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COVID-19, global health and climate change: Causes and convergences

Despite massive global economic growth and advances in science and medicine with spectacular aggregate and individual improvements in health and life expectancy over the past century, the world has now become severely unstable in multiple domains – biological, sociological, political, ecological, economic, and health care. These pervasive instabilities are organically interactive within a complex world system that has reached crisis status at local, global, and planetary levels. Lying at the heart of this complex crisis are long-neglected disparities in health and well-being within and between countries, the refusal to face how these and climate change have arisen, and how economic considerations have fuelled the trend towards entropy (gradual decline of the planet into disorder). The critical point we have reached, starkly highlighted by the emergence of the COVID-19 pandemic *pari passu* with ongoing climate change and planetary degradation, reminds us of our global interconnectedness with each other and with nature. Comprehending and acknowledging the myriad, humanly constructed forces in each of these domains influencing all aspects of life, are the first steps towards effectively facing challenges to our health, our humanity (collectivity as humans) and our planet. Overcoming denial, acknowledging the magnitude and complexity of these challenges, prescient vision and dedicated action capable of fostering the cooperation for overcoming obstacles are now vital to seeking peaceful pathways towards more equitable and sustainable lives. South Africa is a microcosm of the world, with its local threats and challenges mirroring the global.

Significance:

Instabilities that pervade the world, highlighted by the COVID-19 pandemic, are especially significant for South Africa, where they manifest most starkly because of its apartheid legacy, its relative success economically on the African continent, and the implications of ongoing widening disparities and antagonism amongst South Africa's diverse people. Belief in moving towards narrowing wide disparities through decolonisation and reversion to an 'idyllic African heritage' via a transformation that includes widespread corruption, and the ANC government's perverse erosion of lives today and in the future through 'state capture', intensifies rather than ameliorates our predicament in an era when cooperation and a clear vision of current threats and future possibilities are desperately needed.

In an accompanying article, potential pathways towards a better future are offered through suggested shifts in paradigms of thought and action.

...our common goal should be 'healthy people in a healthy environment...part of an interrelated and interdependent community: the community of living things, the world of nature.'

Russell Train¹

Introduction

The COVID-19 pandemic is the latest of many newly emerging infectious diseases that have long been predicted in the context of escalating adverse impacts of human behaviour on our natural environment.² The pandemic's evolution in tandem with climate change and planetary degradation, exposes the increasingly dystopic state of the world, and highlights our moral and practical failures to put into action the detailed documented strategic plans that were developed after the SARS and Ebola warnings, to provide essential services to detect, report and respond to widespread outbreaks of infectious diseases.³ These failures are due to insincerity in practising the values we claim as central to peaceful and sustainable advancement of human flourishing⁴, as well as to the startling inability to take effective action on the even more ominous problem of climate change⁵. Conflicting and unsubstantiated messages in social media also play a role in obscuring the forces shaping our lives.⁶

Yet it was over 40 years ago that Johan Galtung warned of crises of violence, misery, poverty, the environment and repression of human rights, all rooted in *world structural violence* perpetrated through subtle, systemic, unequal distribution of power and resources.⁷ Characteristics of our current humanly constructed global/planetary crisis include egregious disparities in wealth and health⁸; inadequate and inequitable healthcare services⁹; escalating frequency of emerging potentially fatal zoonotic infections^{10,11}; food and water insecurity¹²; structural racism, displacement and refugeeism¹³; and ecological degradation¹⁴. All these perversions are deeply associated with a fraudulent global political economy's exploitative, accumulative and distributive mechanisms.^{15,16} Resulting conflict, anger, and the potential for wars – civil, nuclear, cyber, cyborg or biological, obstruct or could even obliterate pathways towards peace and human flourishing.¹⁷ For example, even a limited nuclear war between India and Pakistan, which between them possess only 1.5% of the global nuclear arsenal, could cause a nuclear 'winter' with up to 2 billion people starving to death.¹⁸

This complex crisis reveals the paradox of threats to the long-term health and survival of our species, notwithstanding all our technological advances made in science, health care, and the promises of genetic medicine, big data and artificial intelligence. Widespread failure to acknowledge and act constructively on long-standing insights into the fragility



of our planetary system, underlies the health challenges and ecological degradation that have fatal implications for life on our planet.^{2,16,19,20}

Health

Advances in health and life expectancy

Impressive advances in science and medicine, and massive growth of the global economy have resulted in much-celebrated improvement in health during the past 100 years.²¹ For example, life expectancy at birth has increased from under 40 years to over 80 years; maternal mortality rates fell from 385 per 100 000 live births in 1990 to 216 in 2015, smallpox and polio have been almost eradicated globally, deaths from cardiovascular disease have declined and many people now survive previously fatal malignant diseases.

Disparities in health

Despite these overall improvements, wide disparities in health remain, within and between countries.⁸ For example, in Canada the lifetime risk of a woman dying from complications of pregnancy or childbirth is 1 in 8800 compared with 1 in 37 in sub-Saharan Africa.⁸ Life expectancy at birth, ranging from 40 years to 80 years, is strongly related to absolute and relative levels of income. Within most countries, these patterns of difference also persist with similar, although narrower, differences in life expectancy and other key measures of health²², as the visible components of a large 'iceberg' of the associated burden of disease²³ and social suffering that undermine so many lives²⁴.

Exacerbation of health inequities affecting people of colour and the poor in wealthy countries during the COVID pandemic, and in the poorest regions of the world (sub-Saharan Africa and Southeast Asia)²⁵, exemplify the contexts of crises linked to the socio-economic determinants of health, with deep discriminatory and exploitative roots. These inequities have fostered divisive, high-profile tensions within and between nations, and have highlighted the persistence of structural racism²⁶, once predominantly associated with overt racial apartheid in South Africa²⁷, but in reality a long-standing, inadequately acknowledged, much neglected feature of global racial and class discriminations²⁸. Polarisation is aggravated by failure to see health as the social goal of making each of us safe only if all are safe by sharing vaccines equitably, avoiding relentlessly rising medical costs, widening disparities in access to health care and mistrust of science.²⁹

Determinants of health

Health should be considered as a comprehensive 'state of being', profoundly influenced by complex interactions between our genetics/biology, our physical environment, economic and social systems, cultural and behavioural patterns, and scientific and technological advances in medical care. These interactive forces shaping health begin at conception, extend through pregnancy and childhood into adult life, and significantly determine longevity and how we die.

A public health perspective reveals that health is most powerfully determined by the social conditions of life (housing, sanitation, safe water, adequate nutrition and education), and the societal forces (political and economic ideologies) that profoundly shape living conditions.³⁰ This association was first noted in the ten-fold reduction in mortality from tuberculosis due to improved living conditions and use of sanatoria during the 19th century, *before* the development of effective drug treatment that could cure almost all patients with this disease.³¹ More recently, it has been shown that even in a wealthy country like Canada, 50% of population health status can be explained by complex, intertwined socio-economic forces.³² Access to modern biomedical health care accounts for 25%, biology and genetics for 15%, and the built and natural environment for 10%.³² The proportions of these determinants of health vary widely within and between geographical boundaries. The social and societal determinants most powerfully affect Africa – a continent disadvantaged by widespread poverty and a legacy of exploitation that continues relentlessly through internal and external processes. COVID-19 case rates and death rates have been lower in countries whose citizens are willing and enabled to cooperate with social rules, for example, wearing masks and social distancing, than in

countries lacking these characteristics.³³ This also has implications for compliance with vaccination for public health benefits.

Crises of health and health care

Health, and healthcare systems are shaped by knowledge applied through politically and ideologically driven power relations that vary with contingent historical and cultural influences at interpersonal, local, national, international, and global levels. In the United Kingdom and Europe after the Second World War, equitable access to innovative medical treatments were initially allied to the politically motivated creation of the welfare state with progressive taxation to provide, *inter alia*, health care, free at the point of delivery for all citizens. Over the next three decades much was achieved through these ideals and the development of socially supportive structures, mainly in the Organisation for Economic Cooperation and Development (OECD) countries.³⁴

In low- and middle-income countries, the Primary Health Care Approach to health care in the 1950s and 1960s embraced a similarly egalitarian health policy. The emphasis on rural health centres, staffed by paramedical workers, achieved remarkable improvements in health in many countries at much lower cost. The strategy of 'Health for All' by the year 2000, approved by Member States of the World Health Organization (WHO) at the historic Alma-Ata conference, was to provide more equitable, appropriate, effective basic health care, and to address the underlying social, economic, and political causes of poor health.³⁴

In the late 1970s and early 1980s, this trajectory of advancement was altered through neoliberal economic and political influences that shaped reform of healthcare services and financing during four subsequent decades. Healthcare priorities were increasingly driven by market values with emphasis on individualism, consumerism and competitiveness. This shift of emphasis away from such ethical principles as equity and the core values of social and economic development, towards so called *market efficiency*, that lacks ethical underpinnings, was part of a broader ideological shift towards political conservatism.³⁴ It is arguably this ideological perspective, with its associated economic policies, that lies at the heart of widening disparities in health and human well-being within an inadequately understood global health landscape shaped by political power structures interconnected with the politics of trade, economics, development, governance, and foreign and security policies.³⁵

The structure and functions of healthcare services globally have thus been re-shaped over the past 50 years by a political dialectic between the conflicting ideas of health care as a socially valued service with equitable access to all, and health care as a *commodity* available to those who can pay.³⁴ The distribution of annual global expenditure on health care is illustrative. A minority of 19% of the world population accounts for over 85% of such expenditure, with annual per capita health expenditure ranging from USD33 in Somalia, to USD10 966 in the USA in 2019.³⁶

All healthcare systems embedded within this structure share three shortcomings – in varying combinations and proportions across the world. (1) *Distortions* relate to inappropriately structured services to deal with local disease burdens. (2) *Dysfunctionality* arises from adverse commercial and bureaucratic intrusions on healthcare delivery. (3) *Unsustainability* results from fragmented services that are poorly coordinated and unbalanced because of failure to use explicit priority setting processes, to serve procedural justice in allocating resources when healthcare needs exceed the ability to supply these.³⁷ Deficiencies observed in implementing management and containment plans for pandemics have revealed the weaknesses of public health systems, and new lessons are being learned as pandemics unfold across the world.^{38,39}

The question of universal and equitable access to health care – a goal widely stated as a global priority – needs to be examined in the above context. The WHO and others that are actively 'promoting' the rhetoric of universal access can only help make this possible by defining *achievable levels* of universal access, considering that about 70% of the world's population lives on less than USD10 a day, and 50% on less than USD4 a day.

Interacting global dysfunctions that contribute to our complex planetary crisis

Biological instability

Humans, animals, plants, and microbes live closely together, both symbiotically and antagonistically. The evolution of pathogens and emergence of new pandemics are influenced by human behaviour patterns that include ecologically destructive industries⁴⁰, wet markets and intensive animal farming with escalating use of antibiotics leading to resistance¹⁰, excessive fishing, deforestation and widespread pollution of air, land and water, all within an increasingly complex human networking system¹¹.

Our understanding and use of molecular genetics that emerged from insights into the dynamics of microbial ecological and evolutionary interactions⁴¹, together with antibiotics and vaccines gave rise to optimism by the 1960s that infectious diseases could be eliminated. Resurging pessimism with the HIV/Aids pandemic was intensified, both by the emergence of many other zoonoses and by rising antimicrobial resistance, to the point where some previously curable diseases, as exemplified by tuberculosis, would become very expensive to treat.⁴²

The formulation of a convergence model for the emergence of infectious diseases⁴¹ and Joshua Lederberg's call for a paradigm shift away from the aggressive 'war against microbes and disease' towards an ecological perspective on the inter-relationships between microbes, hosts and their environments through a 'germs eye view' carried a more expansive analogous health message regarding human interactions with nature.⁴³ Lederberg also presciently suggested that at the onset of the 21st century, infectious diseases were fated to remain a 'crucial research challenge of conceptual intricacy and global consequence', and that 'the future of humanity and microbes would likely unfold as episodes of a suspense thriller, that could be titled "*Our Wits Versus Their Genes*"⁴³.

Warnings of new pandemics, as signs of a planet under unprecedented stress, encouraged the international community to devise detailed plans to increase global security in relation to epidemics as potentially major future threats to global health.³ However, the selective nature of these policy initiatives ignored consideration of other closely intertwined system-based threats to global health and security.^{44,45} COVID-19 has thus emerged and spread at a late stage in the trajectory of climate change, as one of many destructive outcomes of human behaviour. The role of laboratory manipulation of the virus remains unclear.⁴⁶

Exceeding ecological limits

Accelerating industrial production and human consumption (of energy and material goods), has been underpinned most powerfully since the late 1970s by the relentless pursuit of profit and economic growth, regardless of the extent of environmental damage. The resulting climate change (rising temperatures and sea levels, storms, droughts, flooding, and wildfires); the pollution of air, land, seas and lakes; and the creation of new ecological niches, all adversely impact on sustainability of the biosphere.⁴⁷

Between 1990 and 2015, carbon dioxide emissions rose by 60%, with the wealthiest 1% emitting more than double the total amount of the poorest 50%⁴⁸ who bear the brunt of environmental degradation and infectious diseases, e.g. the recent floods in Pakistan. The annual per capita carbon dioxide emission is 15.5 tons in the USA, 7.38 tons in China and 1.91 tons in India.⁴⁹ The USA with 4.2% of the world's population accounts for 25% of global carbon dioxide production, and China with 17.8% of world population for almost 30%. Traditional monitoring of carbon emissions by sector at national levels, with large trade traffic across widely disparate territorial regions, masks how production in one country drives impacts in another and alters the perspective on responsibility for emissions within a specific country by distorting the relative contributions of, for example, the USA and China.⁵⁰ The 7 million deaths in 2017 due to air pollution (16% of all annual deaths globally)⁵¹ was three times the number of annual deaths from tuberculosis, malaria and HIV/Aids combined⁵².

James Speth has documented the 50-year history of climate change denial and escalating investment in fossil fuel production driven by all US administrations from Jimmy Carter in the 1970s to Donald Trump.⁵³ Naomi Oreskes and Erik Conway have lucidly described how doubt was deviously created in the public mind about the adverse effects of climate change despite knowledge of the long-term implications.⁵⁴ Such revelations are sad testimonies to human avarice, stupidity and short-term perspectives on life.

Social disruptions

The extent of divergence in health and wealth in high-, middle-, and low-income groups, both within and between countries, is just one of many aspects of social instability and antagonisms. Other serious threats to social stability and security include ongoing exploitation and dispossession of the poor; inept governance, corruption and collusion with autocratic kleptocrats, *inter alia* within the weapons trade⁵⁵; the deliberately structured transfer of material and human resources from the poor to the wealthy⁵⁶; ineffectual development aid⁵⁷; geo-political power imbalances⁵⁸; erosion of democracy⁵⁹; and interference with local development patterns in a range of countries by exploiting vast natural resources, many for military purposes, with little benefit to humanity⁶⁰.

Pervasive conflict, fear and anger, associated with atrocious living conditions and local wars, have contributed to displacement and mass migration of 80 million people in desperate attempts to seek better lives. Predicted increases to between 100 million and perhaps even 1 billion people by 2050⁶¹ have almost unimaginable implications for all countries⁶². With half the world's population living in China, India, Southeast Asia and Indonesia combined, and another billion in Africa (whose coastal and desert regions are at most risk of climate change damage) excess mortality will predictably continue to be much greater in the Global South than in the Global North.⁵ Such catastrophes are already exemplified by the conservative estimate of 50 000 deaths in 2000 attributable to climate change in the world's poorer and vulnerable populations.⁶³ Displacement and migration of desperate people from these ravaged areas will pose massive humanitarian challenges in the future, as predicted in an allegorical novel 50 years ago.⁶⁴

Wars have killed millions and caused unspeakable suffering, as exemplified by the massive death tolls of the First and Second World Wars and by the recent reminder that

*During the past 60 years, the United States has suffered a series of failed wars in Indochina, Central America, the Middle East, and Afghanistan...at mind-boggling human and financial costs ...each of these wars produced mayhem and suffering, followed by an American retreat.*⁶⁵

There will be no long-term winners if such local and international conflicts extend to nuclear war^{18,67,68}, bioterrorism⁶⁹, cyber wars⁷⁰, or cyborg wars⁷¹ with their potentially devastating and irreversible effects.

The reality of these social instabilities undermines the idea of sustainable development, highlights the limited achievements of the many requirements of the Universal Declaration of Human Rights^{72,73}, and questions our failure to change the metaphor of 'progress' to '*developing sustainability*'⁷⁴.

Economic fragility

The emergence of many new infectious diseases and climate change, as well as instabilities in health care, social relations, biological and ecological domains, are deeply linked to an economic crisis described as a '*creatively destructive*'⁷⁵ '*market civilization*'⁷⁶, characterised by the pursuit of short-term profit, within an economic agenda driven most powerfully by the USA. With the economy as paramount, and dispossession of communities through enclosure of the commons and free riding on the environment, the self-centred frenetic pursuit of endless consumerism within a fraudulent economic system^{15,16} erodes the moral soul of humanity while destroying our planet⁷⁷.

During the 20th century, the global economy expanded and became increasingly unstable. Under post-Second World War Keynesian

economic policies that enabled progressive taxation with high marginal tax rates, the annual global GDP increased from USD3.5 trillion in 1945 to USD18 trillion in 1980. Simultaneous encouragement of cooperation within civil societies, enabled the building of relatively egalitarian societies, with universal access to health care, education, and social security systems in some middle- to high-income countries.

The introduction of neoliberal economic policies in the late 1970s and early 1980s, promoted by Margaret Thatcher and Ronald Regan, unleashed privatisation, de-regulation of the market, aggressive competition, increasing freedom of corporations and financial institutions, radical reduction in marginal taxation and the creation of many new jobs, all with variable effects in different countries. The effects of this were noted in 1992 by a former Wall Street executive:

For those who value justice and equality, the past 12 years have been a painfully wrenching time. We have endured twelve years of extreme conservatism of the American political system at its worst: government by the rich for the rich. Today the spirit of national community has been lost and the ugly divisions of race, sex and class are wider than at any time in recent history... America today is a nation divided not only against itself but also against the world.⁷⁸

The continuing widespread dominance of neoliberal economic ideology driven by the aspirations of the economic elite, who re-regulated the market to suit themselves⁷⁹, increasingly destabilised the economy – especially since 2008. In this market-dominated world, economic growth and other benefits of ‘progress’ accrue mainly to a minority (20–25%) of the world’s population, whose extravagant entitlements/consumption patterns damage our ecology and covertly devalue the lives of billions.

For another example, consider that from 2000 to 2015 the world had difficulty raising USD $\frac{3}{4}$ trillion for the Millennial Development Goals. Yet during the 2008 economic recession, USD17 trillion of public resources (some of which could have been used for public benefit) was found in 3 months to compensate culpable banks and bankers. The loss of their homes by millions of Americans, and austerity measures applied to millions of others, represented socialisation of the losses, while the bank bailouts, including massive bonuses for bankers, represented privatisation of the gains.⁸⁰

In the early 21st century, income and wealth disparities are illustrated by their distribution in 2011. In 2011, 71% of the world’s population lived on <USD10/day, and 7% on >USD50/day.⁸¹ The wealthiest 10% currently earn 50% of annual *global income* (and hold 85% of global wealth) while almost 4 billion people (50%) earn 10% of income (and hold about 1% of wealth).⁸² Inequality has also continued to increase within countries, with many being denied even the very basic benefits of economic growth.⁸³ In relation to poverty alleviation, it is nonsensical to celebrate 1 billion people being ‘lifted out of poverty’ when the actual achievement between 2001 and 2011 amounted to daily per capita income increases from about 20–30 cents below USD2/day to about 20–30 cents above USD2/day.⁸¹ These low incomes, and even per capita incomes up to USD5/day, are grossly inadequate to provide even rudimentary social services for minimally decent lives.

In the USA, President Trump’s policies intensified the effects of neoliberalism, and reversed advances in economic and racial equality achieved through the New Deal in the era of civil rights. Life expectancy in the USA, which was similar to that in other high-income nations in 1980, has fallen 3.4 years below the 2018 average in the G7 countries. This is equivalent to 461 000 excess US deaths in 2018 alone.⁸⁴ An economically divisive market model based on a corrupt and fraudulent global political economy has flourished.⁸⁵ Deliberately imposed adverse structural forces such as unfair trade rules, and the sustainment of unpayable debts, engineered to some extent through devious means, widen rather than narrow local and global disparities^{86–89} at enormous opportunity costs, while preventing meaningful reform beyond the existing paradigm⁹⁰.

The language of *war against disease* is commonly used to develop combative technological strategies through innovation and competition. This framing is extrapolated to global health, and buttressed by linking health to economic growth as the main indicator of progress.^{74,91} Indeed, the term ‘sustainable development’ is premised on the idea that economic growth is the marker of development. However, material wealth, as measured by GDP, reflects the amount of money exchanged without reference to its social value. For example, increased expenditure on weapons and wars will increase the GDP to the same extent as similarly increased expenditure on health care. But the latter is of far greater societal value, illustrating that mere increments in GDP do not necessarily reflect ‘progress’. Notably the unpaid, caring and home-building activities of women are not factored into GDP, despite their contributions to well-being and social cohesion.^{92,93}

Conclusions

We live in an interdependent world, in which human well-being is affected by a fraudulent global political economy that has amplified wasteful consumption patterns of non-renewable resources, over-commercialised health care, and aggravated other social aberrations. Entropic changes in our biosphere are now reaching tipping points within an increasingly intricate and fragile global system^{69,94} with the domino effects into the future not yet fully foreseen.

Although recognised for many decades, it has only been recently acknowledged that systemic, globally entrenched socio-political forces have led to a complex planetary crisis of unprecedented magnitude. Our long-term plight as a species, shockingly revealed by the COVID-19 pandemic’s total disruption of all aspects of life globally, although differently for the wealthy and the poor, has highlighted differing forms of suffering: *economic* (disparities in wealth and opportunities), *social* (security, restriction of highly valued freedoms and access to health care and education), *racial* (respect for dignity), and *biomedical* (disease incidences and death rates).

Failure to understand the workings of a complex global system^{16,39,95}, particularly the pervasive destructive impacts of a wicked economic system on all the domains discussed, and failure to act appropriately, will likely result in our being consumed in the conflict, confusion, and chaos of a world in ongoing entropy⁹⁶. With the COVID-19 pandemic, the writing is more clearly on the wall than ever before. Socio-political commitment to appropriate action is an essential immediate step towards improving health globally, followed by reducing the upstream forces that cause, sustain, and aggravate the impoverished lives of over half the world’s population.

Some of the challenges lying ahead, the impediments to ameliorating these, and glimmers of hope for improving the future are outlined in the accompanying article.

Competing interests

I have no competing interests to declare.

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Note: A list of additional readings is provided in the [Supplementary material of the accompanying article](#).