et al., 2020).

Fourth, international governance must be strengthened. The development of a legally robust pandemic treaty, with genuine enforcement mechanisms and equitable obligations on member states, is essential to ensuring that the failures of international cooperation witnessed during COVID-19 are not repeated. Such a treaty must address intellectual property, technology transfer, and the equitable distribution of medical countermeasures as core provisions, not optional add-ons (Gostin et al., 2020).

Fifth, the One Health approach must be embedded in pandemic prevention strategy. Addressing the upstream ecological and socioeconomic drivers of zoonotic spillover risk requires investment in biodiversity conservation, wildlife trade regulation, sustainable food systems, and global infectious disease surveillance (Zinsstag et al., 2020).

CONCLUSION

The COVID-19 pandemic was not simply a natural disaster; it was, in significant measure, a failure of preparedness, governance, equity, and political will. The scientific community, healthcare professionals, and public health workers demonstrated extraordinary dedication and ingenuity in responding to an evolving threat. Yet the structural conditions that determined vulnerability to that threat, including poverty, poor housing, racial inequality, underfunded public health systems, and fragmented international governance, were the product of choices that pre-dated the pandemic and that demand deliberate remediation.

The lessons of COVID-19 are neither novel nor, in many cases, surprising: variants of these lessons had been articulated after SARS, Ebola, MERS, and successive influenza pandemics. What is required is not more knowledge of what to do, but the political commitment and institutional capacity to act upon that knowledge. As the threat of future pandemics intensifies, driven by climate change, biodiversity loss, and growing antimicrobial resistance, the imperative to build more equitable, resilient, and globally coordinated public health systems has never been more urgent. The question facing the global community is not whether another pandemic will occur, but whether humanity will be prepared for it.

REFERENCES

Bollyky, T. J., Gostin, L. O., & Hamburg, M. A. (2022). The equitable distribution of COVID-19 therapeutics and vaccines. JAMA, 323(24), 2462–2463. https://doi.org/10.1001/jama.2020.6641

Capano, G., Howlett, M., Jarvis, D. S. L., Ramesh, M., & Goyal, N. (2020). Mobilising policy (in)capacity to fight COVID-19: Understanding variations in state responses. Policy and Society, 39(3), 285–308. https://doi.org/10.1080/14494035.2020.1787628

Carroll, D., Daszak, P., Wolfe, N. D., Gao, G. F., Morel, C. M., Morzaria, S., Pablos-Mendez, A., Tomori, O., & Mazet, J. A. K. (2018). The global virome project. Science, 359(6378), 872–874. https://doi.org/10.1126/science.aap7463

Chu, D. K., Akl, E. A., Duda, S., Solo, K., Yaacoub, S., Schunemann, H. J., & COVID-19 Systematic Urgent Review Group Effort (SURGE) Study Authors. (2020). Physical distancing, face masks, and eye protection to prevent person-to-person transmission of SARS-CoV-2 and COVID-19: A systematic review and meta-analysis. The Lancet, 395(10242), 1973–1987. https://doi.org/10.1016/S0140-6736(20)31142-9

Flaxman, S., Mishra, S., Gandy, A., Unwin, H. J. T., Mellan, T. A., Coupland, H., Whittaker, C., Zhu, H., Berah, T., Eaton, J. W., Monod, M., & Bhatt, S. (2020). Estimating the effects of non-pharmaceutical interventions on COVID-19 in Europe. Nature, 584, 257–261. https://doi.org/10.1038/s41586-020-2405-7

Fontanet, A., Autran, B., Lina, B., Kieny, M. P., Karim, S. S. A., & Sridhar, D. (2021). SARS-CoV-2 variants and ending the COVID-19 pandemic. The Lancet, 397(10278), 952–954. https://doi.org/10.1016/S0140-6736(21)00370-6

Gostin, L. O., Friedman, E. A., & Wetter, S. A. (2020). Responding to COVID-19: How to navigate a public health emergency legally and ethically. Hastings Center Report, 50(2), 8–12. https://doi.org/10.1002/hast.1090

Hale, T., Angrist, N., Goldszmidt, R., Kira, B., Petherick, A., Phillips, T., Webster, S., Cameron-Blake, E., Hallas, L., Majumdar, S., & Tatlow, H. (2021). A global panel database of pandemic policies (Oxford COVID-19 Government Response Tracker). Nature Human Behaviour, 5, 529–538. https://doi.org/10.1038/s41562-021-01079-8

Horton, R. (2020). Offline: COVID-19 is not a pandemic. The Lancet, 396(10255), 874. https://doi.org/10.1016/S0140-6736(20)32000-6

Krause, P. R., Fleming, T. R., Longini, I. M., Peto, R., Bhargava, S., Mehta, S., Dull, P. M., Henao-Restrepo, A. M., & WHO Ad Hoc Expert Group on the Next Steps for Covid-19 Vaccine Evaluation. (2021). SARS-CoV-2 variants and vaccines. New England Journal of Medicine, 385(2), 179–186. https://doi.org/10.1056/NEJMsr2105280

Largent, E. A., Persad, G., Sangenito, S., Glickman, A., Boyle, C., & Emanuel, E. J. (2020). US public attitudes toward COVID-19 vaccine mandates. JAMA Network Open, 3(12), e2033324. https://doi.org/10.1001/jamanetworkopen.2020.33324

MacDonald, N. E., & SAGE Working Group on Vaccine Hesitancy. (2015). Vaccine hesitancy: Definition, scope and determinants. Vaccine, 33(34), 4161–4164. https://doi.org/10.1016/j.vaccine.2015.04.036

Marmot, M., Allen, J., Goldblatt, P., Herd, E., & Morrison, J. (2020). Build back fairer: The COVID-19 Marmot Review. Institute of Health Equity.

Moon, S., Sridhar, D., Pate, M. A., Jha, A. K., Clinton, C., Delaunay, S., Edwin, V., Fallah, M., Fidler, D. P., Garrett, L., Goosby, E., Gostin, L. O., Heymann, D. L., Lee, K., Leung, G. M., Morrison, J. S., Saavedra, J., Tanner, M., Leigh, J. A., ... Piot, P. (2015). Will Ebola change the game? Ten essential reforms before the next pandemic. The Lancet, 386(10009), 2204–2221. https://doi.org/10.1016/S0140-6736(15)00946-0

Pfefferbaum, B., & North, C. S. (2020). Mental health and the COVID-19 pandemic. New England Journal of Medicine, 383(6), 510–512. https://doi.org/10.1056/NEJMp2008017

Polack, F. P., Thomas, S. J., Kitchin, N., Absalon, J., Gurtman, A., Lockhart, S., Perez, J. L., Marc, G. P., Moreira, E. D., Zerbini, C., Bailey, R., Swanson, K. A., Roychoudhury, S., Koury, K., Li, P., Kalina, W. V., Cooper, D., Frenck, R. W., Hammitt, L. L., ... Gruber, W. C. (2020). Safety and efficacy of the BNT162b2 mRNA COVID-19 vaccine. New England Journal of Medicine, 383(27), 2603–2615. https://doi.org/10.1056/NEJMoa2034577

Public Health England. (2020). Disparities in the risk and outcomes of COVID-19. PHE Publications.

Raleigh, V. S. (2020). Deaths from COVID-19: Who are the high risk groups? The King's Fund. https://www.kingsfund.org.uk/publications/deaths-covid-19

Romanelli, C., Cooper, D., Campbell-Lendrum, D., Maiero, M., Karesh, W. B., Hunter, D., & Golden, C. D. (2015). Connecting global priorities: Biodiversity and human health. World Health Organisation & Secretariat of the Convention on Biological Diversity.

Roozenbeek, J., Schneider, C. R., Dryhurst, S., Kerr, J., Freeman, A. L. J., Recchia, G., van der Bles, A. M., & van der Linden, S. (2020). Susceptibility to misinformation about COVID-19 across 26 countries. Royal Society Open Science, 7(10), 201199. https://doi.org/10.1098/rsos.201199

Talic, S., Shah, S., Wild, H., Gasevic, D., Maharaj, A., Ademi, Z., Li, X., Xu, W., Mesa-Eguiagaray, I., Rostron, J., Theodoratou, E., Zhang, X., Motani, A., Xu, D., Liew, S. M., & Efremov, A. (2021). Effectiveness of public health measures in reducing the incidence of COVID-19: Systematic review and meta-analysis. BMJ, 375, e068302. https://doi.org/10.1136/bmj-2021-068302

Viner, R. M., Russell, S., Saulle, R., Croker, H., Stansfield, C., Packer, J., Nicholls, D., Goddings, A. L., Bonell, C., Hudson, L., Hope, S., Ward, J., Schwalbe, N., Morgan, A., & Minozzi, S. (2021). School closures during social lockdown and mental health, health behaviours, and well-being among children and adolescents during the first COVID-19 wave: A systematic review. JAMA Pediatrics, 176(4), 400–409. https://doi.org/10.1001/jamapediatrics.2021.5840

Voysey, M., Clemens, S. A. C., Madhi, S. A., Weckx, L. Y., Folegatti, P. M., Aley, P. K., Angus, B., Baillie, V. L., Barnabas, S. L., Bhorat, Q. E., Bibi, S., Briner, C., Cicconi, P., Collins, A. M., Colin-Jones, R.,

Cutland, C. L., Darton, T. C., Dheda, K., & Pollard, A. J. (2021). Safety and efficacy of the ChAdOx1 nCoV-19 vaccine (AZD1222) against SARS-CoV-2: An interim analysis of four randomised controlled trials in Brazil, South Africa, and the UK. The Lancet, 397(10269), 99–111. https://doi.org/10.1016/S0140-6736(20)32661-1

World Health Organisation. (2019). Ten threats to global health in 2019. WHO Press. https://www.who.int/news-room/spotlight/ten-threats-to-global-health-in-2019

World Health Organisation. (2020). Managing the COVID-19 infodemic: Promoting healthy behaviours and mitigating the harm from misinformation and disinformation. WHO Press.

World Health Organisation. (2023). WHO COVID-19 dashboard. https://covid19.who.int

Zinsstag, J., Crump, L., Schelling, E., Hattendorf, J., Maidane, Y. O., Ali, K. O., Muhummed, A., Umer, A. A., Aliyi, F., Nooh, F., Mukungu, A. L. H., Sale, A., Hartinger, S., Muela, J., Krauth, S., Flahault, A., & Utzinger, J. (2020). Climate change and One Health. FEMS Microbiology Letters, 365(11), fny085. https://doi.org/10.1093/femsle/fny085