Paper 2

Racism, Xenophobia and Discrimination: Mapping pathways to health outcomes

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Abstract

Despite being globally pervasive, racism, xenophobia and discrimination are not universally recognised determinants of health. We challenge widespread beliefs related to the inevitability of increased mortality and morbidity associated with certain ethnicities and minoritised groups. In refuting that racial categories have a genetic basis and acknowledging that socioeconomic factors offer incomplete explanations in understanding these health disparities, we examine the pathways by which discrimination based on caste, ethnicity, Indigeneity, migratory status, race, religion and skin colour affect health. Discrimination based on these categories, whilst having their unique historical and cultural contexts, operate in the same way, with overlapping pathways and health impacts.

We synthesise how such discrimination affects health systems, spatial determination- communities, and how these processes manifest at the individual level, across the lifecourse, and intergenerationally. We explore how individuals respond to and internalise these complex mechanisms psychologically, behaviourally, and physiologically. The evidence demonstrates that racism, xenophobia and discrimination affect a range of health outcomes across all ages around the world, and remain embedded within the universal challenges we face, from COVID-19 to the climate emergency.

Key Messages:

1. Discrimination based on ethnicity, caste, Indigeneity, migratory status, race, religion and skin colour occurs everywhere, adversely affecting mental and physical health across all ages, contributing to health inequities.

2. Discrimination directly affects the body through activation of the stress response, resulting in short- and long-term biological changes. Through mechanisms such as epigenetic changes, exposure to discrimination in one generation may propagate adverse health effects to the subsequent generation. The importance for health of biological responses to discrimination has been severely under-recognised, due to a tendency to assume that population differences in disease risk have a genetic basis.

3. Discrimination profoundly shapes people's environments and opportunities, driving diverse processes for ill-health. Discrimination affects formal education, informal networks, recreation, jobs and careers, access to healthcare, poor quality housing, neighbourhood deprivation and violence, air pollution, limited access to green space, and unhealthy food retail environments.

4. The COVID-19 pandemic highlights the cumulative imprint of discrimination on health outcomes, reflecting differences in susceptibility to disease, occupational exposure, access to appropriate care, clinical prognosis, and outcomes.

5. The intersection between racism, discrimination and the climate emergency is often overlooked within public health but at each level of society, minoritised populations are worst affected by the health impacts, whilst often not being the main contributors.

6. At a societal level, discrimination is costly and inflicts collective trauma. There is evidence that discrimination affects all groups, and it would benefit us all to tackle it. Whilst tackling discrimination will improve health outcomes, a key motivator to addressing racism, xenophobia and discrimination is to address our collective trauma from motivations rooted in justice and healing.

Introduction

Given the pervasive nature of racism, xenophobia and other forms of discrimination, it should be no surprise that they are fundamental determinants of health.[1] Despite this, viewing discrimination as a central health concern is not commonplace. Across health conditions, from cancers, cardiovascular disease to COVID-19, caste, ethnicity and race are often listed as risk factors.[23] In this paper, we capture the extensive nature of these health risks, and importantly, we challenge the 'non-modifiable' nature of these associations.

We reject the inevitability associated with the health risks of belonging to a minoritised group (and question the label 'minority' itself). We reject that genetic differences are primarily responsible for health disparities among racialised groups.[4–6] We reject simplistic models that explain differences by adjusting for socioeconomic status without questioning why some groups are systematically poorer than others.[7]. Our drive to modify this relationship between minoritised groups and inequitable health outcomes underpins this series. We propose that differential health outcomes among minoritised groups are not prewritten in genetics ascribed to race or other categorisations such as ethnicity and Indigeneity, but instead are largely physiological responses to a complex range of mechanisms underpinned by past and present discrimination; including epigenetic responses to allostatic load and intergenerational exposures, with the lifecourse stage mediating the health impacts.

As healthcare professionals, if we accept that those of minoritised ethnicities, racial and caste backgrounds, are innately likely to be unhealthy and die early, we are complicit in upholding these inequities. By revealing the active role of discrimination in these associations between higher morbidity and mortality and categories of caste, ethnicity, Indigeneity, migratory status, race, religion and skin colour, we identify areas for action.

The evidence is both overwhelming and a gross underestimate. In only identifying studies where discrimination was overtly examined, the health impacts of discrimination are underrecognised. For example, Black women in the UK are four times more likely to die in childbirth,[10] while in some districts in Odisha, India, children belonging to a lower caste are more likely to be anaemic after adjusting for socioeconomic status.[11] Discrimination was not directly measured in these studies, but it does not mean discrimination was not a contributing factor.

We acknowledge assessing discrimination scientifically can be complex and limited.[9] Academia and science themselves are not free from discrimination.[9] We also acknowledge other forms of discrimination (eg. based on class, gender, sexuality or age and ableness): the third paper of the series examines these in more detail. Even categorisations used in gathering data across populations can be problematic and further discriminate, sometimes conflating skin colour, country or continent.[12] We demonstrate how proximal pathways unravel and interconnect to cause differential health outcomes, from the climate emergency to COVID-19, with Paper 1 focusing on structural pathways such as historical context and racial capitalism. [9,Paper 1] We identify discrimination as a standalone mechanism, as well as a key factor influencing the severity of social, economic and environmental inequalities.[1] Paper 1 addresses the fraught relationship between science and racism, highlighting how science and medicine are not always 'objective truths', and can perpetuate racist and discriminatory ideology. [9,Paper 1] Key definitions for this series are summarised in our glossary. We embrace uncertainty, indeterminacy and complexity in our work, underpinned by an unwavering anti-racist, anti-caste and decolonial perspective that is continually evolving.[13]

Search Strategy and Selection Criteria:

Our comprehensive literature review demonstrates that discrimination affects a wide range of health outcomes, across all ages, across the world. We conducted a scoping review that combined these umbrella search terms:
(1) health outcomes: (1a) mental health, (1b) non-communicable disease, (1c) maternal and perinatal health,(1d) infectious disease, (1e) mortality;
(2) quality of care: (2a) healthcare-centred (2b) patient-centred;
(3) mechanisms of action including socioeconomic determinants of health
with search terms relating to discrimination based on caste, ethnicity, Indigeneity, migratory status, race, religion, skin colour. For discrimination based on race and migration, we restricted to reviews, due to the volume of literature on racism and the 2018 Lancet Series on Migration,[8] which included a literature review on this topic.
Our full search strategy and referenced summary results table is in the appendix. We screened more than 11,000 results. Articles were selected to demonstrate discrimination based on the different forms of categorisation examined in this series, from caste to skin colour, and across global populations. Where possible, we tried to avoid replicating the concentration of literature in areas like the UK and the USA, which are a product of current power structures, epistemic injustice [9,Paper 1] (Paper 1 ref/link to glossary) and dominance of the Global North in health research. We extracted data from 287 articles and coded them by health outcome, basis of discrimination, global region, and lifecourse stage.

Conceptual Framework: Mapping pathways of discrimination to health outcomes

Anchored in Figure 1 and throughout our series is our conceptual framework, drawing out how discrimination affects health. Figure 1 illustrates a range of health outcomes affected by discrimination, mapped onto their respective lifecourse stages, whilst centring the pathways of discrimination affecting health. At the core of how racism, xenophobia and discrimination affect health are the concepts of hierarchical power and separation. [9,Paper 1] Our first paper explores how these central themes manifest at the structural level; through their significance in history, such as through colonialism and the establishment of caste and racial hierarchies, as well as their significance in current power dynamics and processes of structural determination. In keeping with the framework, this paper moves inwards through the proximal layers, from the individual to the health system. This paper has four fundamental aims: (1) To explore the layer of societal institutions and systems, in particular how racism, xenophobia and discrimination affect the healthcare system and healthcare professionals. (2) To review how discrimination interacts with spatial determination and emerges in communities to cause biological changes and ill-health at an individual level. (3) To synthesise the ubiquitous nature of how discrimination affects health outcomes across the lifecourse and generations. (4) To emphasise how discrimination relates to and exacerbates two of our greatest health challenges: COVID-19 and the climate emergency. For the purpose of this series, when we say discrimination, we mean discrimination based on caste, ethnicity, Indigeneity, migratory status, race, religion and skin colour, unless otherwise specified.

Figure 1: Racism, Xenophobia, Discrimination and Health: mapping pathways to health outcomes

Figure 1 maps out health outcomes associated with discrimination across the lifecourse, centring the conceptual model of the series as a visual aid for the complex pathways underneath the visible surface. Paper 1 offers a more complete explanation of the conceptual framework. [9,Paper 1] We reiterate that the identified health outcomes are not exhaustive and underestimate the health impacts of discrimination. Though incomplete, the evidence for the health impacts of racism, xenophobia and discrimination is overwhelming: across the world, across different categorisations that form the basis for discrimination and across the life course.

A fully referenced results summary table for Figure 1 can be found in the appendix.

PRECONCEPTION & PERINATAL

Offspring outcomes
- Low birth weight/Small for gestational age - predicts higher blood pressure and cortisol reactivity in children and adolescents
- Preterm birth
- Poor infant social-emotional development
- Congenital anomalies
- Offspring mortality: Stillbirth, perinatal, neonatal and infant mortality
- Changes in hypothalamic-pituitary-axis (HPA) genes in offspring (due to maternal stress in pregnancy)
- Less likely to breastfeed - associated with childhood obesity, types 1 and 2 diabetes and higher risk of infectious disease in baby
- Reduced effectiveness of mother to child HIV transmission prevention

Maternal outcomes
- Barriers to accessing maternity care
- Poor quality of care
- Maternal mortality - related to hypertensive disorders, deep vein thrombosis and pulmonary embolism
- Complex obstetric issues
- Sexual assault
- Unwanted pregnancy
- Breastfeeding duration and initiation
- Forced sterilisation
- Family disruption
- More induced or second-trimester abortions
- Antenatal and post-partum depression
- Excessive weight gain in pregnancy

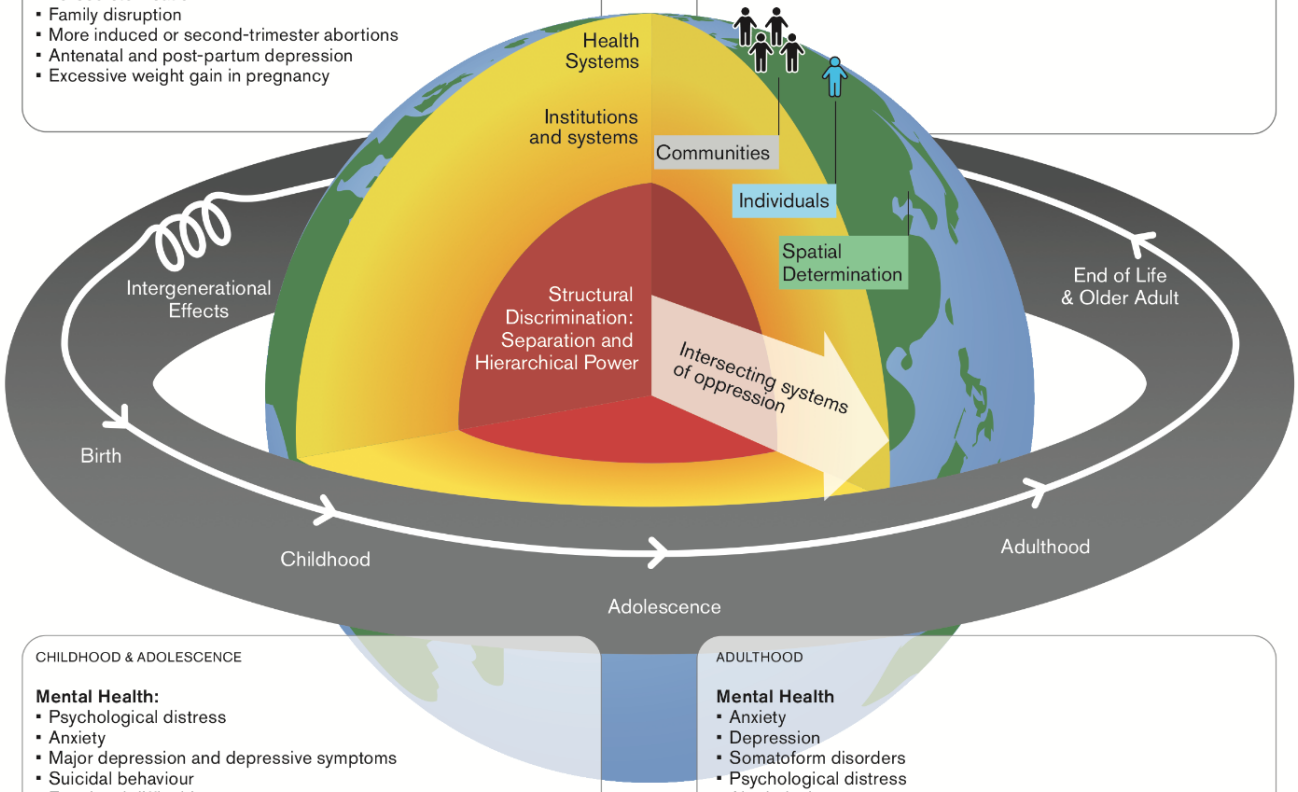
OLD AGE & END OF LIFE

Mental Health
- Depressive symptoms
- Psychological distress
- Schizophrenia
- Cognitive impairment and dementia

Non-Communicable Diseases
- Cognitive Impairment and Dementia
- Reduced access and quality of palliative care

Increased Mortality

Reduced Life Expectancy



CHILDHOOD & ADOLESCENCE

Mental Health:
- Psychological distress
- Anxiety
- Major depression and depressive symptoms
- Suicidal behaviour
- Emotional difficulties
- Sleep difficulties
- Self-reported stress
- Low self esteem
- Low academic motivation
- Maladaptive behaviours problems eg. drug and substance misuse, risk-taking behaviours
- Internalising behaviours

Sexual and Reproductive Health:
- Sexually maladaptive behaviours

Non-Communicable Diseases:
- Increased adolescent BMI, waist circumference and IL6
- Early drinking
- Asthma

Increased Mortality

ADULTHOOD

Mental Health
- Anxiety
- Depression
- Somatoform disorders
- Psychological distress
- Alcohol misuse
- Suicidal ideation
- PTSD

Sexual and Reproductive Health
- Reduced healthcare access
- Unsafe abortion
- Forced sterilisation
- Sexual assault
- Sexually maladaptive behaviours, including higher risk of HIV

Non-Communicable Diseases
- Hypertension
- Diabetes
- Heart Disease
- Stroke
- Chronic Pain
- Obesity
- High cancer risk
- Myocardial infarction
- Asthma

Increased Mortality

Individual responses

To illustrate the health consequences of discrimination, we focus on three responses evident in individuals: behavioural, psychological and physiological.

First, there is substantial evidence that many behaviours considered unhealthy, from physical inactivity to poor nutrition,-are associated with experiences of discrimination.[14,15] The spatial determination of these behaviours is explored in Panel 2. Risk factors must be viewed not only as causative to ill-health but also as responses to complex processes of discrimination, from the structural to the interpersonal level. They also represent coping mechanisms; responses to the daily stresses of discrimination and its indirect effects through differential opportunities in employment or education.[16] In a longitudinal study among African American 8th graders, substance use was predicted by exposure to racial discrimination two years earlier.[17] Similarly, discrimination directly influenced alcohol use as early as 12 years of age among North American Indigenous adolescents, and was associated with an elevated risk of problem drinking in adulthood.[18]Alcohol consumption was reported as a coping mechanism in second-generation migrants in San Francisco[19] and two studies showed that Aboriginal health workers in Australia and Palestinians in Israel coped with discrimination-related stress, and maintained social connectedness by smoking.[20,21]

Second, discrimination profoundly impacts psychology. We are ingrained to take on discriminatory ideologies as the default, whilst society refuses to recognise this.[22–24] This internalisation has many effects; from unconscious bias, reinforcing hierarchies and the subsequent differential treatment of individuals, to poor mental health and self-esteem issues.[25] Psychological responses are not only linked to internalisation: sometimes the stress of not internalising the norm can take its toll and witnessing discrimination without directly being involved can have negative sequelae for mental health.[26] Individual psychological responses to discrimination can include poor overall mental health[27,28], anxiety, depression [27,28], emotional difficulties, self-reported stress[28,29] and suicide attempts.[28,29] Finally, a poorly recognised aspect of discrimination is how these external and internal processes translate into physiological and molecular changes within the body. Mapping how these changes occur, and the health outcomes they can lead to, is fundamental to our aim of reconceptualising discrimination as a public health crisis. Panel 1 explores how stress, weathering and allostatic load alter physiology and disease risk. Importantly, while discrimination acts primarily via the stress response in the immediate and short-term, the cumulative consequences extend to diverse metabolic mechanisms that are central to maintaining homeostasis, healthy growth and development.

To fully appreciate the toll of contemporary discrimination, we need to consider how discrimination in earlier generations may have led to cumulative biological effects. For example, 19th-20th century colonialism subjected large colonised populations to chronic undernutrition as well as psychosocial stress, reflected among other outcomes in negative secular trends in stature.[30] Such somatic variability, emerging through non-genetic mechanisms, may then shape the metabolic response to discrimination and associated health effects in the current generation. For example, ancestral malnutrition associated with past discrimination may render contemporary minoritised groups more vulnerable to central fat accumulation and insulin resistance, under the twin stresses of unhealthy food environments and current discrimination.[30] Looking forwards, poor fetal growth has been linked to an altered stress response in later life.[31] These associations have particular significance for the elevated risk among minoritised groups of chronic conditions such as Type 2 Diabetes Mellitus and hypertension, which healthcare professionals are ingrained to attribute primarily to racial or ethnic genetic differences.'[4] We argue instead that the molecular and epigenetic changes resulting from chronic discrimination across the lifecourse and generations are a significant driver of this burden among minoritised groups. This is supported by mechanistic work, linking both low birthweight and elevated cortisol levels with perturbed glucose metabolism.[32,33]

Panel 1 - Physiological Responses to Discrimination

A key mechanism through which discrimination affects health in the long-term and intergenerationally is through the over-activation of stress pathways. Irrespective of whether the discrimination was based on skin colour, caste or Indigeneity for example, our body adapts to its environment and, when we perceive threat or danger, three important biological systems activate to prepare for confronting or escaping from it: the so-called fight-or-flight response. These systems are the neurological, endocrine and immune systems, and each contributes by activating the sympathetic nervous system, the hypothalamic-pituitary-adrenal (HPA) axis and increasing levels of inflammation. Biologically, the result is a state of general alertness, increased heart rate and blood pressure, as well as increased circulating energy, through elevated blood glucose and fat breakdown due to the effects of cortisol and norepinephrine. When this response occurs for a prolonged period, it is termed allostatic load (AL) and gives rise to direct and indirect physiological effects. Among markers of AL are daily cortisol variations, fibrinogen, IL6 and C Reactive Protein (indexing inflammation), blood pressure, heart rate, glycosylated haemoglobin, HDL cholesterol levels and urinary norepinephrine. Indirect measurements of stress exposure - such as BMI, waist circumference and insulin resistance - are not specific to AL, but can result from unhealthy living conditions and/or behaviour that are related to discrimination and stress. Discrimination is perceived as, and often is, a threat which activates these stress response pathways. Experiencing discrimination and its mental health consequences multiple times over the lifecourse leads to chronic activation of a response that favours short-term survival over long-term health. Over-activation of an energy-consuming, 'emergency' response results in physiological wear and tear, ultimately dysregulating the response at the cellular level, sometimes irreversibly.

Epigenetics refers to the differential expression of genes as a form of environmental adjustment and, when the body adapts to a chronically stressful environment, the health consequences are significant. Cumulative wearing of the body among discriminated populations has been associated with epigenetic ageing - where biological age exceeds chronological age - which in turn predicts coronary heart disease, diabetes, other age-related chronic illness and premature mortality. Beyond epigenetics, other relatively stable biological changes associated with chronic stress include faster telomere attrition - another marker of 'wear and tear'- and changes in the gut microbiota. Stress-induced biological alterations can be intergenerational; through epigenetic mechanisms influenced by AL, as a consequence of stress response in the mother, or both. Maternal exposure to discrimination has been associated with fetal exposure to excess cortisol, fetal HPA axis activation and higher rates of low birth weight. This type of fetal environment has been correlated with methylation of the glucocorticoid receptor gene and the NR3C1 gene promoter, both involved in HPA axis regulation.

Ultimately, these epigenetic alterations have an effect on precursors of cardiometabolic disease, such as blood pressure, stress reactivity, abdominal adiposity and insulin resistance. The timing of exposure to stressors is critical: the earlier this exposure occurs during the lifecourse, the more it can impact development and long-term health. Finally, it is important to distinguish epigenetic mechanisms, the environmental modification of genes, from genetic variability itself. Epigenetic predisposition to disease is due to social influences that have such duration or impact that they become embedded in biological processes. Racism, xenophobia and discrimination are environmental influences that cause health inequalities. They should be recognised and addressed as such.

A fully referenced version of this panel with supporting bibliography is in the appendix.

Communities

Health and wellbeing are structured by the relationships between people and their environments, including other people and broader ecosystems. In other words, ‘individual’ health is co-constituted by the various aspects of communities in which we live, due to our manifold forms of connected interdependence. Discrimination plays a key role in structuring communities, by corralling minoritised people into places that create or perpetuate unhealthy environments, simultaneously increasing their ill-health and need to access healthcare, while undermining their abiliity to obtain it. In this way, the health of communities can be spatially determined (Panel 2).

Discrimination plays out on a national and international scale, through the targeting of identity and active minoritisation of people in conflict, wars and genocides, often related to underlying geopolitical interests. The Rohingya crisis and mass forced migration is just one devastating example. In Rakhine state, Myanmar, the mortality of Rohingya children younger than five in the predominantly Rohingya township Maungdaw, is 224 per 1000 live births, compared with 77 per 1000 live births in the non-Rohingya predominant Sittwe region. Outside of Myanmar, the health of Rohingya children is also affected, with 18% of Rohingya refugees in Malaysia having low birthweight, more than 60% higher than across Malaysia in general.[34] With globalisation, communities are rooted in physical and virtual locations. For example, during the COVID-19 pandemic, certain communities relying on social media outlets for health information were at higher risk of misinformation Figure 2). Witnessing violence or brutality against those that you identify as being similar to you, online or on television, can have detrimental mental health effects.[26]

Crucially, the role of communities can also buffer the effects of discrimination. Protective buffers of stress and allostatic load include religiosity, social support and strong cultural identity, even if it is an identity that is discriminated against.[35–38]

Panel 2: Discrimination and Spatial Determination of health - a two-way street

Discrimination impairs health through many forms of unequal exposure to harmful environments. We consider spatial determination (glossary) to encompass a proximal set of factors and processes that determine health, related to location and geopolitical factors. Social geographers emphasise that 'everything happens somewhere', and this encompasses where people live and work, what opportunities for healthy lives are available and accessible, and what forms of adversity threaten them. Relative to privileged groups, those exposed to discrimination are more likely to experience household poverty, neighbourhood deprivation, low educational attainment, poor employment prospects, and unhealthy environments. However, if we 'adjust' for socio-economic characteristics, to identify the 'specific effect' on health of belonging to the minoritised group, we conceal the fundamental role of discrimination, in particular racism, in driving those groups into disadvantaged environments and circumstances.

The unequal spatial distribution of health determinants is actively generated and maintained by the norms and activities of privileged groups, whose advantages emerge directly through maintaining hierarchical societies and unequal opportunities. This is seen at the international level through migration and economic policies, at the national level by the incarceration or confinement of minoritised populations such as the Uighurs in China or Palestinians in the Gaza strip, or at the local level through formal policies and informal practices relating to housing, education, employment, access to healthy food and public health.

Low wages and wealth undermine access to adequate housing, or neighbourhoods with appropriate amenities. Historically, discrimination involved exclusion from the opportunity to buy housing, hence inequalities in total household wealth are considerably greater than those in financial income. Such economic constraints may be exacerbated by persistent discrimination. In South Africa, for example, xenophobia rose after Apartheid ended, targeted primarily at migrants from other African countries. Such migrants are typically restricted to informal sub-leases, live in overcrowded and unsanitary conditions from which they may be regularly displaced, and must often pay bribes to access accommodation. More generally, although many states provide public housing, it is often of poor quality. The tragic fire at Grenfell Tower in London, UK highlights the risks faced by those inhabiting poorly maintained, high-density accommodation.

Low wages both reflect and perpetuate inequalities in education that extend beyond what is learnt in school, denying some groups access to networks that are key to developing social capital and achieving economic and social success. Moreover, direct discrimination reduces employment opportunities, concentrating ethnically minoritised people and migrants in insecure, low-paying jobs such as night-shift work in food service industries, transport and security. Shift work disrupts homeostatic circadian rhythms, elevating the risk of mental ill-health and NCDs, and reduces the time available to access healthcare or engage in healthy lifestyles. Furthermore, workplace discrimination promotes psychological distress.

Neighbourhood deprivation imposes many constraints on healthy lifestyles. Inadequate access to green space undermines mental health and constrains physical activity, while local food outlets typically prioritise cheaper processed foods over fresh healthy produce. Minoritised communities are often targeted by advertising campaigns for products that may temporarily relieve stress (cigarettes, alcohol, high-fat foods) but promote disease. In this way, discrimination is structurally and geographically embedded in the commercial determinants of ill-health, the strategies and approaches of the private sector that promote unhealthy products and choices.

Discrimination therefore not only targets personal identity, but also constrains the body in unhealthy environments. Strong inter-connections between education, employment, residence and lifestyle mean

that societal discrimination exposes each generation not only to current constraints, but also to the consequences of such constraints in previous generations. However, a primary reason why minoritised individuals struggle to obtain better living conditions and experience structural violence is that they are actively relegated to conditions and contexts of artificial scarcity, in order to maintain cheap labour in an economic system that benefits dominant groups, to support capitalism. (Glossary)

A fully referenced version of this panel is in the appendix

The impact of racism, xenophobia and discrimination on health systems

Discrimination, past and present, significantly affects the experience and usage of healthcare systems.[39,40] The World Health Organization (WHO)'s quality of care framework emphasises services must be available, accessible, acceptable and of the highest quality.[41] Table 1 demonstrates how discrimination undermines this criteria. Discrimination diminishes systemic quality of care and quality of life for minoritised patients and healthcare professionals.

Table 1: How do racism, xenophobia and discrimination affect health systems?

Table 1: How do racism, xenophobia and discrimination affect health systems? Racism, xenophobia and discrimination systematically undermine aspects of the health system such as availability, acceptability, accessibility, and quality of care. They also impact more upstream processes that affect health systems, from structural discrimination, to other institutions and systems such as education and housing and other forms of oppression. We also explore the duality of healthcare workers as people within a system who can both discriminate and be discriminated against. A fully referenced Table 1 and accompanying prose can be found in the Appendix.

			Pathways of discrimination	Examples
	Health Systems - Availability Range of service delivery points and services offered, staffing of health workers	Inadequate provision of services	Inaccessible healthcare, particularly specialised care	Indigenous people in Canada with cancer living in rural/remote communities
		Lack of translation services	No interpreters/translated information sheets affecting informed decision-making	Immigrant women needing perinatal care in Japan, Dalit women in rural Nepal, and Romani populations in several countries
		Staff shortage	Stress and burnout of healthworkers associated with increased levels of explicit and implicit discrimination and racism	Healthcare providers in the USA
	Heath Systems - Acceptability Culturally appropriate, respectful and responsive to patient needs, values and choices	Not recognising patients' needs	Rejection of patients' beliefs as 'outsider beliefs'	Latin American Indigenous populations, whose cultural practices were blamed for their diseases, and Muslim immigrant women in Canada
		Lack of awareness of context	Lack of knowledge or understanding of a patient's life context	Indigenous Huichol migrant labourers in Mexico were not able to follow instructions such as to eat well and rest when sick due to work obligations and other minoritised populations were not able to socially distance or self-isolate during the COVID-19 pandemic due to living conditions
		Lack of comprehensive and effective communication	Verbal dominance and less patient-centred communication, resulting in patients' fear of asking for clarification and less partnership in treatment decisions/compliance	The more a diagnosis depends on communication, the more harmful barriers can be, leading to misdiagnosis or inappropriate treatment, as experienced by Israeli Muslim and Druze adolescents seeking mental health care.
	Health Systems - Accessibility Affordable, equitable, free from discrimination, easy to reach location	Inflexible hours	Conflict between services' working hours or long waiting times and other time commitments	Indigenous populations in Mexico not able to miss a day of work to wait in the long queues for health care
		Inaffordable healthcare	Health insurance not provided by governments or employers	Asian female labour immigrants in Russia, and Indigenous, Black and Romani people in Colombia
		Inaffordable transportation	Compromises access even to free healthcare if there is not a way to reach it	Refugees in Australia, Black men in the USA, Indigenous populations and undocumented immigrants in several countries
		Bureaucracy and documentation	Compromises access even to free healthcare	Palestinian women who are denied family unification in Israel, Bedouin people in Lebanon who are politically excluded (limited/ non-existing citizenship), and refugees and undocumented migrants in several countries
	Health Systems - Quality of Care Up-to-date knowledge, evidence-based medicine, technical competence	Health professionals' implicit bias and pernicious stereotypes	Prejudiced beliefs influence treatment	Black, Hispanic, and Indigenous people in the USA receiving reduced treatment and analgesia, as they are perceived as being at greater risk of misusing and abusing drugs.
		Epistemic racism embedded into curriculum and practice	Race and ethnicity used as a variable influencing a clinical diagnosis or treatment	Race and ethnicity used as a variable for calculating renal function eg. UK NICE Guidelines recommend different antihypertensive for those of Black African or African-Caribbean origin.
	Health Systems - Discrimination experienced by	Discrimination based on language or accent	Unequal treatment based on language or accent	Asian, Black or African American, Hispanic/Latino, and American Indian/Alaskan Native physicians in the USA with a primary language other than English have almost twice the odds of experiencing racial bias.

healthcare workers	Career progression and training	Unequal pay, career advancement options, insufficient orientation, overlooking of skills and overrepresentation of minoritised healthcare workers in disciplinary cases	Filipino nurses working globally, minoritised medical students, Immigrant nurses in several countries. Racially and ethnically minoritised members of the workforce are overrepresented in disciplinary cases in the UK NHS,
	Injuries	Higher risk of fatal injuries in the workplace	Migrant nurses from Philippines, India, Europe and Africa working in the US
	Bullying and undermining	Outsider treatment, refusal of care from patients	African American, Latino and Asian physicians working in the USA have reported feeling invisible, alone and treated like an outsider. Discrimination from patients has been mainly described as refusal of care.
Other systems and institutions	Employment	Unemployment and low wages contribute to economic and health inequalities through health problems, unfair treatment and lack of access to healthcare Underrepresentation of minoritised people in the health system	African and Caribbean Americans with mental health disorders, Indigenous men in Australia, and Filipino Americans. Underrepresentation of minoritised people in the health system reduced the capacity to provide linguistically and culturally appropriate care in the USA. Evidence from Florida, examining 1.8 million hospital births across 13 years, shows that Black newborn infant mortality is halved when they are cared for by Black, rather than White physicians, but made no significant difference to maternal mortality when there was racial concordance between mother and physician.
	Education	Low levels of education are barriers to access to healthcare	Indigenous populations in Australia, the US, Canada, South America and Papua New Guinea
	Prison-Industrial-Complex	Globally, minoritised populations are disproportionately subject to state violence, surveillance, arrest, imprisonment, and its adverse health outcomes, including mortality.	Incarcerated Aboriginal women in Australia being stereotyped, judged with prejudice, treated poorer than non-Aboriginal women, and denied culturally appropriate care Populations minoritised due to caste, Indigeneity, migratory status, religion and skin colour, face increased police targeting, stopping and searching, arrest, and mortality at the hands of law enforcement. Discrimination is expressed in the positioning of minoritised people closer to criminality When compared to the general population in the USA or Britain of a similar age, prisoners are twice to four times more likely to have psychotic illness and major depression, and approximately ten times more likely to have antisocial personality disorder
Intersecting systems of oppression	Religion and gender	Unequal treatment based on gender and visible religious identity	Muslim women in the USA suffer more discrimination than men for wearing religious attire
	Masculinity	Fear of exams and diagnoses that challenge manhood, and belief that men do not get sick	Indigenous Guatemalan men seeking healthcare being turned away from healthcare services because ‘men never really get sick’, and African American men who fear exams and diagnoses that challenge manhood
	Class	Unequal treatment based on socio-economic disadvantage	Double discrimination based on low-income and ethnic/racial/caste identity against Black people in Brazil and Dalit women in Nepal
Structural determination	Long lasting oppression	Distrust in response to history of intergenerational segregation and oppression	African American men, Indigenous populations in Canada, Roma, Gypsy and Traveller people in several countries
	Symbolic violence	Reproduction of colonial discourses of racial, ethnic or other identity-based aggressiveness	Health workers who disregard historical practises that have led to detrimental effects on minoritised populations' health

Ubiquity of health effects and pathways

Whilst each form of discrimination examined in this series, based on caste to skin colour, has a unique history, with varying contexts, their function is fundamentally the *same*. The core concepts of hierarchical power and separation remain consistent across context, country and history. The way these forms of discrimination undermine health and contribute to health inequalities is the *same*. It is the *same* kinds of spatial determinants, the *same* biological pathways, and largely the *same* disease outcomes. It is the very ubiquity of these effects and mechanisms this series aims to highlight.

Whilst these systems of discrimination operate similarly, not all minoritised groups will experience them the same, which is why homogenesing non-privileged people (eg. 'BAME') can be harmful and conceal varying extents of discrimination.[12] For example, in New Zealand, Indigeneity is a stronger predictor than migratory status and skin colour of low birthweight and short gestation length.[69] Aboriginal women in Australia experiencing discrimination during perinatal care were also more likely to have a baby with low birthweight (OR=1.9; 95% CI:1.0-3.8).[70] Migratory status, Indigeneity and religion intersect to result in Palestinian Arab mothers in Israel experiencing compounded discrimination, and being more likely to have postpartum depression compared to migrants and non-migrant Jewish mothers.[71]

This ubiquity is also evident from a life-course perspective, which we review next - showing how diverse forms of discrimination first affect individuals through maternal biology before they are even born, before exerting direct effects during childhood and adolescence. By adulthood, the cumulative damage expresses itself more overtly, where the harmful effects are amplified in interaction with the biology of ageing.[42,43]

A life-course perspective on discrimination

Timing of discrimination exposure influences the health impacts.For example, the effects of discrimination experienced in-utero can manifest as chronic disease during adulthood.[44,45] Furthermore, certain periods indicate increased sensitivity to the harmful effects of discrimination, such as the key stage of transitioning from adolescence into adulthood: experience of events affected by discrimination such as incarceration, unemployment or poor education in young people can have profound long-term effects on their health and wellbeing.[46] We go through the lifecourse with selected examples, with further evidence in the appendix.

Preconception, perinatal and postnatal period

Minoritised individuals bear the burden of discrimination before they are born. The effects of discrimination experienced in-utero can manifest as poorer developmental outcomes in infancy,[72] and chronic disease during adulthood.[44,45] Experiencing chronic racial discrimination is associated with unwanted pregnancy, and sexual assault, and changes in maternal biology during pregnancy.[52] Experiencing discrimination can be associated with higher rates of birth complications, mortality, excessive weight gain, and poor physical and mental health. These effects can propagate to offspring, manifesting as higher rates of preterm birth, low birthweight, or congenital anomalies.[53-55]

The effects of discrimination, especially during the preconception to the postnatal period, cannot be disentangled from other systems of oppression such as the patriarchy.[47] For example, Obstetrics and Gynaecology, a specialty providing care around pregnancy, childbirth, and ill-health associated with reproductive organs across the lifecourse, has part of its knowledge-base built on the experimentation on Black women without anaesthesia by a White male physician.[48] Contraception as a tool of colonisation and eugenics is longstanding. Forced and coercive sterilisation to curtail minoritised populations is a historical and current issue, for example for women living with HIV.[49 50–52] The harmful rhetoric of

overpopulation fueling the climate emergency and the need for greater family planning and population control in the global South is entrenched with sexism, racism, and eugenics. (See Panel 3)

In the USA, young Latinas have difficulty accessing contraceptive services[58] and in Brazil, Black women experienced more barriers to abortion care.[59]

Discrimination is associated with a number of maternal health outcomes globally (Figure 1), including maternal death. When accessing maternal healthcare, a rigidly structured caste system excludes many women in Pakistan, India, Nepal and other South Asian countries. The devaluing of women and girls, and the lack of economic and social power experienced by impoverished women, bars them from lifesaving maternity services.[62,63] Women from minoritised castes may not access care because of cost, or, in internalising the caste system, may not think they deserve to.[64] This is associated with poor quality treatment, lack of access to health professionals, unauthorised charges,[65] and exclusion from formal and informal spaces for maternal and child healthcare.[66] By comparison, women from privileged castes are almost twice as likely to have an institutional birth.[67]

Intergenerational poor health can be exacerbated by racism.For mothers suffering with substance misuse and addiction; Black mothers whose babies tested positive for cocaine are less likely to be discharged to maternity-specific care for addiction support, which further disrupts the mother-baby relationship.[6869]

Childhood and Adolescence

Throughout childhood and adolescence, minoritised individuals continue to face the effects of discrimination experienced by their parents, but also begin consolidating the effects of their own experiences during this sensitive period.

The risk of dying before the fifth birthday, is higher among minoritised castes in some Indian states.[3] A study showed that 83% of this caste-based gap can be attributed to differences in women's level of education and household income.[3] This reflects how discrimination interacts with the patriarchy and other systems such as education, to impact health. In the USA, discrimination during pregnancy predicted greater inhibition, separation problems and greater negative emotionality in infants at 6 months and 1 year.[73]

Discrimination, affects the childhood and adolescent period with the increase in social interactions outside the family, coupled with the development of complex cognitive processes, leading to societal and self awareness of minoritised status.[27,74] Discrimination is embedded within numerous institutions that shape these formative years, including education, housing, justice and policing. This can have profound long-term effects on health and wellbeing.[46] Policing of minoritised communities leads to a disproportionate number of children in state care.[75] During Canada's "sixties scoop" (1960-1980), provincial social workers were authorised to enter Aboriginal homes and remove children from families who did not meet White, middle-class, parenting standards, with no acknowledgment of the oppressive government policies that contributed to their socioeconomic status.[75] Such policing and carceral institutions impact health through isolation from the family unit. Parents' fear of being declared unfit parents become key barriers to seeking healthcare.[76 77]

Self-reported racism of urban Aboriginal youth in Australia was associated with food insecurity, housing instability, exclusion from school, and loneliness. Number of worries and number of friends were effect modifiers for the association between racism and poor mental health [27] Schools are reported sources of xenophobia.[78]those who are not heterosexual[79] or are from low-income backgrounds[80] can be more likely

to experience racial discrimination.[28]Behavioural responses to discrimination during this period orelates to poorer academic engagement,[29] externalising behaviors, heavy drinking, substance use,[38] deviant peer associations,[29] and maladaptive sexual behaviours.[81,82] Physiological responses to chronic discrimination experienced during adolescence include altered cortisol metabolism,[83,84] higher adult allostatic load,[85]shorter adult telomere length,[86]asthma,[27,80,87]sleeping difficulties,[88]excessive weight gain[80] and indicators of metabolic and cardiovascular disease such as insulin resistance,[89] compromised large artery elasticity[90] and increased cardiovascular reactivity.[91]

Adulthood

By adulthood, the cumulative effects of discrimination can manifest after latency as overt mental and physical health problems. The mental health impacts of discrimination are well established. Depressive symptoms were associated with First Nations adults who experienced early adverse life events; immigrants and asylum seekers globally, particularly regarding uncertainty of asylum claims; and among Muslims in the UK and USA experiencing incidents attributed to post 9/11 xenophobia.[92,93] Social withdrawal, reduced self-esteem and depression are consequences of social exclusion and caste-based discrimination in India, with higher rates of suicide reported among minoritised caste students in higher-level education[94,95]. These findings are consistent with a meta-analysis reporting a significantly negative mean weighted effect across 328 studies (r=-0.23; 95% CI -0.24, -0.21) between discrimination and psychological wellbeing (self-esteem, life satisfaction, low depression, anxiety or psychological distress).[96].

Poor mental health is both an outcome in itself, as well as relating to poor physical health. For example, mental health problems were directly associated with an increased risk of cardiovascular disease among Indigenous people in the USA[97]; while exposure to discrimination has been widely associated with worse sleep[98] and maladaptive health behaviours.[99,100] Chronic stress and the progressive 'wear and tear' of the body's stress pathways lead to a cumulative allostatic load visible through cortisol variations and inflammation levels (Panel 1)[101–103], increasing risk for mental disorders and non-communicable diseases (NCDs)[104]. Discrimination-related unhealthy lifestyles and structural minoritisation culminate in increased cardiometabolic risk factors such as blood pressure, obesity, BMI, waist circumference, blood glucose, glycated haemoglobin and cholesterol levels, which ultimately give rise to metabolic disorders, chronic diseases and disparate mortality rates.[105] High levels of internalised racism[114] predicted increased risk of elevated fasting glucose (OR= 2.4; 95%CI 1.1-5.5) and waist circumference compared to low levels.[115] Metabolic disorders also increase the incidence and mortality of colon, oesophagus, kidney, postmenopausal breast and endometrial cancers.[106,107] Higher colorectal and breast cancer risk is directly related to poverty, neighbourhood disadvantage, immigration status and social isolation.[108,109]

Structural discrimination in the USA, measured as political participation, employment, educational attainment and judicial treatment was associated with myocardial infarction, with the highest odds for employed Black people (OR=1.74; 95%CI 1.48-2.04).[110] Minoritised people are overrpresented in prisons[111,112] and the health outcomes for prisoners can be far worse than their peers who are not incarcerated, for example being more likely to have psychosis and major depression.[111,113] In addition, we see the over-policing of minoritised populations in health systems, for example with the higher use of compulsory detentions of ethnically minoritised individuals and migrants with mental health issues.[77 115]

Beyond non-communicable diseases, the COVID-19 pandemic has demonstrated how racism, xenophobia, and discrimination can be breeding grounds for infectious disease, and vice versa (Figure 2).[116,117] Similarly, Black men who have sex with men (MSM) are more likely to be HIV positive and less

likely to initiate antiretroviral therapy compared to other MSM, as shown by data in the UK (OR=1.86; 95%CI 1.58-2.18) and USA (OR=3.00; 95%CI 2.06-4.40).[118]

Older Adult and End of Life

In later life, the impact of cumulative exposure of discrimination interacts with the biological effects of age, driving biological, physical and mental health effects that culminate in irreversible comorbidities.[119] Epigenetic changes and chronically activated stress-related pathways can cause higher cortisol secretion in older adults,[120] potentially reducing hippocampal volume and impairing memory. Continued exposure to stress is also associated with chronic degeneration, atrophy, and impaired neuronal function in the prefrontal cortex, impairing cognitive function.[120]

In Canada, New Zealand, and the USA, the consequences of perceived and systemic discrimination in older Aboriginal individuals include poverty, marginalisation, and external disruption of their social networks. These circumstances directly increase health conditions which worsen mortality in Indigenous communities, including accelerating the onset of age-associated disease.[119,121] Previous and ongoing racial discrimination causes higher rates of psychological distress and chronic pain in older adults,[122] increasing the need for healthcare. This demand is often inadequately met among minoritised groups. In Europe for example, older migrants have less access to important screening services; and those with access are less likely to participate because of perceived cultural and language barriers.[123] Additionally, discrimination leads practitioners to under-diagnose and under-treat conditions such as depression in older adults.[124]

At every lifecourse stage, there is increased risk of premature mortality associated with discrimination, including due to violence.[116] During the COVID-19 pandemic, we have witnessed populism, scapegoating, and pre-existing inequities due to structural discrimination being exacerbated (Figure 1b). We have also seen that centring equityat the heart of a pandemic response could result in better social, economic and health outcomes for all.[125] Conversely, embedding necropolitics - deciding the acceptability of who lives and who dies based on aspects of their identity- within pandemic responses has failed devastatingly at protecting society as a whole Figure 2).[126] Evidence for how discrimination can abruptly cut short the life cycles of minoritised people precedes this pandemic. Life expectancy for the Aboriginal and Torres Strait Islander population is 8.6 years less for males, and 7.8 years less for females, compared to the non-Indigenous population.[127]

Figure 2. Racism, xenophobia and discrimination are embedded within two of the most significant health challenges of our time; COVID-19 and the climate emergency

Figure 2 presents our conceptual framework to demonstrate how racism, xenophobia and discrimination are embodied within our greatest health challenges; the COVID-19 pandemic and the climate emergency. Panel 3 further explores how racism, xenophobia and discrimination are embedded within the climate emergency.

A referenced Figure 2 can be found in the appendix.

Below is previous model, revised version will feature edited model and text (uploaded as separate document and see below):

COVID-19

Individuals
- Occupational exposure in public facing jobs

Communities
- Fake news infodemic via social media, which certain communities can be rely upon for information
- Increased prevalence of co-morbidities — severe presentations, worse outcomes and less likely to be admitted to intensive care

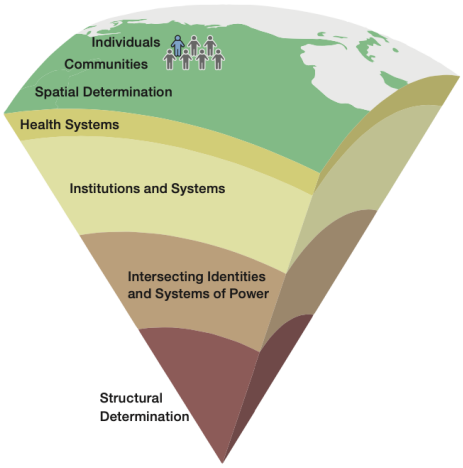
Spatial Determination
- Inability of multigenerational households to self-isolate or socially distance
- Unequal exposures to air pollution

Health Systems
- Exclusionary health systems eg. Hostile Environment
- Minoritised healthcare workers more likely to be sent to higher risk areas, and less likely to receive adequate personal protective equipment.
- Poor public health messaging
- Lack of trust in health systems
- Discrimination rooted in pandemic response ie. Sinophobia and reluctance to learn from other countries and global inequity in vaccine delivery

Institutions and Systems
- Cultural racism and medical populism—newspapers and media outlets furthering outsider narrative of minoritised groups and deepening separation.

Intersecting Identities
- Necropolitics - ie. the use of social and political power to determine that it is acceptable for some people die and others to live eg. Black and other racially minoritised people, those with comorbidities, the elderly, those with disabilities.

Structural Determination
- Housing policies restricting minoritised groups to conditions where virus is more likely to spread
- Structural barriers to healthcare eg. Hostile Environment
- Blaming and scapegoating narratives



Climate Crisis

Individuals
- Onus on individual action

Communities
- Overlooking of Indigenous knowledge

Spatial Determination
- Proximity of minoritised communities to toxic waste, air pollution, incinerators.
- Minoritised communities bearing burden of climate crises despite being smallest contributors
- Climate-related migration

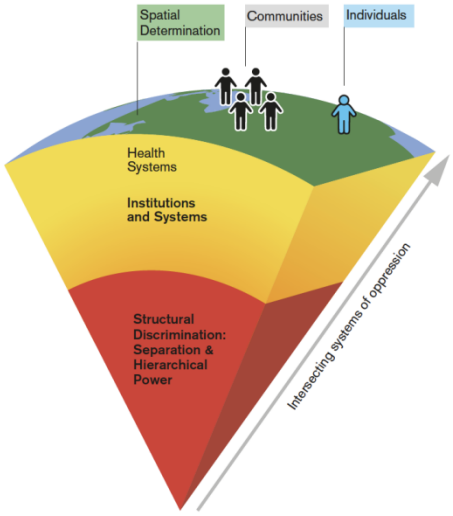
Health Systems
- Health system as tool for eco-xenophobia, exacerbating hostile environment policy.
- Health systems' lack of recognition of environmental determination of health.

Institutions and Systems
- Movements to mitigate and combat climate crisis can be exclusionary

Intersecting Identities
- Natural hazards become disasters when power structures which create and perpetuate discrimination - disproportionately harming the health of minoritised people
- Eco-fascism and necropolitics - deciding upon the acceptability of certain people and populations death ie. forced sterilisation and contraception targeting minoritised groups as a means of population control

Structural Determination
- History of structural violence contributing to existing power dynamics - many efforts of minoritised communities resisting the degradation of their livelihoods, have been unsuccessful
- Discrimination and inequity embedded in commerical determinants of health

New model:



New content for figure 2:

	COVID-19	Climate Emergency
Individual	Occupational exposure	Onus on individual action
Communities	Fake news infodemic via social media	Systematic exclusion of Indigenous voices and knowledge
Spatial Determination	Difficult for multigenerational households to self-isolate or socially distance. Unequal exposures to air pollution, exacerbating COVID-19 outcomes	Proximity of minoritised communities to toxic waste, air pollution, incinerators and fossil fuel plants. Minoritised communities bearing burden of climate crisis Climate-related migration
Health Systems	Exclusionary health systems eg. Hostile Environment Minoritised healthcare workers more likely to be in higher risk areas, and less likely to receive adequate personal protective equipment Ineffective public health messaging Discrimination rooted in pandemic response ie. Sinophobia and global vaccine inequity Increased prevalence of co-morbidities associated with severity and mortality - increasing likelihood of requiring intensive care. With systemic scarcity of resources, could also reduce chances of receiving intensive care	Health system as tool for eco-xenophobia, exacerbating hostile environment policy. Health systems' underrecognition of environmental and spatial determination of health.
Other Institutions and Systems	Cultural racism and medical populism	Exclusionary environmentalism movements
Intersecting Systems of oppression	Necropolitics - use of social and political power to determine acceptability of some people dying and others living	Natural hazards becoming disasters, disproportionately harming minoritised people Eco-fascism and necropolitics - gender and sexual health intersect when people of reproductive age in the Global South are targeted to control population growth through contraception and forced sterilisation
Structural Discrimination	Vaccine Apartheid between high and middle to low income countries Structural barriers to healthcare eg. Hostile Environment Blaming and scapegoating narratives Distrust in health systems	Extractive industry's history of structural violence: much of the resistance to environmental degradation today comes from minoritised communities Discrimination and inequity embedded in commerical determinants of health

Panel 3: Racism, xenophobia and discrimination are embedded within the climate emergency.

Climate and environmental breakdown have profound implications for health. Conversations on the climate emergency and health are often incomplete, lacking the lens of racial justice and discrimination. Figure 1b highlights how discrimination exacerbates the climate emergency. This panel illustrates the numerous dimensions of this interaction between discrimination and the climate emergency, at each level of society.

Structural Discrimination

The core concepts of discrimination, power and separation manifest as neocolonialism to dictate the health impacts of and mitigation efforts against climate change. Whilst the climate emergency affects us all, often the communities contributing least to it bear the greatest burden. Minoritised communities are often excluded from climate advocacy, research and policy. These examples demonstrate environmental racism: “racial discrimination in environmental policy-making, the enforcement of regulations and laws, the deliberate targeting of communities of colour for toxic waste facilities, the official sanctioning of life-threatening presence of poisons and pollutants in our communities, and the history of excluding people of colour from leadership of the ecology movements.” Today, the commercial determinants of climate change cannot be dissociated from persisting structural discrimination; testament to the entrenched power of large extractive industries. Divesting from harmful capitalist practices and fossil fuel industries requires divesting from whiteness and other hierarchical power structures.

Intersecting systems of oppression

Intersecting forms of oppression compound the health impacts of climate change. For example, caste, class and gender intersect in South Asian countries that already fare poorly in considering women in disaster risk reduction and resilience building. Even after surviving a disaster, Indian women face barriers attending support groups due to caste-based discrimination. Disasters are not the droughts, floods or hurricanes, but rather the deaths, destruction of livelihoods and lack of support for the minoritised people affected by these events.

Institutions and Systems

The interdisciplinary intervention of access to green spaces that improves physical, mental and planetary health often leaves behind minoritised communities. Creating these spaces for communities of colour in the poorest neighbourhoods provides health benefits, and for every dollar spent, saves three dollars on healthcare costs.

Spatial determination

Air pollution is increasingly understood to explain a large part of inequalities in the risk of NCDs and mental ill-health, as well as poorer outcomes from COVID-19. The Dakota Access Pipeline Protests (North America) and activism of the Secwepemc community against the Trans Mountain Pipeline Project (Canada) highlight the resistance against erosion of local identity and livelihood, and the power of governments and corporations. Proximity to hazardous waste has been more closely correlated with racial category rather than socioeconomic class. The life expectancy of a person in the Niger Delta, where the fossil fuel industry pollutes the land, is 49 years, in comparison to the Nigerian average of 55 years. The principle of population control as a solution for climate change is inextricably linked to racism, xenophobia and eugenics-based ideology. Without major efforts to address this, we forecast that as climate-related migration increases, nationalism and eco-xenophobia will intensify.

Individual and community responses

Forest fires, droughts and rising temperatures, all driven by increased consumption of meat and dairy in high-income settings, increase land vulnerability for Indigenous communities. In Brazil, the largest exporter of beef globally, almost 50% of cows are raised in former rainforests. Moreover, high-income countries with subsidised agriculture export cheap but ecologically damaging grains to low-income countries, undercutting local producers and increasing food insecurity among Indigenous communities. This leads to malnutrition and starvation. When mitigation efforts are taken, Indigenous voices and knowledge are often excluded from decision-making.The view that mitigating the health impacts of climate change relies on individual sustainable practices and ongoing "green" consumerism fails to acknowledge the pervasive nature of capitalism. The onus must shift from emphasising individuals, especially minoritised people, to reproduce and consume less, to holding powerful industries shaping consumption and driving the climate emergency accountable.

A fully referenced version of this panel is in the appendix.

Who does racism, xenophobia and discrimination harm?

In addition to the profound damage to oppressed and minoritised groups globally, racism and discrimination financially strains health systems. For example, an estimate of healthcare related costs from racial inequalities in the USA over a four-year period (2003-2008) was $229 billion along with a loss of $1 trillion due lost productivity from illness and premature deaths.[128] Similar work estimated that, over 2001-2011, racism cost the Australian economy 3% of annual GDP.[129] For privileged groups (e.g. White people in high-income countries, privileged castes), racism, xenophobia and discrimination may have real and tangible benefits in relation to both psychosocial and material resources such as income, wealth, property, status, networks, belonging and entitlement. How this translates into health and wellbeing benefits is more complex and less well understood. While many studies of structural racism demonstrate damaging effects on the health of Black but not White people,[130,131]others show deleterious impacts affecting both groups.[132-133] In addition to this complexity,[134] there is now ample evidence that socioeconomic inequalities within societies are bad for everyone's health and wellbeing, while individual wealth/power, beyond a fairly low threshold, does little, if anything, to improve overall health or happiness.[135] As such, there is a compelling argument for the privileged to address racism and discrimination, not only as an ethical wrong, but as an endeavour that, in seeking to address a 'collective trauma' which impacts everyone in distinct ways and to various intensities, converges with their interests.[135,136]

Limitations

The study of racism, xenophobia and discrimination as a determinant of health is still relatively nascent, despite consistent growth in studies with an explicit focus on these concerns. The literature we reviewed represents a subset of the more established scholarship on the health impacts of discrimination, which is itself a topic that is grossly under-examined due to the skewing of global research efforts towards the health needs of privileged groups and high-income countries.[137,138] Most of the literature focused on racial discrimination in North America, European countries and Australia. There are a multitude of health outcomes associated with discrimination not covered in this review - the absence of discrimination measured as exposure in academia does not mean the absence of discrimination in causing ill-health. There is little evidence on discrimination and infectious diseases in low- and middle-income countries. For instance, we found scarce literature exploring the role of racial discrimination on HIV prevalence in South Africa, despite it being the country with the highest HIV rates and a well documented history and presence of discrimination and separation.

Measuring and studying discrimination comes with its own challenges. Self-assessment of perceived discrimination is sometimes used, which is subjective. Additionally, the full effects of discrimination accumulate through diverse biological and socio-cultural mechanisms across several generations. Many of the studies were cross-sectional, which limits the generalisations we can make due to confounding factors and bias. To robustly demonstrate the causal role of discrimination on health outcomes, we need longitudinal studies[139] using a range of implicit, explicit, direct and indirect measurement approaches.
We noted a lack of literature studying the relationship between caste systems, colourism or religious discrimination and health, and gaps in understanding how discrimination affects older adults and palliative care. There was a distinct lack of studies examining intersectional discrimination and health. The invisibility of non-binary and transgender populations in the examined literature reflects the potency of the discrimination and minoritisation they experience. As we move forward, we call for longitudinal analyses focussing on all the aforementioned evidence gaps, examining how discrimination affects wellbeing in all its dimensions; from education and economic impacts to health outcomes. More importantly, such calls for evidence cannot delay the urgency of acting on these known health inequalities. There is enough evidence to act. A moral argument stands alongside current evidence to justify immediate interventions rooted in justice.

Conclusion

Despite a recent worsening in health injustices, racism, xenophobia and discrimination are potentially 'modifiable risk factors.' They are contingent on geo-political economic power relations rather than anything 'intrinsic' to the categorisations of caste, ethnicity, migration status, Indigeneity, race, religion or skin colour. Racism, xenophobia and discrimination constitute a social, political and cultural crisis in themselves, fracturing and undermining social cohesion and inclusion worldwide. As the profound impacts of resource extraction and capital accumulation on climate and ecosystems unfold in the coming decades, discrimination will continue to exacerbate the crises experienced by minoritised people, especially in low resource settings, during the disasters and emergencies to follow on the heels of COVID-19.
At the same time, as health injustices, patterned by manifestations of oppression, are a powerfully deleterious feature of the current state of our world, they are also a reflection of factors that are far more fundamental than health. Specifically, discrimination is underpinned by the existence, in modern global societies, of profoundly oppressive hierarchical societal configurations characterised by rampant individualism and competition, as well as artificial scarcity produced through regimens of ownership that result in severely unjust global wealth concentrations. Racism, xenophobia and discrimination need not be a permanent fixture of our world. How might we work towards a world that centres equity and togetherness, instead of hierarchical power and separation? To undermine the conditions that make racism possible, we must advocate for more caring, connected, egalitarian communities, characterised by an abundance of locally shared power and resources, in which a flourishing, sustainable existence for all life on Earth is possible.[140]

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Author contributions

SS, SCM and DD conceived and designed the comprehensive reviews, with input from YP. SS and SCM ran the searches, and undertook the initial screening process, with further screening by TAD, PMS, SSK, MY. The majority of the data extraction was completed by TAD, PMS, SCM and MY who then summarised the data in a comprehensive results summary table with SS and wrote the initial drafts of the

corresponding sections on health outcomes by life course stage. The conceptual framework used throughout the series was conceived, developed and designed by SS. SS designed Figure 1a, devised Figure 1b and led the collaborative structuring, writing and editing of the manuscript. The sections on the proximal layers of the framework and their effects on health, preceding the lifecourse section, were written by SS, JW and YP. JW wrote panel 2. PMS extracted the data for Table 1 and together with SS developed Table 1. JW and SCM wrote panel 1. TAD and SS wrote Panel 3. All authors edited and critically revised the draft.

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