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Paradigm under threat: The International AIDS Society–*Lancet* Commission on Health and Human Rights [H1]

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Executive summary

2023 marked the 75th anniversary of the UN's Universal Declaration of Human Rights. The Universal Declaration articulates an inspiring vision of a world that is just, equitable, tolerant, and strategically focused on actions to address the most vulnerable and marginalised populations—a counterpoint to the atrocities, repression, and colonialism that characterised the much of the 20th century. Endorsement of the Universal Declaration was not commensurate with reality in many cases—especially because numerous signatories still had colonies and because Cold War politics resulted in divisions of social, economic, and political rights into separate international covenants—but it nevertheless inspired decades of progress. The Universal Declaration helped to support important, if partial, retreats of colonialism (with 17 formerly colonised African countries gaining independence in 1960 alone), to enable growing recognition of the rights of women, girls, and gender minorities, and to drive a decline in the annual number of war deaths in the second half of the 20th century.

Human rights principles have had profound effects on human health and on the global health field. Health advocates and practitioners have drawn inspiration from principles of equity and human rights: in the unprecedented global expansion of access to HIV treatment, in reducing the prevalence of female genital mutilation, in successfully lowering the burden of neglected tropical diseases, in caring for populations affected by war, and, most recently, in the global push to achieve universal health coverage.

Yet the future of the health and human rights paradigm is uncertain, partly as a result of major changes in the global political and economic environment. The COVID-19 pandemic was a failed test case for the world's commitment to international solidarity, equity, and human rights: corporate profits were allowed to be prioritised over the needs of people and billions of people were largely left to fend for themselves. Similarly, climate change is already having severe health and economic consequences in the communities and societies least responsible for it, with vastly more serious disparities forecasted, yet the world as a whole has failed to marshal the financial and technical resources required to support

essential mitigation and adaptation efforts in low-income and middle-income countries (LMICs). Additionally, although the pernicious effects of racism, including on human health, have never been more apparent, the 21st century has witnessed a rise in racism and xenophobia in diverse societies across the world.

The International AIDS Society–*Lancet* Commission on Health and Human Rights, launched in 2021, has studied the state of health and human rights, explored the reasons for global backtracking on health and human rights, and developed recommendations for renewing and updating the health and human paradigm at a time of major technological, political, and social transformations. The 23 Commissioners include health practitioners, academic experts, researchers, and civil society representatives with expertise in various disciplines, including medicine, infectious diseases, women's health, mental health, epidemiology, mathematical modelling, law, international human rights, climate, migration, history, and anthropology, and Commissioners reside and have expertise in a broad array of geographical regions. The Commission reviewed available evidence and developed actionable recommendations in eight different health and human rights domains (pandemics and access to essential interventions; the climate crisis and health and rights; displacement, migration, refugees and conflict; structural racism, inequity, and discrimination against devalued minorities; sexual and reproductive health and rights; misinformation, disinformation and the right to benefit from accurate scientific information; artificial intelligence; and the economic and commercial elements of the right to health). These domain-specific reviews were guided and informed by a socioecological model, which described the complex relationship among the factors that affect health and human rights and posited human dignity as the basis underlying all human rights. Modelling exercises were commissioned to assess the harms associated with human rights violations and the positive public health effect of various policy and programmatic innovations based on human rights approaches. Due to their cross-cutting nature, gender and criminalisation (e.g. of possession of small amounts of drugs for personal use, one or more aspects of sex work, consensual same-sex relations) were mainstreamed across all eight thematic domains.

Global commitment to human rights has deteriorated steadily in the 21st century, with serious and increasingly damaging effects on health. By every available measure, the gains in human rights in the decades after endorsement of the Universal Declaration have begun to reverse across much of the world. Authoritarianism is on the rise, the freedom of civil society to operate without unreasonable official regulation is declining, conflict and violence are surging, and violators of human rights act with

increasing impunity. A global backlash has emerged with respect to gender equality and sexual and reproductive health, threatening to erase decades of progress. The centrality of human rights in the global health field is also increasingly in question: although the pandemic accord being drafted by WHO member states refers to the importance of human rights and equity, substantive provisions of the draft agreement incorporate language that is advisory rather than obligatory for countries. The deteriorating human rights climate is having far-reaching effects on human health, as evidenced by the stark racial and ethnic disparities in COVID-19 hospitalisations and deaths in many countries, the preventable deaths each year of thousands of migrants at sea, the rise of heat-related mortality and in the number of climate refugees, the loss of sexual and reproductive autonomy and rights in countries where abortion access is restricted, and a growing toll of non-communicable diseases in LMICs because of predatory commercial marketing of tobacco, sugary beverages, and highly processed food. Potential health benefits from the rapid rise of social media and the growing use of artificial intelligence risk being overwhelmed by these platforms' facilitation of the spread of health misinformation and disinformation. Modelling undertaken by the Commission suggested that the circulation of disinformation during the COVID-19 pandemic cost 15 000 lives in Texas, USA, during a 4-month span in 2021.

We firmly believe that renewing and reviving the health and human rights paradigm is crucial for the achievement of health and wellbeing for all. In response to the steady, startling deterioration in the human rights climate, health and human rights advocates and practitioners have largely been on the defensive, decrying human rights violations as they occur while struggling to attract new allies or to build public support for approaches grounded in human rights. A more compelling, proactive message is needed to convince decision makers and the public at large of the overriding importance of health and human rights. We argue that the health field should lead in making the case that respect for human rights is essential for human survival. Only inclusive societies grounded in acceptance, mutual respect, and collective solidarity can muster the unified responses required to tackle the complex, existential challenges faced by humanity. Although human history is replete with examples of racism, intolerance, and xenophobia, humankind has also shown an immense capacity for empathy, inclusion, and cooperation for the common good. At a moment when the survival of the planet is at stake—when entire island nations and coastal cities risk disappearing in the foreseeable future, accelerating broad-scale population displacement—a renewed commitment to health and human rights has the potential to aid the global community in envisaging a world that speaks to the best of humanity rather than our worst instincts.

The health field must actively work to recentre human rights in health practice. Human rights need to occupy a central place across all aspects of health policy making and practice. Diverse health practitioners have a role to play in addressing the social determinants of health and improving health equity, and health centres and broader health systems need to rigorously track, and effectively work to close, disparities in health service access and outcomes. Human rights should be mainstreamed across the breadth of medical and health education, with the aim of equipping all health professionals with the knowledge and skills needed to address human rights-related barriers and social determinants of health. For example, health education and training should ensure that health practitioners have the skills to engage in the rapidly changing digital world—to leverage the potential of these innovations to improve health outcomes, to ensure equity in access, and to effectively counter health-related misinformation and disinformation. WHO member states should endorse a pandemic accord which outlines clear obligations to ensure equitable, timely, worldwide access to pandemic-related health products, including through time-limited waivers of intellectual property and sustained, well resourced efforts to build robust, resilient vaccine-manufacturing capacity in all regions.

By centring human rights, the health field could serve as a model for human rights approaches in other sectors. However, the health sector does not have the means to single-handedly address the many human rights abuses and violations that affect health and wellbeing. Stakeholders across the health field should join with partners and champions in other fields, including—but not limited to—human rights, racial and social justice, women's health and rights, climate and environmental justice, international trade, and diplomatic and humanitarian actors, to dismantle structural barriers that facilitate discrimination and worsen disparities in health and human rights. In working with these diverse disciplines, the health field should ensure that health is mainstreamed across key policy-making and decision-making institutions in other sectors, including the World Trade Organization, the UN Human Rights Council, and the UN Climate Change Conference. Similar efforts to prioritise health in other sectoral bodies are needed at regional and national levels, and stakeholders in the health field should actively work to join with diverse partners and allies in local coalitions to advance coordinated action to address the social determinants of health. Modelling exercises we did suggested that reforms to policing practices to align with human rights principles would reduce the frequency of HIV infection and other health and social risks among sex workers and people who inject drugs.

Recommitment to human rights, and recentring those rights in health, needs to deepen and accelerate the decolonisation of the international order by empowering representatives from LMICs and making anti-racism a central pillar of the revival of health and human rights. Although the Universal Declaration continues to inspire, enforcement of the many international covenants that draw on human rights principles has lagged, largely because the design of the international legal and economic order serves to perpetuate and exacerbate longstanding power disparities. Renewal and updating of the health and human rights paradigm for the 21st century will require far-reaching reforms in global governance to ensure equitable representation of people from all global regions. Reform of the membership and voting rules of the UN Security Council is long overdue. Meanwhile, the tendency of many international donors to earmark their contributions to WHO for specific activities effectively deprives the globally representative World Health Assembly of its ability to steer global health policy for the benefit of all. Racism is at the heart of many of the world's problems—in startling racial and ethnic disparities in health outcomes, in the skewed distribution of global resources, and in the growing hostility to migration in many high-income countries—and so the transformation of the international order requires open and aggressive combatting of racism and rejection of the enduring legacy of colonialism. Transformation of the global order necessitates accounting for historic wrongs, including via meaningful reparations from former colonial powers to countries that were colonised, comparable reparations to account for the legacy of the international slave trade, substantial, sustained financial transfers to LMICs for climate mitigation and adaptation measures, and vigilant regulatory oversight and collective action to prevent multinational corporations from worsening global health through marketing of unhealthy products and other predatory practices. As the transformation of the international order will not occur over night, regional political bodies should step in to impose reputational and other penalties on countries that flout human rights. When global or regional consensus cannot be reached on any aspect of health and human rights, so-called coalitions of the willing should step forwards to drive progress and to persuade other countries on the importance of aligning their actions with health and human rights principles.

Introduction: a moment of truth for health and human rights [H2]

The devastation and atrocities of World War 2 convinced the world of the importance of a new era in human relations. Never again would the global community tolerate impunity for the wholesale violation of people's rights and freedoms. Never again would the health, dignity, and wellbeing of people and the communities in which they lived be sacrificed on the altars of nationalism, authoritarianism, and the

unprincipled will to power. Embraced in 1948 by member states from all global regions, the UN's Universal Declaration of Human Rights asserted that "recognition of the inherent dignity and of the equal and inalienable rights of all members of the human family is the foundation of freedom, justice, and peace in the world."[1] To translate these principles into international human rights law, UN member states endorsed an array of binding covenants and treaties.[2] Unfortunately, nearly all these conventions have been commonly violated. Their abrogation has been a feature of the post-war international order from the outset: when the Universal Declaration was adopted, dozens of countries remained under the control of colonial powers and electoral democracy prevailed in only some countries.[3] Although the Universal Declaration addressed a broad array of fundamental human rights, Cold War politics led to the adoption of separate covenants for civil and political rights and for economic, social, and cultural rights, with many of the most powerful countries prioritising the former over the latter.[4] Yet, despite these flaws, the international human rights framework reflects global determination to correct the wrongs of the past and seek a just world order, and articulates aspirational principles for the global community—of norms within and between countries.

A commitment to human rights has motivated the health field to demand access to affordable, high-quality, and respectful health services for all, especially the most marginalised people, and to strive towards gender equality, social justice, and basic minimum standards of living commensurate with human dignity. From the landmark Declaration of Alma Alta, which grounded its call to ensure an acceptable level of health for all in the fundamental human right to health, to the historic, worldwide expansion of access to HIV treatment and the UN Climate Change Conference, efforts to improve health and wellbeing have cited and been inspired by human rights principles. Global human rights leaders such as Archbishop Desmond Tutu have long made a clear link between health and human rights (see Panel XX). In the era of the Sustainable Development Goals, human rights imperatives are also central to the global movement to achieve universal health coverage.[5]

The grounding of international relations in human rights principles, however imperfect, has been linked with unparalleled gains in human health and wellbeing. Before the COVID-19 pandemic , the proportion of the world's population living in extreme poverty had fallen by almost 80% since 1970;[6] life expectancy worldwide had risen by 16 years during the same period.[7] The proportion of humanity living in countries adhering to basic electoral democratic principles is substantially greater today than in 1948.[8] Globally, the length of time a girl typically stays in school has nearly doubled in the past 50 years, and

longstanding disparities in educational attainment between girls and boys have sharply narrowed—and, in some regions, have disappeared altogether.[9]

However, there are ominous signs that much of the world is rapidly backtracking on human rights commitments, with potentially egregious health effects. After steadily increasing for decades, the proportion of the global population residing in countries where human rights are respected began to plateau towards the end of the 20th century and has subsequently declined.[10] A longitudinal measure purporting to track personal, civil, and economic freedom suggested that 83% of the world's population are living in countries that are less free today than they were in 2008.[11] As the number of people living under authoritarian regimes has increased, the space for civil society engagement has diminished.[12] Diverse regimes, both ostensibly democratic and overtly tyrannical, have invoked the spectre of terrorism or the purported benefits of racial and cultural uniformity to justify violence and restrict global mobility.[13,14] More human beings than ever—at least 103 million[15]—have been forcibly displaced from their homelands, and racist and anti-immigrant sentiment is on the rise, even in settings with few migrants.[16]

Injustice is corrosive, and its effects are global, multisectoral, and accelerating. In 2022, Russia's illegal invasion of Ukraine triggered the "fastest, largest displacement witnessed in decades"[17] and worsened global food insecurity, and Russia's purposeful targeting of civilians and civilian infrastructure has increased the risk of injury, death, and further displacement within Ukraine. Attacks on health-care facilities have been a prominent feature of Russia's war on Ukraine and in Israel's ground invasion of Gaza (see text box), and represent a further deterioration in human rights protections. Poverty, hunger, widespread violence, and impunity with respect to human rights violations are contributing to internal displacement and massive migration from many central American countries.[18] Widespread human rights violations—in North Korea,[19] Syria, Sri Lanka,[20] Ethiopia,[21] Iran, and countless other settings[22]—elicit wholly inadequate global responses and, as new catastrophes emerge, are rapidly largely sidelined in the global discourse. In Myanmar, for example, instigators of an illegal coup remain in power, thousands of activists are imprisoned, and the country's economy is in freefall.[23] The persistence of human rights violations in many high-income countries, including frequent discrimination on the basis of race, ethnicity, sexual orientation, and gender identity, similarly contributes to a perception among many that human rights are a rhetoric concept rather than a reality.

Other forms of impunity with regard to violations of human rights are also causing immense harm to human health and wellbeing. Climate change is having the most severe effects on the countries and communities that are least responsible for the planetary crisis, and the disparate effects of climate change are likely to grow more acute in future.[24] Increasingly, non-state, multinational economic actors escape meaningful governmental regulation, including with regard to their profound effect on population health.

Wholesale violations of privacy and authoritarian efforts to regulate gender rights and human sexuality are also common human rights infringements. Although the proportion of the world's population living in countries that criminalise same-sex relations has fallen with time,[25] over the last decade there has been a rise in demagogic attacks on lesbian, gay, bisexual, transgender, and queer (LGBTQ+) people, with rollbacks of LGBTQ+ rights either implemented or proposed in countries including Brunei, Ghana, Indonesia, Malaysia, Nigeria, Poland, Qatar, Russia, Senegal, and Uganda, and in an increasing number of US states.[26] The US Supreme Court in 2022 invalidated women's fundamental right to control their bodily and reproductive autonomy, following its decision in 2014 that restricted health coverage for contraception. After taking control of the national government in Afghanistan in 2021, the Taliban has imposed draconian restrictions on women and girls, effectively excluding them from public life.[27]

Human rights violations of all types have devastating consequences for health. The experience of racism is associated with an increased risk of longstanding illness, psychological distress, poor mental and physical health functioning, and reductions in self-reported health status.[28] Gender-based violence, which is experienced by one in three women worldwide, can lead to death and lifelong disability, is associated with depression, post-traumatic stress disorder, and other mental health disorders, and contributes to unsafe behaviours, increasing the risk of acquiring HIV and other sexually transmitted infections.[29] Men who have sex with men who live in countries that impose criminal penalties for same-sex sexual activity are five times more likely to have HIV than are their counterparts living in countries that do not criminalise such relations.[30]

Notwithstanding the well documented negative health effects of human rights violations, there are considerable uncertainties about the future of the global health field's leadership on human rights. During the COVID-19 pandemic, the international solidarity and commitment to equity that are the foundations for a human rights approach to health gave way to openly self-interested, nationalistic

approaches that worsened global health inequities and disregarded the countries and communities with the least resources. Pre-existing social and economic inequalities deepened the effects of the COVID-19 pandemic, which itself gave rise to an increase in human rights violations, including gender-based violence and discrimination against marginalised populations.[31]

Renewing and updating the health and human rights paradigm [H3]

Drawing on its own 35-year history, which has underscored the centrality of human rights to an effective, sustainable response to HIV, the International AIDS Society joined with *The Lancet* to convene the International AIDS Society–*Lancet* Health and Human Rights Commission. Over the past 3 years, we have examined the past, present, and future of the health and human rights paradigm, taking into account the extraordinary and accelerating deterioration in the human rights environment worldwide. We have explored crucial questions posed by these trends, interrogated evidence from an array of disciplines, and sought to unpack the complex interrelations between health, rights, justice, accountability, and sustainability.

After extensive study and reflection, we believe that the steady deterioration in global commitment to human rights (and the associated serious health effects) demand not only a return to the basic principles that once brought a measure of coherence and unity to a fractious world, but also concerted action to adapt these principles to the transnational breadth of the challenges the world confronts in the 21st century. Although human rights instruments and provisions outline rights, outcomes, and responsibilities that bind nations, enforcement of these provisions has primarily focused on the obligations that sovereign states have towards their citizens. Yet health threats, including those posed or exacerbated by human rights violations, increasingly traverse national borders, necessitating transnational collaboration and action. Although it has long been noted that disease knows no boundaries, this maxim has become even more apparent in the interconnected contemporary world. However, as the need for international cooperation has become more apparent than ever, the barriers to global solidarity and collective action have grown evermore daunting—as evidenced by a diminishing commitment to multilateralism, intensifying nationalism, inertia created by a failure to respond effectively to escalating international crises, progressive degradation of the human rights climate (including a weakening of human rights accountability mechanisms), and adherence to an international order that has starkly worsened economic inequalities and prioritized national individualism over

collective action. Finding ways to surmount these obstacles represents the central global challenge of this era.

Positioning human rights at the centre of health practice will require important shifts in approaches. Over the past two decades, proponents of human rights approaches to health, along with human rights advocates in general, have been on the defensive, decrying the steady erosion of human rights protections without always offering an affirmative case for why respect for human rights is essential. In addition to principled reasons, there are practical, self-interested reasons for the world to prioritise human rights as an overriding imperative. Put simply, a commitment to human rights is essential to human survival. Although humankind might have evolved in a manner that normalises war, zero-sum competition, and unrestricted, self-interested consumption of the natural world, these instincts are incompatible with the ability to live in peace, security, and prosperity at a time when the global population exceeds 8 billion people. As COVID-19 showed, no one is safe in a pandemic unless everyone, everywhere is safe. Freedom, mutual respect, and global solidarity are essential for survival of the human species.

In working to reinvigorate the health and human rights paradigm, acknowledgment of the limitations of actions confined solely to the health sector is crucial. Neither individual health practitioners nor health policy institutions can independently correct climate injustices, prevent conflict, or ensure that health-related information disseminated on digital platforms is accurate. The health field urgently needs to make common cause with practitioners and advocates in a broad array of disciplines, including the human rights field. Actors in the health field, irrespective of their role, must shed the notion that their work is merely technical, grounded solely in science and divorced from the world of politics. The decisions that profoundly affect human health—how resources are distributed, who is valued and who is not, whether well financed systems are in place to meet human needs— are inherently political, and attempts to separate health from politics will inevitably end in failure.[32]

Efforts to place human rights at the centre of health need to account for how the human rights field and the broader international environment are evolving over time. In addition to the individual rights recognised by the international liberal order after World War 2, there is growing appreciation of the rights of marginalised racial and ethnic groups whose experiences of discrimination are often shielded from human rights protections by claims of national sovereignty.[33] Whereas the post-war international

order was put in place at a time when national governments were paramount, government power is now frequently rivalled and often exceeded by the actions of multinational corporate actors, whose actions are not directly governed by human rights law and which are often purposefully organised to avoid taxation or the regulatory reach of governments. Indeed, multinational commercial actor encounter few if any actors capable of holding them accountable, enabled by free-trade agreements that frequently prohibit meaningful regulation of commercial practices that worsen health outcomes. This degree of impunity and absence of oversight mean that multinational actors are increasingly free to make decisions that affect the health and wellbeing of people worldwide. In the face of proliferating transnational threats to health, revisiting the health and human rights paradigm and identification of how it might need to further evolve is essential to ensuring that it is fit for purpose in the 21st century.

Recommitment to health and human rights also needs to incorporate the decolonisation of the international order. Decolonisation necessitates elevation throughout all levels of health governance of the voices of low-income and middle-income countries (LMICs), including both governments and communijties. If the illegal invasion of Ukraine properly provokes global outrage, the global community should respond commensurately to war crimes in Yemen, the political disempowerment and military and economic strangulation of Palestinian people living in territory occupied by Israel, widespread hunger in the Central African Republic, and the epidemic of femicide and gender-based violence in many Central American countries. Mpox should be prioritised on the global health agenda not only when outbreaks occur in high-income countries (HICs) but also when endemic transmission remains high in low-income settings.

Racism is a root cause of many of the human rights violations that impede human health. Globally, 16 of the 20 countries with the highest gross domestic product per person in 2022 were largely populated by people of European ancestry, vividly underscoring the racialised manner in which global resources are distributed.[34] In all of the many domains of health and human rights studied by the Commission, marginalised racial and ethnic groups frequently have the poorest health outcomes and are most likely to have their rights violated. In the USA, a growing number of states and municipalities have declared racism a public health crisis.[35] Anti-racism should be a pillar of efforts to revive and update the health and human rights paradigm.

How the Commission approached its work [H3]

The International AIDS Society–*Lancet* Commission on Health and Human Rights was formally launched in *The Lancet* in April, 2021.[36] The Commission has convened virtually since 2019, and when COVID-19-related travel restrictions began to lift, we met for a 3-day face-to-face meeting in 2022. The Commissioners are a diverse group of global researchers, physicians, human rights lawyers, scholars, historians, social scientists, advocates, and activists from Asia, Africa, Australasia/Oceania, Europe, South and Central America and the Caribbean, the Middle East, and North America

Our work began with three framing questions: what is the future of the health and human rights framework, how can the health and human rights framework be revitalised, reinvigorated, and updated to achieve healthy communities and support human existence, and what domains of the health and human rights framework are most relevant for ensuring robust health systems and universal access to prevention and care? These questions led to the elaboration of several linked objectives, including to examine the past, present, and future of the health and human rights paradigm; to explore critical questions posed by noted trends; to interrogate evidence from an array of disciplines; to unpack the complex interrelations between health, rights, justice, accountability, and sustainability; to identify pathways to rejuvenate and update the health and human rights framework; and to identify strategic actions to recentre human rights in health practice.

We did scoping reviews of the health literature, and reviewed trends in human rights reporting, accountability, and justice. As we discussed and debated the framing questions and objectives, domains emerged in which the clear connections between rights and health could be meaningfully explored. We then formed smaller working groups to address each domain. In several cases, it became clear that additional expertise was required, and commissioners were added to address these gaps—perhaps most importantly the complex interactions of the climate crisis, health, and rights. The domain working groups each developed their sections of the Commission report, which were integrated during the 3-day in-person meeting. Mathematical modelling was done in several domains to help to interrogate the potential benefits of interventions to address health and rights.

In the end, the Commission focused its work on eight core areas of inquiry, each underpinned by a fundamental rights imperative. These domains are pandemics and access to essential interventions; the climate crisis and health and rights; displacement, migration, refugees and conflict; structural racism, inequity, and discrimination against devalued minorities; sexual and reproductive health and rights;

misinformation, disinformation, and the right to benefit from accurate scientific information; digital health, artificial intelligence, and rights (which was added in 2023 in response to rapid developments in the field); and the economic and commercial elements of the right to health. This report addresses each of the eight domains, and is informed throughout by a socioecological model (panel 1). We decided that gender would be a cross-cutting issue affecting all eight domains, and each of the Commission's domain working groups has undertaken a gender analysis. Likewise, working groups also examined the role of criminalisation in each of their respective domains.

The human rights paradigm has provided an essential tool for demanding and promoting equity in health. Although far from realisation, the right to health offers a comprehensive approach to addressing health and wellbeing, including remedying injustices that lead to ill health and are exacerbated by weaknesses in contemporary health systems. Human rights, with its commitment to inclusion, equity, and the common good, constitute the sole sound foundation for humans to survive and flourish in the 21st century.

Domain 1: Pandemics, human rights, and equitable access to essential interventions [H2]

We are in an age of pandemics.[44] By the end of 2021, the COVID-19 pandemic had caused an estimated 15 million deaths[45] and the most severe global economic downturn in nearly a century.[3] Pandemics with death rates even higher than that associated with COVID-19 could soon be on the way,[46] yet the response to COVID-19 underscores that the world is wholly unprepared to prevent or respond effectively to future health emergencies. As with so much else in the health domain, human rights principles point towards an approach to pandemic preparedness and response that is optimally effective, equitable, and sustainable. This approach will require broad systemic changes, including the development of meaningful transnational obligations to cooperate to address global health challenges and the dismantling of systems and practices that prioritise profits over effective pandemic responses.

Human rights principles reinforce a fundamental reality of pandemic responses: no one is safe during a pandemic unless everyone, everywhere is safe. The UN's International Covenant on Economic, Social and Cultural Rights recognises the right of every person to the "highest attainable standard of physical and mental health" and makes protection from epidemic diseases an explicit component of the core health rights that all humans share.[47]

In virtually every aspect of the response to COVID-19, profound inequities were tolerated on the global scale, which left many countries and communities to fend for themselves.[48] Within many countries, the frequency of infection and mortality was substantially higher,[49,50] and that of vaccination substantially lower,[51] in racial and ethnic minority populations than in ethnic or racial majority populations. Social distancing, a core COVID-19 control method, was unfeasible for many people, especially for poor people living in densely populated informal settlements and other urban settings[52] or those confined to prisons.[53] Women were particularly affected by COVID-19 because they comprise 70% of the global health and social service workforce.[54] Additionally, the COVID-19 pandemic was associated with a surge in gender-based violence and substantial discrimination against marginalised populations, such as east Asian populations and sex workers.[55,56]

LMICs generally did not have access to the same extent to COVID-19 diagnostics, personal protective equipment, ventilators, and other essential prevention tools that as HICs did.[57] Even as rapid vaccination uptake enabled many HICs to relax some COVID-19 precautions, many LMICs, especially in Africa, lacked sufficient access to vaccines to enable broad vaccination of their populations.[58] Although 90% of people in upper-middle-income countries and 78% of those in HICs had been vaccinated at least once as of July, 2023, only 31% of people in low-income countries had received at least one dose of a COVID-19 vaccine.[59]

The self-interested actions of a few pharmaceutical companies have proved to be a crucial driver of global inequities in access to COVID-19 vaccines. Although there is substantial, untapped capacity to manufacture mRNA vaccines for COVID-19 in nearly every global region,[60–62] the world has remained reliant for vaccine supplies on manufacturing in HICs, largely because of the refusal of the makers of these vaccines to license their products for generic manufacture in LMICs. The implicit claims by the pharmaceutical industry and their diplomatic defenders that their intellectual property (and, by extension, their private profits) are more important than the health and wellbeing of 8 billion people worldwide are especially scandalous given that COVID-19 vaccines were created by using technologies developed through research funded by the public sector. An agreement by the World Trade Organization in 2022 of a narrow waiver of patent protections for COVID-19 vaccines amounted to far too little and occurred far too late to have a meaningful effect, and the loopholes and limitations of the waiver render it effectively useless.[63]

A lack of international solidarity in the financing of vaccine efforts exacerbated the severity of vaccine inequities. COVAX, the global community's mechanism to facilitate equitable access to COVID-19 vaccination, fell substantially short of its ambitions, largely due to the refusal of HICs to make sufficient financial contributions to the initiative and because many countries agreed to bilateral deals with manufacturers and hoarded finite vaccine doses, resulting in considerable wastage even as billions of people worldwide lacked access.[64,65] Although the EU aided in the establishment of COVAX and the broader, multilateral Access to COVID-19 Tools Accelerator initiative to which COVAX belonged, it actively fought efforts to waive intellectual property protections for essential COVID-19 vaccines.[66]

The socioecological model points the way towards more effective pandemic preparedness and responses, by looking to human rights principles and approaches to shape needed structural reforms. By contrast with the often haphazard, disjointed, and nationally driven responses that characterised the COVID-19 response, collaboration, collective solidarity, and a commitment to equitable access to pandemic-fighting tools are crucial to pandemic preparedness planning and actual responses to future emergencies. The new pandemic accord, which is being negotiated under the auspices of WHO and is set to be finalised by mid-2024, offers a potential vehicle for enshrining equity and human rights in enforceable international provisions. However, early indications are not promising. Although the draft text of the pandemic accord identifies human rights and equity as cornerstones of pandemic preparedness and response, the draft opts for language that is advisory rather than obligatory.[67] Especially concerning is that the negotiations about the text seem to be replaying central disagreements from the COVID-19 response: the USA, the UK and other HICs have reportedly resisted demands from LMICs for obligatory time-bound waivers of intellectual property rights during a health emergency.[68] Any new global agreement needs to reflect and enforce zero tolerance for self-serving actions by countries that jeopardise the health of the global community. Wealthy countries should be obligated by international law to contribute their fair share to address future health emergencies and global crises.

The hoarding by HICs of medical goods needed by people worldwide is inherently unjust and contrary to human rights principles, global health equity, and the effective management of health emergencies. Never again can the world allow corporations to take precedence over people, especially during a global crisis. In the context of COVID-19, more than 140 former world leaders, scientists, humanitarians, and other stakeholders joined together to call for a so-called people's vaccine, including the suspension of intellectual property rules and mandatory pooling of COVID-19-related knowledge and technologies

(panel 2).[69] In addition to temporary waivers of intellectual property, the Medicines Patent Pool, developed in response to the urgency of scaling up HIV treatments, offers an imperfect but proven, ready-made model of voluntary licensing of priority medical technologies. The Medicines Patent Pool relies on technology transfer and generic manufacturing in LMICs to produce affordable, priority medicines, diagnostics, and preventive interventions (panel 3).[70]

To avoid repeating the mistakes of the past in future pandemics, robust research and development and pharmaceutical manufacturing capacity must be ensured and fully in place in LMICs. The creation of WHO's mRNA vaccine technology hub represents an important step towards correcting the mistakes made during COVID-19.[71] In view of the utter failure of global solidarity in the response to COVID-19, it is heartening that regional actors have stepped into the breach. In Africa, more than 30 initiatives in 14 countries had emerged as of July, 2023, to build vaccine manufacturing capacity in the region, and the African Union, the African Centres for Disease Control and Prevention, and Gavi, the Vaccine Alliance were supporting efforts to ensure that African countries will never again be reliant on other regions for essential vaccines.[72]

Communities and civil society are essential actors in pandemic responses, as evidenced historically in the context of HIV and more recently in the cases of COVID-19[73,74] and the mpox outbreak of 2022.[75] At global, regional, and national levels, communities and civil society need to have a seat at the table when plans are formulated and key decisions are made about pandemic preparedness and response.[76] In this regard, the secrecy surrounding negotiations for a new pandemic accord is of deep concern.

As the world works to prepare for the next pandemic, it must also follow through on commitments to end AIDS, a pandemic that was first recognised more than 40 years ago. It is disheartening that funding for HIV programmes in 2022 was more than US$8 billion short of the amount needed to get the global response on track to end AIDS as a public health threat by 2030.[77]

The Commission came up with three recommendations on pandemics, human rights, and equitable access to essential interventions. First, WHO member states should endorse a pandemic accord that sets out clear, well monitored obligations for countries to ensure timely, equitable, worldwide access to pandemic-related products, including diagnostics, therapeutics, and vaccines, through temporary waivers of intellectual property provisions, routine mandates for technology transfer, and substantial,

assessed outlays for the distribution and uptake of these products. Second, WHO, international donors, regional political bodies, national governments, and private sector investors should develop and implement a milestone-driven action plan to build robust, resilient, readily adaptable pharmaceutical manufacturing capacity in all parts of the world. Finally, international donors and multilateral institutions should provide financial and technical support to LMICs to establish robust, inclusive, people-centred social protection systems, which would reduce vulnerability to health problems and minimise the negative social effects of disease-control measures during pandemics.

Domain 2: Climate change, health, and human rights [H2]

Climate change is affecting every aspect of life, posing an existential threat to many species, and imperilling human health and livelihood.[86] WHO has referred to it as an urgent global health threat[87] and projects that it will cause 250 000 deaths per year between 2030 and 2050.[88]

Climate change is already depriving countless millions of their basic human rights, including the right to health, social security, and the essentials of life.[89] It is increasing worldwide food insecurity and triggering broad population movement at a time when the number of people affected by humanitarian crises due to conflict and insecurity is at an all-time high. The Office of the UN High Commissioner for Human Rights has declared that climate change “threatens the enjoyment of all human rights, including the rights to health, water, food, housing, self-determination, and life itself”.[90] In 2021, the Human Rights Council declared that having a clean, healthy, and sustainable environment constitutes a human right.[91]

In addition to depriving countless millions of the right to health, the growing toll from climate change reflects the profound inequities and injustices at the heart of the international economic and political order. Although the world’s wealthiest countries and multinational corporations are most responsible for climate change, the effects are felt most acutely by the poorest and most marginalised populations, whose governments tend to have fewer resources to protect them.[92] The World Meteorological Organization reports that 90% of all deaths related to climate change in the past 50 years have occurred in LMICs.[93] The Office of the UN High Commissioner for Human Rights has identified Indigenous populations, women, and people with disabilities as among those who face the biggest challenges adapting to a changing climate,[94] and UN Women has projected that climate change is likely to have its greatest effects on women, who account for the majority of agricultural workers in LMICs.[95]

While substantial global attention has focused on efforts to slow climate change, including by accelerating the transition from fossil fuels to renewable energy sources, too little has focused on the injustices and inequities inherent in the climate crisis. Efforts to tackle climate change should address the harms inflicted by a warming planet on fundamental human rights and prioritise measures to diminish the suffering of those economically, socially, or politically unable to accommodate the necessary transitions caused by climate change. To do so will necessitate historic changes to international norms, institutions, and practices: the effects of climate change extend across time and national borders and affect entire ecosystems, which means that efforts to address the health and human rights ramifications of climate change cannot be managed by or within individual sovereign states, as is common for most other human rights abuses.

The broader regional impacts of climate change are a natural consequence of both extreme weather events (eg, hurricanes, floods, landslides, heat waves, wildfires) and the disruption of long-established weather patterns, neither of which are constrained by politically constructed borders.[96] Globally, the number of disasters related to weather, climate, or water hazards increased five-fold in the past 50 years, with a seven-times increase in documented economic losses.[97] In 2020, the third hottest year on record after 2016 and 2023,[98] the global cost of natural disasters was estimated at $210 billion. In 2022, unprecedented flooding in Pakistan killed more than 1700 people, damaged or destroyed more than 2 million homes, and left more than 10 million people without safe drinking water.[99]

Extreme weather events disproportionately affect the poorest communities, particularly Indigenous ones[100]—especially those who live in less healthy, more polluted environments with inferior shelter, because badly constructed slums and inadequate infrastructure have increased vulnerability to extreme climate events. Hurricanes batter coastal areas[101–104] and increase flooding, with especially dire consequences for marginalised populations, who disproportionately live on flood plains.[105–109] Marginalised communities in urban areas, historically located along navigable waters to maximize transport and trade, have also had their housing, transportation, food distribution, and energy infrastructure disproportionately impacted by rising water and floods. Meanwhile, wildfires, which are increasing in frequency and intensity, are destroying rural and farming communities worldwide.[110–112] All of large parts of some island nations, such as Micronesia, Marshall Islands and Tuvalu, might disappear altogether because of climate change.

Equally pernicious for human health and wellbeing is the loss of arable land due to long-term climate events. The 5 years with the most extreme recorded droughts have all occurred since 2015.[113] Drought has reduced people's ability to produce food in diverse settings.[114–117] An estimated 19% of global land surface is being subjected to drought,[118] which is at times severe enough to cause desertification of inland areas. Experiencing prolonged heat increases health risks[119] and has negatively affected labour and farming capacity for many people who were already barely earning subsistence wages.[120] The cost of heat, particularly for the world's 1 billion agricultural workers, who are predominantly women, is projected to increase to $2·4 trillion by 2030 from $280 billion in 1995.[121] As temperatures and the frequency of heatwaves have increased, heat has resulted in major disparities in adverse health outcomes by income group, age, gender, and race or ethnicity.[122–125] Saltwater intrusion from rising sea levels is also causing the loss of arable land loss and destroying water sources, coastal agriculture,[126] and drinking-water aquifers.[127] The UN Intergovernmental Panel on Climate Change warns that sea levels are likely to rise by about half a meter by 2100,[128] which threatens more than 600 million people who live in low-elevation coastal areas worldwide.[129,130,163]

Within countries, there are often profound inequities in the effects of environmental destruction, with the poorest and most marginalised people being the most likely to live near sources of pollution and to experience negative health effects.[131] Air pollution, which alone is associated with 7 million premature deaths annually, is closely interlinked with climate change, with most sources of air pollution also contributing the greenhouse gases primarily reponsible for the climate crisis.[147] These inequities have given rise to national and global movements for environmental justice that increase awareness of environmental racism and advocate for intersectional approaches that address the multifaceted nature of vulnerability to environmental harms.

Climate-driven migration and displacement are not merely future concerns: they are already taking place. Most of the 30·7 million people displaced in 2020 were fleeing floods, wildfire, drought, or heat waves.[132] Homes, schools, businesses, and health facilities have been damaged or destroyed by climate events, driving thousands into resettlement camps.[133] These trends are likely to intensify in the coming decades.[134] By 2050, as many as 1·2 billion people might have been displaced by climate change.[135] Climate change migrants face extraordinary obstacles to good health, wellbeing, and human dignity, including unequal access to assistance, discrimination in resource provision, recruitment of children into

fighting forces, sexual and gender-based violence, and unsafe or involuntary return or resettlement.[136] The surge in migration is straining public health infrastructure in areas that already have scarce finances, poor transportation systems, and a shortage of appropriately trained health workers.[137] Clinics and hospitals have been destroyed by extreme climate events or conflict[138] in such varied settings as New York (NY, USA)[139] and southern Africa.[140] Variations in temperature and humidity increase the risk of vector-borne diseases, such as malaria[141] and arboviruses (Zika, chikungunya, dengue);[142] the risk of deterioration of essential public health infrastructure, which in turn increases the risk of diseases such as cholera;[143] and the risks to vulnerable groups, including elderly people, outdoor workers, immunocompromised people, and people with disabilities.[144–146]

The right to health is compromised in other ways by a rapidly changing climate. Air pollution, which is associated with 7 million premature deaths annually, is closely linked with climate change, with most sources of air pollution also contributing the greenhouse gases responsible for the climate crisis.[147] HIV prevention is also undermined by climate change, which increases food insecurity, thereby enhancing vulnerability to HIV,[148–151] triggers mass population movement, which can enlarge and extend sexual networks,[152] and destroys the health and transportation infrastructure needed for the delivery of prevention and treatment services.[153]

The Commission’s socioeconomic model for health and human rights classifies climate change as one of several global determinants of health and human rights. However, there is a risk that climate change could eventually overwhelm all other considerations. At the 2022 UN Climate Change Conference (COP27), attendees agreed for the first time to create a loss and damage fund for adaptation via the newly established Santiago Network,[154] with the aim of compensating vulnerable countries for harms caused by high carbon emissions. Although some observers have depicted creation of the fund as a turning point, the reality is less comforting. According to the UN, funding for the victims of climate change is inadequate to address current mitigation and adaptation needs, much less the $160-340 billion per year projected to be needed by the end of this decade or the US$315-565 billion projected to be needed annually by 2050.[155]

An even more striking deficiency in efforts to tackle climate change is the complete absence of an agreed-upon centralised analysis to address even some of the predictable adverse health and rights outcomes of climate change—eg, reduced crop yields, increased food insecurity, resettlement of

vulnerable populations after forced migration or necessary future migration.[156] These problems are most often regional and inadequately addressed by actions at the national level. Unfortunately, little meaningful planning has focused on the sustained efforts required to respond to the overwhelming range of long-term health and human rights implications of climate change.

Vague endorsements of the need for long-term action are insufficient. Although the growing recognition of the human rights implications of climate change is heartening, immediate transnational action is necessary not only from state actors but also from multinational corporations and international financial institutions, as described in the Maastricht Principles on the Extra-Territorial Obligations of States in the area of Economic, Social and Cultural Rights.[157] Industrialised nations and multinational corporations have been, often knowingly,[158] the causative agents for climate change, and in the process have intentionally externalised the costs to the countries and populations with the least resources to respond. Yet massive fossil-fuel companies, a primary driver of the climate crisis, oppose the windfall tax proposed by UN Secretary-General António Guterres on a small subset of the vast profits they have made[159]—disregarding the overwhelming evidence that substantial resources are urgently needed to enable climate change mitigation and adaptation that they have caused in LMICs. Certainly, those who have benefitted most should by some mechanism be required to provide for those adversely affected by their actions—particularly Indigenous populations, poor urban communities, women, people with disabilities, and nomadic populations—without regard for the artificial borders of nationhood. Resources need to be made available before more communities are displaced, more arable land is rendered barren, and insufferable heat and widespread disease bring more suffering to everyone at risk from climate change. If not, the human costs will increase exponentially.[160]

The Commission came up with four recommendations on climate change, health, and human rights. First, in recognition of the fact that the growing health and human rights consequences of climate change are primarily due to past and present fossil-fuel emissions in HICs, these countries should build on momentum from COP27 to provide massive, sustainable financing to LMICs that will enable truly effective climate change mitigation and adaptation. Second, all public subsidies for fossil-fuel expansion should be diverted to support a just transition away from the use of fossil fuels and to remedy the adverse effects of climate change on marginalised communities. Third, climate migrants should be afforded refugee status under international and national laws. Finally, the health sector should become a vocal and active player—at the global, regional, country, and community level—in increasing

awareness of climate change and its health effects as well as strengthening resilience and mitigation efforts.

Domain 3: Health and rights in displacement—migration, refugees, and conflict [H2]

In 2020, there were an estimated 281 million international migrants,[161] and the number of people migrating is increasing.[162] Irrespective of the reason for their move, migrants frequently have difficulty accessing needed health services.[164] In this Commission, we opted to examine in depth one key driver of global migration: war. Often fuelled by racism, ethnic, religious, or tribal oppression, climate change, unequal power relations, and competition over resources, war has long resulted in horrific abuses and greater exposures to pathogens and trauma, and an estimated 117·2 million people are projected to be forcibly displaced or rendered stateless as a result of war in 2023.[165] Although human rights law and the law of armed conflict (referred to as international humanitarian law, the centrepiece of which is the Geneva Conventions) have sought to protect millions of people from the consequences of war and to ensure these people's right to health, all too often governments have not agreed to be bound by key international human rights treaties, and those that have agreed to be bound frequently flout compliance. Additionally, governments have no legal duty to accept a minimum number of refugees, or to support those countries overwhelmed by the presence of thousands or millions of refugees. The failure of the clearly articulated human rights obligations to protect people displaced due to conflict affords the opportunity to examine key gaps in enforcement of international human rights norms and provisions.

The link between war and health is obvious and multifaceted. Between 1990 and 2017, an estimated 20 million people died from indirect causes of war.[166] Millions more have been injured and experienced psychological trauma. Women and girls are disproportionately harmed and often experience high levels of gender-based violence from combatants, family, and community members.[167] The health effects of displacement are often severe. Forcibly displaced people seeking protection and work in other countries often live exceptionally insecure lives, and are frequently subjected to racism, xenophobia, harmful cultural stereotypes, and violence, and denied their right to health. Many people are not able to gain entry to their destination country, while others are deported, detained, or prevented from applying for asylum. The circumstances in which migrants are detained are often, in the words of researchers, "harmful by design" —ie, calculated to result in both psychological and physiological harms.[168] The migrant workers in Qatar whose deaths and mistreatment gained global attention during the 2022

World Cup represent a much more pervasive problem: when people work in countries other than their own, even if they have legal permission to work, they are often exploited, discriminated against, and denied services – a pattern that underscores the insecurities experienced by migrants of all kinds..[169] Across southeast Asia, millions of forced migrants often have little redress in cases of discrimination, abuse, or exploitation, because many countries in the region are not signatories to pertinent international frameworks and because national legal schemes vary.[170] Aggressive measures to enforce immigration laws act as a deterrent to migrants' use of health services,[171] and in some countries health systems have been effectively weaponised as enforcement arms of immigration authorities.

Health care itself is often targeted during wartime. In 2022, the worst full year on record since attacks on health care have been tracked, there were more almost 2000 violent acts against individuals, organizations and facilities involved in the provision of health care in 25 countries in conflict.[176] The reverberations of these attacks undermined the health of millions of people. However, a 2016 resolution[177] calling for concrete actions to ensure protection of health care in conflict and accountability for perpetrators of attacks has been largely ignored.

In war, human rights laws, including the right to health, the 1951 Refugee Convention, and the Geneva Convention,[172] are supposed to protect civilians, prisoners, wounded and sick people, and people working in or using health facilities. Under the Refugee Convention and the associated 1967 Protocol Relating to the Status of Refugees, people fleeing persecution on political, religious, ethnic, and related grounds cannot be forcibly returned to their home countries and are entitled to some degree of benefits and protections in receiving countries.[173] A 1990 Convention on the Protection of Migrant Workers was designed to guarantee their rights and freedoms.[174]

Despite their expressly transnational breadth, human rights laws frequently have little, if any, effect. For example, some countries that receive hundreds of thousands or even millions of refugees have not ratified the Refugee Convention. Fewer than two dozen countries, none of which have substantial numbers of migrant workers, have ratified the Migrant Worker Convention. Even when governments have agreed to be bound by international human rights and humanitarian conventions, they often refuse to comply, sometimes making no pretence of adhering to international rules and commitments they have formally endorsed. Despite their ratification of the Refugee Convention, HICs actively prevent people from Africa, Central and South America, and the Middle East from reaching their borders,

frequently for racist and xenophobic reasons. They even prevent rickety, dangerous boats from landing on their shores, a stance that in 2023 contributed to the deaths of more than 600 migrants in the Mediterranean Sea.[175] Detention of asylum seekers is also pervasive. In denying entry to their country, authorities, such as the USA government during COVID-19, have sometimes invoked public health justifications that lack evidence or logic.

A UN Global Compact adopted in 2018 sought to encourage governments to share burdens of support of refugees, but it is entirely voluntary and has lacked funding commitments. Under international law, countries have no duties to individuals fleeing where they live for reasons other than persecution, such as climate change, state failure, or economic collapse.

Perpetrators of war crimes and crimes against humanity are rarely held to account, and their enablers, such as arms suppliers, are often not at all. Governments seeking to put an end to this impunity are often prevented from doing so by the prevailing rules of international governance. The five permanent members of the UN Security Council have used their veto power to prevent referral of cases to the International Criminal Court or to block Security Council efforts to maintain international peace and security. The UN Secretary-General has too often bent to pressure from powerful governments by declining to name them in an annual list of shame of perpetrators of persistent violations against children in war. Having created a surveillance system for attacks on health care at the direction of member states, WHO has abdicated its responsibility to track and report on attacks on health care.

Despite this decades-long record of failure, avenues are available to promote recognition and respect for rights in the context of war and displacement. These include ratification and implementation of key conventions, ending subversion of the Refugee Convention, constraining the veto power of Security Council permanent members in situations when atrocities have been credibly alleged, prosecution of war crimes and crimes against humanity that include attacks on health care, and ensuring that arms sellers are held to account for the crimes of their buyers. The racism, xenophobia, dehumanisation, and fear of the other that drives so many violations of human rights also need to be tackled and proactive measures to prevent war, including strengthening early-warning systems, are also needed.

In view of governments' track records and resistance, achievement of these goals will be difficult. Yet opportunities are available, in which medical, nursing, and global health communities could play crucial

roles. Individual health professionals should actively advance and advocate for refugee rights, and health educational and professional organisations should raise awareness of racism and leverage training and regulatory oversight to build health professionals' capacity to address social determinants of health among migrants.[178] Within countries, health organisations and individual health practitioners can ally with human rights and civil society groups to emphasise the health and human consequences of failing to protect the rights of migrants and refugees. As the UCL–*Lancet* Commission on Migration and Health showed, addressing the key social and structural factors that undermine health for migrants, including "discrimination, gender inequalities, and exclusion from health and social services" requires cross-sectoral action that only multidisciplinary partnerships can bring about.[179] The health field can partner with movements organising against racism and xenophobia. Health professionals can join international justice advocates to press for domestic prosecutions of war criminals. Globally, they can develop alliances with, and provide political support to, governments willing to lead—eg, the success of global health advocates in the International Campaign to Ban Landmines in the 1990s and more recent mobilisations to stop violence against health care in war.[180] The global health community can provide leadership in preventing war and mitigating the consequences of armed conflicts.[181,182] Regional approaches also offer potential promise. The Nansen Initiative, a state-based collaboration on migration, environment, and climate, has gained a broad consensus for humanitarian and human rights approaches to address migration due to disasters or climate change across borders.[183] A group of 10 non-governmental organisations involved in migration demanded a regional framework to harmonise asylum procedures, address discrimination, and consider means of integrating migrants into receiving society.[184]

More broadly, a paradigm shift is needed in the scope of health and human rights protections for displaced people. Transnational obligations to refugees and migrants fleeing conflict, destitution, and climate change need to be strengthened and the imperative to resist the racist foundations of many current policies needs to be recognised. For refugees, new, enforceable obligations for countries to admit a minimum number of people fleeing persecution, and supporting host countries, are essential. The new paradigm should also impose reparative transnational obligations on countries that directly or indirectly contribute to displacement and conflict through policies and practices that exploit poor countries and undermine their economies, foster political instability and internal conflict, and contribute dangerous levels of greenhouse gas emissions. Central to this new paradigm is acceptance by governments of the obligation to alter harmful policies and practices and be accountable for past

actions, rather than continue to exacerbate their effects. Without such a shift, forced displacement is likely to continue, more human beings will be compelled to migrate, and racism and xenophobia will prevail, imposing incalculable costs on human health and dignity. Here, too, we believe that community mobilisation and the engagement of organised groups can make a difference in building and shifting the political will to confront racism, xenophobia, war crimes, and the incalculable associated health consequences.

The Commission came up with three recommendations on health and rights in displacement. First, the UN (and its member states) needs to strengthen the visibility and consistency of its leadership on health and human rights obligations in the context of war and conflict and ensure accountability for violations. The Secretary-General needs to speak honestly and forcefully regarding war-related health and human rights violations, the Security Council should be reformed to end structural constraints on referral of perpetrators for prosecutions, WHO needs to vastly improve its system for tracking and reporting on attacks on health care workers and facilities during conflicts, and governments should implement reforms to which they have committed to prevent such attacks. Second, UN member states should ratify conventions on migrants and refugees and recognise transnational obligations to receive and support refugees and other migrants and to require reparative measures from countries that directly or indirectly contribute to displacement and conflict. Regional bodies and networks should adopt a leadership role in strengthening obligations for rights-based approaches to migration. Finally, the medical, nursing, and global health communities should actively ally with human rights and civil society groups to highlight the health consequences of failing to protect the rights of people subjected to war and conflict, migrants, and refugees and to build political support at national, regional, and global level for political leadership to protect and promote these rights.

Domain 4: Structural racism, inequity, and discrimination against devalued or marginalised populations [H2]

Racism and discrimination against othered groups have been common throughout human history for complex social and economic reasons. In 2022, a series of analyses in *The Lancet* found that "racism, xenophobia, and discrimination are ubiquitous".[185] At the same time, the history of humanity also shows the innate human propensity for solidarity, cooperation, altruism, and sentiments of human equality.[186] In recognition of the potential for human beings to be guided by their best instincts rather than their worst, international human rights law guarantees not only everyone's right to the highest attainable

standard of health but also their right to be free from discrimination based on race, ethnicity, sex, language, religion, political or other opinion, national or social origin, property, birth, or other status.[187] Yet despite these protections, populations in societies continue to be devalued—not fully counted as societal members, having their identities dismissed, experiencing marginalisation and often criminalisation, and having their rights and health needs eschewed, minimised, or pushed to the fringes. Renewal of the commitment to health and human rights demands not only a commitment to equal access to health care, but also active steps towards health equity that take into account the unique vulnerabilities and disadvantages of all who experience discrimination.

The rights to health and to non-discrimination are inextricably linked. The International Covenant on Economic, Social and Cultural Rights and other human rights instruments protect individuals' right to health without discrimination as an immediate obligation of governments.[188–190] States have a special obligation under international law to provide coverage sufficient to enable health-service access to all people residing within the state and to prevent discrimination in the provision of health services.[191] The 2022 report of the UN Special Rapporteur on the right of everyone to the enjoyment of the highest attainable standard of physical and mental health affirms the centrality of human rights to recognising and addressing health inequities arising from the intersectional nature of multiple forms of discrimination and structural disadvantage based on age, sex, gender identity, expression, sexual orientation, disability, migration status, health status, and location in rural or urban communities, which often intersect with discrimination based on race or ethnicity.[192]

Despite the clarity of international human rights law on the need to protect against discrimination, substantial inequities remain within and between countries in access to health care and the conditions required for full enjoyment of health.[193] In some contexts, discrimination is so pervasive and embedded in societal institutions that it serves as a basic organising principle of national life, with enormous health and human rights implications. Contemporary examples include the ongoing Israeli occupation of Palestinian territories (see Gaza panel)[194] systemic discrimination against Kurdish populations in Turkey,[195] the exclusion and disenfranchisement of the Rohingya people in Myanmar,[196] and the systematic oppression of the Uyghur population in China.[197] (These human rights violations are often exacerbated by social media, as discussed in Domain 6.)

Structural inequalities affect historically marginalised populations, leading to disproportionate risks and disparities in physical health, mental health, and overall wellbeing.[198] Discriminatory patterns and practices manifest in severe health disparities, worsen population-level health outcomes, and have the most serious effects in communities with the fewest social and financial resources.[199,200] The O'Neill–*Lancet* Commission on Racism, Structural Discrimination, and Global Health, launched in 2023, has cited racism as "one of the most consequential transnational phenomena to impact the health and lives of afflicted communities globally".[201] Systems of structural discrimination have profound consequences for people's ability to enjoy the right to health. For example, compared with white Americans, Black Americans are three times as likely to die during pregnancy,[202] 23% more likely to die of heart disease,[203] twice as likely to die of diabetes,[204] and 8·5 times as likely to be diagnosed with HIV.[205] In Libya, discrimination against marginalised ethnic groups, such as the Tabu and Tuareg, diminishes access to health services.[206] In south Asia, exclusion of, and discrimination against, scheduled castes worsen the health outcomes of people living towards the bottom of the social hierarchy and diminish access to health services.[207] In diverse societies worldwide, Indigenous communities experience considerable health disparities compared with non-indigenous populations, in many cases due to the rapacious actions of commercial actors, such as land dispossession for industrial development or resource extraction.[208,209]

Discrimination and disadvantage are intersectional. In Brazil, for example, sexual and reproductive health services are unavailable to a substantial share of women, particularly among rural and Black populations.[210] In Ghana, LGBTQ people face violence and repeated violations of their rights to assembly and freedom from arbitrary detention.[211] A range of legal, economic, and cultural barriers to achieving the right to health persist for women and gender minorities—eg, female migrants and Syrian refugees in Türkiye.[212] Worldwide, an estimated 5·1 billion people, a third of whom have mental or physical health issues, do not have meaningful access to justice, and overall women and racial and ethnic minorities are disproportionately affected.[213]

Although there is no shortage of international commitments and frameworks to address racism and other forms of discrimination, few concrete actions have been taken to ensure worldwide ratification or fulfil the promises in these instruments. 20 years ago, the World Conference against Racism, Racial Discrimination, Xenophobia and Related Intolerance adopted the historic Durban Declaration and Programme of Action. The Durban Declaration put forward a comprehensive framework for fighting

discrimination and intolerance, recognised the effect of discrimination on health and the effects of intersectional discrimination, and called for remedies, recourse, redress, and reparation for victims of discrimination.[214] Commitment to the principles outlined in the Durban Declaration has been repeatedly reiterated by global bodies, including a 2019 resolution by the Human Rights Council to move "from rhetoric to reality" in eradicating racism, racial discrimination, xenophobia, and related intolerance.[215] Although there has been some progress on international commitments among UN member states to act against racial discrimination, including developing national legislation or policies,[216] mechanisms remain weak for international monitoring, enforcement, and redress.

To effectively leverage the health and human rights paradigm to respond to 21st-century challenges, several strategic actions are needed. In countries where criminal law is used to target marginalised populations, legal reform is an urgent necessity (panel 4). In addition to articulating the principle of non-discrimination, human rights frameworks should also explicitly state the actions needed to dismantle discriminatory practices and structures. The Special Rapporteur's 2022 report on racism and health emphasises the importance of reparatory justice, financial investment, and data derived from participatory research in developing strategies based on an intersectional rights-based approach to ending racism as a determinant of health.[217]

Several reparatory justice initiatives have been established, including some from regional actors. In 2014, the Caribbean Community (CARICOM) adopted an ambitious plan that highlights the need for European countries to acknowledge and apologise for historic racial injustices that emerged out of slavery and colonialism, and also the need for reparations to address contemporary human rights violations, socioeconomic deprivation, and health inequities (including the high prevalence of hypertension and diabetes) caused by this legacy.[218] The CARICOM regional approach has been supported by other countries, including some African nations, and in a proposal for a commission to study and develop reparation proposals for African Americans in the USA.[219] Although calls for reparations have not always been explicitly framed as human rights documents, former UN High Commissioner for Human Rights Michelle Bachelet has argued that reparations can help to identify and confront past human rights violations that continue to affect the lives of Africans and people of African descent. Reparation initiatives can also open up discussions about mechanisms for redress, which could include systemic health-sector interventions acknowledging the long history of racism[220] in the development and administration of western biomedicine.[221]

Active steps towards attaining health equity from the perspective of human rights, and addressing intersectional discrimination and marginalisation, are essential in attaining broad social empowerment and equity across the different levels of the socioecological model (figure 1, panel 1). These active steps include affirming and restoring the social value, dignity, and identity of all people. Solutions need to be sought at the individual and institutional level, as well as at all levels of government and across diverse sectors, have accountability mechanisms in place, and include proper investments of resources. Within countries, governments, working with stakeholders in the private sector and civil society, should urgently develop tailored approaches to address complex forms of structural discrimination and disadvantage that impede the realisation of the right to health at home. Countries should also engage meaningfully and consistently in effective international cooperation to promote rights to non-discrimination and health globally.

In addition to redressing past injustices, countries need to take active steps to prevent future discrimination and end impunity for people who support discriminatory systems, structures, and practices. Some countries with histories of racial discrimination, colonisation, and slavery, notably in Latin America, have taken actions to disrupt structural discrimination in pursuit of the right to health. In Brazil, the 1988 constitution declared health as a fundamental human right and a governmental duty, which provided the basis for free, universal health care.[222] Public legal services are available in Brazil for people who are unable to access care or medicines, and courts routinely provide redress.[223] Numerous countries, including Costa Rica, Cuba, Ghana, Thailand, and Türkiye, have worked to develop health systems that address the underlying social, economic, and political causes of poor health.[224] Since the 1990s, Costa Rica has restructured its public health system around multidisciplinary teams of public health providers who work with local communities to identify needs and priorities in specific geographical locations, and then apply an equity lens to deliver a range of curative and preventive services.[225] Although some challenges have been experienced, including in delivering services to migrant and urban populations, the restructuring has resulted in substantial improvements in health-care outcomes and reduced inequalities in access.[226]

Within the health sector, clinical providers should actively monitor health outcomes by race and ethnicity, alongside other factors of discrimination, and should use these findings to adapt service-delivery strategies to reduce health disparities.[227] Population health should be systematically monitored,

and these data should be used as a barometer for the health and human rights climate and for the effectiveness of efforts to improve health equity. Health education and professional medical and health associations should actively work to increase awareness of the health consequences of racism.

Addressing health challenges that result from racism and discrimination also requires working in and with non-health institutions. For example, in countries such as Canada and Switzerland, data for race or ethnicity are not routinely collected in public datasets across a range of non-health sectors, which limits the ability to even recognise that health disparities occur across racialised groups. As a positive example, mathematical modelling in Tijuana, Mexico (panel 5), has shown how structural interventions targeting non-health institutions, such as policing, can cost-effectively reduce the frequency of new HIV infections and fatal overdose among people who inject drugs (who are often marginalised in the health-care system; panel 6) as well as an array of harms frequently experienced by sex workers (panel 7).

Recognition of health as a human right needs to address discrimination and structural barriers to health for groups who are devalued or marginalised. In taking action to eliminate structural discrimination, new approaches are needed to document the problem and measure progress in reducing health disparities and increasing health empowerment, including—but not limited to—changes in fiscal policy[228,229] and wealth redistribution. Increased commitment is needed at the community, national, regional, and global levels, including from WHO, the Special Rapporteur on the right to health on human rights and the environment, the World Trade Organization, and the international health-care community. Finally, accountability should be strengthened by developing international standards to assess progress on reducing racism and discrimination as fundamental causes of health inequities. In the effort to eradicate racism and discrimination, we anticipate that additional insights and even clearer pathways for change will emerge from the work of the O'Neill–*Lancet* Commission on Racism, Structural Discrimination, and Global Health.[230]

The Commission came up with three recommendations on structural racism, inequity, and discrimination. First, countries that have colonised or engaged in other forms of economic abuse of countries or populations need to provide fiscal, technical, and other necessary support for meaningful reparations for historical and ongoing harms. Second, global (eg, the UN, WHO) and regional political bodies should proactively explore new mechanisms for translating international commitments on anti-discrimination into meaningful obligations for all countries to prevent and fight discrimination and

intolerance, drawing inspiration from the Durban Declaration and Programme of Action. WHO should prioritise the development of a treaty that protects the right to health as a human right and develop international standards for data collection that can be used for external review to assess progress on reducing racism and discrimination as fundamental causes of health inequities. In addition to increasing and clarifying the obligations of member states, these new mechanisms should also work to strengthen international cooperation and commitment to promote rights to non-discrimination and health. All countries should have in place comprehensive, enforceable legal and policy frameworks to address discriminatory systems, structures, and practices, including the use of health-equity frameworks to identify and deliver needed curative and preventive services equitably. Finally, within countries, the health community should explicitly work towards solutions to tackle racism and discrimination and to reduce bias at national, institutional, community, and individual levels. Regional and national medical associations need to call for equitable access to health care, examine and oppose discriminatory healthcare policies, and be an active voice in ensuring that providers are not criminalised for providing equitable care; standard curriculums for clinicians should be modified to include training on how social and structural factors affect heath; and states and institutions should support participatory community-led or patient-led monitoring of health and health disparities metrics to ensure equitable and discrimination-free access to high-quality care.

Domain 5: Sexual and reproductive health and rights [H2]

Sexual and reproductive health and rights are central to human identity, sexuality, reproductive actions and opportunities, behaviours, and health. Numerous international human rights instruments and technical health guidelines, founded on the dignity and worth of every person, recognise that all people have fundamental rights relating to their sexual and reproductive health. Sexual and reproductive health and rights belong to people in all their diversity, whether they are men, women, non-binary or otherwise gender nonconforming, intersex, cisgender, or transgender, and equally to people of all ages, including adolescents, irrespective of race, ethnicity, citizenship, religion, or other status. Achieving sexual and reproductive health and rights for all demands the engagement of the technical, political, and legal domains and coordination and partnerships across a range of actors (figure 1).[270]

Important advances have resulted from the prioritisation of human rights in the HIV response, including attracting important investments, underscoring the links between health and human rights, and strengthening programming for sexual and reproductive health and rights more generally. Many

countries in Africa have used human-rights-based approaches to increase access to sexual and reproductive health. For example, Benin has expanded reproductive autonomy to include access to safe and legal abortion,[271] and several other countries now permit abortion on demand.[272] In a landmark judgment in 2022, a court in Kenya deemed the non-consensual sterilisation of women with HIV a violation of the rights to dignity, freedom from discrimination, and the highest standard of health and reproductive freedom.[273] At the regional level, the East African Community HIV and AIDS Prevention and Management Act safeguards the rights of people living with and affected by HIV, but is broadly drafted to obligate members states to provide rights-based sexual and reproductive health services, including comprehensive sexuality education, to all women and girls of reproductive age irrespective of HIV status.[274]

Despite gains catalysed in part by the HIV response, sexual and reproductive health and rights remain starkly incomplete and uneven globally—and in several areas have regressed. Maternal mortality remains a huge issue globally, and is increasing even in some high-income settings,[275] with substantial racial disparities and inequities. Gender inequities and gender-based violence continue to undermine health, wellbeing, and rights across countries.[276] Underserved populations, such as gay men and other men who have sex with men, transgender populations, and sex workers of all genders are disproportionately affected by poor outcomes related to HIV, sexually transmitted infections, and sexual health more broadly. Additionally, an estimated 163 million women worldwide had an unmet need for contraception in 2019,[277] and many countries sharply restrict access to abortion.[278] Over the last decade, countries including Kenya, Rwanda, Uganda, Tanzania, the USA and others across the Middle East and North Africa have either restricted adolescents' access to comprehensive sexuality education and contraception or enacted restrictive abortion laws.[279,280]

Criminalisation of abortion, sexual behaviour,[281] sexual orientation, gender identity,[282,283] and sex work[284,285] remain persistent barriers that restrict access to health care, worsen quality of life, and perpetuate stigma, discrimination, and violence. For example, mathematical modelling shows how homelessness and criminalisation can increase experiences of violence (among street-based sex workers in London (panel 7). Young people often face additional challenges to their sexual and reproductive health, particularly young, unmarried women or those deemed to be under the age of sexual consent. Criminalisation frequently contradicts recommended health practices and interventions. Although abortion is safe when it is legal, follows a recommended method appropriate to the pregnancy duration,

and done by someone with the necessary skills, restrictive laws resulting in unsafe abortion are a leading preventable cause of maternal deaths and morbidities, resulting in physical and mental health complications and social and financial burdens for individuals, communities, and health systems. Approximately 25 million abortions occur under unsafe conditions annually, accounting for almost half of all abortions. Abortion under unsafe conditions results in 39,000 deaths annually and millions of people needing medical care for complications.

Because of the sensitive and controversial nature of political support for sexual and reproductive health and rights, global commitments in this domain are often diluted and rendered unduly conservative during the process of negotiations. The weak declarations that often result from consensus decision making in international bodies frequently slow progress and there is a risk that such efforts to further expand rights might ultimately result in backsliding or retrenchment instead. Some governments that support sexual and reproductive health and rights in global forums nevertheless have repressive laws and enforcement practices domestically, such as the growing number of state laws in the USA that have banned or substantially restricted access to abortion.[286]

New challenges to sexual and reproductive health and rights have emerged, including outright political resistance to gender equality, sexuality, reproductive freedom, and self-determination. Religious justifications have been used to limit gender equality and autonomy in sexual and reproductive health decision making. In the USA in the past decade, there has been a surge in state legislative proposals targeting transgender and gender-nonconforming people,[287] and Russian President Vladimir Putin has made gender conformity a centrepiece of his rule.[288] Opponents of sexual and reproductive health and rights often justify their resistance as a defence against so-called alien forms of gender and sexual organisation and culture allegedly imposed by external actors.[289]

Political changes in all countries frequently rely on outside efforts by social movements, to which governments react and respond. To drive progress in the face of growing challenges, sexual and reproductive health advocates and practitioners must more actively engage with the full social architecture needed to support sexual rights, including strategic interaction with the economic, social, cultural, and political contexts that influence and explain the actions of governments. Relationships among stakeholders, bridging marginalised and key affected populations, civil society, policy makers, and global health disciplines, are pivotal to advocacy and action. The fruits of such multidisciplinary

partnerships are evident—from the history of social activism on women's health helping to shift the global focus of action from population control to sexual and reproductive health and rights,[291] to the legacy of HIV activists, many living with HIV, who built successful alliances cutting across not only disciplinary but geographical divides.[292]

Scaling up technically sound, rights-based sexual and reproductive health programmes is an urgent priority. Leading international agencies, such as WHO, the UN Population Fund and UNAIDS, have included human rights standards in their technical guidance related to sexual health,[293] safe abortion,[294] and HIV services, and are paying increased attention to structural-level determinants of health, specifically in relation to HIV.[295] Although this growing attention to human rights within the technical domain has facilitated health funding streams focused on rights-based issues (by The Global Fund to Fight AIDS, Tuberculosis and Malaria, for example), programmes that ground sexual and reproductive health services in rights-based approaches have yet to reach sufficient scale. Improving investments in rights-based sexual and reproductive health and rights programmes is essential.

It is no longer possible to cite a lack of evidence as a reason to delay implementing a rights-based approach to sexual and reproductive health. The evidence base for rights-based action on sexual and reproductive health is robust and rapidly expanding[296]—rights-based programming simply requires paying attention to marginalised groups who are often effectively ignored by many governments.

Key actions to expand and strengthen sexual and reproductive health and rights include increased advocacy for better laws, leveraging existing progressive jurisprudence, and strengthening the capacity of court systems through judicial colloquiums and regular trainings for judicial officers on sexual and reproductive health. Modelling (panel 7) suggests that reducing homelessness and over-policing could reduce the vulnerability and improve the wellbeing of sex workers at high risk of violence. Decriminalisation and the establishment and enforcement of protections for sexual and reproductive health and rights (including access to contraception and abortion, as well as decriminalisation of sex work, sexual orientations and gender identities are urgent necessities. Coordinated efforts across domains can advance progress and also ensure that progress that has been achieved is not lost. Hybrid civil society alliances (such as, for example, the SRHR & Climate Justice Coalition) that address the intersectional nature of barriers to sexual and reproductive health and rights can aid in forging strategic grassroots, national, regional, and global linkages with other health and rights concerns, such as youth

and climate movements. Such alliances can work in different forums, to explain, measure, and act on the links between health and development. Strong, active, and organised resistance to government-sponsored regression on sexual and reproductive health and rights is essential, as is the use of human rights norms and standards to expose, assess, challenge, and systematically address inequalities connected to sex, sexuality, and ultimately the sexual and reproductive health and wellbeing of all people.

The Commission came up with three recommendations on sexual and reproductive health and rights. First, all countries should expeditiously review their legal and policy frameworks to ensure adherence to sexual and reproductive health and rights principles, take immediate action to decrease enforcement of punitive laws, work towards decriminalisation and removal of other burdens related to contraception, abortion, sex work, sexual orientations, and gender identities, and put in place enabling legal environments to ensure people can flourish. Second, sexual and reproductive health advocates and practitioners should actively engage in multidisciplinary, multisectoral partnerships to tackle growing challenges to sexual and reproductive health and rights, increase public awareness of the importance of these rights to health and wellbeing, and promote the scale-up of evidence-based and rights-affirming sexual health and reproductive health programmes. Finally, sexual and reproductive health advocates and practitioners should better leverage the human rights architecture to improve and sustain accountability for sexual and reproductive health and rights, including through leveraging of available data, establishing human-rights-affirming guidelines on routine data collection and data use, and prioritising the collection, use, and dissemination of information that support rights-affirming programmes.

Domain 6: Misinformation, disinformation, and the right to accurate scientific information [H2]

The revolution in communications technologies in the past 35 years has offered important opportunities to advance health and human rights, including enabling access to essential health information for personal decision making and the formulation of sound, evidence-based health policies. At the same time, developments in information technologies, including the ability of anyone to post information or opinions, have had profoundly negative consequences, such as the spread of health disinformation and misinformation, the empowerment of security services to track and harass persecuted minorities in the name of public health, and the mobilisation of hatred for purposes of violence and social exclusion. Renewing and updating the health and human rights paradigm for the 21st century requires the

judicious balancing of protections of the right to freedom of expression with the human right to accurate, reliable, and actionable health information. This balancing should be complemented by structural reforms to ensure universal internet access to close the so-called global digital divide.

The invention and rapid expansion of the internet vastly expanded the availability of information that had previously been beyond the reach of most people. By the end of the 1990s, internet 2.0 enabled user-generated content, allowing anyone to post information and paving the way for social media platforms.[306] Access to the internet has greatly increased since 2000, primarily through smartphones, which more than 4 billion people use to access the internet and led to many countries leapfrogging the intermediate stage of wired telephone networks.[307] Internet access enables individuals to participate fully in society, as suggested by the association between improved internet access and increased voter turnout.[308] Those experiencing attacks or persecution can now capture human rights violations on video and upload the footage.[309] The internet also enables investigative journalism that exposes corruption or reveals the ultimate ownership of companies engaged in environmental and human rights abuses.[310] Tracking systems can support communicable disease surveillance.[311,312] Online investigators have rigorously documented the extraordinary range of actionable information available online.[313] To fully leverage the rights-advancing potential of online resources, such as the use of open-source intelligence to document abuses after the Russian invasion of Ukraine, standards are needed for what constitutes evidence. In this regard, the Berkeley Protocol, a collaborative effort to create standards for use of digital tools for open-source investigations, offers a possible way forward.[314]

However, the utopian visions of a digitally connected world that prevailed a decade ago have quickly given way to recognition of the mixed consequences of the internet as a medium. The internet, and especially social media, has amplified the reach and impact of extremists who spread hatred, in some cases encouraging attacks on persecuted populations.[315] In balancing the promise and potential peril of the internet, we focused on the effects of digital advances on two aspects of the right to health: the right to information in a world where this right is increasingly exercised online, and the right to scientifically accurate information in a world where so-called fake news proliferates, especially in relation to health.

The right to information [H3]

Digital portals are, in some countries, the primary way that people access health care other than in an emergency, and are used to book appointments and order prescriptions online.[316] However, profound inequalities in access to these services became apparent early in the COVID-19 pandemic, when many forms of human interaction moved online, including education, clinical consultations, and shopping. It quickly became clear that many people were unable to afford the equipment or, as importantly, the data necessary to engage with online services: a large-scale community testing programme in Liverpool, UK, showed that large differences in digital access contributed to socioeconomic differences in uptake of COVID-19 testing.[317]

Given the increasing centrality of the internet to all aspects of human life, digital access should be understood as a fundamental element of the right to health and its prerequisites. Measures are urgently needed to enable people without internet access to gain access to essential online information. This need is especially important in cases when lack of access could accentuate other inequalities by excluding, for example, refugees, people seeking asylum, people who have been trafficked, people experiencing homelessness, sex workers, and migrants with insecure immigration status.[318] Unfortunately, many countries are creating internet firewalls that deny people the ability to share information that is crucial for asserting human rights and documenting violations.[319]

Access to health information is only meaningful if the information is scientifically accurate. Much of what circulates online is not. The consequences of the online dissemination of false health information became especially apparent during the COVID-19 pandemic (although COVID-19 is not the first issue to attract scientifically inaccurate claims, as the long histories of HIV[320] and climate denial[321] attest to), especially in the USA, where most research has been done regarding the health effects of misinformation. According to modelling (panel 8), 44% of SARS-CoV-2 infections and 52% of COVID-19 deaths could have been prevented in Texas in a 3-month period in 2021 had consumption of vaccine-related misinformation been equivalent among Republican and Democratic voters.

Misinformation—ie, inaccurate information shared without intent to cause harm—is distinct from disinformation, which refers to false information knowingly created and shared to cause harm.[322] A further distinction has been made by the philosopher Harry Frankfurt between lying, when the speaker knows what the truth is but seeks to deceive, and bullshit, when they do not care about the difference

between lies and the truth.[323] Post-truth is a related concept, whereby politicians intentionally make inaccurate statements because they know that they can lie with impunity.[324]

Misinformation and disinformation lie on a spectrum from satire, which has no intention to cause harm but can undermine trust in authority, to messages explicitly designed to cause harm. As an example, anti-vaccine propaganda might be spread by those who have a genuine concern, however misguided, about safety and by those who are using the issue as a tool to undermine trust in governments and health experts.[325] Information that is misleading often spreads more rapidly than that which is accurate.[326] In 1947, Allport and Postman proposed a basic law of rumour, in which the amount of rumour circulating was associated with a function that combined the importance of the subject to the individuals concerned and the ambiguity of the evidence.[327]

Health-related issues feature prominently in disinformation. False stories about vaccines and communicable diseases are especially common,[328] many involving conspiracy theories and pseudoscience. These stories have been especially damaging during COVID-19.[329] Although some vaccine-related instances of disinformation include a grain of scientific evidence, even if distorted, others are simply bizarre. For example, in one study,[330] West Nile virus infections were variously attributed to alien warfare, a shift in the North Pole, and the fulfilment of a biblical prophecy, among other causes.

Disinformation has at least four damaging effects, all of which have consequences for health:[331] disengagement in democracy, interference in democracy, economic harm, and risks to life. Public health is based on the principle of solidarity, but disinformation typically seeks to create or exacerbate divisions. Disinformation-based social media campaigns can encourage attacks on minorities, such as what occurred with the Rohingya in Myanmar.[332] There is increasing evidence that advances in digital technologies, such as rapidly accessible artificial intelligence techniques, are being used to undermine democratic processes while evading the public's communal literacy in media forensics.[333]

An effective response needs to consider what motivates people who create and spread disinformation. A study[334] of tweets about vaccines identified three sources of disinformation. First Russia-based trolls from the Internet Research Agency, a company linked to the Russian Government, conveyed messages that were for and against vaccination and many other issues, with the apparent aim of generating

discord and undermining trust in political leaders. Second, so-called content polluters used vaccination as a topic with which to attract individuals who will forward tweets, thereby spreading malware or ransomware or generating income by acting as clickbait to direct readers to websites that produce revenue. The third category had diverse but often unclear motives, but often including strongly anti-vaccination messages. An effective response to disinformation also needs to stay one step ahead of emerging technology, such as artificial intelligence, which makes it easy to create convincing messages, such as those conveyed by deepfakes, in which images of real people are manipulated to have them say or do something that never happened. Deepfakes have been deployed in the online media warfare adjacent to the conflicts in Myanmar and Ukraine,[335] and are increasingly implicated in national political campaigns.[336]

Human rights approaches to address misinformation and disinformation [H3]

Solutions to address access to information are straightforward. Much progress is being made in expanding digital access, although wide inequalities remain.[337] Ultimately, success can be achieved with money, innovation, and political will. Health disinformation is more difficult to address. Tackling health-related disinformation should now be a core skill for public health professionals. Disinformation is not a new problem, but its scale and reach are wider than ever. To overcome cognitive biases, people developing messages promoting health and human rights should keep messages simple and decline to explicitly engage with people promulgating false information (to avoid unintentional amplification of this disinformation).[338] Public health authorities should also make effective use of traditional methods to tackle false information,[339,340] including corrective messages, labelling the accuracy of information,[341] and correcting misinformation and disinformation.[342] Fact-checking can help to reduce some individuals' willingness to believe and share false information.[343] Some evidence suggests that fact-checking can have an long-lasting effect, as corrected facts are internalised and shape how individuals interpret events.[344,345] Inducing people to reflect on the accuracy of news can reduce sharing of potentially misleading news stories.[346,347]

Social media companies such as X (formerly known as Twitter), Instagram, and Facebook need to take an important degree of responsibility for the accuracy of information shared on their platforms by moderating accounts that promote hatred and qualifying messages that threaten health or democracy, even when they originate from senior political leaders. Unfortunately, the chaotic developments on X since it was purchased by Elon Musk offer little grounds for optimism that these platforms are prepared

to undertake the careful monitoring and judicious balancing required for the preservation of human rights.

The balancing between free speech and preventing the spread of misinformation and disinformation creates complex moral dilemmas for social media platforms. Where is the boundary between enabling freedom of expression and protecting public health? What one person sees as fact another might view as disinformation. If public health professionals are to address these issues effectively, they might often have to work with security services. Will they feel comfortable doing so? Furthermore, the tools that can be used for good where authorities are countering lies can equally easily be used by authoritarian regimes to suppress the truth.

The implications of the centrality of the internet to contemporary life are multifaceted, complex, and contextual. Responses to associated issues will vary according to the nature and scale of the issue, the legal and regulatory context, and much else. What is important is that everyone seeking to promote and protect health and human rights engage with this rapidly changing technological landscape.

The Commission came up with three recommendations about misinformation, disinformation, and the right to accurate scientific information. First, the global community—including international donors, multilateral bodies (such as the International Telecommunication Union), national governments, and private sector actors in both HICs and LMICs – should collaborate to close the global digital divide and ensure universal access to digital technologies, including through meaningful investments in building sustainable and resilient digital infrastructure and economic and policy incentives for innovation. Second, national governments should establish mechanisms to monitor emerging technologies that facilitate disinformation, such as the creation of deepfakes, and work with experts in a broad range of disciplines to develop countermeasures, but should also recognise the difficult balance between the competing rights to free speech and to accurate information. Finally, public health authorities should actively combat disinformation by making full use of insights from psychology and communication science to deliver simple, compelling messaging and timely fact-checking. Individual clinicians should leverage their trusted relationships with patients and communities to deliver scientifically accurate information and combat disinformation.

Domain 7: Artificial intelligence [H2]

In the time since this Commission was established, a new and important threat to health and human rights emerged: artificial intelligence. As a result, we add artificial intelligence as a domain for inquiry. Intelligent machines capable of simulating human-like intelligence are being designed to perform tasks that would otherwise require human intelligence, such as visual perception, speech recognition, decision making, problem solving, and learning from experience.

Artificial intelligence is advancing so quickly that regulatory measures cannot keep up with it.[360] Although artificial intelligence has the potential to bring major benefits to humanity, it also poses major threats, which has led some to call for a moratorium on its development. As governments discuss how to respond to these developments, an essential first step is to set out the implications for health and human rights. We have identified several causes for concern.

Many artificial intelligence systems rely on collecting and analysing vast amounts of personal data, including sensitive information like personal preferences, behaviour patterns, and biometric data. The extensive collection and use of personal data raises concerns about the potential invasion of privacy if data is accessed, used, or shared without individuals' consent.[361] If not properly regulated, privacy violations and unauthorised access to health-related and other sensitive information could occur, compromising people's right to privacy.

A related concern is the ability of artificial intelligence to analyse user data to create detailed profiles and target individuals with personalised advertisements, which has already occurred in the context of political campaigns in Kenya, Nigeria, the UK, and the USA.[362–364] Profiling can also be used to exclude people with certain characteristics from access to information that would benefit them. For example, ProPublica showed how it was possible to use Facebook's algorithms to restrict the ability of groups such as African Americans, Jews, and disabled people to view an advertisement for a desirable rental property.[365] The ability to profile individuals or groups through artificial intelligence has clear implications for health, potentially exposing people to the risk of violence or exacerbating the discriminatory patterns that have been shown to undermine health outcomes.

Artificial intelligence-powered facial recognition technologies can identify individuals on the basis of unique facial features, raising concerns about mass surveillance, loss of anonymity, and potential misuse of biometric data. China, for example, is using this and related technologies to create a social credit

system that will assess the conduct of all Chinese citizens.[366] If artificial-intelligence systems are not properly secured, they can become targets for cyberattacks, leading to data breaches and privacy violations, including the non-consensual disclosure of personal health information

Artificial intelligence algorithms can deanonymise supposedly anonymous data by combining and analysing several sources of information, although methods such as differential privacy, which aims to protect individuals' privacy by adding noise or distortion to datasets, can disrupt such deanonymisation.[367] Ensuring the adoption of such privacy-enhancing techniques in artificial intelligence systems is essential. The task of ensuring privacy is being complicated greatly by the so-called internet of things—the increasing integration of artificial intelligence with devices connected to the internet, enabling data collection from various sources, such as smart home devices or wearables. The latter, in the form of period tracking apps, has attracted particular attention following the overturning by the US Supreme Court in 2022 of the constitutional right to abortion.[368]

Artificial intelligence can give rise to discriminatory outcomes, particularly in areas such as hiring, lending, and law enforcement, affecting individuals' rights to equality and non-discrimination. As our work in the other domains has shown, such inequities and discrimination diminish health-service access and worsen health outcomes.

The growth of artificial intelligence has been facilitated by the ability of online providers to gather vast quantities of information about their users, for good or ill. Although this process can increase the relevance of information sent to users, it can also make it easier to discriminate against groups already disadvantaged. Sometimes such discrimination is inadvertent, such as when an algorithm replicates human behaviour that, consciously or unconsciously, discriminates on grounds of, for instance, gender or ethnicity. For example, a computer that was programmed to learn English by analysing large bodies of text learned to associate male names with career-related terms, female names with family-related terms, European names with pleasant terms, and African American names with unpleasant ones.[369] Issues can also arise when unrepresentative data are used to generate algorithms. When Google Translate was used to translate languages that lack gendered pronouns, such as Hungarian, into English, it added female pronouns when referring to domestic activities and male ones for roles associated with prestige.[370]

The avenues through which artificial intelligence can facilitate discrimination are numerous. If the training data and datasets on which algorithms are trained contain biases, the resulting models could reflect these biases. For example, use of historical data, which could reflect discriminatory practices, would result in artificial intelligence systems that inadvertently perpetuate discriminatory practices. Furthermore, any biases and assumptions held by the people involved in building artificial-intelligence systems can unconsciously influence the design and implementation of algorithms. Biases can also arise where there is a lack of diversity in the perspectives and experiences of development teams, resulting in overlooking things that will disproportionately affect marginalised groups. If the training data used for artificial-intelligence systems is incomplete or contains inaccuracies, it can lead to biased outcomes. For instance, if a facial recognition system is primarily trained on a specific racial group, it might perform poorly or exhibit bias when identifying individuals from underrepresented groups.

Some algorithms are inherently complex, which makes interpretation of how they arrive at specific decisions a challenge. This lack of interpretability means that identification and addressing of biases within the algorithm can be difficult, potentially leading to discriminatory outcomes. This issue is being addressed by the creation of explainable artificial-intelligence systems, which advise the operator how decisions were made by the intelligence.[371–374]

The enormous processing power of artificial intelligence applied to techniques such as facial recognition, video analytics, and predictive analytics has substantial potential for abuse. It can potentially impede the right to freedom of association or shift the balance of power between authorities and the individual—for example by allowing the former to ask intrusive questions about the latter's movements. Artificial intelligence can easily be misused or abused by regimes to suppress dissent, target specific groups, or infringe upon human rights. A notable example is the use of these technologies to track activities of the Uyghur minority in China.[375] Artificial-intelligence algorithms can also be used for content filtering, censorship, and the identification of objectionable or illegal content. Although there are some legitimate uses of this approach—eg, removing child pornography or the live-streaming of atrocities—there is an obvious risk of overreach, whereby algorithms mistakenly (or deliberately) flag or remove legitimate content, thereby inhibiting freedom of expression.

Artificial intelligence has the potential to take the well established process of automation of work to an entirely new level. So far, robots have largely displaced manual workers and are increasingly taking over

jobs in the service sector. The displacement of humans with chatbots in services jobs, such as in call centres, risks compromising the ability of customers without digital access (due to a lack of technology or the physical and mental capacity to use it) to access essential services. Transitioning from humans to artificial intelligence also has the potential to undermine the quality of services, as occurred when chatbot began dispensing tips for weight loss to callers to a helpline for people with eating disorders.[376]

The threat posed by misinformation discussed in the previous section has been increased by advances in artificial intelligence, which enables generation of more convincing misinformation and manipulated content, which could have a detrimental effect on public discourse and trust in information sources. This risk is especially pertinent to social media, on which artificial intelligence can create filter bubbles and echo chambers. The spread of artificial intelligence-generated disinformation poses challenges to maintaining accurate and reliable information, affecting freedom of expression and the ability to make informed decisions. Perhaps most concerningly, the speed of this spread and the increasing user-friendliness of artificial-intelligence platforms are outrunning the capacity of states and institutions to regulate the use of artificial intelligence. As artificial intelligence makes the production and dissemination of disinformation easier, it is even more important to develop and implement responses to messaging that undermines the veracity and integrity of science communication to the public, including public health communications. Yet, perhaps inevitably, this is being pushed back by political leaders, such as some US Republicans, exemplified by the June 2023 suspension of the US National Institutes of Health Advancing Health Communication Science and Practice programme.[377] There is an urgent need to build collective—and equitable—media literacy among governments, researchers, community groups, and the public to demystify artificial intelligence and empower independent interrogations to discern reality from artificially generated untruths.

The development of artificial intelligence-powered weapons systems increases the risk of violation of the right to life, and could lead to uncontrolled escalation in conflicts if decision making is entrusted to machines. While, as far as is known, so-called autonomous weapons remain under a degree of human control, such as those used by the Israeli Defence Force, the International Committee of the Red Cross and others have warned that these systems could remove human beings from decisions on the use of lethal force, eliminating human moral judgment, responsibility, and accountability. While autonomous weapons, just as with those directed by humans, might fail to follow international humanitarian law, which requires distinguishing between combatants and non-combatants and ensuring proportionality

and necessity in the use of force, their use raises important questions of accountability. Autonomous weapons could lead to an arms race, with countries striving to gain a technological advantage, increasing the risk of conflicts and reducing opportunities for diplomatic resolutions. However, whether this happens will depend on the global community's willingness to agree on their development and deployment. The historical record offers examples both ways. The positive examples, albeit far from perfect, include nuclear, biological, and chemical weapons. The negative ones include the race between the UK and Germany to build battleships at the turn of the twentieth century, a development seen as contributing to the First World War. Furthermore, autonomous weapons, like other digitally contolled weapons systems, could be susceptible to hacking or malicious use, posing risks of unauthorised access, control, or manipulation by malicious actors. One disturbing scenario is the potential use of artificial intelligence to design chemical weapons that are even more toxic than available chemical weapons.[378] At present, no clear international guidelines or norms exist to govern the development or use of autonomous weapons.

Artificial intelligence has the potential to both help and exacerbate social isolation. The UN Convention on the Rights of Persons with Disabilities includes the right to "full and effective participation and inclusion in society". The internet has served as a lifeline for many people, including elderly people, those living in remote settings, and LGBTQ+ people, and has the potential to strengthen access to mental health services. Artificial intelligence-based chatbots and virtual assistants can provide initial assessments, offer resources and information, and deliver support to individuals who might have little access to traditional mental health care. Algorithms have the capacity to analyse large datasets and identify patterns that could suggest early signs of mental health conditions, thereby assisting in early intervention. Predictive analytics could be used to analyse different data sources, such as social media activity, smartphone use, or biometric data, to identify patterns and potential triggers for mental health issues. There could also be scope for helping individuals to manage their mental health—eg, by using mood-tracking apps, meditation and relaxation apps, digital therapeutic programs, or artificial intelligence-guided interventions that provide support and assistance. However, artificial intelligence-powered social platforms and virtual interactions can also have adverse effects on mental wellbeing and the right to public participation. Such negative consequences could arise when individuals become dependent on artificial intelligence-powered devices and platforms for communication and social interaction, leading to reduced face-to-face interactions. Although interactions with artificial-intelligence systems that simulate human-like responses can create a sense of companionship, the absence of

genuine human connection and empathy could lead to a shallow form of social engagement, reducing opportunities to form meaningful relationships and deep connections and potentially increasing social isolation and posing profound risks for the vitality of human culture.

Addressing all the threats posed by artificial intelligence requires a multidimensional approach that combines legal frameworks, ethical guidelines, robust regulation, and responsible deployment of artificial-intelligence systems. Transparency, accountability, and human oversight are essential in the development and deployment of artificial intelligence to safeguard human rights in the digital age.

The Commission came up with four recommendations about artificial intelligence. First, governments should ensure that existing privacy legislation, regulation, and impact monitoring keeps pace with advances in artificial intelligence, including the potential to deanonymise data, while ensuring that these activities do not impede legitimate uses (eg, crime prevention, public health promotion) and recognising the need for these measures to be underpinned by a strong human rights framework. Second, governments, universities, and civil society organisations should work together to raise awareness of the scope and nature of applications using artificial intelligence, including the potential of media forensics to empower and initiate examinations on suspected content manipulated by artificial intelligence. Third, governments should work with the technology industry to develop a set of ethical best practices that should include the greatest possible sharing of codes for artificial intelligence devices that have a potential effect on health (and the implementation of other safeguards where this sharing is not possible), incorporation of identifiable signatures of content generated through artificial intelligence, and supporting of independent groups, such as Witness Media Labs, who routinely review and issue guidance on emerging digital threats. These ethical best practices should be complemented by enhanced regulation to address the societal harms caused by artificial intelligence. Finally, global equity is essential in the potential contributions of artificial intelligence to health and human rights. The same standards for relevant stakeholders pertinent to artificial intelligence should be in place in all countries including in LMICs, with appropriate funding and resource distributions to ensure the deepening of equitable capacity in media forensics and media literacy.

Domain 8: Economic and commercial determinants of the right to health [H2]

Although governments have primary responsibility for providing functioning health systems for people within their borders, the ability of people to enjoy their right to the highest attainable standard of health

is increasingly determined by private companies, which often operate free of meaningful regulatory oversight. HICs, where most large multinational corporations are based, might limit or prohibit some industry practices within their own borders, but they exercise little regulatory oversight over how these businesses operate in other parts of the world. LMICs, eager to welcome international investment, frequently cannot or do not want to bar harmful or predatory industry practices. Free trade agreements often limit or preclude LMICs from exercising regulatory oversight of harmful industries. Likewise, as occurred during the COVID-19 pandemic when strategies to ensure worldwide vaccine access were debated, HICs are protective of their home-grown industries and often block international bodies from taking effective action on behalf of global health and wellbeing.

The absence of oversight enjoyed by multinational corporations is having devastating consequences for human health. Commercial determinants of health are "strategies and approaches used by the private sector to promote products and choices that are detrimental to health".[379] Key private players that are driving negative health consequences include so-called big sugar, big tobacco, big agriculture, big pharma, big oil, and the vast interests in products like palm oil, corn, and processed foods. Through targeted marketing and political strategies to forestall regulation, multinational tobacco companies have driven steady increases in smoking in LMICs,[380] where more than 80% of the world's smokers now reside.[381] Abetted by trade agreements, the food and beverage industry has, through reckless marketing of highly processed foods and sugar-laden beverages, effectively exported an epidemic of obesity and associated ills worldwide.[382] The rise of industrial agriculture has been associated with environmental degradation, the spread of zoonotic diseases, increased inequality, and acceleration of obesity and chronic disease, especially in low-income countries, where the agricultural sector is a key source of income for many people.[383] The pharmaceutical industry has long fought efforts to curb or even question its patent monopolies in the interest of health and often encouraged the inclusion of provisions in trade agreements that inappropriately extend monopoly rights, effectively rendering essential medical products unaffordable in many global regions.[384] Despite international commitments to decarbonise, the G20 countries continue to prioritise fossil fuels over renewable sources of energy in their economic relations with low-income countries,[385] and the oil industry aggressively fights climate-friendly policies.[386] Corporate power to undermine health operates largely unchecked as a result of corporate control of the print and broadcast media, corporate influence on the governments ostensibly charged with regulating economic and health matters, and the use of intellectual property concepts to shield corporate behaviour from oversight.[387]

The liberal macro-economic policies that have held sway over the past several decades have not only empowered international private sector actors but also substantially weakened the ability of the public sector in countries worldwide to address commercial determinants of health. The post-World War 2 international economic order prioritises economic restructuring and privatisation, austerity with respect to public expenditures and other human investments, and government deregulation, whereby matters related to general welfare that were previously overseen by the government are relegated instead to the realm of personal responsibility.[388]

In many settings, health systems have turned to user fees or other economic barriers to health-service access, which in the most egregious forms have converted health facilities into debtors' prisons.[389–391] Structural adjustments demanded by leading international lenders to LMICs have encouraged growing privatisation of health services, even though substantial evidence has linked privatisation with worse health outcomes compared to care delivered through the public sector.[392] Across Europe, austerity policies have resulted in cuts in funding for health services and the imposition of user fees, widening socioeconomic inequalities and reducing access to health services.[393–395]

Further cuts to public services are likely in view of the parlous state of national finances in many countries. Public debt in LMICs increased from 55% of gross domestic product in 2019 to 64% of gross domestic product in 2020, constricting the fiscal space available for investments in health and other public sector priorities.[396] Participants in the G20 Debt Service Suspension Initiative spent four times more on debt service in 2020 than they did on health.[397] According to an analysis by UNAIDS, the rapidly worsening debt crisis means that, without meaningful debt relief, LMICs are likely to experience painful cuts to health services in the coming years.[398]

The prevailing international economic order has substantially increased inequalities within countries,[399,400] worsened the health and economic circumstances of the most vulnerable people,[401,402] and weakened the governmental institutions charged with ensuring social, health, and economic security.[403] These effects have deprived millions of people of inalienable human rights recognised in the Universal Declaration of Human Rights, including the rights to social security, education, the basics of life (including food, clothing, housing, and medical care), and the ability to participate freely and fully in the life of their community. The Commission's sociopolitical model for health and human rights (figure

1)—and especially its emphasis on global determinants, governance, and socioeconomic, commercial, and political determinants—offers approaches that value people over profits. A major rejuvenation of economic and social regulation is needed to address economic and commercial determinants of health. This strengthening of regulatory oversight aligns with the UN Guiding Principles on Business and Human Rights, which call for countries to fully leverage national regulatory and policy functions to ensure commercial adherence to human rights principles.[404] The HICs that reap the economic benefits of extractive industries and businesses that plan or manufacture harmful products should marshal sufficient regulatory oversight to prevent these companies from foisting unhealthy products onto consumers in LMICs. Governments in LMICs should resist the temptation of quick returns resulting from investments by harmful industries, because these short-term benefits are substantially outweighed by the long-term health burden borne by their populations and their health-care systems.

Regulatory action needs to extend across national borders, and requires strong international cooperation and commitment. Common refrains about the benefits of unrestricted free trade cannot allow companies in HICs to escape regulation by moving operations to LMICs, as the tobacco industry did—the bulk of tobacco farming is now done in LMICs.[405] A pivotal step towards increased international commitment for health is to stop using bilateral and multilateral free trade agreements to tie the hands of LMICs that seek to take action on commercial determinants of health.[406,407]

In all settings, the overriding focus of economic and social policy should be on reducing socioeconomic inequalities, which will require new approaches to taxation (both nationally and transnationally), budget allocations, and income distribution. To ensure that this commitment is meaningful in debt-burdened LMICs, debt relief needs to be prioritised and accelerated in international economic recovery efforts, and financial assistance should be conditioned on gains in health equity, educational equity, and sustained domestic investments in public health infrastructure.

We came up with three recommendations about economic and commercial determinants of the right to health. First, all countries should strengthen their regulatory oversight of commercial interests by developing and enforcing legal and policy frameworks to implement taxes and other restrictions on tobacco, unhealthy beverages, and other health-harming products, and to prevent the export of harmful products or commercial practices. Second, WHO, the World Trade Organization, regional political bodies, and countries should ensure that bilateral and multilateral trade agreements respect human

rights obligations and do not impede the abilities of LMICs to effectively regulate and mitigate the commercial determinants of health. Finally, at global, regional, and national levels, the reduction of socioeconomic inequalities should be the primary focus of economic and social policy. Development banks and other lenders should offer substantial debt relief, in return for commitments that funds freed through debt relief will be prioritised for programmes that increase health equity, educational equity, social protection, and robust domestic investments in public health infrastructure.

Centring human rights in global health and political, social, economic, and cultural relations [H2]

Sustained, strategic action is needed to halt and reverse the steady deterioration in the global commitment to human rights and to reposition human rights as a central driver of global health and of political, social, economic, and cultural relations. Regression on human rights is having increasingly damaging effects on human health and wellbeing and can no longer be tolerated as the inevitable outcome of an imperfect world. The international framework of health and human rights continues to inspire people worldwide to risk imprisonment, injury, and even death on a daily basis to uphold human rights principles. Young women in Iran, proponents of a more democratic constitutional order in Peru, and people protesting military rule in Sudan are among the many people globally who are sufficiently inspired to risk their lives to advance and resist the violation of human rights principles. In settings of war or civil unrest, health workers continue to care for those who are ill, knowing that hospitals and other health facilities are increasingly targeted by combatants.

Yet, despite the continuing resonance of principles of health and human rights, the imperative to place human rights at the centre of global health and human relations remains insufficiently embraced. Increasingly, human rights champions are on the defensive, left to condemn the seemingly relentless march to authoritarianism and scapegoating of the most vulnerable and marginalised communities. To counter the self-interested demands of the powerful, a compelling competing vision, one capable of uniting diverse people worldwide, is needed. This new vision posits that respect for human rights is not only right and fair, but also essential to human survival. At a moment in history when the existential threat posed by unrestrained corporate power and the heedless extraction of the earth's resources has never been clearer, we believe that the time is ripe for a renewed narrative that offers a positive alternative to authoritarianism, the neoliberal model, and the persistent legacy of colonialism.

Members of the health field—including community health workers, researchers, health-care professionals, programme administrators, policy makers and health educators—have a key role to play in this essential centring of human rights in health practice. They need to encourage action across sectors that have important effects on human health and wellbeing, both by modelling the benefits of a human rights-centred approach and by demanding that decision makers in diverse fields take health into account. Only by making common cause with diverse partners and sectors globally to renew and revive the health and human rights paradigm will the health field be able to achieve traction.

Transformation of the international order to ensure adherence to health and human rights principles will require radical, far-reaching change that takes on powerful interests and upends long-held assumptions among the powerful regarding the so-called natural order of global relations. Realisation of a world where human rights and principles of equity are the drivers of the transformed global order will not be possible so long as the most important global decision-making institutions reflect colonialist assumptions and power dynamics. Combatting racism thus needs to serve as a central pillar of efforts to revive and strengthen health and human rights.

Our survey of eight key domains underscores the distressing deterioration of global commitment to health and human rights. Yet even in the face of growing obstacles and setbacks, we are united in the belief that the global community—from the largest global institutions to individuals at the grassroots, and including practitioners across all aspects of the health field—has the power to demand that the international order be grounded in first principles of health and human rights. At a time of enormous flux and uncertainty with respect to international relations, when the costs of human rights violations are increasingly apparent, we have faith that a new international order, centring the needs of people rather than governments or profit-seeking corporations, is possible. Indeed, there are important signs of progress on which we can build. Even as a global backlash against recognition of the rights of sexual and other marginalised minorities grows, 12 countries have repealed laws criminalising same-sex relations since 2016, Belgium decriminalised sex work in 2022, countries such as Argentina and Pakistan have taken steps to recognise and protect transgender rights, and a global movement has emerged to support the decriminalisation of drug possession for personal use. The reversal of the global gender gap in education means that, by 2050, women on average will be better educated than men in nearly every country.[408] Although an estimated 3·1 billion people in 2023 do not have access to basic health services and are therefore denied the human right to the best attainable standard of health, improvements in

health-care access has increased substantially worldwide in the past 30 years.[409,410] And, although the outcome was imperfect, the 2022 COP27 summit for the first time established a fund to help vulnerable countries cope with the challenges associated with climate change.

We believe that the end result of this renewal of global commitment to health and human rights will be more than worth the effort: a more just world, in which burdens and opportunities are equitably shared and one's ability to exercise the right to health and other human rights does not depend on place of birth or residence. A world transformed to respect and promote health and human rights will result in the saving of countless lives, advance human dignity, and contribute to increased and more equitably shared prosperity by unleashing the potential of every person.

We have articulated the legal, policy, and programmatic changes need across the eight domains of the Commission. In the following recommendations, we aimed to synthesise the domain-specific guidance, taking both a visionary and a practical approach. These recommendations seek to clearly articulate a strategic, long-term direction for transformation of the international order to align with the international health and human rights framework. We recognise that such transformation of the world order is probably a decades-long undertaking, and so in our recommendations we also identify shorter-term actions that we believe can help to achieve concrete progress. We also identify key sets of actors who can help move this global transformation forwards despite what is sure to be ferocious resistance from countries and other global actors who will need to share the power they hoard.

Practitioners and stakeholders across the health field should ensure that all aspects of their work reflect and promote a commitment to human rights. In this Commission, we issue a call to action for all health practitioners and stakeholders to reaffirm that health is a human right. Individual health practitioners should speak out against human rights violations. Health practitioners of all kinds should critically examine how they can contribute to centring human rights in their work, including—but not limited to—measures to reduce health inequities and address social determinants of health. Health-care practitioners need to actively combat health disinformation when counselling and treating patients and in their capacity as trusted leaders in their communities. With the financial and technical support of national governments, international donors, and multilateral partners (such as WHO and development banks), health-service delivery sites should be reconfigured to monitor and promote equitable service access and to provide well coordinated person-centred care that addresses the full array of issues that

affect health and wellbeing, with particular attention paid to marginalised groups whose needs are often not effectively addressed by mainstream facility-based services. Medical and other health-related educational institutions should prioritise and integrate human rights across educational offerings and ensure that all health professionals are able to identify and address social determinants of health in their day-to-day work. Both national governments and international health and development donors should make major, sustained investments in building the capacity of community systems, which play an essential role in closing health-service gaps and addressing social and other vulnerabilities. Health research funders, researchers, health policy makers and programme implementers should systematically undertake evidence-based modelling exercises to guide and inform efforts by health systems and service sites to reduce inequalities and promote universal realisation of the right to health. At the policy-making level, WHO member states need to ensure that the international pandemic accord, set to be finalised and approved in 2024, not only identifies human rights as an organising principle but also sets forth clear, binding obligations to ensure worldwide, equitable access to affordable pandemic tools (eg, diagnostics, treatments, vaccines) and to prevent human rights abuses in the implementation of pandemic preparedness and response measures.

The health field needs to make common cause with diverse sectors and communities to bring about the far-reaching structural changes needed to centre human rights in global health and in political, social, economic, and cultural relations. The health field should actively partner with other movements—including groups advocating for climate justice, women's rights, racial and migrant justice, holding war criminals to account, the broader human rights field, and investigative journalists—to drive action to address the many factors that affect human health and wellbeing. Health practitioners have a unique role to play in making the case that advancing human rights is essential to human health and wellbeing and to the survival of the planet and civilisation. Although many of the structural factors that violate human rights and worsen health outcomes require changes at the global and regional levels, health practitioners can promote health and human rights at national, district, and municipal levels, including via active leadership and supporting the development of multisectoral local coalitions to promote practical actions to combat racism, enhance gender equality and social inclusion, decriminalise sexual behaviour, sex work, and substance use, promote environmental justice, improve access to healthy diets and safe housing, and provide a safe and welcoming space for environmental migrants and people who have fled war or civil conflicts.

Concrete policy changes are essential globally, regionally, and nationally to revive and renew the health and human rights paradigm. To honour the 75th anniversary of the Universal Declaration of Human Rights, all countries should recommit—both rhetorically and through a systematic review and reform of existing laws and policies—to the eradication of discrimination and human rights violations. All countries should repeal criminal laws that are inconsistent with health and wellbeing, including laws that criminalise same-sex relations, sex work, transgender identity, and the possession of drugs for personal use. Taking inspiration from countries such as Botswana (which provides free HIV treatment to non-citizens) and Thailand (which has taken steps to include migrants in its commitment to universal health coverage), countries should enact laws and policies ensuring that non-citizens have access to the same level and quality of health services as citizens—an approach that is consistent with the basic principles of public health. To promote realisation of the right to health for all, governments should understand health spending as an investment rather than a cost, and should allocate substantially greater domestic resources for the health workforce, health infrastructure, and procurement and equitable distribution of essential health goods. All countries should systematically monitor and report on health, social, and economic outcomes among marginalised or underserved populations, including racial and ethnic minorities, women and girls, sexual and gender minorities, migrants, and people in prisons or other public and private places of detention and use monitoring data to guide policy and programmatic responses to close disparities and gaps. Countries should eliminate discriminatory and unscientific restrictions on access to sexual and reproductive health and rights, which are foundational to human dignity and wellbeing. In recognition of gender inequality as a fundamental driver of poor health and global inequities, UN member states should prioritise effective implementation of the commitments outlined in the Convention on the Elimination of All Forms of Discrimination Against Women. In exercising their environmental, social, and governance obligations, corporations should align these goals and reporting obligations to the full array of human rights issues, including but not limited to climate justice, anti-racism, gender equality, and commercial determinants of health. The modelling exercises included in this Commission point to achievable reforms that can promote health and human rights in diverse settings, including programmes to educate police and reform local law enforcement practices to prevent HIV and overdose among people who inject drugs and homelessness among sex workers.

Radical reform efforts should focus on comprehensively decolonising global health and broader international relations. In the quest to align global health and international relations with principles of human rights, equity, and inclusion, far-reaching changes to international governance will be required.

In this regard, we agree with Brazilian President Lula da Silva, who has persuasively argued that the structure and operations of the UN and other international institutions (such as the International Monetary Fund and the World Bank) are no longer tenable in a world that is radically different from the one that emerged in the aftermath of World War 2. Every global region of needs to be meaningfully represented, with equitable decision-making authority, on the UN Security Council and on the governing bodies of major international political and economic institutions. Emerging economies and regions that do not have an equitable seat at the table of global governance should use every reasonable economic and political means to demand a revision of the global order. A radical reimagining of international governance is likely to be essential for the dismantling of the neoliberal economic and political order, which continues to have profoundly negative effects on human health and wellbeing. In addition to laying the foundation for a more just, equitable, and inclusive global order, countries and economic interests that have benefitted from disparities in access to economic and political power need to take meaningful steps to correct previous wrongs, which continue to shape international relations and limit the ability of much of the world to thrive. This transformation of the global order needs to meaningfully respond to the degree to which racism, subjugation of women, and the purposefully skewed access to global public goods have shaped and warped the world, to the detriment of billions of people. Countries and regions that have benefitted from colonialism should take active steps to correct historic wrongs, including the payment of substantial reparations to countries that have experienced colonialism. Urgent, concerted efforts are needed to amplify the voices of health professionals from LMICs in biomedical and other health research and in global health bodies and decision-making forums.[411,412] Continuing momentum from COP27, HICs that are largely responsible for perilous climate changes need to make massive, sustained investments to aid LMICs in mitigation and adaptation efforts. In addition to preventing harms within their own borders from entrenched economic interests such as big oil, big tobacco, big food, and the beverage industry, HICs should prevent multinational companies from exporting these harms to LMICs. Sustained investments by countries of all income levels will be needed to close the global digital divide, and the dissemination of disinformation on digital platforms must be combatted in ways consistent with freedom of expression. With respect to global health governance, radical steps are needed to empower new voices. In recognition of the fact that countries are often the most flagrant perpetrators of human rights violations, and taking account of the unique role of civil society in addressing health inequities, we recommend that WHO member states amend WHO's constitution to ensure voting membership of civil society from all WHO regions, an approach that has

proven exceptionally effective for such global health pillars as the Global Fund and Gavi, the Vaccine Alliance.

Impunity for human rights violations, including war-related atrocities, needs to end, and a renewed commitment is needed to overcome self-interested claims of national sovereignty and to hold those responsible for violations to account. Although we are idealistic, we are not naive. The essential reimagining of the global order and the replacement of the prevailing neoliberal, neocolonial model of international relations that we recommend will not occur overnight. However, although universal acceptance of the jurisdiction of the International Criminal Court or other human rights bodies might not occur until well into the future, there are pressure points that can be leveraged to encourage countries and other actors to abide by the international health and human rights framework. Prices to be paid for flouting international human rights commitments include reputational damage, exclusion from global bodies, and, when appropriate, economic sanctions or other trade restrictions. Although imperfect, regional bodies—such as the African Union, Organization of American States, the Association of Southeast Asian Nations, and regional human rights bodies—offer a potentially useful vehicle for reviewing and responding to health and human rights issues, because neighbouring countries often have greater influence over national decision makers than international bodies or countries from other regions. Indeed, across several domains studied in the Commission, regional bodies and initiatives are already taking action to provide human rights leadership where it is lacking at the global level. Fully leveraging regional bodies will necessitate advocacy and capacity-building to strengthen these regional organisations' commitment to, and competency in, health and human rights issues. Where international unanimity or consensus on the way forwards for health and human rights issues is not achievable, likeminded national governments can join together in so-called coalitions of the willing to raise awareness and advance progress. The WHO Framework Convention on Tobacco Control, which has grown to become one of the most widely adopted treaties in the history of the UN system, shows the power of motivated, committed governments to build support on challenging issues of health and human rights.

Conclusion [H2]

75 years after the world endorsed the Universal Declaration of Human Rights, it is time for the global community to revive, renew, and update the health and human rights paradigm. The health field should lead the way in combatting the steady deterioration of the human rights climate and the increasing

impunity that human rights violators exercise. Undertaking this essential but daunting task requires successful efforts to persuade both policy makers and global citizens that adherence to human rights is essential to survival. The health field will also need to hold itself accountable for recentring human rights across all aspects of health practice. Aligning health and broader economic, political, and social relations between people and nation-states to human rights principles will require a wholesale reordering of the international political and economic order, dismantling the vestiges of colonialism, moving beyond neoliberalism, and tackling the persistent, pernicious role of racism in perpetuating and exacerbating disparities in health and wellbeing.

This challenge is daunting, but not insurmountable. Even as global political structures reflect outdated power dynamics, regional bodies have stepped into the gap to exert important leadership on health and human rights issues. As numerous countries have moved towards authoritarianism, others have taken courageous action to remove discriminatory laws and policies, expand health-care access, and strengthen human rights protections. We believe that the steady, further relinquishment of health and human rights commitments is not evitable. The spirit of the Universal Declaration can be recaptured and adapted for the challenges faced in the 21st century.

Contributors [H6]

All authors participated in the conceptualisation, writing, and editing of the Commission report. CB and AK co-chaired the Commission, and CB developed the initial framing and outline of the work. MTI **[A: is this MI? Michael Isbell?]** served as the overall manuscript editor and led the development and drafting of the recommendations.

Declaration of interests [H6]

We declare no competing interests.

Data sharing [H6]

Researchers interesting in access to the data used in the Commission's modelling exercise should contact the corresponding author.

Acknowledgments [H6]

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References [H6]

1 UN. Universal Declaration of Human Rights. 1948. https://www.un.org/en/about-us/universal-declaration-of-human-rights (accessed Dec 30, 2021).
2 UN Office of High Commissioner for Human Rights. The core international human rights treaties. Geneva: Office of High Commissioner for Human Rights, 2014.
3 Herre B, Roser M. Democracy. 2022. https://ourworldindata.org/democracy#licence (accessed Dec 11, 2022).
4 UN Office of High Commissioner for Human Rights. Key concepts on ESCRs—are economic, social and cultural rights fundamentally different from political rights? https://www.ohchr.org/en/human-rights/economic-social-cultural-rights/escr-vs-civil-political-rights (accessed July 25, 2023).
5 Chapman AR. The contributions of human rights to universal health coverage. *Health Hum Rights* 2016; 18: 1–6.
6 Hassell J, Roser M, Ortiz-Ospina E, Arriagada P. Poverty. 2022. https://ourworldindata.org/poverty (accessed Dec 11, 2022).
7 Rose M, Ortiz-Ospina E, Ritchie H. Life expectancy. 2022. https://ourworldindata.org/life-expectancy (accessed 11 December 2022).
8 Herre B, Roser M. Electoral Democracy, 1948. 2022. Oxford UK: Our World in Data. https://ourworldindata.org/democracy#licence (accessed 11 December 2022). **[A: this is the same as reference 3 – we don't cite distinct sections of the same web page as separate references. Shall I delete this and cite reference 3 instead?]**
9 Montoya S. Data to celebrate 50 years of progress on girls' education. 2019. http://uis.unesco.org/en/blog/data-celebrate-50-years-progress-girls-education (accessed Dec 11, 2022).
10 Herre B, Roser M. Human Rights. 2022. https://ourworldindata.org/human-rights (accessed Dec 12, 2022).
11 Vasquez I, McMahon F, Murphy R, Sutter Schneider G. The Human Freedom Index 2021: a global measurement of personal, civil, and economic freedom. Washington, DC: Cato Institute, 2021.
12 Hayes B, Barat F, Geuskens I, Buxton N, Dove F, Martone F. On "shrinking space": a framing paper. 2017. https://www.tni.org/files/publication-downloads/on_shrinking_space_2.pdf (accessed Dec 11, 2022).
13 Ja'afari B. Identical letters dated July 16, 2018 from the Permanent Representative of the Syrian Arab Republic to the United Nations addressed to the Secretary-General and President of the Security Council. S/2019/572; 2019. https://documents.un.org/doc/undoc/gen/n19/221/84/pdf/n1922184.pdf?token=XdUKKsEwxy93a6DoIy&fe=true (accessed on 20 February 2024).
14 Gilsinan K. Trump keeps invoking terrorism to get his border wall. 2018. https://www.theatlantic.com/international/archive/2018/12/trump-incorrectly-links-immigration-terrorism/576358/ (accessed Feb. 20, 2024).
15 Lederer E. Russian invasion displaced 14 million Ukrainians, according to UN report. 2022. https://www.pbs.org/newshour/world/russian-invasion-displaced-14-million-ukrainians-according-to-u-n-report (accessed Dec 11, 2022).
16 Messing V, Ságvári B. Looking behind the culture of fear: cross-national analysis of attitudes towards migration. 2018. https://cps.ceu.edu/sites/cps.ceu.edu/files/attachment/article/3014/messing-sagvari-fes-study-march-2018.pdf (accessed Jan 9, 2022).
17 Lederer E. Russian invasion displaced 14 million Ukrainians, according to UN report. 2022. https://www.pbs.org/newshour/world/russian-invasion-displaced-14-million-ukrainians-according-to-u-n-report (accessed Dec 11, 2022). **[A: this is the same as reference 15 – should it be deleted, or do you wish to cite a different reference here instead?]**

18 US Congressional Research Service. Central American migration: root causes and US Policy. 2022. https://sgp.fas.org/crs/row/IF11151.pdf (accessed Dec 11 2022).
19 Human Rights Watch. World Report 2021. 2021. https://www.hrw.org/world-report/2021/ (accessed Feb 18, 2023).
20 Human Rights Watch. World Report 2023. 2023. https://www.hrw.org/world-report/2023 (accessed Feb 18 2023).
21 UN Human Rights Council. International Commission of Human Rights Experts on Ethiopia finds reasonable grounds to believe that the federal government has committed crimes against humanity in Tigray region and that Tigrayan forces have committed serious human rights abuses, some amounting to war crimes. 2022. https://www.ohchr.org/en/news/2022/09/international-commission-human-rights-experts-ethiopia-finds-reasonable-grounds (accessed Dec 15, 2022).
22 Human Rights Watch. World Report 2022. 2022. https://www.hrw.org/sites/default/files/media_2022/01/World%20Report%202022%20web%20pdf_0.pdf (accessed Dec 18, 2022).
23 Farrelly N. No international back end in sight to the misery in Myanmar. 2023. https://www.eastasiaforum.org/2023/01/15/no-international-backed-end-in-sight-to-the-misery-in-myanmar/ (accessed Jan 16, 2023).
24 Bathiany S, Dakos V, Scheffer M, Lenton TM. Climate models predict increasing temperature variability in poor countries. *Sci Advance* 2018; **4:** aar5809.
25 UNAIDS. Criminalization of same-sex relations decreasing. 2019. https://www.unaids.org/en/resources/presscentre/featurestories/2019/october/20191007_criminalization-same-sex-sexual-relationships-decreasing (accessed Dec 11, 2022).
26 Peyton N. FACTBOX—beyond Kenya and Brunei, eight countries rolling back LGBT+ rights. 2019. https://www.reuters.com/article/global-lgbt-rights/factbox-beyond-uganda-and-brunei-eight-countries-rolling-back-lgbt-rights-idUSL5N26V5FT (accessed Dec 11, 2022).
27 UN Women. In focus: Women in Afghanistan one year after the Taliban takeover. 2022. https://www.unwomen.org/en/news-stories/in-focus/2022/08/in-focus-women-in-afghanistan-one-year-after-the-taliban-takeover (accessed Feb 18, 2023).
28 Hackett RA, Ronaldson A, Bhui K, Steptoe A, Jackson SE. Racial discrimination and health: a prospective study of ethnic minorities in the United Kingdom. *BMJ Pub Health* 2020; **20:** 1652.
29 WHO. Violence against women. 2022. https://www.who.int/news-room/fact-sheets/detail/violence-against-women (accessed Dec 12, 2022).
30 Lyons CE, Twema JOT, Makofane K, et al. Associations between punitive policies and legal barriers to consensual same-sex sexual acts and HIV among gay men and other men who have sex with men in sub-Saharan Africa: a multicountry, respondent-driven sampling survey. *Lancet HIV* 2023; **10:** e186–94.
31 UN Office of High Commissioner for Human Rights. Impact of the coronavirus disease (COVID-19) pandemic on the enjoyment of human rights around the world, including good practices and areas of concern. Geneva: Office of the High Commissioner for Human Rights, 2021.
32 Gómez E, Singh P, Shiffman J, Barberia L. Political science and global health policy. *Lancet* 2022; **399:** 2080–82.
33 Búzás ZI. Racism and antiracism in the liberal international order. *Int Organ* 2021; **75:** 440–63.
34 Knoema. World GDP per capita ranking 2022. 2022. https://knoema.com/sijweyg/world-gdp-per-capita-ranking-2022-data-and-charts (accessed July 25, 2023).
35 Bellware K. Calls to declare racism a public health crisis grow louder amid pandemic, police brutality. 2020. https://www.washingtonpost.com/nation/2020/09/15/racism-public-health-crisis/ (accessed Feb 19, 2023).

36 Commissioners of and collaborators with the International AIDS Society–*Lancet* Commission on Health and Human Rights. Human rights and fair access to COVID-19 vaccines: the International AIDS Society–*Lancet* Commission on Health and Human Rights. *Lancet* 2021; 397: 1524–27.
37 Giacaman R. Reframing public health in wartime: from the biomedical model to the "wounds inside". *J Palestine Studies* 2018; **47:** 9–27.
38 Baral S, Logie CH, Grosso A, Wirtz AL, Beyrer C. Modified social ecological model: a tool to guide the assessment of the risks and risk contexts of HIV epidemics. *BMC Public Health* 2013; **13:** 482.
39 Gostin LO, Monahan JT, Kaldor J, et al. The legal determinants of health: harnessing the power of law for global health and sustainable development. *Lancet* 2019; **393:** 1857–910.
40 Kickbusch I. The political determinants of health—10 years on. *BMJ* 2015; **350:** h81.
41 Amon JJ. The political epidemiology of HIV. *J Int AIDS Soc* 2014; **17:** 19327.
42 Giacaman R. Reframing public health in wartime: from the biomedical model to the "wounds inside". *J Palestine Studies* 2018; 47: 9–27 **[A: this is a duplication of reference 37 – should something else be cited here instead, or should this just be deleted?]**.
43 Logie CH, Earnshaw V, Nyblade L, et al. A scoping review of the integration of empowerment-based perspectives in quantitative intersectional stigma research. *Glob Public Health* 2022; **17:** 1451–56 **[A: correct as updated?]**.
44 A global deal for our pandemic age. G20 High level Independent Panel on Financing the Global Commons for Pandemic Preparedness and Response. 2021. https://pandemic-financing.org/report/foreword/#:~:text=In%20short%2C%20we%20need%20a,building%20resilience%20against%20future%20pandemics (accessed on 20 February 2024).
45 WHO. 14·9 million excess deaths associated with the COVID-19 pandemic in 2020 and 2021. Geneva: World Health Organization, 2022.
46 Tufecki Z. An even deadlier pandemic could soon be here. 2023. https://www.nytimes.com/2023/02/03/opinion/bird-flu-h5n1-pandemic.html (accessed Feb 12, 2023).
47 UN. International Covenant on Economic, Social and Cultural Rights. 1966. https://www.ohchr.org/en/instruments-mechanisms/instruments/international-covenant-economic-social-and-cultural-rights (accessed Nov 20, 2022).
48 Gostin LO, Friedmn EA, Hossain S, et al. Human rights and the COVID-19 pandemic: a retrospective and prospective analysis. *Lancet* 2023; **401:** 154–68.
49 Public Health England. Disparities in the risk and otucomes of COVID-19. London: Public Health England, 2020.
50 US Centers for Disease Control and Prevention. Coronavirus disease 2019 (COVID-19) in the US. Atlanta, GA: US Centers for Disease Control and Prevention, 2020.
51 Ndugga N, Hill L, Artiga S, Haldar S. Latest data on COVID-19 vaccination by race/ethnicity. 2022. https://www.kff.org/coronavirus-covid-19/issue-brief/latest-data-on-covid-19-vaccinations-by-race-ethnicity/ (accessed Nov 20, 2022).
52 Chamberlain HR, Lazar AN, Tatem AJ. High-resolution estimates of social distancing feasibility, mapped for urban areas in sub-Saharan Africa. *Nat Sci Data* 2022; **9:** 711.
53 Kim H, Hughes E, Cavanagh A, et al. The health impacts of the COVID-19 pandemic on adults who experience imprisonment globally: a mixed methods systematic review. *PLoS One* 2022; **17:** e0268866.
54 WHO. Value gender and equity in the global health workforce. 2022. https://www.who.int/activities/value-gender-and-equity-in-the-global-health-workforce (accessed Nov 20, 2022).
55 UNAIDS. Rights in a pandemic. 2020. https://www.unaids.org/sites/default/files/media_asset/rights-in-a-pandemic_en.pdf (accessed Nov 20, 2022).

56 Gostin LO, Friedmn EA, Hossin S, Mukherjee J, Zia-Zarifi S, Clinton C et al. Human rights and the COVID-19 pandemic: a retrospective and prospective analysis. Lancet 2023; **401:** 154–68 **[A: already cited as reference 48 – cite something else here or delete?]**.

57 Nkengasong JN, Mankoula W. Looming threat of COVID-19 infection in Africa: act collectively, and fast. *Lancet* 2020; **395:** 841–42.

58 Commissioners of and collaborators with the International AIDS Society–*Lancet* Commission on Health and Human Rights. Human rights and fair access to COVID-19 vaccines: the International AIDS Society–*Lancet* Commission on Health and Human Rights. *Lancet* 2021; **397:** 1524–27 **[A: already cited as reference 36 – cite something else here or delete?]**.

59 Henry J Kaiser Family Foundation. KFF global COVID-19 vaccine coverage tool: current and projected coverage. 2023. https://www.kff.org/interactive/kff-global-covid-19-vaccine-coverage-tool-current-and-projected-coverage/ (accessed July 26, 2023).

60 Nolen S. Here's why developing countries can make mRNA Covid vaccines. 2021. https://www.nytimes.com/interactive/2021/10/22/science/developing-country-covid-vaccines.html (accessed May 21, 2022).

61 Prabhala A, Alsalhani A. Pharmaceutical manufacturers across Asia, Africa and Latin America with the technical requirements and quality standards to manufacture mRNA vaccines. 2021. https://msfaccess.org/pharmaceutical-firms-across-asia-africa-and-latin-america-potential-manufacture-mrna-vaccines (accessed May 21, 2022).

62 Kavanagh MM, Pillinger M, Singh R, Ginsbach K. To democratize vaccine access, democratize production. 2021. https://foreignpolicy.com/2021/03/01/to-democratize-vaccine-access-democratize-production/ (accessed May 21, 2022).

63 Green A. TRIPS waiver compromise draws mixed response. 2022. https://www.devex.com/news/trips-waiver-compromise-draws-mixed-response-102860 (accessed May 21, 2022).

64 WHO. The Access to COVID-19 Tools (ACT) accelerator. 2022. https://www.who.int/initiatives/act-accelerator (accessed 19 May 2022).

65 Dalberg Advisors. Act-accelerator strategic review: an independent report prepared by Dahlberg. Geneva; Dalberg Advisors. 2021. https://www.who.int/publications/m/item/act-accelerator-strategic-review (accessed on Feb. 20, 2024).

66 Human Rights Watch. Seven reasons the EU is wrong to oppose the TRIPS waiver. 2021. https://www.hrw.org/news/2021/06/03/seven-reasons-eu-wrong-oppose-trips-waiver (accessed Dec 22, 2022).

67 UNAIDS. Pandemic accord: UNAIDS offers lessons from the AIDS pandemic on Bureau's text. 2023. https://www.unaids.org/en/resources/presscentre/pressreleaseandstatementarchive/2023/july/20230724_pandemic-accord (accessed July 26, 2023).

68 Jeurkar A. The pandemic treaty must put people before big pharma profits. 2023. https://views-voices.oxfam.org.uk/2023/05/the-pandemic-treaty-must-put-people-before-big-pharma-profits/ (accessed July 26, 2023).

69 The People's Vaccine. 130+ leading voices call for an end to vaccine monopolies after two years of pandemic. 2022. https://peoplesvaccine.org/resources/media-releases/world-leader-2-year-letter/ (accessed Nov 21, 2022).

70 Medicines Patent Pool. Business model. https://medicinespatentpool.org/who-we-are/business-model (accessed June 14, 2022).

71 WHO. The mRNA vaccine technology transfer hub. 2023. https://www.who.int/initiatives/the-mrna-vaccine-technology-transfer-hub (accessed Jan 17, 2023).

72 Cullinan K. Lining up realistic solutions if the 'holy grail' of the pandemic accord fails. 2023. https://healthpolicy-watch.news/lining-up-realistic-solutions-if-the-holy-grail-of-the-pandemic-accord-fails/ (accessed 26 July 2023).
73 Chan H-Y, Chen A, Ma W, Sze N-N, Liu X. COVID-19, community response, public policy, and travel patterns. *Transp Policy* 2021; **106:** 173–84.
74 Wu Y, Zhang Q, Li M, Mao Q, Li L. Global experiences of community responses to COVID-19: a systematic literature review. *Frontier Public Health* 2022; **10:** 907732.
75 Gaffney T. With support on monkeypox hard to come by, queer communities turn to one another. 2022. https://www.statnews.com/2022/08/11/with-support-on-monkeypox-hard-to-come-by-queer-communities-turn-to-one-another/ (accessed Nov 20, 2022).
76 Wenham C, Reisdorf R, Asthana S. Pandemic treaty: a chance to level up on equity. BMJ Global Health 2022;377:o1279.
77 UNAIDS. Global HIV & AIDS statistics – fact sheet. 2023. Geneva: Joint United Nations Programme on HIV/AIDS. https://www.unaids.org/en/resources/fact-sheet (accessed 26 July 2023).
78 Vienna Center for Disarmament and Non-Proliferation. Advancing access to radiotherapy in middle- and low-income countries. 2022. https://vcdnp.org/advancing-access-to-radiotherapy. (accessed July 26, 2023).
79 WHO. Accelerating access to hepatitis C diagnostics and treatment. 2021. https://www.who.int/publications/i/item/9789240019003 (accessed Feb 19, 2023).
80 UNAIDS. The path that ends AIDS: 2023 UNAIDS global AIDS update. 2023. https://thepath.unaids.org/wp-content/themes/unaids2023/assets/files/2023_re port.pdf (accessed 26 July 2023).
81 Marks S. Human rights and root causes. *Modern Law Rev* 2011; **74:** 71.
82 Broz D, Carnes N, Chapin-Bardales J, et al. Syringe services programs' role in ending the HIV epidemic in the US: why we cannot do it without them. *Am J Prevent Med* 2021; **61** (suppl 1)**:** S118–29.
83 UNAIDS. The path that ends AIDS: 2023 UNAIDS Global AIDS Update. 2023. https://thepath.unaids.org/wp-content/themes/unaids2023/assets/files/2023_report.pdf (accessed July 26, 2023) **[A: already cited as reference 80 – please either delete or cite something else]**.
84 Beyrer C, for the International AIDS Society–Lancet Commission on Health and Human Rights. Archbishop Desmond Tutu and the universality of human rights. *Lancet* 2022; **399:** 503–04.
85 Adarov A. Global income inequality and the COVID-19 pandemic in three charts. 2022. https://blogs.worldbank.org/developmenttalk/global-income-inequality-and-covid-19-pandemic-three-charts (accessed Aug 17, 2023).
86 Ching J, Kajino M. Rethinking air quality and climate change after COVID-19. *Int J Environ Res Public Health* 2020; **17:** 5167.
87 WHO. Climate change and health. 2021. https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health (accessed July 27, 2023).
88 WHO. Climate change and health. 2021. https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health (accessed July 27, 2023) **[A: already cited as reference 87 – please either delete or cite something else]**.
89 UN High Commissioner for Refugees. United Nations Climate Action Summit. 2019. **[A: please provide URL]** (accessed Jan 13, 2023).
90 UN Office of High Commissioner for Human Rights. Human rights and climate change. 2018. https://www.ohchr.org/Documents/Issues/ClimateChange/FactSheetClimateChange.pdf (accessed Feb 13, 2022).
91 UN News. Access to a healthy environment declared a human right by UN rights council. 2021. https://news.un.org/en/story/2021/10/1102582 (accessed Feb 13, 2022).

92 Costello A, Abbas M, Allen A, et al. Managing the health effects of climate change. *Lancet* 2009; **373:** 1693–733.

93 Al Jazeera. Climate change causes 2m deaths in 50 years; poor suffer most: UN. 2023. https://www.aljazeera.com/news/2023/5/22/climate-change-causes-2m-deaths-in-50-years-poor-suffer-most-un (accessed July 27, 2023).

94 UN Office of High Commissioner for Human Rights. Joint statement by UN Special Procedures on the occasion of Environment Day. 2015. https://www.ohchr.org/en/statements/2015/06/joint-statement-un-special-procedures-occasion-world-environment-day-5-june-2015 (accessed March 21, 2022).

95 UN Women. Women, gender equality and climate change. 2009. https://www.un.org/womenwatch/feature/climate_change/downloads/Women_and_Climate_Change_Factsheet.pdf (accessed on Feb. 20, 2024).

96 Rahman M, Bodrud-Doza, Shammi M, Islam A, Khan A. COVID-19 pandemic, dengue epidemic, and climate change vulnerability in Bangladesh: scenario assessment for strategic management and policy implications. *Environ Res* 2021; **192:** 110303.

97 World Meterological Organization. Weather-related disasters increase over the past 50 years, causing more damage but fewer deaths. 2021. https://wmo.int/media/news/weather-related-disasters-increase-over-past-50-years-causing-more-damage-fewer-deaths#:~:text=The%20number%20of%20disasters%20has,deaths%20decreased%20almost%20three%2Dfold. (accessed Feb 12, 2022),

98 Munich RE. Record hurricane season and major wildfires—the natural disaster figures for 2020. 2021. https://www.munichre.com/en/company/media-relations/media-information-and-corporate-news/media-information/2021/2020-natural-disasters-balance.html (accessed Feb. 20, 2024).

99 UNICEF. Devastating floods in Pakistan. 2023. https://www.unicef.org/emergencies/devastating-floods-pakistan-2022 (accessed July 27, 2023).

100 International Labour Organization. Indigenous peoples and climate change: from victims to change agents through decent work. Geneva: International Labour Organization, 2017.

101 Rahman M, Bodrud-Doza, Shammi M, Islam A, Khan A. COVID-19 pandemic, dengue epidemic, and climate change vulnerability in Bangladesh: scenario assessment for strategic management and policy implications. *Environ Res* 2021; **192:** 110303 **[A: this has already been cited as reference 96 – please either cite something else or delete]**.

102 Lane K, Charles-Guzman K, Wheeler K, Abid Z, Graber N, Matte T. Health effects of coastal storms and flooding in urban areas: a review and vulnerability assessment. *J Environ Public Health* 2013; **2013:** 913064.

103 International Federation of Red Cross and Red Crescent Societies. Displacement in a changing climate: localized humanitarian action at the forefront of the climate crisis. 2021. https://www.ifrc.org/document/displacement-in-a-changing-climate (accessed Feb. 20, 2024).

104 International Federation of Red Cross and Red Crescent Societies. Displacement in a changing climate: localized humanitarian action at the forefront of the climate crisis. 2021. https://www.ifrc.org/document/displacement-in-a-changing-climate **[A: this has already been cited as reference 103 – please either cite something else or delete]**.

105 Kreienkamp F, Philip SY, Tradowsky JS, et al. Heavy rainfall which led to severe flooding in western Europe made more likely by climate change. 2021. https://www.worldweatherattribution.org/wp-content/uploads/Scientific-report-Western-Europe-floods-2021-attribution.pdf (accessed Feb. 20, 2024).

106 McDonnell T. Climate change creates a new migration crisis for Bangladesh. 2019. https://www.nationalgeographic.com/environment/article/climate-change-drives-migration-crisis-in-bangladesh-from-dhaka-sundabans (accessed Feb. 20, 2024).

107 Lavelle M. By 2050, 200 million climate refugees may have fled their homes. But international law offers them little protection. 2021. https://insideclimatenews.org/news/02112021/climate-refugees-international-law-cop26/ (accessed Feb. 20, 2024).
108 Schatz JJ. Floods hamper health-care delivery in southern Africa. *Lancet* 2008; **371:** 799–800.
109 Schatz JJ. Floods hamper health-care delivery in southern Africa. *Lancet* 2008; **371:** 799–800 **[A: this has already been cited as reference 108 – please either cite something else or delete]**.
110 US National Oceanic and Atmospheric Administration National Centers for Environmental Information. Billion-dollar weather and climate disasters. 2021. https://www.ncdc.noaa.gov/billions/ (accessed Feb. 20, 2024).
111 International Federation of Red Cross and Red Crescent Societies. Displacement in a changing climate: localized humanitarian action at the forefront of the climate crisis. 2021. https://www.ifrc.org/document/displacement-in-a-changing-climate **[A: this has already been cited as reference 103 and 104 – please either cite something else or delete]**.
112 UN Environment Programme. Spreading like wildfire—the rising threat of extraordinary landscape fires. 2022. https://www.unep.org/resources/report/spreading-wildfire-rising-threat-extraordinary-landscape-fires (accessed Feb 26, 2022).
113 Romanello M, McGushin A, Di Napoli C, et al. The 2021 report of the *Lancet* Countdown on health and climate change: code red for a healthy future. *Lancet* 2021; **398:** 1619–62.
114 International Federation of Red Cross and Red Crescent Societies. Displacement in a changing climate: localized humanitarian action at the forefront of the climate crisis. 2021. https://www.ifrc.org/document/displacement-in-a-changing-climate **[A: this has already been cited as reference 103, 104, and 111 – please either cite something else or delete]**.
115 International Federation of Red Cross and Red Crescent Societies. Displacement in a changing climate: localized humanitarian action at the forefront of the climate crisis. 2021. https://www.ifrc.org/document/displacement-in-a-changing-climate **[A: this has already been cited as reference 103, 104, 111, and 114 – please either cite something else or delete]**.
116 Integrated Food Security Phase Classification. Afghanistan IPC acute food insecurity analysis: September 2021–March 2022. 2021. https://reliefweb.int/report/afghanistan/afghanistan-ipc-acute-food-insecurity-analysis-september-2021-march-2022-issued (accessed Feb. 20, 2024).
117 UN Office of High Commissioner for Human Rights. Historic UN Human Rights case opens door to climate change asylum claims. 2020. https://www.ohchr.org/EN/NewsEvents/Pages/DisplayNews.aspx?NewsID=25482 (accessed Feb. 20, 2024).
118 Romanello M, McGushin A, Di Napoli C, et al. The 2021 report of the *Lancet* Countdown on health and climate change: code red for a healthy future. *Lancet* 2021; **398:** 1619–62 **[A: this has already been cited as reference 113 – please either cite something else or delete]**.
119 WHO. Heat and health. 2018. https://www.who.int/news-room/fact-sheets/detail/climate-change-heat-and-health (accessed July 27, 2023).
120 Boano C, Zetter R, Morris T. Environmentally displaced people: understanding the linkages between environmental change, livelihoods and forced migration. 2008. https://www.rsc.ox.ac.uk/files/files-1/pb1-environmentally-displaced-people-2008.pdf (accessed Feb. 20, 2024).
121 International Labour Organization. Working on a warmer planet: the impact of heat stress on labour productivity and decent work. Geneva: International Labour Organization, 2019.
122 Chambers J. Global and cross-country analysis of exposure of vulnerable populations to heatwaves from 1980 to 2018. *Clim Change* 2020; **163:** 539–58.

123 International Labour Organization. Working on a warmer planet: the impact of heat stress on labour productivity and decent work. Geneva: International Labour Organization, 2019 **[A: this has already been cited as reference 121 – please either cite something else or delete]**.

124 Schmeltz MT, Petkova EP, Gamble JL. Economic burden of hospitalizations for heat-related illnesses in the United States, 2001–2010. *Int J Environ Res Public Health* 2016; **13:** 894.

125 Hansen A, Bi L, Saniotis A, Nitschke M. Vulnerability to extreme heat and climate change: is ethnicity a factor? *Glob Health Action* 2013; **6:** 21364.

126 Rahman M, Bodrud-Doza, Shammi M, Islam A, Khan A. COVID-19 pandemic, dengue epidemic, and climate change vulnerability in Bangladesh: scenario assessment for strategic management and policy implications. *Environ Res* 2021; **192:** 110303 **[A: this has already been cited as reference 96 and 101 – please either cite something else or delete]**.

127 Addaney M, Boshoff E, Olutola B. The climate change and human rights nexus in Africa. *Amsterdam Law Forum* 2017; **9:** 5–28.

128 Intergovernmental Panel on Climate Change. Climate Change 2021 6th Assessment Report. https://www.ipcc.ch/report/ar6/wg1/#FullReport (accessed Feb. 20, 2024).

129 Addaney M, Boshoff E, Olutola B. The climate change and human rights nexus in Africa. *Amsterdam Law Forum* 2017; **9:** 5–28 **[A: this has already been cited as reference 127 – please either cite something else or delete]**.

130 Lieber M, Chin-Hong P, Whittle HJ, Hogg R, Weiser SD. The synergistic relationship between climate change and the HIV/AIDS epidemic: a conceptual framework. *AIDS Behav* 2021; **25:** 2266–77.

131 Skelton R, Miller V. The environmental justice movement. 2016. https://www.nrdc.org/stories/environmental-justice-movement (accessed Feb 19, 2023).

132 International Federation of Red Cross and Red Crescent Societies. Displacement in a changing climate: localized humanitarian action at the forefront of the climate crisis. 2021. https://www.ifrc.org/document/displacement-in-a-changing-climate **[A: this has already been cited as reference 103, 104, 111, 114, and 115 – please either cite something else or delete]**.

133 Schatz JJ. Floods hamper health-care delivery in southern Africa. *Lancet* 2008; 371: 799–800 **[A: this has already been cited as reference 108 and 109 – please either cite something else or delete]**.

134 Lavelle M. By 2050, 200 million climate refugees may have fled their homes. But international law offers them little protection. 2021. https://insideclimatenews.org/news/02112021/climate-refugees-international-law-cop26/ **[A: please provide access date] [A: already cited as ref 107 – please either delete or cite something else]**.

135 McAllister S. There could be 1·2 billion climate refugees by 2050. Here's what you need to know. 2023. https://www.zurich.com/en/media/magazine/2022/there-could-be-1-2-billion-climate-refugees-by-2050-here-s-what-you-need-to-know (accessed July 27, 2023).

136 Ferris E. Natural disasters, conflict, and human rights: tracing the connections. 2010. https://www.brookings.edu/on-the-record/natural-disasters-conflict-and-human-rights-tracing-the-connections/ (accessed Feb. 20, 2024).

137 Tuller DM, Bangsberg DR, Senkungu J, Ware NC, Emenyonu N, Weiser SD. Transportation costs impede sustained adherence and access to HAART in a clinic population in southwestern Uganda: a qualitative study. AIDS Behav 2009; **2010:** 778–84.

138 Lieber M, Chin-Hong P, Whittle HJ, Hogg R, Weiser SD. The synergistic relationship between climate change and the HIV/AIDS epidemic: a conceptual framework. *AIDS Behav* 2021; **25:** 2266–77 **[A: already cited as ref 130 – please either delete or cite something else]**.

139 Lane K, Charles-Guzman K, Wheeler K, Abid Z, Graber N, Matte T. Health effects of coastal storms and flooding in urban areas: a review and vulnerability assessment. *J Environ Public Health* 2013; **2013:** 913064 **[A: already cited as ref 102 – please either delete or cite something else]**.

140 Schatz JJ. Floods hamper health-care delivery in southern Africa. *Lancet* 2008; **371:** 799–800 **[A: this has already been cited as reference 108, 109, and 133 – please either cite something else or delete]**.
141 Iwamura T, Guzman-Holst A, Murray KA. Accelerating invasion potential of disease vector *Aedes aegypti* under climate change. *Nat Commun* 2020; **11:** 2130.
142 Mordecai EA, Ryan SJ, Caldwell JM, Shah MM, LaBeaud AD. Climate change could shift disease burden from malaria to arboviruses in Africa. *Lancet Planet Health* 2020; **4:** 416–23.
143 Schatz JJ. Floods hamper health-care delivery in southern Africa. *Lancet* 2008; **371:** 799–800 **[A: this has already been cited as reference 108, 109, 133, and 140 – please either cite something else or delete]**.
144 Lieber M, Chin-Hong P, Whittle HJ, Hogg R, Weiser SD. The synergistic relationship between climate change and the HIV/AIDS epidemic: a conceptual framework. *AIDS Behav* 2021; **25:** 2266–77 **[A: already cited as ref 130 and 138 – please either delete or cite something else]**.
145 GBD 2019 Diseases and Injuries Collaborators . Global burden of 369 diseases and injuries in 204 countries and territories, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019. *Lancet* 2020; **396:** 1204–22.
146 US Environmental Protection Agency. Climate change and the health of people with disabilities. 2016. https://www.cmu.edu/steinbrenner/EPA%20Factsheets/disabilities-health-climate-change.pdf (accessed Feb 13, 2022).
147 UN Environment Programme. Pollution action note—data you need to know. https://www.unep.org/interactive/air-pollution-note (accessed Aug 29, 2023).
148 Low AJ, Frederix K, McCracken S, et al. Association between severe drought and HIV prevention and care behaviors in Lesotho: a population-based survey 2016–17. *PLoS Med* 2019; **16:** e1002727.
149 Baker RE. Climate change drives increase in modeled HIV prevalence. *Climate Change* 2020; **2020:** 237–52.
150 UNAIDS. Climate change and AIDS: a joint working paper. 2008. https://data.unaids.org/pub/basedocument/2008/20081223_unep_unaids_joint_working_paper_on_cca_en.pdf (accessed Feb. 20, 2024).
151 Burke M, Gong E, Jones K. Income shocks and HIV in Africa. *Econ J* 2015; **125:** 1157–89.
152 Lieber M, Chin-Hong P, Whittle HJ, Hogg R, Weiser SD. The synergistic relationship between climate change and the HIV/AIDS epidemic: a conceptual framework. *AIDS Behav* 2021; **25:** 2266–77 **[A: already cited as ref 130, 138, and 144 – please either delete or cite something else]**.
153 Lieber M, Chin-Hong P, Whittle HJ, Hogg R, Weiser SD. The synergistic relationship between climate change and the HIV/AIDS epidemic: a conceptual framework. *AIDS Behav* 2021; **25:** 2266–77 **[A: already cited as ref 130, 138, 144, and 152 – please either delete or cite something else]**.
154 UN Climate Change. Santiago Network. 2022. https://unfccc.int/santiago-network (accessed Jan 13, 2023).
155 United Nations Environment Programme. Adaptation gap report 2022: too little, too slow—climate adaptation failure puts world at risk. https://www.unep.org/resources/adaptation-gap-report-2022 (accessed Jan 13, 2023).
156 Schütte S, Gemenne F, Zaman M, Flahault A, Depoux A. Connecting planetary health, climate change, and migration. *Lancet Planet Health* 2018; **2:** e58–59.
157 Abraham M, de Albequerque C, van Boven T, Bras Gomes MV, Chenwi L, Chirwa D et al. Maastricht Principles on Extraterritorial Obligations of States in the area of Economic, Social and Cultural Rights. 2011. https://ciel.org/wp-content/uploads/2015/05/Maastricht_ETO_Principles_21Oct11.pdf (accessed on Feb. 20, 2024).
158 Supram G, Rahmstorf S, Oreskes N. Asessing ExxonMobil's global warming projections. *Science* 2023; **379:** eabk0063.

159 UN Environment Programme. What you need to know about the COP27 Loss and Damage Fund. 2022. https://www.unep.org/news-and-stories/story/what-you-need-know-about-cop27-loss-and-damage-fund (accessed Jan 13, 2023).
160 United Nations Environment Programme. Adaptation gap report 2022: too little, too slow—climate adaptation failure puts world at risk. https://www.unep.org/resources/adaptation-gap-report-2022 (accessed Jan 13, 2023) **[A: already cited as ref 155 – please either delete or cite another reference]**.
161 International Organization for Migration. World migration report 2022. 2022. https://worldmigrationreport.iom.int/wmr-2022-interactive (accessed July 27, 2023) (accessed Feb. 20, 2024).
162 Batalova J. Top statistics on global migration and migrants. 2022. https://www.migrationpolicy.org/sites/default/files/source_images/Global_FRS2022-PRINT_FINAL.pdf (accessed July 27, 2023).
163 Romanello M, McGushin A, Di Napoli C, et al. The 2021 report of the *Lancet* Countdown on health and climate change: code red for a healthy future. *Lancet* 2021; **398:** 1619–62 **[A: this has already been cited as reference 113 and 118 – please either cite something else or delete]**.
164 Nöstlinger C, Cosaert T, Van Landeghem E, et al. HIV among migrants in precarious circumstances in the EU and European Economic Area. *Lancet HIV* 2022; **9:** 428–37.
165 UN High Commissioner for Refugees. Global appeal 2023. 2023. https://reporting.unhcr.org/globalappeal (accessed July 27, 2023).
166 Jawad M, Hone T, Vamos EP et al. Estimating indirect mortality impact of armed conflict in civilian populations: panel regression analyses of 193 countries, 1990–2017. *BMS Med* 2020; **18:** 206.
167 Manjoo R, McRaith C, Gender-based violence and justice in conflict and post-conflict areas. *Cornell Intl Law J* 2011; **44:** 11–31.
168 Diaz C, Ortiz V, Sanchez L, et al. Harmful by design—a qualitiative study of the health impacts of immigration detention. *J Gen Intern Med* 2023; **38:** 2030–37.
169 Abubakar I, Aldridge RW, Devakumar D, et al. The UCL–*Lancet* Commission on Migration: the health of the world on the move. *Lancet* 2018; **382:** 2606–54.
170 Chen E. Uneven refugee protections across southeast Asia put migrants at risk. 2021. https://www.csis.org/blogs/new-perspectives-asia/uneven-refugee-protections-across-southeast-asia-put-migrants-risk (accessed Aug 17, 2023).
171 Friedman AS, Venkataramani AS. Chilling effects: US immigration enforcement and health care seeking among hispanic adults. *Health Affairs* 2021; **40:** 02356.
172 UN General Assembly. Report of the Special Rapporteur on the right to health. 2013. https://documents.un.org/doc/undoc/gen/n13/422/97/pdf/n1342297.pdf?token=O964F7oYxn5Ga9uTxe&fe=true (accessed Feb. 20, 2024).
173 UN High Commissioner for Refugees. The 1951 Refugee Convention. https://www.unhcr.org/en-us/1951-refugee-convention.html (accessed Dec 27, 2022).
174 UN Office of High Commissioner for Human Rights. The International Convention on the Protection of the Rights of All Migrant Workers and Members of their Families. 1990. https://www.ohchr.org/en/instruments-mechanisms/instruments/international-convention-protection-rights-all-migrant-workers (accessed Dec 27, 2022).
175 Piper I, Lee JS, Parker C, Labropoulou E. Tracing a tragedy: how hundreds of migrants drowned on Greece's watch. 2023. https://www.washingtonpost.com/world/interactive/2023/greece-migrant-boat-coast-guard/ (accessed July 28, 2023).
176 Safeguarding Health in Conflict. Ignoring red lines: violence against health care in conflict 2022. 2023. https://insecurityinsight.org/wp-content/uploads/2023/05/SHCC-Report-Ignoring-Red-Lines.pdf (accessed Feb. 20, 2024).

177 United Nations Security Council. Resolution 2286. (2016). http://unscr.com/en/resolutions/doc/2286 (accessed Feb. 20, 2024).
178 Abubakar I, Aldridge RW, Devakumar D, et al. The UCL–*Lancet* Commission on Migration: the health of the world on the move. *Lancet* 2018; **382:** 2606–54 **[A: already cited as reference 169 – please either delete or cite something else here]**.
179 Abubakar I, Aldridge RW, Devakumar D, et al. The UCL–*Lancet* Commission on Migration: the health of the world on the move. *Lancet* 2018; **382:** 2606–54 **[A: already cited as reference 169 and 178 – please either delete or cite something else here]**.
180 Rubenstein L. Perilous medicine: the struggle to protect health care from the violence of war. New York, NY: Columbia University Press, 2021.
181 Hagopian A, Jabbour S. Global public health workers must step up in response to war. *Am J Public Health* 2022; **112:** 814.
182 The Nobel Prize. International Physicians for the Prevention of Nuclear War: facts. https://www.nobelprize.org/prizes/peace/1985/physicians/facts/ (accessed 29 August 2023).
183 Nansen Initiative. Protection of persons moving across borders in the context of disasters. 2016. https://disasterdisplacement.org/wp-content/uploads/2016/11/protection-for-persons-moving-in-the-context-of-disasters.pdf (accessed Dec 26, 2022).
184 Refugees International. Guiding principles for a regional framework on migration and protection in the Americas. 2022. https://www.refugeesinternational.org/reports/2022/5/27/guiding-principles-for-a-regional-framework-on-migration-and-protection-in-the-americas (accessed Dec 26, 2022).
185 Devakumar D, Selvarajah S, Abubakar I, et al. Racism, xenophobia, discrimination, and the determination of health. *Lancet* 2022; **400:** 2097–108.
186 Marks SP. On human nature and human rights. Mensch und Recht: Liber amicorum Eibe Riedel. 2013; 183:101-116.
187 UN. International covenant of economic and social rights. 1966. https://www.ohchr.org/Documents/ProfessionalInterest/cescr.pdf (accessed Jan 8, 2022).
188 UN. International convention on the elimination of all forms of racial discrimination. 1965. https://www.ohchr.org/Documents/ProfessionalInterest/cerd.pdf (accessed Jan 8, 2022).
189 UN. International covenant on civil and political rights. 1966. https://www.ohchr.org/Documents/ProfessionalInterest/ccpr.pdf (accessed Jan 8, 2022).
190 UN. International convention on the suppression and punishment of the crime of apartheid. 1974. https://www.un.org/en/genocideprevention/documents/atrocity-crimes/Doc.10_International%20Convention%20on%20the%20Suppression%20and%20Punishment%20of%20the%20Crime%20of%20Apartheid.pdf (accessed Jan 8, 2022).
191 UN Office of High Commissioner for Human Rights. CESCR general comment no 14: the right to the highest attainable standard of health. 2000. https://www.refworld.org/pdfid/4538838d0.pdf (accessed Feb 14, 2022).
192 UN Office of High Commissioner for Human Rights. Report by the Special Rapporteur on the right of everyone to the enjoyment of the highest attainable standard of physical and mental health—racism and the right to health. 2022. https://www.ohchr.org/en/documents/thematic-reports/a77197-report-special-rapporteur-right-everyone-enjoyment-highest (accessed Feb. 20, 2024).
193 Jumbri IA, Ikeda S, Jimichi M, Saka C, Managi S. Inequality of health stock and the relation to national wealth. *Int J Equity Health* 2019; **18:** 188.
194 Dugard J, Reynolds J. Apartheid, international law, and the occupied Palestinian territory. *Eur J Int Law* 2013; **24:** 867–913.

195 Stockholm Center for Freedom. 70 percent of Kurdish youth face discrimination, research shows. 2020. https://stockholmcf.org/70-percent-of-kurdish-youths-face-discrimination-research-shows/ (accessed Feb 18, 2023).
196 Beyrer C, Kamarulzaman A. Ethnic cleansing in Myanmar: the Rohingya crisis and human rights. *Lancet* 2017; **390:** 1570–73.
197 UN Office of High Commissioner for Human Rights. Assessment of human rights concerns in the Xinjiang Uyghur Autonomous Region, People's Republic of China. 2022. https://www.ohchr.org/sites/default/files/documents/countries/2022-08-31/22-08-31-final-assesment.pdf (accessed Feb. 20, 2024).
198 Allwood MA, Ford JD, Levendosky A. Introduction to the special issue: disproportionate trauma, stress, and adversities as a pathway to health disparities among disenfranchised groups globally. *J Trauma Stress* 2021; **34:** 899–904.
199 Williams DR, Mohammed SA, Discrimination and racial disparities in health: evidence and needed research, *J Behav Med* 2009; **32:** 20.
200 Kreiger N. Discrimination and health inequities. In Berkman LF, Kawachi I, Glymour MM, eds. Social epidemiology (2nd edn). Oxford: Oxford University Press, 2014, pp. 63-125.
201 Erondu NA, Mofokeng T, Kavanagh MM, Matache M, Bosha SL. Towards anti-racist policies and strategies to reduce poor health outcomes in racialised communities: introducing the O'Neill–Lancet Commission on Racism, Structural Discrimination, and Global Health. *Lancet* 2023; **401:** 1834–46.
202 Petersen EE, Davis NL, Goodman D, et al. Racial/ethnic disparities in pregnancy-related deaths in the United States, 2007–2016. *MMWR Morb Mortal Wkly Rpt* 2019; **68:** 762–65.
203 US Centers for Disease Control and Prevention. Health, United States spotlight: racial and ethnic disparities in heart disease. 2019. https://www.cdc.gov/nchs/hus/spotlight/HeartDiseaseSpotlight_2019_0404.pdf (accessed Jan 5, 2022).
204 Rosenstock S, Whitman S, West JF, Balkin M. Racial disparities in diabetes mortality in the 50 most populous US cities. *J Urban Health* 2014; **91:** 873–85.
205 US Centers for Disease Control and Prevention. HIV surveillance report 2019. 2021. https://www.cdc.gov/hiv/pdf/library/reports/surveillance/cdc-hiv-surveillance-report-2018-updated-vol-32.pdf (accessed Jan 5, 2022).
206 Amnesty International. Racism and the right to health: preliminary observations on the draft general recommendation no 37 by the committee on the elimination of racial discrimination. 2022. https://www.amnesty.org/en/documents/ior40/5785/2022/en/ (accessed July 28, 2023).
207 Thapa R, Van Tijlingen E, Regmi PR, Heaslip V. Caste exclusion and health discrimination in south Asia: a systematic review. *Asia Pac J Public Health* 2021; **33:** 828–38.
208 Crocetti AC, Cubillo B, Lock M, et al. The commercial determinants of Indigenous health and well-being: a systematic scoping review. *BMJ Glob Health* 2022; **7:** e010366.
209 Ninomiya MEM, Burns N, Pollock NJ, et al. Indigenous communities and the mental health impacts of land dispossession related to industrial resource development: a systematic review. *Lancet Planet Health* 2023; **7:** e501–17.
210 Riggirozzi P. Everyday political economy of human rights to health: dignity and respect as an approach to gendered inequalities and accountability. *New Political Econ* 2021; **26:** 735–47.
211 Human Rights Watch. Ghana: LGBT activists face hardships after detention. 2021. https://www.hrw.org/news/2021/09/20/ghana-lgbt-activists-face-hardships-after-detention (accessed Jan 8, 2022).
212 Özvarış ŞB, Kayı İ, Mardin D, Sakarya S, Ekzayez A, Meagher K, Patel P. COVID-19 barriers and response strategies for refugees and undocumented migrants in Turkey. *J Migr Health* 2020; **1–2:** 100012.

213 UNAIDS. In danger: UNAIDS global AIDS update 2022. 2022. https://www.unaids.org/sites/default/files/media_asset/2022-global-aids-update_en.pdf (accessed Feb 16, 2023).
214 UN Department of Public Information. World conference against racism, racial discrimination, xenophobia and related intolerance: declaration and programme of action. 2002. https://www.ohchr.org/Documents/Publications/Durban_text_en.pdf (accessed Feb. 20, 2024).
215 UN. From rhetoric to reality : a global call for concrete action against racism, racial discrimination, xenophobia and related intolerance: resolution adopted by the Human Rights Council on 27 September 2019. 2019. https://digitallibrary.un.org/record/3840230?ln=en (accessed Feb 17, 2023).
216 UN Office of High Commissioner for Human Rights. Fighting racism, 20 years from the adoption of the Durban Declaration and Programme of Action. 2021. https://www.ohchr.org/EN/Issues/Racism/Pages/20th-anniversary-DDPA.aspx (accessed Dec 18, 2022).
217 UN Office of High Commissioner for Human Rights. Report by the Special Rapporteur on the right of everyone to the enjoyment of the highest attainable standard of physical and mental health—racism and the right to health. 2022. https://www.ohchr.org/en/documents/thematic-reports/a77197-report-special-rapporteur-right-everyone-enjoyment-highest (accessed Dec 18, 2022) **[A: already cited as ref 192 – please either delete or cite something else]**.
218 Caribbean Community. CARICOM ten point plan for reparatory justice. https://caricom.org/caricom-ten-point-plan-for-reparatory-justice/ (accessed Dec 18, 2022).
219 Wilkinson B. CARICOM fights for reparations with help from Africa. 2021. https://ibw21.org/reparations/caricom-fights-for-reparations-with-help-from-africa/ (accessed Dec 18, 2022).
220 Ernest W, Harris B eds. Race, science and medicine, 1700–1960. Routledge, 2022 **[A: please cite city of publication]**.
221 UN High Commissioner for Human Rights. 2021. https://www.ohchr.org/en/documents/reports/ahrc4753-promotion-and-protection-human-rights-and-fundamental-freedoms-africans (accessed Feb. 20, 2024).
222 Constituição Federal do Brasil, art 196: da saúde. 1988. https://www.refworld.org/legal/legislation/natlegbod/1988/en/103855 (accessed on Feb. 21, 2024).
223 Socal MP, Amon JJ, Biehl J. Right-to-medicines litigation and universal health coverage: institutional determinants of the judicialization of health in Brazil. *Health Human Rights* 2020; **22:** 221.
224 Bitton A, Ratcliffe HL, Veillard JH, et al. Primary health care as a foundation for strengthening health systems in low- and middle income countries. *J Gen Intern Med* 2017; **32:** 566–71.
225 Spigel L, Pesec M, Villegas del Carpio O, et al. Implementing sustainable primary healthcare reforms: strategies from Costa Rica. *BMJ Glob Health* 2020; **5:** e002674.
226 Bala A. Costa Rica prioritizes public health. 2022. https://www.imf.org/en/News/Articles/2022/03/09/cf-costa-rica-prioritizes-public-health (accessed Aug 19, 2023).
227 Hostetter M, Klein S. Confronting racism in health care: moving from proclamations to new practices. 2021. https://www.commonwealthfund.org/publications/2021/oct/confronting-racism-health-care (accessed Dec 20, 2022).
228 Spigel L, Pesec M, Villegas del Carpio O, et al. Implementing sustainable primary healthcare reforms: strategies from Costa Rica. *BMJ Glob Health* 2020; **5:** e002674 **[A: already cited as ref 225 – please either delete or cite something else here]**.
229 Davis DM. Taxation and equality: the implications for redressing inequality and the promotion of human rights. *Humanity* 2019; **10:** 465–78.
230 Erondu NA, Mofokeng T, Kavanagh MM, Matache M, Bosha SL. Towards anti-racist policies and strategies to reduce poor health outcomes in racialised communities: introducing the O'Neill–Lancet

Commission on Racism, Structural Discrimination, and Global Health. *Lancet* 2023; 401: 1834–46 **[A: already cited as ref 201 – please either delete or cite something else]**.
231 Csete J, Kamarulzaman A, Kazatchkine M, et al. Public health and international drug policy. Lancet 2016; **387:** 1427–80.
232 Stone J, Fraser H, Lim AG, et al. Incarceration history and risk of HIV and hepatitis C virus acquisition among people who inject drugs: a systematic review and meta-analysis. *Lancet Infect Dis* 2018; **18:** 1397–409.
233 Merrall ELC, Kariminia A, Binswanger IA, et al. Meta-analysis of drug-related deaths soon after release from prison. *Addiction* 2010; **105:** 1545–54.
234 Stone J, Fraser H, Lim AG, et al. Incarceration history and risk of HIV and hepatitis C virus acquisition among people who inject drugs: a systematic review and meta-analysis. *Lancet Infect Dis* 2018; **18:** 1397–409 **[A: already cited as ref 232 – please either delete or cite something else]**.
235 Merrall ELC, Kariminia A, Binswanger IA, et al. Meta-analysis of drug-related deaths soon after release from prison. *Addiction* 2010; **105:** 1545–54 **[A: already cited as ref 233 – please either delete or cite something else]**.
236 Rivera Saldana ED, Beletsky L, Borquez A, et al. Impact of cumulative incarceration and the post-release period on syringe-sharing among people who inject drugs in Tijuana, Mexico: a longitudinal analysis. *Addiction* 2021; **116:** 2724–33.
237 Borquez A, Beletsky L, Nosyk B, et al. The effect of public health-oriented law reform on HIV incidence in people who inject drugs in Tijuana, Mexico: an epidemic modelling study. *Lancet Public Health* 2018; **3:** e429–437.
238 Amon JJ. COVID-19 and detention: respecting human rights. *Health Human Rights* 2020; **22:** 367.
239 UN Office of High Commissioner for Human Rights. CESCR general comment no 14: the right to the highest attainable standard of health. 2000. https://www.refworld.org/pdfid/4538838d0.pdf (accessed Feb 14, 2022) **[A: already cited as ref 191 – please either delete or cite something else]**.
240 UCLA Law COVID Behind Bars Data Project. https://uclacovidbehindbars.org/ (accessed Jan 8, 2022) **[A: is this a general ref to the website rather than a specific document or page? If so, I will delete from the reference list and include as a margin link instead]**.A
241 Ismail N, Lazaris A, O'Moore E, Plugge E, Stürup-Toft S. Leaving no one behind in prison: improving the health of people in prison as a key contributor to meet the Sustainable Development Goals 2030. *BMJ Glob Health* 2021; **6:** e004252.
242 O'Grady J, Maeurer M, Atun R, et al. Tuberculosis in prisons: anatomy of global neglect. *Eur Respir J* 2011; **38:** 752–54.
243 Saydah M, Rahim F, Keyedani GA, Shirbandi K, Saki-Malehi A. Global view of HIV prevalence in prisons: a systematic review and meta-analysis. *Iran J Public Health* 2019; **48:** 217–26.
244 Busschotts D, Kremer C, Bielen R, et al. Hepatitis C prevalence in incarcerated settings between 2013–2021: a systematic review and meta-analysis. *BMJ Public Health* 2022; **22:** 2159.
245 UN Office on Drugs and Crime. Technical brief 2020 update: HIV prevention, testing, treatment, care and support in prisons and other closed settings: a comprehensive package of interventions. 2020. https://www.unodc.org/documents/hiv-aids/publications/Prisons_and_other_closed_settings/20-06330_HIV_update_eBook.pdf (accessed 17 February 2023).
246 Kamarulzaman A, Verster A, Altice FL. Prisons: ignore them at our peril. *Curr Opin HIV AIDS* 2020; **14:** 415–22.
247 WHO Regional Office for Europe. Cancer and cardiovascular health inequities in prison settings: a rapid literature review. 2022. https://www.who.int/europe/publications/i/item/WHO-EURO-2022-5814-45579-65357 (accessed July 28, 2023).

248 Ismail N. Rolling back the prison estate: the pervasive impact of macroeconomic austerity on prisoner health in England. *J Public Health* 2019; **42:** 625–32.
249 WHO Regional Office for Europe. Cancer and cardiovascular health inequities in prison settings: a rapid literature review. 2022. https://www.who.int/europe/publications/i/item/WHO-EURO-2022-5814-45579-65357 (accessed July 28, 2023) **[A: already cited as ref 247 – please delete or cite something else]**.
250 McLeod K, Butler A, Young JT, et al. Global prison health care governance and health equity: a critical lack of evidence. *Am J Pub Health* 2020; **110:** 303–08.
251 UN. Arbitrary detention relating to drug policies: study of the Working Group on Arbitrary Detention. 2021. https://www.wola.org/wp-content/uploads/2021/09/G2110965.pdf (accessed Feb 17, 2023).
252 Human Rights Law Centre. South African Constitutional Court affirms prisoner rights. 2012. https://www.hrlc.org.au/human-rights-case-summaries/south-african-constitutional-court-affirms-prisoner-rights (accessed March 20, 2022).
253 Global Commission on HIV and the Law. Risks, rights & health. 2012. https://hivlawcommission.org/wp-content/uploads/2017/06/FinalReport-RisksRightsHealth-EN.pdf (accessed Feb 14, 2022).
254 Blake VK, Hatzenbuehler. Legal remedies to address stigma-based health inequities in the United States: challenges and opportunities. *Milbank Q* 2019; **97:** 480–504.
255 WHO. Strengthening road safety legislation: a practice and resource manual for countries. 2013. https://www.who.int/publications/i/item/strengthening-road-safety-legislation (accessed Feb 14, 2022).
256 Vargas-Pelàez C, Rover MRM, Leite SN, Buenaventura FR, Farias MR. Right to health, essential medicines, and lawsuits for access to medicines—a scoping study. Social Sci Med 2014; **121:** 48–55.
257 Daynard RA, Bates C, Francey N. Tobacco litigation worldwide. *BMJ* 2000; **320:** 111–13.
258 Drugwatch. Opioid lawsuits. 2022. https://www.drugwatch.com/opioids/lawsuits/ (accessed Feb 1, 2022).
259 UNAIDS. Evidence review: implementation of the 2016–2021 UNAIDS strategy: on the fast track to end AIDS. 2020. https://www.unaids.org/sites/default/files/media_asset/PCB47_CRP3_Evidence_Review_EN.pdf (accessed Feb 1, 2022).
260 International Lesbian, Gay, Bisexual, Trans and Intersex Association. Maps—sexual orientation laws. 2020. https://ilga.org/maps-sexual-orientation-laws (accessed Feb 15, 2022).
261 Shannon K, Strathdee SA, Goldenberg SM, et al. Global epidemiology of HIV among female sex workers: influence of structural determinants. *Lancet* 2015; **385:** 55–71.
262 UNAIDS. Evidence review: implementation of the 2016–2021 UNAIDS strategy: on the fast track to end AIDS. 2020. https://www.unaids.org/sites/default/files/media_asset/PCB47_CRP3_Evidence_Review_EN.pdf (accessed Feb 1, 2022) **[A: already cited as reference 259 – please either delete or cite something else]**.
263 Kazathchkine C, Bernard E, Eba P. Ending overly broad HIV criminalization: Canadian scientists and clinicians stand for justice. *J Int AIDS Soc* 2015; **18:** 20126.
264 UNAIDS. Evidence review: implementation of the 2016–2021 UNAIDS strategy: on the fast track to end AIDS. 2020. https://www.unaids.org/sites/default/files/media_asset/PCB47_CRP3_Evidence_Review_EN.pdf (accessed Feb 1, 2022) **[A: already cited as reference 259 and 262 – please either delete or cite something else]**.
265 DeBeck K, Cheng T, Montaner JS, et al. HIV and the criminalisation of drug use among people who inject drugs: a systematic review. *Lancet HIV* 2017; **4:** e357–74.

266 International Centre on Human Rights and Drug Policy, UN Office of High Commissioner for Human Rights, UNAIDS, WHO, UN Development Programme. International guidelines on human rights and drug policy. 2019. https://www.undp.org/publications/international-guidelines-human-rights-and-drug-policy#modal-publication-download (accessed Feb 14, 2022).
267 UNAIDS. Evidence review: implementation of the 2016–2021 UNAIDS strategy: on the fast track to end AIDS. 2020. https://www.unaids.org/sites/default/files/media_asset/PCB47_CRP3_Evidence_Review_EN.pdf (accessed Feb 1, 2022) **[A: already cited as reference 259, 262, and 264 – please either delete or cite something else]**.
268 UNAIDS. UNAIDS welcomes parliament's decision to repeal the law that criminalizes HIV transmission in Zimbabwe. 2022. https://www.unaids.org/en/resources/presscentre/pressreleaseandstatementarchive/2022/march/20220318_law-hiv-transmission-zimbabwe (accessed March 18, 2022).
269 UNAIDS. The path that ends AIDS: 2023 UNAIDS Global AIDS Update. 2023. https://thepath.unaids.org/wp-content/themes/unaids2023/assets/files/2023_report.pdf (accessed July 26, 2023) **[A: already cited as reference 80 and 83 – please either delete or cite something else]**
270 Gruskin SM, Cottingham J, Kismodi E, Desert E. Rainforest or jungle: navigating the global sexual rights lanscape, in Corrêa SP, ed. SexPolitics: trends & tensions in the 21st century—critical issues. Rio de Janeiro: Sex Policy Watch, 2018, pp. 8-36.
271 International Federation of Gynecology and Obstetrics. FIGO welcomes Benin's new law to address preventable maternal deaths and disability by improving access to abortion. 2021. https://www.figo.org/sites/default/files/2021-10/FIGO_Statement_welcome_Benin_law_2021_0.pdf (accessed Jan 8, 2022).
272 Ipas Africa Alliance. Making change happen: a review of progressive abortion policy change in Africa. 2016. https://www.ipas.org/wp-content/uploads/2020/06/POLCAFE16-MakingChangeHappenPolicyChangeAfrica.pdf (accessed Jan 8, 2022).
273 Kelin. After an 8-year wait for the first time ever, the court rules that the forced sterilization of a woman living with HIV is discriminatory! 2022. https://www.kelinkenya.org/after-an-8-year-wait-for-the-first-time-ever-the-court-rules-that-the-forced-sterilization-of-a-woman-living-with-hiv-is-discriminatory/ (accessed Feb. 20, 2024).
274 East African Legislative Assembly. The East African Community HIV Prevention and Management Act, 2012. 2012. https://www.kelinkenya.org/wp-content/uploads/2017/04/EAC-HIV-ACT-2012.pdf (accessed Feb. 20, 2024).
275 WHO. Trends in maternal mortality 2000 to 2017: estimates by WHO, UNICEF, UNFPA, World Bank Group and the United Nations Population Division. 2019. https://www.unfpa.org/sites/default/files/pub-pdf/Maternal_mortality_report.pdf (accessed Feb. 20, 2024).
276 WHO. Violence against women. 2021. https://www.who.int/news-room/fact-sheets/detail/violence-against-women (accessed Jan 1, 2023).
277 Haakenstad A, Angelino O, Irvine CMS, et al. Measuring contraceptive method mix, prevalence, and demand satisfied by age and marital status in 204 countries and territories, 1970–2019: a systematic analysis for the Global Burden of Disease Study 2019. *Lancet* 2022; **400:** 295–327.
278 Population Division, Department of Economic and Social Affairs, UN. Abortion policies and reproductive health around the world. 2014. https://www.un.org/en/development/desa/population/publications/pdf/policy/AbortionPoliciesReproductiveHealth.pdf (accessed Jan 8, 2022).
279 Center for Reproductive Rights. The world's abortion laws. 2022. https://maps.reproductiverights.org/worldabortionlaws (accessed Jan 22, 2022).

280 UNESCO, UNICEF, UNAIDS, UN Population Fund, WHO, UN Women. The journey towards comprehensive sexuality education: global status report. 2021. https://unesdoc.unesco.org/ark:/48223/pf0000379607 (accessed Jan 22, 2022).
281 Lyons CE, Twema JOT, Makofane K, et al. Associations between punitive policies and legal barriers to consensual same-sex sexual acts and HIV among gay men and other men who have sex with men in sub-Saharan Africa: a multicountry, respondent-driven sampling survey. *Lancet HIV* 2023; **10:** e186–94 **[A: already cited as ref 30 – please either delete or cite something else]**.
282 Stannah J, Dale E, Elmes J, et al. HIV testing and engagement with the HIV treatment cascade among men who have sex with men in Africa: a systematic review and meta-analysis. *Lancet HIV* 2019; **6:** e769–87.
283 Pachankis JE, Hatzenbuehler ML, Mirandola M, et al. The geography of sexual orientation: structural stigma and sexual attraction, behavior, and identity among men who have sex with men across 38 Eropean countries. *Arch Sex Behav* 2017; **46:** 1491–502.
284 Lyons CE, Schwartz SR, Murray SM, et al. The role of sex work laws and stigmas in increasing HIV risks among sex workers. *Nat Commun* 2020; **11:** 773.
285 Platt L, Grenfell P, Meiksin R, et al. Associations between sex work laws and sex workers' health: a systematic review and meta-analysis of quantitative and qualitative studies. *PLoS Med* 2018; **15:** e1002680.
286 Erdman R. Remarks at the UN Women Executive Board. New York, NY: United States Mission to the United Nations, 2015.
287 American Civil Liberties Union. Mapping attacks on LGBTQ rights in US state legislature. 2023. https://www.aclu.org/legislative-attacks-on-lgbtq-rights (accessed Feb 19, 2023).
288 Troianovski A, Hopkins V. One year into war, Putin is crafting the Russia he craves. 2023. https://www.nytimes.com/2023/02/19/world/europe/ukraine-war-russia-putin.html (accessed Feb 19, 2023).
289 Rahman M. Queer Muslim challenges to the internationalization of LGBT rights: decolonizing international relations methodology through intersectionality. In Bosia M, McEvoy S, Rahman N, eds. The Oxford handbook of global LGBT and sexual diversity politics. New York, NY: Oxford University Press, 2020 **[A: please provide page range of chapter]**.
290 Stolberg SG. AIDS relief program under threat as GOP insists on abortion restrictions. 2023. https://www.nytimes.com/2023/07/28/us/politics/aids-relief-pepfar-abortion-republicans.html (accessed July 29, 2023).
291 Lane SD. From population control to reproductive health: an emerging policy agenda. *Soc Sci Med* 1994; **39:** 1303–14.
292 UNAIDS. AIDS at 30: nations at the crossroads. Geneva: Joint United Nations Programme on HIV/AIDS, 2011.
293 WHO. Sexual health, human rights and the law. Geneva: World Health Organization, 2015.
294 WHO. Safe abortion: technical and policy guidance for health systems. Geneva: World Health Organization, 2012.
295 UNAIDS. End Inequalities. End AIDS. Global AIDS strategy 2021–2026. Geneva: Joint United Nations Programme on HIV/AIDS, 2021.
296 Neal JJ, Pryblylski D, Sanchez T, Hladik W. Population size estimation methods: searching for the holy grail. *JMIR Public Health Surveill* 2020; **6:** e25076.
297 Deering KN, Amin A, Shoveller J, et al. A systematic review of the correlates of violence against sex workers. *Am J Pub Health* 2014; **104:** e42–54.
298 Platt L, Grenfell P, Meiksin R, et al. Associations between sex work laws and sex workers' health: a systematic review and meta-analysis of quantitative and qualitative studies. *PLoS Med* 2018; **15:** e1002680 **[A: already cited as ref 285 – please update or delete]**.

299 Platt L, Grenfell P, Meiksin R, et al. Associations between sex work laws and sex workers' health: a systematic review and meta-analysis of quantitative and qualitative studies. *PLoS Med* 2018; **15:** e1002680 **[A: already cited as ref 285 and 298 – please update or delete]**.
300 Fehrenbacher AE, Nyeong Park J, Footer KHA, Silberzahn BE, Allen ST, Sherman SG. Exposure to police and client violence among incarcerated female sex workers in Baltimore City, Maryland. *Am J Pub Health* 2020; **110** (suppl 1)**:** S152–59.
301 Footer KHA, Nyeong Park J, Allen ST, et al. Policy-related correlates of client-perpretrated violence among female sex workers in Baltimore City, Maryland. Am J Pub Health 2019; **109:** 289–95.
302 Elmes J, Stuart R, Grenfell P, et al. Effect of police enforcement and extreme social inequalities on violence and mental health among women who sell sex: findings from a cohort study in London, UK. *Sex Transm Infect* 2022; **98:** 323–31.
303 Grenfell P, Stuart R, Eastham J, et al. Policing and public health interventions into sex workers' lives: necropolitical assemblages and alternative visions of social justice. *Crit Public Health* 2023; **3:** 282–96.
304 Platt L, Grenfell P, Meiksin R, et al. Associations between sex work laws and sex workers' health: a systematic review and meta-analysis of quantitative and qualitative studies. *PLoS Med* 2018; **15:** e1002680 **[A: already cited as ref 285, 298, and 299 – please update or delete]**.
305 Deering KN, Amin A, Shoveller J, et al. A systematic review of the correlates of violence against sex workers. *Am J Pub Health* 2014; **104:** e42–54 **[A: already cited as ref 297 – please update or delete]**.
306 Leiner BM, Cerf VG, Clark DD, et al. A brief history of the internet. *ACM SIGCOMM Comp Commun Rev* 2009; **39:** 22–31.
307 DataReportal. Digital 2021: global overview report. 2021. https://datareportal.com/reports/digital-2021-global-overview-report (accessed Dec 8, 2021).
308 Poy S, Schüller S. Internet and voting in the social media era: evidence from a local broadband policy. *Res Policy* 2020; **49:** 103861.
309 Hermida A, Hernández-Santaolalla V. Twitter and video activism as tools for counter-surveillance: the case of social protests in Spain. *Inf Commun Soc* 2018; **21:** 416–33.
310 Berglez P, Gearing A. The Panama and Paradise Papers. The rise of a global fourth estate. *Int J Commun* 2018; **12:** 20.
311 Milinovich GJ, Williams GM, Clements ACA, Hu W. Internet-based surveillance systems for monitoring emerging infectious diseases. *Lancet Infect Dis* 2014; **14:** 160–68.
312 Ganasegeran K, Abdulrahman SA. Artificial intelligence applications in tracking health behaviors during disease epidemics. *Human Behav Anal Using Intell Sys* 2020; **6:** 141–55.
313 https://www.bellingcat.com **[A: generic web links will be deleted and included as margin links instead]**.
314 Human Rights Center, UC Berkeley School of Law, Office of UN High Commissioner of Human Rights. Berkeley protocol on digital open source investigations. 2022. https://www.ohchr.org/sites/default/files/2022-04/OHCHR_BerkeleyProtocol.pdf (accessed Feb 18, 2023).
315 Siegel AA. Online hate speech. In: Persily N, Tucker JA, eds. Social media and democracy: the state of the field, prospects for reform. 2020: 56–88 **[A: please provide publisher name and location]**.
316 Kruse CS, Bolton K, Freriks G. The effect of patient portals on quality outcomes and its implications to meaningful use: a systematic review. *J Med Internet Res* 2015; **17:** e44.
317 Green MA, García-Fiñana M, Barr B, et al. Evaluating social and spatial inequalities of large scale rapid lateral flow SARS-CoV-2 antigen testing in COVID-19 management: an observational study of Liverpool, UK (November 2020 to January 2021). *Lancet Reg Health Eur* 2021; **6:** 100107.
318 Doctors of the World UK. A rapid needs assessment of excluded people in England during the 2020 COVID-19 pandemic 2020. London: Doctors of the World UK.

https://www.doctorsoftheworld.org.uk/wp-content/uploads/2020/06/covid-full-rna-report.pdf (accessed Feb. 20, 2024).
319 Earl J, Maher TV, Pan J. The digital repression of social movements, protest, and activism: a synthetic review. *Sci Advance* 2022; **8:** eabl8198.
320 Smith TC, Novella SP. HIV denial in the internet era. *PLoS Med* 2007; **4:** e256.
321 Al Jazeera. The long fight against climate change deniers. 2022. https://www.aljazeera.com/features/2022/10/20/the-long-fight-against-climate-change-deniers (accessed Feb 19, 2023).
322 Wardle C, Derakhshan H. Information disorder: toward an interdisciplinary framework for research and policy making. Strasbourg: Council of Europe, 2017.
323 Frankfurt HG. On bullshit. Princeton, NJ: Princeton University Press, 2009.
324 Higgins K. Post-truth: a guide for the perplexed. *Nature* 2016; **540:** 9.
325 Poland GA, Jacobson RM. Understanding those who do not understand: a brief review of the anti-vaccine movement. *Vaccine* 2001; **19:** 2440–45.
326 Donzelli G, Palomba G, Federigi I, et al. Misinformation on vaccination: a quantitative analysis of YouTube videos. *Hum Vacc Immunother* 2018; **14:** 1654–59.
327 Allport GW, Postman L. The psychology of rumor. Oxford: Henry Holt, 1947.
328 Wang Y, McKee M, Torbica A, Stuckler D. Systematic literature review on the spread of health-related misinformation on social media. *Soc Sci Med* 2019; **240:** 112552.
329 Wang Y, Bye J, Bales K, et al. Understanding and neutralising COVID-19 misinformation and disinformation. BMJ 2022; **379:** e070331.
330 Dubey D, Amritphale A, Sawhney A, Dubey D, Srivastav N. Analysis of YouTube as a source of information for West Nile virus infection. *Clin Med Res* 2014; **12:** 129–32.
331 Full Fact. Fighting the causes and consequences of bad information. London: Full Fact, 2020.
332 Siddiquee MA. The portrayal of the Rohingya genocide and refugee crisis in the age of post-truth politics. *Asian J Comparative Politics* 2019; **5:** 89–103.
333 Kirchgaessner S, Ganguly M, Pegg D, Cadwalladr C, Burke J. Revealed: the hacking and disinformation team meddling in elections. 2023. https://www.theguardian.com/world/2023/feb/15/revealed-disinformation-team-jorge-claim-meddling-elections-tal-hanan (accessed Feb 18, 2023).
334 Broniatowski DA, Jamison AM, Qi S, et al. Weaponized health communication: Twitter bots and Russian trolls amplify the vaccine debate. *Am J Public Health* 2018; **108:** 1378–84.
335 Gregory S. The world needs deepfake experts to stem this chaos. 2021. https://www.wired.com/story/opinion-the-world-needs-deepfake-experts-to-stem-this-chaos/ (accessed Aug 2, 2023).
336 Altimari D. FEC deadlocks on whether to govern deepfake campaigns. 2023. https://rollcall.com/2023/06/22/fec-deadlocks-on-whether-to-govern-deepfake-campaign-ads/ (accessed Aug 2, 2023).
337 Lambrechts W, Sinha S. Last mile internet access for emerging economies: Springer, 2019 **[A: please provide city of publication]**.
338 McKee M, Middleton J. Information wars: tackling the threat from disinformation on vaccines. BMJ 2019; **365:** l2144.
339 Doctors of the World. A rapid needs assessment of excluded people in England during the 2020 COVID-19 pandemic 2020. **[A: please provide full reference] [A: already cited as ref 318 – please either delete or cite something else]**
340 Earl J, Maher TV, Pan J. The digital repression of social movements, protest, and activism: a synthetic review. *Sci Advance* 2022; **8:** eabl8198 **[A: already cited as ref 319 – please either delete or cite something else]**.

341 Rao A, Morstatter F, Lerman K. Partisan asymmetries in exposure to misinformation. *Sci Rep* 2022; **12:** 15671.
342 Bruine de Bruin W, Saw HW, Goldman DP. Political polarization in US residents' COVID-19 risk perceptions, policy preferences, and protective behaviors. *J Risk Uncertain* 2020; **61:** 177–94.
343 Bekalu MA, Dhawan D, McCloud R, Pinnamaneni R, Viswanath K. Adherence to COVID-19 mitigation measures among American adults: the need for consistent and unified messaging. *Health Educ Res* 2021; **36:** 178–91.
344 Morris DS. Polarization, partisanship, and pandemic: the relationship between county-level support for Donald Trump and the spread of COVID-19 during the spring and summer of 2020. *Soc Sci Q* 2021; **102:** 2412–31.
345 Wood D, Brumfiel G. Pro-Trump counties now have far higher COVID death rates. Misinformation is to blame. 2021. https://www.npr.org/sections/health-shots/2021/12/05/1059828993/data-vaccine-misinformation-trump-counties-covid-death-rate?t=1639131760934 (accessed Dec 10, 2021).
346 Wardle C, Derakhshan H. Information disorder: toward an interdisciplinary framework for research and policy making. Strasbourg: Council of Europe, 2017 **[A: already cited as ref 322 – please either delete or cite something else]**.
347 UK Digital Culture Media and Sport Committee. Disinformation and "fake news": final report. London: House of Commons, 2019.
348 Loomba S, de Figueiredo A, Piatek SJ, de Graaf K, Larson HJ. Measuring the impact of COVID-19 vaccine misinformation on vaccination intent in the UK and USA. *Nat Hum Behav* 2021; **5:** 337–48.
349 Jones DR, McDermott ML. Partisanship and the politics of COVID vaccine hesitancy. *Polity* 2022; **54:** 408–34.
350 Hamel L, Lopes L, Sparks G, et al. KFF COVID-19 vaccine monitor: September 2021. 2021. https://www.kff.org/coronavirus-covid-19/poll-finding/kff-covid-19-vaccine-monitor-september-2021/ (accessed Feb. 20, 2024).
351 Kirzinger A, Sparks G, Kearney A, Stokes M, Hamel L, Brodie M. KFF COVID-19 vaccine monitor: November 2021. 2021. https://www.kff.org/coronavirus-covid-19/poll-finding/kff-covid-19-vaccine-monitor-november-2021/ (accessed Feb. 20, 2024).
352 Hamel L, Lopes L, Sparks G, et al. KFF COVID-19 vaccine monitor: September 2021. 2021. https://www.kff.org/coronavirus-covid-19/poll-finding/kff-covid-19-vaccine-monitor-september-2021/ **[A: please provide access date] [A: already cited as ref 350 – please delete or cite something else]**.
353 Associated Press, NORC Center for Public Affairs Research, University of Chicago. The February 2020 AP-NORC Center poll. 2020. https://apnorc.org/wp-content/uploads/2020/02/topline_election-security.pdf (accessed Feb. 20, 2024).
354 Enton, H. Flu shots uptake is now partisan: it didn't use to be. 2021. https://www.cnn.com/2021/11/14/politics/flu-partisan-divide-analysis/index.html **[A: please provide access date]**.
355 Pew Research Center. Explore key 2020 survey data. https://www.pewresearch.org/pathways-2020/camp20news_a/ (accessed Feb. 20, 2024).
356 Guess A, Nagler J, Tucker J. Less than you think: prevalence and predictors of fake news dissemination on Facebook. *Sci Adv* 2019; **5:** eaau4586.
357 Osmundsen M, Bor A, Vahlstrup PB, Bechmann A, Petersen MB. Partisan polarization is the primary psychological motivation behind political fake news sharing on Twitter. *Am Polit Sci Rev* 2021; **115:** 999–1015.
358 Loomba S, de Figueiredo A, Piatek SJ, de Graaf K, Larson HJ. Measuring the impact of COVID-19 vaccine misinformation on vaccination intent in the UK and USA. *Nat Hum Behav* 2021; **5:** 337–48 **[A: already cited as ref 348 – please clarify]**.

359 Hassan A, Barber SJ. The effects of repetition frequency on the illusory truth effect. *Cogn Res Princ Implic* 2021; **6:** 38.
360 McKee M, Wouters OJ. The challenges of regulation artificial intelligence in healthcare. Comment on "Clinical decision support and new regulatory frameworks for medical devices: Are we ready for it?" *Int J Health Policy Manag* 2023; **12:** 7261 .
361 Murdoch B. Privacy and artificial intelligence: challenges for protecting health information in a new erea. *BMC Med Ethics* 2021; **22:** 1–5.
362 Lee D. Facebook reveals targeted Vote Leave campaign ads. 2019. https://www.thetimes.co.uk/article/facebook-reveals-targeted-vote-leave-campaign-ads-03hmzw0lz (accessed June 11, 2023).
363 Kirchgaessner S. Cambridge Analytica used data from Facebook and *Politico* to help Trump. 2017. https://www.theguardian.com/technology/2017/oct/26/cambridge-analytica-used-data-from-facebook-and-politico-to-help-trump (accessed June 11, 2023).
364 Ekdale B, Tully M. African elections as a testing ground: comparing coverage of Cambridge Analytica in Nigerian and Kenyan newspapers. *Af Journalism Studies* 2019; **40:** 27–43.
365 Angwin J, Tobin A, Varner M. Facebook (still) letting housing advertisers exclude users by race. 2017. https://www.propublica.org/article/facebook-advertising-discrimination-housing-race-sex-national-origin (accessed June 11, 2023).
366 Qiang X. The road to digital unfreedom: President's Xi's surveillance states. *J Democracy* 2019; **30:** 53–67.
367 Yang Z, Zhang Z, Miklau G, Winslett M, Xiao X. Differential privacy in data publications and analysis. In: Selçuk Candan K, Chen Y, Snodgrass R, Gravano L, Fuxman A, eds. Proceedings of the 2012 ACM SIGMOD International Conference on Management of Data. New York, NY. Association for Computing Machinery, 2012: 601–16.
368 Cox D. How overturning Roe v Wade has eroded privacy of personal data. *BMJ* 2022; **378:** o2075.
369 Broniatowski DA, Jamison AM, Qi S, et al. Weaponized health communication: Twitter bots and Russian trolls amplify the vaccine debate. *Am J Public Health* 2018; **108:** 1378–84 **[A: already cited as ref 334 – please either delete or cite something else]**.
370 Prates MOR, Avelar PH, Lamb LC. Assessing gender bias in machine translation: a case study with Google Translate. *Neural Comp Applic* 2020; **32:** 6363–81.
371 Arrieta AB, Díaz-Rodríguez N, Del Ser J, et al. Explainable artificial intelligence (XAI): concepts, taxonomies, opportunities and challenges toward responsible AI. *Inf Fusion* 2020; **58:** 82–115.
372 Wu W, Su Y, Chen X, et al. Towards global explanations of convolutional neural networks with concept attribution. Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition. 2020: 8652–61 **[A: please provide editors, publisher, and city of publication]**.
373 Zhang Y, Liao QV, Bellamy RK. Effect of confidence and explanation on accuracy and trust calibration in AI-assisted decision making. Proceedings of the 2020 conference on fairness, accountability, and transparency. 2020: 295–305 **[A: please provide editors, publisher, and city of publication]**.
374 Ribeiro MT, Singh S, Guestrin C. "Why should i trust you?" Explaining the predictions of any classifier. Proceedings of the 22nd ACM SIGKDD international conference on knowledge discovery and data mining. 2016: 1135–44 **[A: please provide editors, publisher, and city of publication]**.
375 Leibold J. Surveillance in China's Xinjiang region: ethnic sorting, coercion, and inducement. *J Contemp China* 2020; **29:** 46–60.
376 Wells K. Eating disorder helpline takes down chatbot after it gave weight loss advice. NPR. June 8, 2023. https://www.npr.org/2023/06/08/1181131532/eating-disorder-helpline-takes-down-chatbot-after-it-gave-weight-loss-advice (accessed Feb. 20, 2024).

377 Schillinger D, Baron RJ. Health communication science in the balance. JAMA 2023; published online July 31. https://doi.org/10.1001/jama.2023.14763.
378 Urbina F, Lentzos F, Invernizzi C, Ekins S. Dual use of artificial-intelligence-powered drug discovery. *Nat Mach Intell* 2022; **4:** 189–91.
379 Kickbusch I, Allen L, Franz C. The commercial determinants of health. *Lancet Glob Health* 2016; **4:** e895–96.
380 Sebrié E, Glantz SA. The tobacco industry in developing countries. *BMJ* 2006; **332:** 313–14.
381 WHO. Tobacco. 2021. https://www.who.int/news-room/fact-sheets/detail/tobacco (accessed Jan 3, 2022).
382 Lin TK, Teymourian Y, Tursini MS. The effect of sugar and processed food imports on the prevalence of overweight and obesity in 172 countries. *Global Health* 2018; **14:** 35.
383 UN Environmental Programme. 10 things you should know about industrial agriculture. 2020. https://www.unep.org/news-and-stories/story/10-things-you-should-know-about-industrial-farming (accessed Dec 21, 2022).
384 Sell SK. TRIPS was never enough: vertical forum shifting, FTAS, ACTA, and TTP. *J Intell Prop L* 2011; **18:** 447–78.
385 Ferris N. Wealthy governments still subsidizing fossil fuels in developing nations. 2021. https://www.energymonitor.ai/finance/sustainable-finance/how-wealthy-governments-continue-to-subsidise-fossil-fuels-in-developing-nations (accessed Jan 3, 2022).
386 Meyer R. The oil industry is quietly winning local climate fights. 2020. https://www.theatlantic.com/science/archive/2020/02/oil-industry-fighting-climate-policy-states/606640/ (accessed Jan 3, 2022).
387 McKee M, Stuckler D. Revisiting the corporate and commercial determinants of health. *Am J Public Health* 2018; **108:** 1167–70.
388 Barnett P, Bagshaw P. Neoliberalism: what it is, how it affects health and what to do about it. *N Zealand Med J* 2020; **133:** 1512.
389 WHO. Ending hospital detention for non-payment of bills: legal and financing policy options. 2020. https://www.who.int/publications/i/item/9789240008830 (accessed Feb 14, 2022).
390 Otremba M, Berland G, Amon JJ. Hospitals as debtor prisons. *Lancet Glob Health* 2015; **3:** e253–54.
391 Kippenberg J, Sahokwasama JB, Amon JJ. Detention of insolvent patients in Burundian hospitals. 2008; **23:** 14–23.
392 Sánchez-Martínez FI, Abellán-Perpiñan JM, Oliva-Morena J. Privatization in healthcare management : an adverse effect of the economic crisis and a symptom of bad governance. SESPAS report 2014. *Gaceta Sanitaria* 2014; **28:** 75–80.
393 Stuckler D, Reeves A, Loopstra R, Karanikolos M, McKee M. Austerity and health: the impact in the UK and Europe. *Eur J Public Health* 2017; **27** (suppl 4)**:** 18–21.
394 Waitzkin H, Jasso-Aguilar R, Iriart E. Privatization of health services in less developed countries: an empirical response to the proposals of the World Bank and Wharton School. *Int J Health Serv* 2007; **37:** 205–27.
395 Sobhani S. From privatization to health system strengthening: how different International Monetary Fund (IMF) and World Bank policies impact health in developing countries. *J Egypt Public Health Assoc* 2019; **94:** 10.
396 UNAIDS. A pandemic triad: HIV, COVID-19 and debt in developing countries. 2022. https://www.unaids.org/sites/default/files/media_asset/pandemic-triad-HIV-COVID19-debt-in-developing-countries_en.pdf (accessed Nov 21, 2022).
397 UNAIDS. A pandemic triad: HIV, COVID-19 and debt in developing countries. 2022. https://www.unaids.org/sites/default/files/media_asset/pandemic-triad-HIV-COVID19-debt-in-

developing-countries_en.pdf (accessed Nov 21, 2022) **[A: already cited as ref 396 – please delete or cite something else]**.
398 UNAIDS. A pandemic triad: HIV, COVID-19 and debt in developing countries. 2022. https://www.unaids.org/sites/default/files/media_asset/pandemic-triad-HIV-COVID19-debt-in-developing-countries_en.pdf (accessed Nov 21, 2022) **[A: already cited as ref 396 and 397 – please delete or cite something else]**.
399 Collins C, McCartney G, Garnham L. Neoliberalism and health inequalities. In: **[A: please provide editors]**. Health inequalities: critical perspectives. Oxford: Oxford University Press, 2015: pp. 124-137.
400 Ostry JD, Loungani P, Furceri D. Neoliberalism: oversold? *Finance Dev* 2016; **53:** 2.
401 Amann E, Baer W. Neoliberalism and its consequences in Brazil. *J Latin Am Studies* 2002; **34:** 945–59.
402 Sakellariou D, Rotarou ES. The effects of neoliberal policies on access to healthcare for people with disabilities. *Int J Equity Health* 2017; **16:** 199.
403 Gatwiri K, Amboko J, Okolla D. The implications of neoliberalism on African economies, health outcomes and wellbeing: a conceptual argument. *Soc Theory health* 2020; **18:** 86–101.
404 UN Office of High Commissioner for Human Rights. Guiding principles on business and human rights. 2011. https://www.ohchr.org/sites/default/files/documents/publications/guidingprinciplesbusinesshr_en.pdf (accessed Feb 19, 2023).
405 Action on Smoking and Health. ASH fact sheet: tobacco and the developing world. 2019. https://ash.org.uk/uploads/tobacco-developing-world.pdf (accessed 21 November 2022).
406 Deen Islam M, Kaplan WA, Trachtenberg D, Thrasher R, Gallagher KP, Wirtz VJ. Impacts of intellectual property provisions in trade treaties on access to medicine in low and middle income countries: a systematic review. *Global Health* 2019; **15:** 88.
407 Sell SK. TRIPS—plus free trade agreements and access to medicines. *Liverpool Law Rev* 2007; **28:** 41–45.
408 Esteve E, Schwartz CR, Van Bavel J, Permanyer I, Klesment M, Garcia J. The end of hypergamy: global trends and implications. *Popul Dev Rev* 2016; **42:** 615–25.
409 Lazano R, Fullman N, Mumford JE, et al. Measuring universal health coverage based on an index of effective coverage of health services in 2014 countries and territories, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019. *Lancet* 2020; **306:** 1250–84.
410 WHO. Universal health coverage (UHC). 2023. https://www.who.int/news-room/fact-sheets/detail/universal-health-coverage-(uhc) (accessed Feb. 20, 2024).
411 Lawrence DS, Hirsch LA. Decolonising global health: transnational research partnerships under the spotlight. *Int Health* 2020; **12:** 518–523.
412 Khan M, Abimbola S, Aloudat T, Capobianco E, Hawkes S, Rahman-Shepherd A. Decolonising global health in 2021: a roadmap to move from rhetoric to reform. *BMJ Glob Health* 2021; **6:** e005604.

***Panel 1*: Health and rights—a socioecological model [linked panel]**

Our work has been framed within a socioecological model that describes the relationship between health and rights across the selected domains of this Commission (figure 1). To develop the model, RG[37] conceptualised the domains of human suffering and the associated effects on people's health and wellbeing, and SB and CB characterised the relationship between structural risks, rights contexts, and individual health outcomes, with input from other Commissioners.[38]

Our socioecological model situates the wellbeing of communities—consisting of individuals as well as collective populations—within an ever-widening realm of influence that ultimately governs the ability of people to live in dignity. The first level of the model is human dignity, the basis underlying all human rights. The concept human dignity is intended to extend to everyone. Violations of human dignity can occur individually but also at the collective level, in the form of ongoing humiliation and exploitation of entire groups of people.

The second level of the model recognises that minimum standards of health, food, education, digital access, and other necessities are essential for individuals and communities to live in dignity and good health. Among the key actions encompassed in this second level are interventions to strengthen health systems, which remain weak and fragmented in diverse countries among all income groups. The third level of this model highlights the social, environmental, and economic determinants of health, or the intersectional conditions in which people are born, grow, live, and age, which span education, housing, taxation, and social and economic equity. The fourth level details the political, legal, and broader structural determinants that govern the systems in which communities operate and interact with one another. The political and legal determinants of health are centred on key aspects of human rights protections or abrogation, such as the presence or absence of war and conflict, racism, patriarchy, and other drivers of inequality.[39–41] Political and legal determinants also incorporate determinants that have generally received less concerted attention in the human rights arena, including neoliberal global market forces and global and country-specific health governance and regulations. The final level focuses on transnational factors, such as intellectual property policies, digital access, migration, and climate change. Oppressive conditions created by the multiple spheres of influence identified in this model can generate health and human rights threats, but in doing so can bolster community strength and capacity for endurance, which could in turn galvanise collective solidarity, resistance, and empowered action for high-level change.[42,43]

***Panel 2*: The right to benefit from scientific advances**

The global response to the COVID-19 pandemic is one of many example of the inability of billions of people worldwide to benefit from scientific advances. Although 90% of people with cancer in high-income countries can access radiotherapy, only 10% of those in low-income countries have such access.[78] Although price decreases have accelerated uptake of curative regimens for hepatitis C virus

infection, only a small proportion of the more than 70 million people worldwide chronically infected with the virus has received treatment, partly because of the persistent scarcity and high cost of diagnostics.[79] Although pre-exposure antiretroviral prophylaxis for HIV is helping some cities in high-income countries to work towards ending their HIV epidemics, uptake is largely concentrated in a few countries, although progress in eastern and southern Africa is heartening.[80]

As a leading expert on international law has noted, although human rights organisations "have begun to address the root causes of the rights violations they decry…they nonetheless typically fail to engage the larger framework within which those conditions are systematically reproduced",[81] including commercial determinants and policies aligned with the post-World War 2 international economic order. The alleged scarcity of medicines and vaccines in LMICs is positioned as a mistake that market-based technocratic strategies rooted in neoliberal assumptions can solve via public–private partnerships and support from so-called big philanthropy. The result is a focus on overcoming barriers to scaling up manufacturing of products (sharing or licensing intellectual property and technology transfer) rather than true efforts to ensure all people benefit from scientific advances. Even in cases where pharmaceutical companies have arguably acted heroically, such as the commitment by Merck in 1987 to donate ivermectin until the goal of eliminating onchocerciasis (river blindness) had been achieved, wholesale reliance on the pharmaceutical industry's good intentions nonetheless perpetuates a charity model that has failed to deliver sustainable results and that effectively disempowers the low-income and middle-income countries where the global health burden is concentrated. Fundamental structural changes are needed if the world's population are to benefit from equitable access to scientific advances, including concerted efforts to build robust, resilient research and development and pharmaceutical manufacturing capacity in low-income and middle-income countries.

Commercial factors are not the only barrier to equal access to scientific advances. In some instances, political timidity and the scapegoating of marginalised populations prevent countries from expanding access to highly effective, scientifically validated health interventions. For example, although a comprehensive package of drug-related harm-reduction services effectively prevents both HIV and hepatitis C virus infection,[82] many jurisdictions either prohibit or sharply limit key elements of harm-reduction services. Although incremental gains have been made in increasing access to these services, in many countries opioid agonist therapy is either completely unavailable or available only in specific settings (figure 2).[83]

***Panel 3*: Archbishop Tutu and the universality of health and human rights**

The UN adopted the Convention on the Suppression and Punishment of the Crime of Apartheid in November, 1973, which made this systematised form of racial discrimination an international crime. Initially linked specifically to the Apartheid regime of South Africa, the crime has since been more broadly invoked—in the war crimes tribunals of the former Yugoslavia and the Rwandan genocide, and more recently in the abuses perpetrated against the Rohingya minority in Burma/Myanmar. The late Archbishop Emeritus Desmond Tutu was among the essential leaders in the struggle against Apartheid in South Africa.[84] He remained ever after one of the world's moral arbiters against Apartheid regimes and acts, including China's treatment of the Tibetan people and the treatment of Palestinians under Israeli occupation.

Archbishop Tutu saw and understood that discrimination based on race, ethnicity, and faith was always a crime, and his vision of inclusivity was broader still. He led the effort for the full ordination of women in his church. He became an outspoken and passionate supporter of lesbian, gay, bisexual, transgender, and queer inclusion, criticised the exclusion faced by people with HIV and tuberculosis, and advocated for the rights of prisoners and detainees to health care. Tutu's vision of radical inclusivity, and his deep grasp of the connections between exclusion and poor health outcomes, were at the core of his calls for all human beings to be treated with compassion and care. This universality is the foundation of the modern human rights movement—and it is under widespread attack.

Faith had a crucial role to play in Archbishop Tutu's commitment to inclusion. When he said that no one was excluded from his God's grace and love, he meant it without exception. And he went further. The African principle he invoked, *Ubuntu,* holds that for each of us our humanity, our dignity, is dependent on upholding the humanity of others: "My humanity is caught up in yours, and if you are dehumanized, then I am dehumanized." To benefit from racist systems, deny people with HIV full humanity, and exclude refugees, is to compromise and diminish one's humanity. Many forms of global inequality have worsened since the onset of the COVID-19 pandemic.[85] Archbishop Tutu's radical inclusivity is more needed than ever. Our shared humanity depends on it.

***Panel 5*: Modelling the effectiveness and cost-effectiveness of a police education programme in Tijuana, Mexico, about HIV and overdose among people who inject drugs**

The Commission undertook a series of mathermatical modelling exercises on key health and human rights issues – both to illustrate the benefits of a public health approach grounded in human rights and to expand the evidence base for analysis and action. One such area focused on how human rights can guide efforts to address HIV and overdose among people who inject drugs.

In many countries, drug criminalisation is the primary approach to substance use disorder.[231] Interactions between people who inject drugs and police officers can lead to deleterious health consequences. For example, systematic reviews show that a history of incarceration is associated with increased incidence of HIV and hepatitis C virus infection among people who inject drugs and that recent prison release is associated with fatal overdose.[232,233] The hypothesised causal pathway is that the post-release period is a high-risk time because of reduced tolerance to opioids (due to forced withdrawal during incarceration), poor linkage to harm-reduction services, and reduced access to treatment for opioid use disorder, collectively increasing the risk of overdose and syringe sharing risks.[234–236]

In Tijuana, Mexico, a border city situated on a major drug-trafficking route into the USA, consistent associations were noted between police interactions and injection-related risk among people who inject drugs. In response, a police education programme, Proyecto Escudo (Project Shield), was initiated to align policing with evidence-based public health principles. In 2015 and 2016, 1806 police officers in Tijuana received training encompassing harm reduction, the drug decriminalisation reforms passed in Mexico in 2009, and the epidemiology of HIV and hepatitis C virus infection. Researchers followed a subset of officers for 2 years to track self-reported policing behaviors.

Proyecto Escudo presented an opportunity to assess the effect of a structural, human-rights based HIV-prevention intervention on the frequency of new HIV infections and fatal overdose. A research team (JAC, NKM) used reports of police encounters among a longitudinal cohort of people who inject drugs in Tijuana before (2011–2015), during (2015–16), and after the project (ie, 2016–18, when police were being followed up), combined with epidemic modelling incorporating a dynamic model of HIV transmission and overdose calibrated to HIV and incarceration patterns in the population,[237] to establish the population effectiveness. To measure cost-effectiveness, researchers incorporated the costs of Proyecto Escudo (US$149 per officer trained), and simulated reductions in incarceration reported among people who inject drugs during the 2-year follow-up period.

Segmented regression analysis suggested significant declines in recent incarceration among people who inject drugs in the two years after Proyecto Escudo compared with the pre-Escudo period (figure 3A), consistent with reduced drug-related arrests reported by police during this period (appendix p 1). Over 2 years, the project was estimated to have prevented 1·5% (2.5 – 97.5 percentile intervals 95% CI) of new HIV cases and 13·7% (4·326·4) of fatal overdoses, compared with a counterfactual scenario without Proyecto Escudo (ie, no reduction in incarceration; figure 3B). If the effect were maintained with retraining over 10 years, researchers estimated that the project could prevent 4·1% (1·9–8·6) of new HIV infections and 18·5% (5·3–46·1) of fatal overdoses among people who use drugs (figure 3B). Most of the intervention costs were offset by reductions in incarceration costs (figure 3C): assuming a 2-year intervention effect and a 50-year time horizon, Proyecto Escudo was cost-effective (mean incremental cost-effectiveness ratio $3746 per disability-adjusted life-year averted, less than the willingness-to-pay threshold of the gross domestic product per person in Mexico). Overall, results suggest that the project was a cost-effective strategy to align human-rights-based policing practices and public health within the context of public-health-oriented drug law reform. Although these findings were based on an observational study, the research team believes that further causal analyses would strengthen these findings.

***Panel 6*: Prisons, health, and human rights**

International law obligates countries to provide medical care for prisoners at least equivalent to the care available to the general population.[238,239] Countries also have obligations related to transparency, including the publication of information that can inform policy making about the steps needed to protect the right to health.

Although prisoners, like all people, possess the human right to health, there is limited evidence regarding the standard of care received by prisoners and whether their care is equivalent to care available in the adjoining community. The systemic violation of prisoners' human rights became especially apparent during the COVID-19 pandemic, when congregate living and persistent overcrowding, combined with chronic weaknesses in prison-based health services, meant that prisons became hotspots for SARS-CoV-2 transmission. Despite the knowledge that crowded prison conditions increase the risk of transmission, little was done to prevent the spread of COVID-19 in penal settings. By

the end of 2021, in the USA alone, more than 470 000 incarcerated people had been infected with SARS-CoV-2, and nearly 3000 had died.[240]

Although the failed COVID-19 response in prison settings worldwide is notable, it is not unique. The authors of one analysis[241] wrote that "the 11 million people in prison globally comprise the 'left behind'". Another review described tuberculosis in prisons as a case study in global neglect.[242] Although prisoners are substantially more likely than non-prison populations to be living with HIV or hepatitis C virus infection in most parts of the world,[243,244] few countries provide comprehensive HIV or hepatitis C virus infection programmes in prison settings.[245,246] In Europe, some prisons do not routinely screen for common cancers, and prisoners diagnosed with cardiovascular diseases have poor outcomes due to lack of follow-up and the low priority that prisons often place on health services.[247] In some settings, budgetary austerity policies have sharply undermined prison health services.[248]

A common saying in the global health field is that what gets measured gets done. Health record keeping is poor in many prison settings.[249] In the case of COVID-19 in prisons, little effort was made to track the pandemic's course in penal settings globally: although media coverage discusses the high prevalence of COVID-19 among incarcerated people, no comprehensive database was created to track COVID-19 cases and deaths in prisons. This failure to collect and use strategic data on COVID-19 follows a familiar pattern, with one review[250] finding a "critical lack of evidence" on prison health governance and equity.

Public health surveillance systems that do not reflect the circumstances of marginalised populations are a form of structural neglect and undermine efforts to measure progress towards ending discrimination in health. That detention facilities would be hit hard by COVID-19 was foreseeable, and it is equally foreseeable that such facilities will be heavily affected by the next airborne pandemic. Legal and structural reforms are needed to reduce the causes of prison overcrowding, such as the war on drugs.[251] Lessons also need be drawn from other unconscionable failures to protect the health and wellbeing of people in detention. In this regard, a promising precedent was established by the Constitutional Court of South Africa, which ruled that prison officials have an obligation to minimise the risk of tuberculosis transmission in prison.[252] In addition, countries should routinely report information on the health status of prisoners, and international organisations such as the UN Office on Drugs and Crime and WHO should provide technical assistance and ensure timely and transparent reporting of key health indicator data in prison settings.

Panel 4: **Laws, health, and human rights**

Law is typically the most important tool in the promotion of human rights approaches to health. As the Global Commission on HIV and the Law found, “Good laws, fully resourced and rigorously enforced, can widen access to prevention and health care services, improve the quality of treatment, enhance social support for people affected by the epidemic, protect human rights that are vital to survival, and save the public money.”[253] Well tailored and effectively enforced anti-discrimination laws can help to reduce both external and self-stigma.[254] Laws, regulations, and imposition of civil and criminal penalties have helped to improve road safety,[255] and litigants in diverse countries have used the law to expand access to medicines for HIV, viral hepatitis infections, and other health conditions.[256] Civil litigation had an important role in improvements in tobacco control in many countries over the past few decades,[257] and billions of dollars in legal settlements from opioid manufacturers and distributors have compensated governments and individuals for the harms caused by predatory, deceptive marketing of addictive pain medicines.[258]

Often, however, the law can undermine sound public health efforts and prevent individuals and entire communities from enjoying and exercising their fundamental human rights. Criminal law in particular frequently serves as a way to exclude marginalised communities from participating as full and equal members of society. Nearly all countries worldwide criminalise some aspect of sex work, and more than 30 deploy the criminal law against transgender people.[259] Sexual behaviours, orientation, and same-sex sexual preferences and practices are criminalised in at least 68 countries.[260] These laws have profound health consequences. For example, mathematical modelling indicates that it would be possible to prevent 33–46% of new HIV infections among sex workers and their clients over 10 years simply by decriminalising sex work.[261]

Even criminal laws that are expressly justified on the basis of their purported role in disease prevention frequently do far more harm than good, including by increasing vulnerability and social exclusion and diminishing access to essential health services. More than 90 countries criminalise HIV transmission, non-disclosure of HIV-positive status, or exposure of another person to HIV,[262] presumably as a means to prevent new HIV infections, but leading scientific experts have decreed that such laws are scientifically baseless, because they do not consider how antiretroviral therapy effectively blocks HIV transmission.[263]

The global war on drugs, reflected in laws in most countries that criminalise possession or personal use of drugs,[264] ostensibly aims to reduce the physical and social harms associated with drug use, but instead increases the health burden and incarceration of people convicted of non-violent offences. Criminalisation of drug use is associated with increased HIV risks and reduced use of harm reduction and other health programmes.[265] The UN has issued guidelines to enable countries to ensure that laws and policies that aim to reduce harms associated with drug use also align with international human rights obligations.[266]

Repeal of discriminatory, counterproductive criminal laws is pivotal to the realisation of the right to health. Towards this aim, there is positive momentum on which to build, because several countries have taken steps to remove or ease laws criminalising drug possession, sex work, same-sex relations, and HIV transmission, non-disclosure, or exposure.[267] In 2022, for example, Zimbabwe's parliament voted to repeal the section of the criminal code that criminalised HIV transmission.[268] In 2022 and 2023, six countries decriminalised same-sex relations, and Belgium and the Australian state of Victoria removed criminal penalties for sex work.[269] Despite these signs of hope, the pace and breadth of legal-reform efforts remain inadequate and urgently need to be accelerated and expanded.

***Panel 7*: Modelling the effect of homelessness and police displacement on violence experienced by female sex workers in London, UK**

[A: please cite figure 4 somewhere in this panel] Sex workers are at high risk of violence, with global estimates suggesting that 19–44% have experienced work-related physical violence in the past year.[297] A 2018 systematic review[298] showed that criminalisation of sex work is associated with three-times higher odds of violence from clients or other partners when compared with those who have not experienced repressive policing. Enforcement practices, such displacement from street-based work settings, can lead to loss of income and working in more isolated areas, necessitating longer working hours and compromises in prices, client selection, and safety.[299–301]

The research team (JW, PV, and LP) built on a recent mixed-methods participatory study, the East London Project, in which 90 female street-based sex workers were recruited. Around two-thirds of the participants had experienced high homelessness in the 4 weeks before recruitment (55/86; 64·0% [95%

CI 52·8–73·8]), and around three-quarters had been displaced by police (67/86; 77·9% [67·4–85·9]) or experienced violence from clients (62/86; 72·1% [61·2–81·0]) in the past 6 months.[302] Findings suggested that recent client violence may be increased among homeless sex workers (odds ratio 1·97 [95% CI 0·88–4·43] compared to sex workers who were not currently homeless) and among sex workers experiencing police displacement (4·79 [1·99–12·11] compared to sex workers that had not experienced police displacement)), and the odds of police displacement were higher if sex workers were homeless (3·60 [1·59–8·17] compared to sex workers who were not homeless). According to qualitative research in this study, the causal pathways between displacement and violence were related to the disruption of safety networks. Similarly, fear of the police led to rushed client selection and negotiations, which alongside homelessness, results in increased vulnerability to violence.[303,304]

On the basis of these statistical associations, the research team developed a deterministic compartmental model to estimate the extent to which police displacement and homelessness increase levels of violence from clients among street-based sex workers, and to explore how reducing these structural determinants might reduce violence (appendix p **X [A: please cite the appropriate page numbers here]**). The model focused on one direction of causality for the association between policing or homelessness and violence, which is an oversimplification but aligns with previous evidence.[305] The model was stratified by sex workers' experience of police displacement or violence from clients in the past 6 months and homelessness in the past 4 weeks. It was parameterised and calibrated to data from the East London Project by using approximate Bayesian computation, run to equilibrium, to give 1000 model fits to six summary statistics: the prevalence of homelessness, police displacement, and client violence, the odds ratio of violence if homeless or displaced, and the odds ratio of displacement given homelessness. The model was used to estimate the effects of reducing homelessness and police displacement on violence.

The model projected that preventing homelessness could reduce the proportion of sex workers experiencing violence by 29.8% (14.5-50.2%) from 77·3% (66·5–83·3) to 54·0% (36·3–67·5), that avoiding police displacement could reduce the proportion experiencing violence by 42.7% (23.2-77.4%) to 43·7% (16·3–68·1), and that preventing both homelessness and displacement could reduce the proportion experiencing violence to 25·2% (13·2–37·7%). The effect of decreasing these structural factors was non-linear, with a halving in the prevalence of homelessness or police displacement leading to 12% and 18% reductions, respectively, in the prevalence of violence. This non-linear relation was due

to the high baseline prevalence of violence of multiple causes, which is slow to decrease initially. Similarly, large decreases in homelessness and police displacement are difficult to achieve because both are highly prevalent. For instance, the frequency of police displacement needs to decrease by more than 80% to halve the number of sex workers experiencing police displacement in the past 6 months (appendix p **X [A: please cite the appropriate page number]**). Taking into account the various, complex social factors that affect the wellbeing of sex workers, these findings show that major systemic changes are needed to substantially reduce violence experienced by these women.

***Panel 8*: Modelling the effect of misinformation and disinformation on COVID-19 vaccine uptake in Texas, USA**

A growing body of evidence suggests a causal link between COVID-19 misinformation and decreased vaccine uptake. A randomised controlled trial[348] in the USA and UK showed that receipt of vaccine misinformation led to a 6·2% (95% CI 4·0–8·8) decrease in vaccine willingness compared with people who had not received misinformation. COVID-19 vaccination in the USA is closely aligned with political affiliation at the individual level,[349–351] with large disparities: as of September, 2021, 90% of self-identified Democrats had received at least one vaccine dose compared with 58% of people who said they were Republicans.[352] However, in a February, 2020 poll, 54% of Republicans and 58% of Democrats reported having received an influenza vaccination,[353,354] which suggests that vaccine hesitancy is not intrinsically linked to political ideology. Instead, politicians hijacked the messaging during the COVID-19 pandemic, when many Republican politicians made false statements about COVID-19 severity and the dangers of vaccines.

A research team (RG, RTS, NKM) used statistical models and agent-based network models of misinformation spread and SARS-CoV-2 vaccination, transmission, and disease progression, to estimate the effects of misinformation and disinformation on COVID-19 in Texas (appendix p **X [A: please cite appropriate page numbers]**). To establish vaccine uptake over time by political status, the team used county-level data for vaccine uptake from February to October, 2021 in Texas, and regressed these data against the proportion of individuals who voted for Donald Trump versus Joe Biden in the 2020 presidential election as a proxy for political affiliation (figure 5A). The regression model controlled for county-level characteristics (e.g. perentage of county population with at least a high school diploma or equivalent, percentage of people over age 65, percentage males, percentages of Blacks and Hispanics in population, median income) previously identified as affecting vaccination uptake at an individual level.

The research team then simulated SARS-CoV-2 vaccination misinformation consumption and distribution and resulting effects on vaccination uptake by political ideology in Texas. The modelling exercise calibrated the misinformation model to vaccine-uptake trends by assuming three-times differential for digestion and spread of misinformation and disinformation among Republications compared with Democrats based on news source and sharing.[355–357] On the basis of data from the randomised controlled trial,[358] the research team assumed that receipt of a first piece of misinformation was associated with a 6·2% reduction in vaccine uptake, and that the size of the reduction logarithmically declined with subsequent misinformation.[359] Researchers used misinformation model outputs in a model simulating SARS-CoV-2 transmission in Texas from July 1 to Oct 8, 2021 (100 days) to capture the summer case surge. A status quo scenario of vaccine uptake in Texas was compared with two counterfactuals: if intake of misinformation among Republicans equalled that among Democrats and if there was no misinformation consumption and spread (figure 5B).

The model suggested that, had misinformation intake among Republicans equalled that among Democrats, 44% of SARS-CoV-2 cases and 52% of COVID-19-related deaths could have been prevented in Texas between in the period of interest, equating to roughly 1·6 million preventable reported cases and 9000 preventable deaths. Had no misinformation been digested or spread, 75% of cases and 87% deaths, or roughly 2·7 million cases (657 000 reported) and 15 000 deaths, could have been prevented (figure 1C,D).

Propagandists have long taught that lies, when repeated frequently enough, become accepted as truth. This analysis suggests that people who live within bubbles of misinformation and disinformation are likely to make decisions detrimental to their survival. Contemporary social media algorithms and people who manipulate them threaten rather than enable informed personal choice.