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Pandemic Preparedness in the Real World:

A Multi-Country Observational Study of Inequality, Global Health Security, and Poverty

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Pandemic Preparedness in the Real World: A Multi-Country Observational Study of Inequality, Global Health Security, and Poverty

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ABSTRACT

Global health security frameworks assume that reducing global systemic risk from pandemics rests on realizing a set of core national capacities in areas such as disease surveillance, emergency response, and health workforce readiness. But are these the decisive factors in how well countries fare in the real world? During the COVID-19 and AIDS pandemics, countries have shown wide differences in their ability to stop transmission and death. Yet some countries ranked most prepared under the standard conceptualization fared among the worst, while other countries considered less capable mounted more effective responses. This study tests three competing explanations for cross-national variation in real-world outcomes: health security capacity—differences in technical ability and infrastructure for preparation, detection, and response explain efficacy of responses; economic inequality—national political economy structures create governance and social conditions that determine countries' ability to curb pandemics, regardless of potential capacities; and absolute deprivation—the prevalence of poverty in the population drives pandemic outcomes. After constructing a global dataset of national demographic, economic, and pandemic factors, regression analysis tests these theories individually and in combination. Pandemic outcomes from COVID-19 and AIDS—COVID mortality, SARS-CoV-2 Infection Rate, AIDS mortality, and HIV incidence—are used with a set of widely recognized controls for cross-national analysis. The results support the economic inequality theory. Inequality is a consistent predictor of pandemic response outcomes, with higher inequality associated with greater pandemic incidence and mortality. This association held when controlling for global health security capacity and poverty. Standard pandemic preparedness capacity under the global health security paradigm was not independently associated with better outcomes, nor was poverty. These findings suggest that while building technical and infrastructure capacity to fight pandemics is important, it is insufficient. Nor will tackling poverty necessarily tackle pandemics. A new inequality-informed pandemic preparedness paradigm is needed.

INTRODUCTION

In recent years, a global effort to build national prevention, preparedness, and response (PPR) capacity worldwide has taken a central place on the global political and policy agenda. This reflects an optimism that it is possible, in the contemporary era, to stop outbreaks before they become pandemics and to respond to pandemics to effectively contain them. Real world experience of which countries have been most and least able to tackle pandemics, however, suggests a gap in the standard understanding of what drives pandemic risk.

Infectious diseases have taken the lives of billions of humans. Influenza, cholera, smallpox, tuberculosis, the bubonic plague—microbes ran rampant populations for millennia, shaping the course of humanity. European colonization of the Americas was enabled by diseases introduced by colonizers after 1492 that killed a majority of the approximately 60 million people living in the Americas prior to European contact.[1] Cholera pandemics occurred frequently between 1865 and 1947, killing tens of million people in India alone. The Black Death killed an estimated 50 million.[2] In the early 20th century, H1N1 became the world's deadliest influenza pandemic.[3]

In the era of modern virology, the science of fighting pandemics has brought the world remarkable tools.[4] By the close of the first quarter of the 21st century the world had highly effective vaccines, cutting edge antivirals, point of care diagnostics capable of confirming infection in a few minutes, and sophisticated disease surveillance systems tracking diseases globally across time and space. But outbreaks have become more frequent, not less (see Fig 1).[5] The biggest in the last half century have been the AIDS pandemic—which has killed at least 44 million people globally since the early 1980s [6] and COVID-19, which killed at least 15-18 million people in its first two years.[7,8] These diseases have caused far more deaths than all the wars over the last half-century. But there have been notable differences between countries in how well they have been able to address these and other global health crises.

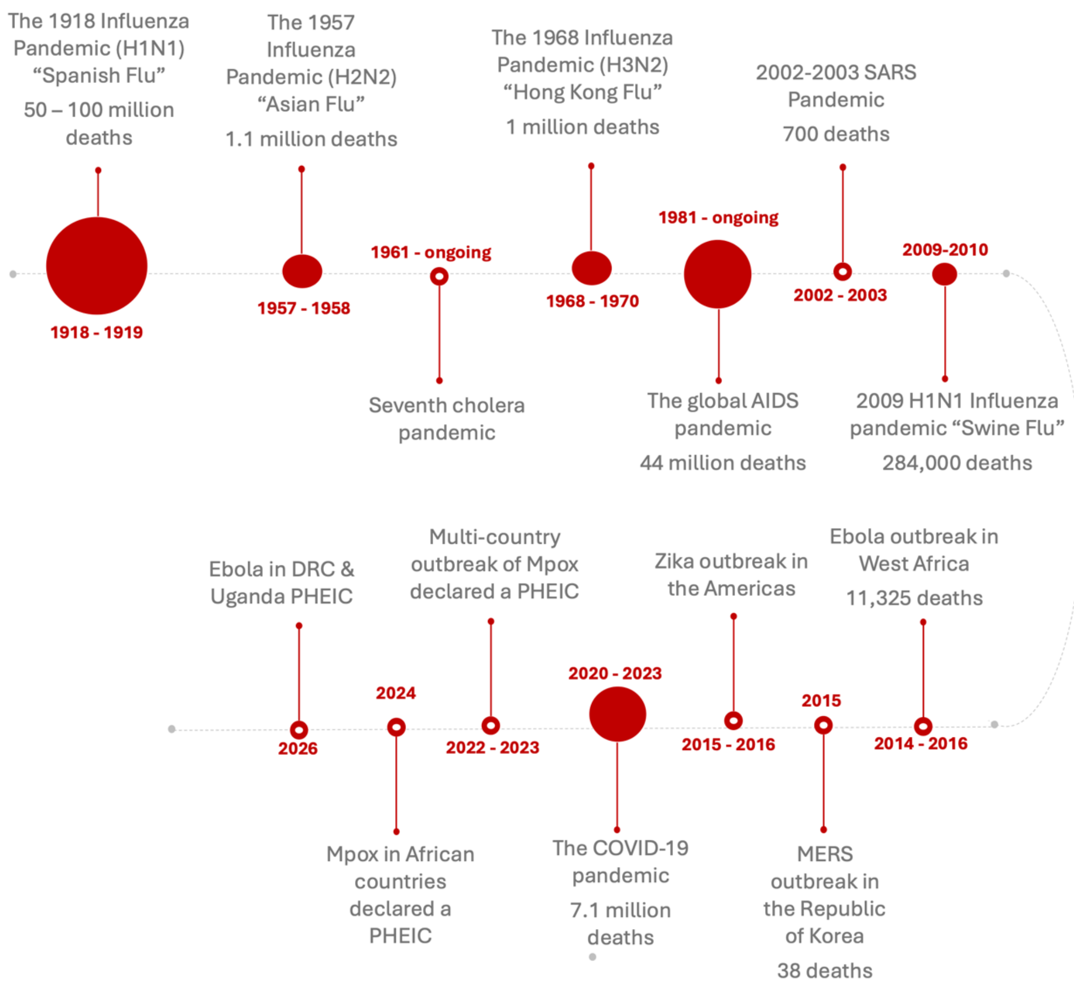

Figure 1. Timeline of Major Outbreaks and Pandemics 1900-2026

An international political and legal regime, rooted in a global health security paradigm, has sought to stop pandemics and reduce the systemic risk faced by all countries by equalizing capacity cross-nationally.[9–13] The International Health Regulations set out a core set of PPR capacities that all countries must meet, with revisions agreed by health ministers in 2024 and the WHO Pandemic Agreement passed in 2025 seeking to strengthen commitment to ensuring all countries have these capacities. [14,15] Presidents and prime ministers have made commitments at the international level, international organizations have built new technical agendas, and major financing efforts for preparedness efforts have been launched by wealthy governments and individuals.[16–19] And these have helped drive important gains. In Uganda and the Democratic Republic of the Congo, for example, multiple Ebola outbreaks were contained using public health capacities.

However, there is reason for concern about whether this paradigm correctly captures the most important drivers of pandemic risk. Along with the creation of international norms and capacity building efforts, multiple different instruments have been developed to measure national-level progress toward PPR capacity. [20–23] Yet during COVID-19 many of the countries understood as the most capable and most prepared in the world were shown to have mounted quite ineffective responses while some of those that should have been less able, according to the international core capacities, mounted the most effective responses.[23–27] Nonetheless, since COVID-19, debates have centered around doubling down on these scientific and technical aspects of PPR, especially in high-income countries. [28–31]

An alternative theory posits that while these technical capacities may be important, real-world mobilization of them and their impact on actual disease outcomes is determined by a political economy of inequality. Economic inequality undermines effective outbreak response through a different set of mechanisms upstream from the health security capacity paradigm.[32] In this view, technical capacity, strong medical infrastructure, and excellent emergency planning matters less than the structural political economy of countries.[33] This interplay in the distribution of wealth, power, resources, and institutions shapes economic and social outcomes. The structural forces of inequality shape whether, how, and on whose behalf the capacities available are deployed when outbreaks hit. Inequality shapes the speed and coherence of pandemic policymaking, deployment of medical and non-pharmaceutical countermeasures, and ability of key groups to follow public health advice. In real-world settings, having more capacity but being unable to mobilize it due to barriers created by inequality may not be better than having lower capacity, better mobilized. Since the AIDS pandemic, economic inequality within countries has risen dramatically, reaching levels last seen at the height of the industrial revolution.[34] Today, according to the G20 Extraordinary Committee of Experts on Global Inequality, more than 90% of the world's population lives in a country with a Gini index, measuring inequality, that surpasses the World Bank's threshold for "high inequality." [35] Previous studies have linked inequality with infectious disease outcomes cross-nationally,[36–40] and between sub-national units in the same country, as in the US and Brazil.[41,42] But they have not addressed the relationship to health security and the idea that some countries are simply less capable.

A related question is whether it is inequality at work or, drawing on the extensive work in the social determinants of health,[43,44] whether it is absolute deprivation. There is clear evidence that the social gradient operates within countries during outbreaks and pandemics, that people living in poverty are disproportionately impacted, and that deprivation interacts with marginalization along the lines of race or ethnicity, sexuality, and other factors. [45–49] The global health security paradigm assumes, implicitly, that less wealthy nations will have less capacity to respond and, at individual level, it may be that greater poverty levels explain why some countries respond less effectively.

This study explores these three theories of what explains the substantial cross-national differences in outcomes during actual pandemics: health security capacity, inequality, and deprivation. Better understanding the drivers could help us better construct PPR efforts for the highly likely pandemics of the future.

METHODS

Study design and overview

We conducted a cross-national observational study, with the country as the unit of analysis, to test three competing explanations for why countries differed in their ability to limit pandemic transmission and death: global health security capacity, economic inequality, and absolute deprivation. Following best practices in quantitative cross-national comparative social science and public health,[50–54] we assembled a harmonized dataset covering up to 190 countries from established international sources (described below) to compare countries with appropriate, theoretically grounded controls.

Our biggest point of leverage given our theoretical question was to compare across multiple different measures of pandemic outcomes—mortality and incidence and across distinct diseases. As such, a cross-sectional rather than longitudinal design was required to build a consistent model across exposures and outcome measurements, as there was not within-country variation on variables of interest during the COVID pandemic; cross-sectional models also align each outcome with the structural conditions of countries at the relevant phase of each pandemic. Analytic samples ranged from approximately 130 to 184 countries across outcomes and specifications, reflecting differences in data availability.

Outcome variables

We examined four outcomes spanning two epidemiologically distinct pandemics, providing a demanding test of cross-outcome generalizability. For COVID-19 we used (i) excess mortality—excess deaths per 100,000 population in 2021, from The Economist's excess-mortality model [55]—and (ii) cumulative infection—the modeled percentage of the national population ever infected by SARS-CoV-2 as of 2021, from the Institute for Health Metrics and Evaluation (IHME).[56] We deliberately used excess mortality and modeled cumulative infection rather than reported COVID-19 deaths and confirmed cases, because reported counts are subject to large, systematic, and income-correlated differences in testing, case ascertainment, and death registration that undermine cross-national comparability, whereas excess-mortality and infection models are explicitly constructed to correct for these biases. We used the 2021 cross-section rather than 2020 because cumulative burden through 2021 reflects the full first phase of the pandemic and the structural vulnerabilities we are interested in, whereas end-2020 values are dominated by which countries were seeded earliest (often well-connected, higher-income travel hubs); epidemic timing is additionally controlled directly (see Covariates).

For HIV/AIDS we used (iii) the AIDS-related mortality rate per 100,000 population and (iv) the HIV incidence rate among adults aged 15–49, both for 2024 from the UNAIDS 2025 epidemiological estimates [6]—the most recent internationally standardized estimates available. Because both HIV/AIDS outcomes are strongly right-skewed across nearly four orders of magnitude (AIDS mortality 0.06–231 per 100,000; HIV incidence 0–0.75%), they were natural-log transformed before estimation. Log transformation normalized residuals, stabilized the error variance, and prevented a small number of hyperendemic southern African countries from exerting disproportionate leverage (see Sensitivity analyses). The two COVID-19 outcomes are approximately symmetric and were modeled in levels.

Exposure and predictor variables

Economic inequality was measured by the disposable-income Gini coefficient (0–100) from the Standardized World Income Inequality Database (SWIID),[57] which harmonizes thousands of household surveys to maximize cross-national and temporal comparability and is the most widely used comparative inequality series. Because the Gini is a structural feature measured irregularly, we used the most recent available value per country; inequality is highly persistent year-to-year, so this maximizes country coverage without materially changing values (robustness to a five-year lag and to alternative inequality measures is reported below).

Pandemic preparedness capacity was measured by two indicators from the GHSI [20,58]: the composite GHSI Overall Score and the GHSI Rapid Response Score (Category 3, capacity for rapid response to and mitigation of an epidemic), each ranging 0–100. We used the 2019, pre-pandemic scores (released as part of the 2021 edition) because a pre-pandemic measure provides a clean test of whether prior preparedness predicted subsequent outcomes and avoids contamination of the index by pandemic experience.

Absolute deprivation was measured by the World Bank poverty headcount ratio at $3.00/day (2021 purchasing-power parity)—the Bank's current extreme-poverty standard—from the Poverty and Inequality Platform,[59], again using the most recent available survey value per country.

Covariates

All models adjusted for a standard set of country characteristics to compare otherwise-similar countries: national income group (World Bank classification) and current health expenditure (% of GDP), capturing fiscal space and health-system resourcing; urbanization (% urban) and population density, capturing structural demographic differences relevant to transmission. Aware that a key factor during COVID-19 was over-performance in Asia perhaps due to recent experience we used six geographic region indicators (UNAIDS classification; reference = eastern and southern Africa) to absorb region-specific factors. COVID-19 models additionally adjusted for the population share aged ≥65, given the steep age gradient in COVID-19 mortality. HIV/AIDS models additionally adjusted for HIV prevalence in 2000 as a baseline measure of pre-existing epidemic burden.

COVID-19 models also included an early-pandemic seeding control: the modeled cumulative percentage of the population infected as of 30 June 2020 (IHME). This isolates the structural inequality gradient in cumulative 2021 burden from differences in epidemic timing—which countries were exposed earliest—a confounder that runs counter to the structural relationship of interest. We chose the 30 June 2020 snapshot because it falls after initial global seeding but well before the inequality-patterned waves of late 2020 and 2021; results were robust to alternative seeding dates (see Sensitivity analyses).

Statistical analysis

For each outcome we estimated six OLS specifications: (1) Gini alone; (2) GHSI Overall alone; (3) GHSI Rapid Response alone; (4) poverty alone; (5) Gini and GHSI Overall jointly; and (6) Gini and poverty jointly. The standalone models assess each theory's independent association with outcomes; the joint models (5–6) test whether inequality's association persists when preparedness or poverty is held constant. All models included the covariate set above. Heteroskedasticity-consistent (HC3) standard errors were used throughout, as HC3 is robust to non-constant error variance. Influential outliers were identified by formal influence diagnostics (Cook's distance and DFBETA). Analyses were conducted in Python 3 using statsmodels (version 0.14).

Sensitivity and robustness analyses

We assessed robustness along several dimensions. First, we re-estimated all models adding tax revenue as a share of GDP to control for state fiscal capacity. Second, we replaced the most-recent Gini with a five-year-lagged Gini (2019 for HIV/AIDS outcomes; 2016 for COVID-19) to address slow-moving measurement and potential reverse causation. Third, we compared HC3 with classical OLS standard errors and used Cook's distance and DFBETA diagnostics to identify influential observations; the log transformation of the HIV/AIDS outcomes was adopted in response to these diagnostics. Fourth, for the COVID-19 outcomes we varied the seeding-control date (11 March, 30 June, and 31 December 2020) and estimated lagged-dependent-variable models regressing 2021 outcomes on the 2020 epidemic state, to confirm that the inequality gradient reflects cumulative structural burden rather than epidemic timing. Across all of these checks, the sign, magnitude, and statistical significance of the associations in Figure 2 below were stable.

Reproducibility

The curated country-level datasets are available in Appendix S2.

RESULTS

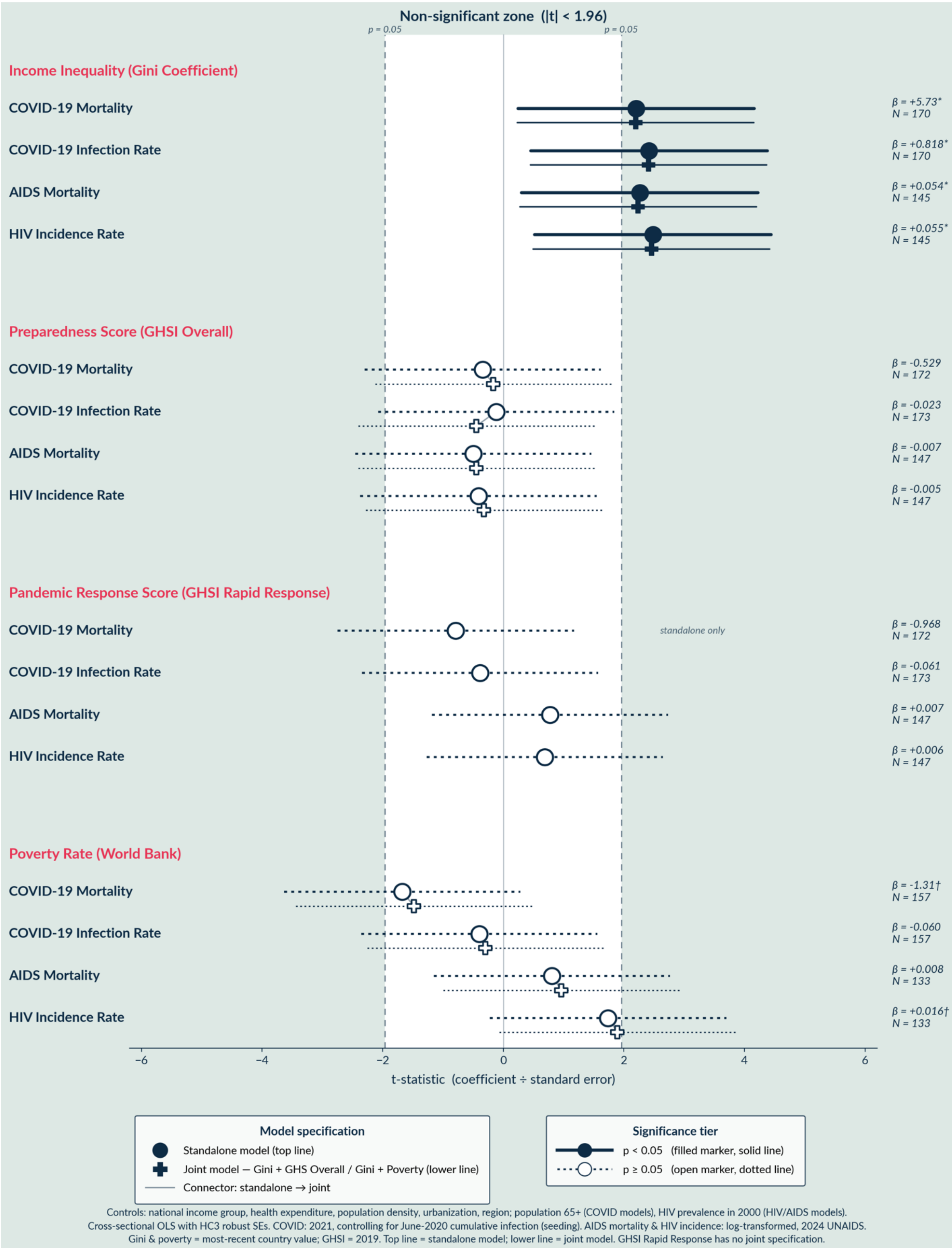

Figure 2. Global Health Security, Inequality, and Deprivation and Pandemic Outcomes

Figure 2 displays t-statistics (coefficient ÷ standard error) from cross-sectional OLS models for four groups of predictors (Income Inequality/Gini, Preparedness Score/GHSI Overall, Pandemic Response Score/GHSI Rapid Response, and Poverty Rate) and four pandemic health outcomes (COVID-19 Excess Mortality, COVID (SARS-CoV-2) Infection Rate, AIDS Mortality, and HIV Incidence Rate). The white (non-shaded) region indicates the non-significant zone ($|t| < 1.96$) so that only those that pass outside this region are significant. Large round markers represent standalone models; the "+" markers represent joint specifications (Gini + GHS Overall; Gini + Poverty). Regression coefficients (β) and sample sizes (N) are shown to the right of each row. GHSI Rapid Response has no joint specification (standalone only). Controls: national income, health expenditure, population density, urbanization, region fixed effects, and early pandemic transmission (HIV prevalence, 2000 in HIV/AIDS models, SARS-CoV-2 infection rate as of June 2020 for COVID) and population aged 65+ in COVID-19 model.

See *S1 Appendix* for full regression tables.

Economic inequality and pandemic outcomes

Across all four pandemic outcomes, income inequality was a statistically significant and substantively meaningful predictor (Fig 2). For COVID-19 excess mortality, each one-point increase in the Gini coefficient was associated with approximately 5.7 additional excess deaths per 100,000 population ($\beta = +5.73$, $SE = 2.60$, $p < 0.05$; $N = 170$). For COVID-19 cumulative infection, each one-point increase in the Gini coefficient was associated with an approximately 0.82 percentage-point higher share of the population ever infected by SARS-CoV-2 ($\beta = +0.82$, $SE = 0.34$, $p < 0.05$; $N = 170$). Because the two HIV/AIDS outcomes were natural-log transformed, their coefficients are semi-elasticities: a one-point higher Gini was associated with approximately 5.4% higher AIDS mortality ($\beta = +0.054$, $SE = 0.024$, $p < 0.05$; $N = 145$) and approximately 5.5% higher HIV incidence ($\beta = +0.055$, $SE = 0.022$, $p < 0.05$; $N = 145$). These associations were consistent in direction and statistically significant at conventional thresholds across all four outcomes and all model specifications (Fig 2).

The Gini coefficient's association with each outcome was strikingly stable across specifications. When GHSI Overall was added jointly, the Gini coefficients were essentially unchanged (β = +5.73, +0.82, +0.054, and +0.055 for COVID-19 mortality, COVID-19 infection, AIDS mortality, and HIV incidence, respectively). When poverty was added jointly, Gini coefficients were similarly stable or slightly larger (β = +6.02, +0.95, +0.054, and +0.053), and poverty itself was not a significant predictor of any outcome (Fig 2). This stability indicates that inequality's association with pandemic outcomes is not confounded by health-system preparedness or by poverty, and that each predictor captures distinct variance in outcomes. The inequality association also held after controlling for early-pandemic transmission in both the COVID and AIDS models, indicating that it reflects the cumulative structural burden of the pandemic rather than differences in which countries were seeded earliest.

Global health security capacity and pandemic outcomes

In contrast to income inequality, the GHSI indicators showed no predictive value across outcomes. GHSI Rapid Response, which we might expect to have the biggest association with what happened during a pandemic, was not significantly associated with COVID-19 excess mortality (β = −0.97, SE = 1.23, ns), COVID-19 infection (β = −0.06, SE = 0.16, ns), AIDS mortality (β = +0.008, SE = 0.010, ns), or HIV incidence (β = +0.006, SE = 0.008, ns; Fig 2). Countries with higher rapid-response capacity did not have systematically better outcomes on any of the four pandemic metrics examined.

GHSI Overall Score was likewise non-significant for every outcome: COVID-19 excess mortality (β = −0.53, SE = 1.55, ns), COVID-19 infection (β = −0.02, SE = 0.20, ns), AIDS mortality (β = −0.007, SE = 0.013, ns), and HIV incidence (β = −0.005, SE = 0.013, ns). When GHSI Overall and Gini were entered jointly, GHSI Overall remained non-significant for all four outcomes while the Gini coefficient was unchanged.

The t-statistic forest plot (Fig 2) illustrates this contrast visually. All four Gini estimates fall beyond the significance threshold ($|t| > 1.96$) on the right side of the plot, indicating positive associations with pandemic burden. The GHSI Overall and GHSI Rapid Response estimates cluster tightly around zero across all four outcomes. Together, these patterns indicate a systematic divergence: inequality is a consistent predictor of pandemic severity; GHSI preparedness scores are not.

Poverty and pandemic outcomes

Deprivation (headcount poverty <$3.00/day) was not significantly associated with any of the four outcomes in standalone models: COVID-19 excess mortality ($\beta = -1.31$, SE = 0.78, ns), COVID-19 infection ($\beta = -0.06$, SE = 0.15, ns), AIDS mortality ($\beta = +0.008$, SE = 0.010, ns), and HIV incidence ($\beta = +0.016$, SE = 0.009, ns). The two coefficients that approached significance did so weakly and in opposite directions (COVID-19 mortality, $p = 0.10$, negative; HIV incidence, $p = 0.08$, positive), giving no consistent evidence of a poverty gradient. These null results held in joint models with Gini: poverty remained non-significant for all outcomes while the Gini coefficients were essentially unchanged. The absence of a poverty association—after conditioning on income group, health expenditure, urbanization, population density, and region—is consistent with inequality capturing a dimension of societal stratification beyond absolute deprivation.

Robustness and model fit

Model fit was strong for a comparative social science analysis involving complex human phenomena, institutions, and systems.[60,61] Fit was highest for the HIV/AIDS outcomes (R^2 = 0.74–0.77 for AIDS mortality; 0.58–0.64 for HIV incidence) and strong for the COVID-19 outcomes (R^2 = 0.40–0.46 for excess mortality; 0.42–0.47 for cumulative infection), with Gini-inclusive models fitting at least as well as GHS-only models for every outcome.

The inequality findings were robust across a series of sensitivity analyses. Adding tax revenue as a share of GDP to control for state fiscal capacity left the Gini coefficient positive and statistically significant for all four outcomes (β = +6.47, +0.84, +0.054, and +0.056). Substituting a five-year-lagged Gini likewise preserved the sign and significance of the association for all four outcomes, and strengthened it for the COVID-19 outcomes (β = +7.74 and +1.07, both $p < 0.01$). The direction of the association was also consistent across alternative operationalizations of inequality—market-income Gini, the Palma ratio, and the top-10% wealth share were all positively signed for every outcome. Finally, for the COVID-19 outcomes the Gini association was robust to controlling for early-pandemic seeding at alternative dates (11 March, 30 June, and 31 December 2020) and to a lagged-dependent-variable specification, confirming that the relationship reflects cumulative structural burden rather than epidemic timing.

DISCUSSION

This study provides a real-world global analysis of the outcomes of responses to the biggest pandemics of the last half century by countries worldwide and finds that economic inequality, not health security capacity and not level of development and deprivation, predicts which countries are able to reduce the spread and deadliness of pandemic pathogens.

The standard conceptualization of what makes countries well prepared to tackle pandemics has not held up when actual viruses have spread globally. For example, the United States and the United Kingdom were judged the most capable countries according to the Global Health Security Index when the COVID-19 pandemic hit, but they had some of the worst outcomes among high-income countries. Brazil was the most prepared country in Latin America but its pandemic outcomes were similarly poor. South Africa had one of the highest rates of COVID-19 mortality per capita in Africa despite being judged the best prepared on the continent to tackle a pandemic. On the other hand, countries with less preparedness capacity—from Mauritius and Ethiopia to Ireland and Uruguay—mounted far more successful efforts to prevent COVID mortality. This study suggests this anecdotal evidence reflects a systematic dynamic—neither overall pandemic preparedness scores nor capacity to respond were associated with rates of AIDS deaths, HIV infections, or COVID-19 mortality. Our findings do not particularly support a critique of the measures themselves. [26,27] It is important to separate performance from construction validity.[62] In this case, the measures seems to accurately measure the concept of global health security capacity described above, backed consistent findings in this study across multiple specifications and controls as well as the strong consistency between multiple different measures of pandemic preparedness. Instead, the more straightforward conclusion is that global health security capacity is important but insufficient to achieve better outcomes in real life.

Economic inequality, on the other hand, is systematically associated with success confronting pandemics. In high-inequality contexts, pandemic responses have been less effective in stopping infections and deaths in the two biggest pandemics of the contemporary era. This relationship holds even when controlling for global health security capacity. The United States, United Kingdom, Brazil and South Africa may have higher preparedness and response capacity, but they also have among the highest levels of income inequality in the world. This suggests an answer to why measures of global health security capacity are not predictive. Highly unequal countries struggle to mobilize even strong capacity to prevent, detect, assess, and respond to global outbreaks in real life. A broader causal literature on the effects of inequality support this suggestion, showing that high inequality undermines provision of public goods,[63,64] reduces welfare state provision,[65,66] makes policy coordination slower,[67] reduces worker protection,[68] and decreases trust in government. [69,70] Further work is needed on whether and how these mechanisms play out behind the associations we see in pandemics, but they are suggestive. Even where the laboratories are highly capacitated, the emergency response plans are strong, and the health workforce is well prepared and rehearsed, highly unequal societies are less able to stop infections and mortality.

Pandemics also do not emerge as a story of deprivation and development, a theory that might have helped explain the phenomenon at work. Lower poverty rates in a country were not associated with better pandemic outcomes. Indeed, some countries with high poverty rates have been able to mount highly effective efforts to fight COVID-19 and AIDS using a mix of low-tech field epidemiology, affordable medicines, and strong community-led pandemic efforts.[71–73] This does not mean deprivation does not matter, however. Within countries, evidence clearly shows that many infectious diseases follow the social gradient and that health inequities between people are explained by that gradient.[74] But in terms of explaining differences in the performance of countries inequality, not poverty rates, is a significant explainer. Put another way, people living in poverty in the United States and South Africa and those living in poverty in Canada and Mauritius, all suffered more during pandemics than did the well off, an inequity that demands policy change. But as a whole the factor that predicted US and SA's far worse outcomes compared to Canada or Mauritius was the far larger size of the gap between the economic top and bottom.

Limitations

This study has clear limitations. Data availability limitations were addressed wherever possible, but in the full model independent, dependent, and control variables all had gaps for some countries that were not overlapping. This limited the statistical power of our models and biased in the final sample. Dropping sample-limited variables did not substantially change our findings, suggesting the restricted data were not fatal, but they did reduce the model fit. The findings are associational and causality will require further investigation into the mechanisms through which inequality is producing pandemic outcomes. Quantitative analysis here has significant limitations, suggesting the need for future studies that use qualitative case studies, process tracing, and interviews with multiple stakeholders to understand causal mechanisms.

Policy Implications

These are actionable findings. The suggestion is not that strong labs or cutting-edge medicines or smart planning are unimportant. Many millions of people are alive today, for example, because of the development of highly effective antiretroviral HIV medicines and COVID-19 vaccines and their effective deployment. But in highly-unequal societies, interventions had less impact. Inequality got in the way.

An inequality-informed pandemic response is necessary—one that takes seriously political economy. In the short term, that would mean starting by assessing the level and shape of economic inequality in each country as part of pandemic preparedness planning. On that basis, planners can assess and anticipate the barriers to successful pandemic response that might be driven by inequality. Rapid policy coordination, for example, is a known problem in unequal societies[75] and the power of economic elites to oppose public health measures that may harm their interests is a top concern. Planners in highly unequal contexts could build stronger governance structures for use during pandemics, with coordinated and politically powerful cross-sectoral participants and engagement of communities, that anticipate opposition to public health measures that might be less of an issue in more equal contexts. In particular community-led and engaged responses build trust.[72,76] Special social protection instruments could be created for highly unequal contexts to provide monetary assistance to those for whom unfair economic relationships might mean choosing between following public health advice and going to work with few protections in order to feed ones family. Such social protection measures, such as cash transfers, can help people cope with crises and shocks associated with pandemics, improving their health outcomes. Social protection can thus be not just fair but necessary to stop transmission [77,78]. Many more such inequality-informed policies and plans can be imagined. And in the longer term, tax and social policy to reduce the level of economic inequality may be an important pathway to stopping pandemics faster and reducing their impact.

CONCLUSION

Global understanding of which factors generate pandemic vulnerability and risk requires revision. This study finds that countries with higher economic inequality have seen significantly less success in responding to the COVID-19 and AIDS pandemics. This holds true even controlling for the health security capacities embedded in international agreements and measures of preparedness. These measures themselves have no association with better pandemic outcomes. While inequality is related to higher deaths and infections, poverty rates are not. High inequality within countries represents a systemic international risk. International frameworks, however, currently take little account of inequality factors and international institutions have focused little effort on addressing them. Reducing the world's vulnerability to pandemics depends on reversing this.

Supporting information

S1 Appendix. Supplementary materials appendix. This document includes the full regression results from the regression analysis summarized in Figure 2. Full replication data is available in S2 Appendix at OSI at https://osf.io/ftra9/overview

AI statement

Anthropic Claude (Sonnet 4.6) was used in coding and data cleaning. The authors have full knowledge of, control over, and takes full responsibility for the analysis and content of the article.

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