The Lancet Commission on Peaceful Societies through Health Equity and Gender Equality

Final Report Supplementary Appendix

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A The Commission's Principles and Journey

The Commission's goal, to explore the relationships among health equity (SDG 3), gender equality (SDG 5), and peaceful societies (SDG 16). We recognised that the SDGs are interdependent. Yet many analyses of the specific goals treat them in isolation and reinforce disciplinary silos, and perhaps miss opportunities to identify synergistic relationships between the various SDGs. We aimed to break down these siloes by analysing the relationships among SDGs 3, 5, and 16. Specifically, we examined if and how improved health equity and gender equality can contribute to more peaceful societies. While our research is relevant for all countries, we focused on fragile and conflict affected settings as these places have made the least progress on the SDGs, and they would particularly benefit from attention to the inter-relationships between gender inequality, health inequities, and violence.

Our work has been guided by three core principles. First, we are committed to social justice and believe that health equity and gender equality are indispensable components of just societies. Second, we recognise that discrimination and violence undermine health equity and gender equality and diminish individual and social well-being, and we acknowledge the historical and structural causes of such discrimination and violence. And third, we are committed to scholarly rigour, as well as the importance of incorporating critical and diverse perspectives in our research. We recognise that interdisciplinary research is critical to understanding the contribution of health equity and gender equality to the dynamics of conflict and peace and to identifying processes that lead to more just and peaceful societies.

The Commission also began its work with an appreciation that societies are complex systems. To establish if and how health equity and gender equality play a causal role in peaceful societies, our research approach needed to confront this complexity. Improvements in health equity and gender equality may set in motion processes that contribute to peace and may be self-reinforcing. The political, social, and economic factors that create the conditions for peace could simultaneously improve health equity and gender equality outcomes in feedback loops. As outlined below, we needed a research approach that could navigate this complexity. Throughout our work, we remained keenly aware of the turbulent international context, including the ongoing COVID-19 pandemic and its impact on health equity and gender equality as well as conflict and fragility. This turbulence and resulting setbacks for the global agenda to advance health equity, gender equality, and peace, heightened the urgency of our findings.

To foster global, interdisciplinary, and forward-looking work, The Lancet brought together 24 Commissioners representing a wide range of disciplinary and professional backgrounds, geographic regions, and career stages. Seventy percent of our Commissioners are women, including our Chair. Three-quarters of our Commissioners are currently affiliated with institutions in high-income countries, and one-quarter with institutions in middle-income countries. Commissioners include a former head of state, medical and social science researchers, academic professors and leaders, medical doctors, legal scholars, public health practitioners, policy makers, and doctoral students. We bring expertise on conflict studies, humanitarianism, gender norms and structures, public health, governance, economics, political science, and foreign policy. No Commission can encompass all of the perspectives – disciplinary, geographic, institutional – that can illuminate research questions as complex as the one we investigate here. Our hope is that our work will provide a foundation for

other scholars and practitioners to build upon.

Our Commission was first convened in May 2019 to develop our research direction and organise into working groups. Our research was conducted in collaboration with other researchers and students around the world. A writing team incorporated this research into the final report. Our work was done over three and half years, with much of our collaboration online due to COVID-19 restrictions. The pandemic limited our ability to directly engage with those impacted by war and violence. We held three multi-day Commission meetings (two virtually), two small in-person workshops, and a series of Commission-wide video calls to discuss the conceptual framework, early findings and key messages, an annotated report outline, and draft versions of the report. We benefited greatly from discussions with experts across sectors and in conflict-affected settings, several of whom provided informal reviews of our draft report, as well as numerous formal and informal interviews and conversations with researchers and practitioners across the human rights, humanitarian, public health, and development communities, among others. A writing team incorporated this research into the final report in consultation with the broader Commission, and the report reflects their interpretation of the research findings based on their training and epistemological perspectives.

In line with The Lancet's Diversity Pledge, we worked to ensure our research teams were inclusive of diverse backgrounds and perspectives and integrated researchers with lived experience within our case study countries. Incorporating researchers with direct, lived experiences provided critical insight and supported reflexivity within our research teams. We also believe in the value of comparative researchers who work to apply research questions across varying contexts to build generalizable, empirical evidence. Our use of positivist empirical approaches enhanced the robustness of this research and facilitated its receptivity across diverse research and policy communities.

As we undertook our research (2019 to 2022), the international context shifted dramatically, heightening the urgency of our questions, findings, and our research and policy agenda. While such trends underscored the continued relevance and importance of the SDG Agenda, they also revealed the weakening of international cooperation. Such trends make realising the SDG Agenda ever more urgent, yet also place it in peril. Our analysis reflects this time and place in history. As outlined in this report, we believe that a focus on the interaction of health equity and gender equality provides the SDG Agenda with a reinvigorated focus and new tools to achieve its promise.

B Definitions Used by the *Lancet* Commission

Below is a list of definitions used throughout the report. Excerpts from this list are included in Panel 2 in the report.

B.1 Health-related terms

Health equity asserts that all individuals and groups should have an equal opportunity, without bias, to be healthy. The Commission uses the Braveman and Gruskin [4, p. 254] definition of health equity as "the absence of systematic disparities in health (or in the major social determinants of health) between groups with different levels of underlying social advantage/disadvantage – that is, wealth, power, or prestige."

Sexual and reproductive health and rights (SRHR) is defined by The Guttmacher-*Lancet* Commission as the "state of physical, emotional, mental, and social wellbeing in relation to all aspects of sexuality and reproduction, not merely the absence of disease, dysfunction, or infirmity."[14] The Commission emphasises that sexual and reproductive health requires the protection and promotion of rights as well as the provision of services in ways that meet the standards of "Availability, Accessibility, Acceptability and Quality."

B.2 Gender-related terms

For our examination of gender equality and equity, the Commission takes the definitions from The Lancet Series on Gender equality, norms and health.[7]

Sex refers to the biological status of being female, male, or intersex (a person who is born with sexual anatomy or chromosomes that do not conform to what typically distinguishes male from female).[7]

Gender is socially determined, varying within and across societies and over time.[11] It is the meaning and value associated with being male or female. Gender defines the roles, responsibilities, attributes, range of acceptable behaviours, and entitlements associated with being male or female in a given setting.[7]

Gender equality means that all human beings, irrespective of their sex or gender identity, must be free to develop their personal abilities and make choices without the limitations set by gender stereotypes, rigid roles, or discrimination. The different behaviours, aspirations, and needs of males, females, and other gender identities must be considered, valued, and favoured equally.[7]

Gender norms are the unspoken social rules that reinforce and perpetuate the social meaning of gender. These norms dictate how males and females should (and should not) behave, the desirable attributes associated with being male and female and their acceptable roles and responsibilities within society. These norms are learned and reinforced within the family, community and broader society through observation, instruction, behavioural incentives, and sanctions.[7] Gender norms are dynamic, relational, and often hierarchical.

Gender systems within societies are the structures and processes that support and reinforce gender norms, promote gendered behaviours, and justify the gendered allocation of tasks, roles, social

positions, and power. Gender forms part of the system of social relations that shapes the authority and power of men and women.[3, 13] Under most gender systems, power and authority are deemed masculine and allocated to men.[7]

Hegemonic masculinity is a representation of gender norms where an idealized image of masculinity dominates, embodying the 'most honoured way of being a man'.[5] In many cultures, the ideal man is independent, risk-taking, aggressive, heterosexual, and rational.[5, 2] Other gender norms surrounding masculinity can co-exist, but lack institutionalization and reinforcement through the media and other imagery.

Patriarchy is a social structure, expressed through political, economic, and social relations, that upholds male dominance and power.[9] The system of patriarchy maintains male dominance and control over the family and its assets, the sexuality of women and girls, as well as private property and public institutions.[16]

Gender identity is a person's internal psychological sense of being male, female, or a blend of both. One's gender identity can be the same or different from one's sex assigned at birth.[7] ***Gender expression*** is how individuals express their sense of being masculine, feminine, neither or both, through clothing, mannerisms, haircuts, voice, and behaviour. This differs from ***sexual orientation***, which is an enduring pattern of emotional, romantic, and/or sexual attraction to men, women, or both sexes.

From birth, concepts of femininity and masculinity are socially reinforced.[6] ***Sexual and gender minorities*** – individuals whose gender identities, expression, and/or sexual orientation do not conform to these social expectations – often face psychological distress and discrimination. This includes individuals who are ***transgender***, meaning that they do not conform to the gender identity or expression typically associated with the sex to which they were assigned at birth.

B.3 Specific Categories of Inequity

Horizontal inequity refers to inequality between social groups. Such inequities are socially clustered, shared by people with a common economic, social, political, cultural, or religious identity. These inequalities result from access to resources shaped by social status including ownership of assets, access to social services, and/or political power which shapes opportunities amongst groups. Such social status is determined by varying recognition and respect accorded to a group's gender, language, religion, and customs.[15] Understanding the social patterns of inequality is essential for intersectional analysis.

Vertical inequities are economic inequalities distributed among individuals or households, denoting hierarchies within otherwise homogeneous groups.

The concept of equity focuses policy on the socially determined processes that lead to differential outcomes within the same 'equal rights' context. Procedural equity shifts attention from the distribution of health outcomes to the processes or mechanisms through which those health outcomes come about. The focus on the processes as opposed to outcomes is critical because it brings into sharp focus the issue of power as ingrained in otherwise neutral sounding technical and bureaucratic rules, procedures, and practices. The focus on procedural equity allows us to question the nature and proper use of power, the actors involved, and to what end.

The concept of equity has been used to justify the limitation of rights to individuals and groups on the basis of cultural and religious differences. As noted by Braveman and Gruskin "where women are particularly disenfranchised, those in power have argued that conditions for women in their countries are not unfair but rather are appropriate given the different capacities and roles of women."[4] This argument has long been used in international negotiations to justify limitations to the rights of adolescent girls and women.[1]

B.4 Peace, fragility, and conflict-related terms

Definitions of conflict, fragility, and peace are contested. The Commission uses definitions of conflict from the Uppsala Conflict Data Programme.[12]

There are two forms of state based armed conflict. **Interstate conflict** refers to the use of armed force (weapons) between two or more warring parties that represent states or governments, which results in at least 25 battle-related deaths in one calendar year. **Intrastate conflict** refers to armed force between two or more warring parties where one is a government.

Internationalized intrastate conflict refers to a conflict between a government and a non-government party where other governments provide active support in the form of troops, weapons, and financing. Another name for this type of conflict is 'proxy war.'

Non-state conflict occurs when at least 25 related battle deaths result from fighting between two or more organized groups, neither of which is the government. These organized groups can include criminal organizations, such as drug trafficking cartels, but the violence inflicted by informal gangs is not included.

One-sided violence is the deliberate and targeted use of violence against civilians by the state or an organized group which results in 25 deaths in a year.

Organized violence is an umbrella term that refers to three mutually exclusive categories of conflict where the use of armed force results in at least 25 deaths per year, which are 1) State based armed conflict 2) Non-state conflict; and, 3) One-sided violence.[12]

We use the World Bank definition of **fragility** as countries or settings with high levels of institutional and social fragility, based on public indicators that measure the quality of policy and institutions; and/or countries/settings affected by violent conflict based on a threshold number of conflict-related deaths relative to the population.[18] Critics argue that the use of the term 'fragility' to describe states is based on problematic western assumptions about states to justify economic, political, and security intervention by Western powers.

International relations scholarship has traditionally defined **peace** as the absence of war, known as negative peace. While the concept of organised violence is easier to identify and measure, peace scholars argued that it does not sufficiently capture the lived experiences of individuals and groups, including the impact of oppression, domination, and symbolic violence. Johan Galtung coined the phrase **structural violence** to describe the inequitable distribution of power and resources that is built into the structure of formal institutions and undermines the freedom, opportunities, and wellbeing of individuals and groups.[8]

Quality peace, as defined by Peter Wallensteen, incorporates goals of social justice and requires "conditions that make the inhabitants of a society (be it an area, a country, a region, a continent, or the planet) secure in life and dignity now and for the foreseeable future."[17, p. 6] We build on Melander's expansion of quality peace [10] to incorporate the importance of gender equality and health equity within its conceptualization.

B.5 Exogenous and Endogenous

Science searches for the cause of an effect or an outcome. In an ideal scientific experiment, the cause is clearly independent or **exogenous**. A spark starts a fire. A seed grows into a plant. In these cases, the spark and the seed are exogenous factors independently causing an outcome.

In contrast, **endogenous** means a factor is 'embedded' within a context where multiple factors influence both the independent/explanatory variable and the outcome of interest.

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C Knowledge Gaps

To ensure our Commission identified knowledge gaps to further existing scholarship, we reviewed research on gender equality and organised violence, population health and conflict, and health services within fragile and conflict affected settings. As outlined below, knowledge gaps include why gender equality is associated with more peaceful societies, if and how the provision of health services has an impact on conflict dynamics, the interrelationship between gender equality and health services and health outcomes, and how this interrelationship shapes conflict dynamics. Our research aimed to address these knowledge gaps.

Research by political scientists established a strong statistical association between various measures of gender equality and the level of organised violence in a society.[8, 24, 10, 9, 6, 13, 27] These cross-national quantitative studies identified statistical associations among indicators of gender equality and peace that hold across societies and over time. However, this research has not yet fully explained why gender equality leads to peace. While some pathways have been proposed, they have not been fully operationalised or tested in case studies.[24, 13, 23] Despite some research using fertility rates as an indicator of gender equality,[8] research has not explored the inter-relationship between gender equality and health equity (including health services and outcomes) and the impact of this relationship on levels of peace and violence.

Other political science researchers suggested a relationship between population health indicators and organised violence. Early analysis of the causes of state failure showed an association between high infant mortality rates and levels of organised violence.[19, 21, 22] Yet researchers did not fully interrogate this relationship, and instead suggested that infant mortality rates simply captured "the overall quality of material life."[21, p. 51] Some political science scholarship suggested that HIV-related mortality could erode state capacity – for example, by causing a high disease burden among military forces, and weakening the state's ability to maintain a monopoly on violence – and increase the potential for violent conflict.[25, 16, 26, 28] However, the dire predictions of HIV/AIDS eroding state capacity and causing widespread state failure, chaos, and violence did not materialise.

Research has also documented the impact of violence on health service provision and health outcomes. The humanitarian community has examined how health services can effectively reduce population morbidity and mortality in situations of organised violence and fragility.[29, 12, 3, 20] Recent analysis focuses on the effects of violent conflict on the safety, health, and wellbeing of women and girls.[5, 4] While invaluable to support health engagement in these settings, this research has significant methodological limitations, casting doubt on the validity of the findings for the Commission's purposes. For instance, health policy research in conflict settings is largely case study based without methodological approaches to enable generalizability to other contexts. Moreover, this research largely overlooks the agency of women and girls, does not interrogate if and how health services support (or undermine) this agency, and does not explore the impact of health services on conflict.

Advocacy and scholarship on health as a bridge to peace has examined if and how the provision of health services can transform conflict dynamics and lay a foundation for more peaceful societies. This research reflects the critically important tradition of human rights and peace activism within the medical community. It also reflects the important contribution of health services to facilitating dialogue between warring parties. We recognise the importance of healthcare providers advocating

for the rights of civilians affected by conflict and honour the personal and professional sacrifices made by many health care providers in the name of peace. However, as noted below, evidence of the generalizability of supportive case studies is currently limited and may be subject to selection bias.

C.1 Health as a Bridge to Peace

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The History: Healthcare providers have long drawn attention to the civilian suffering which results from structural conditions outside of the control of individuals and communities.[32, 31] Given that healthcare providers are at the frontline of war and violence and bear witness to the devastating impact of conflict, their active role in peace movements is not surprising. Through this activism, healthcare providers have expressed their solidarity with communities, advocated that their rights to safety, security, and dignity be respected, and mobilized for peaceful solutions to violent conflict.

During the civil wars in Central America and Peru in the 1980s, the Pan-American Health Organisation (PAHO) led efforts to negotiate temporary ceasefires which enabled vaccinations to reach civilian populations, particularly children.[15] Given the success of these efforts in El Salvador and Peru, WHO worked to implement "health as a bridge to peace" approaches in other conflict and post-conflict settings, including Afghanistan, the Balkans, Colombia, and Sri Lanka. Several other organisations have also developed frameworks and actions for "peace through health", including McMaster University, the International Physicians for the Prevention of Nuclear War, the Institute for Resource and Security Studies, and the Carter Center.[18] In 2019, the WHO initiated a new Global Health and Peace Initiative, which seeks to "strengthen and operationalize the link between health, social cohesion, and peace" with a focus on resilience and trust at the community level and between populations and governments.[33, p. 1]

The Approach: Unlike humanitarian action which addresses civilian health needs while maintaining neutrality and impartiality, the "peace through health" approach embraces the potential for health interventions to transform the dynamics of conflict. It advocates that healthcare providers harness their credibility to work as mediators and promote peaceful dialogue within and between communities. Data on population health can provide critical inputs for the development of more equitable health and other social services, and health interventions can be harnessed to address broader social challenges.[7] Health can be framed as a superordinate goal, and health interventions can build bridges and trust among community members, increasing state-citizen cohesion. Moreover, by acting as advocates within the global community, healthcare providers can influence decision-making structures in ways that promote sustainable peace.[2, 1]

Evidence - Challenges and Success: While peace through health initiatives reference global health diplomacy efforts,[11] most health as a bridge to peace initiatives are focused on mobilisation for peace at the individual level (use of healthcare providers as mediators) and community level (effort to build bridges among communities). Peace through health initiatives have saved thousands of lives through the provision of health services, including vaccinations. Evidence also shows that healthcare providers have a unique ability to navigate challenging social dynamics within communities to bridge differences.[14, 30] Moreover, the appeal to health professionals to embrace this unique role

and act as 'peacemakers' has undoubtedly had meaningful and long-lasting consequences in many communities.

However, as noted in the Commission's discussion of the dynamics of conflict and peace, actions at the individual and community level are either assisted by structural conditions which favour peace or limited by these same forces.

As recognized by those within the health through peace community,[17] to harness the full potential of healthcare providers to work effectively as mediators and health interventions to build bridges between communities requires a comprehensive analysis of the broader dynamics of conflict and peace. This analysis would include identifying the structural factors which facilitate or impede the use of health to mobilise for peace.

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D Health In/Equity, Gender In/Equality, and Violence/Peace: Drivers and Interactions

We undertook comprehensive reviews of the published literature to determine the factors that shape the levels of health equity, gender equality, and violence and peace. What drives health equity, gender equality, and levels of peace and violence? Are there common contextual factors which shape these relationships? And what are the relationships amongst health equity, gender equality, and peace and violence?

We begin with an overview of key contextual factors which shape health in/equities, gender in/equalities, and violence. Next, we examine the drivers of levels of health equity, gender equality, and violence. We conclude by reviewing evidence for the interactions amongst these three variables.

D.1 Contextual Factors

The analysis of the contextual factors could fill volumes; our summary is not exhaustive. We selected these factors as they emerged as key background factors in our comprehensive literature review as well as our case studies. Where applicable, we draw illustrations of these factors from our case studies.

D.1.1 The Long Shadow of History

Historical events set in motion social, economic, and political processes that shape subsequent outcomes in a process broadly defined as path dependency.[96] These historical processes have a clear impact on future patterns of gender inequalities and health inequities, as well as a country's susceptibility to violent conflict. Historical processes establish patterns of economic activity, determine the structure of formal state institutions, and shape patterns of politics and power. These historical processes delimit the future trajectory of countries and can set in motion patterns of social and economic inequity which constrains the opportunities of individuals and social groups. The impact of colonialism and slavery provide two illustrations of the legacy of history.

Illustration: Legacy of Slavery in Africa Many African states continue to feel the legacy of slavery. The legacy of the slave trade shows the path dependency of historical injustices. Slavery contributed to weakened social networks, ethnic fractionalization, and the weakening of local political institutions, leaving a legacy of economic stagnation and organised violence.[16] African countries most impacted by the slave trade are the poorest on the continent[92] and have the weakest levels of socio-economic development.[3] Research that compared the intensity of the slave trade with contemporary population survey data showed how individuals from ethnic groups affected by the slave trade had lower levels of trust in their families, communities, and government.[93]

Illustration: Colonialism The path dependencies established by patterns of colonialism provide another example of the long shadow of history. Colonial rule created the conditions for conflict, particularly through its creation of artificial borders throughout the continent as well as its fuelling of identity conflicts.[133, 20] Patterns of economic activity established by colonial powers also had lasting effects on socio-economic development and gender roles.[3] The political, economic, and

social systems imposed through colonial rule transformed social norms surrounding gender, and the economic and social roles of women and men.[15] Colonial institutions were repressive, violent, and provided few public goods: they funnelled natural resources to the colonial power, made little effort to build infrastructure that favoured domestic economic development, often replaced slavery with exploitative and brutal indentured labour systems, and failed to build economic relationships with other colonies.[3]

Case Study Illustration: Colonial Legacy of Health Inequities in Mozambique Our case study review of Mozambique showed the lasting impacts of extractive oriented colonial rule on health equity (see Appendix N). The Portuguese did not invest in education or infrastructure for the African population and provided health services largely to Portuguese citizens. When Mozambique gained its independence in 1975, it emerged as one of the poorest countries in the world. Little health infrastructure existed, including human resources, clinics, or medical training.

D.1.2 Geopolitics and Global Power Relations

Geopolitics is the relationship between politics and geographic space. While many definitions exist, geopolitics is most often used as a description of the deliberate use by states of all forms of their power – military, ideological, political, social, and economic including trade, investment, and technology – to extend their influence beyond their borders.[121] Geopolitics has long shaped relations between states and influenced domestic politics and economics. From the expansion of empires throughout history to the promotion of a neoliberal form of globalization, powerful states have used various forms of power – military, political, economic, social - to promote and protect their national interests.

Geopolitics influences health equity, gender equality and violence and peace. The clearest example is through its influence on violent conflict. As we outline below, during the Cold War, the United States and the Soviet Union competed for influence in many low-and-middle income countries, causing a series of internationalised civil wars, also known as proxy conflicts, with deadly consequences for civilian populations. Proxy conflicts continued after the Cold War ended; recent examples include the wars in Syria, Yemen, and Ukraine.

Case Study Illustration: Mozambique Civil War Upon assuming power in 1975, the Frente de Libertação de Moçambique (FRELIMO) government prioritised the creation of a primary care system. Quickly after the country gained independence, geopolitics reversed this progress as a proxy civil war engulfed the country. The Resistência Nacional Moçambicana (RENAMO), backed by the Rhodesian and South African white nationalist governments, launched attacks against the Soviet-backed FRELIMO government. During the ensuing civil war (1976-1992), RENAMO targeted health facilities, destroying almost half of Mozambique's primary care network.

Case Study Illustration: Afghanistan Our Afghanistan case review also illustrates how geopolitics has influenced the path of gender equality (see Appendix M). Throughout history, the behaviour and activities of women have been deeply politicised, with gender equality as symbolic of Afghanistan's modernization, or women's adherence to religious and cultural values symbolic of its resistance to Western domination. In 1919, encouraged by the Russian Bolshevik revolution,

the Afghan government promoted the education of women and their participation in the economy. Women's rights were then rolled back when the "Ulema" or religious scholars asserted control in 1929. From the 1950s to the 1973 takeover by the Soviet-backed Marxist government, Afghanistan re-introduced women's equality initiatives. Then the Mujahideen, backed by the United States and supported by those who saw the Afghan government as un-Islamic, fought against the Soviet invasion (1979-1989). Some Mujahideen factions were notorious for their widespread use of sexual and gender-based violence. As civil war broke out after the Soviet withdrawal, the Taliban emerged as the strongest faction and brutally rolled back the rights of women and girls upon taking power in 1996. After the Western-backed government assumed power in 2001, they prioritised women's education, legal rights, and civic and political participation. When the Taliban again took over in 2021, these rights were entirely removed.

D.1.3 The International Political Economy

The interactions between the state and international political and economic systems shape health equities and gender equalities. From intellectual property rights to the availability of international capital and the patterns of economic activity, these interactions shape structures of social, political, and economic relations, individual and social capabilities, as well as the distribution of power within society.

Illustration: Structural Adjustment Policies Structural adjustment (SAPs) and economic 'shock therapy' programs clearly illustrate these dynamics. SAPs implemented across many low-income contexts conditioned financial loans upon economic liberalisation. These reforms aimed to increase economic competitiveness and efficiency through deregulation, privatisation, and the reduction of government spending. The logic behind such reforms was that long-term economic growth would offset short-term pain.

In social sectors, such as gender and health, the implementation of structural adjustment programs during the 1990s 'hollowed out' bureaucratic capacity,[103] which undermined the ability of formal institutions to implement and oversee social policies and programs. Fiscal reforms reduced domestic health expenditures which affected access to and quality of healthcare services and resulted in higher out of pocket health care expenditures.[118] Forster et al. [51] provide evidence of the association between structural adjustment programs and increased neonatal mortality and decreased access to health services. Such reforms in Eastern Europe and countries that emerged from the Soviet Union were associated with significantly higher tuberculosis incidence, prevalence, and mortality.[115] These and other effects of reforms, including their impact on infrastructure such as water and sanitation systems as well as food prices, fell disproportionately on women due to pervasive gender inequalities, the nature of women's economic participation, and their caregiving responsibilities.

The broader consequences of structural adjustment programs are complex, and possibly long-term in nature. Abouharb and Cingranelli [1] suggest the imposition of structural adjustment policies by the World Bank over the period 1981-2000 is associated with future government violations of physical integrity rights. Analysis by Eriksen and De Soysa [45] suggests that countries in economic crisis during the 1981-2003 period have higher rates of physical integrity rights violations. They also find the period when the country receives loan disbursements form International Financial Institutions (IFIs) are associated with fewer rights violations. Countries where disbursements by IFIs are halted

experience more violations.[45] The time frame for these studies precedes important changes to IFI adjustment programs, including the tenure of Christine Lagard as IMF managing director, who adopted a policy to 'safeguard social spending.'[128] Efforts by IFIs to be more sensitive to the social impacts of fiscal policies have continued, with the implementation of specific strategies to minimise those effects.[65]

D.1.4 The International Arena of Ideas

Recent public policy research shows that 'ideational factors' play an important role in political processes as well as policy making. Ideational factors include philosophical beliefs about the world that influence individual and institutional attitudes and action, as well as programmatic concepts or frameworks that help develop public policy.[116] Based on their belief in universal principles – like gender equality and health equity – epistemic communities or knowledge networks of advocates and researchers, sometimes referred to as 'norm entrepreneurs,' work within an international arena of ideas. These networks identify and fill knowledge gaps, share best practices, and build consensus for policy change through the promotion of international norms.[50]

Case Study Illustration: El Salvador Our case review of El Salvador shows how female combatants from the Frente Farabundo Martí para la Liberación Nacional (FMLN) benefited from their connection with the international women's movement (see Appendix O). As outlined in Section 3, such norms articulate and promote a universal vision for gender equality and health equity.

Case Study Illustration: Women and Peacebuilding Our review on women in peace processes (Panel 6) illustrates the power of norms and networks as critical sources of support for domestic efforts to build gender equality across diverse societies.

D.1.5 Formal Institutions

North defines institutions as "humanly devised constraints that structure political, economic, and social interactions"[91, p. 97] which includes formal laws (constitutions, legal codes, property rights, codes of conduct) as well as informal rules (traditions, customs, values, taboos) that provide order in society.[91] The state is the dominant formal policy-making institution in any society. The state can be a progressive force, using a range of tools such as discourses, policies, and laws to improve gender equality and health equity, as well as promote peaceful relations in society. However, state institutions -including health systems - can also reflect and reinforce discriminatory social norms related to gender, race, ethnicity, and class, producing and perpetuating inequalities, inequities, and violence. Type (democratic, partially democratic, or authoritarian) as well as the quality of its institutions determine the role of the state in perpetuating harmful or facilitating beneficial cycles.[5]

D.1.6 Informal Institutions

Formal institutions like the state are deeply embedded within a system of social norms and relationships that shape power relations and structure political and social life. Known as informal institutions, these social norms are "created, communicated, and enforced outside of officially sanctioned channels."[60, p. 725] These unwritten rules and social relationships shape the behaviour

of formal institutions and how society responds to the policies that they implement. Informal institutions in turn shape – and are shaped by – the arena of ideas, including culture, religion, and other social beliefs. Multiple and competing 'informal institutions' often co-exist, such as those related to religious or cultural beliefs and those reflecting economic and social relationships.

Through the interaction between informal institutions and formal ones, social norms and interests are constantly constructed and negotiated. Complementary informal institutions co-exist with formal institutions. The values and objectives of informal institutions can either converge with efforts by formal institutions to promote gender equality and health equity or diverge from them and undermine these efforts. Informal institutions may implement sanctions for violating informal rules and social norms on gender and health.[85] Unlike formal enforcement mechanisms, these informal sanctions are often subtle and hidden.[60]

D.1.7 The Gender System

As we outline in our definitions (Appendix B) gender is the socially determined meaning and value of being male or female. Gender identities are reinforced through a "system of social practices that constitutes people as different in a socially significant way and organizes relations of inequality based on that difference."[105, p. 192] These systems of social practices operate through both formal and informal institutions to support and reinforce gender norms, promote gendered behaviours, and justify the gendered allocation of tasks, roles, social positions, and power. Under most gender systems, power and authority are deemed masculine and allocated to men.[21, 39, 106] Patriarchy is an example of a gender system where male dominance and control over economic and social relations is maintained through unwritten rules.

Illustration: Mozambique In Mozambique, the gender system is reflected in sexual relationships between adolescent girls and older men (see Appendix N). While the legal age of marriage in Mozambique is 18, early marriages are common in both rural and urban areas, particularly in rural settings and in the north. Factors driving early marriage include cultural norms such as initiation rituals, poverty, adolescent pregnancies, family pressure, vulnerabilities including orphanhood, as well as the lack of public policies to protect adolescent girls. Some girls report that teachers use sexual intercourse as a condition for promotion between grades, and state that both teachers and boys in their peer groups harass and abuse them, further undermining their potential. Studies suggest that girls from the poorest 20 percent of households were more than twice as likely to be married early than those from the richest 20 percent of households. After marriage, most girls drop out of school, undermining their employment and livelihood opportunities. Informal institutions normalise the subordination of women and contribute to widespread gender-based violence, including intimate partner violence.

Illustration: Afghanistan In Afghanistan, gender equality interventions navigated and interacted with social structures shaped by ideas surrounding 'namus' – meaning 'honour' (see Appendix M). Honour is almost inseparable from masculinity, where a significant component of a man's honour is his perceived ability to regulate the behaviour of the women in his household. This extends to the societal level, where a family's honour is measured by the perception of the 'purity' and moral conduct of family members, both male and female. Religious and cultural duty obliges men to

preserve their honour by enforcing patriarchal norms that regulate women's behaviour in the private and public sphere. Abuse and violations of the rights of girls and women were not interpreted as such by most families; instead, they were considered a prerogative, necessary to uphold honour.

Case Study Illustration: Kosovo Our Kosovo case study review outlines how efforts to address sexual violence after Kosovo's war navigated a similar honour code, the set of traditional Albanian customary law known as the Kanun which guides and codifies behaviour (see Appendix Q).

D.1.8 Exogenous Shocks

Exogenous shocks include international economic pressures such as trade disruptions or global financial crises, neighbourhood conflicts, the influx of refugees, climate change, natural disasters, and pandemics.[37] Just as formal institutions can be (slowly) strengthened through endogenous processes of political contestation and change, they can also be degraded and weakened by exogenous shocks that can initiate, or contribute to, harmful self-reinforcing cycles.

Illustration: COVID-19 Pandemic Our review of the COVID-19 pandemic (Section 4) illustrates the devastating impact of the pandemic on gender equality and health equity. In many countries, COVID-19 morbidity and mortality was felt most strongly by marginalised and economically vulnerable populations. The pandemic disrupted decades of progress in routine childhood immunizations, with millions of children worldwide missing expected doses of measles and diphtheria-tetanus-pertussis (DPT3) vaccines.[29] Without urgent efforts to "catch-up" immunizations, the health consequences of these missing doses may be long-lasting. Moreover, the pandemic – and disease control measures designed to reduce transmission, such as school closures, stay at home orders, and restrictions on commercial activity, particularly in the service sector – had compounding and sharply negative effects on gender equality. Disruptions to childcare systems (daycare, schools) and to work, especially in sectors with higher levels of female workforce participation, led to women exiting the workforce, assuming an increased burden of caregiving, and exposed to higher levels of intimate partner violence. In many contexts, adolescent girls bore heavy costs, including declining school enrolment and increased rates of early marriage. The pandemic rolled back decades of progress on gender equality in many contexts.

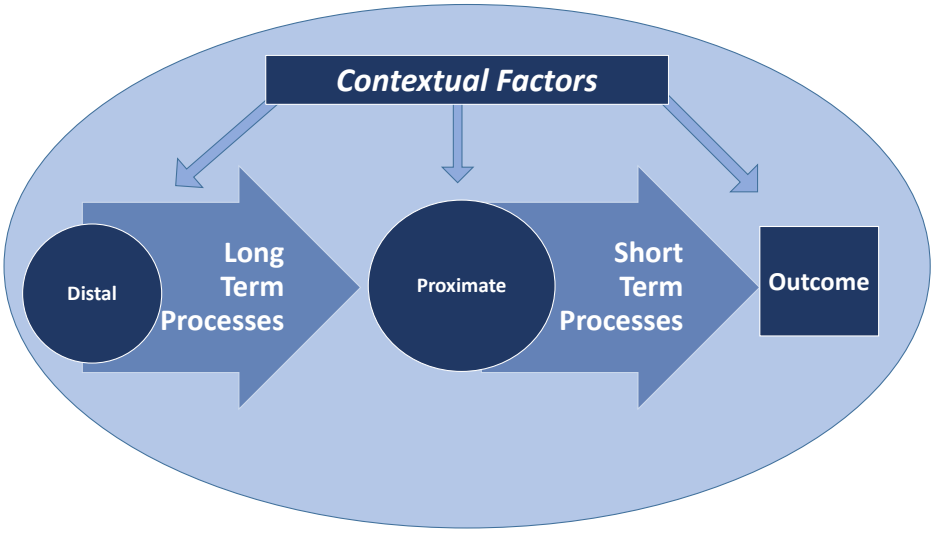
D.2 Drivers of Health In/Equity, Gender In/Equality, and Violence/Peace

Figure 1 outlines our approach to assessing the drivers of health equity, gender equality, and violence/peace (outcomes). We use the following categorizations to describe the factors shaping these outcomes: distal causes are long-term processes while proximate causes are short term processes that shape outcomes. Interventions to influence proximate factors may have a more immediate effect in altering outcomes. These causal processes are embedded in and shaped by the contextual factors outlined above.

D.2.1 Variation in Health Equity

The Commission defines health equity as the ability of all individuals and groups to have the opportunity, without bias, to be healthy. As we outline below and summarize in Table X, health

Figure 1: Causes of outcomes



equity is shaped by more than access to quality health care.[80] Contextual factors, such as the ones identified above, form the broad social, economic, and political backdrop which shape the drivers of health equity. Distal factors include the political determinants as well as the social determinants of health. While proximate factors are shaped by both context and distal forces, they include health systems, individual and group circumstances, as well as exogenous shocks. We address each briefly in turn. Table 1 groups these factors by global, state/national and community/social levels.

Contextual Factors As we note above, geopolitics and the international political economy influence health equity in several ways. The efforts of powerful empires and countries to establish and control political and economic systems to advance their national interests have long shaped the health of populations.[46] These global factors help to define the current and future actions and activities of states and their national institutions. Recent manifestations of globalized political and economic systems include neoliberal policies, global capital flows, the expansion of trade and globalized supply chains, and the protection of intellectual property.[69] Multilateral institutions designed to promote global norms and advocate for health equity are also important.

Formal institutions, shaped by a constellation of national history and contexts, exercise a powerful influence on health equity through regime type and structures of governance as well as the nature of the economic system. Other contextual factors which help shape health equity include the powerful role of epistemic communities and health advocates (outlined in Section Three). And informal institutions interact with the formal institutions of the state to perpetuate social relations that advantage some groups and discriminate against others.[74]

Distal Factors We identify two distal drivers of health equity, both of which are shaped by context: the political and social determinants of health. The social determinants of health are well established, defined as the non-medical factors which influence health outcomes, and include food security, water and sanitation, housing, other forms of social infrastructure, and safety.[94] We distinguish the (under-researched) political determinants of health from these social determinants, including the

nature or leadership and the quality of governance, the responsiveness of governance to the public, the strength and inclusivity of the domestic economy, structures of laws and regulations, and public financing and revenue systems.[71, 79] The ongoing nature of engagement with the 'global system,' including the international political economy, participation in multilateral institutions, and political alliances, also influence health equity.

Proximate Factors While the determinants of health equity go beyond health care, the effectiveness and responsiveness of health systems is a key driver of health equity. The various components of health systems are well known and articulated below (see Mechanisms) and in Section 3. These components include access to and delivery of quality healthcare services, human resources for health, financing mechanisms, adequate infrastructure, health information systems, as well as access to medicines and technologies. While we acknowledge that health services should ideally be delivered within the context of a national health system, under certain circumstances, the vertical delivery of health services is warranted. These circumstances include when the state is unable to provide services, such as during a natural disaster or conflict, to deliver specific services like immunization, or when marginalized or vulnerable groups and individuals are unable to receive those services from the state.

Individual and group circumstances also drive health in/equity, and include economic circumstances, as well as structures of broader social inequity and discrimination such as access to housing, water, sanitation, other forms of social infrastructure, and fair employment.[74] Endogenous shocks, including natural disasters, violence, violent conflict, and outbreaks of infectious disease such as pandemics also shape health equity.

Table 1 summarizes these various drivers of health equity and inequity.

D.2.2 Variation in Gender Equality

The Commission defines gender equality as the ability of everyone, regardless of gender identity, to develop their human capabilities, access economic and broader public sector resources and assets, live in safety and security, and exercise individual agency. In Table 2, we identify the multidimensional contextual, distal, and proximate factors which shape levels of gender equality and inequality. Like the health equity, multiple volumes of scholarship have been – and will be – written about the factors which drive gender inequality. In Table X, we broadly summarize these key drivers.

Contextual Factors Feminist scholars argue that geopolitical systems, through their extensions of state power, have fostered the global spread of patriarchal systems of gender social relations.[42] The neoliberal international political system has deepened gendered inequalities, focusing on the expansion of systems of production.[127] Through their engagement with formal state institutions, as well as informal systems of social relations, these broader systems drive inequality. As we note in our description of the processes and principles of gender equality, multilateral organizations create global norms and frameworks, while global advocacy coalitions and epistemic communities develop global coalitions in support of gender equality. As noted by Goetz [54], multilateral forums are contested spaces, where organised forms of resistance to gender equality attempt to undermine and

roll back progress on global norms. The type of government or 'regime' also shapes gender equality, with evidence of the benefits of democratic forms of government for measures of gender equality.[12] Informal institutions and social norms and practices also drive the gender in/equality.[49]

Distal Factors We suggest that distal drivers of gender in/equality include the degree of national engagement with global norms on gender equality, political and economic factors. An important interplay exists between national and international engagement on gender equality which informs both global gender and national gender equality norms.[120] Political and economic factors play a critical role in advancing gender equality, including the strength and inclusivity of economic growth,[87] governance that supports and promotes gender equality including through budgeting, laws and regulations that safeguard equal rights and opportunities.[44] The existence of a safe and secure environment, as well as a space for civil society activity also shape levels of gender equality.

Proximate Factors Two fundamental drivers of gender equality operate in the short term and are critically important for gender equality. These two processes include access to quality health care services, including comprehensive sexual and reproductive health care, and access to education. The ability of all individuals, regardless of gender identity, to participate in political life, the economy, and civil society also drives gender equality outcomes. These processes are outlined in more detail in the mechanisms for gender equality (Section 3 and Appendix K). The role of informal institutions, such as gender systems, shape the level of equality experienced by individuals and groups. And as COVID-19 demonstrated (see Section 4 of the Report), exogenous shocks can significantly roll back gender equality levels.

D.2.3 Variation in Conflict and Peace

As we outline in Table 3, multiple global, state/structural, and social and community level factors interact, leading to violence or contributing to peace.[76] As with our discussion on the drivers of health equity and gender equality, we divide these drivers of conflict and peace into three broad categories: contextual, distal, and proximate factors. We also acknowledge that the presentation of these drivers is a cursory summary of complex processes.

Contextual Factors Global factors, including geopolitical configurations and patterns of competition, the international political economy including trade, global flows of financial and military aid,[67] the strength of multilateral institutions, international norms and beliefs, transnational cultural or religious networks, and epistemic communities that share research and policy ideas are powerful forces that either facilitate global cooperation or contribute to violence. The role of climate change can also influence the susceptibility to violence, while efforts to address it could foster cooperation.

Structural or contextual conditions – the type of regime (particularly the existence of partial democracies), the nature of state institutions or bureaucracies, the existence and strength of cross cutting connections across identity groups, as well as economic, demographic, and environmental factors – can raise the risk of violence or enable peaceful cooperation. The role of social norms, particularly those surrounding the role of aggression and violence, can also shape the propensity for violence or peace.

Distal Factors Political and economic factors play a key role in the dynamics of conflict. Factors that drive violence include a government without a full monopoly on the use of force within its territory, low government competence and capacity, favourable geography ('rough' or inaccessible terrain offering rebel groups safe space to operate), the availability of weapons, as well as low levels of social capital and societal distrust.[48, 5, 43, 56, 78] Evidence also suggests that identity cleavages, specifically the increased presence of non-state armed groups with religious goals or claims, makes some conflicts less amenable to mediation and resolution.[99] The willingness of leaders to fuel group grievances and stoke anger through populist strategies can mobilise grievances into social and political movements.[41] Geopolitical contestation at national levels can be an important driving force of violence, particularly through proxy wars.

Evidence suggests the participation of countries in international institutions and cooperative processes can also facilitate the peaceful settlement of disputes and reduce the risks of war.[58] Empirical analysis of conflict termination shows that after the end of the Cold War, the number of negotiated settlements rose, only to fall again after the 9/11 terrorist attacks. This variation reflects the international political context, namely the charged 'us-versus-them' nature of the War on Terror and its implications for the willingness of states and non-state actors to engage in negotiations.[62]

As we demonstrate in Section 3, economic, social, and political processes are also important drivers of more peaceful societies. We provide evidence for the role of human capital and inclusive economic growth, social capital and the role of trust, as well as quality of governance and a strong social contract in contributing to more peaceful societies.

Proximate Factors As with our analysis of health in/equity and gender in/equality, we acknowledge the role of exogenous shocks and their impact on drivers of violence and peace. These include natural disasters, economic shocks, pandemics such as COVID-19, and conflict in neighbouring countries.

Several conditions are necessary for conflict and organised violence to erupt. Interstate conflict has a myriad of proximate causes, including misperception regarding the intentions of adversaries (known as the security dilemma), an effort to secure resources, and to divert attention from domestic policies.[76] For intrastate conflict, a segment of the population must be mobilised to fight. Leaders often use grievance narratives as a mobilisation tool, focusing on fears related to security, loss of political power, economic circumstance, control over territory and resources; aspects of social identity, including ethnic, religious, or cultural identity; or horizontal inequities among identity groups. An opportunity structure for violence must exist, namely the factors that enable armed groups to form, recruit fighters, finance their activities, and operate. External actors can shape this opportunity structure through the provision of resources, weapons, fighters, technical support or training, advocacy, and propaganda. Digital operations by conflict actors to gain strategic advantage is a new weapon of war; examples include cyber-attacks on essential services and the weaponization of information to sow distrust and spread hatred. None of these factors are necessary conditions for conflict to occur, but individually and collectively, they influence the likelihood of organised violence.

Wars end in several ways: through outright military victory by one side, the external imposition of a stabilisation agreement, the fading away of warring groups, or a negotiated settlement among parties

to the conflict.[62] Mediation and peacebuilding efforts to bring conflict actors to the negotiating table[11] are facilitated by the ability of third parties such as the United Nations to provide 'credible commitments,' which are security guarantees to protect the interests and safety of warring parties when they lay down arms.[126, 36] A negotiated settlement is highly preferable as it averts further bloodshed and enables political and economic grievances to be discussed and addressed through peace agreements. Negotiated settlements also provide an opportunity to embed agreements to improve health equity and gender equality, as outlined in Section 3. Bakken and Buhaug [9] find that post conflict improvements in women's empowerment are largely a result of gains achieved through peace agreements, particularly when those agreements include provisions to address gender equality.

The ability for conflict parties to reach a negotiated settlement depends on several pre-conditions. These include a change in domestic or structural factors, such as local mobilisation for peace[104] or a 'mutually hurting stalemate'[134] where conflict actors recognise that they cannot meet their objectives through continued violence. Youth peacebuilding processes also facilitate constructive social transformation.[117] We also highlight the important role of women's organizations in peace processes around the world in Section 3.

Table 1: Drivers of health in/equity

	Contextual	**Distal**	**Proximate**
Global	**Geopolitics** **International Political Economy** **Multilateral Organizations** • Global norms • Global frameworks **International Arena of Ideas** • Epistemic communities • Advocacy coalitions	**International Engagement** • State participation in the global economy • State participation in multilateral organizations and initiatives • State engagement in developing / accepting global norms on health equity • Political alliances	**Exogenous Shocks** • Pandemics • Economic Shocks • Natural Disasters • (Organized) Violence
State / National	**Formal Institutions (State)** • Regime Type • Economic System • State Capacity	**Political and Economic Determinants** • Governance / Leadership including responsiveness • Domestic economy (strength and inclusivity) • Laws and Regulations • Financing / Public Revenues	**Health Systems** • Delivery of Quality Healthcare Services, including comprehensive sexual and reproductive health • Human Resources for Health • Financing • Infrastructure • Health Information Systems • Medicines / Technologies **Vertical Delivery of Health Services**
Social / Community	**Informal Institutions / Systems of Social Relations** • Gender Systems • Other identity systems (race, class, religion)	**Social Determinants** • Food Security • Water / Sanitation • Housing • Social Infrastructure • Safe and Secure Environment	**Individual / Group Circumstance** • Economic Circumstances • Racial, Sexual, and Gender Identity • Access to Quality Health Services • Access to Housing, Water, Sanitation, Social Infrastructure, and Fair Employment

Table 2: Drivers of gender in/equality

	Contextual	Distal	Proximate
Global	**Geopolitics** • Power and patriarchy **International Political Economy** **Multilateral Organizations** • Global norms • Global frameworks **International Arena of Ideas** • Epistemic communities • Advocacy coalitions	**International Engagement** • State engagement in developing / accepting global norms on gender equality	**Exogenous Shocks** • Pandemics • Economic shocks • Natural Disasters • (Organized) Violence
State / National	**Formal Institutions (State)** • Regime Type • Economic System • State Capacity	**Political and Economic Determinants** • Governance / Leadership • Domestic economy (strength and inclusivity) • Laws and Regulations • Budget / Financing for gender equality	**Access to Healthcare, including Comprehensive Sexual and Reproductive Health Services** **Access to Education** **Access to Political Systems** • Participation in Politics • Responsiveness of Politics to gender equality **Access to Economic Systems** • Economic Opportunities and Participation • Access to Assets, Infrastructure, Technologies • Access to Social Infrastructure
Social / Community	**Informal Institutions / Systems of Social Relations** • Gender Systems	**Social Determinants** • Active Civil Society • Safe and Secure Environment	**Access to Social Systems** • Participation in Civil Society **Individual / Group Circumstance** • Economic Circumstances • Access to Education

Table 3: Drivers of variation in conflict and peace

	Contextual	Distal	Proximate
Global	**Geopolitics** **International Political Economy** **Environmental and Demographic Factors** **Multilateral Organisations** • Global norms • Global Treaties of Framework to Support Cooperation **The International Arena of Ideas** • Epistemic communities • Advocacy coalitions	**Geopolitical Contestation** **Institutional Involvement** • Engagement of State in International or Regional Cooperative Structures	**Exogenous Shocks** • Neighbourhood Conflict • Proxy Wars • Economic Shocks • Natural Disasters • Pandemics **International Mediation and Negotiation** • Credible Commitments to Facilitate Peace Agreements
State / Structural	**Formal Institutions (State)** • Regime Type • Economic System • State Capacity **Identity Cleavages** • Ethnicity, Race, Religion, Class	**Political and Economic Determinants** • Quality of Governance / Leadership including responsiveness • Social Contract • Domestic economy (strength and inclusivity) **Civil Society and Social Capital** • Bridging Social Capital • Linking Social Capital **Identity Grievances** • Identity shapes economic, political, and other forms of opportunity	**Populist / Grievance Narratives** **Availability of Weapons and Resources** **Mobilization for Organized Violence** **Mobilization for Peace** **Economic Opportunities and Participation**
Social / Community / Individual	**Informal Institutions / Systems of Social Relations** • Social norms surrounding use of violence / aggression	**Social Contract** **Trust in Formal Institutions**	**Nature of Leadership** • Psychological Risk Factors • Risk Perception **Individual Beliefs and Norms**

D.3 Interactions among Health In/Equity, Gender In/Equality, and Conflict/Peace

As we outline in Section 1, we were inspired by the Suri et al framework that established the existence of self-reinforcing feedbacks between human development and economic growth. To explore the feasibility of applying the concept of self-reinforcing feedbacks in the Commission's work, we undertook a review that found clear interactions amongst health in/equity, gender in/equality, and violence and peace.

D.3.1 The Impact of Conflict on Health Inequity

Violence has both immediate and long-term impacts on civilian health, showing a clear harmful self-reinforcing cycle between violence and health equity. Conflict often dramatically increases civilian mortality, through 'direct deaths' – mortality attributable to violence – and 'indirect deaths' – mortality due to the consequences of war. Civilians are often caught in violence, victims of aerial bombardments, suicide bombing, targeted killing in one-sided violence, ground warfare in urban areas, and the explosive remnants of war (landmines and unexploded ordinances). Warring parties also target health care services in violation of international humanitarian law, which also heightens direct and indirect mortality from conflict. In 2020, the Safeguarding Health in Conflict Coalition identified 806 incidents of violence or obstruction of healthcare in 43 countries and territories that killed 185 health workers.[108] In Afghanistan (see Appendix M), cases of violence against healthcare workers were often part of a planned effort to undermine trust in the government and drive out foreign influence. This impact is gendered as in many contexts women are the majority of the health workforce. As reported by Human Rights Watch, these attacks against health care were not only carried out by the Taliban, but also by Afghan Special Forces supported by the Afghan government.

The indirect consequences of war cause excess mortality that lasts into the post war period. During the period of heavy fighting in Kosovo (February 1998 to June 1999), the crude mortality rate was 2·3 times higher than the baseline.[114] Elevated mortality often continues post-conflict, as a result of the disruption to and destruction of critical infrastructure, inability to access essential services, economic insecurity, and limited supply of food.[53, 66, 61] As noted above, the impact of conflict on the supply of health services is a key driver of this excess mortality. Critical infrastructure is damaged, health workers are killed, detained, or seek refuge, while the availability of essential medicines and commodities is affected by the interruption of supply chains.[57, 22] Fragility and violence also impede and threaten vaccination campaigns and disease eradication efforts, as seen with the halting of the eradication campaign against polio[18, 70] and the great difficulty controlling the 2018-2019 Ebola outbreak in the North Kivu and Ituri provinces of the Democratic Republic of the Congo.

While diminishing the supply of health services, conflict also impedes access to health services. Patients are often unable to secure safe passage to health centres, lack the funds for transportation, health services, or medication, and the autonomy of some family members – particularly women – to access health care is reduced by contexts of fragility.[55, 98] Our Afghanistan case review shows how the conflict made travel to health facilities difficult due to ongoing violence as well as damage to road networks.[86] People became increasingly fearful of accessing healthcare in areas with

active fighting. Health facilities also lacked staff, equipment, and supplies, which made the delivery of services extremely challenging.

At the same time as it disrupts the supply of and impedes access to health services, violence increases the need for these services through its effects on the social determinants of health –disrupted water and sanitation infrastructure, the lack of adequate housing and shelter, lower economic well-being, and declining community security.[31] In Mali, these factors have combined to provide one of the world's highest under-five mortality rates (106/1000 live births in 2017) and maternal mortality ratios (567/100,000 live births in 2017).[8]

The toll of conflict on health is therefore significant and long term. Indirect mortality is concentrated among women and children and often substantially exceeds deaths directly caused by violence.[77, 101] Between 1995 to 2015, the deaths of about 6·7 - 7·5 million infants and 10·1 – 11·2 million children under five years old were attributable to the indirect impact of conflict.[14]

The burden of direct deaths from conflict often falls more heavily on men,[95] as they are injured or die from violence due to their membership or suspected membership in an armed group. High rates of male morbidity and mortality are an immediate consequence of violence.[77] As noted below, in certain conflicts, women are subjected to targeted killing because combatants believed their behaviour or activities violated gender norms dictated by their cultural context.

The impact of conflict on children and youth provides a clear illustration of the long-term effects of violence on individual potential as well as social and economic development.[17] An estimated 450 million children (one in six children worldwide) lived in conflict zones in 2020, and over a third of that number were found in high conflict intensity zones (more than 1,000 battle deaths per year).[68] Violent conflict heightens the vulnerability of children and youth through the death of parents, family members, or other caregivers; the disruption of social services; forcible recruitment into conflict as child soldiers or labourers; sexual and gender-based violence (SGBV); and unlawful detention because of suspected association with insurgents.[122] Physical and mental health consequences for children and youth include higher rates of injury, malnutrition, infectious diseases, post-traumatic stress disorder, depression, and anxiety.[47, 64]

D.3.2 The Impact of Conflict on Gender Inequality

Research shows a clear interaction between fragility and violence and gender inequality, caused by the direct effects of violence as well as the indirect impact of the security environment, the deterioration of social and economic conditions, and the disruptions to services and institutions. Important feedback loops exist. Norms that devalue and discriminate against women and girls exacerbate the gendered impacts of conflict and heighten many forms of gender inequality.[25] Violence also increases the salience of masculine norms that emphasise the importance – the honour – of male toughness, and their need to protect their family, community, and state.[35]

Evidence shows that a general deterioration of the security environment as well as the hardening of misogynistic gender norms within the family and community increases all forms of violence against women, including forms of SGBV.[59] While we focus on the impact of SGBV on gender inequality, we acknowledge that SGBV is also an important health issue. In Afghanistan (see Appendix M), such targeted attacks against women increased significantly in 2021, with 82 percent more attacks in

the first six months of 2021 compared to the same time frame in 2020.[124] While human rights organisations also documented abuse by Afghan forces and government officials, targeted killings were predominantly carried out by insurgents, with the Hazara Shia community disproportionately affected. The Taliban's targeting of women, ethnic minorities, and sexual and gender minorities escalated as it gained strength in 2020, and dramatically increased after the Taliban takeover in 2021.

Warring parties often use SGBV as a deliberate instrument of war.[130, 131] SGBV dehumanises and humiliates civilian populations, instils fear to trigger displacement, and undermines the social fabric of communities. Trials for the International Criminal Tribunal of the Former Yugoslavia (ICTY) provided stark evidence of the widespread and brutal nature of such crimes during the Bosnia and Herzegovina and Kosovo conflicts. Combatants specifically targeted women as part of their ethnic cleansing campaigns. ICTY also documented widespread sexual violence against men and boys.[123] Widespread sexual violence also characterized conflicts in the Democratic Republic of the Congo, Sierra Leone, and Timor Leste.[34] Recent evidence also documents the use of SGBV against men and boys in other conflicts, such as Syria.[33]

Intimate partner violence (IPV) appears to increase in conflict and fragile settings. In Afghanistan, the 2015 Demographic and Health Survey (DHS) showed that 53 percent of married women aged 15-49 reported experiencing IPV in their lifetime, and 46 percent reported experiencing IPV in the past year. Ninety four percent of women who had experienced physical violence from the age of 15 identified their current husband as the perpetrator, while between 5-10 percent also cited violence by a mother or stepmother, father or stepfather, or a mother- or father-in-law. The 2018 International Men and Gender Equality Survey found that half (49·6 percent) of married Afghan women experienced physical IPV in the past year in the 14 provinces surveyed. Perpetrators were mostly male, but 10·4 percent were female.

The deterioration in social and economic conditions also has gendered impacts. In Afghanistan, non-governmental organisations reported that families pressured women to drop out of community activities when insecurity increased. The departure of male household members due to insecurity, death, participation in war, or to seek employment opportunities increases the responsibilities of female heads of households, reduces the labour assets that they can draw upon, and heightens their vulnerability to economic exploitation and looting.[25, 24] Discriminatory laws and government policies also limit women's ability to engage in economic activity, disproportionately impacting women who are unmarried or widowed. This lack of economic opportunity often creates higher levels of poverty among women versus men during conflict.[25] Marginalised populations, such as indigenous communities, are often more severely affected by these economic and social effects.[119]

Conflict disrupts institutions and the provision of services like education, which sharply increases gender inequality. Educational infrastructure is often damaged, and families are often unwilling or unable to send their children to school. In 2022, the organization Education Cannot Wait estimated 78 million children were out of school because of emergencies and protracted crises, with girls twice as likely to be out of school than boys.[125] In our Afghanistan case review (see Appendix M), we found that insecurity and attacks on schools were often cited as the main reason for keeping children, particularly girls, out of school. Girls made up 60 percent of the 3·7 million children who were absent from school, and girls were more likely to be permanently kept out of school. One study in Uruzgan province found that while most families wanted to send both boys and girls to school, girls were less likely to travel alone to school due to insecurity.

Because of the combined social and economic consequences of war, adolescent girls are often forced into early marriage. Although the reasons for child marriage are complex and vary across conflict contexts,[72, 111] child marriage remains a form of gender-based violence that carries substantial long-term risks to health and wellbeing: early marriage heightens reproductive health risks and early pregnancy, increases exposure to sexually transmitted infections, results in the loss of educational opportunities,[129] and replaces education and recreation with household chores and other forms of reproductive labour. Girls are forcibly abducted by armed groups, subjected to sexual abuse and exploitation, with the UN reporting that this form of abduction increased by 40 percent in 2021.[113]

The plight of adolescent boys is not as well documented. Boys continue to be forcibly recruited into armed groups to fight in conflict.[113] To avoid this risk, boys are often forced to leave their homes. They also leave to 'scout' for safe locations and/or earn money to send back to their families. Unaccompanied boys face heightened risks of exploitation, abuse, and psychological distress.[84, 52]

D.3.3 The Impact of Conflict on Health Inequity and Gender Inequality

Our hypothesised harmful cycle is particularly clear when examining the impact of conflict on the convergence of health inequities and gender inequalities. Conflict-induced disruptions to the health system disproportionately affect women and girls due to their reproductive role as well as caregiving expectations related to infants, children, and older family members.[75, 102] While precise estimation is challenging,[90] research suggests that maternal mortality, including deaths from unsafe abortions, increases in contexts of fragility, with this increase continuing in the post-conflict period.[98, 82, 6] A recent analysis suggested that the risk of death among women of childbearing age went up by 21 percent in African countries with intense levels of conflict.[14]

Reduced access to and availability of reproductive and maternal services in conflict zones is also well documented. A study of provinces in Afghanistan showed that violence undermined reproductive, maternal, newborn, and child health services, with key indicators lower in moderate and severely conflict affected provinces.[86] In Mali, family planning services were halted due to fear of targeting by religiously based parties to the conflict.[8] In Colombia, the municipalities with the highest levels of conflict had increased maternal mortality, higher adolescent fertility rates, and reduced access to antenatal care and caesarean sections.[102] In South Sudan, lingering concerns about national sovereignty underpin men's deep aversion to use of modern family planning methods by their spouses. The use of tribal militia to control territory means that having women who can continue to bear children to replenish military ranks is key to the ability of armed groups to leverage political power.[88]

Adolescent health needs are not well researched in contexts of fragility.[4] There is a documented relationship between fragility and increased adolescent fertility rates. In post-war Iraq, adolescent fertility rose by 30 percent.[30] This heightened fertility is driven by girls' inability to attend school, gender norms that condone sexual violence against adolescent girls, including early marriage, and barriers for adolescent girls to access and receive comprehensive reproductive health services at health care facilities. In the conflict-affected province of Cabo Delgado, fragility significantly increased rates of early marriage. For example, Save the Children reported increases in early marriage in districts affected by conflict: between January and March 2022, the agency recorded 108

cases of child marriage in the Pemba, Metuge, Chiure, and Montepuez districts of Cabo Delgado, compared to 65 cases between October and December 2021.[109] The health needs of adolescent boys are insufficiently researched, but research suggests that these include the health risks associated with malnutrition and economic insecurity, interpersonal violence, sexual exploitation and violence, and substance abuse.[23, 2]

D.3.4 The Impact of Gender Equality on Peace

Empirical evidence shows that greater physical security of women, as measured through low rates of sexual and gender-based violence and other forms of violence against women, is strongly correlated with more peaceful states.[63] States with higher levels of gender equality are less likely to initiate the use of force in interstate disputes.[27] Gender equality also seems to limit the escalation of violence and decrease the severity of that violence.[28] Countries with higher levels of gender equality, as measured by fertility rates and female labour force participation, are more likely to be internally peaceful with less risk of civil war.[26]

One study simulated an international crisis to examine differential responses between male and female leaders. While male participants acted aggressively with military force to escalate disputes, women relied less on weapons and "were much more conciliatory in the tone of their messages and showed remarkably consistent attempts to resolve the conflict through negotiation."[81, p. 368] The risks of conflict relapse after a negotiated settlement also appear to decrease with higher levels of female representatives in national legislatures in post-conflict contexts.[110] Higher numbers of female legislators may influence peace because they prioritise social welfare over military spending and positively influence perceptions of governance quality and state credibility.[110, p. 996]

Some explanations for the inter-relationship between gender equality and peace adopt an essentialist view, suggesting that women have evolved over time to become more peaceful. According to this logic, social, political, and economic processes favoured the creation of patriarchal systems, socialised men to be aggressive, and promoted strength and toughness as desirable male characteristics.[19] The same processes created incentives for women to be more conciliatory,[63] while the reproductive roles of women produced a natural aversion to violence.[83] As the research agenda progressed, both quantitative and qualitative studies showed limited evidence for the 'women are essentially more peaceful' hypothesis. For example, a survey to ascertain gender differences in political approaches in Israel found no differences between men and women in their support for direct political aggression (using force and other direct methods of intimidation against political rivals). On the contrary, women showed greater support for indirect political aggression, including policies that promoted exclusion and social distancing.[13]

Empirical evidence associates gender equality in political representation with reduced conflictual behaviour by governments and states. A clear sex difference exists in support for war, with women less supportive of war.[35] Suggested pathways include the link between female political participation and reduced military spending[73] as well as between increased egalitarian attitudes and declining support for the use of force to resolve disputes.[132] Female political participation at the national level is not always associated with increases in societal-wide female empowerment and gender equality.[38] As our case review of Mozambique reveals, in countries with high levels of female political representation, gender inequalities stubbornly persist (see Appendix N).

Researchers hypothesise that meaningful change results from a 'critical mass of women' within the political elite[83] as well as bottom-up participation of women in civil society. Institutions reflect and reinforce gender norms in the broader society, and select and socialise their leaders to reflect and reinforce these norms.[38] Social expectations for leaders reinforce norms associated with masculinity, including self-discipline, perseverance, and toughness, taking risks, enduring hardship, and demonstrating competence and rationality under pressure.[10] Female leaders in positions of power are not immune from the seductions of political aggression as they are also shaped by these social expectations of toughness. However, when the power of women within the electorate grows, their influence can impact on the policy preferences of all political leaders.[35]

A beneficial cycle between gender equality and peace therefore requires something deeper than merely having large numbers of women in political roles: it requires the establishment of a 'gender equal culture.'[19] Such a culture promotes gender equality in economic and social roles as well as politics. In line with this expectation, a statistical analysis found that conflict risk is almost five times lower in societies where women are empowered, enjoy civil liberties, and fully engage in civil society. A powerful predictor of a peaceful society is women's broad participation in social, economic, and political life, particularly civil society, the law, and the media.[38]

D.3.5 The Impact of Health Equity on Peace

Peace is a precondition for good health. But could the inverse also be true – could good health be a precondition for peace? Peace advocates argue that health interventions could act as a form of functional peacebuilding, such as bringing conflict actors together around a common project, breaking down patterns of mistrust and fear, and emphasising the humanity of civilians as well as combatants.[7, 107] There have been few systematic cross-national studies that explore this potential across contexts, or in-depth comparative studies within specific conflict zones. Yet studies in several contexts suggest health interventions reduced the likelihood and severity of violence and accelerated peace-building efforts in specific post-conflict settings.[7, 40, 112, 32, 89] The "health as a bridge to peace" approach (Appendix C.1) is often used at the community level and relies on the unique role of health care providers, the universal value of health services, and their potential to build unity within divided communities.

Research illustrates the power of health engagement to transform conflict dynamics in families and communities.[40, 112] Moreover, healthy individuals are also more likely to participate in civic and political life, leading to a more inclusive and peaceful society. Yet, as we noted earlier, studies also document the structural limits to these approaches in low-resource and politically charged settings. More research is needed to identify the conditions that facilitate health interventions leading to peace, namely the type of conflict, the type of health interventions,[97] and the links to the community.[100] For example, analysis of health services in conflict affected regions in Colombia found that when health workers (and government officials) came from the community, they were able to continue to deliver health services across conflict lines and were able to sustain service delivery during periods of escalating violence.[102]

D.3.6 The Impact of Gender Equality and Health Equity with Peace

While existing evidence hints at a beneficial cycle among our three variables of gender equality, health equity, and peace, we found no research that explicitly examines this three-way relationship. This knowledge gap persists due to disciplinary divides among three broad fields of scholarship and policy: health services, gender equality, and conflict and peacebuilding. The Women, Peace, and Security research and policy agenda connects the disciplines of conflict analysis and gender. Gender researchers provide evidence that gender norms influence health services and policy, although as outlined in Section 3, policy processes have not fully integrated these findings into practice. Yet researchers and policy makers have largely failed to interrogate how the relationships between gender equality and health equity impact on the dynamics of peace and conflict.

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E Self-Reinforcing Cycles of Gender In/Equality, Health In/Equity, and Violence/Peace

Many researchers and policy makers have argued that gender equality and health equity are not important contributing factors to peace or violence for several reasons.

First, they maintain these factors largely operate as distal factors in complex causal processes that influence the dynamics of conflict and peace. The Commission counters that causally distal factors can remain powerful drivers of peace and violence.[1] Changes in distal factors like health equity and gender equality may be unlikely to generate large shifts in conflict dynamics over short periods of time yet are significant – potentially pivotal – in the long term, creating societies that are ultimately more resilient to instability.

Second, sceptics also suggest that health equity and gender equality are confounding factors; social, economic, and political forces drive improvements in health equity and gender equality, as well as improvements in peace. We agree that health equity and gender equality are 'endogenous' and embedded within social, political, and economic processes. Yet as we outline in Section 3, the Commission argues that improvements to health equity and gender equality – the principles and mechanisms - can influence the social, political, and economic processes that shape more peaceful societies.

Third, critics argue that the drivers of health inequity and gender inequality and violence are rooted in the dynamics of geopolitics, the international political economy, as well as informal systems of power, patriarchy, and other forms of social inequity. Until these broader conditions are altered, any improvements to gender equality and health equity will be eclipsed by pernicious outcomes of these broader processes.

We counter this argument with two points. First, one of the Commission's objectives is to propose a future oriented research and policy agenda that provides practical and actionable guidance and recommendations to communities, civil society groups, states, and international institutions. Tearing down the patriarchy may be a laudable goal – yet unrealistic in the absence of changes to the various structures which uphold informal systems. Second, we suggest improvements in health equity and gender equality can help generate important shifts in complex social systems. Complex systems are characterized by tipping points: "A system can flip from one equilibrium to another (a critical transition or tipping event) when feedbacks in key processes that sustain system equilibrium shift from negative to positive."[2, p. 4]

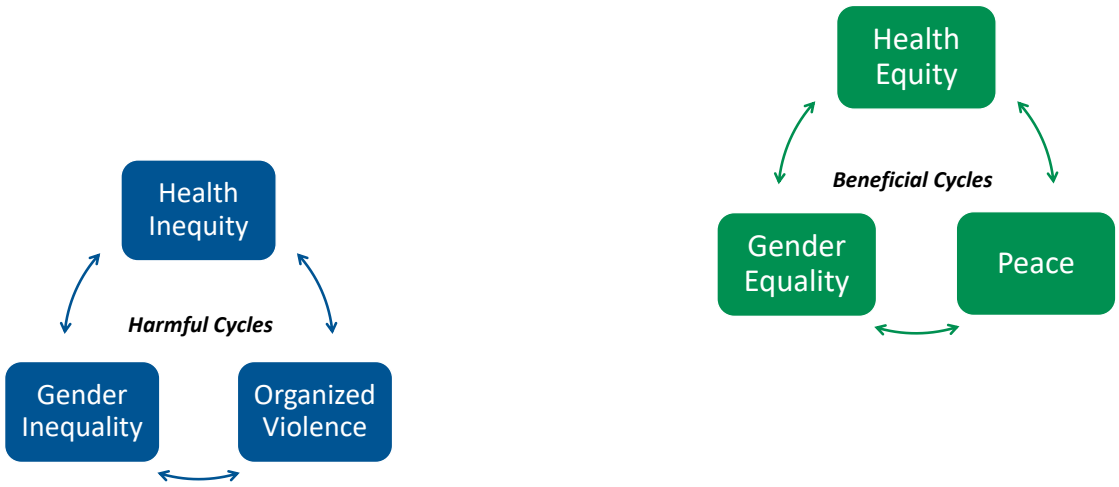
Further detail on the concepts of self-reinforcing cycles can illustrate how those shifts can happen.

E.1 The Concept of Self-Reinforcing Cycles

Self-reinforcing feedback cycles occur when one variable (x), interacts with another variable (y) to increase its value (2y), with cycles of interactions leading to subsequent increases in the value of x (2x), which leads to further increases in the value of y (3y). We describe these cycles based on our normative assessment of the outcomes generated by these interactions. As we outline in Section 1 and illustrate in Figure 2, the Commission uses the term harmful cycles to describe the interactions

amongst health inequity, gender inequality, and violence; and the term beneficial cycles to describe the interactions amongst health equity, gender equality, and peace.

Figure 2: Self-reinforcing cycles: harmful and beneficial



The Commission has established three hypotheses to investigate. The first hypothesis is that health inequity, gender inequality, and violence interact in self-reinforcing cycles with harmful effects. The second is that health equity, gender equality, and peace interact in self-reinforcing cycles with beneficial effects.

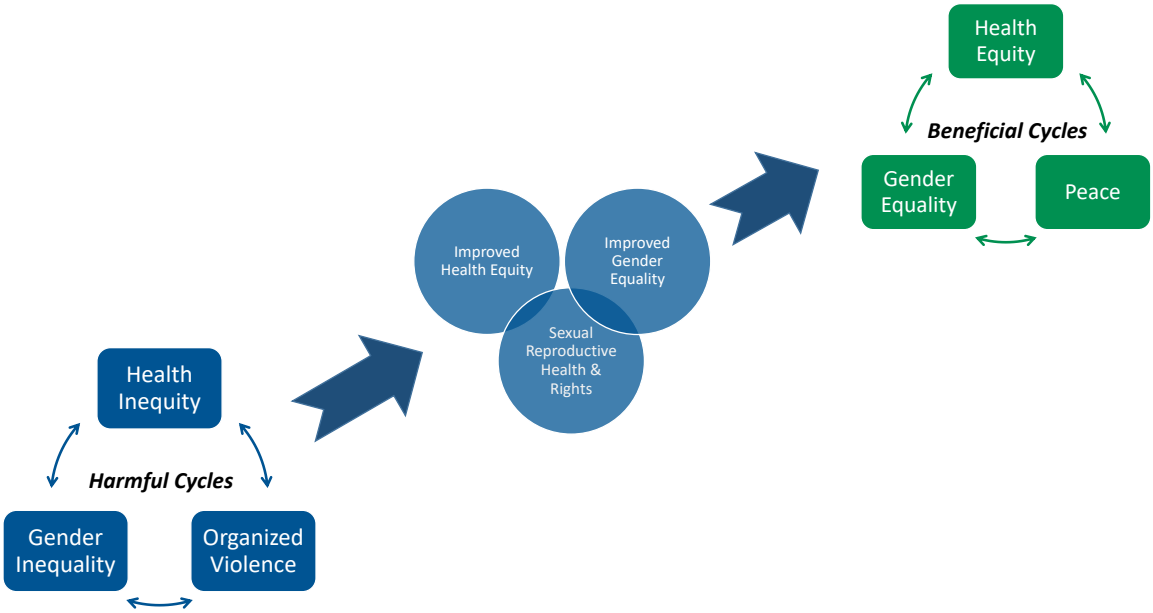
And the third hypothesis is that under the right conditions, improvements in health equity and gender equality can nudge communities into beneficial cycles by setting in motion unique social, economic, and political processes that contribute to more peaceful societies. This third hypothesis represents our theory of change, illustrated in Figure 3. We want to identify if and how health equity and gender equality improvements can exercise an **independent** role in the dynamics of peace and violence.

E.2 The Dynamics of Self-Reinforcing Cycles

To identify if gender equality and health equity improvements play this independent role, we need to examine the factors that determine the levels or values of health equity, gender equality and violence or peace within these cycles. These outcomes are shaped by three factors.

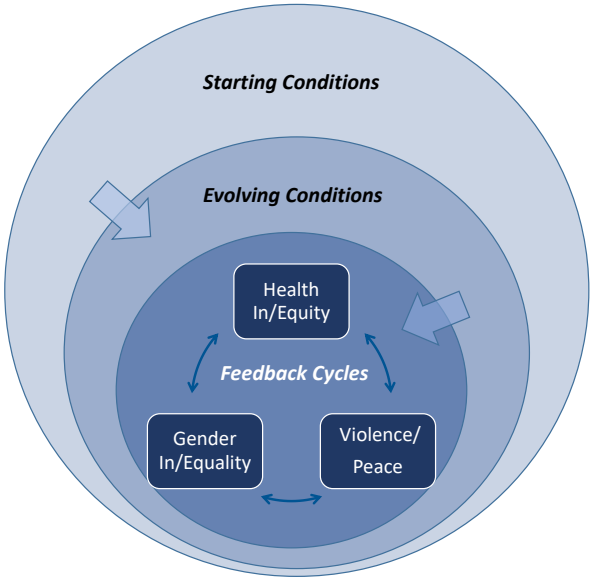
- ***Starting Conditions***: The self-reinforcing cycles we describe do not originate in a vacuum. The 'starting conditions' of the cycles, i.e., the initial values of health equity, gender equality and peace/violence, are shaped by the contextual, distal, and proximate drivers we outline in Appendix D.
- ***Evolving Conditions***: The values of gender equality, health equity, and peace and violence in these self-reinforcing cycles are also shaped by changes in these contextual, distal, and proximate factors, what we call the evolving conditions.
- ***Feedback Cycles***: The values of these three variables also are determined through feedback cycles: levels of gender equality (x), interact with levels of health equity (y) to increase the

Figure 3: Theory of change



value of health equity (2y), with cycles of interactions leading to subsequent increases in the value of gender equality (2x), which leads to further increases in the value of health equity (3y).

Figure 4: The three factors influencing outcomes of self-reinforcing cycles



The concept of self-reinforcing cycles enables us to illustrate the importance of the factors that influence health equity, gender equality, and peace, but also show how improvements in health equity and gender equality could potentially produce a 'tipping point'.

- These cycles show that health equity and gender equality, as outlined in Appendix D and

illustrated in Figure 5 are influenced by 'starting conditions,' including historical path dependencies, informal institutions such as patriarchy, the broader social and political determinants of health, and the international political economy.

- These cycles accept and illustrate those levels of health equity, gender equality and conflict/peace are shaped by the same economic, social, and political factors that influence the dynamics of peace and conflict, outlined in Appendix D and Figure 5.
- We suggest that improvements to health equity and gender equality can alter or interrupt the self-reinforcing dynamics of the harmful cycle. By doing so, improvements in health equity and gender equality enable these cycles to shift from self-reinforcing harmful cycles to self-reinforcing beneficial ones (hypothesis 3) and alter the outcome of violence or peace.
- Our analyses of the drivers of health inequity and gender inequality suggests that short term change may be facilitated by proximate factors. These proximate factors may support change in distal factors. Further research is needed by experts in complex systems to fully explore these dynamics.

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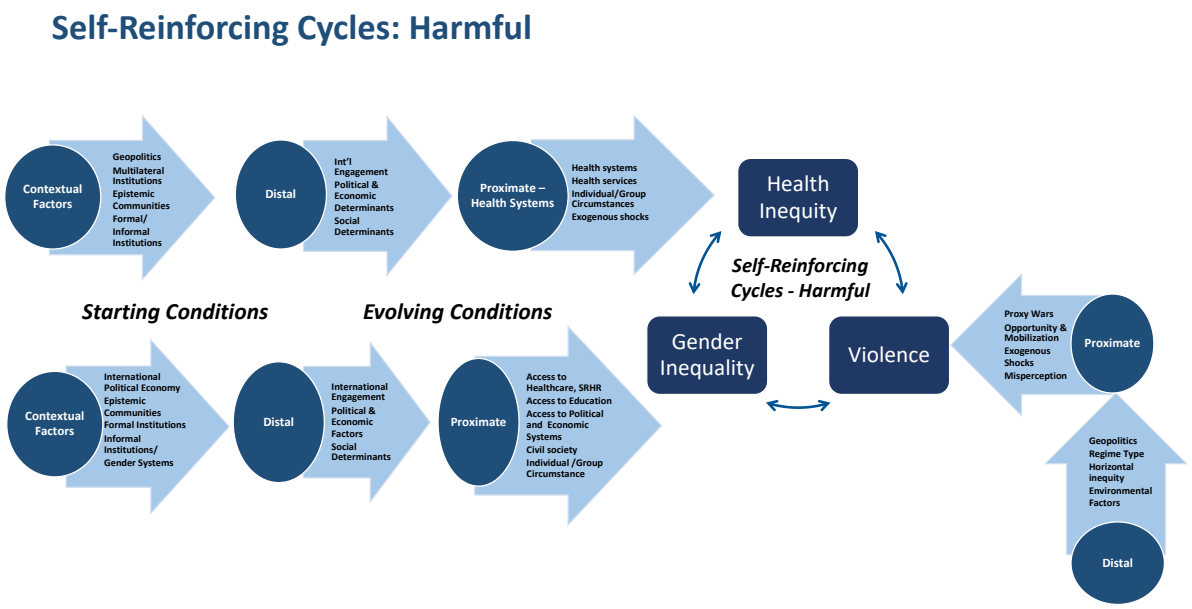
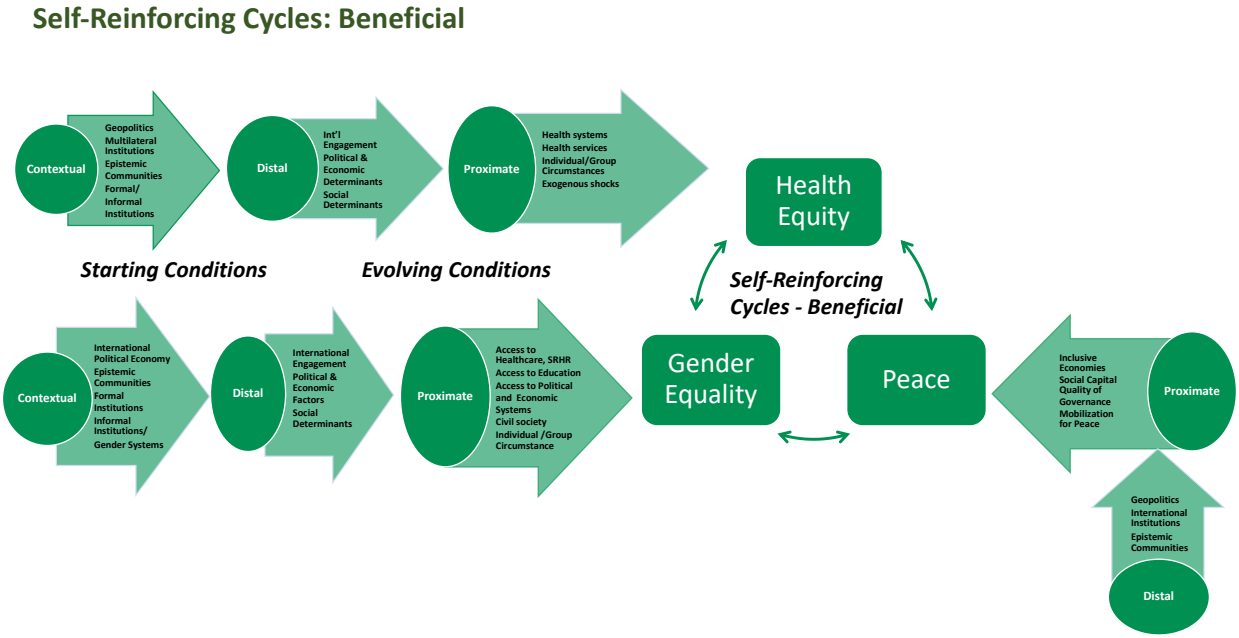
Figure 5: The drivers of outcomes of self-reinforcing cycles

(a) Harmful



(b) Beneficial



F The Commission's Interrogation of Data

Author: Samuel MacIsaac

The *Lancet* Commission selected data sources for health, gender, and conflict estimates with careful attention to how this data is generated. Below is an overview of different types of estimates and their common weaknesses or limitations. **Central Registration and Vital Statistics (CRVS)**: A CRVS system registers all births, deaths (including cause of death), and other relevant vital statistics such as marriages and divorces. CRVS systems are critical for the calculation of health indicators and broader demographic trends. CRVS is a form of administrative data,[4] as it is routinely gathered and covers the entire population. Yet low and lower-middle income countries often lack the financial, human, and technical resources to administer CRVS systems, nor are they prioritised in budget allocation decisions.

Health Information Systems collect health data related to infectious diseases, non-communicable diseases and injury. They also provide information on the performance of health services (e.g., numbers of visits, human resources). Health information systems are often insufficiently prioritised and funded, and not fully functional in low-resource settings.

Surveys provide information about a given population in a given geographic area. With appropriate sampling, design, rigorous data collection, and weighting, the sample estimates yielded by surveys are generalizable to the studied population. Furthermore, if a survey is repeated over time, and the variables are largely consistent across periods, the resulting series of cross-sectional data can be studied to examine change over time. A more powerful, yet administratively difficult, approach is to interview the same respondents over time, creating panel data.

The advantages of surveys stem from the fact they can be tailored to answer specific as well as broader questions, their results can be representative of the wider population, and they are a relatively inexpensive method of acquiring larger-scale data. Disadvantages include potentially high costs, particularly in conflict-affected and unstable areas, lack of information needed to construct proper sampling frames and designs, errors in data collection which inadvertently introduce bias, improper understanding of questions or erroneous responses from those surveyed, and (often depending on the survey content or context) high non-response rates within the sample or sub-populations of interest, which can lead to biased estimates.

Modelled data, estimated data, and latent variables: Whether modelled, forecasted, or backcasted, estimated data are especially useful in cases where a variable cannot be estimated directly (a latent or inferred variable) or in the absence of available data. Often calculated using machine learning, regressions, or various types of models, these are yet another tool for researchers to obtain data. Advantages include the ability to derive data that is not otherwise available, fill data gaps in existing data series, and increase consistency across categories such as geographies (since, for example, countries may otherwise use different data collection methods). Drawbacks frequently include opacity in methods, difficulty in replicability, and a heavy reliance on assumptions due to missing information. The nature of these assumptions are often not transparently reported.

Indices: To capture broader ranging phenomena that cannot be captured by a single value (e.g., gender equality, human development), indices enable researchers to quantify wider trends and

behaviours on an array of topics. For instance, the Human Development Index is able to partially capture broad trends in social development while indices of political stability and of quality of institutions are able to measure more normative elements quantitatively. Indices expand the analytical toolkit of social scientists, but they rely on the importance of weights and proper representation of underlying data. From this angle, indices are subject to strong assumptions and therefore can easily reflect the developer's own biases in what to include and how it is weighted.

Quantitative content analysis and web scraping: In the digital age, web scraping and mining can generate an enormous wealth of information. Whether it be scrapping news media for keywords or mass scale analysis of documents such as speeches or Wikileaks, this type of quantitative data has significant analytical potential with the caveat that the lack of controls as well as the reliability is often questioned.

Digital trace data is information about individual activity generated through the broad use of technologies such as mobile phones and the internet. It has been used by models to predict socioeconomic status. When combined with geolocation data, such as the coordinates of cellular towers, digital trace data has been shown to produce reliable localized estimates of socioeconomic status as validated against survey data.[2] It can also be used by models in combination with survey data to produce more accurate estimates than those relying on a single data source.[1]

Metadata is data that describes and provides information about data. The structure and content of metadata is highly variable: it may describe who produced a dataset, how a dataset was collected, structured, or generated, who is permitted to access or use it, and a range of other attributes. In context of administrative statistics and modeled (or estimated) data, metadata can provide crucial information to researchers regarding methodological factors underpinning reported statistics, including aspects of data generation (e.g., sampling design in surveys) which can provide vital information regarding potential sources, directions, and magnitudes of bias when the data are applied to specific research questions.

The Commission's research on indicators (see Panel 4) found, in many cases, that metadata documentation described datasets with modeled or imputed health, gender, and violence data, yet offered limited information on the accuracy of employed methods and its effects on the uncertainty of produced estimates. This suggests a need for further transparency and stronger and more comprehensive standards to ensure that analysts understand potential sources of bias.

Big data is the generation of information through a process characterized by three "Vs": the analysis of a significant *volume* of data from a wide *variety* of sources in a timely manner, or with *velocity*. The effectiveness of big data often relies on the availability and accuracy of routine administrative data.[3]

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G Data for cross-national analyses

Author: Oskar Timo Thoms

G.1 Objectives and questions

The Lancet Commission Metrics Working Group conducted statistical analyses with the objective to examine if and how gender equality and health equity can contribute to more peaceful societies. The central research question is: how does variation in gender equality and health equity – improvements or declines – influence variation in violence and conflict?

The Working Group explored this question through quantitative analyses of large-N cross-national data, as well as studies based on systematic reviews of the existing literature and the use of descriptive data. To understand the quality of the data for both the large-N and the case studies, the Working Group first undertook a rigorous analysis of indicators used in such research. Then, through the analysis of a large number of observations, the large-N analyses examined associations to determine if and how variables relate to each other and if these relationships have statistical significance, i.e. whether findings of associations are likely not due to chance alone. Careful statistical analysis can partly account for endogeneity and lessen the chances that correlations are due to spurious associations. Without such large-N analyses, we risk making false claims about the generalizability of relationships between gender equality, health equity and peace. In short, large-N analyses can provide greater confidence in the external validity of the Commission's broader analyses.

Inspired by the work of Suri et al. [9], who argue that human development and economic growth operate in harmful and beneficial cycles, the Working Group tested this concept with three sets of variables on health, gender and violence/conflict. Specifically, the aim was to explore: if and how gender inequalities and health inequities and violence reinforce each other in harmful cycles; if and how gender equality, health equity, and peace reinforce each other in beneficial cycles; and if and how efforts to support gender equality and health equity, under the right conditions, have the ability to nudge communities and societies from harmful to beneficial cycles.

The large-N analyses do not examine the impacts of specific health and gender interventions, but rather begin to build an evidence base for broad statistical relationships between gender, health, and violence outcomes. While the Lancet Commission is primarily interested in the direction of effects from gender and health to violence, the proposed beneficial and harmful cycles imply feedback loops, in which health, gender, and violence variables interact with each other to produce mutually reinforcing patterns which can have harmful or beneficial outcomes. The analyses are guided by the following questions: First, while accounting for the overall improvements that almost all countries have experienced in health and gender outcomes in recent decades, do those countries that score low in earlier periods improve less than the global average and/or high performers, or do they perhaps even decline? Second, while accounting for possible ceiling effects, do those countries that score high in earlier periods a) maintain stable and high levels and b) avoid violence? Third, do countries that experience higher levels of violence a) improve less on gender equality and health outcomes than those with less violence, or b) do their gender and health outcomes perhaps even deteriorate? Fourth, are countries that score low on health and gender outcomes more prone to violence than those that score higher? These questions imply considerable complexity, as they examine statistical

effects between gender and health outcomes; from gender and health outcomes to violence; and from violence to gender and health outcomes.

Our bivariate descriptive and multivariable analyses examine these questions in probabilistic terms, not in deterministic fashion. While there are many other important factors influencing health, gender and violence outcomes, we do not develop detailed causal models of each outcome, but examine whether statistical associations between these outcomes are consistent with harmful and beneficial cycles. We see this exploratory research as a first useful step in a larger research agenda exploring relationships between health, gender, and peaceful societies. We steer clear of causal language to describe the results because no strong causal claims can be made on the basis of these analyses, but we find many associations that are consistent with the proposed hypotheses and that warrant deeper investigation. We consider this work to be useful ground-clearing for establishing a new research agenda on the inter-relationships between health, gender and violence.

We examined multivariable models of cross-sectional and panel data. These two different approaches to modeling cross-national data have complementary advantages and disadvantages. The cross-sectional models allow us to examine long-term changes in the outcome variables, over a twentyfive-year period, while the panel models examine short-term variation, from one five-year period to the next but over a longer time-frame than the cross-sectional analyses. The two approaches have different methodological trade-offs. While the cross-sectional models make it somewhat easier to address problems of endogeneity and heteroscedasticity, they also have fewer degrees of freedom due to their small sample sizes, i.e. the number of countries included. Panel models are subject to more concerns about endogeneity, heteroscedasticity and serial correlation due to the structure of the data used, i.e. several observations of countries over time, but they also have much larger sample sizes allowing for more precision in statistical estimates. We believe that both approaches are valuable in examining the research questions.

The remainder of this appendix section discusses the data used throughout all large-N analyses. Appendix H, presents the cross-sectional analyses, followed by the panel analyses in Appendix I. As discussed in Appendix H.1, these chapters follow a social science (i.e. non-clinical) approach to reporting regression results. Finally, Appendix J presents descriptive analyses of sequences of health and gender change over several decades to examine which pathways of change are more common than others and which ones are more likely to lead to long-term improvements.

G.2 Measures used in the analyses

Guided by the indicator mapping carried out by the Working Group, we identified a wide range of health, gender and violence measures as candidates for analyses, and assembled a comprehensive cross-national time-series dataset with the best available data on relevant indicators and key covariates. Many health and gender measures in particular are subject to many missing data points across countries and over time, and this missingness is unlikely to be random and thus presents a potential threat to inferences. Therefore, based on our evaluation of the quality and coverage of these data, and based on within-category correlations, for the main analyses we chose two representative and commonly accepted variables each for the health (life expectancy and infant mortality rate, IMR) and gender (mean years of schooling ratio of females to males and the age-specific fertility rate for adolescents, AFR) dimensions. To measure violence, we chose several indicators to capture different

types, including state-based internal conflict, state repression of physical integrity, and the total and civilian battle-related death rates per population resulting from varying types of conflict. We also considered, and used in earlier exploratory analyses, other measures of health (under-five mortality rate, UFMR, and disability-adjusted life years, DALYs), gender (labour participation ratio of females to males and Gender Inequality Index, GII), and violence (non-state conflict and homicide rates). These variables are listed in Table 4.

Table 4: Measures used in large-N analyses

Category	Variable	available from	Source
health	life expectancy	1950	[10]
	infant mortality rate (IMR)	1950	[10]
	under-five mortality rate (UFMR)	1950	[10]
	disability-adjusted life years (DALYs)	1990	[5]
gender	mean years of schooling (MYS) ratio	1970	[4]
	adolescent fertility rate (AFR)	1950	[10]
	labour participation ratio	1990	[6]
	Gender Inequality Index (GII)	1995	[11]
state-based conflict	internal (incl. internationalized) conflict incidence	1946	[7]
	internal (incl. internationalized) war incidence	1946	[7]
	internal conflict deaths (rate per pop.)	1989	[7]
	internal conflict civilian deaths (rate per pop.)	1989	[7]
state repression	one-sided violence (OSV) incidence	1989	[7]
	one-sided violence (OSV) deaths (rate per pop.)	1989	[7]
	latent physical integrity measure	1946	[2]
	state torture	1789	[1]
	extra-judicial killings	1789	[1]
societal violence	non-state conflict (NSC) incidence	1989	[7]
	non-state conflict (NSC) deaths (rate per pop.)	1989	[7]
	non-state conflict (NSC) civilian deaths (rate per pop.)	1989	[7]
	homicides (rate per pop.)	1990	[12] & [13]
control variables	population size or density (logged)	1950	[10]
	real GDP per capita (logged) or growth therein	1950	[3]
	electoral democracy component index	1789	[1]
	participatory democracy component index	1789	[1]
	liberal democracy component index	1789	[1]
	polity 2 index	1800	[8]

Note: Variables in ***bold italics*** are inverted for easier comparison across key variables.

Some of the data are available for earlier years, but as the IHME educational data is available from 1970 onward, this is the starting point for our initial dataset. Moreover, the OSV and NSC indicators and all the death rates derived from the Uppsala Conflict Data Programme (UCDP) are available from 1989. Finally, the DALYs, labour participation ratios, and GII data are only available from 1990, 1990, and 1995, respectively. Thus, the samples in analyses using these latter variables would be much more limited. All variables are aggregated to five-year averages (covering 1971-75, 1976-1980, etc.) because three of the key health and gender variables are provided as

such averages by the World Populations Prospects (WPP) database. As data availability and quality generally improves after 1989 and more violence variables exist for this period, the period of the cross-sectional analyses is 1991-2015. The panel analyses, which focus on a subset of the violence measures, cover the period 1971-2015.

It is important to note that, for easier comparisons of results across variables within the health, gender and violence dimensions, we have inverted some variables in the statistical analyses such that higher values of all health and gender variables always indicate "better" outcomes, while higher values of the violence variables always mean higher levels of violence; the affected variables are indicated by ***bold italics*** in Table 4. Readers familiar with these measures should keep in mind that this alters how one would usually interpret the results.

Our initial panel analyses focused on the individual health and gender measures, leading to a large number of models that are difficult to summarise (see Appendix I.1). To decrease the number of combinations of variables in examining patterns of harmful and beneficial cycles, and thereby simplify the panel analyses, we created combined health and gender indices. We standardised each of the four main health and gender measures such that they have zero means and standard deviations of one. We then took the averages of the two health measures and of the two gender measures to create two standardised indices, one for health and one for gender. These combined measures are also used in the sequencing analysis.

For control variables, we use per capita income to represent the level of a country's economic development, population density, and measures of political structure representing the presence or absence of facets of democracy. While not exhaustive, these variables exhibit useful features in terms of country and year coverage, collection and reporting reliability, and theoretical plausibility.

G.3 Classifications to operationalise harmful and beneficial cycles

Harmful and beneficial cycles can be conceptualised and operationalised in different ways. The simplest tests are whether the individual gender and health variables are positively correlated with each other or with violence variables, controlling for other factors. While we include such models in the analyses, this approach comes with two distinct drawbacks. First, these correlations between two variables imply that harmful and beneficial cycles are simply two sides of the same coin – one implies the other. This approach cannot distinguish between harmful and beneficial cycles, and allow for the possibility that one could occur without the other or that they operate on different timelines. Second, in this approach, it is not possible to determine whether the gender, health and violence variables actually mutually reinforce each other, i.e. whether their combinations have statistical effects beyond their individual effects. Such effects can be investigated with two-way or even three-way interaction terms between the health, gender and violence variables in the statistical models, but this approach quickly becomes very complicated to implement and interpret. To make the analyses more tractable, we opt for an approach using joint classifications, which is akin to including interaction terms, and two-way interactions.

We developed a classification of countries based on the four main health and gender outcomes, in order to create groups of countries for comparisons. We again scale the four individual health and gender measures to have zero means and standard deviations of one and combine them as above, but with one important difference: we standardise them separately for each period, thus making

Table 5: Country classifications in 1991-1995 (180 countries; those marked † are not included in panel analyses)

Health	**Gender** Q1	Q2	Q3	Q4	Q5
Q1	†Afghanistan; Angola; Benin; Burkina Faso; Cameroon; Central African Republic; Chad; Congo, DRC; Cote d'Ivoire; Equatorial Guinea; †Eritrea; Ethiopia; Guinea; Guinea-Bissau; Liberia; Malawi; Mali; Mozambique; Niger; Nigeria; Sierra Leone; †Somalia; Tanzania; Uganda; Zambia	Burundi; Cambodia; Haiti; Laos; Madagascar; Rwanda			
Q2	Bangladesh; Bhutan; Comoros; Congo; Gambia; Nepal; Pakistan; Sao Tome & Principe; Senegal; Sudan; Togo; Yemen	Bolivia; Djibouti; Egypt; Eswatini; Gabon; Ghana; Guatemala; India; Kenya; Maldives; Mauritania; †Papua New Guinea; Zimbabwe	Botswana; Indonesia; †Kiribati; Myanmar; Namibia; Tajikistan	Azerbaijan; Mongolia; Turkmenistan	Lesotho
Q3		†Belize; Cape Verde; Honduras; Iran; Iraq; Morocco; Nicaragua; Oman; †Palestinian Territory; Saudi Arabia; †Solomon Islands; Turkey	Algeria; Armenia; Brazil; China; Dominican Republic; Ecuador; El Salvador; Fiji; Guyana; Jordan; Kyrgyzstan; †Libya; †Micronesia; Paraguay; Peru; South Africa; Suriname; Tunisia; Uzbekistan; †Vanuatu; Viet Nam	Georgia; Kazakhstan; Moldova; Philippines; Russian Federation; Trinidad & Tobago	Latvia; †Samoa
Q4		Syria	Colombia; †Grenada; Jamaica; Macedonia; Mauritius; Mexico; Panama; †Saint Lucia; †Saint Vincent & the Grenadines; Thailand; United Arab Emirates; Venezuela	Albania; †Antigua & Barbuda; Argentina; †Bahamas; Bahrain; Bosnia & Herzegovina; †Brunei; Bulgaria; Chile; Croatia; Czech Republic; Kuwait; Lebanon; Lithuania; Malaysia; Romania; Seychelles; Slovakia; South Korea; Sri Lanka; Ukraine; Uruguay	Belarus; Estonia; Hungary; Poland; †Tonga
Q5			Costa Rica; †Cuba	Barbados; Cyprus; Qatar; Singapore; Taiwan; United States of America	Australia; Austria; Belgium; Canada; Denmark; Finland; France; Germany; Greece; Iceland; Ireland; Israel; Italy; Japan; Luxembourg; Malta; Netherlands; New Zealand; Norway; Portugal; Slovenia; Spain; Sweden; Switzerland; United Kingdom

Table 6: Frequency of classifications in 1991-1995 (180 countries)

	Gender				
Health	1st quintile	2nd quintile	3rd quintile	4th quintile	5th quintile
1st quintile	25	6	0	0	0
2nd quintile	12	13	6	3	1
3rd quintile	0	12	21	6	2
4th quintile	0	1	12	22	5
5th quintile	0	0	2	6	25

Table 7: Classification categories used in the analyses

	Gender				
Health	1st quintile	2nd quintile	3rd quintile	4th quintile	5th quintile
1st quintile	low	low	G>H	G>H	G>H
2nd quintile	low	low	G>H	G>H	G>H
3rd quintile	H>G	H>G	mid	G>H	G>H
4th quintile	H>G	H>G	H>G	high	high
5th quintile	H>G	H>G	H>G	high	high

comparisons within, but not across, periods. We then divide the resulting combined health and gender indices into quintiles to produce a 5x5 matrix for each five-year period. For instance, for the period ending in 1995, this leads to the country classifications in Table 5 and the cell frequencies in Table 6. (Table 5 also indicates the countries included in the datasets for all large-N analyses.) These tables suggest a strong correlation between the standardised health and gender outcomes, as most countries are classified on the diagonal. Off-diagonal classifications are much less common. To make these classifications amenable to statistical analyses, we further aggregate them into five groups for inclusion in some of our statistical models, as indicated in Table 7: the lower, middle, and high diagonal classification groups, where countries have similar relative health and gender outcomes, and those that score comparatively higher on health than on gender (H>G), and those that score comparatively higher on gender than on health (G>H).

Plotting the averages of the four main health and gender measures at the global level (the gray lines) and within the classification groups in Figure 6 shows clear trends over time. These figures show the original measures as five-year averages, not the inverted versions used in the statistical analyses. They indicate two important points. First, there is considerable global improvement in the health and gender measures, regardless of how countries are classified. Second, overall improvements are greatest in the low classifications, with two partial exceptions. Most improvement in the IMR occurs in the G>H classification, and most improvement in the AFR occurs in the H>G classification, followed by the low classification. Improvements tend to be much less pronounced in the upper classification. These trends suggest ceiling effects for better performers; those that start out at relatively low levels of health and gender outcomes have much more room to improve.

The classification groups are used in the analyses below to examine the possibility of harmful and

beneficial cycles in two different ways. First, to examine whether particular configurations of health and gender outcomes (i.e. the classification groups) are associated with improvement or worsening in gender, health and violence variables, we include models with binary ("dummy") variables indicating the groups in Table 7. This can be interpreted as the effect of past health and gender configurations on current health and gender outcomes or on violence outcomes, relative to one excluded or "reference" category. Associations of lower classifications with worse outcomes and of higher classifications with better outcomes provides evidence that is consistent with "two-way" harmful or beneficial cycles, respectively.

Second, modelling interactions of these binary classification indicators with violence variables lets us calculate the statistical effects of past violence within each classification group on current health, gender or violence outcomes. This can be interpreted as a "three-way" cycle. We can test whether past violence in particular classification groups is associated with worse or better current health or gender outcomes or with more or less violence. For instance, if we find an association of past violence in lower classifications with more current violence or worse health or gender outcomes, this evidence would support harmful cycles because violence limits health or gender improvements or begets more violence where countries already perform comparatively poorly on health and gender. Or, if we find past violence in higher classifications groups is associated with better health or gender outcomes or less violence, this would support beneficial cycles, because countries in the higher classifications were able to maintain or improve outcomes despite the violence. Moreover, the evidence does not need to be this clear-cut to be supportive of harmful and beneficial cycles. Rather, the relative statistical effects of past violence in the different classification groups may be consistent with such cycles. For instance, past violence may be associated with more current violence across several or all classifications, but more so in lower classifications relative to higher ones; such evidence would be supportive of harmful cycles.

G.4 Bivariate associations

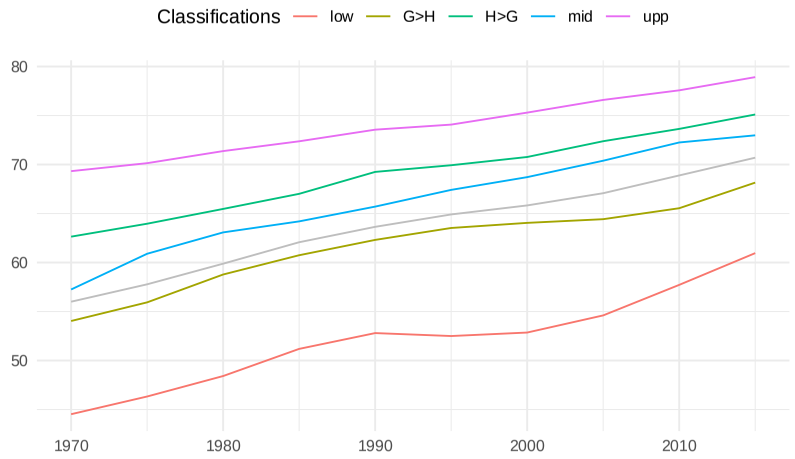
Initial graphical analyses of bivariate associations not shown here indicate that, across different health and gender measures and different types of violence, low performers on health and gender tend to have the most violence on average over time, and high performers experience much less violence. In a partial exception to this strongly supported generalization, average homicide rates are highest in the intermediate rather than the low classifications, but the upper classification still has the lowest average homicide rates.

We only show the bivariate relationship between the classifications and internal conflict or war. It illustrates the strong bivariate relationship between joint gender and health outcomes on one side and violence on the other. Figure 7 distinguishes countries that during the period 1996-2015 had conflict (based on a threshold of 25 battle-related deaths in a given year) or war (based on a threshold of 1000 battle-related deaths in a given year) and whether countries had conflict or war for five years or more over the entire period. While the majority of countries in each classification group had no conflict, the proportion (i.e. the ratio between "none" and all the conflict or war categories) is lowest in the low and G>H classifications and highest in the upper classification. Moreover, the lower the classification, the higher the proportion of countries with five or more years of conflict or war.

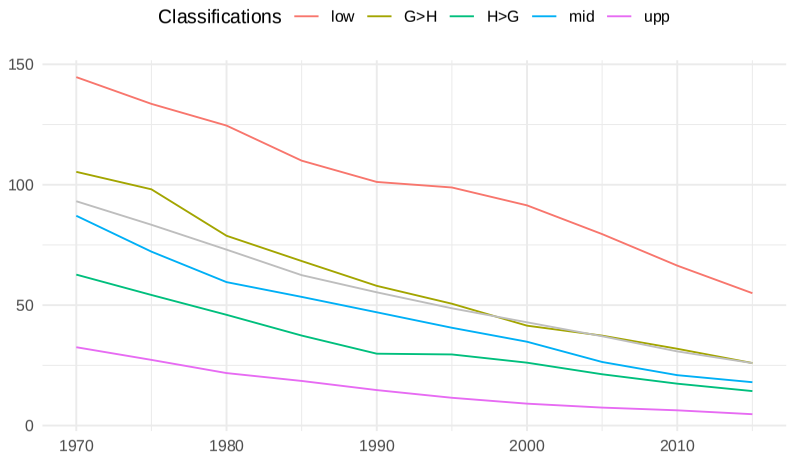
When the conflict data for 1996-2015 are further broken down in Figure 8 by whether a country had

Figure 6: Health & gender trends

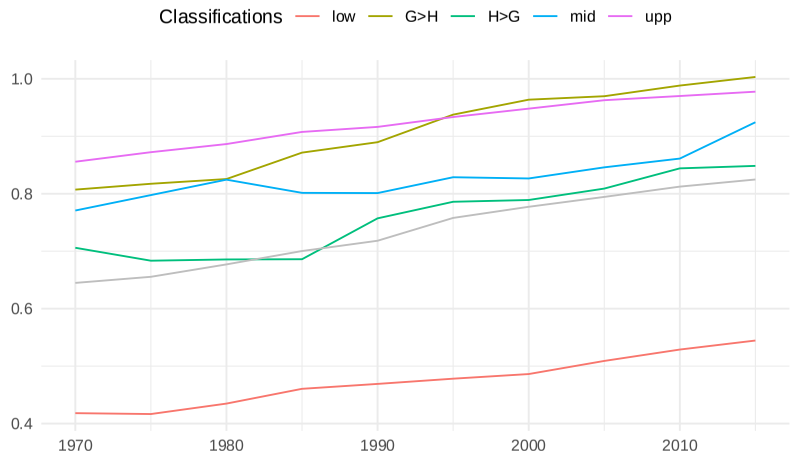
(a) Average life expectancy trends



(b) Average infant mortality trends



(c) Average mean years of schooling ratio trends



(d) Average adolescent fertility trends

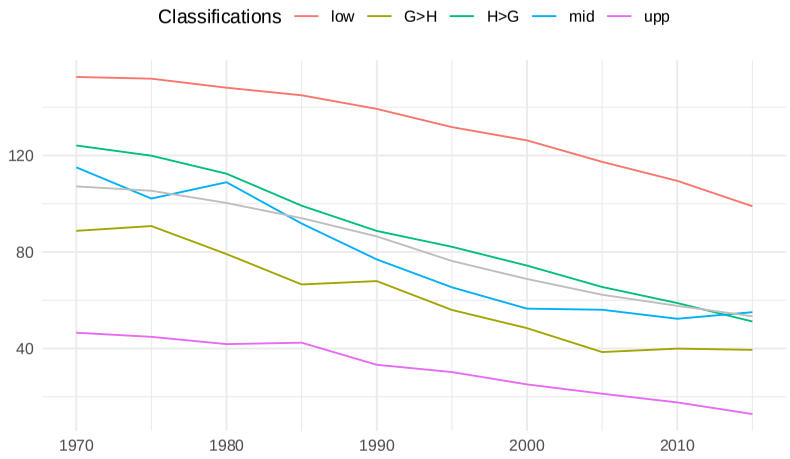
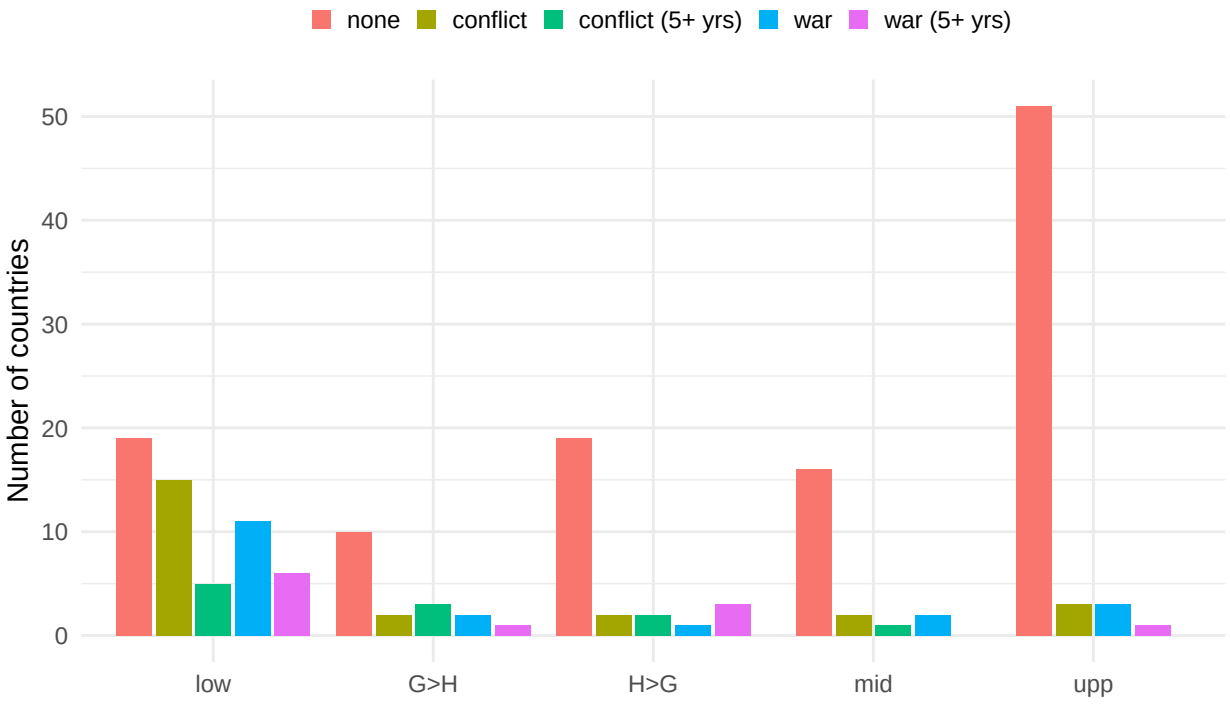


Figure 7: Internal (incl. internationalised) conflict (1996-2015) by 1991-1995 classification

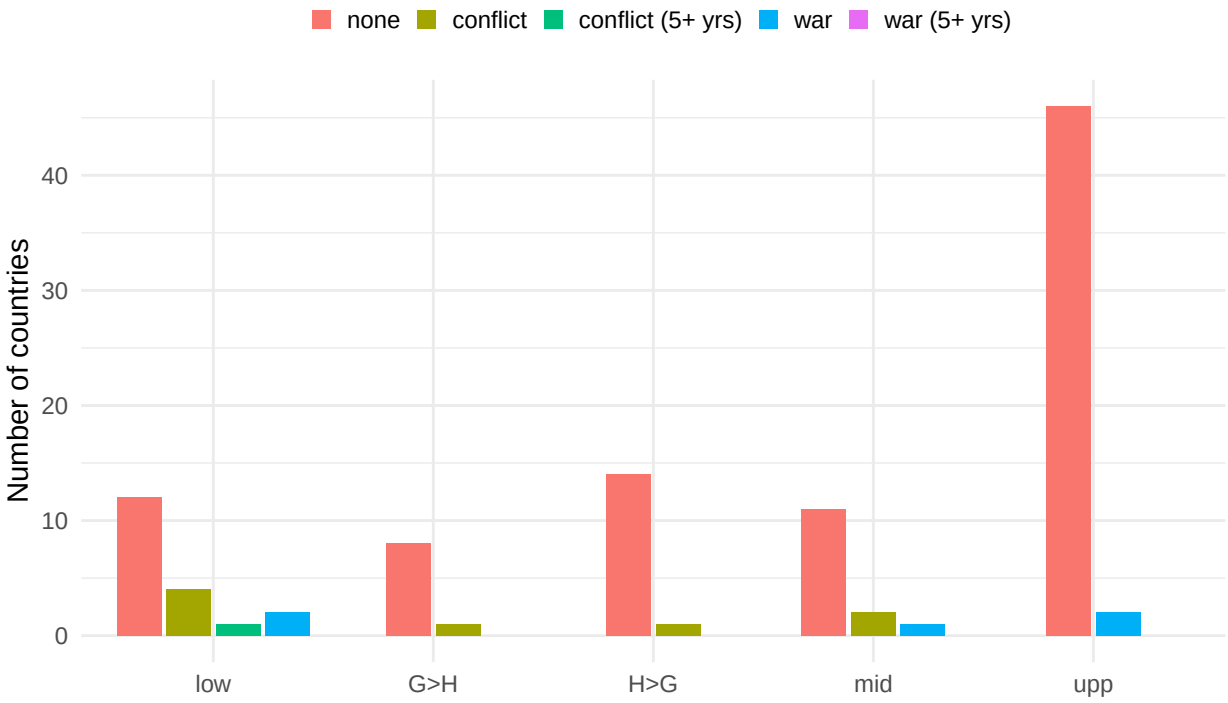


any internal conflict or war in the previous twenty years (1976-1995), another important pattern emerges. Among countries that had no previous conflict or war, very few had any conflict or war in 1996-2015, and most occurred in the low classification group. However, when considering only those countries that had at least one year of conflict or war in 1976-1995, the differences between the lower and higher classifications are particularly stark: four out of five countries in the low and G>H classification groups had conflict or war again, and almost three out of five in the H>G classification group. Interestingly, countries in the mid classification, rather than the upper classification, were the least likely to experience conflict again. The key finding is that internal conflict in the past is strongly associated with conflict in the future, and overwhelmingly so for countries placed lower in our classification based on health and gender outcomes.

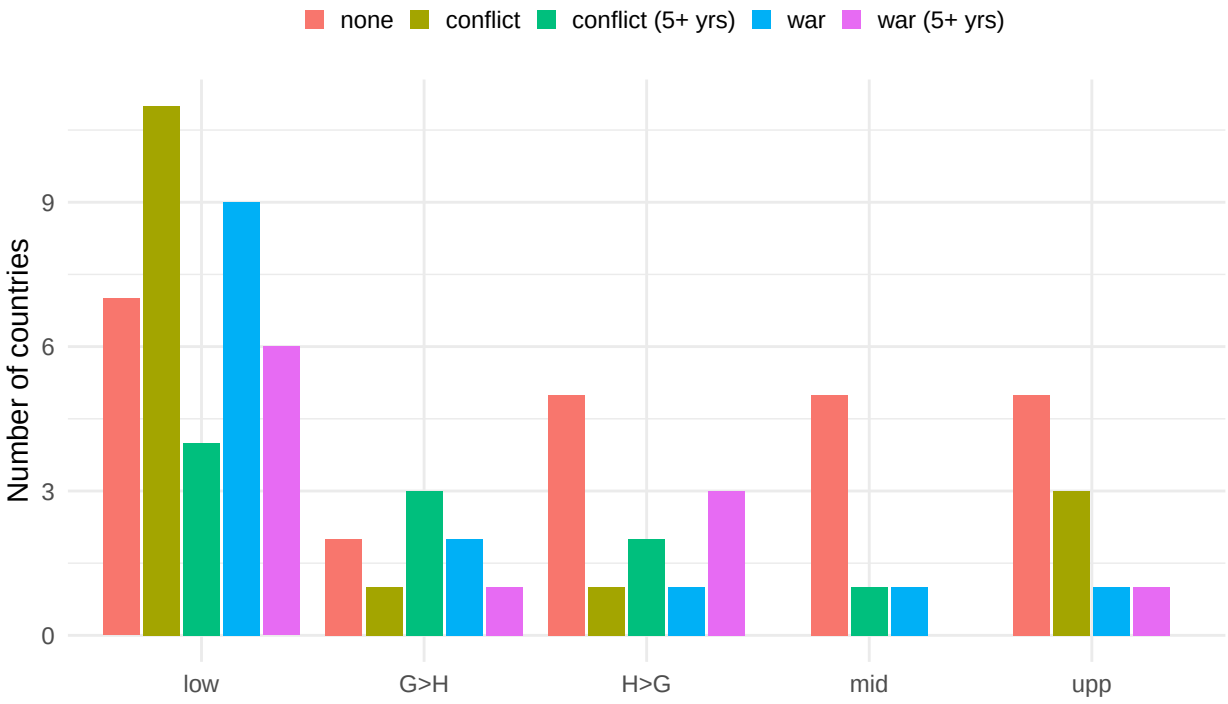
These bivariate data are strongly consistent with the harmful and beneficial cycles hypotheses and they provide motivation for deeper analyses. However, bivariate associations are inherently limited in that they do not account for plausible alternative explanations and endogeneity or selection effects. They could represent spurious associations and must not be interpreted as causal. The multivariable analyses in the next two appendix sections begin to further probe the statistical relationships.

Figure 8: Internal (incl. internationalised) conflict (1996-2015) by 1991-1995 classification

(a) no previous conflict (1976-1995)



(b) at least one previous conflict (1976-1995)



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H Cross-sectional analyses

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H.1 Methodological approach

For the first part of the large sample empirical analysis we use national-level cross-sectional data to test the hypotheses that health, gender, and violence levels interact in ways that generate mutually reinforcing harmful or beneficial patterns. Building on the extensive collection, review and evaluation of different cross-country variables, we select two measures to represent basic health performance (life expectancy and infant mortality rates), two to represent gender equality (the ratio of female-to-male mean years of schooling, and the age-specific fertility rate for adolescents) and a variety of measures of conflict and violence. For controls, we also use per capita income to represent the level of a country's economic development, and a basic measure of political structure (polyarchy). While not exhaustive, these variables exhibit useful features in terms of country and year coverage, collection and reporting reliability, and theoretical plausibility. We use regression analysis to examine the associations between these variables.

The research presented here follows standard social science practices in terms of the objectives, assumptions, limitations, and reporting of results. These practices will differ from those used in clinical studies. The primary objective of our statistical analysis is to explore the nature of any associations between various indicators of health, gender, and violence. As there is no consensus regarding the nature of these associations, we start with the standard approach that they can be reasonably approximated using a linear regression model, along with the standard assumption that the error terms are randomly and normally distributed. We are primarily interested in the direction and robustness of statistical relationships, and whether the evidence is indicative of the presence of self-reinforcing cycles (with either beneficial or harmful effects). We do not want to claim specific causality given the complexity of the phenomena under investigation.

While it is standard to present confidence intervals in clinical studies to give a sense of the range of a likely effect on the response variable, we adopt the social science convention of presenting the probability scores of the coefficient estimates as an indication of the likelihood of a non-zero relationship between each explanatory variable and the dependent variable. While we provide an interpretation of the magnitude of some key coefficient estimates, we do not want to infer a degree of precision that is unwarranted given the weaker identification strategies that must be used in a non-clinical setting.

There are a few important observations on the data that need to be recognised. First, on average, most of the key indicators of health and gender exhibit steady improvement over the 1995-2015 period both in average and for almost all countries in the sample. As a result, in the cross-section analysis, beneficial cycles and harmful cycles are essentially opposite sides of the same coin as the performance of countries are measured relative to one another.[1]

[1] One line of inquiry that might be worth pursuing is to impose an absolute measure, for example sustained declining performance, and ask which country groups exhibit absolute decline. In the cross section data it is rare that well-off countries end up having sustained reduction in health and gender performance, while poorly-off countries exhibit a much broader range of future performance, ranging from sustained declines to dramatic improvements.

Data are collected on 201 territorial entities, and while missing information restricts this number in the regressions, we are still able to analyse a very large group of countries with extensive global coverage. The largest sample in the cross-section analysis is 180 countries.[2] Most of the missing 21 jurisdictions are states that had ceased to exist (e.g. the Soviet Union), had only recently been formed (e.g. Kosovo) or were very small states (e.g. Palau).[3] The smallest sample in the analysis is 161 countries, which unfortunately excludes some failed states that would be useful as extreme cases of possible harmful cycles (Afghanistan and Somalia, for example).[4] Overall, the sample is biased against small (especially island) states, states that have fallen apart or become recently formed, those in extreme distress, and some that have largely been excluded from parts of the international system of data collection (Cuba). Since these exclusions are clearly non-random, our results should not be taken as necessarily universal.

In terms of the standard regression diagnostics, the analysis pays particular attention to problems of multicollinearity, as we know that many of these variables are closely associated theoretically and empirically. We used the variance inflation factor (VIF) to check multicollinearity. None of the mean VIF scores exceeds 5 (the standard strict threshold), and the maximum VIF scores are all below 6 (under the less strict but acceptable threshold of 10). While there were very few instances where serious multicollinearity was detected, we did avoid using the life expectancy and infant mortality performance in the same equation as their correlation coefficient is very high ($r = 0.96$). By contrast, the two measures used for gender equity have a correlation coefficient of only 0.6 and their joint inclusion in models is not particularly problematic. In addition, the Breusch-Pagan/Cook-Weisberg tests indicate that all estimating equations exhibit heteroscedasticity, so models are estimated with robust (Huber-White sandwich) standard errors.

H.2 Explaining health and gender improvements using prior and contemporaneous effects

The first three steps of the analysis build an increasingly complex regression model to examine factors associated with subsequent (1996-2015) improvements in health and gender equity measures as well as violence and conflict. The purpose of the statistical analysis is to investigate the plausibility of the overall hypotheses of the report regarding possible linkages amongst these three phenomena. That objective, along with the need for parsimony, largely drives the choice of variables used. The estimated equations are not derived from a formal model, and should be considered exploratory due to the possibility of omitted variables. Future work needs to consider other variables to improve on our estimations and to expand our understanding of how improvements in these three measures interact. In addition, the regression analysis assumes linear relationships amongst these variables as a starting point. Tests on the regression residuals indicate that most are distributed normally, as expected. In three cases in Table 9 and Table 11, however this assumption is clearly violated; these

[2]These countries are listed in Table 5 in Appendix G.3.

[3]The full list of missing countries in the largest sample is: Andorra, Czechoslovakia, Dominica, East Germany, Kosovo, Liechtenstein, Marshall Islands, Macau, Montenegro, Nauru, Palau, Saint Kitts & Nevis, San Marino, Serbia, Serbia & Montenegro, South Sudan, Soviet Union, Timor-Leste, Tuvalu, West Germany, Yugoslavia SFR.

[4]The additional exclusions are Afghanistan, Antigua & Barbuda, Bahamas, Belize, Brunei, Cuba, Eritrea, Grenada, Kiribati, Libya, Micronesia, Papua New Guinea, Saint Lucia, Saint Vincent & the Grenadines, Samoa, Solomon Islands, Somalia, Tonga, Vanuatu.

are discussed at the end of sections H.3.1 and H.5.1.

The first model regresses the future improvements in the four health and gender measures. The second model adds in pre-1996 economic and political measures, while the third model adds pre-1996 measures of conflict and violence. The primary variables selected for the regressions are chosen because they represent the three key areas of focus for the Commission (health, gender, and conflict), and because they had desirable qualities of consistency and relevance as well as maximum temporal and geographic coverage. The secondary variables of per capita income and polyarchy are chosen as representing important economic and political characteristics generally believed to be associated with the three primary variables. As these initial models generate coefficient estimates that are close in terms of magnitude and levels of significance, we do not present their details here (the results are available upon request).

Therefore, the first set of results presented in Table 8 include the pre-1996 values of the primary and secondary variables as well as the contemporaneous (1996-2015) measures of economic improvement, political change, and conflict and violence. There is a danger that adding contemporaneous variables into the analysis can complicate causal interpretations and introduce problems of simultaneity. Adding in these variables, however, have only small effects on the coefficient estimates generated by earlier models, so the examination of this complete model allows us to present the results for the initial three "predictive" models that are all based on pre-1996 variables.

The addition of the contemporaneous variables acknowledges the fact that improvement in the health and gender variables over two decades from 1995 will also be affected by how the economy, the government, and social conflict evolve over the same period. Ideally, economic, political and conflict performance would capture subsequent exogenous shocks to a country, though in reality there is likely to be a high degree of endogeneity. Care is needed in interpreting the results of this model, portrayed in the figure below, and causal inferences should be regarded with caution.

We present the results for each model after eliminating in a stepwise fashion those variables that have coefficients that are statistically insignificant at the 10% level of alpha, though in Table 8 we always retain one health variable and the two gender variables for illustrative purposes, while in Table 10 and Table 11 we retain the classification variables regardless of the statistical significance of their coefficient estimates. A big advantage of the stepwise process is the larger sample sizes we are able to use due to missing observations on some variables.[5] While stepwise procedures may lead to the removal of potentially interesting variables, we use a statistical significance cut off of 10% (rather than 5%) to mitigate this problem. After eliminating each independent variable we check to make sure that the coefficient estimates of the remaining variables are reasonably similar in magnitude and statistical significance. Finally, we also add back into our final equation previously dropped variables to make sure that their coefficients remain statistically insignificant. One variable, post-1995 political changes, did not have a statistically significant coefficient estimate in any of the models, so it does not appear at all in the table even though it was included initially.

[5]We make no claims about the out-of-sample predictive value of the estimating equation. In social science research the use of observational data, as opposed to those derived from a clinical trial, limits our ability to match sample sizes with testing models. Therefore, we do not have the same concerns over the events-per-variable as in clinical analysis.

Direct beneficial or harmful effects based on prior and contemporaneous conditions

Initial health, gender, income and political conditions, conflict and violence conditions

$\longrightarrow$

Subsequent long-term improvements in health, gender, and conflict levels

$\longleftarrow$

Contemporaneous economic, political, conflict and violence characteristics

Table 8 presents the results for the main cross-section analysis, with four columns for each of the health and gender models. The table includes one health and both gender-related measures regardless of the statistical significance of the coefficient estimates, to give a sense of how these associations appeared in the estimations. Other prior and contemporaneous variables are reported only if the statistical significance of their coefficient estimates are below (or reasonably close) to 10%.In all models the null hypothesis that all coefficient estimates are zero is clearly rejected, and the mean variance inflation factor (VIF) scores all indicate that multicollinearity is not a serious problem. The country coverage is extensive, with the smallest sample including 161 countries and the largest sample including 180. All equations use an F-test to test the hypothesis that all coefficient estimates in the model are zero; in all cases except one the null hypothesis is rejected at the 1% level. The exception appears in Table 9 for the estimation on the civilian death rate, which rejects the null hypothesis only at the 10% level. The amount of variance in the dependent variables explained in the model, the adjusted R^2 values, ranges from almost 84% for the infant mortality rate, to just under 36% for the adolescent fertility rate model.

The first observation is that high achievement in the initial level of each measure is negatively associated with its subsequent improvement. We attribute this to the presence of a strong ceiling effect by which the rate of improvement of a variable will decline the closer a country already is to the best performance. For example, there are biological and technological limits to how long a person may live or how low infant mortality or adolescent fertility rates can go, and the marginal cost of achieving a unit of improvement will rise as achievements improve. The magnitude of these ceiling effects vary across the measures, but all are strongly significant in statistical terms.

To get a sense of the magnitude of these effects we compute how much a 10% improvement in the average value of each explanatory variable has in terms of the associated percentagage change in the average of the dependent variable. For example, the average life expectancy in the sample for 1995 is 64.9 years, so a 10% improvement would be 6.49 years. With the coefficient estimate of -0.452, that change in the 1995 life expectancy would be associated with a decline of 2.9 years in future life expectancy improvements. The average life expectancy improvement from 1996-2015 is 5.84 years. Therefore, a 10% improvement in the 1995 life expectancy measure is associated with a 50% decline in the future improvement in life expectancy. Similarly, a 10% improvement in the 1995 infant mortality rate is associated with a 12.5% reduction in its future improvement, a 10% improvement in the education ratio is associated with a 6% decline in its future improvement, and a 10% improvement in the adolescent fertility rate is associated with a 9% decline in its future improvement.

There are also cross-effects amongst the health and gender measures. A 10% improvement in the 1995 infant mortality measure is associated with a 3.7% improvement in the adolescent fertility rate, though a 10% improvement in the 1995 mean-years-schooling gender ratio is weakly associated with a 6% deterioration in adolescent fertility rate improvements. Finally, a 10% improvement in the 1995 adolescent fertility rate is associated with improved future performance in all of the other variables (5.9% for life expectancy, 2.7% for infant mortality rates, and nearly 2% for the mean years schooling ratio). With the exception of the unexpected negative (though statistically weak) association between education equality and adolescent fertility rates, these effects are indicative of a strong beneficial cycle wherein prior good performance in health and gender are mutually reinforcing in the future.

The previous values of per capita income and polyarchy do affect some of the health and gender improvement measures. A 10% increase in the 1995 per capita income is associated with a negligible decline in future education improvements of less than 1%. A 10% higher polyarchy score in 1995 is associated with a 4% increase in life expectancy improvements and, unexpectedly, a 1.5% worsening in future mean years schooling ratio improvements. Not surprisingly, pre-1996 conflict conditions also affected future health and gender improvements. There are, of course, numerous possible variables to represent conflict and violence, from which we choose three: an indicator of the presence of internal conflict in previous years (more than 25 battle deaths per year), the civilian death rate associated with internal conflict, and the civilian death rate associated with one-sided violence. These variables are accumulated for each country from 1989 to 1995 (due to data limitations) to get a clearer representation of levels of violence, which often vary extensively from year to year. These three measures also capture different aspects of violence, and while one-sided violence deaths and those from internal conflict are fairly closely correlated overall ($r = 0.765$), their correlation with the conflict indicator measure is surprisingly low ($r < 0.04$ in both cases).

The expected effects of adding conflict and violence into the models are complex. On the one hand, prior conflict may have temporarily reduced health and gender levels, leading to more dramatic improvements in the future. In this case the violence variables would have positive coefficient estimates. On the other hand, widespread and enduring conflict may also damage important health and education infrastructure, so the coefficient estimates for these variables could just as easily be negative. It should be noted that the addition of the violence variables does not affect significantly the coefficient estimates of the other explanatory variables as observed in prior test models. In addition, adding the violence variables does not add a lot to the explanatory power of the regressions from models when they are excluded.

The variable identifying the number of pre-1996 period years in which there was a serious internal conflict has a weak positive statistical association with future life expectancy and education equity. A 10% increase in this conflict measure (i.e. more pre-1996 conflict) is associated with a very small (less than 0.5%) increase in subsequent life expectancy improvements, and an even smaller (0.3%) improvement in the mean years schooling ratio. By contrast, a 10% increase in the death rate from internal conflict is associated with declines in future infant mortality performance (though only of 0.2%) and in education equity (of a negligible amount, less than 0.1%). Finally, a 10% increase in the pre-1996 death rate from one-sided violence is associated with small future improvements in life expectancy (less than 0.2%) and in infant mortality (less than 0.3%). These effects of past conflict on future health and gender improvements are mixed, though always relatively small in magnitude.

The addition of contemporaneous variables measuring economic, political and conflict-related measures have only marginal effects on the coefficient estimates for the other variables found in the test models where only pre-1996 factors are included. There is no model in which future political developments affect health or gender improvements, and that variable has been removed from the table. A 10% increase in contemporaneous economic growth is associated with a 7% increase in life expectancy improvements. Not surprisingly, most of the measures of contemporaneous violence are associated with poorer performance on health and gender measures. A 10% increase in current conflict presence is associated with a very small (0.35%) reduction in educational equality improvements. A 10% increase in the civilian death rate from internal conflict is associated with a very small (less than 0.1%) decline in life expectancy improvement and, unexpectedly, and an equally small improvement in education equality. The latter result is observed regardless of which other conflict or violence measures are removed from the equation. It is possible that internal conflicts deflect young men away from education thereby harming educational achievement while improving the equity measure, but such a post hoc explanation would require additional analysis to assess its plausibility. Finally, the contemporaneous one-sided violence death rate variable does not have a statistically significant coefficient estimate in any of the models, though its p-value in the adolescent fertility rate equation is close to an acceptable level of statistical significance; in any event the magnitude of the effect would be very small.

Overall, adding in contemporaneous values for the economy, politics, and violence does not dramatically affect or improve the model based on pre-1996 measures of the explanatory variables. Some of the effects that are observed are very small in magnitude, and given the sensitivity of some of their coefficient estimates and the weaker levels of statistical significance, caution is warranted in drawing conclusions at this stage, though they suggest useful avenues for future work. The bulk of the explanatory power of the models rests on the pre-1996 measures, which suggests a high degree of path dependence in health and gender improvements.

H.3 The association of health and gender with changes in income, democracy and violence

The next step of the cross-section analysis is to consider that contemporaneous changes in economics, politics and conflict are connected to prior conditions. The purpose of this section is to understand how these subsequent economic, political and conflict developments may be linked to current conditions, as indicated by the blue arrow in the figure below, on the assumption that these may in turn affect health and gender conditions (the red arrow). Of particular importance is the possibility that current conditions may help to understand subsequent conflict and violence as part of a harmful cycle downwards.

Direct beneficial or harmful effects: adding contemporaneous conditions

Initial health, gender, income and political conditions, conflict and violence conditions

$\longrightarrow$

Subsequent economic, political, conflict and violence characteristics

$\longrightarrow$

Subsequent long-term improvements in health, gender, and conflict levels

Five models are estimated using as dependent variables the 1996-2015 changes in per capita real GDP, democracy (polyarchy), and the three post-1995 conflict and violence measures. The resulting coefficient estimates are provided in Table 9. There is a wide variation in the performance of the equations. The model is able to account for only 10% of the variation in growth in per capita real income from 1996-2015, with the coefficient estimates conforming to our expectations. Specifically, future income growth is associated with previously high life expectancy, good adolescent fertility achievement, and the absence of past conflict. The variation in democracy improvements is largely explained ($R^2 = 0.85$) by just two variables: past democratization levels and past one-sided violence, though the latter has an unexpected positive coefficient estimate.

Future economic growth is positively associated with prior good performance on health (life expectancy) and gender (adolescent fertility rate), and with lower rates of prior conflict. Infant mortality rate improvements are associated with better past democracy levels and, perhaps unexpectedly, with past death rates from one sided violence. The presence of future conflict is connected to better past performance on adolescent fertility rates, an unexpected association that is replicated in a model for future one-sided violence death rates. While the coefficient estimates in both of these cases are relatively weak in terms of statistical significance, the consistency of the effect merits further examination. Future death rates from one sided violence are also linked to lower initial infant mortality rates, but has no strong association with prior violence levels. Finally, the civilian death rate from internal conflict is weakly associated with poorer education equality, though the equation explains very little variation and the null hypothesis that all coefficient estimates are zero is barely rejected and only for the most reduced version of the model. Aside from the unusual association between adolescent fertility and future conflict and violence, and the positive association between past one-sided violence and democratization, there is some evidence of harmful and beneficial cycles in these results. The health variables, in particular, are associated with improvements in future income and reduced conflict.

The magnitudes of the effects identified in Table 9 are often quite large. A 10% improvement in the 1995 life expectancy variables is associated with a 23% increase in real per capita income gains. A 10% improvement in the infant mortality rate is associated with an 7.7% reduction in future conflicts and a 25% reduction in the average future death rate from one-sided violence. A 10% increase in the mean years of schooling ratio is weakly associated with an 28% subsequent decline in the average death rate from internal conflicts. A 10% decline in the average adolescent fertility rate is associated with a 4.2% increase in future real per capita income gains, a 5.2% increase in the future conflict count and a 10% increase in the future death rate from one-sided violence. A 10% improvement in the 1995 polyarchy score is associated with a 7.8% improvement in future increases in the average polyarchy measure. A 10% decline in the 1995 conflict indicator variable is associated with a 0.6% increase in income improvements and a 6.4% increase in future conflicts. Finally, a 10% increase in the one-sided violence death rate has a negligible association (less than 0.1%) increase in the average future increase in the polyarchy score. Some of these associations are very small in magnitude and often weak in terms of statistical significance. The connections may warrant further investigation, but the importance and generality of some results are likely limited.

H.3.1 Sensitivity Analysis

As noted earlier, three of the estimations reported in Table 9 had residuals that clearly violated the normality assumption. We therefore explored these cases further to check for the sensitivity of the results. Since the dependent variable in column 3 (years of conflict) is count data, we used a negative binomial estimation as an alternative. The results are qualitatively similar to those reported in Table 9, with the exception that the coefficient estimate for the adolescent fertility rate can no longer be accepted as statistically significant. As this is a somewhat anomalous result given our expectations, the basic results remain supportive of the hypothesis of a benevolent feedback mechanism.

For the two death-rate dependent variables (columns 4 and 5 in Table 9), the regression residuals exhibited excessive kurtosis well outside the range of –7 to 7 that is considered consistent with normality. This excessive kurtosis was especially apparent in the case of the regression for the civilian death rate from internal conflict, which also exhibited very high levels of skewness (well beyond the normal range of –2 to 2). As a result, both regressions were re-estimated using the log of the dependent variable (approximated as very small when the rate is zero), which yielded residuals that were well within the acceptable range for assuming normality.

The log transformed regression for the civilian death rate from internal conflicts yielded much more statistically significant negative coefficient estimate for the mean years schooling ratio variable than that reported in Table 9 (p-value < 0.001). A revised stepwise equation for this dependent also indicated that higher initial levels of income and democracy are statistically significantly associated with lower death rates, which supports the idea of benevolent feedback systems.

Finally, for the one-sided violent death rate, the log transformed version of the regression yields a negative coefficient estimate for the infant mortality variable that is more statistically significant than reported in Table 9, while the positive coefficient estimate for the adolescent fertility rate can no longer be accepted as statistically different from zero. This result is actually more supportive of the positive feedback hypothesis. The results need to be regarded with some caution however, as a different stepwise process yielded a reduced equation in which the association between the one-sided violence and mean years schooling variables superseded that of infant mortality, and also indicated a positive relationship with initial democracy and lower levels of violence, and a strong effect of past conflict and future one-sided violence death rates. This alternative specification, however, is also consistent with benevolent feedback.

H.4 Country classifications and the analysis of health and gender outcomes

The next step in the analysis is to include the classification system that assigns countries to one of five groups according to their 1995 attributes.[6] The first three of these groups are of countries that perform relatively poorly on both health and gender equity scores (low group) , those that perform very highly on both health and gender (upper group) , and those with balanced health and gender scores in the middle (middle group). The other two groups are of countries that perform relatively well on health but less well on gender equity (H>G group), or vice versa (G>H group). We take the basic prediction model and add in four of the classification indictors, leaving the "middle" group as

[6]The classifications and assignment methodology is discussed in detail in Appendix G.

the base case. Introducing all of these variables leads to higher levels of multicollinearity due to the health and gender variables being used individually as well as collectively via the classifications. We reduce the models to eliminate the non-classification variables that have statistically insignificant coefficient estimates to minimise multicollinearity, though we keep in the classifications due to our specific interest in them.[7]

The results are reported in Table 10. When compared to the coefficient estimates reported in Table 8, there are a few minor changes. It is interesting that despite reflecting the separate health and gender variables, the classification indicators sometimes have their own statistically significant coefficient estimates.

Countries in the lowest performing group, and intermediate performing countries with gender measures that are relatively greater than health (G>H), tend to be weakly associated with worse subsequent health outcomes. By contrast, the H>G group has weak positive associations with health outcomes; there no significant differences between the upper group and the middle classification group of countries (the latter being the reference group for comparison). For gender equality measures, the results suggest weak but opposite effects, with countries in the lowest performing group having larger improvements in the adolescent fertility rate. The worst performance on gender improvements is in the upper classification group, especially in terms of mean years of schooling equality.

The magnitudes of the associations are generally quite large. Relative to the middle performing group, being in the lowest performing group is associated with a 35% decline in future infant mortality rate improvements, but a 64% increase in the adolescent fertility rate improvement. Countries in the G>H group have an average decline in life expectancy gains of 56%. Being in the H>G group is weakly associated with a 31% improvement in life expectancy gains relative to the middle-performing group. Finally, the best-performing classification group is associated with a 20% reduction in mean years of schooling ratio improvement.

This analysis lends some support to the hypothesis of the harmful cycle, with the lowest performing group generally performing more slowly (ceteris paribus) in future health improvements, though this group does better on subsequent improvements in the adolescent fertility rate. The countries in the G>H group also appear to perform worse on future health and education improvements, though the latter effect does not reach standard levels of statistical significance. The H>G group may perform slightly better on future life expectancy gains, but in general it and the upper-performing group are similar to the middle-performing group. These results are manifested despite the inclusion of the other health and gender measures and other controls, suggesting that the classifications based on aggregate performance contain additional information about future improvements.

Given the small sample sizes for some groups, erratic coefficient estimates are to be expected, and extreme caution is required before placing any confidence in specific results. The cross-section analysis provides clear indications that the association of certain variables with health and gender equity improvements varies across different groups. These emerging and interesting patterns deserve further and more detailed analysis in the future.

[7]We did try other versions of the models, including just using the full model, using the G>H and H>G classifications as the only additions, and eliminating variables that have statistically insignificant coefficient estimates and above average VIF scores. The results here are indicative, but some are sensitive to the model used.

H.5 Classifications and economic, political and violence

Table 11 presents the results for the stepwise reduced models estimating future economic growth, political development, and violence measures along with the classification system. The equation for future income gains provide some support for the beneficial cycle hypothesis, with the best performing countries having the most rapid improvements in future income per capita ($11429 more than the middle classification group). There is weaker evidence that the G>H group also does better than the middle group in per capita income growth (by $3168). None of the classifications had a statistically significant coefficient estimate in the equation for future polyarchy measure improvements.

The results on violence are complex and mixed. The lowest group in the classification seems to have lower levels of future conflict, though the coefficient does not quite reach accepted levels of statistical significance. By contrast, it has a much higher civilian death rate from internal conflicts and a much lower death rate from one-sided violence. This result suggests that the nature of conflict is different for this group than for the reference group (i.e. middle). The G>H group also has a lower death rates from one-sided violence, which stands in stark contrast to the higher levels in the H>G and the highest performing groups. These results again draw attention to the complex nature of violence, and the distinct behaviour of their different measures.

H.5.1 Sensitivity Analysis

The violence regressions in Table 11 are similar to those from Table 9, with the addition of the classification variables. The residuals from the two civilian death rate estimations also violate the normality assumption, a problem which is not apparent when using the log version of the dependent variables. The results from the regression on civilian death rates in internal conflict have broadly similar results to those reported in Table 11, and an alternative equation using a different step-wise procedure also provides some evidence of benevolent feedback. Similarly, the results for the one-sided violence death rate estimation are much more supportive of benevolent feedback. Therefore, adjusting the estimations to address the presence of non-normal residuals provide more weight to the argument of the report.

H.6 Summary and conclusion

Reviewing the results, the following conclusions can be drawn from the cross-sectional analyses:

1. All four of the health and gender measures exhibit ceiling effects in so far as better performance as of 1995 is associated with slower improvements from 1996-2015. This effect limits the extent to which we observe harmful and beneficial impulses in the cross-section data.
2. Improved 1995 performance in infant mortality is associated positively with future improvements in adolescent fertility.
3. Good performance on adolescent fertility is associated with future improvements in health and education equality, though the statistical significance of the coefficient estimates are generally lower.

4. Unexpectedly, current educational equality is weakly associated with poorer adolescent fertility rate improvements.

5. Conflict and violence measures have complex effects. For the infant mortality equation in Table 8, current civilian death rates due to internal violence have a negative relationship with future infant mortality improvements, while the opposite is true of one-sided violence death rates. The opposing effects do not appear to be the consequence of multicollinearity. The same mix of effects is also observed in the life expectancy and educational equity equations, though often the coefficient estimates are statistically insignificant. While some of the coefficient estimates have low levels of statistical significance, they do seem to be capturing distinct associations, A more refined model of how different types of violence might affect health and gender measures is required.

6. There are some associations that suggest that future economic, political and violence developments are associated with previous health and gender conditions. While most of these effects are positive in the sense of improving economic growth or reducing the likelihood or intensity of conflict and violence, there is a weak statistical association between better adolescent fertility rates and future conflict.

7. The models using the aggregated performance classifications indicate that the lowest performing group does worse on future health improvements than most other groups, which would be consistent with a harmful cycle. It also appears that countries with a relatively greater emphasis of gender over health do worse on future health and education improvements, though the latter effect is weak. The group of countries with relatively better health than gender performance may have a weak advantage in future health improvements, but there is no strong evidence of a beneficial cycle whereby the best performing group improves faster than most other groups.

8. The addition of the classification indicators provides strong evidence of the beneficial and harmful cycles hypotheses in terms of future economic gains, though there is no relationship to political transformation. The relationships between the country groupings and the violence measures is complex, and provides evidence for and against the harmful and beneficial hypotheses.

Finally, it is extremely important to recall that drawing conclusions regarding causality in these associations is premature. It is difficult in cross-section analysis to have clear identification of the effects of one group of variables on another, let alone evaluate different policies. The strength of some of these associations, and the lag structure of most of the models, are suggestive of potential causal links, but they need to be investigated further before any firm conclusions can be drawn.

H.7 Regression tables

Table 8: Main cross-section models with prior and contemporaneous explanatory variables

Stepwise reduced models	Dependent variables: improvements from 1996-2015			
Independent variables 1995	Life expectancy	Infant mortality	Education equality	Adolescent fertility
Life expectancy	-0.452 (0.003)			
Infant mortality		-0.589 (<0.001)	-0.00000378 (0.967)	0.173 (0.017)
Education equality	-4.21 (0.212)	6.91 (0.322)	-0.0561 (<0.001)	-17.6 (0.050)
Adolescent fertility	0.0448 (0.015)	0.0813 (0.009)	0.000168 (0.026)	-0.265 (<0.001)
Per capita income ($1000)			-0.0000480 (0.004)	
Polyarchy	5.45 (0.001)		-0.0236 (0.001)	
Internal conflict indicator	0.0644 (0.051)		0.000535 (0.039)	
Death rate internal conflicts		-6.33 (0.003)	-0.00265 (0.057)	
Death rate one-sided violence	0.0356 (0.105)	0.228 (0.002)		
Per capita income growth ($1000, 1996-2015)	0.0445 (0.008)			
Conflict indicator (1996-2015)			-0.000915 (0.048)	
Civilian deaths internal conflict (1996-2015)	-0.233 (0.005)		0.00106 (0.022)	
Civilian deaths one-sided violence (1996-2015)				-1.86 (0.111)
Number of observations	161	180	161	180
Adjusted R^2	0.489	0.832	0.381	0.356
P(all $\beta s = 0$) from F-test	<0.001	<0.001	<0.001	<0.001
Mean VIF [max VIF]	1.91 [3.97]	2.81 [4.06]	2.14 [4.61]	2.56 [4.12]

Coefficient estimates (p-values based on robust standard errors). The estimated coefficient on the constant term is not reported.

Table 9: Models of subsequent income, democracy and violence measures

Reduced models	Dependent variables: changes from 1996-2015				
Independent variables 1995	Per capita real income	Polyarchy	Conflict indicator	Civilian deaths (internal)	Civilian deaths (one-sided violence)
Life expectancy	331 (0.003)				
Infant mortality			-0.0457 (<0.001)		-0.0156 (0.001)
Education equality				-0.622 (0.095)	
Adolescent fertility	51.5 (0.011)		0.0198 (0.031)		0.00388 (0.063)
Polyarchy		0.874 (<0.001)			
Internal conflict indicator	-122 (0.024)		0.405 (<0.001)		
Death rate one-sided violence		0.00127 (<0.001)			
Number of obs.	168	169	180	180	180
Adjusted R^2	0.182	0.848	0.478	0.009	0.182
P(all $\beta s = 0$) from F-test	<0.001	<0.001	<0.001	0.096	0.004
Mean VIF [max VIF]	2.00 [2.49]	1.02 [1.02]	2.01 [2.52]	1.00 [1.00]	2.46 [2.46]

Coefficient estimates (p-values based on robust standard errors). The estimated coefficient on the constant term is not reported.

Table 10: Classification models for health, gender and violence measures

Reduced models	Dependent variables: improvements from 1996-2015			
Independent variables 1995	Life expectancy	Infant mortality	Education equality	Adolescent fertility
Life expectancy	-0.564 (<0.001)			
Infant mortality		- 0.662 (<0.001)		0.240 (0.005)
Education equality			-0.0493 (0.013)	
Adolescent fertility	0.0469 (0.001)	0.0825 (0.013)	0.000214 (0.002)	-0.217 (<0.001)
Per capita income ($1000)			-0.0000439 (<0.001)	
Polyarchy	3.75 (0.002)		-0.0180 (0.014)	
Internal conflict indicator	0.0652 (0.055)			
Death rate internal conflicts	-1.32 (0.099)	-6.30 (0.002)		
Death rate one-sided violence	0.0558 (0.024)	0.206 (0.002)		
Lowest performance group	-1.02 (0.559)	-8.01 (0.044)	-0.00131 (0.897)	14.5 (0.029)
G>H group	-3.27 (0.033)	-5.23 (0.108)	-0.0119 (0.121)	0.561 (0.895)
H>G group	1.83 (0.052)	3.26 (0.117)	0.00392 (0.569)	3.48 (0.444)
Highest performance group	1.11 (0.206)	2.54 (0.241)	-0.0142 (0.047)	-5.27 (0.156)
Number of observations	169	180	161	180
Adjusted R^2	0.518	0.840	0.394	0.358
P(all $\beta s = 0$) from F-test	<0.001	<0.001	<0.001	<0.001
Mean VIF [max VIF]	2.99 [5.94]	3.28 [5.83]	3.03 [5.75]	3.41 [5.27]

Coefficient estimates (p-values based on robust standard errors). The estimated coefficient on the constant term is not reported.

Table 11: Classification models of income, democracy and violence measures

Reduced models	Dependent variables: changes from 1996-2015				
Independent variables 1995	Per capita real income	Polyarchy	Conflict Indicator	Civilian deaths (internal)	Civilian deaths (one-sided violence)
Life expectancy	199 (0.063)				-0.0823 (<0.001)
Infant mortality			-0.0395 (0.022)		
Education equality			-5.40 (0.026)		
Adolescent fertility					
Polyarchy		0.854 (<0.001)			
Internal conflict indicator			0.389 (<0.001)		
Death rate internal conflict	-1164 (0.018)	0.0501 (<0.001)			
Death rate one-sided violence					
Lowest group	-268 (0.877)	-0.0210 (0.531)	-2.78 (0.117)	0.139 (0.003)	-0.459 (0.010)
G>H group	3168 (0.052)	-0.0160 (0.719)	1.96 (0.205)	0.0202 (0.178)	-0.323 (0.007)
H>G group	808 (0.752)	-0.0192 (0.613)	0.588 (0.662)	0.628 (0.305)	0.397 (0.013)
Highest group	11429 (<0.001)	0.00548 (0.883)	1.26 (0.270)	0.0610 (0.137)	0.543 (<0.001)
Number of obs.	168	169	180	180	180
Adjusted R^2	0.228	0.851	0.483	0.004	0.191
P(all $\beta s = 0$) from F-test	<0.001	<0.001	<0.001	0.009	0.003
Mean VIF [max VIF]	2.95 [4.84]	1.96 [3.02]	3.13 [5.26]	2.17 [2.55]	3.18 [4.64]

Coefficient estimates (p-values based on robust standard errors). The estimated coefficient on the constant term is not reported.

I Panel data analyses

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I.1 Modelling the complexity of harmful and beneficial cycles

Our overall objectives and methodological approach are discussed in Appendix G.1 and Appendix H.1. In contrast to the cross-sectional models in Appendix H, which examine the growth of the outcome variables between the periods 1991-1995 and 2011-2015, the panel models examine short-term changes from one five-year period to the next, over as many periods as data availability allows. They use "wide and short" panels of many countries with a relatively small number of time periods; the dataset includes ten five-year periods, which leaves nine periods after lagging the independent variables.[8] Table 5 in Appendix G.3 lists the countries that are included in the panel data. The dependent variables are the combined health and gender indices and select violence variables. Our initial panel analyses focused on the individual health, gender, and violence measures listed in Table 4, leading to a large number of models and a wide range of findings that are difficult to summarise. To make the analyses more manageable and decrease the number of combinations of variables in examining patterns of harmful and beneficial cycles, we use the combined health and gender indices (see Appendix G.2) in the final analyses discussed in this chapter.

The panel analyses test the hypotheses of harmful and beneficial cycles by examining the statistical effects of the lagged health and gender variables or of the classification indicators, and lagged violence variables and their interactions. Two of three violence variables are included in each model: conflict or war incidence[9] and a latent measure of state repression of physical integrity rights. These variables were chosen for three reasons. First, internal armed conflict between organised groups is of particular interest to the research agenda of the Lancet Commission. Second, initial analyses suggested that different types of violence matter in different ways. Third, many of the measures of organised violence (see Table 4) are only available for shorter periods; those used in the panel models maximise the number of periods with available data. All panel models also include lagged covariates for logged GDP per capita, logged population density, and electoral, participatory, and liberal aspects of democracy, in order to account for socio-economic and institutional conditions. Many of the models further include the lagged dependent variable in order to examine feedback loops and possible ceiling effects.

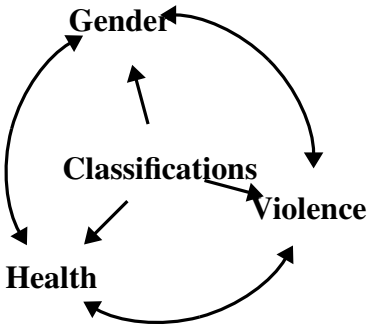
As discussed in Appendix G.1, the hypotheses of beneficial and harmful cycles imply considerable complexity of statistical associations: between gender and health outcomes; from gender and health outcomes to violence; and from violence to gender and health outcomes. At minimum, these hypotheses relate strong health and gender performance to relatively less violence and poor health and gender performance to relatively more violence. The multivariable panel models therefore first examine simple correlations, while holding other covariates constant. The hypotheses of beneficial

[8] All covariates are lagged by one period to ensure that they are measured prior to the outcome variable.

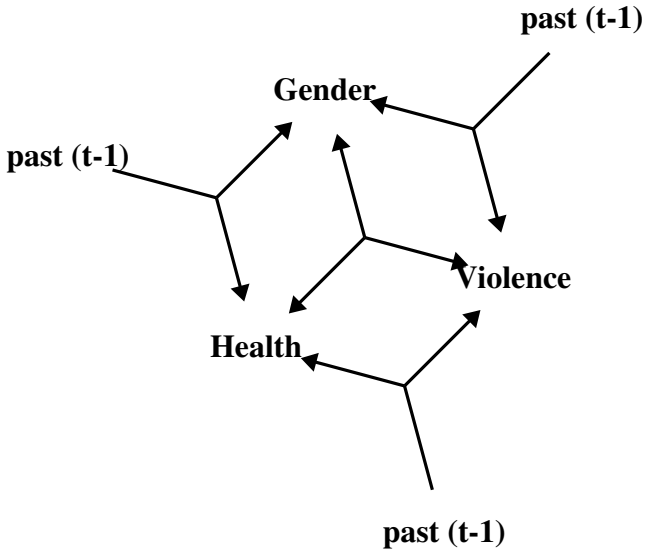
[9] In these analyses, incidence refers to the occurrence of conflict or war in a given year, averaged over the 5-year period. The Uppsala Conflict Data Programme codes conflict based on at least 25 battle-related deaths within a given year and war based on at least 1000 deaths. We examine both lower-intensity conflict incidence and higher-intensity war incidence to explore whether beneficial and harmful cycles are applicable at different levels of organised violence.

Figure 9: Statistically examining complexity

(a) Simple correlations



(b) Two-way & three-way interactions



and harmful cycles also propose that it is the combination of health and gender performance that makes societies more peaceful and that there are feedback loops whereby stronger health and gender performance and less violence in earlier periods reinforce each other to produce better outcomes in the future.

The observable implications of these hypotheses are conditional effects. As discussed in Appendix G.3, the classifications provide a way to examine the combined effect of broad health and gender configurations. Therefore, in some models we replace the health and gender indices with the classification groups (excluding a reference category) and examine their statistical effects on the outcome variables. These simple correlations are depicted in Figure 9a; every arrow represents a statistical effect to be examined. Further, we examine conditional effects by including two-way and three-way interactions, as depicted in Figure 9b. Two-way refers to the interaction effect of two of our key variables on the third or the effect of an interaction involving past health or gender performance on its current performance; the latter allows us to examine feedback loops and possible ceiling effects. Three-way effects are the interactions of the violence variable with the classifications, to examine whether the effect of violence varies across the classification groups. Where applicable, we calculate any interaction effects and present them graphically with 95% confidence intervals.

The discussion of results below is organised with the help of summary diagrams, which indicate the associations examined in each sub-section. In the summary diagrams, blue arrows indicate findings that support beneficial and/or harmful cycles, orange for contradictory or mixed findings, and gray for null results. Lighter colors and thinner lines indicate weaker statistical results. The complete regression results are provided in the tables at the end of this chapter, which follow the same social science reporting conventions as those discussed in Appendix H.1.

I.2 Methods

Appendix H.1 discusses our use of regression analyses. In this section, we further discuss considerations that are specific to the panel data. The country-period panel structure of the data entails dependence of observations within countries over time, leading to issues of unit (country) and/or time effects, heteroscedasticity and serial correlation. These are problems in our models, as evidenced by a variety of econometric tests developed for panel data; details of these tests are not shown here but are available on request. With the exception of some of the models of war incidence, F-tests for individual effects otherwise always suggest the presence of unobserved unit heterogeneity. If covariates are correlated with unit effects, a standard linear regression or generalised linear model can lead to poor fit and misleading estimates due to omitted variable bias. Quantitative studies in economics and political science commonly rely on country fixed-effects (FE) to control for potential unobserved (time-constant) country heterogeneity. By estimating only within-unit effects, fixed effects models allow for dependence between the unobserved country effects and the observed covariates. Another option would be random-effects models, but these rely on the strong assumption that the unit effects are uncorrelated with the independent variables.[10] In our specifications, Hausman-tests always indicate that random-effects models are not justified. We use the fixed effects ordinary least squares (FE) estimator (run on demeaned within-country data) with cluster-robust standard errors (clustered by country), and the fixed effects general (or unrestricted) feasible generalised least squares (FEGLS) estimator. A FE model, which accounts for individual effects, has composite errors that are necessarily serially correlated, due to the time-invariant error component. There can also be "persistent" or time-decaying serial correlation in the idiosyncratic errors, such as an AR(1) process [4, ch. 4]. A test for this latter type or serial correlation in FE panels by Wooldridge [6, sec. 10.5.4], which is well suited to our context of short panels, suggests that most of the panel models (with the exception of some of the health models) are subject to such persistent serial correlation. We primarily base our conclusions on the FEGLS estimator, which addresses both sources of serial correlation. Wooldridge [6, p. 312] notes that "[t]his is a natural route to follow if the robust standard errors of the FE estimator are too large to be useful and if there is evidence of serial dependence or a time-varying variance." Indeed, in our specifications, the coefficients of the FE and FEGLS very often have the same sign but the FE estimates have much larger standard errors and are not statistically significant while the FEGLS estimates are.[11]

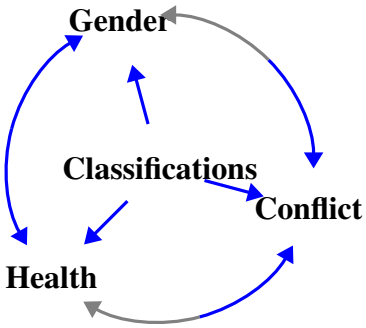
As discussed in the previous section, many of the panel models include the lagged dependent variable as a covariate, because this allows us to examine feedback loops and ceiling effects. It is well known that such dynamic fixed-effects models are subject to Nickell-bias – named after the author who first analytically derived it – in the parameter estimates of the unit effects [2, pp. 85–86, 1, p. 245, 3]. This downward bias is a function of the number of time points (T) in the sample and the size of the lagged dependent variable effect; it is largest in very short panels and becomes negligible with very large T, but cannot be ameliorated by increasing the number of countries (units) in the sample. At very low values of T, such as 2 or 3, the bias can be so severe that it changes the direction of estimated effects. There are estimators and corrections to address this, but they require other very strong assumptions and introduce new problems. We choose to use the dynamic fixed-effects

[10] This assumption is clearly not justified in our analyses, as we include lagged dependent variables in order to test the harmful and beneficial cycles hypotheses, which implies feedback loops.

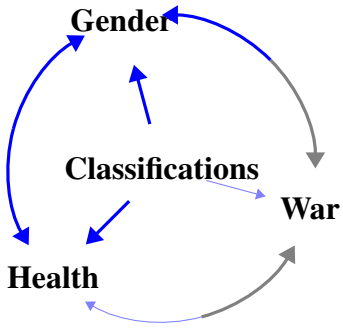
[11] We also implemented the models with the first difference (FD) and FDGLS estimators. These results are often similar but do not reach statistical significance when the FE and FEGLS estimates do (not shown).

Figure 10: Simple correlations

(a) using conflict measure



(b) using war measure



models despite the likely bias because they are still useful in revealing broad associations between our variables of interest that can shed light on beneficial and harmful cycles. As we have 7-9 periods (T) for most countries in our dataset, and the coefficients on the lagged dependent variable are sufficiently large, we contend that the bias is highly unlikely to change the direction of estimates, and note that therefore we are likely presenting underestimates of associations.

The following discussion is based on results and interaction effects calculated from the multivariable regressions shown in the tables at the end of this appendix section. We report only associations that are statistically significant at the 0.05 alpha level or lower. The figures of interaction effects include 95% confidence intervals; in these figures, estimates are statistically significant if their confidence intervals do not touch the zero line.[12]

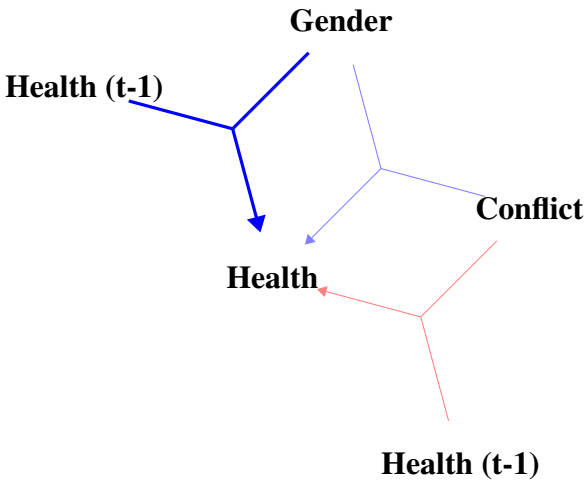
I.3 Findings on beneficial and harmful cycles with armed conflict

The diagrams in Figure 10 summarise our findings on simple correlations. We find that health and gender are positively correlated with each other in multivariable models. Moreover, the classification groups have associations that are consistent with beneficial and harmful cycles. We implemented several models with the classification groups, varying the reference category such that we estimate differences compared to the low, mid, and high classifications, respectively. The low classification is associated with worse subsequent health and gender outcomes than all of the other classifications, while the high and mid classifications also have better outcomes than the G>H classification; the associations with gender outcomes are sometimes statistically significant in only the FE models. The differences in estimated health and gender outcomes between the high, mid and H>G classifications are often not statistically distinguishable. Nonetheless, these findings regarding the lower and upper

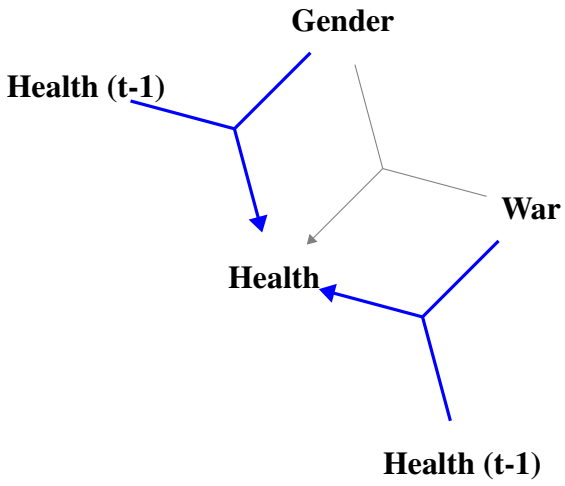
[12]The analyses were implemented in R with the *plm* package. [5, 4].

Figure 11: Two-way interactions: health models

(a) using conflict measure



(b) using war measure



ends of the classification clearly support beneficial and harmful cycles.

Better health and gender performance are also associated with decreased subsequent conflict incidence based on the 25 battle-related deaths threshold. In the models with the conflict measure, however, we do not find evidence of feedback from conflict to health and gender outcomes; conflict incidence is not associated with decreased subsequent health or gender performance. Interestingly, when we replace the conflict measure with the war incidence measures, the findings on armed conflict are partially reversed. War is associated with decreased subsequent gender performance, as expected. While in the basic health model, the estimate for war incidence is still not statistically significant, when we include the interaction of health and gender (see below), it is. In the model of war incidence, however, while the health or gender estimates have the expected sign, neither are statistically significant. Moreover, the only clear difference between classification groups is that the high classification is associated with less war than the G>H classification. These differences in findings on the role of lower-intensity conflict and higher-intensity war suggest that while health and gender may play a role in small-scale conflict incidence, it is higher-intensity war that appears to to have feedback effects on health and gender outcomes. Overall, the simple correlations provide much support for the harmful and beneficial cycles hypotheses.

As noted in Appendix I.1, modelling interactions of health, gender, and violence allows us to examine conditional effects, which may shed light on beneficial and harmful cycles. We calculated and plotted any interaction effects for interpretation; the figures show the estimated effects of variables of interest across the full range of the other variable in the interaction. First, we report the two-way interactions for each outcome, and then turn to the three-way interactions.

In models of health, summarised in Figure 11, the evidence partially supports beneficial and harmful cycles. To begin with, while both health and gender have overall positive associations with subsequent health performance, their interaction clearly supports the ceiling effects raised

Figure 12: Conditional effect of past gender (FEGLS)

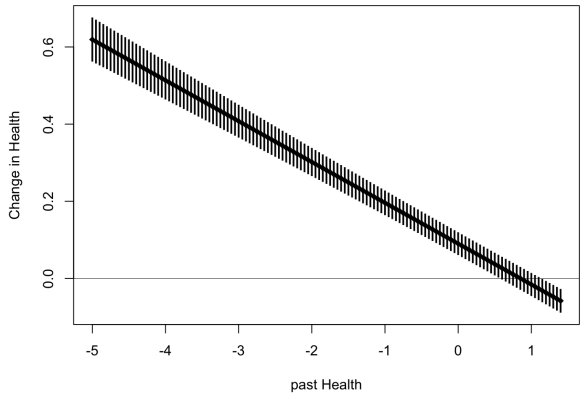
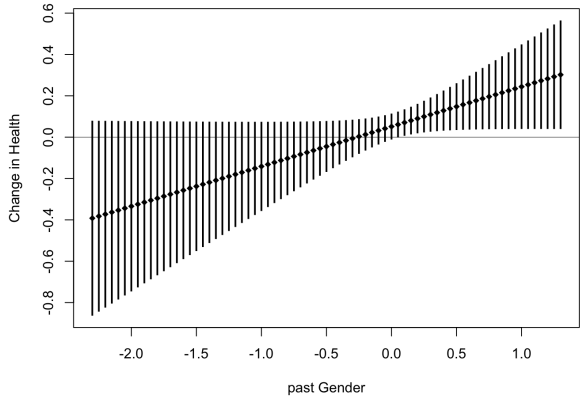


Figure 13: Health outcomes: conditional effect of past conflict (FE)

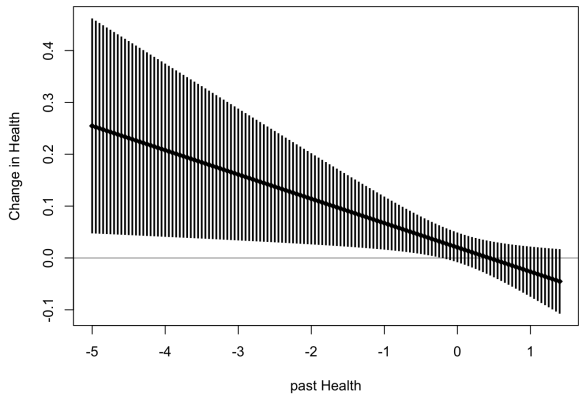


in Appendix H. Figure 12 and other interaction figures below present the calculated interaction effects across the range of observed values with 95% confidence intervals; the confidence bands of statistically significant associations do not touch the zero line. This figure shows that the effect of gender on current health performance is mostly positive but decreasing as past health performance increases, and even becomes negative at the very highest levels of prior health outcomes. What is the role of organised violence in this? Recall that we found less robust evidence of associations between conflict or war and subsequent health; this finding masks some interesting conditional effects. Figure 13 shows the effect of conflict on subsequent health outcomes across the range of the gender variable; this effect is increasing with increasing gender performance, but the negative effects when prior gender performance was low are not statistically significant, while conflict is actually associated with improved health outcomes when gender performance is high in the FE model. This finding suggests that gender matters to how conflict impacts health, but this evidence is not replicated in the FEGLS model or when the conflict incidence variable is replaced by war incidence.

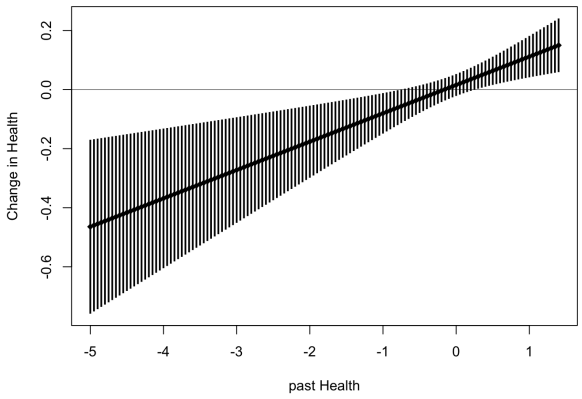
Finally, Figure 14 shows the conditional effects of conflict and war by prior performance, clarifying the simple correlations above. Conflict is associated with improved subsequent health outcomes

Figure 14: Health outcomes: conditional effects of past conflict & war by health (FEGLS)

(a) Effect of conflict



(b) Effect of war

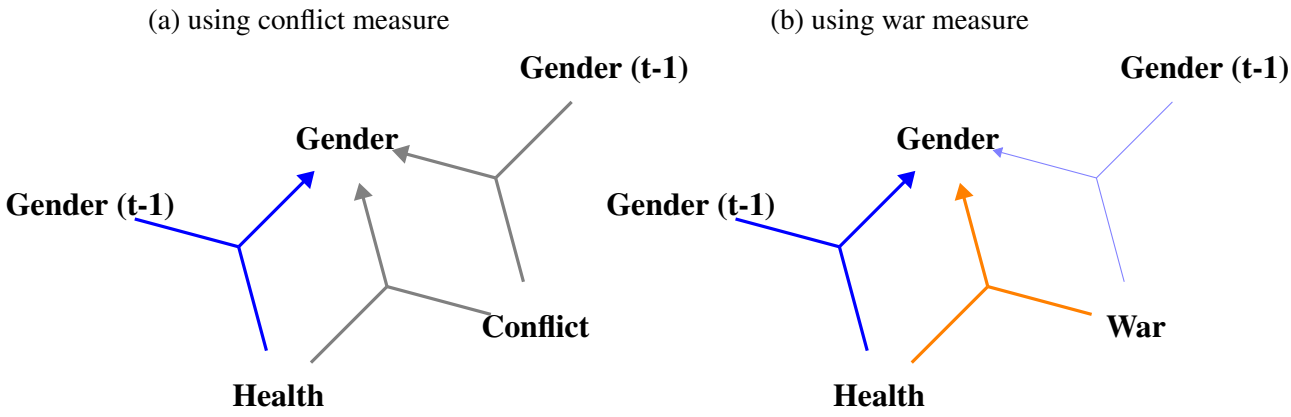


at low to mid levels of past health performance, and has no statistically significant effect at high levels. This seems at odds with the beneficial and harmful cycles hypotheses, but it is plausible that lower-intensity conflict does not have so much of an effect on population-level health that it cancels out general improvements on average – recall that all countries experience significant improvements overall – and the null effect at high levels of past health may be due to the previously noted ceiling effect. The conditional effect of war, however, is exactly as expected: war incidence is associated with decreased subsequent health outcomes at low to mid levels of past health performance, and with improved outcomes at only very high levels of past health. This contrast as unsurprising, as war is more like to severely undermine population health than lower-level conflict. Thus, some interaction effects shed light where the simple correlations do not support the harmful and beneficial cycles hypotheses.

Figure 15 summarises the findings of interactions in the gender models. In Figure 16, there is again clear evidence of a ceiling effect: health is associated with improvements in gender outcomes only at low to mid levels of past gender performance. The other interactions in gender models provide weak or no evidence. None of the other interaction effects involving conflict incidence are statistically significant. Figure 17 shows the conditional effect of war across prior levels of health and gender. War is associated with a decrease in gender performance only at high levels of past health performance; the downward sloping effects line is the opposite of our expectation. In the second panel of the figure, which plots interaction effect of war and past gender performance, however, the effect of war on gender is negative and the line is upward-sloping but only statistically significant at mid levels of past gender. Overall, the two-way interactions in models of gender provide little additional evidence on beneficial and harmful cycles involving armed conflict.

The findings on two-way interactions in the models of conflict or war are summarised in Figure 18. Figure 19 shows two views on the interaction of health and gender, based on which of the two variables the conditional effects are calculated for. While the interaction coefficient itself is not statistically significant, the conditional effects (calculated from the interaction term and the constitutive terms) are strongly supportive of beneficial cycles. Improvements in health are associated with subsequent decreases in conflict incidence at mid to high levels of past gender performance, but not at low levels.

Figure 15: Two-way interactions: gender models



Alternatively, improvements in gender outcomes are associated with decreased conflict incidence only at high levels of past health performance. When the outcome variable is war incidence, however, the effects are never statistically significant, which is consistent with the simple correlations discussed above.

Figure 20 shows the conditional effects of conflict on subsequent conflict over the ranges of the health and gender variables. The downward sloping effects line in the first figure panel indicates that past conflict is always associated with subsequent conflict but that the likelihood decreases with increasing past health performance; this is consistent with the presence of a beneficial cycle. Again, however, the finding regarding the role of gender is contrary to expectations: at mid to high levels of past gender performance conflict is associated with increased subsequent conflict. When the

Figure 16: Gender outcomes: Conditional effect of past health (FEGLS)

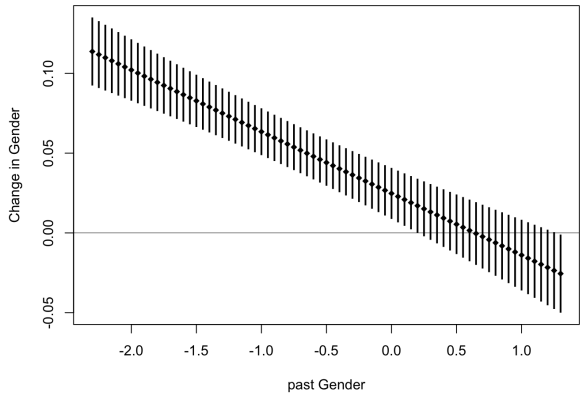
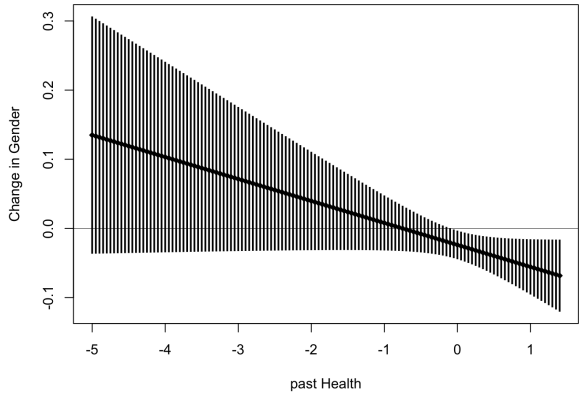
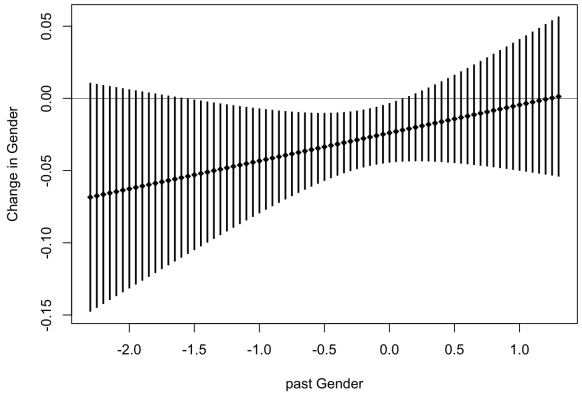


Figure 17: Gender outcomes: conditional effect of past war (FEGLS)

(a) by health



(b) by gender

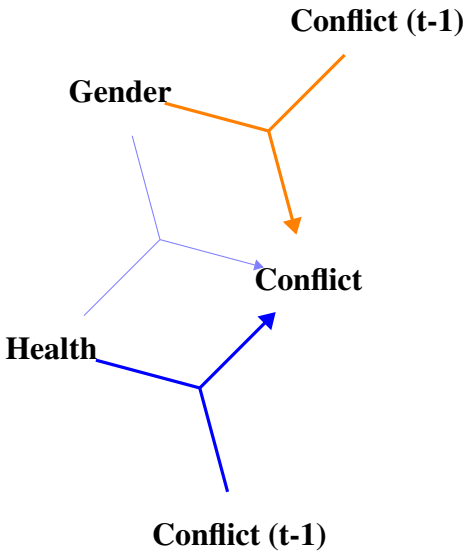


conflict incidence variable is replaced with war incidence, these interaction effects are even more pronounced (not shown); for instance, war is associated with decreased subsequent war at low levels of prior gender performance. Thus, while we find support for a link between gender inequality and conflict in the simple correlation discussed above, this interaction suggests that the role of gender in recidivism is complex. Future research should explore whether gender plays different roles in initial onset of conflict and recidivism.

Finally, Figure 21 summarises the findings of the three-way interactions. Here, each arrow represents the result of interactions of conflict or war incidence with the classifications to examine whether certain combinations of health and gender outcomes mediate impacts of armed conflict differently.

Figure 18: Two-way interactions: conflict & war models

(a) using conflict measure



(b) using war measure

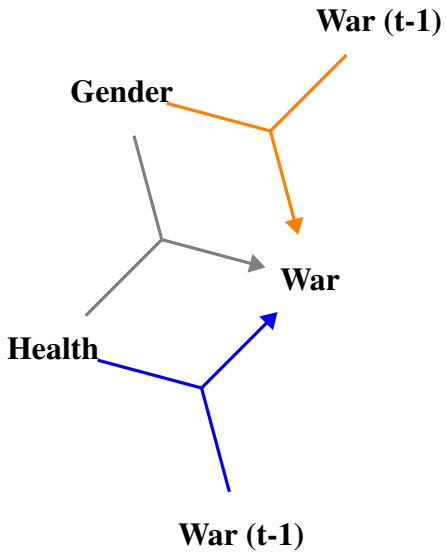
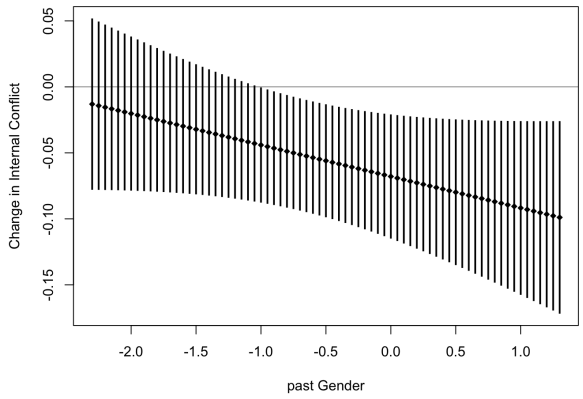


Figure 19: Conflict outcomes: health-gender interaction

(a) Conditional effect of past health (FEGLS)



(b) Conditional effect of past gender (FEGLS)

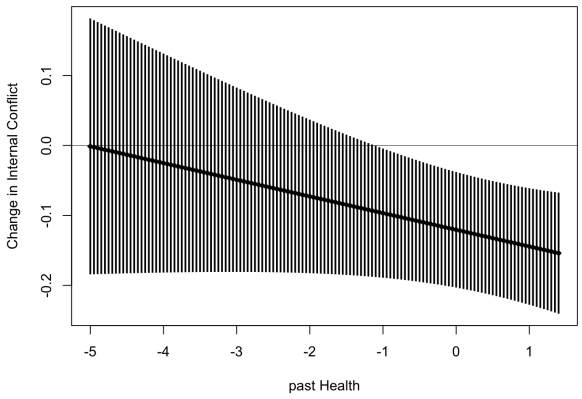
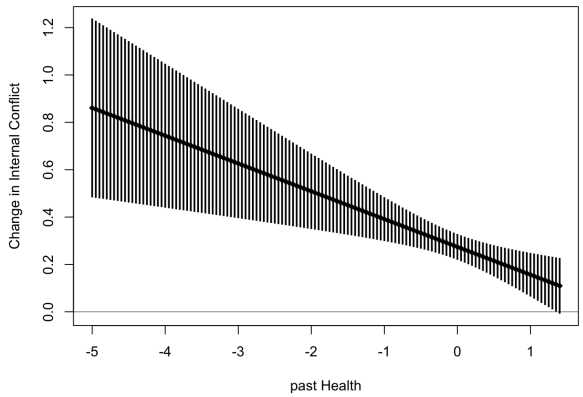
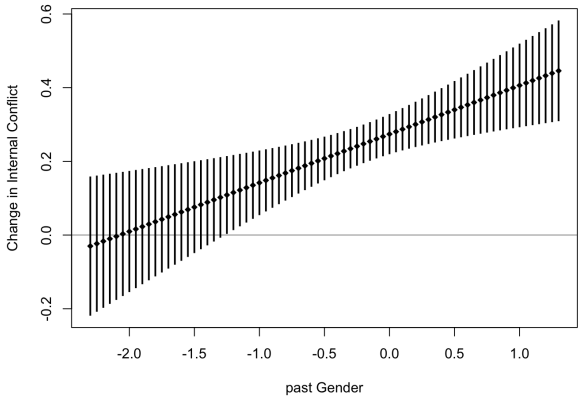


Figure 20: Conflict outcomes: conditional effect of past conflict (FEGLS)

(a) by health



(b) by gender

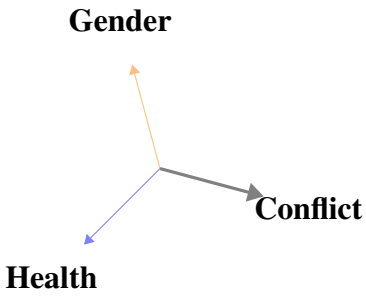


The following figures show the calculated interaction effects of conflict or war in each classification group with 95% confidence intervals. In Figure 22, conflict is associated with decreases in health outcomes only in the low and mid classifications. The result for the low classification is consistent with a harmful cycle, but this effects is not clearly statistically distinguishable from the effects in the other groups. When substituting the war incidence measure, the differences are much clearer; only in the low classification group is war associated with a decrease in health outcomes and this effect is statistically distinguishable from those in almost all other groups, as the confidence intervals do not overlap (with the exception of G>H). This provides strong support for the presence of a harmful cycle.

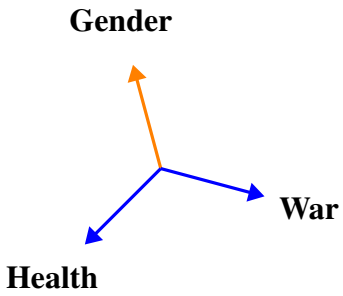
The results of the gender models in Figure 23 are less clear. Conflict is associated with decreases in gender outcomes in all but the mid classification, but the decrease is smallest in the low classification, largest in the G>H classification, with the high classification in-between. This is difficult to interpret from the perspective of beneficial and harmful cycles, because it partially supports and contradicts expectations, although it raises the possibility of a particularly harmful cycle in the G>H

Figure 21: Three-way interactions

(a) using conflict measure



(b) using war measure

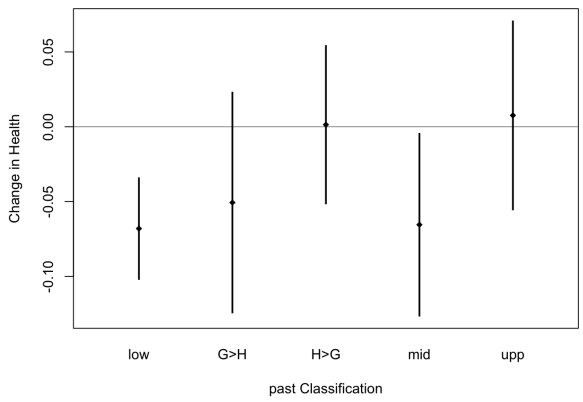


classification group. When substituting the war incidence measure, however, the results largely contradict our expectations, as here war is associated with improved gender outcomes in the G>H and mid classifications, but worsened outcomes in the H>G and high classifications. Once again, these results suggest that gender outcomes do not fit as clearly into beneficial and harmful cycles as health outcomes. While the simple correlations provide support for such cycles involving gender conditions, the interactions suggest that feedback loops are complicated, and call for further analyses.

Figure 24 shows the three-way interaction effects on conflict or war. The positive associations of past conflict with subsequent conflict are not statistically distinguishable between classification groups. However, in the case of war incidence, the evidence strongly supports a harmful cycle in all

Figure 22: Health outcomes: conditional effects of conflict & war

(a) Conflict



(b) War

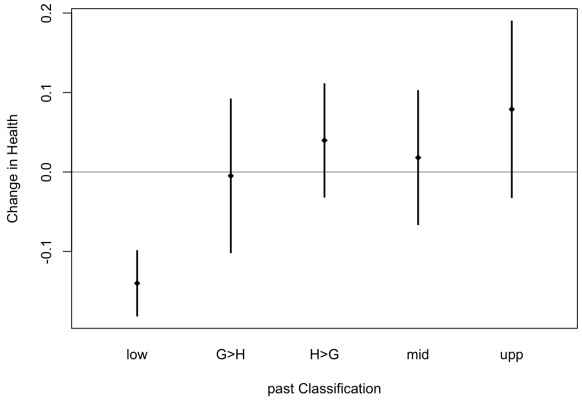
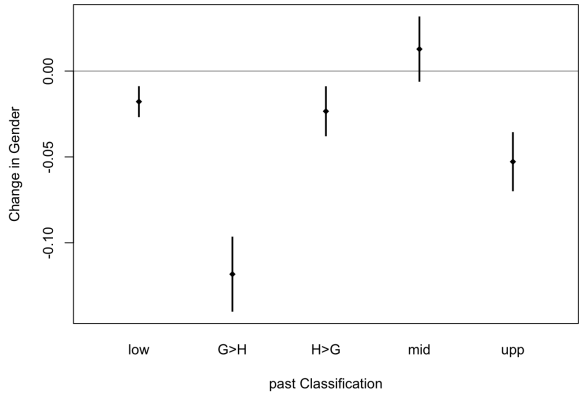


Figure 23: Gender outcomes: conditional effects of conflict & war

(a) Conflict



(b) War

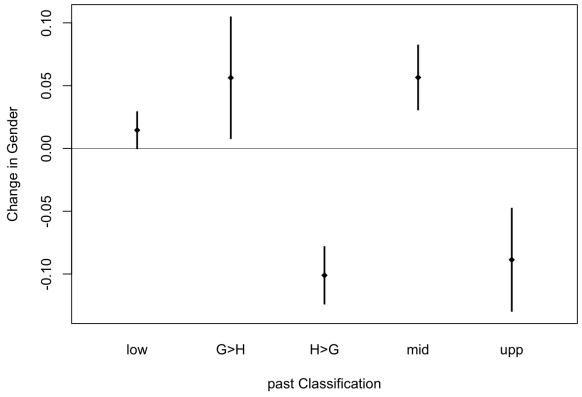
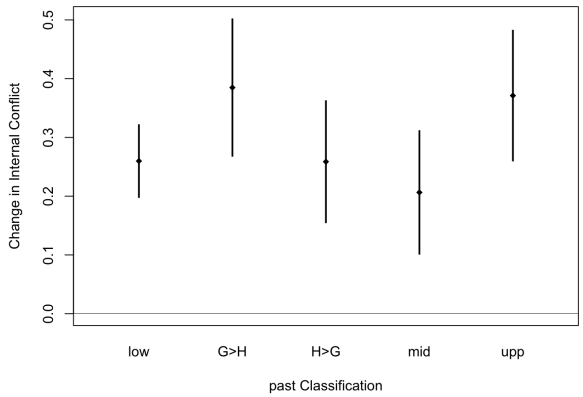
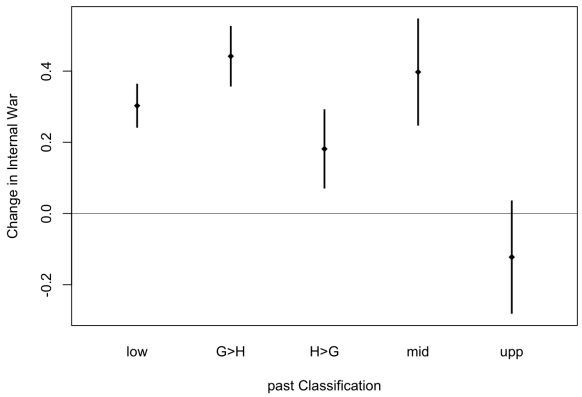


Figure 24: Conflict & war outcomes: conditional effects of past conflict or war

(a) Conflict



(b) War

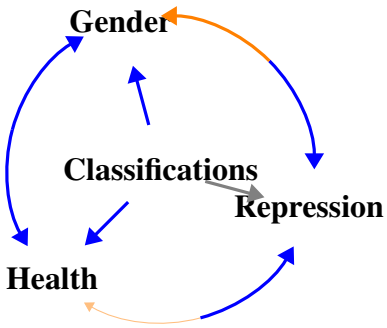


but the high classification, in which the estimate is negative but not statistically significant. In the other classification groups, war is associated with increased subsequent war incidence, and these estimates are also statistically distinguishable from that in the high classification.

I.4 Findings regarding state repression of physical integrity

All panel models include the latent physical integrity measure, and additional models examine interactions with this variable, analogous to the analyses of conflict and war discussed above. This section briefly summarises these results on the role of physical integrity repression but does not show the interaction figures. The evidence on beneficial and harmful cycles, summarised in Figure 25 and Figure 26, is not as strong as in the case of armed conflict, but still support some elements. In Figure 25, increases in both the health and gender indices are associated with less subsequent repression, but there are no clear differences in repression outcomes across the classification categories. There is no evidence of a feedback from repression to health and gender performance.

Figure 25: Repression: simple correlations



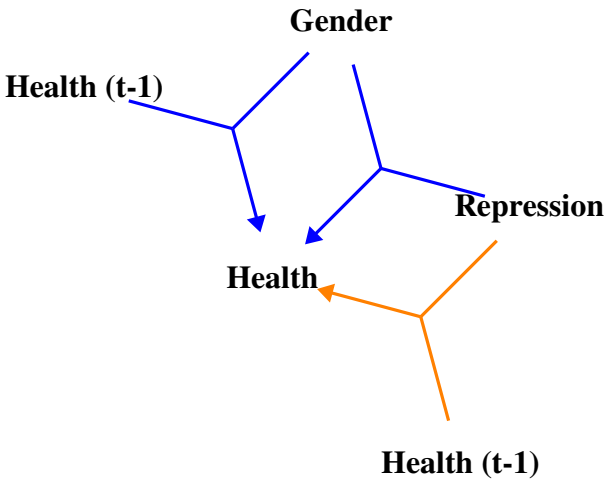
Rather, repression is associated with increased subsequent health and gender performance, though the evidence is weaker in the health model. This indicates that gender and health tend to improve despite physical integrity repression.

The results of the interactions are mixed, as summarised in Figure 26, both supporting and contradicting harmful and beneficial cycles. When health (a) is the dependent variable, the interaction of gender and repression strongly supports the notion of beneficial and harmful cycles, as increased repression is associated with decreased subsequent health outcomes when past gender performance was poor, and with improved health at high levels of past gender performance. The interaction with past health, however, suggests that repression is associated with health improvements at all but the highest prior health performance. This is the opposite of expectation from the perspective of beneficial and harmful cycles, but is consistent with the positive correlation between repression and health noted above, and the possibility of a ceiling effect. The gender models (b) show similar conditional associations. Repression is associated with improved gender outcomes only at the highest levels of past gender performance, but with gender improvements at lower levels of past health performance. In these interactions, past gender performance contributes to beneficial and harmful cycles but health performance does not.

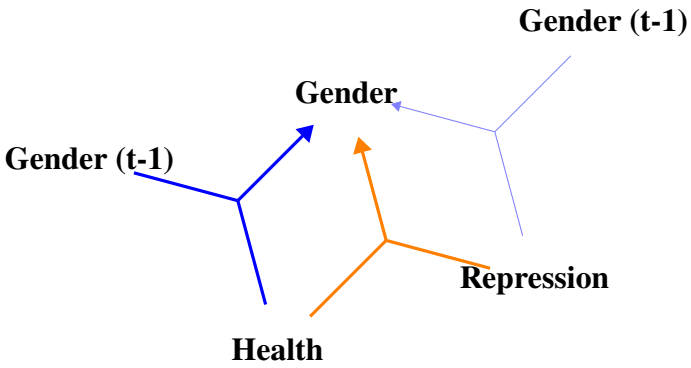
The interactions with the classifications (d) indicate that repression is associated with improved health outcomes in the H>G, mid, and high classification groups, and these effects are statistically different from that of the low classification; this suggests that the association between repression and better health outcomes is driven by the higher classifications. In the gender model, the interaction with the classifications leads to mixed results that neither clearly support nor clearly contradict beneficial or harmful cycles. Finally, in the models of repression (c and d), the health-gender interaction provides strong support: improved health performance is associated with decreased subsequent repression at all but the lowest levels of past gender performance, and gender improvements are associated with decreased repression at high levels of past health performance. The interactions of past repression with health or gender performance or the classifications shed little light, as they show weakly contradictory or null results.

Figure 26: Repression: interactions

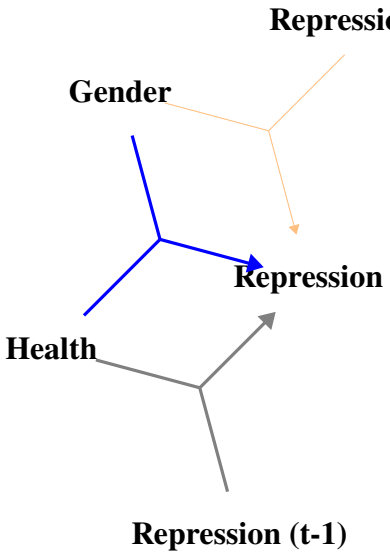
(a) Two-way interactions: health models



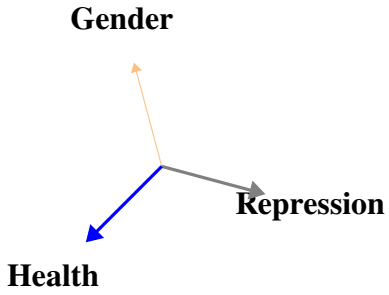
(b) Two-way interactions: gender models



(c) Two-way interactions: repression models



(d) Three-way interactions (violence with classifications)



I.5 Regression tables

Table 12: Health models with conflict measure (FEGLS)

Variables (lagged)	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
GDP per capita (log)	-0.008 (0.415)	0.047 (<0.001)	-0.006 (0.541)	-0.010 (0.328)	0.062 (<0.001)	0.062 (<0.001)	0.062 (<0.001)	0.084 (<0.001)	0.076 (<0.001)
population density (log)	0.085 (<0.001)	0.090 (<0.001)	0.084 (<0.001)	0.081 (0.001)	0.989 (<0.001)	0.989 (<0.001)	0.989 (<0.001)	0.937 (<0.001)	0.929 (<0.001)
electoral democracy	-0.008 (0.881)	0.011 (0.738)	-0.005 (0.930)	0.006 (0.916)	0.088 (0.093)	0.088 (0.093)	0.088 (0.093)	0.110 (0.077)	0.119 (0.038)
participatory democracy	0.107 (0.036)	0.119 (<0.001)	0.115 (0.031)	0.136 (0.012)	0.026 (0.635)	0.026 (0.635)	0.026 (0.635)	0.072 (0.274)	0.046 (0.441)
liberal democracy	0.085 (0.077)	0.151 (<0.001)	0.072 (0.155)	0.045 (0.384)	0.130 (0.004)	0.130 (0.004)	0.130 (0.004)	0.082 (0.139)	0.099 (0.047)
gender	0.068 (0.005)	0.090 (<0.001)	0.066 (0.013)	0.087 (0.001)					
health	0.785 (<0.001)	0.667 (<0.001)	0.786 (<0.001)	0.781 (<0.001)					
health * gender		-0.106 (<0.001)							
low classification					-0.222 (<0.001)	-0.193 (<0.001)			
G>H classification					-0.068 (<0.001)	-0.038 (0.017)	0.155 (<0.001)	0.138 (<0.001)	0.134 (<0.001)
H>G classification					0.000 (0.997)	0.030 (0.017)	0.222 (<0.001)	0.191 (<0.001)	0.213 (<0.001)
mid classification					-0.030 (0.089)		0.193 (<0.001)	0.178 (<0.001)	0.191 (<0.001)
high classification						0.030 (0.089)	0.222 (<0.001)	0.190 (<0.001)	0.184 (<0.001)
conflict incidence	0.013 (0.317)	-0.010 (0.238)	0.020 (0.165)	0.021 (0.112)	-0.046 (<0.001)	-0.046 (<0.001)	-0.046 (<0.001)	-0.068 (<0.001)	-0.029 (0.026)
conflict * health			-0.047 (0.023)						
conflict * gender			0.041 (0.083)						
conflict * G>H								0.018 (0.658)	
conflict * H>G								0.069 (0.033)	
conflict * mid								0.002 (0.964)	
conflict * high								0.076 (0.031)	
latent physical integrity	0.010 (0.062)	0.012 (0.001)	0.009 (0.115)	0.010 (0.082)	0.018 (0.004)	0.018 (0.004)	0.018 (0.004)	0.017 (0.021)	-0.015 (0.106)
LPI * health				-0.062 (<0.001)					
LPI * gender				0.079 (<0.001)					
LPI * G>H									0.035 (0.021)
LPI * H>G									0.078 (<0.001)
LPI * mid									0.058 (<0.001)
LPI * high									0.043 (<0.001)
N	1290	1290	1290	1290	1290	1290	1290	1290	1290
countries	160	160	160	160	160	160	160	160	160
periods	2-9	2-9	2-9	2-9	2-9	2-9	2-9	2-9	2-9
R^2	0.968	0.968	0.968	0.97	0.923	0.923	0.923	0.923	0.924

Note: estimates (p-value)

Table 13: Health models with conflict measure (FE)

Variables (lagged)	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
GDP per capita (log)	-0.022 (0.222)	0.012 (0.528)	-0.025 (0.137)	-0.032 (0.085)	0.142 (0.001)	0.142 (0.001)	0.142 (0.001)	0.139 (0.002)	0.152 (<0.001)
population density (log)	0.092 (0.099)	0.043 (0.340)	0.089 (0.096)	0.057 (0.136)	0.875 (<0.001)	0.875 (<0.001)	0.875 (<0.001)	0.879 (<0.001)	0.876 (<0.001)
electoral democracy	0.085 (0.547)	0.108 (0.428)	0.074 (0.610)	0.058 (0.658)	0.205 (0.367)	0.205 (0.367)	0.205 (0.367)	0.211 (0.348)	0.242 (0.293)
participatory democracy	0.248 (0.126)	0.203 (0.197)	0.251 (0.116)	0.241 (0.111)	0.778 (0.005)	0.778 (0.005)	0.778 (0.005)	0.781 (0.005)	0.762 (0.007)
liberal democracy	-0.101 (0.552)	-0.088 (0.588)	-0.095 (0.583)	-0.097 (0.567)	-0.312 (0.281)	-0.312 (0.281)	-0.312 (0.281)	-0.314 (0.272)	-0.325 (0.264)
gender	0.083 (0.198)	0.113 (0.083)	0.044 (0.380)	0.087 (0.118)					
health	0.763 (<0.001)	0.709 (<0.001)	0.801 (<0.001)	0.810 (<0.001)					
health * gender		-0.074 (<0.001)							
low classification					-0.458 (<0.001)	-0.465 (<0.001)			
G>H classification					-0.252 (<0.001)	-0.259 (0.001)	0.206 (0.026)	0.165 (0.130)	0.172 (0.100)
H>G classification					0.058 (0.250)	0.051 (0.227)	0.516 (<0.001)	0.467 (<0.001)	0.482 (<0.001)
mid classification					0.007 (0.906)		0.465 (<0.001)	0.405 (<0.001)	0.451 (<0.001)
high classification						-0.007 (0.906)	0.458 (<0.001)	0.425 (<0.001)	0.414 (<0.001)
conflict incidence	0.048 (0.222)	0.051 (0.178)	0.051 (0.109)	0.057 (0.109)	0.055 (0.394)	0.055 (0.394)	0.055 (0.394)	-0.016 (0.875)	0.062 (0.323)
conflict * health			-0.154 (0.089)						
conflict * gender			0.193 (0.060)						
conflict * G>H								0.175 (0.235)	
conflict * H>G								0.199 (0.191)	
conflict * mid								0.218 (0.119)	
conflict * high								0.036 (0.749)	
latent physical integrity	-0.001 (0.921)	-0.010 (0.377)	-0.003 (0.718)	-0.012 (0.244)	0.006 (0.803)	0.006 (0.803)	0.006 (0.803)	0.007 (0.762)	-0.028 (0.500)
LPI * health				-0.086 (0.005)					
LPI * gender				0.112 (0.004)					
LPI * G>H									0.048 (0.417)
LPI * H>G									0.093 (0.026)
LPI * mid									0.013 (0.842)
LPI * high									0.058 (0.127)
N	1290	1290	1290	1290	1290	1290	1290	1290	1290
countries	160	160	160	160	160	160	160	160	160
periods	2-9	2-9	2-9	2-9	2-9	2-9	2-9	2-9	2-9
Adjusted R^2	0.823	0.828	0.826	0.835	0.622	0.622	0.622	0.623	0.624

Note: estimates (p-value)

Table 14: Health models with war measure (FEGLS)

Variables (lagged)	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
GDP per capita (log)	-0.010 (0.276)	0.055 (<0.001)	-0.012 (0.195)	-0.010 (0.358)	0.068 (<0.001)	0.068 (<0.001)	0.068 (<0.001)	0.087 (<0.001)	0.089 (<0.001)
population density (log)	0.098 (<0.001)	0.105 (<0.001)	0.082 (<0.001)	0.091 (<0.001)	1.020 (<0.001)	1.020 (<0.001)	1.020 (<0.001)	0.890 (<0.001)	0.923 (<0.001)
electoral democracy	-0.009 (0.864)	0.033 (0.161)	0.004 (0.936)	0.010 (0.860)	0.150 (0.009)	0.150 (0.009)	0.150 (0.009)	0.153 (0.019)	0.161 (0.015)
participatory democracy	0.119 (0.015)	0.127 (<0.001)	0.113 (0.021)	0.146 (0.006)	0.052 (0.378)	0.052 (0.378)	0.052 (0.378)	0.048 (0.487)	0.109 (0.106)
liberal democracy	0.104 (0.031)	0.156 (<0.001)	0.110 (0.023)	0.059 (0.257)	0.051 (0.299)	0.051 (0.299)	0.051 (0.299)	0.034 (0.553)	0.023 (0.696)
gender	0.054 (0.022)	0.080 (<0.001)	0.065 (0.007)	0.076 (0.003)					
health	0.791 (<0.001)	0.660 (<0.001)	0.787 (<0.001)	0.782 (<0.001)					
health * gender		-0.111 (<0.001)							
low classification					-0.214 (<0.001)	-0.184 (<0.001)			
G>H classification					-0.070 (<0.001)	-0.041 (0.020)	0.143 (<0.001)	0.173 (<0.001)	0.121 (0.001)
H>G classification					0.001 (0.947)	0.030 (0.023)	0.215 (<0.001)	0.242 (<0.001)	0.201 (<0.001)
mid classification					-0.029 (0.121)		0.184 (<0.001)	0.224 (<0.001)	0.176 (<0.001)
high classification						0.029 (0.121)	0.214 (<0.001)	0.241 (<0.001)	0.172 (<0.001)
latent physical integrity	0.013 (0.019)	0.014 (<0.001)	0.014 (0.011)	0.014 (0.017)	0.008 (0.171)	0.008 (0.171)	0.008 (0.171)	0.009 (0.206)	-0.021 (0.024)
LPI * health				-0.058 (<0.001)					
LPI * gender				0.077 (<0.001)					
LPI * G>H									0.037 (0.033)
LPI * H>G									0.076 (<0.001)
LPI * mid									0.059 (0.001)
LPI * high									0.046 (<0.001)
war incidence	-0.011 (0.495)	-0.058 (<0.001)	0.016 (0.399)	-0.010 (0.574)	-0.055 (<0.001)	-0.055 (<0.001)	-0.055 (<0.001)	-0.140 (<0.001)	-0.052 (0.001)
war * health			0.096 (0.001)						
war * gender			-0.011 (0.741)						
war * G>H								0.136 (0.011)	
war * H>G								0.180 (<0.001)	
war * mid								0.158 (0.001)	
war * high								0.220 (<0.001)	
N	1290	1290	1290	1290	1290	1290	1290	1290	1290
countries	160	160	160	160	160	160	160	160	160
periods	2-9	2-9	2-9	2-9	2-9	2-9	2-9	2-9	2-9
R^2	0.968	0.968	0.968	0.97	0.925	0.925	0.925	0.925	0.925

Note: estimates (p-value)

Table 15: Health models with war measure (FE)

Variables (lagged)	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
GDP per capita (log)	-0.018 (0.323)	0.014 (0.461)	-0.014 (0.500)	-0.029 (0.116)	0.144 (0.001)	0.144 (0.001)	0.144 (0.001)	0.146 (0.001)	0.153 (<0.001)
population density (log)	0.100 (0.082)	0.053 (0.278)	0.096 (0.130)	0.067 (0.085)	0.870 (<0.001)	0.870 (<0.001)	0.870 (<0.001)	0.869 (<0.001)	0.874 (<0.001)
electoral democracy	0.104 (0.495)	0.124 (0.402)	0.139 (0.408)	0.070 (0.612)	0.231 (0.313)	0.231 (0.313)	0.231 (0.313)	0.250 (0.276)	0.264 (0.253)
participatory democracy	0.272 (0.106)	0.229 (0.164)	0.229 (0.177)	0.264 (0.092)	0.807 (0.004)	0.807 (0.004)	0.807 (0.004)	0.766 (0.005)	0.785 (0.005)
liberal democracy	-0.113 (0.517)	-0.100 (0.554)	-0.096 (0.531)	-0.104 (0.545)	-0.331 (0.258)	-0.331 (0.258)	-0.331 (0.258)	-0.315 (0.258)	-0.343 (0.241)
gender	0.070 (0.249)	0.098 (0.101)	0.088 (0.234)	0.070 (0.172)					
health	0.762 (<0.001)	0.711 (<0.001)	0.735 (<0.001)	0.811 (<0.001)					
health * gender		-0.070 (<0.001)							
low classification					-0.448 (<0.001)	-0.461 (<0.001)			
G>H classification					-0.255 (<0.001)	-0.268 (0.001)	0.193 (0.040)	0.190 (0.055)	0.155 (0.152)
H>G classification					0.063 (0.209)	0.050 (0.241)	0.511 (<0.001)	0.487 (<0.001)	0.479 (<0.001)
mid classification					0.013 (0.831)		0.461 (<0.001)	0.434 (<0.001)	0.445 (<0.001)
high classification						-0.013 (0.831)	0.448 (<0.001)	0.431 (<0.001)	0.395 (<0.001)
latent physical integrity	0.014 (0.277)	0.005 (0.670)	0.016 (0.260)	0.004 (0.679)	0.026 (0.227)	0.026 (0.227)	0.026 (0.227)	0.026 (0.222)	-0.003 (0.945)
LPI * health				-0.087 (0.007)					
LPI * gender				0.108 (0.004)					
LPI * G>H									0.053 (0.368)
LPI * H>G									0.093 (0.028)
LPI * mid									0.014 (0.828)
LPI * high									0.044 (0.212)
war incidence	-0.141 (0.342)	-0.123 (0.405)	0.006 (0.922)	-0.135 (0.369)	-0.205 (0.252)	-0.205 (0.252)	-0.205 (0.252)	-0.398 (0.244)	-0.203 (0.249)
war * health			0.352 (0.270)						
war * gender			-0.169 (0.478)						
war * G>H								0.262 (0.485)	
war * H>G								0.406 (0.274)	
war * mid								0.595 (0.109)	
war * high								0.445 (0.187)	
N	1290	1290	1290	1290	1290	1290	1290	1290	1290
countries	160	160	160	160	160	160	160	160	160
periods	2-9	2-9	2-9	2-9	2-9	2-9	2-9	2-9	2-9
Adjusted R^2	0.825	0.829	0.83	0.836	0.626	0.626	0.626	0.629	0.627

Note: estimates (p-value)

Table 16: Gender models with conflict measure (FEGLS)

Variables (lagged)	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
GDP per capita (log)	-0.005 (0.404)	0.009 (0.104)	-0.005 (0.403)	-0.008 (0.161)	0.036 (<0.001)	0.036 (<0.001)	0.036 (<0.001)	0.034 (<0.001)	0.033 (<0.001)
population density (log)	0.179 (<0.001)	0.145 (<0.001)	0.178 (<0.001)	0.176 (<0.001)	0.639 (<0.001)	0.639 (<0.001)	0.639 (<0.001)	0.653 (<0.001)	0.645 (<0.001)
electoral democracy	0.042 (0.165)	0.037 (0.190)	0.039 (0.195)	0.025 (0.397)	-0.009 (0.738)	-0.009 (0.738)	-0.009 (0.738)	-0.049 (0.006)	-0.058 (0.002)
participatory democracy	0.009 (0.767)	0.005 (0.860)	0.006 (0.847)	0.004 (0.897)	0.015 (0.561)	0.015 (0.561)	0.015 (0.561)	0.010 (0.562)	0.010 (0.573)
liberal democracy	0.003 (0.931)	0.012 (0.654)	0.004 (0.899)	0.013 (0.660)	0.072 (0.002)	0.072 (0.002)	0.072 (0.002)	0.114 (<0.001)	0.109 (<0.001)
gender	0.699 (<0.001)	0.725 (<0.001)	0.700 (<0.001)	0.688 (<0.001)					
health	0.052 (<0.001)	0.025 (0.002)	0.054 (<0.001)	0.066 (<0.001)					
health * gender		-0.039 (<0.001)							
low classification					-0.012 (0.408)	-0.024 (0.057)			
G>H classification					0.059 (<0.001)	0.047 (<0.001)	0.071 (<0.001)	0.110 (<0.001)	0.116 (<0.001)
H>G classification					0.004 (0.551)	-0.008 (0.179)	0.016 (0.206)	0.030 (0.002)	0.038 (<0.001)
mid classification					0.012 (0.131)		0.024 (0.057)	0.037 (<0.001)	0.054 (<0.001)
high classification						-0.012 (0.131)	0.012 (0.408)	0.029 (0.005)	0.037 (<0.001)
conflict incidence	-0.002 (0.838)	0.001 (0.876)	-0.007 (0.396)	-0.004 (0.591)	-0.020 (<0.001)	-0.020 (<0.001)	-0.020 (<0.001)	-0.018 (<0.001)	-0.027 (<0.001)
conflict * health			-0.007 (0.541)						
conflict * gender			-0.007 (0.590)						
conflict * G>H								-0.101 (<0.001)	
conflict * H>G								-0.006 (0.529)	
conflict * mid								0.031 (0.004)	
conflict * high								-0.035 (<0.001)	
latent physical integrity	0.007 (0.044)	0.005 (0.153)	0.006 (0.070)	0.005 (0.127)	0.018 (<0.001)	0.018 (<0.001)	0.018 (<0.001)	0.021 (<0.001)	0.033 (<0.001)
LPI * health				-0.015 (<0.001)					
LPI * gender				0.009 (0.048)					
LPI * G>H									-0.059 (<0.001)
LPI * H>G									-0.015 (<0.001)
LPI * mid									-0.029 (<0.001)
LPI * high									-0.018 (<0.001)
N	1290	1290	1290	1290	1290	1290	1290	1290	1290
countries	160	160	160	160	160	160	160	160	160
periods	2-9	2-9	2-9	2-9	2-9	2-9	2-9	2-9	2-9
R^2	0.996	0.996	0.996	0.996	0.977	0.977	0.977	0.978	0.978

Note: estimates (p-value)

Table 17: Gender models with conflict measure (FE)

Variables (lagged)	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
GDP per capita (log)	0.001 (0.937)	0.020 (0.056)	0.001 (0.951)	-0.002 (0.806)	0.114 (<0.001)	0.114 (<0.001)	0.114 (<0.001)	0.114 (<0.001)	0.108 (<0.001)
population density (log)	0.130 (<0.001)	0.101 (<0.001)	0.128 (<0.001)	0.129 (<0.001)	0.731 (<0.001)	0.731 (<0.001)	0.731 (<0.001)	0.730 (<0.001)	0.733 (<0.001)
electoral democracy	0.032 (0.447)	0.046 (0.261)	0.029 (0.495)	0.019 (0.670)	0.086 (0.466)	0.086 (0.466)	0.086 (0.466)	0.084 (0.478)	0.067 (0.564)
participatory democracy	0.033 (0.382)	0.007 (0.837)	0.033 (0.382)	0.029 (0.437)	0.191 (0.061)	0.191 (0.061)	0.191 (0.061)	0.188 (0.062)	0.173 (0.089)
liberal democracy	-0.010 (0.809)	-0.003 (0.939)	-0.010 (0.808)	-0.001 (0.977)	-0.062 (0.629)	-0.062 (0.629)	-0.062 (0.629)	-0.059 (0.642)	-0.054 (0.671)
gender	0.765 (<0.001)	0.782 (<0.001)	0.767 (<0.001)	0.759 (<0.001)					
health	0.058 (<0.001)	0.026 (0.013)	0.060 (<0.001)	0.065 (<0.001)					
health * gender		-0.044 (<0.001)							
low classification					-0.264 (<0.001)	-0.217 (0.001)			
G>H classification					0.021 (0.654)	0.068 (0.015)	0.285 (<0.001)	0.299 (<0.001)	0.321 (<0.001)
H>G classification					-0.082 (0.021)	-0.035 (0.289)	0.181 (0.001)	0.185 (0.001)	0.204 (0.001)
mid classification					-0.047 (0.202)		0.217 (0.001)	0.199 (0.005)	0.239 (0.001)
high classification						0.047 (0.202)	0.264 (<0.001)	0.266 (<0.001)	0.275 (<0.001)
conflict incidence	-0.009 (0.549)	-0.007 (0.623)	-0.015 (0.317)	-0.010 (0.499)	-0.043 (0.115)	-0.043 (0.115)	-0.043 (0.115)	-0.037 (0.367)	-0.050 (0.074)
conflict * health			-0.006 (0.810)						
conflict * gender			-0.011 (0.672)						
conflict * G>H								-0.072 (0.249)	
conflict * H>G								-0.034 (0.666)	
conflict * mid								0.077 (0.201)	
conflict * high								-0.002 (0.963)	
latent physical integrity	0.013 (0.008)	0.008 (0.079)	0.013 (0.009)	0.011 (0.018)	0.030 (0.004)	0.030 (0.004)	0.030 (0.004)	0.030 (0.004)	0.059 (0.002)
LPI * health				-0.008 (0.184)					
LPI * gender				0.003 (0.641)					
LPI * G>H									-0.071 (0.021)
LPI * H>G									-0.022 (0.466)
LPI * mid									-0.027 (0.445)
LPI * high									-0.054 (0.012)
N	1290	1290	1290	1290	1290	1290	1290	1290	1290
countries	160	160	160	160	160	160	160	160	160
periods	2-9	2-9	2-9	2-9	2-9	2-9	2-9	2-9	2-9
Adjusted R^2	0.946	0.95	0.946	0.946	0.779	0.779	0.779	0.779	0.783

Note: estimates (p-value)

Table 18: Gender models with war measure (FEGLS)

Variables (lagged)	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
GDP per capita (log)	-0.004 (0.426)	0.010 (0.091)	-0.005 (0.375)	-0.008 (0.158)	0.028 (<0.001)	0.028 (<0.001)	0.028 (<0.001)	0.027 (<0.001)	0.033 (<0.001)
population density (log)	0.179 (<0.001)	0.147 (<0.001)	0.177 (<0.001)	0.175 (<0.001)	0.651 (<0.001)	0.651 (<0.001)	0.651 (<0.001)	0.649 (<0.001)	0.628 (<0.001)
electoral democracy	0.045 (0.136)	0.039 (0.170)	0.043 (0.155)	0.029 (0.337)	-0.036 (0.060)	-0.036 (0.060)	-0.036 (0.060)	-0.053 (0.029)	-0.037 (0.179)
participatory democracy	0.010 (0.723)	0.008 (0.767)	0.016 (0.592)	0.004 (0.894)	-0.013 (0.466)	-0.013 (0.466)	-0.013 (0.466)	0.050 (0.038)	0.038 (0.163)
liberal democracy	-0.002 (0.957)	0.009 (0.745)	-0.005 (0.865)	0.009 (0.766)	0.094 (<0.001)	0.094 (<0.001)	0.094 (<0.001)	0.087 (<0.001)	0.078 (0.002)
gender	0.698 (<0.001)	0.723 (<0.001)	0.697 (<0.001)	0.688 (<0.001)					
health	0.051 (<0.001)	0.025 (0.003)	0.054 (<0.001)	0.066 (<0.001)					
health * gender		-0.038 (<0.001)							
low classification					-0.012 (0.278)	-0.034 (0.001)			
G>H classification					0.070 (<0.001)	0.048 (<0.001)	0.081 (<0.001)	0.046 (0.001)	0.110 (<0.001)
H>G classification					0.010 (0.080)	-0.012 (0.004)	0.022 (0.026)	0.008 (0.521)	0.047 (0.001)
mid classification					0.022 (<0.001)		0.034 (0.001)	0.016 (0.205)	0.062 (<0.001)
high classification						-0.022 (<0.001)	0.012 (0.278)	-0.005 (0.719)	0.042 (0.007)
latent physical integrity	0.008 (0.015)	0.006 (0.058)	0.007 (0.023)	0.006 (0.070)	0.016 (<0.001)	0.016 (<0.001)	0.016 (<0.001)	0.012 (<0.001)	0.025 (<0.001)
LPI * health				-0.015 (<0.001)					
LPI * gender				0.008 (0.065)					
LPI * G>H									-0.052 (<0.001)
LPI * H>G									-0.014 (0.022)
LPI * mid									-0.025 (<0.001)
LPI * high									-0.019 (<0.001)
war incidence	-0.021 (0.032)	-0.018 (0.053)	-0.024 (0.024)	-0.023 (0.017)	-0.009 (0.050)	-0.009 (0.050)	-0.009 (0.050)	0.015 (0.057)	-0.016 (0.017)
war * health			-0.032 (0.068)						
war * gender			0.019 (0.287)						
war * G>H								0.042 (0.105)	
war * H>G								-0.116 (<0.001)	
war * mid								0.042 (0.006)	
war * high								-0.104 (<0.001)	
N	1290	1290	1290	1290	1290	1290	1290	1290	1290
countries	160	160	160	160	160	160	160	160	160
periods	2-9	2-9	2-9	2-9	2-9	2-9	2-9	2-9	2-9
R^2	0.996	0.996	0.996	0.996	0.977	0.977	0.977	0.977	0.978

Note: estimates (p-value)

Table 19: Gender models with war measure (FE)

Variables (lagged)	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
GDP per capita (log)	0.001 (0.944)	0.020 (0.058)	0.000 (0.964)	-0.002 (0.783)	0.113 (<0.001)	0.113 (<0.001)	0.113 (<0.001)	0.112 (<0.001)	0.106 (<0.001)
population density (log)	0.130 (<0.001)	0.101 (<0.001)	0.129 (<0.001)	0.130 (<0.001)	0.729 (<0.001)	0.729 (<0.001)	0.729 (<0.001)	0.728 (<0.001)	0.730 (<0.001)
electoral democracy	0.035 (0.410)	0.047 (0.248)	0.033 (0.433)	0.021 (0.630)	0.093 (0.437)	0.093 (0.437)	0.093 (0.437)	0.088 (0.465)	0.075 (0.524)
participatory democracy	0.034 (0.368)	0.007 (0.839)	0.035 (0.342)	0.029 (0.426)	0.189 (0.060)	0.189 (0.060)	0.189 (0.060)	0.198 (0.047)	0.171 (0.089)
liberal democracy	-0.012 (0.780)	-0.004 (0.919)	-0.012 (0.777)	-0.003 (0.951)	-0.068 (0.599)	-0.068 (0.599)	-0.068 (0.599)	-0.069 (0.599)	-0.061 (0.636)
gender	0.764 (<0.001)	0.782 (<0.001)	0.763 (<0.001)	0.758 (<0.001)					
health	0.058 (<0.001)	0.026 (0.013)	0.060 (<0.001)	0.065 (<0.001)					
health * gender		-0.043 (<0.001)							
low classification					-0.268 (<0.001)	-0.217 (0.001)			
G>H classification					0.017 (0.703)	0.068 (0.013)	0.285 (<0.001)	0.291 (<0.001)	0.323 (<0.001)
H>G classification					-0.082 (0.022)	-0.031 (0.335)	0.186 (0.001)	0.193 (<0.001)	0.209 (<0.001)
mid classification					-0.051 (0.167)		0.217 (0.001)	0.219 (0.001)	0.241 (0.001)
high classification						0.051 (0.167)	0.268 (<0.001)	0.273 (<0.001)	0.280 (<0.001)
latent physical integrity	0.013 (0.005)	0.008 (0.071)	0.013 (0.005)	0.011 (0.013)	0.029 (0.002)	0.029 (0.002)	0.029 (0.002)	0.028 (0.003)	0.057 (0.001)
LPI * health				-0.008 (0.174)					
LPI * gender				0.003 (0.656)					
LPI * G>H									-0.072 (0.019)
LPI * H>G									-0.022 (0.466)
LPI * mid									-0.029 (0.419)
LPI * high									-0.054 (0.010)
war incidence	-0.026 (0.188)	-0.014 (0.445)	-0.029 (0.183)	-0.029 (0.144)	-0.076 (0.006)	-0.076 (0.006)	-0.076 (0.006)	-0.037 (0.346)	-0.085 (0.004)
war * health			-0.023 (0.494)						
war * gender			0.025 (0.539)						
war * G>H								-0.077 (0.249)	
war * H>G								-0.131 (0.130)	
war * mid								0.014 (0.822)	
war * high								-0.056 (0.228)	
N	1290	1290	1290	1290	1290	1290	1290	1290	1290
countries	160	160	160	160	160	160	160	160	160
periods	2-9	2-9	2-9	2-9	2-9	2-9	2-9	2-9	2-9
Adjusted R^2	0.946	0.95	0.946	0.946	0.779	0.779	0.779	0.779	0.784

Note: estimates (p-value)

Table 20: Conflict models (FEGLS)

Variables (lagged)	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
GDP per capita (log)	0.097 (<0.001)	0.106 (<0.001)	0.090 (<0.001)	0.076 (<0.001)	0.076 (<0.001)	0.076 (<0.001)	0.076 (<0.001)
population density (log)	0.120 (0.008)	0.101 (0.029)	0.116 (0.010)	-0.020 (0.453)	-0.020 (0.453)	-0.020 (0.453)	-0.021 (0.452)
electoral democracy	-0.076 (0.427)	-0.072 (0.454)	-0.046 (0.639)	-0.073 (0.443)	-0.073 (0.443)	-0.073 (0.443)	-0.086 (0.367)
participatory democracy	0.206 (0.024)	0.207 (0.023)	0.214 (0.021)	0.142 (0.118)	0.142 (0.118)	0.142 (0.118)	0.159 (0.081)
liberal democracy	-0.034 (0.719)	-0.036 (0.702)	-0.081 (0.397)	-0.010 (0.917)	-0.010 (0.917)	-0.010 (0.917)	-0.009 (0.922)
gender	-0.132 (0.002)	-0.121 (0.004)	-0.159 (<0.001)				
health	-0.052 (0.017)	-0.068 (0.005)	-0.018 (0.459)				
health * gender		-0.024 (0.120)					
low classification				0.098 (0.037)	0.084 (0.043)		
G>H classification				-0.014 (0.709)	-0.028 (0.378)	-0.112 (0.011)	-0.139 (0.003)
H>G classification				-0.031 (0.325)	-0.045 (0.097)	-0.129 (0.001)	-0.132 (0.001)
mid classification				0.014 (0.709)		-0.084 (0.043)	-0.070 (0.107)
high classification					-0.014 (0.709)	-0.098 (0.037)	-0.108 (0.024)
conflict incidence	0.288 (<0.001)	0.287 (<0.001)	0.274 (<0.001)	0.283 (<0.001)	0.283 (<0.001)	0.283 (<0.001)	0.260 (<0.001)
conflict * health			-0.117 (0.002)				
conflict * gender			0.132 (0.002)				
conflict * G>H							0.125 (0.056)
conflict * H>G							-0.001 (0.989)
conflict * mid							-0.053 (0.380)
conflict * high							0.112 (0.081)
latent physical integrity	0.034 (0.001)	0.032 (0.002)	0.032 (0.002)	0.034 (0.001)	0.034 (0.001)	0.034 (0.001)	0.034 (0.001)
N	1290	1290	1290	1290	1290	1290	1290
countries	160	160	160	160	160	160	160
periods	2-9	2-9	2-9	2-9	2-9	2-9	2-9
R^2	0.701	0.701	0.704	0.699	0.699	0.699	0.7

Note: estimates (p-value)

Table 21: Conflict models (FE)

Variables (lagged)	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
GDP per capita (log)	0.049 (0.017)	0.059 (0.012)	0.046 (0.030)	0.029 (0.095)	0.029 (0.095)	0.029 (0.095)	0.030 (0.099)
population density (log)	0.127 (0.024)	0.113 (0.045)	0.123 (0.027)	0.014 (0.655)	0.014 (0.655)	0.014 (0.655)	0.014 (0.651)
electoral democracy	0.015 (0.892)	0.022 (0.844)	0.002 (0.984)	0.002 (0.988)	0.002 (0.988)	0.002 (0.988)	0.003 (0.975)
participatory democracy	0.040 (0.693)	0.027 (0.790)	0.043 (0.679)	-0.022 (0.838)	-0.022 (0.838)	-0.022 (0.838)	-0.019 (0.862)
liberal democracy	-0.061 (0.602)	-0.057 (0.622)	-0.055 (0.642)	-0.032 (0.786)	-0.032 (0.786)	-0.032 (0.786)	-0.033 (0.785)
gender	-0.097 (0.033)	-0.089 (0.062)	-0.134 (0.003)				
health	-0.051 (0.125)	-0.067 (0.075)	-0.012 (0.712)				
health * gender		-0.022 (0.303)					
low classification				0.099 (0.042)	0.065 (0.225)		
G>H classification				0.007 (0.862)	-0.027 (0.655)	-0.092 (0.135)	-0.112 (0.094)
H>G classification				-0.019 (0.455)	-0.053 (0.181)	-0.117 (0.012)	-0.121 (0.024)
mid classification				0.034 (0.434)		-0.065 (0.225)	-0.057 (0.323)
high classification					-0.034 (0.434)	-0.099 (0.042)	-0.106 (0.053)
conflict incidence	0.424 (<0.001)	0.425 (<0.001)	0.424 (<0.001)	0.422 (<0.001)	0.422 (<0.001)	0.422 (<0.001)	0.401 (<0.001)
conflict * health			-0.154 (0.011)				
conflict * gender			0.182 (0.016)				
conflict * G>H							0.093 (0.522)
conflict * H>G							0.019 (0.874)
conflict * mid							-0.042 (0.676)
conflict * high							0.076 (0.452)
latent physical integrity	0.026 (0.032)	0.023 (0.055)	0.023 (0.052)	0.024 (0.045)	0.024 (0.045)	0.024 (0.045)	0.025 (0.038)
N	1290	1290	1290	1290	1290	1290	1290
countries	160	160	160	160	160	160	160
periods	2-9	2-9	2-9	2-9	2-9	2-9	2-9
Adjusted R^2	0.101	0.102	0.112	0.097	0.097	0.097	0.096

Note: estimates (p-value)

Table 22: War models (FEGLS)

Variables (lagged)	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
GDP per capita (log)	0.030 (0.005)	0.031 (0.007)	0.021 (0.044)	0.022 (0.033)	0.022 (0.033)	0.022 (0.033)	0.020 (0.048)
population density (log)	0.014 (0.586)	0.014 (0.607)	0.040 (0.124)	-0.029 (0.069)	-0.029 (0.069)	-0.029 (0.069)	-0.024 (0.121)
electoral democracy	0.019 (0.746)	0.018 (0.750)	0.003 (0.952)	0.020 (0.726)	0.020 (0.726)	0.020 (0.726)	0.024 (0.671)
participatory democracy	0.027 (0.637)	0.026 (0.651)	0.034 (0.544)	0.000 (1.000)	0.000 (1.000)	0.000 (1.000)	0.003 (0.964)
liberal democracy	0.015 (0.802)	0.016 (0.787)	0.010 (0.864)	0.029 (0.619)	0.029 (0.619)	0.029 (0.619)	0.017 (0.764)
gender	-0.043 (0.075)	-0.043 (0.082)	-0.065 (0.006)				
health	-0.015 (0.276)	-0.016 (0.265)	0.002 (0.892)				
health * gender		-0.002 (0.829)					
low classification				0.015 (0.610)	-0.006 (0.816)		
G>H classification				0.057 (0.023)	0.036 (0.076)	0.042 (0.127)	0.034 (0.224)
H>G classification				0.007 (0.763)	-0.014 (0.454)	-0.008 (0.704)	-0.002 (0.944)
mid classification				0.021 (0.394)		0.006 (0.816)	0.003 (0.901)
high classification					-0.021 (0.394)	-0.015 (0.610)	-0.011 (0.717)
latent physical integrity	0.015 (0.014)	0.015 (0.017)	0.014 (0.022)	0.015 (0.013)	0.015 (0.013)	0.015 (0.013)	0.014 (0.018)
war incidence	0.270 (<0.001)	0.270 (<0.001)	0.165 (<0.001)	0.264 (<0.001)	0.264 (<0.001)	0.264 (<0.001)	0.288 (<0.001)
war * health			-0.296 (<0.001)				
war * gender			0.261 (<0.001)				
war * G>H							0.154 (0.004)
war * H>G							-0.106 (0.105)
war * mid							0.109 (0.186)
war * high							-0.411 (<0.001)
N	1290	1290	1290	1290	1290	1290	1290
countries	160	160	160	160	160	160	160
periods	2-9	2-9	2-9	2-9	2-9	2-9	2-9
R^2	0.433	0.433	0.448	0.433	0.433	0.433	0.442

Note: estimates (p-value)

Table 23: War models (FE)

Variables (lagged)	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
GDP per capita (log)	0.029 (0.018)	0.032 (0.021)	0.026 (0.031)	0.022 (0.083)	0.022 (0.083)	0.022 (0.083)	0.024 (0.044)
population density (log)	0.020 (0.532)	0.016 (0.591)	0.015 (0.628)	-0.019 (0.385)	-0.019 (0.385)	-0.019 (0.385)	-0.015 (0.484)
electoral democracy	0.100 (0.266)	0.101 (0.256)	0.077 (0.379)	0.093 (0.290)	0.093 (0.290)	0.093 (0.290)	0.085 (0.332)
participatory democracy	0.069 (0.362)	0.065 (0.387)	0.090 (0.277)	0.046 (0.546)	0.046 (0.546)	0.046 (0.546)	0.050 (0.530)
liberal democracy	-0.138 (0.172)	-0.137 (0.175)	-0.143 (0.144)	-0.120 (0.243)	-0.120 (0.243)	-0.120 (0.243)	-0.120 (0.229)
gender	-0.041 (0.113)	-0.038 (0.141)	-0.056 (0.040)				
health	-0.012 (0.392)	-0.016 (0.377)	0.012 (0.512)				
health * gender		-0.006 (0.545)					
low classification				0.021 (0.501)	0.026 (0.392)		
G>H classification				0.038 (0.085)	0.042 (0.137)	0.017 (0.693)	0.000 (0.997)
H>G classification				0.004 (0.826)	0.008 (0.627)	-0.017 (0.540)	-0.020 (0.541)
mid classification				-0.005 (0.762)		-0.026 (0.392)	-0.031 (0.343)
high classification					0.005 (0.762)	-0.021 (0.501)	-0.025 (0.448)
latent physical integrity	0.020 (0.018)	0.019 (0.026)	0.018 (0.020)	0.019 (0.023)	0.019 (0.023)	0.019 (0.023)	0.021 (0.006)
war incidence	0.297 (<0.001)	0.298 (<0.001)	0.234 (<0.001)	0.302 (<0.001)	0.302 (<0.001)	0.302 (<0.001)	0.239 (0.023)
war * health			-0.291 (0.013)				
war * gender			0.270 (0.050)				
war * G>H							0.322 (0.065)
war * H>G							0.060 (0.692)
war * mid							0.029 (0.796)
war * high							-0.198 (0.073)
N	1290	1290	1290	1290	1290	1290	1290
countries	160	160	160	160	160	160	160
periods	2-9	2-9	2-9	2-9	2-9	2-9	2-9
Adjusted R^2	0.015	0.015	0.015	0.016	0.016	0.016	0.007

Note: estimates (p-value)

Table 24: Repression models (FEGLS)

Variables (lagged)	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
GDP per capita (log)	-0.020 (0.456)	0.033 (0.274)	-0.017 (0.520)	-0.098 (0.001)	-0.098 (0.001)	-0.098 (0.001)	-0.085 (0.005)
population density (log)	0.205 (0.005)	0.139 (0.078)	0.188 (0.008)	-0.125 (0.019)	-0.125 (0.019)	-0.125 (0.019)	-0.148 (0.006)
electoral democracy	0.698 (<0.001)	0.683 (<0.001)	0.731 (<0.001)	0.439 (0.031)	0.439 (0.031)	0.439 (0.031)	0.409 (0.047)
participatory democracy	-0.763 (<0.001)	-0.720 (<0.001)	-0.724 (<0.001)	-0.789 (<0.001)	-0.789 (<0.001)	-0.789 (<0.001)	-0.719 (<0.001)
liberal democracy	-0.867 (<0.001)	-0.906 (<0.001)	-0.918 (<0.001)	-0.690 (<0.001)	-0.690 (<0.001)	-0.690 (<0.001)	-0.660 (<0.001)
gender	-0.264 (<0.001)	-0.235 (0.003)	-0.256 (0.001)				
health	-0.194 (<0.001)	-0.271 (<0.001)	-0.195 (<0.001)				
health * gender		-0.104 (<0.001)					
low classification				-0.096 (0.316)	-0.021 (0.822)		
G>H classification				-0.122 (0.125)	-0.047 (0.480)	-0.026 (0.794)	0.004 (0.970)
H>G classification				-0.098 (0.108)	-0.022 (0.674)	-0.002 (0.982)	0.004 (0.959)
mid classification				-0.075 (0.302)		0.021 (0.822)	0.039 (0.681)
high classification					0.075 (0.302)	0.096 (0.316)	0.191 (0.060)
conflict incidence	0.241 (<0.001)	0.234 (<0.001)	0.249 (<0.001)	0.202 (<0.001)	0.202 (<0.001)	0.202 (<0.001)	0.216 (<0.001)
latent physical integrity	0.517 (<0.001)	0.498 (<0.001)	0.515 (<0.001)	0.519 (<0.001)	0.519 (<0.001)	0.519 (<0.001)	0.502 (<0.001)
LPI * health			-0.025 (0.256)				
LPI * gender			0.046 (0.077)				
LPI * G>H							-0.009 (0.875)
LPI * H>G							-0.065 (0.162)
LPI * mid							-0.053 (0.352)
LPI * high							0.074 (0.049)
N	1290	1290	1290	1290	1290	1290	1290
countries	160	160	160	160	160	160	160
periods	2-9	2-9	2-9	2-9	2-9	2-9	2-9
R^2	0.919	0.92	0.919	0.92	0.92	0.92	0.92

Note: estimates (p-value)

Table 25: Repression models (FE)

Variables (lagged)	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
GDP per capita (log)	-0.003 (0.955)	0.037 (0.483)	-0.008 (0.871)	-0.043 (0.350)	-0.043 (0.350)	-0.043 (0.350)	-0.033 (0.487)
population density (log)	0.176 (0.135)	0.117 (0.342)	0.171 (0.151)	-0.031 (0.665)	-0.031 (0.665)	-0.031 (0.665)	-0.039 (0.593)
electoral democracy	0.132 (0.587)	0.160 (0.514)	0.110 (0.650)	0.105 (0.657)	0.105 (0.657)	0.105 (0.657)	0.132 (0.587)
participatory democracy	-0.422 (0.133)	-0.476 (0.082)	-0.428 (0.127)	-0.551 (0.050)	-0.551 (0.050)	-0.551 (0.050)	-0.548 (0.049)
liberal democracy	-0.525 (0.045)	-0.510 (0.052)	-0.513 (0.048)	-0.448 (0.092)	-0.448 (0.092)	-0.448 (0.092)	-0.452 (0.093)
gender	-0.151 (0.101)	-0.115 (0.225)	-0.158 (0.090)				
health	-0.108 (0.072)	-0.174 (0.016)	-0.093 (0.151)				
health * gender		-0.090 (0.025)					
low classification				0.154 (0.237)	0.069 (0.467)		
G>H classification				0.187 (0.179)	0.102 (0.312)	0.033 (0.777)	0.050 (0.704)
H>G classification				0.035 (0.690)	-0.050 (0.452)	-0.119 (0.241)	-0.127 (0.262)
mid classification				0.085 (0.464)		-0.069 (0.467)	-0.040 (0.719)
high classification					-0.085 (0.464)	-0.154 (0.237)	-0.131 (0.377)
conflict incidence	-0.013 (0.870)	-0.009 (0.913)	-0.014 (0.867)	-0.009 (0.912)	-0.009 (0.912)	-0.009 (0.912)	0.011 (0.896)
latent physical integrity	0.649 (<0.001)	0.638 (<0.001)	0.645 (<0.001)	0.645 (<0.001)	0.645 (<0.001)	0.645 (<0.001)	0.627 (<0.001)
LPI * health			-0.022 (0.563)				
LPI * gender			0.019 (0.687)				
LPI * G>H							-0.026 (0.768)
LPI * H>G							0.028 (0.633)
LPI * mid							-0.052 (0.376)
LPI * high							0.052 (0.332)
N	1290	1290	1290	1290	1290	1290	1290
countries	160	160	160	160	160	160	160
periods	2-9	2-9	2-9	2-9	2-9	2-9	2-9
Adjusted R^2	0.497	0.5	0.497	0.495	0.495	0.495	0.495

Note: estimates (p-value)

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J Sequencing analysis

Author: Oskar Timo Thoms

The Lancet Commission is interested not only in whether harmful and beneficial cycles are at work, but also if and how policy interventions to support gender equality and health equity would be able to nudge societies into beneficial cycles. Toward this end, it is useful to identify pathways of gender and health change to identify entry points and policy levers. A key question is: are there particular sequences of improvements in gender and health performance that are more likely to break countries out of harmful cycles? This appendix maps different pathways of change over time, to determine which sequences are a) more common and b) more likely to lead to improvements. The following sections discuss the development of a simple sequencing typology and then relate this typology to outcomes of interest.

J.1 Mapping pathways of change and coding the sequencing typology

The pathways mapping is based on the same four main health (life expectancy and infant mortality ratio) and gender (mean years of schooling ratio and adolescent fertility rate) variables used in the classifications and the large-N regression analyses. As in the other analyses, the IMR and AFR are inverted such that higher values indicate "better" outcomes. Complete observations for all four measures are available for 182 countries starting in 1970. Since we are using averages for five-year periods (as in the other large-N analyses), the first period is 1971-1975, and the last is 2011-2015. As in the regression analyses, two countries (Montenegro and Serbia) are excluded, because their data are available for only two periods, which is not sufficient for coding long-term sequences of change. (All included countries are listed in Table 5.)

The health and gender variables are scaled to have zero means and standard deviations of one, in order to standardise them. The means of the two standardised health variables and of the two standardised gender variables are then calculated and plotted separately for each country, providing the basis for coding the sequencing typology. These combined variables are different from those used in the classifications, which are standardised separately for each period (thus comparing the health and gender measures within, but not across, periods), as explained in Appendix G.3. For the sequencing typology, as in the panel analyses, the standardization is done once for all observations in the dataset, in order to make changes in the different measures comparable over time.[13]

Figure 27 overlays the individual country plots, grouped by the classifications for 1971-1975, the first period in the dataset, while Figure 28 provides the pathways from 1991-1995 by the classification for that period.[14] Each coloured line with arrows represents the pathway of a country. These figures illustrate three points. First, almost every country improves on the health and gender outcomes

[13] Note that the country classifications, which are available for each period, cannot be used for mapping the pathways of change, because for any given five-year period the classifications are relative to all other countries. In the regression analyses using the classifications, this is useful because it accounts for the global improvements in the gender and health measures, but it would misrepresents change over time in trend analyses, because an underlying change from one period to the next may not be reflected in the classifications, or a classification may change compared to all other countries, without a significant change in the underlying health and gender measures.

[14] Many countries are not classified for the earlier period because they come into existence later or due to missing data.

Figure 27: Pathways (1971-2015) by 1971-1975 classifications

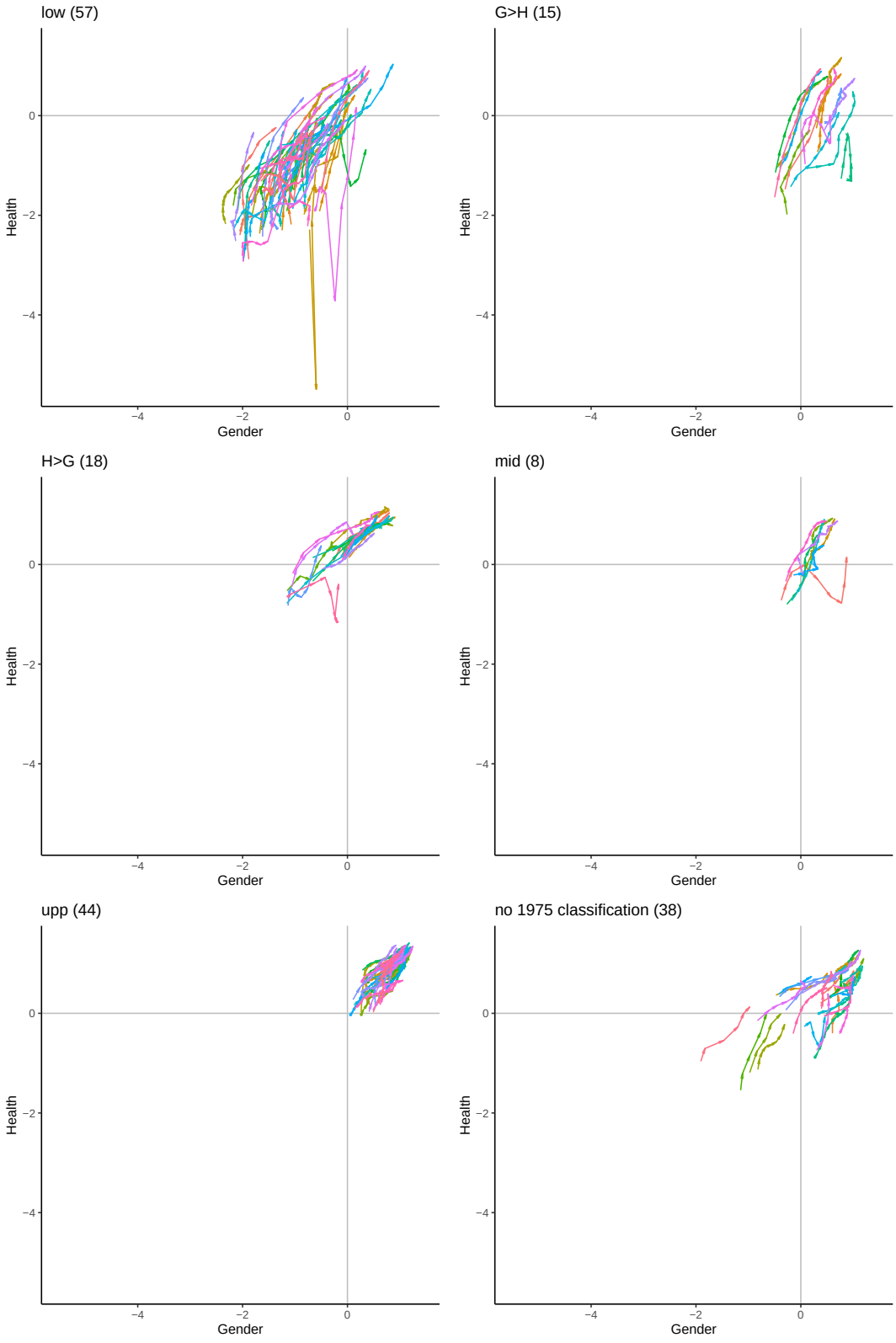
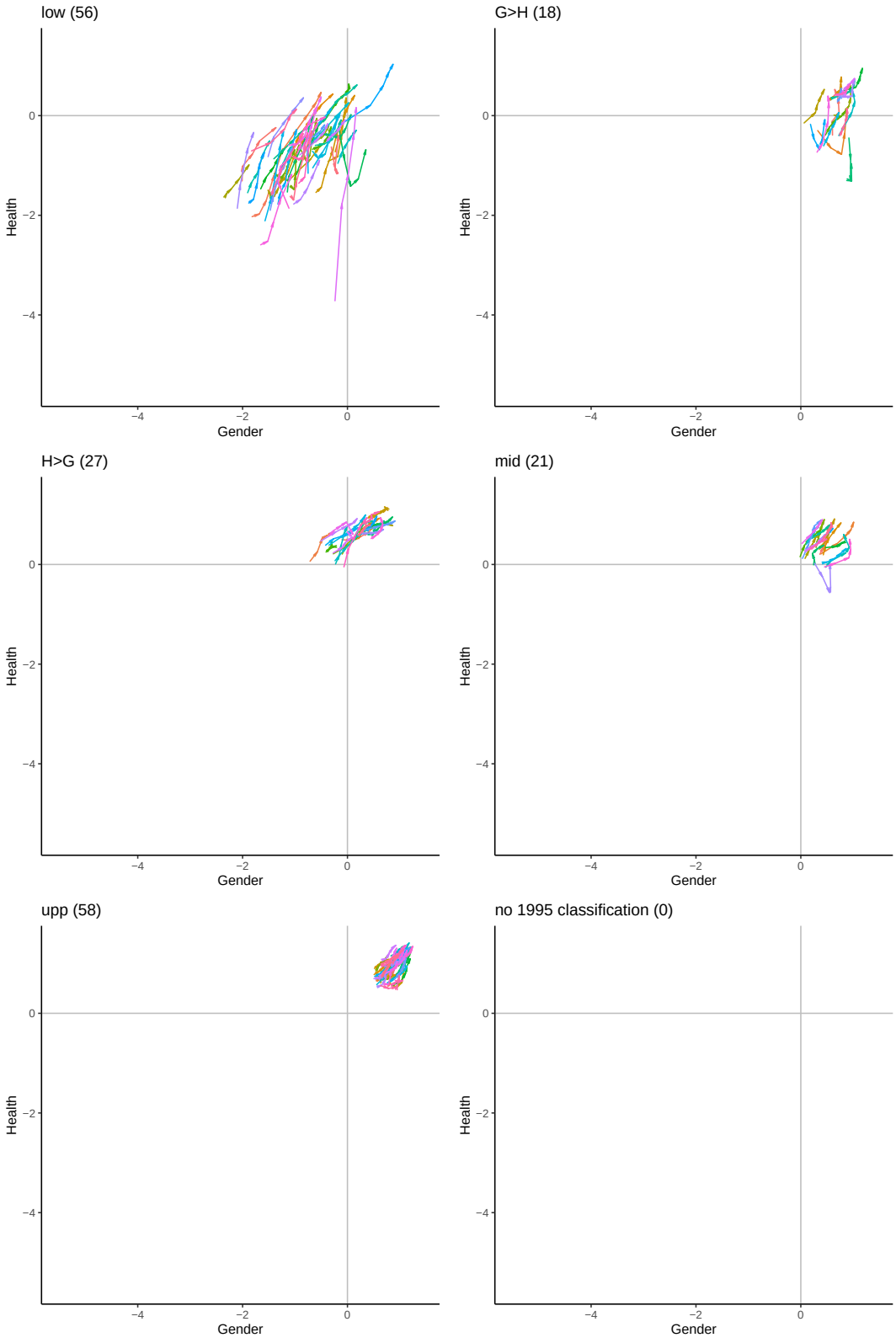


Figure 28: Pathways (1991-2015, from origin) by 1991-1995 classifications



overall from the early 1970s until 2015. Second, the figures strongly support the notion of ceiling effects when comparing lower with higher classifications. The pathways in the low classification group show long and spread-out trajectories with much variation in the directions of change, whereas those in the upper classification start with above average health and gender scores and are short and compact, and the pathways in the other classification groups fall in-between these descriptions. Support for this generalization is stronger still in Figure 28, which presents the data starting in 1991-1995. Third, the sub-figures for the G>H and H>G classification groups suggest a subtle difference between the two. With some exceptions, countries that have comparatively stronger gender than health performance at the outset tend to improve more on health than on gender overall. This, again, could be due to ceiling effects. Countries that have stronger health than gender performance at the outset, however, tend to improve similarly on health and gender overall, again with some exceptions. Ceiling effects may be part of the story, but from a sequencing perspective, earlier gender improvements may help subsequent health improvements more than the other way around. Future research on this question would be welcome.

Based on the individual country pathways (represented by the lines in Figure 27) of the combined health and gender measures, we developed a sequencing typology. This is a data-driven rather than theory-driven typology. Considering the direction in a country's health and gender changes in each period, we code whether the two measures improved jointly, or whether one or both declined (which we label setbacks); it is very rare for both to decline during the same period. We then summarise the entire sequence by aggregating contiguous periods with the same directions of changes and determine whether any resulting segment is health-led or gender-led, i.e. whether the standardised health or the standardised gender measure improves more than the other – based on the slope – early in the aggregated segment or overall. In most cases this determination is the same whether based on the first two or three periods of the segment or the entire segment; for edge cases, where these lead to different determinations, the coding for the first periods of a segment is chosen. The goal is to categorise sequences such that similar pathways are grouped together. We further aggregate some resulting categories on the basis of the directions of setbacks. Given that all countries improved overall, setbacks are a useful distinguishing characteristic, and this aggregation does not lead to loss of informative variation in the descriptive analyses below.

Figure 29 shows the country pathways grouped by the categories of the sequencing typology and notes their frequencies, while Figure 30 shows another version of the typology starting with the period of 1991-1995. The typology leads to several basic observations about sequences of health and gender change. First, simple H-led or G-led sequences, where countries improve jointly and continually throughout the entire sequence, are the most common, but H-led sequences are almost twice as common as G-led. Second, G-led sequences tend to start at higher levels of both the gender and health measures than H-led sequences. Third, many countries have setbacks on either gender or health, but very few have setbacks on both. Fourth, sequences with G-setbacks are more common than those with H-setbacks for the longer period, but not since 1991. Finally, setbacks of all types, but particularly G-setbacks, do not preclude high performance by the end of the study period.

The following sections present distributions of health, gender and violence outcomes broken down by the sequence typology, in order to examine whether different sequences are associated with different outcomes. Again, such bivariate associations could represent spurious relationships, but they are useful first steps in analysing whether sequences of change may matter to outcomes.

Figure 29: Sequences, 1971-2015

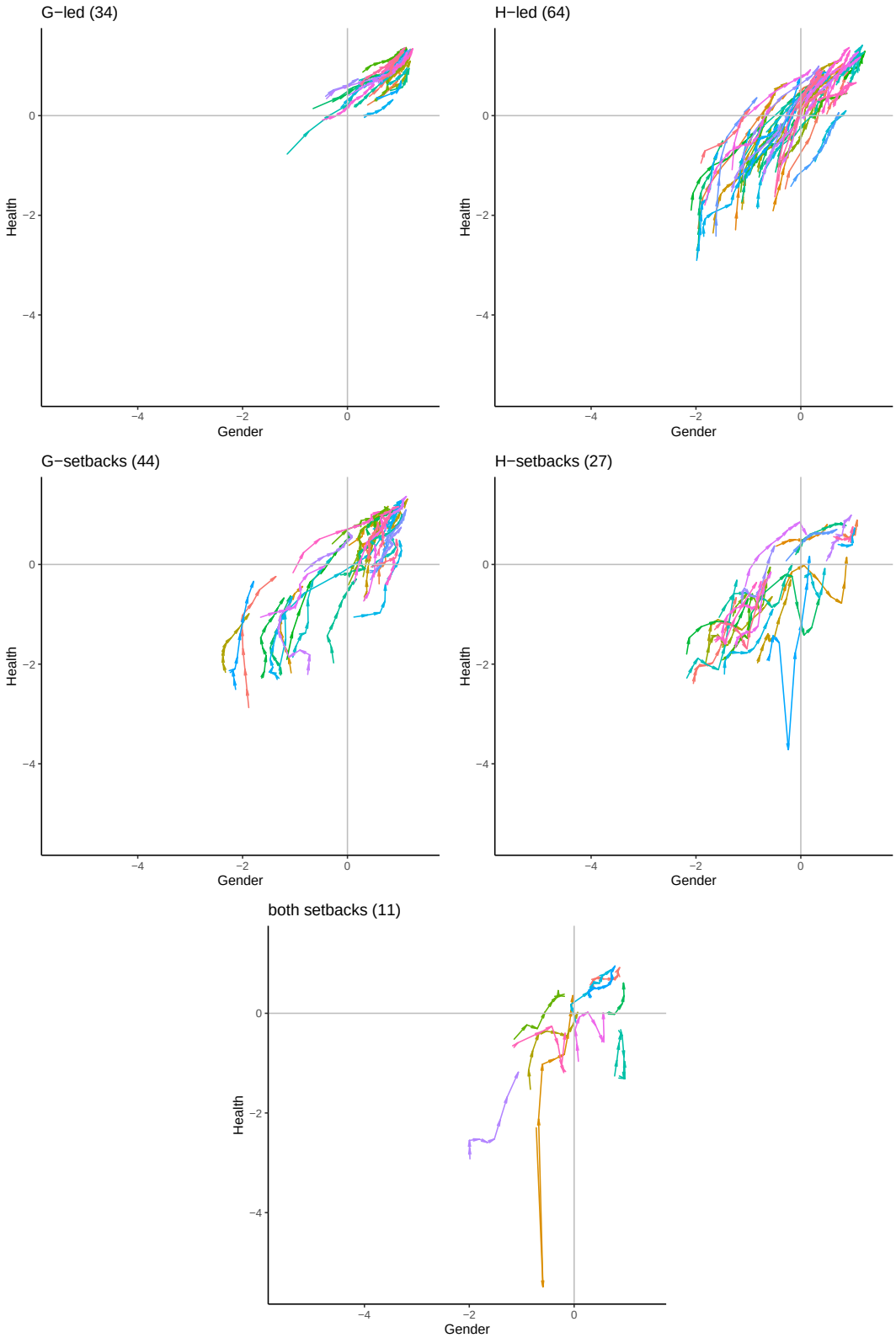
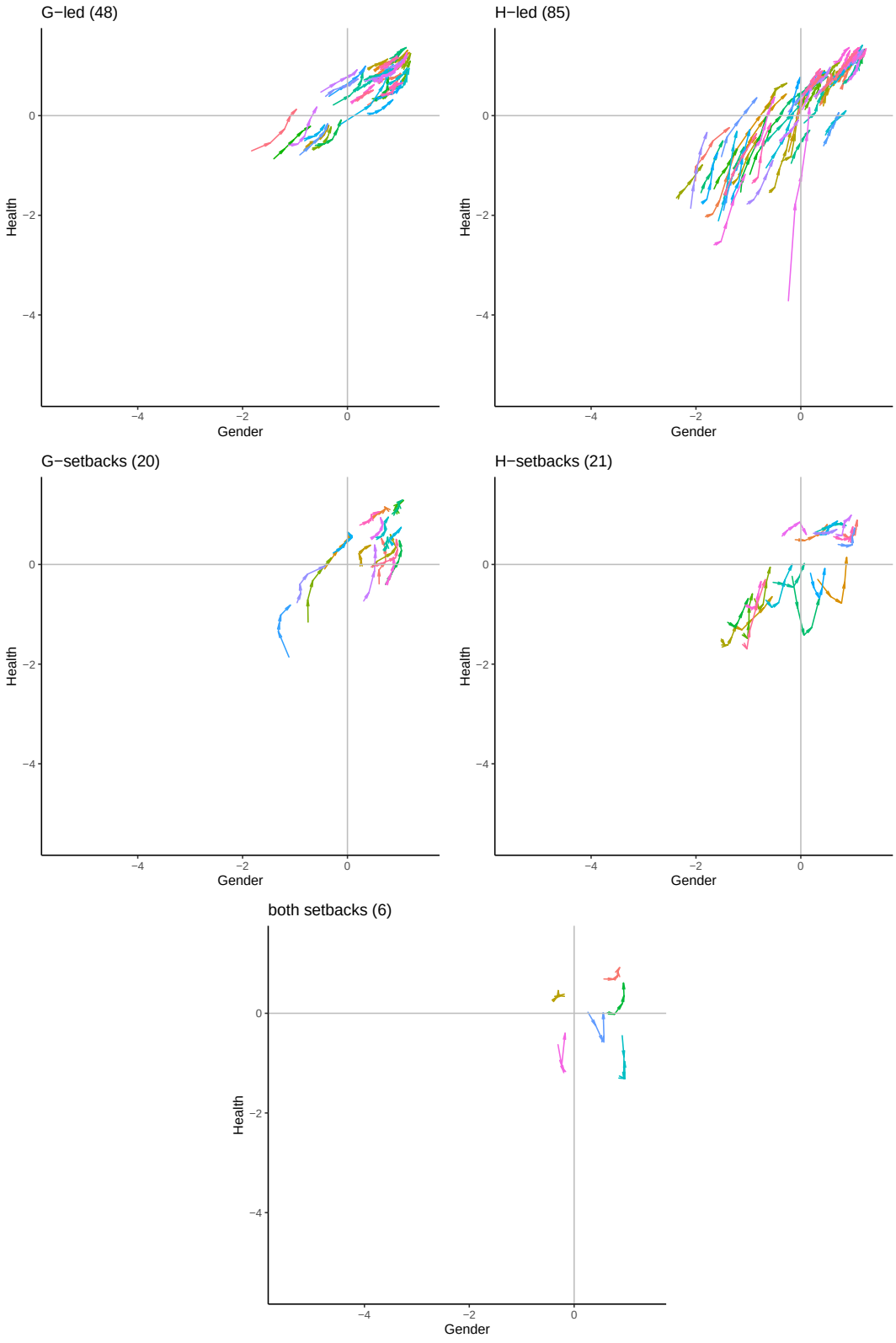


Figure 30: Sequences, 1991-2015



J.2 Associations with health and gender change

The difference between the start and end values of the combined health index used in the pathways mapping for a given country, divided by the number of included 5-year periods, provides a comparable measure of the overall health change associated with particular sequences. Figure 31a shows the distribution of this measure for each sequence in the typology. The boxplots represent the interquartile range and medians, the round points are outliers, and the red diamonds and bars indicate the means with 95% confidence intervals.[15] The boxplots do not show statistical effects but where most of the values of the health index are. The confidence intervals provide a rough indication of whether differences between the means of sequencing types are statistically significant.

The figure shows that H-led sequences are associated with more overall health improvements than G-led sequences and sequences with H-setbacks. On its face, the association of G-led sequences with limited health improvements may be expected because of how G-led and H-led are defined. However, it is important to note that segments are coded based only on the relative direction of change, and not based on the magnitude of change. Interestingly, sequences involving H-setbacks or G-setbacks also appear to be associated with more health improvement than G-led sequences.

By contrast, in Figure 31b, which shows the analogous gender change measure, G-led sequences do not have the largest gender improvements on average. With the exception of sequences involving G-setbacks, which involve the least gender improvements, these distributions are closer together than in Figure 31a. Moreover, all but the G-led sequences involve somewhat less overall gender change than health change. No strong conclusions can be drawn from these bivariate associations but they are suggestive and invite new analyses. Some sequences seem to involve greater average combined health and gender change than others. These figures suggest that those sequences are H-led or those with H-setbacks (the latter of which may include G-led and H-led segments).

Figure 32 shows a measure of "path efficiency." This is the Euclidean distance between the start and end values of both the health and gender measures, divided by the total length of all segments in a country's pathway; the closer this measure is to one, the more direct the path from the beginning of a sequence to its end. Since setbacks imply less efficiency, several of the differences in the figure are as expected, foremost the pathways represented by the H-led and G-led sequences, which are much more efficient than all others, and the inefficient sequence with setbacks on both. However, the difference between sequences with setbacks is notable: those with G-setbacks are clearly more efficient than those with H-setbacks and those with both setbacks. One possibility that would benefit from further investigation is that setbacks in health change are more difficult or take longer to recover from than gender setbacks.

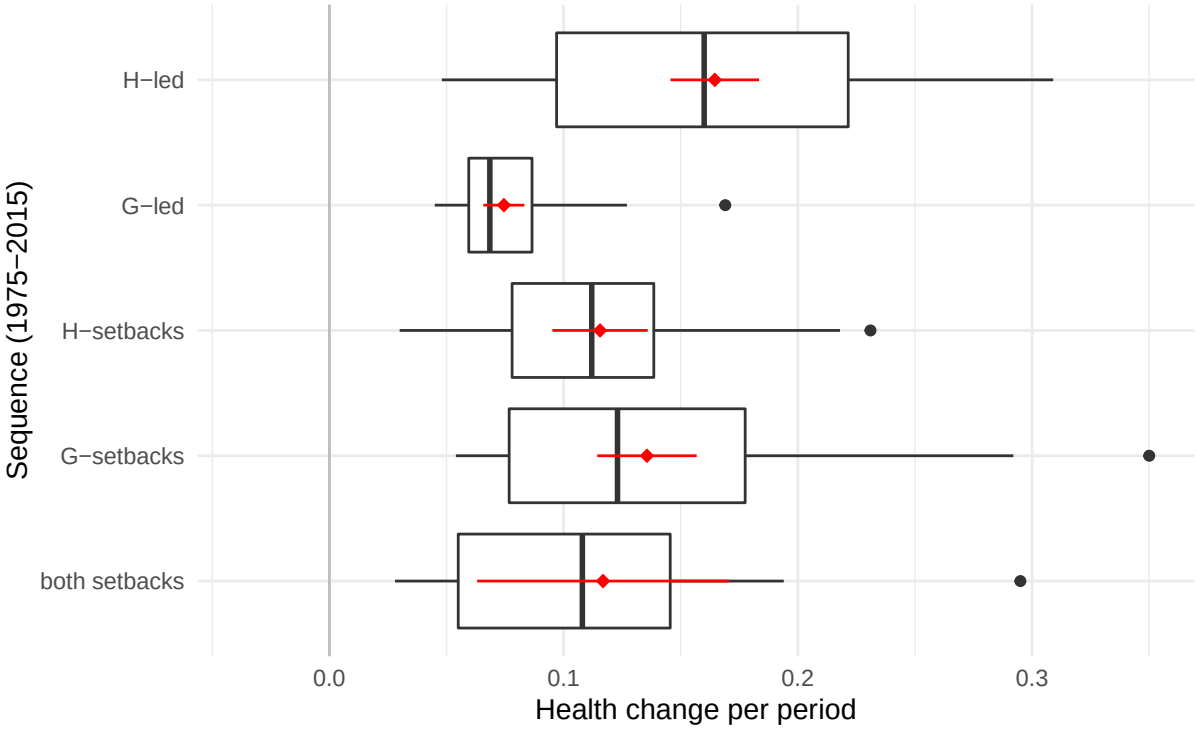
J.3 Associations with violence outcomes

The remaining figures show bivariate relationships with several violence measures, in order to probe whether certain types of sequences are associated with more violence than others. The findings are very consistent across different measures of violence, with one partial exception noted below. Only some of these results are shown here.

[15] Outliers are defined as less than the 25th percentile minus 1.5 times the interquartile range or greater than the 75th percentile plus 1.5 times the interquartile range.

Figure 31: Distributions of health & gender change per period by sequence (1971-2015)

(a) health change



(b) gender change

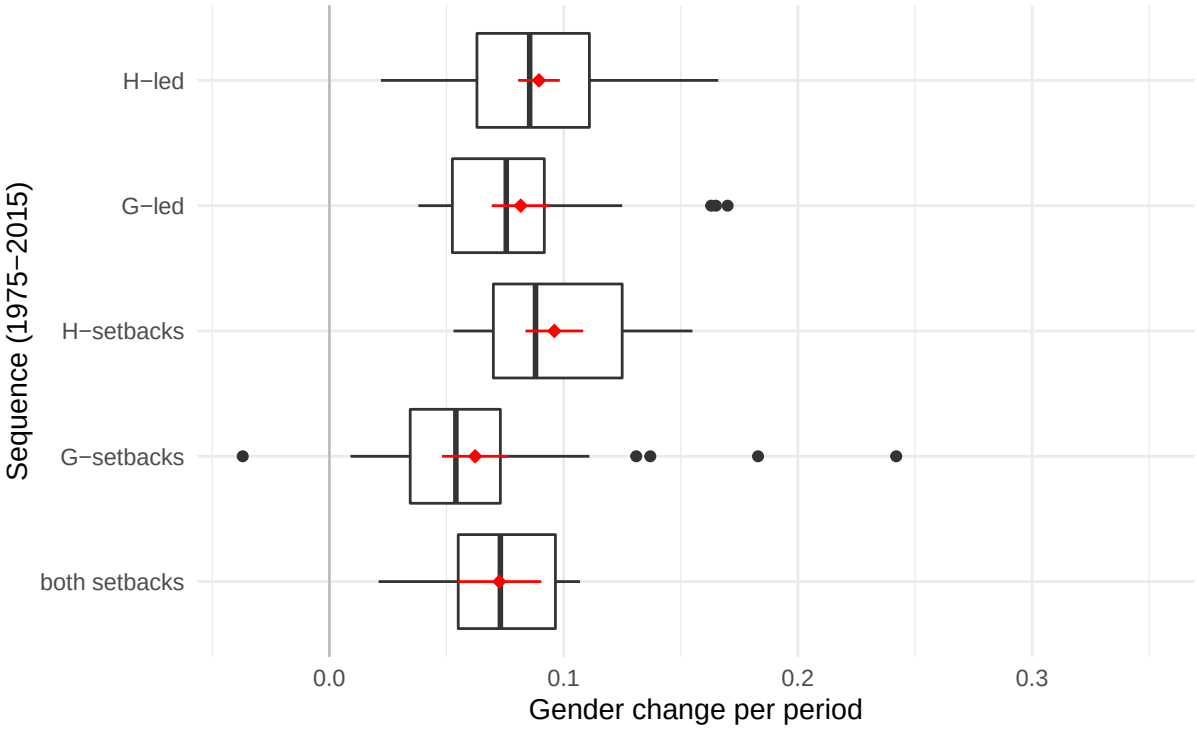


Figure 32: Distribution of path efficiency measure by sequence (1971-2015)

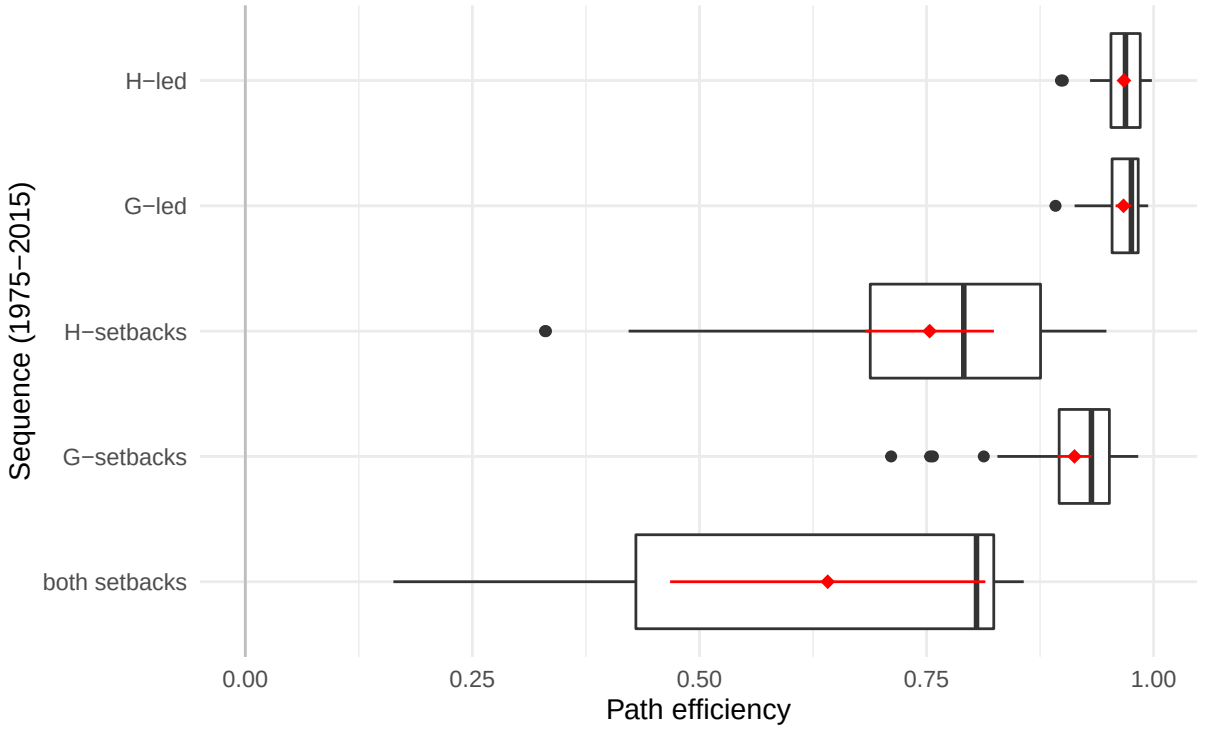


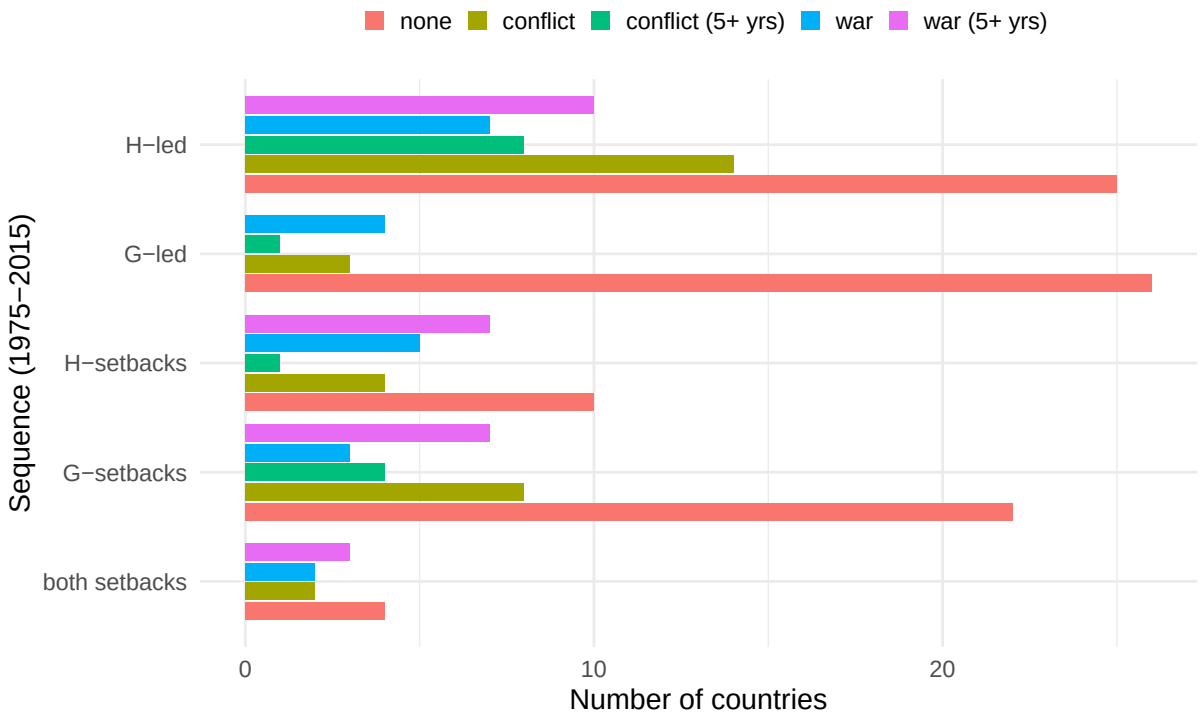
Figure 33 employs the same internal conflict data as introduced in Figure 7, except that here the data are shown for the period 1971-2015. The ratios between the numbers of countries with and without conflict for the different sequences indicate that G-led sequences are associated with the least conflict or war by far and very little long-term conflict and no long-term war. Sequences involving H-setbacks or both setbacks have high proportions of countries with conflict and especially war, including long-term. Importantly, even H-led sequences are associated with conflict and war for the majority of countries in that group. Given that the conflict data are aggregated over the entire period, it is possible that this association is due to the recovery of health outcomes after conflicts.

Figure 34 shows similar data for non-state conflict. Since these data are available since 1989, this figure uses the second version of the sequences typology, which starts with the 1991-1995 period. This figure again shows that G-led sequences are associated with the smallest proportion of countries with non-state conflict, including long-term violence. Countries with sequences involving H-setbacks have the highest proportion, followed by those with H-led sequences.

Figure 35 shows the data on one-sided violence – organised violence such as atrocities against civilians – for the same period. G-led sequences are again associated with the smallest proportion of countries with one-sided violence and such violence committed over five years or more. Almost three out of five countries with H-led sequences and those involving H-setbacks had one-sided violence and high proportions had such violence over more than four years.

Figure 36 shows the distributions of a measure of violent state repression, the latent physical integrity index (LPI). Recall that this measure was inverted such that higher scores indicate higher levels of state violence. Once again, G-led sequences are strongly associated with less violence, while

Figure 33: Internal (incl. internationalised) conflict by sequence (1971-2015)



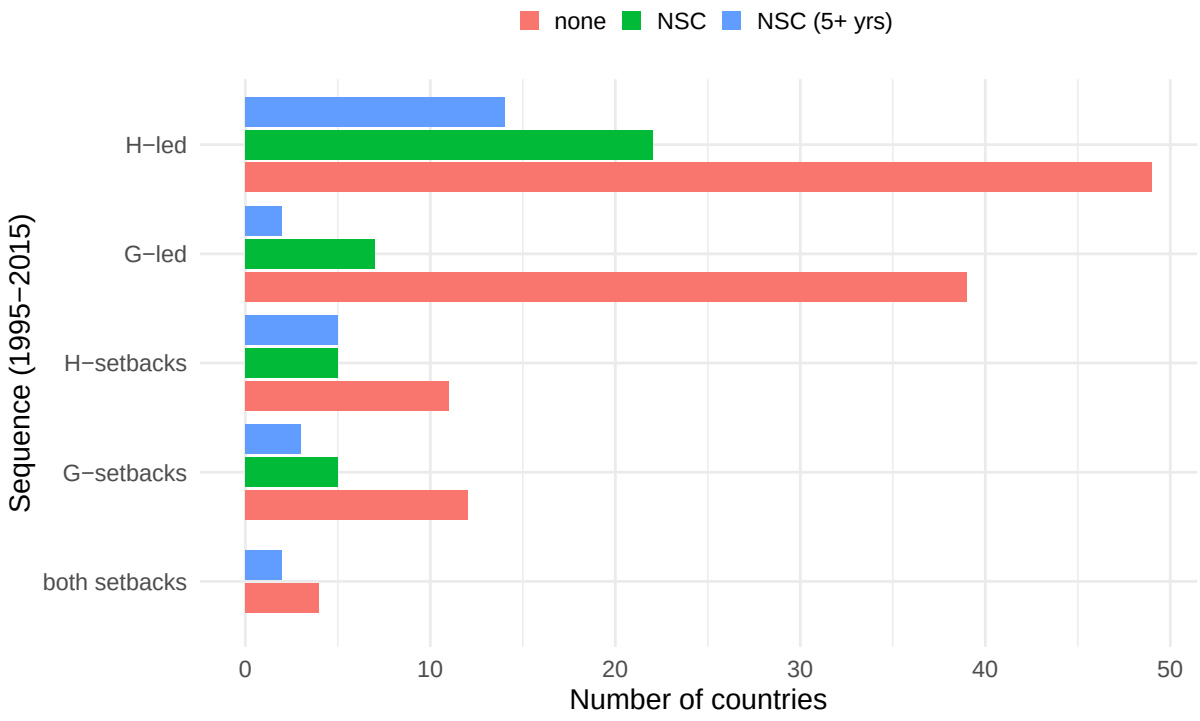
sequences involving H-setbacks (or both setbacks) have the highest average scores, although the differences between sequences other than G-led are small and cannot be statistically distinguished. Analogous analyses of V-Dem measures of extra-judicial killings, state torture and societal violence are not shown here but have results very similar to those in Figure 36.

Finally, Figure 37 shows the distributions of average homicides rates, logged to address skew and make differences in easier to discern. These data have to be used with caution, as they are subject to more missing data than other measures used in this report. Countries with G-led and H-led sequences have the lowest average homicide rates, and those involving H-setbacks (including both setbacks) have the highest. While these differences between sequences are similar to the results for other measures of violence, the finding with respect to G-led sequences is not as clear.

J.4 Summary and Conclusion

The descriptive analyses of the sequencing typology suggest that different sequences are associated with varying health, gender and violence outcomes. H-led sequences and those with H-setbacks appear to be associated with more overall improvements in health and gender outcomes, but the differences are small and often not statistically distinguishable. The data also suggest that sequences involving H-setbacks are particularly detrimental to overall change; this is due, at least in part, to greater health than gender changes on the standardised measures for the majority of pathways. The most robust finding is that G-led sequences are consistently and strongly associated with less violence, while sequences with H-setbacks are associated with the most violence and longer periods of violence. It is important to note that, violence may occur before or after setbacks; the data

Figure 34: Non-state conflict by sequence (1991-2015)



presented here do not distinguish their temporal order. In addition, H-led sequences are also often linked to much conflict, which could be due to recovery of health outcomes after conflict has ended.

No strong conclusions can be drawn from these bivariate associations, but they show sufficient variation in outcomes that new research is warranted to better understand how the pathways of health and gender change may condition the inter-relationships between health inequity, gender inequality and violence. The strong association between G-led sequences and less violence in particular calls for further research.

Figure 35: One-sided violence by sequence (1991-2015)

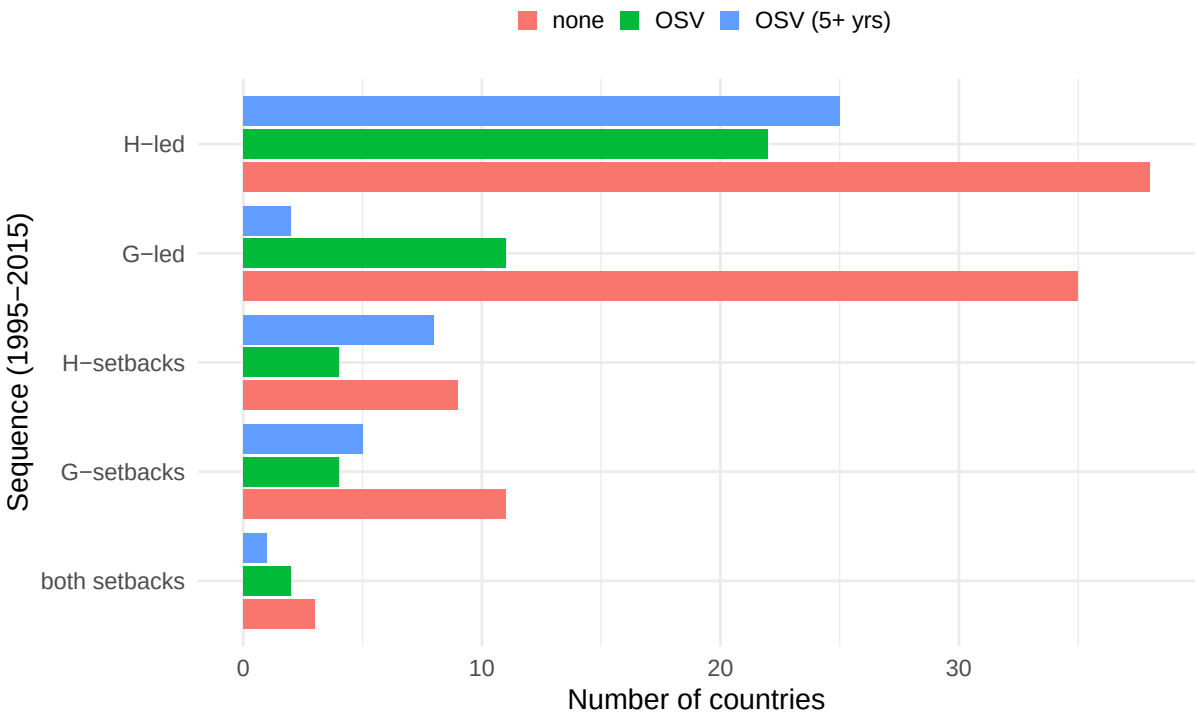


Figure 36: Distribution of average LPI measure by sequence (1971-2015)

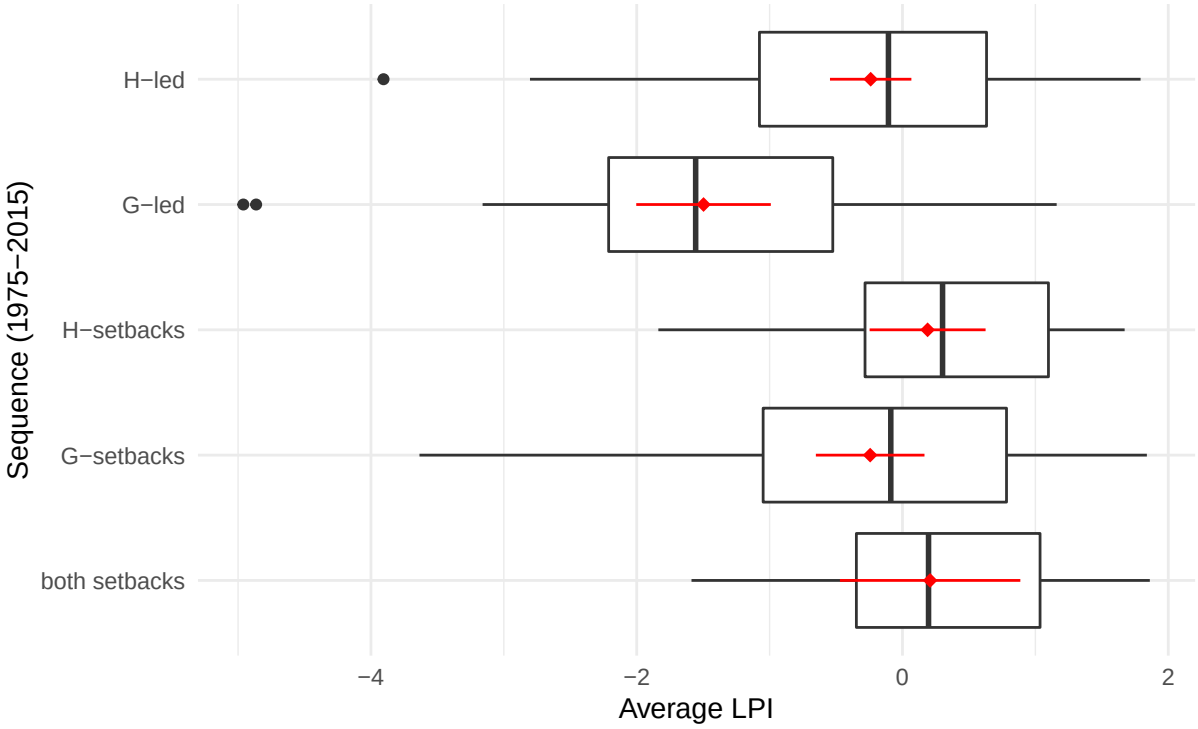
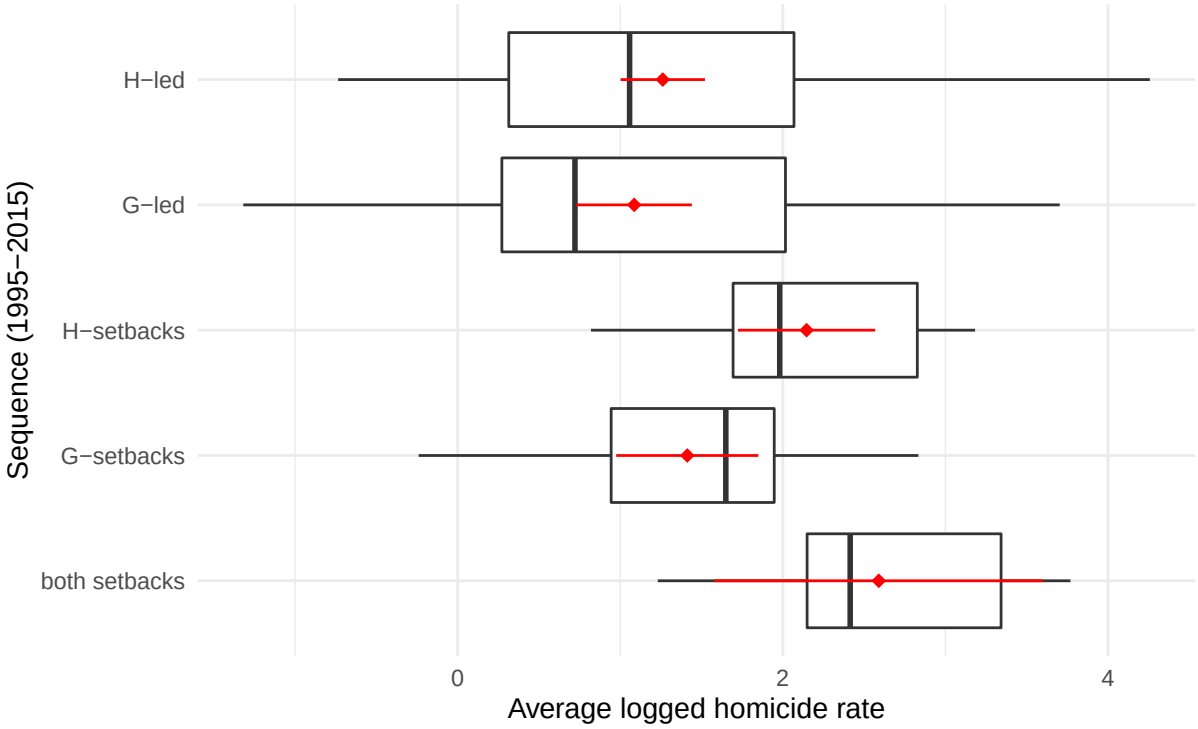


Figure 37: Distribution of average homicide rates by sequence (1991-2015)



K Mechanisms that Improve Health Equity and Gender Equality

K.1 Health Equity

Exactly how health equity is improved has not received a great deal of attention. As we note in Section 1, our focus in this report is on the relationship between the health system and health equity, rather than the broader social determinants of health. While we highlight these mechanisms in the main report, we provide further detail below.

Advocacy on the Right to Health: Mobilisation for the right to health connects community, national, and international networks of researchers and civil society groups. Advocacy networks can document inequitable health outcomes and advocate for policies to rectify these inequities and advance the right to health.[7, 17] This documentation of inequitable health outcomes within communities raises awareness of the situation of marginalised and vulnerable groups. As noted below, positive externalities, such as improved community governance and greater trust, flow from these efforts to advocate for the right to health and health equity.[6]

Laws and Regulatory Frameworks: The law signals the degree to which the state recognizes and is committed to uphold its responsibility to safeguard public health and protect citizens from foreseeable harm.[11] It affirms the commitment of the state to "pursue the highest possible level of physical and mental health in the population" and provides the state with the powers and duties to "assure the conditions for people to be healthy (to identify, prevent, and ameliorate risks to health in the population)" while also establishing the "limitations on the power of the state to constrain the autonomy, privacy, liberty, proprietary, or other legally protected interests of individuals for the common good."[20, p. 4] Laws and regulatory framework provide the critical foundation for all elements of health equity, setting standards of care.

Building Health Systems: Health equity requires systems that ensure universal access to health care that is delivered in a manner that is efficient, effective, and equitable. Health systems are strengthened through a focus on primary care with effective reproductive, maternal, newborn, and child healthcare services; financing reforms which separate purchaser and provider functions to maximise the cost-effectiveness of service delivery; the affordable provision of essential medicines and other commodities; and human resource and facility planning to ensure integrated delivery of appropriate and accessible services. Infectious disease outbreaks like the COVID-19 pandemic also highlight the critical importance of public health functions – in particular disease surveillance, data analysis, and risk communication – as a key component of health systems. Health information systems are also essential to provide health data disaggregated by sex, race and other relevant forms of identity, economic class, and geographic region.

Essential packages of health services offer a promising approach to universal health coverage and equity, particularly in fragile and conflict affected settings. Such essential packages increase access to health care services, improve the health of the population, and provide financial risk protection.[34] These packages can be delivered by non-governmental entities as part of a contracting for services model, or be implemented through government run clinics. The design of such packages clearly matters. Their contribution to health equity depends on the type and quality of services covered,

supervision and motivation of health workers, coordination and integration of services, financing and the impact on out of pocket payments, and access to and delivery of these services.[8] Moreover, as noted below, health systems design has insufficiently integrated gender and social equity as an objective or an output of health systems.

Direct Provision of Health Services: To improve health outcomes, international and national organisations often directly provide health services in emergency or humanitarian contexts. Guided by the principles of humanitarian neutrality, impartiality, independence and humanity, the delivery of health services in conflict is coordinated by WHO through the health cluster and includes national health actors as well as international and national non-governmental organisations.[35] (WHO Health cluster guide, 2020). While progress has been made in improving the coordination and standardisation of health services, conflict affected contexts are challenging environments. The ability of these services to improve health outcomes is impacted by the nature of specific conflicts,[12] the lack of health data to guide health responses,[10] the nature of the overwhelmed and underfunded humanitarian system,[29] as well as low levels of technical and programmatic competence in some contexts.[12] Moreover, many medical interventions in humanitarian contexts lack sustainability, with little integration or support to national health systems, undermining their long-term impact on health equity and potentially reversing hard won gains.

In non-humanitarian contexts, health organizations implement targeted 'vertical' health interventions to address a specific disease (e.g., HIV/AIDS), a cluster of connected health issues (e.g., child or maternal health), provide vaccinations, or provide services to a specific and often marginalized group such as sex workers or ethnic minorities.[4] Targeted health services tend to produce more rapid, measurable results in weak systems.[4] Direct health interventions can have a significant social and economic impact when they target diseases such as HIV/AIDS.[18] The clear benefits of expanded immunisation programs also demonstrate the critical role of vertical interventions in improving health equity.[27] Vertical interventions can also contribute to health equity through interventions directed at marginalised and vulnerable groups.

While most vertical interventions, particularly in non-conflict contexts, link in some manner with the national health system, the extent of that integration varies significantly.[3] Targeted interventions are often driven by the priorities of external actors with specific health agendas.[24] As such, the fragmentation of health service delivery can increase while the overall governance and administration of the system is weakened. The failure to strengthen national and local capacity[4] undermines the ability to manage infectious disease outbreaks like Ebola[5] and COVID-19.[28]

K.2 Gender Equality

There is no universal formula for societies to achieve gender equality.[25] While we highlight the key mechanisms for gender equality in Section 3 of the main report, we provide more detail on these mechanisms below.

Gender based analysis (GBA): GBA is a tool that examines gender within a particular context. While often hindered by data limitations, GBA reveals how gender influences both productive and reproductive roles and activities as well as opportunity, position, power, and influence within the

family, community, and broader society. Through this understanding, policies and programs can understand how gender impacts on outcomes and how to encourage a transformation in gender relations. While GBA is a tool for understanding gender dynamics within a specific context, it is a complement to, not a substitute for, building the mechanisms that improve gender equality.

Laws and Regulatory Frameworks: Legal frameworks that ensure non-discrimination on the basis of sex are critical for all elements of gender equality, from education to economic participation to the elimination of gender-based violence and other harmful and discriminatory practices against women and girls. While laws and regulations are necessary, they are insufficient without effective implementation.[25] Laws must guarantee equality in both personal status (e.g., citizenship) and economic status (e.g., property rights, other assets).[16] Particularly critical are family laws that govern equality in the private domain of the household, including marriage, divorce, guardianship, inheritance, and property.[16] The law must also ensure that the comprehensive sexual and reproductive rights of women and adolescent girls are protected to ensure they have full control over their sexual and reproductive health.[13]

Access to Quality Education: Education is a foundational aspect of gender equality, critical to ensure the participation of women and gender minorities in the economy, political life, and social movements. Societies must ensure girls and gender minorities can safely access education, stay in school throughout their adolescence, and enjoy equal treatment and access to educational opportunities while in school.[32] Evidence suggests an enabling environment for gender equality in education includes legislation, regulation, educational resources, infrastructure, and favourable public opinion.[32, 25] It is also critically important that education curriculums do not perpetuate misogynistic social norms surrounding gender. The benefits of education cascade across society and are multi-generational in their impact. A strong association exists between educational investment in girls and lower levels of violence.[19]

Economic Participation: Gender equality requires gender equitable participation in the economy in decent work that ensures workplace conditions of dignity, safety and fairness. While the precise levels of female labour force participation vary across countries and regions, globally women's participation rate is 25 percent below men and a large proportion of women are engaged in the informal economy that is characterised by precarious and seasonal work not protected by labour laws[23] Moreover, in both the formal and informal economy women are not equally paid for their work.[22] Social norms that discourage employment for married women and promote the uneven distribution of reproductive labour within the home undermine formal labour force participation. To increase women's economic participation, efforts to promote gender equality must provide affordable child care, ensure safe transportation, and address oppressive and discriminatory social norms.

Access to Assets, Infrastructure and Technology: Ownership of assets, such as land, property, and access to credit facilitates economic participation. It improves the livelihoods of women through their ability to generate income and heightens their bargaining power within families and communities. Men and women use household assets differently, and evidence shows that more asset ownership by women is associated with significant improvements in food security, reproductive and child health, and education, as well as reductions in domestic violence.[2, 9, 15, 1, 21, 30]

Access to infrastructure is also a critical input for gender equality. Digital infrastructure, transportation networks, water and sanitation systems, and social infrastructure such as education and health centres are essential and overlooked elements of gender equality.[26] Infrastructure must meet the needs of both women and men, and everyone should be equally able to enjoy its benefits, including access to communications infrastructure such as mobile and broadband networks.

Participation and Leadership in Politics and Institutions of Governance: Efforts to encourage and incentivize the equal and full participation of women in politics and institutions of governance represent another critically important mechanism to promote gender equality. Societies with gender balanced political representation function differently. Evidence shows female politicians prioritise social policies, increase the effectiveness of governance institutions, and modify the behaviour of men within those institutions.[33] Mechanisms to incentivize this political participation include gender quotas, mentorships, and the creation of women's advocacy networks to encourage candidates and support them once elected. Such incentives should exist at all levels of participation, from community councils and municipal governance to national office.[25]

Participation in Civil Society: Equally important is the participation of women in decision making roles in civil society, as journalists, advocates, and within the private sector.[14] National organisations linked with transnational gender equality movements have been critical to build social and political momentum for gender equality, to provide oversight and monitoring of gender equality efforts, and to share experiences and lessons learned.[31]

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L Introduction to Case Studies

The *Lancet* Commission undertook several case studies to examine the challenges involved with improving health equity and gender equality in conflict-affected states. We selected these case studies based on convenience, based on familiarity with these cases, not as part of a deliberative mixed method study.

In each case study, we remained cognisant of our overarching research question and our theory of change. The case studies of Afghanistan and Mozambique illustrate the challenges of improving health equity and gender equality in contexts with informal institutions which undermine policies to improve gender equality. In El Salvador, the Ministry of Health actively participated in efforts to improve gender equality. All five cases reveal the interconnections between gender equality and health equity, the importance of the health sector working to improve gender equality, as well as how deeply both health equity and gender equality are politicised.

M Case Review Afghanistan: Gender as a Battlefield

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In many ways, Afghanistan before the Taliban take-over in 2021 presents a critical test for the *Lancet* Commission's theory of change, which suggests improvements in health equity and gender equality can nudge societies from vicious to virtuous cycles.

Decades of conflict had devastated Afghan lives, livelihoods, and infrastructure. After the NATO invasion in 2001, the international community spent hundreds of millions of dollars to improve health equity and gender equality in Afghanistan. These initiatives formed a key part of a Western-backed effort to build democratic institutions in that country. Yet these interventions struggled to navigate Afghanistan's patriarchal, honour-based culture norms with the extended family as the core social and economic unit. Moreover, the effort to build and sustain these institutions took place amidst a deadly internationalised civil war between the US-led NATO forces, the Western backed Afghan government, and various insurgent groups, including al Qaeda, ISIS, and the Taliban. The ongoing counterinsurgency effort provided a problematic and violent backdrop for Western-funded efforts to improve gender equality and health equity.

In August 2021, US forces pulled out of Afghanistan and the Taliban re-asserted control of the country. The Taliban quickly rolled back rights, denying women and girls their freedom of movement, education, employment, autonomy, and dignity. The health care system has also teetered on the brink of collapse, undermined by the lack of foreign currency and the overall collapse of the economy due to the UN Security Council (Resolution 1988) sanctions regime against members of the Taliban. While the Security Council granted a humanitarian exemption under Resolution 2615, the sanctions regime and the freezing of Afghanistan's assets have devastated Afghanistan's economy.[27]

As outlined below, gender and health indicators improved from 2001-2021, yet violence also dramatically escalated. The factors fuelling this ongoing violence were deeply complex, rooted in the historical legacy of the proxy wars in the 1980s and 1990s, regional politics and brutal counter-insurgency measures by the NATO members. Afghanistan illustrates the difficulty of improving gender equality and health equity in fragile contexts. It suggests important lessons for policy makers to consider which include the long shadow of history, the politicisation of gender equality and health, the role of informal institutions, and the importance of understanding and navigating culture. Afghanistan also illustrates the potential within the health sector to contribute to gender equality, namely the power of community health workers to quietly and effectively navigate gender norms.

M.1 Methods

This comprehensive review of peer reviewed literature consisted of 54 searches using different combinations of keywords in five databases. A total of 27 keywords representing location ("Afghanistan", "Afghan", "Panjshir", Kandahar", "Kabul"), gender ("gender", "women", "gender-based violence"), health ("health", "determinants", "mortality", "morbidity", "disease"), conflict ("conflict", "violence") and social trends ("social", "norms", "trends") were used on Jstor, Scopus, Google Scholar, and Pubmed. A total of 4737 articles were identified and screened, and 225 articles

were reviewed. We built upon this review with reports from Human Rights Watch on the situation in Afghanistan after the return to power of the Taliban.

M.2 Health and Gender Progress from 2001-2021

- Life expectancy at birth improved from Male 54.6 years; Female 57.1 years in 2000 to Male 63.7 years, Female 66.7 years in 2020;
- The maternal mortality ratio improved from 1,450 per 100,000 live births in 2000 to 638 in 2017;
- Total fertility rate declined from 7.5 per woman (2000) to 4.2 per woman (2020);
- The adolescent birth rate decreased from 194 births per 1,000 women ages 15-19 in 2001 to 62 births in 2017;
- Skilled birth attendance increased from 12.4% in 2000 to 61.8% in 2020;
- Infant mortality fell from 90.6 deaths per 1,000 in 2000 to 47.9 per 1,000 live births in 2018;
- Neonatal mortality fell from 61.0 deaths per 1,000 in 2000 to 37.1 deaths per 1,000 live births in 2018;
- Under five mortality rates reduced from 129.2 per 1,000 in 2000 to 58 per 1,000 live births in 2020;
- The universal health coverage (UHC) index increased from 22 in 2000 to 37 in 2017;
- The proportion of population with health expenditures above 25% of total household expenditure increased from 0.1% in 2007 to 2.0% in 2013, while those with expenditure above 10% of household income increased from 4.8% in 2007 to 14.6% in 2013;
- Attendance rate for children of primary school age, 2015: boys 73.1%, girls 53.2%;
- Attendance rate for children of lower secondary school age, 2015: boys 47.8%, girls 27.9%;
- Completion rate for primary school, 2015: boys 67.2%, girls 40.2%;
- Literacy rate among females aged 15-24 improved from 32% in 2011 to 41.6 percent in 2021;
- Percentage of women (aged 20-24 years) married or in union before age 18, 2017: 28.3

These data were obtained from the SDG Data Portal,[32] the World Bank,[30] and UNICEF. [31] It is challenging to find data disaggregated by geographic area, socio-economic status, gender identity, or ethnic group, which undermines the ability for intersectional analysis. In addition, little information is provided to guide the user in the interpretation of this data, namely the extent to which data is measured or estimated.

M.3 The Health System

After the 2001 NATO invasion and the fall of the Taliban, Afghanistan had some of the worst health indicators in the world. Its health system was almost completely devastated by decades of war.

The majority of health services had been provided by non-governmental organizations for years. While the international community handed over governance responsibility to the nascent Afghan Ministry of Health, donors and multilateral agencies agreed to fund a basic package of essential health services, and contracted non-governmental organizations to undertake the delivery of these services, leaving the Ministry of Health in a stewardship role.[29] This 'contracting of services' model to provide a package of health services has been widely credited for Afghanistan's dramatic improvement in health indicators (including infant mortality and maternal mortality) and its rapid expansion of health services.[28]

The health system was highly dependent on NGOs for health service delivery and out-of-pocket payments and international assistance for health financing. A 2015 study noted that while government expenditure on health had increased, it still made up a small share of total government spending. Private payments, mainly out-of-pocket, made up about 73.6% of health spending while the government's expenditure made up only 5.6% and ODA contributed 20.8%.[2] Additionally, in a landscape where donors play a definitive role, NGOs and the health sector competed with donor organizations, which drained talent from the public workforce.[26]

While the contracting-out mechanism allowed for a rapid scale-up without relying on government capacity, this approach has long-term consequences including the weakening of the national health system, and the legitimacy and capacity of the government as a whole.[25] Adding to the mistrust of the health system was the militarization of health. In addition to NGO engagement, the US-led invasion resulted in military involvement in health service delivery. While USAID worked to build national ownership and community engagement, NGOs were widely critical of the political pressure for 'quick fixes' due to the military's intention to leverage healthcare for their 'hearts and minds' strategy. This 'quick fix' approach undermined the focus on the underlying social determinants of health, and while several surveys showed marked improvements on several health outcomes, including maternal and child mortality and vaccination rates, concerns were raised about cultural issues, sustainability of programs, the quality and underutilization of health services, and poor self-sufficiency of the national health system. Additionally, there was a growing perception of health and health workers not being viewed as neutral, which was used to explain a number of attacks against health workers and aid agencies.[20]

M.4 The Long Shadow of History

Throughout Afghanistan's history, domestic leaders and foreign forces have instrumentalized women's rights for the purposes of politics and power.

Historically, the United Kingdom and Russia competed for influence in Afghanistan. After forty years as a British Protectorate, Afghanistan became an independent country in 1919. In the early 20th century, the government encouraged the education of women and their participation in the economy. Women's rights were rolled back when the "Ulema" or religious scholars asserted control in 1929. From the 1950s to the 1973 takeover by the Soviet-backed Marxist government, the government introduced women's equality initiatives which were accelerated by the Marxist government. Yet the Soviet invasion in 1979 accelerated the existing resistance from the rural population against the 'un-Islamic' Soviet-backed regime, precipitating a decade long proxy war with the US-backed Mujahideen, notorious for its widespread use of sexual and gender-based violence. Upon assuming

power in 1996, the Taliban brutally restricted the rights of women and girls.[37, 18, 1] When the Western-backed government assumed power in 2001, they prioritised the expansion of education, legal reforms, and civic and political participation by women; however, these rights were entirely removed after the 2021 Taliban takeover.

This history illustrates the extreme precariousness and politicisation of women's rights. For Afghanistan's political and religious leaders as well as international advocates, the behaviour and activities of women have become symbols of either Afghanistan's modernization or its adherence to religious and cultural values. Women's rights were instrumentalized, used by all parties to legitimize oppression, violence, and resistance.[37, 21, 11]

M.5 Understanding the Nature of the Conflict

After the US-led invasion of Afghanistan, much of the country experienced significant periods of instability. This internationalised intra-state conflict was characterised by conflict between the government of Afghanistan, foreign forces supporting the government and insurgents including the Taliban and the Islamic State. Between 2013 and 2019, Afghanistan experienced a dramatic escalation of violence and civilian deaths, in part due to an escalation of US airstrikes and drone warfare.

This conflict continued to have a serious impact on civilian infrastructure. While the international development assistance did invest heavily in building such infrastructure, as Graeme Smith of Crisis Group reported "some of the more open-minded amongst the Taliban will say, 'Yeah, it is good that some things were built and we got some roads, that telecommunications towers are now dotted across the landscape.' But then they look at me and they'll say, 'Just imagine what might have happened if you hadn't turned our country into an inferno of violence.'"[10]

Internationalised civil wars, particularly conflicts over control of the government, are challenging environments for efforts to improve health equity and gender equality, as these initiatives are often interpreted as reflections of state influence and sources of support for the state. As foreign parties engaged in the conflict were also development assistance donors in Afghanistan, gender equality and health projects became further politicised and targeted by insurgents.

M.6 Importance of Cultural Context

Gender equality interventions navigated and interacted with social structures shaped by ideas surrounding 'namus'—meaning 'honour. Honour is almost inseparable from masculinity, where a significant component of a man's honour is his perceived ability to regulate the behaviour of the women in his household. This extends to the societal level, where a family's honour is measured by the perception of the 'purity' and moral conduct of family members, both male and female. Religious and cultural duty obliges men to preserve their honour by enforcing patriarchal norms that regulate women's behaviour in the private and public sphere. Abuse and violations of the rights of girls and women were not interpreted as such by most families; instead, they were considered a prerogative, necessary to uphold honour.[22, 9]

Children are socialised by the family and community under cultural concepts such as 'tarbia' – meaning 'upbringing' or 'training' – 'adab' – meaning 'politeness' or 'good manners' – and 'akhlaq'

– meaning 'morality.' These generally translate into expectations of respect for elders, obedience, and gender-specific good manners. A significant component of family honour involves girls obeying their male relatives, fulfilling their 'gender roles,' and restricting their mobility and sexuality.[34]

The enforcement of patriarchal norms, through both formal and informal institutions, has led to the acceptance of and impunity to violence against women and girls (VAWG) such as early marriage and domestic abuse. But its most tragic example is honour killing, a form of behaviour regulation meant to preserve family honour, even in cases of rape. VAWG is perceived by many families and communities as a private family matter, and male heads of families must 'mitigate' the reputational damage that comes with the shame and stigma associated with the victim. Some customary practices also commodify the 'honour' of women and girls. The context of economic hardship exacerbated these practices, including bride prices, early and forced marriage, 'baad' or the practice of settling debts with the 'gift' of girls, and 'badal' or the practice of marriage, particularly of girls, to settle feuds.[15, 14]

Gender equality interventions operated against this backdrop of honour and were forced to navigate the challenging terrain of donor driven imperatives for gender equality programming against the power of informal institutions.

M.7 The Role of Informal Institutions

Two contradictory systems operate in Afghanistan: formal and informal institutions. From 2001-2021, formal state institutions were backed by Western assistance and found their source of authority in the 2004 Constitution, the new Penal Code and Islamic law. Contradictions within these formal institutions limited progress on gender equality. Article 22 in the Constitution guaranteed equal rights to both men and women, but Article 3 stressed that "No law can be contrary to the belief and provisions of the sacred religion of Islam." In many cases, judges evaluated this law based a strict interpretation of Islam.[8]

Informal institutions – local customs, traditions, religious interpretations, and social norms such as 'namus' – governed the day-to-day life of most of the mostly rural population. The influence of informal institutions is evident in the application of overarching laws meant to provide protection and justice for women and girls.[17, 19]

Most judges who interpreted the law were men educated in madrasas, which resulted in a judiciary ill-equipped to interpret laws designed to improve gender equality. The Elimination of Violence Against Women (EVAW) law was endorsed in 2009, yet most cases of gender-based violence continued to be referred to informal justice mechanisms, such as jirgas, shuras, or village mediators. Tribal jirgas and shuras are exclusively male. Women who escape abusive households are therefore often accused of adultery.[8]

Informal institutions also undermined efforts to pursue an education, seek employment, and participate in political and community life. Women and girls were subjected to ongoing harassment and disrespect. For example, while the Constitution reserved Parliamentary seats for women and there was a considerable increase in women's public participation, gender norms limited the decision-making and influence of female parliamentarians. Female politicians were often mocked and belittled by male politicians and harassed by the public.[16, 13]

M.8 Impact of Violence on Gender Equality

Cycles of violence created conditions that further undermined gender equality, both through direct and indirect forms of violence.

Insurgents targeted women and sexual and gender minorities, particularly civil society and political leaders, for transgressing gender roles, and these targeted killings escalated as the Taliban gained strength in 2020 and 2021. The Hazara Shia community were disproportionately affected by these attacks. It was not only insurgents that engaged in attacks against women; human rights organisations also documented abuse by Afghan forces and government officials. Moreover, human rights organisations reported that the targeting of women, ethnic minorities, and sexual and gender minorities dramatically escalated after the Taliban takeover in 2021.[33]

Beyond the direct attacks on women and girls, the context of rising insecurity undermined their freedoms and opportunities. Insecurity and attacks on schools were often cited as the main reason for keeping children, particularly girls, out of school. UNICEF estimated that girls made up 60% of the 3.7 million children who were kept out of school, and girls were more likely to be permanently kept out of school. One study in Uruzgan province found that while most families wanted to send both boys and girls to school, girls were less likely to travel alone to school due to insecurity.[6, 5] Another study looking at a women's empowerment NGO, the Afghan Women's Resources Centre, found that families pressured women to drop out of community activities as a result of insecurity.[23]

Domestic violence against women and sexual and gender minorities has also been widespread. One study found that 82% of all violent acts against women were committed by family members, 9% by community members, and 2.5% by the state.[35] Data from the 2015 Demographic and Health Survey reported that 94% of women who had experienced physical violence from the age of 15 identified their current husband as the perpetrator, but 9% also cited violence by a mother or stepmother, 8% by father or stepfather, 7% by a mother-in-law, 7% by a father-in-law, and 4% by siblings. In 2015, 53% of married women aged 15-49 reported a lifetime experience of physical Intimate Partner Violence (IPV) and 46% reported physical IPV in the past year.[7] In 2018, the International Men and Gender Equality Survey found that, in 14 provinces surveyed, half (49.6%) of married women experienced physical IPV in the past year. Perpetrators are mostly male but 10.4% are female.[35]

M.9 Failure to Engage with Boys and Men

Masculine honour shapes gender self-identity and relations in Afghanistan. While subordinating women and girls, the social norm of namus or honour also places significant social expectations on men and boys. Men are expected to be the primary breadwinner for their family. Yet during the conflict, many Afghan men were unable to work, and subsequently felt a loss of integrity and a feeling of dishonour and worthlessness. These pressures were linked with men's violent and aggressive behaviour against women in both the private and public sphere.[12]

For boys, their freedom of mobility and employment meant that they were exposed to different forms of abuse. While the culture of stigma, silence, and taboos around sexual violence resulted in little concrete data, human rights groups report adolescent boys are the 'constant victims of physical violence, torture, and rape.' The cultural practice of 'bacha bazi' (dancing boys, the child

exploitation of boys by older men) led to the victimisation of many boys who were taken from the protection of their families and sold as objects of entertainment. Not only were they stripped of their masculine identity by being coerced into gender transformation that embodies femininity, but they were also subject to violent psychological, physical, and sexual abuse. Even though human trafficking, exploitation of minors, prostitution, and paedophilia were against Afghan law, bacha bazi continued to be normalized as a cultural tradition, thereby shielding it from scrutiny.[4]

Gender norms surrounding masculinity and their impact on boys and men were not sufficiently addressed by efforts to improve gender equality in Afghanistan. And most egregiously, SGBV against adolescent boys was largely ignored in both the examination of and response to GBV in Afghanistan.[4]

M.10 Impact of Violence on Healthcare

Health infrastructure, the safety and wellbeing of healthcare workers, and the ability and willingness of patients to access care was impacted by the ongoing conflict. The direct and indirect effects of violence took a tragic toll on public health. In regions with active conflict, people became increasingly fearful of accessing healthcare. Moreover, the delivery of services remained challenging, with health facilities lacking staff, equipment, and supplies. Donor support gradually declined, further undermining the healthcare system. Healthcare infrastructure was damaged or destroyed by all sides in the conflict, and health workers were targeted.[3]

M.11 The Influence of Gender on Health

The case study of Afghanistan reinforced existing evidence that gender influences both access to and the delivery of health care services. Gender norms impacted the ability of women to seek health care services, and their autonomy in making decisions about contraception. Gender norms can also limit care-seeking behaviour, such as the expectation of women to be 'strong' and the shame a woman is made to feel if she asks for help. Gender norms influence how health care staff treat women and girls. Health workers are reluctant to address issues such as gender-based violence because it is viewed as a private family matter and beyond the scope of their work. There is also a negative perception of survivors of sexual violence.[24, 26, 36]

M.12 Positive Role of Community Health Workers

Community health workers (CHWs) have been instrumental in increasing health care coverage in remote regions and improving health outcomes. Beyond positive health outcomes, CHW programmes can be a key channel for women's empowerment as they enable women's mobility and decision-making, economic participation, and community recognition, while subtly changing community attitudes towards women's participation in public life. At the household level, female CHWs reported feeling more empowered because of knowledge gained through their training and assume responsibility for household decision-making. Much like CHWs, community midwives also serve as positive role models, taking part in educating and employing other women and helping to prioritise women's health in their communities.[24]

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N Case Review Mozambique: The Persistence of Gender Norms

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Mozambique is also an important case for our theory of change. Mozambican women organized and mobilized for policies to support gender equality. Yet despite these efforts, gender inequalities persist.

From 1977 to 1992, Mozambique endured a devastating civil war. Estimates place conflict mortality as high as one million while the fighting displaced a further six million people.[4] [11] Combatants deliberately targeted civilians and government infrastructure like health clinics (Finnegan A Complicated War 1992; Walt and Cliff The dynamics 1986). After the war ended, Mozambique avoided recidivism for over two decades. Yet from 2013 to 2016, periodic violence simmered, and in 2017, a violent insurgency erupted in Cabo Delgado – the economically impoverished yet resource rich northern province.[8] While health inequities and gender inequalities did not cause this conflict, they left the province and the country more susceptible to violence. The Mozambique case provides insight into the promise of nationally driven mobilisation for gender equality, how informal institutions undermine efforts to improve health equity and gender equality, as well as the gender-blind nature of efforts to improve health systems.

N.1 Methods

This comprehensive review of the literature, which supplemented earlier reviews conducted in English, was conducted from Portuguese language sources from 2000 to 2020. Search terms included "Moçambique" AND normas de género, violência de género, mortalidade, morbilidade, deslocamentos, instabilidade, desastres, acesso à saúde, serviços de saúde. These searches were conducted using Google Scholar; Proquest; Jstor; ReliefWeb; RefWorld. The review included 43 peer reviewed articles, 16 non-peer reviewed articles, and four book chapters.

N.2 Health and Gender Indicators

- Life Expectancy improved: from Male 46.8 years, Female 51 years (2000); to Male 59 years, Female 65 years (2022);
- Maternal mortality ratio decreased from 798 per 100,000 live births in 2000 to 289 per 100,000 live births in 2017;
- The percentage of births attended by skilled health staff increased from 47.7% in 2003 to 73% in 2015;
- Total fertility rate per woman fell slightly from 5.8 (2000) to 4.6 (2022);
- The adolescent birth rate was largely stagnant, declining only slightly from 185 per 1,000 women aged 15-19 years in 2001 to 180 per 1,000 women aged 15-19 in 2016;
- The proportion of women of reproductive age who had their need for family planning satisfied with modern methods was also largely stagnant, increasing only slightly from 51.2% in 2004 to 55.5% in 2015;

- Infant mortality fell by half, from 113.4 deaths per 1,000 live births in 2000 to 54.0 deaths per 1,000 live births in 2018;
- Neonatal mortality rate fell from 45.6 deaths per 1,0000 live births in 2000 to 27.8 deaths per 1,000 live births in 2018;
- The under-five mortality rate also fell by half, from 171.5 deaths per 1,000 live births in 2000 to 73.2 live births in 2018;
- While Mozambique has experienced a 33% decline in new HIV infections since 2010, UNICEF reports HIV prevalence among adolescent girls 15-19 remains approximately three times higher than for adolescent boys;
- The universal health coverage (UHC) increased from 21.0 in 2000 to 46.0 in 2017;
- The proportion of the population with health expenditures above 25% of total household expenditure declined from 0.6% in 2002 to 0.4% in 2014, while expenses above 10% of total household expenditure declined from 2.2% in 2002 to 1.6% in 2014;
- Completion rate for children of primary school age (2011): Female 39% Male 43.6%;
- Child marriage by age 18, percent 2005-2020 53%;
- Female literacy rate increased from 33.2% in 2003 to 50.3% in 2017.

Cabo Delgado

- According to the 2011 DHS, 39.3% of girls aged 10-14 in Cabo Delgado were out of school, the highest level in Mozambique;
- Early marriage: according to the 2011 DHS, 60.7% of women aged 20-24 were married before the age of 18;
- 20.7% of women and girls aged 15-24 had a husband or cohabitating partner who is 10 or more years older;
- Attitudes towards intimate partner violence: according to the 2011 DHS, 37.7% of women and girls aged 15-24 believe that wife beating can be justified;
- Adolescent pregnancy: according to the 2011 DHS, 11.4% of women aged 20-24 gave birth before the age of 15;
- Adolescent SRHR: according to the 2011 DHS, 87.7% of girls aged 15-19 had sexual intercourse and 46.7% were sexually active, yet only 22.7% of these girls had a comprehensive knowledge of HIV.

These data were obtained from the Mozambique Data Portal,[1] SDG Data Portal,[35] UNFPA,[36] UNAIDS,[33] the World Bank,[30] and UNICEF.[34] Little information is provided to guide the user in the interpretation of this data, namely the extent to which data is measured or estimated.

N.3 The Long Shadow of History

As the colonial power in Mozambique, the Portuguese did not invest in national health infrastructure for the broader population, instead providing services largely to Portuguese citizens. When Mozambique gained its independence in 1975, little health infrastructure existed. The Frente de Libertação de Moçambique (FRELIMO) government prioritised the creation of a primary care system throughout the country.[37]

Quickly after the country gained independence, the Resistência Nacional Moçambicana (RENAMO), backed by the Rhodesian and South African white nationalist governments, launched attacks against the FRELIMO government. During the ensuing civil war (1976-1992), RENAMO targeted civilians as well as health facilities. Almost half of Mozambique's primary care network was damaged or destroyed during the war.[37, 11]

The war left Mozambique as one of the poorest, most indebted, and aid-dependent countries in Africa, with extremely troubling health indicators and little health infrastructure. After the Rome Peace Agreement was signed in 1992, the Mozambique government once again faced the task of building the health system. In the face of a severe drought and economic pressure, the government implemented structural adjustment policies in exchange for financial support from the IMF and the World Bank. These policies required deep cuts to public sector spending, which further undermined the capacity of the government to strengthen health services.[27, 29]

From 2000-2015, the country enjoyed historic levels of economic growth, driven by economic reforms, strong economic governance, the expansion of agricultural activity, and the expansion of other sectors (such as the Mozal aluminum smelter).[18] The country received significant development assistance for health (estimated at USD 570 million in 2018 by IHME).[15] Despite this economic growth and health support, stark economic inequities remain, and health indicators reflect persistent gender inequalities, particularly clear in the indicators for adolescent girls.

N.4 Mobilisation for Gender Equality

Advocacy for the rights of women and girls has a long and proud history in Mozambique. Activists for women's rights founded the Organisation of Mozambican Women (Organização Moçambicana de Mulheres) in 1973. The 1990 Constitution and the 1991 Law on Associations (Lei 8/91) further strengthened the development of social movements and civil society groups. With help from UNDP, UNICEF, and other international donors, women's rights advocates founded Fórum Mulher (The Women's Forum) in 1990. Fórum Mulher continues to mobilize and advocate for gender sensitive policies.[5, 12, 22, 29]

Fórum Mulher and other civil society organizations pressed for a new Family Law in 2004 (Nova Lei da Família) which set the legal age of marriage at 18, prohibited polygamy, and provided both parents with equal rights for custody of their children. It also lifted restrictions on freedom of movement for women, which allowed women to travel alone with their children and guaranteed equality with their husbands in property ownership, although this has been inadequately enforced. The government's commitment to gender equality was solidified through a 2007 Action Plan (Resolution 17/2007) and the Law Against Violence towards Women in 2009 (Lei contra a Violência Doméstica). In 2014, Mozambique reformed its penal code to expand access to safe abortions, allowing legal abortions on

request during the first twelve weeks of pregnancy. For rape or incest, abortions can be provided until 16 weeks while in cases of fetal abnormality, abortions can be provided until 24 weeks.[28]

Due to this advocacy, the country has signed onto several international gender equality agreements, including the Convention on the Elimination of all forms of Discrimination Against Women (CEDAW), the Beijing Platform, The Declaration for Gender Equity in Africa, and the Southern African Development Community Declaration on Gender.[24, 32, 22]

Mozambique is praised for its high level of female political participation, and women make up over 40% of all parliamentarians. In 2008, the country adopted the Southern Africa Development Community's (SADC) Protocol on Gender and Development and agreed to reach a ratio of 50% of female participation in decision-making spaces. Yet gender equal representation is lacking at local levels of government, in bureaucracies, and in the formal economy.[31]

The ability of Mozambique's inspiring advocacy and progressive legislation to support and promote gender equality is continuously confronted by the power of informal institutions which reflect and reinforce cultural norms.[31, 19]

N.5 Informal Institutions

Two different 'informal' systems guide social norms in Mozambique; while different, both perpetuate gender systems where women are subordinate to men. The matrilineal system is common in the Centre and North regions of the country. Descent is traced through the mother and women stay with or close to their family after they marry, with their husbands joining their family. While this provides women with greater familial support, it does not necessarily translate into more power within the family or community. Widely practised initiation rituals socialise adolescent girls and boys to preserve the gender system, by emphasising male aggression and domination over women in initiation rituals for boys, and female submission to men in initiation rituals for girls.[23]

The patrilineal system prevails in the South-Central parts of the country. In this system, lineage is traced through one's father, men pay 'lobolo' to the bride's family, and upon marriage women join their husband's household. Women are expected to follow the authority of their husband's family and have little power within that family unit. If their spouse dies, some women are stripped of their property and are obliged to participate in rituals such as marrying their late husband's brother. These practices endure even with laws that decree women and their children will inherit the resources of their spouses upon their death.[6, 7]

These informal institutions undermine the dignity of women and girls, and their ability to reach their potential. For example, sexual relationships between adolescent girls and older men are widely tolerated. While the legal age of marriage in Mozambique is 18, early marriages are common in both rural and urban areas, particularly in rural settings and in the north. Factors driving early marriage include cultural norms such as initiation rituals, poverty, adolescent pregnancies, family pressure, vulnerabilities including orphanhood, as well as the lack of public policies to protect adolescent girls. Studies suggest that girls from the poorest 20% of households were more than twice as likely to be married early than those from the richest 20% of households. After marriage, the majority of girls drop out of school, undermining their employment and livelihood opportunities.

Gender systems which normalise the subordination of women also contribute to widespread gender-based violence, including intimate partner violence.[23] Moreover, in Mozambique's schools, some girls report that teachers use sexual intercourse as a condition for promotion between grades, and state that both teachers and boys in their peer groups harass and abuse them, further undermining their potential.[20]

Gender norms also influence patterns of employment, which is characterized by a large gender gap related to the quality of employment. Women shoulder the burden of reproductive, unpaid labour in the household, including childcare, elder care and food preparation and maintenance. While many women also engage in paid labour, much of this employment is through the unprotected informal sector or subsistence agriculture. Women did not benefit as much as men from economic growth and the expansion of paid jobs due to low human capital as well as social norms and the burden of reproductive labour.[17, 2, 29, 13]

Efforts to improve gender equality confront informal institutions, occasionally with unforeseen consequences. Polygamy is prohibited by the Family Law yet remains widespread across Mozambique. One result of the ban on polygamy is that the rights of other wives are not protected in the context of family dissolution due to break-up, divorce, or death,[32]

N.6 The Influence of Gender on Health

Studies show that some women dangerously postpone the decision to seek healthcare, even in pregnancy and childbirth. Husbands (or the husband's family members, particularly the mother-in-law) often decide when women should be taken to a hospital or health care facility. One cause of delayed access to care is related to beliefs surrounding protracted labour, which is interpreted as a sign that the child is illegitimate. Prior to taking a woman experiencing difficulties in labour to a health care centre, some families interrogate her on suspected infidelity. Other factors which impact on delayed access to health services include distance from the health facility, financial concerns, and opportunity costs – time away from paid or unpaid employment. These delays can result in maternal mortality and stillbirth, with higher levels of both in rural areas and in the North. In addition, the number of adolescent girls giving birth leads to a significant number of girls and women living with obstetric fistula.[3, 6, 7, 14, 19, 25, 29]

Men tend to seek primary health care services less often than women and believe that healthcare is a "feminine thing." However, men use emergency health services at similar or higher rates than women, usually due to violence, accidents, or complications related to advanced diseases that could have been previously treated. Many feel more comfortable with traditional healers. In some rural regions and villages, the proportion of spiritual/religious healers is higher than the number of health workers. Individuals and families may prefer to visit their healers before going to a hospital or may prefer to only visit health care facilities for certain diseases.[14]

The Mozambican government has worked to revitalise the utilisation of community health workers, known as Agentes Polivalentes Elementares (APEs). These volunteers engage in health promotion, malaria testing and treatment, provision of first aid, and basic antenatal care. Yet the promotion of female community health workers is not part of the recruitment or planning process, and the majority of APEs in some regions – particularly in the North of Mozambique – are men. Given that pernicious gender norms can be a determinant of poor health outcomes and a barrier to accessing

health care services, the failure to train and promote female community health workers, including on how gender norms impact on health outcomes, is a missed opportunity.[21]

While efforts have been made to develop gender sensitive policies, the health system remains far from gender equitable. Gender focal points lack the power to enforce legislation, or the resources to exercise a meaningful role in their positions. When analysing the system, it is challenging to distinguish between general weaknesses and gender inequities. The system suffers from fragmentation in delivery, low levels of human resources, lack of data and information, insufficient financing and the lack of sufficient investment in national research and policy development capacity. Yet Mozambique has clearly not utilized the health system as a vehicle to address pervasive discrimination of women, or the risk factors that lead to poor health outcomes among men.[26]

N.7 Understanding the Nature of the Current Conflict

While support from transnational Islamic insurgency movements and the lure of natural resources (natural gas and rubies) within the region has fuelled the conflict, its roots lie within grievances fuelled by socio-economic inequities. During Mozambique's civil war, the long coastline of the province facilitated illicit trade in timber and ivory which transitioned to narcotics such as heroin in the post-war period. After the discovery of natural gas, government elites in the region, predominantly from the Makonde ethnic group, used their positions to control profits related to resource extraction and illicit activity. The ability of the population to engage in artisanal mining and fishing was disrupted by the expansion of commercial interests and extortion of local officials. Much of the affected population was from the Mwani ethnic group which added an identity or ethnic dimension to the conflict.[8, 9, 10, 16]

The al-Shabab insurgency erupted in 2017 and quickly overwhelmed Mozambican security forces. Hundreds of thousands have been displaced and thousands killed. While deployments of Rwandan and SADC troops have enabled the government to regain territory, the insurgency is far from over. The al-Shabab group is composed of both Mozambicans as well as foreign fighters, and while referring to Islam, the attacks and patterns of killing appear to be motivated by grievances toward the government. Insurgents have attacked police and military checkpoints, brutalised civilians, and damaged civilian infrastructure.[16]

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O Case Review El Salvador: The Health System as a Vehicle for Change

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Sexual and gender-based violence (SGBV) affects millions of women across Latin America, undermining their safety, security, and potential. SGBV spans class, geography, and age-groups, yet individuals who are indigenous or of African descent, LGBTQ+, children and young women, living in poverty, or with disabilities are particularly vulnerable.

El Salvador has experienced among the highest rates of SGBV in the region, including femicide which is the deliberate killing of women because of their gender.[11] The causes of this violence are complex, rooted in the dynamics of history and culture, the brutality of the civil war, the experiences of El Salvador's migrant populations in Los Angeles, as well as poverty, inequality, and weak institutions.[11, 3]

To address this violence, women's rights organizations mobilized to demand policies and programs to prevent and respond to SGBV.[15] As outlined below, El Salvador provides important insight into the Commission's theory of change, namely the engagement of the health sector in efforts to promote gender equality. Yet as outlined below, the case also highlights the precariousness of progress on gender equality and the challenges faced by the health sector when gender equality becomes culturally supported by machismo and politicized. Despite legislative progress and innovative programs, national institutions required more financial support to support their implementation. In addition, important initiatives to promote gender equality and counter SGBV were discontinued with the change in government, even though they kept some programs and began others. Stronger national involvement of academia, government, and civil society is needed to address the problem.

O.1 Methods

This comprehensive review of the literature was conducted from English and Spanish language sources from 2000 to 2020. Search terms in English included "El Salvador", "Gender-Based Violence", "Health System", "Domestic Violence", "War", "Cartels", "Sexism", "Justice", "Institutions", "Feminicide", "Drugs", NGOs", and "Gender Norms". Meanwhile, search terms in Spanish included "El Salvador", "Violencia de Género", "Sistema de Salud", "Violencia doméstica", "Guerra", "Pandillas", "Machismo", "Justicia", "Instituciones", "Feminicidio", "Drogas", "ONGs", and "Normas de Género". These searches were conducted using Google Scholar, Proquest, and Jstor. In total, the review included 53 peer reviewed articles, eight stakeholder reports, three non-peer reviewed articles, two book chapters, and one doctoral dissertation.

O.2 Sexual and Gender Based Violence Data

- In 2019, El Salvador registered 6,793 cases of sexual violence: 6,268 (92%) committed against women. Of the sexual violence committed against women, 3,194 (50.9%) occurred in households, 2,185 (34.8%) occurred in public spaces, while 370 (5.9%) occurred in other

places (such as schools, institutions, businesses etc.); 65% of registered sexual violence cases were committed against girls and young women with ages ranging from 10 to 19 years old.

- El Salvador has one of the highest femicide rates in Latin America, second only to Honduras. Unlike other countries in the region, the perpetrator is often a stranger or someone with no affective ties to the victim, rather than an intimate partner. Data suggest that adolescent girls and young women are at the highest risk of femicide.
- In 2017, El Salvador registered 469 "violent women deaths" with 41% of the victims 15 to 29 years old; 5,226 cases of sexual violence against women with 2,323 (44.4%) aged 15 to 19 years old and 1,652 (31.6%) aged 10 to 14 years old.
- In 2017, 6 in 10 women (with ages ranging from 15 to 29 years old) reported they experienced some type of violence at some point in their lives. Half of women within this age group reported that they had experienced psychological violence, while 47% experienced sexual violence, and 19% experienced physical violence.

O.3 Mobilization for Gender Equality

Women composed approximately 30% of combatants with the Frente Farabundo Martí para la Liberación Nacional (FMLN). After El Salvador's civil war ended in 1992, many of these former combatants mobilized to promote the political, social, and economic rights of women. Women's organizations benefited from international connections and support, including individuals returning to El Salvador from exile after the war, donor funding to support civil society groups, participation in international conferences, and engagement with international networks of feminist activists. Civil society groups that emerged out of the FMLN forged alliances across the political spectrum to advocate for issues such as quotas for women in political parties, intimate partner violence, and the strengthening of child support laws.[8, 6]

O.4 Legal Frameworks

Women's groups were unable to prevent El Salvador from adopting restrictive policies on sexual and reproductive health and rights. Prior to 1998, national legislation allowed for abortions (1) when the pregnancy was a result of rape or incest; (2) when the pregnancy put the life of the woman in danger; and (3) when fetal abnormalities were detected. In 1998, El Salvador passed one of the strictest anti-abortion laws in the region, banning and criminalizing all abortions under any circumstances. In 1999, the new constitution recognized the embryo as a human being at the moment of conception. Women and health professionals who undergo or conduct abortive procedures can therefore be charged with homicide. These laws criminalize survivors of sexual violence with unwanted pregnancies who seek abortions. Women who are vulnerable and economically marginalized are disproportionately prosecuted for violating these very strict anti-abortion laws. There have been cases in the borderline of and obstetric emergency and being criminalized by suspected abortion.[2, 8]

Yet women's advocates successfully mobilized to reform laws related to sexual and gender-based violence. Prior to the Special Law for a Life Free of Violence Against Women (2012), Article 200 of the Criminal Code prohibited acts of domestic violence. The law limited criminal prosecution to a

narrow range of circumstances, including evidence of injuries on the victim (such as bruises that last five days or longer), or if the aggressor was a repeat offender. Through the work of the cross-party group 'Women in Parliament,' El Salvador passed the Law for a Life Free of Violence Against Women (2012) (Ley Especial Integral para una Vida Libre de Violencia para las Mujeres). This law addresses all forms of violence against women, from harassment of women to feminicides. It directs the government to eradicate violence against women through the establishment of mechanisms to prevent and detect violence and protect victims.[4, 16, 13, 9]

Despite this progressive legislation, the rate of registered SGBV cases taken to court as well as the country's institutional capacity to implement this law remains low. Moreover, in many cases, survivors of SGBV are unaware of existing legislation that protects them.[14]

O.5 The Power of Informal Institutions

Salvadorian society is influenced by a machismo culture. Machismo is characterized by male aggressiveness, intransigence in male-to-male interpersonal relationships, and sexual aggression in male-to-female relationships. Such a culture objectifies and dehumanises women, encourages men to dominate and control their partners, and tacitly accepts violent behaviour towards women, including domestic violence. It has also contributed, particularly for young people, to the idealization of gang identities and gang-related violence. Machismo culture permeates daily life, influencing the prevalence of SGBV and shaping institutional responses to SGBV. Through machismo, the criminal justice system, including police, judges, and juries can reflect and reinforce attitudes that minimize the legitimacy and seriousness of domestic violence and femicide.[1, 13, 12]

O.6 The Health Sector and Gender Equality

The health system embraced its unique role in the development of targeted programs to raise awareness of health workers to gender issues. These health workers then became leaders in promoting gender equality through their participation in the innovative Ciudad Mujer (CM) initiative.

O.7 Ciudad Mujer (CM)

In 2011, El Salvador adopted a ground-breaking program that provided health and other public services for women in one location: the Ciudad Mujer. Vanda Pignato, a gender equality activist, FMLN politician, and former first lady of El Salvador spearheaded this initiative. Six centres have been established across the country. In these centres, women should be provided with free childcare while they access health care services and receive skills training to participate in the formal labour market and strengthen their financial independence. Survivors of SGBV can report this violence to police officers, receive legal advice, and access medical services and psychological counselling.[5, 7]

Given its success and with support from the Inter-American Development Bank, the initiative was replicated in other Latin American countries, including Bolivia, the Dominican Republic, Honduras, Mexico, and Paraguay. However, the expansion of these centres has slowed under the government of President Bukele, perhaps a result of the close affiliation of the Ciudad Mujer with the previous

FMLN government. Since 2019, some centres have been closed and budget cuts have affected the operational capacity of other centres.[10]

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P Case Review Kenya

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The disputed 2007 Kenyan national election resulted in almost two months of violence between supporters of Mwai Kibaki's Party of National Unity and Raila Odinga's Orange Democratic Movement. Political party affiliations were ethnically based, between the Kikuyu and Luo ethnic groups. The violence therefore fell along ethnic lines and included murder, forced displacement, and rape and other forms of sexual and gender-based violence (SGBV).[7, 1, 3, 2] The violence ended with the signing of the National Accord and Reconciliation Act which created a power-sharing arrangement.[9]

During the election violence, children, men, and women were affected by rape and other forms of sexual violence. Rape was used to humiliate the opposition, inflict pain and suffering on political opponents, emasculate men, and to incite fear within and punish communities. Reports by human rights groups also indicated that police officers, deployed to keep peace, also engaged in sexual violence. In January 2008, Nairobi Women's Hospital and the Coast General Hospital in Mombasa reported a two- to three-fold increase in the number of women and children seeking treatment for sexual assault.[4, 5, 10]

This case study underscores the important role of the health system in general, and specifically healthcare providers to advance gender equality.

P.1 Importance of the Health System

A rapid, evidence-based, and empathetic response to SGBV is critically important to reduce barriers to care seeking behaviour, to deliver effective treatment to minimize the physical and mental health consequences of SGBV, and to provide ongoing support to survivors. Coordination between the health system and the legal and judiciary system is also important to ensure justice for survivors. Health outcomes for survivors are negatively impacted if the health sector does not have effective protocols in place or lacks connectivity with law enforcement, if treatments are not available, or if healthcare providers hold biases towards survivors of SGBV.[6]

P.2 Response of the Health System to Election Violence

The health system was not prepared for the widespread nature of SGBV during the Kenyan elections. Hospitals like Nairobi Women's Hospital Gender Recovery Center were praised for their response, and NGOs like Médecins Sans Frontières provided care and treatment to survivors.[10] Reports also indicate that healthcare providers responded with care and empathy, and the election-related political divisions did not diminish the quality of care provided.[6]

Yet in general, the health sector was not sufficiently sensitized to the various forms of SGBV, lacked referral mechanisms with the police and judicial system (Kilonzo et al Sexual violence 2009), did not have sufficient equipment or treatment available, and healthcare providers needed extensive training on patient centred and gender aware approaches to sexual violence, counseling, testing, and treatment protocols for survivors of sexual violence.[8]

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Q Case Review Kosovo

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After the end of the NATO campaign in Yugoslavia in June 1999, Kosovo was placed under the political control of the United Nations. At that time, Kosovo's health indicators were among the worst in Europe, the legacy of a decade of repression, over a year of simmering conflict, and several months of war between NATO and the Yugoslav army, during which the majority of the Albanian population was displaced.[14] International officials controlled the health sector until provisional institutions of self-government were established in 2002. The UN maintained overall administrative control of Kosovo until its declaration of independence in February 2008.

During the 1990s, the Albanian community established the Mother Theresa Network; a tribute to the tremendous capacity of civil society.[16] However, when the international community arrived in Kosovo, the Mother Theresa Network was largely marginalized.

Q.1 Health Reform Effort

As part of its efforts to rebuild and reform the state, the international community launched an ambitious health reform program, with the objective of reorienting the system from a socialist to a European model, with a focus on primary care and instituting the concept of family medicine.[13] In many ways, Kosovo represented the ultimate imitation project.

Kosovo's bold vision for dramatic health reform was initially lauded as a success, given the organized, orderly nature of the policy generation process. Infrastructure was rehabilitated, and the family medicine program was funded and put in place.[13, 9] However, the implementation of these reforms was more problematic than their creation, and key objectives of health reform were not met despite decades of effort.

Kosovo's health indicators are among the worst in Europe. In 2018, the life expectancy in Kosovo was almost five years lower than neighboring countries, three years lower than the average of upper middle-income countries, and nine years lower than high income countries.[15] In 2019, the infant mortality rate was 9 per 1,000 births,[17] lower than the average in upper middle-income countries (11 per 1,000), and double the average of upper middle-income countries.[15]

Many central elements of the reform process have not met their promise. Access to health services is inequitable, with substantial out of pocket payments and referrals by physicians to their private practices. According to the Kosovo National Health Accounts, in 2017 out-of-pocket payments represent 36 percent of total health spending while government spending as GDP is also low, at 2.83 percent.[11] And while family medicine has officially been accepted, many questioned its efficacy.[4, 18] A 2019 survey found parents often sought the care of paediatricians within the private system instead of taking their children to family health centres.[18] Many members of the health workforce are frustrated by low wages; a 2018 survey of students at the Faculty of Medicine in the University of Pristina stated they intend to leave the country.[1]

A review of health reform efforts in Kosovo suggests that efforts to engage in health systems must avoid attempting 'too much, too fast.' More attention needs to be paid to slowly ensure the key

building blocks of a health system are in place and the focus is on the delivery of quality services to build the trust of the population. While health reform measures should reflect evidence, national stakeholders know the implementing environment better than donors and multilateral agencies. Health reform measures must reflect their concerns and reservations. The state is an integral component of any health system. Post-conflict reconstruction efforts need to either contribute to building state capacity or incorporate weak state capacity into the design of health reform measures.[9]

Q.2 Sexual and Gender Based Violence (SGBV)

As part of our case review of Kosovo, we also examined how attitudes and the response to SGBV changed over time. SGBV was widespread during the period of violence and instability in Kosovo, with evidence of widespread rape during ethnic cleansing efforts.[5] Despite the efforts of ICTY to include sexual and gender based violence as a war crime, and the UN's establishment of a court with international judges and prosecutors, sexual and gender based violence cases were not successfully prosecuted.[6] Only three cases were brought to trial, and all resulted in acquittals.[2] While UN police struggled to track down the perpetrators of these crimes, social norms related to gender further traumatised survivors of sexual violence. Within the Kosovo Albanian community, an informal institution in the form of a cultural code, known as the Kanun of Lekë Dukagjini, guides and codifies individual behaviour to ensure honour, dignity, and respect to families and communities. As a member of a rural community noted in a study, "The Kanun is our mindset. The social norms have deep roots and are hard to destroy."[12] Given these social norms, survivors of sexual violence were thought to have brought disrepute onto their families and their communities, and were ostracised or killed by their family members.[12]

Through more than a decade of advocacy, social attitudes towards SGBV shifted dramatically. Women's civil society organizations, in collaboration with female political leaders and supported by donor states, fought for recognition of these crimes, access to justice, reparation, and the end to stigma.[3] Survivors of sexual violence during the war testified openly about their experiences, including the devastating toll of the stigma they endured and demanded justice for these crimes.[10] As a result of this advocacy, in 2014, the Kosovo government recognised the right of survivors to seek compensation, although these survivors had to wait until 2018 to apply for their war pension.[7, 2] Critics note that these reparations are insufficient, and justice for many of the survivors of SGBV committed by the Kosovo Liberation Army remains elusive.[8]

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R Cross-national evidence on the impact of health service delivery on institutional trust

Authors: Ben Oppenheim, Armand Zimmerman, Matthew Clance, Stephanie Buell, Carolyn Chisadza, Jaclyn Guerrero, Jessica Hagen-Zanker, Sara Fewer & Mareike Schomerus

The Commission collaborated with researchers from the Secure Livelihoods Research Consortium (SLRC), a multi-country, longitudinal research project that explored household livelihoods, service delivery, and perceptions of state and local governance in conflict-affected areas.[2] We studied whether perceived changes in health equity, as measured by the quality and accessibility of health services, were associated with stronger trust in government institutions and the legitimacy of state institutions.[3]

We drew upon population survey data collected by SLRC researchers in conflict-affected areas of five countries: Nepal, Sri Lanka, Uganda, Democratic Republic of the Congo, and Pakistan. Data was collected from the same households in multiple waves over a seven-year period; three waves of data were collected in Nepal, Pakistan and Uganda, and two waves in Democratic Republic of the Congo and Sri Lanka. The surveys included measurements of household access to health facilities and perceptions of the quality of health services, as well as other indicators measuring multiple dimensions of institutional trust and legitimacy for both the central and local governments.

Our analysis of the survey data used random effects regression models to analyze the association between measures of health equity and measures of state legitimacy, over multiple survey waves. We measured health equity through two indicators: a measure of overall satisfaction with the quality of services, and health system access, which was measured in terms of travel time to the nearest health facility. We measured perceptions of state legitimacy through two variables: a binary variable measuring whether the respondent felt that the government cared about their opinion, and an ordinal variable measuring the extent to which the respondent felt that government decisions reflected their priorities. These measures of institutional legitimacy were available for both national and local governments.

We estimated both crude and adjusted models. The adjusted models controlled for a range of household demographic and socioeconomic characteristics, including the respondent's age, gender, level of education, marital status, and employment status, as well as the respondent's district. We also analyzed the impact of armed conflict, in particular whether exposure to violence moderated any trust-building impacts of health equity over time. To do so, we drew on data from a survey question which asked the respondent whether fighting had occurred in the area within the last three years.[16] As a robustness check, we estimated both crude and adjusted models with household and district fixed effects. Results are consistent with the analysis presented here.

This analysis does not account for intra-household differences and dynamics which could impact how household members experience changes in health service delivery, and condition any potential impacts on trust in government. The data do not allow for a gender-disaggregated analysis, through

[16] As an additional robustness check, we extracted data on armed conflict and violence from the ACLED dataset,[4] and matched it to GPS measures of each respondent's location. GPS data was available for all survey data except the Pakistan sample.

which we could compare results across members of the same household unit (and we know of no dataset that would enumerate multiple household members and capture data on our variables of interest). However, qualitative data from the SLRC does point to consistent, cross-national differences in trust in government by gender,[1] while the broader literature examined in this report underscores the profoundly different experiences that men and women (and non-binary) human beings have, when interacting with the health system. These results point to a need for further investigation, using quantitative data to explore intra-household differences.

Table 26: Crude and adjusted regression models for each country for national and local government

	Central government cares about my opinions		Decisions of central government reflect my priorities		Local government cares about my opinions		Decisions of local government reflect my priorities	
	Unadjusted β coef (p-value)	Adjusted β coef (p-value)	Unadjusted β coef (p-value)	Adjusted β coef (p-value)	Unadjusted β coef (p-value)	Adjusted β coef (p-value)	Unadjusted β coef (p-value)	Adjusted β coef (p-value)
Nepal								
Overall satisfaction	0.013 (0.051)	0.020 (0.003)	0.029 (0.032)	0.045 (0.002)	0.039 (<0.001)	0.045 (<0.001)	0.080 (<0.001)	0.081 (<0.001)
Time to health clinic	0.000 (0.341)	0.000 (0.003)	-0.001 (0.040)	-0.001 (0.005)	0.000 (0.232)	0.000 (0.642)	0.000 (0.322)	0.000 (0.490)
Paid official fees	-0.019 (0.180)	-0.022 (0.133)	-0.055 (0.077)	-0.064 (0.049)	-0.001 (0.967)	-0.009 (0.556)	0.009 (0.768)	-0.012 (0.723)
Paid informal fees	-0.022 (0.215)	-0.020 (0.293)	0.050 (0.205)	0.038 (0.359)	-0.072 (<0.001)	-0.057 (0.004)	-0.065 (0.121)	-0.061 (0.150)
Sex (women vs. men)		-0.025 (0.039)		-0.013 (0.610)		-0.003 (0.810)		0.008 (0.758)
Fighting in area		-0.002 (0.845)		-0.022 (0.392)		-0.068 (<0.001)		-0.137 (<0.001)
Sri Lanka								
Overall satisfaction	0.050 (<0.001)	0.007 (0.035)	0.078 (0.096)	-0.031 (0.753)	0.063 (<0.001)	-0.007 (0.137)	0.163 (<0.001)	0.227 (<0.001)
Time to health clinic	0.001 (<0.001)	0.000 (0.182)	-0.004 (<0.001)	-0.001 (0.744)	0.001 (<0.001)	0.000 (0.248)	0.001 (0.330)	0.001 (0.236)
Paid official fees	-0.049 (0.087)	0.008 (0.574)	0.018 (0.874)	-0.064 (0.795)	-0.089 (0.009)	0.016 (0.432)	-0.245 (0.001)	-0.249 (0.022)
Paid informal fees	0.083 (0.018)	-0.001 (0.873)	-0.095 (0.690)	0.348 (0.313)	0.169 (<0.001)	-0.002 (0.815)	0.263 (0.032)	0.343 (0.011)
Sex (women vs. men)		0.003 (0.468)		0.133 (0.424)		0.017 (0.005)		0.137 (0.050)
Fighting in area		-0.526 (<0.001)		0.965 (0.011)		-0.414 (<0.001)		0.197 (0.358)
Uganda								
Overall satisfaction	0.114 (<0.001)	0.116 (<0.001)	0.256 (<0.001)	0.267 (<0.001)	0.132 (<0.001)	0.135 (<0.001)	0.256 (<0.001)	0.278 (<0.001)
Time to health clinic	0.000 (<0.001)	0.000 (0.014)	-0.001 (<0.001)	-0.001 (0.015)	0.000 (<0.001)	0.000 (<0.001)	-0.001 (<0.001)	0.000 (0.079)
Paid official fees	-0.071 (<0.001)	-0.032 (0.282)	-0.218 (<0.001)	-0.145 (0.064)	-0.105 (<0.001)	-0.117 (<0.001)	-0.219 (<0.001)	-0.150 (0.043)
Paid informal fees	0.024 (0.358)	0.076 (0.071)	0.011 (0.854)	0.169 (0.129)	0.003 (0.893)	0.067 (0.105)	-0.095 (0.091)	0.030 (0.767)
Sex (women vs. men)		0.012 (0.656)		0.054 (0.413)		-0.015 (0.571)		0.057 (0.356)
Fighting in area								
DRC								
Overall satisfaction	0.029 (0.203)	0.032 (0.184)	0.017 (0.462)	0.019 (0.436)	0.103 (<0.001)	0.106 (<0.001)	0.095 (0.001)	0.089 (0.002)
Time to health clinic	0.000 (0.934)	0.000 (0.841)	0.000 (0.798)	0.000 (0.438)	0.000 (0.306)	-0.001 (0.023)	0.000 (0.246)	-0.001 (<0.001)
Paid official fees	0.258 (0.009)	0.208 (0.057)	0.182 (0.218)	0.155 (0.311)	0.052 (0.770)	0.011 (0.953)	0.173 (0.283)	0.128 (0.444)
Paid informal fees	0.080 (0.323)	0.091 (0.288)	0.114 (0.183)	0.148 (0.108)	0.115 (0.260)	0.133 (0.221)	0.031 (0.769)	0.088 (0.432)
Sex (women vs. men)		-0.026 (0.542)		-0.006 (0.889)		-0.114 (0.044)		-0.083 (0.120)
Fighting in area		-0.100 (0.115)		-0.094 (0.160)		-0.091 (0.215)		-0.174 (0.020)
Pakistan								
Overall satisfaction	0.036 (<0.001)	0.017 (0.004)	0.096 (<0.001)	0.035 (0.013)	0.039 (<0.001)	0.014 (0.026)	0.109 (<0.001)	0.000 (0.987)
Time to health clinic	-0.002 (<0.001)	-0.001 (<0.001)	-0.003 (<0.001)	-0.001 (0.020)	-0.002 (<0.001)	0.000 (0.078)	-0.004 (<0.001)	-0.001 (0.024)
Paid official fees	-0.003 (0.816)	-0.009 (0.572)	0.002 (0.961)	0.041 (0.259)	-0.011 (0.412)	-0.017 (0.344)	0.047 (0.145)	0.069 (0.084)
Paid informal fees	-0.003 (0.893)	-0.042 (0.128)	-0.038 (0.493)	0.021 (0.788)	0.023 (0.327)	-0.047 (0.126)	0.126 (0.030)	0.022 (0.778)
Sex (women vs. men)		-0.039 (0.020)		-0.081 (0.053)		-0.062 (0.001)		-0.178 (<0.001)
Fighting in area		-0.213 (<0.001)		-0.539 (<0.001)		-0.248 (<0.001)		-0.621 (<0.001)

Adjusted models control for the following variables: age, sex, years of education, marital status, income, employment status, district, and fighting in the area in the last three years. Beta coefficients for age, years of education, marital status, income, employment status, and district are not reported. X indicates variable dropped out of model

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S Analysis of COVID-19 Pandemic Models (June 10th, 2020)

Authors: Francois Daudelin & Patrick Saunders-Hastings

The purpose of this analysis was to determine how models used to simulate COVID-19 incidence during the first wave of the epidemic accounted for the presence of vulnerable groups within the population and indicators of national-level epidemic preparedness.

S.1 Search Strategy

On June 10th of 2020, the Medline (Pubmed) database was searched using the following string: "COVID" OR "CORONAVIRUS" AND "MODELLING". The search was limited to articles published in 2020. The search did not limit the geographic location of the included studies. Search results were exported to an excel spreadsheet for subsequent analysis.

Eligibility criteria for inclusion of studies in the analysis were the following:

Study types. Only peer-reviewed journal articles were included in the review.

Intervention/Exposures. Studies were eligible for inclusion if they were concerned with modelling the transmission of COVID-19 in humans.

Outcome. Studies were eligible for inclusion if they modelled COVID-19 incidence.

Setting. Only studies concerned with modelling community transmission were included. Studies exclusively aimed at fitting/estimating epidemiological parameters were excluded.

Language. Only studies available in English were included.

S.2 Article Search Results

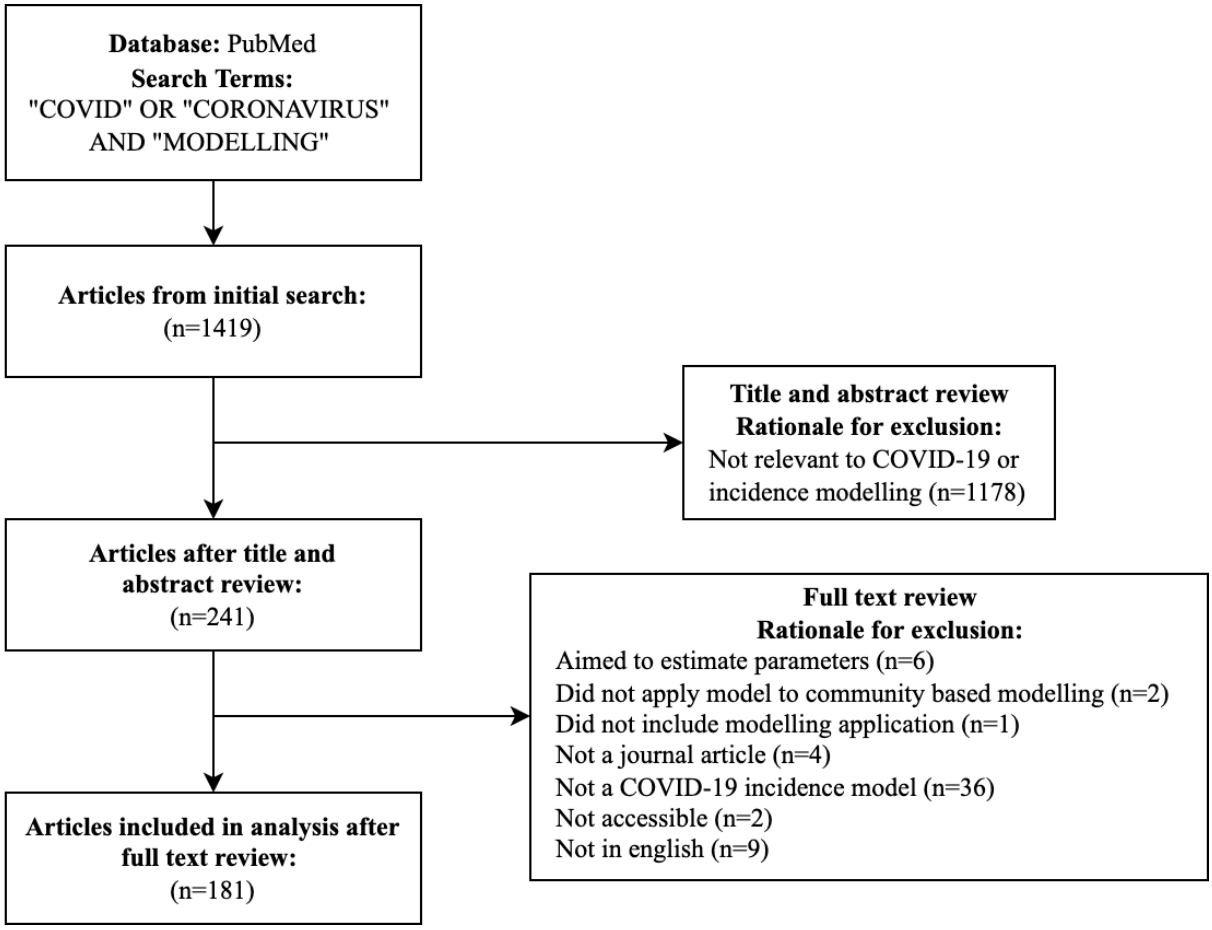
A total of 1419 articles were identified by the initial search, 241 articles were included after reviewing titles and abstracts, and 181 articles were included for analysis following a full-text review (Figure 38).

S.3 Analysis

Two analytical frameworks were used to extract information from studies that were included in the analysis.

The first framework considered how studies accounted for individual characteristics when modelling the exposure, vulnerability and adaptive capacity of the community under study. Exposure was defined as the likelihood of exposure to or contracting infections within a community, vulnerability as the likelihood of severe outcomes if infected and adaptive capacity as the ability to react to

Figure 38: Review process



limit exposure or vulnerability. For each of these three factors, model consideration of "Age", "Sex and Gender", "Socioeconomic Status", "Racial/ Ethnic/ Indigenous Status", "Employment Status/Condition" and "Pre-existing Conditions" was evaluated. An additional "other" category was included to capture characteristics that did not fit within these categories.

The second framework considered how models accounted for national-level epidemic preparedness. The "Epidemic Preparedness Index" proposed by Oppenheim et al. [1] was used for this analysis. For each study, consideration of each of the index's sub-indices was evaluated. These included "Public health infrastructure", "Physical/Communications infrastructure", "Institutional capacity", "Economic resources" and "Public health communications". The resulting extraction spreadsheet and summary table are available in a supplementary online appendix at http://sight.nu/peacehealthgenderequality/.

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T COVID-19 and Conflict Dynamics

To better understand the impact of COVID-19 on conflict dynamics, the Commission undertook three separate pieces of research.

We examined the impact of COVID-19 on attacks against humanitarian aid, analysed the results of the COVID ceasefire call issued by the UN Secretary-General, and assessed if and how COVID-19 affected cyber-attacks against healthcare. These three analytical pieces reveal that the impact of the pandemic did not have a pacifying effect on violence. Instead, the pandemic exacerbated problematic trends in conflict contexts, revealed the contested and deeply political nature of healthcare, and belied expectations that the COVID-19 pandemic would unite antagonists around a common cause.

T.1 Violence against Humanitarian Aid

Authors: Jason Phillips & Holly Norris

Humanitarian organisations worried that COVID-19 could exacerbate aid worker insecurity and attacks against humanitarian infrastructure, including healthcare. To better understand the impact of COVID-19 on the humanitarian environment, Phillips and Norris conducted a background study for the Commission on violence against humanitarian aid.[7] We established a database which documented violent events towards humanitarian aid workers, facilities and supplies from 1 January to 12 August 2020. We identified 236 incidents of violence against humanitarian aid in this period. For each incident, the database identified the target of that violence, the gender dimensions of that violence, and if and how the violence was motivated by or related to the COVID-19 pandemic.

This evidence showed that COVID-19 exacerbated security challenges for humanitarian actors. Proactive health diplomacy efforts included the "Unilateral Declaration of COVID-19 and Health Care" initiated by the Swiss NGO Geneva Call and signed by a few non-state armed actors in Iraq, Syria, and Mali.[3] Yet acts of violence against humanitarian aid continued apace.

This violence reflected a continuation rather than an escalation of trends within the humanitarian space. Violent incidents remained concentrated in a small subset of locations and disproportionately impacted national staff. Eighteen percent of the incidents tracked by our database displayed a COVID-19 dimension where violence was directed against an individual, place or assets embedded within a COVID-19 response, yet the database showed no discernible relationship between the severity of the pandemic and violence against humanitarian aid. A combination of xenophobia, distrust, and stigmatization of health workers created an environment where recipient communities often perceived humanitarian workers as vectors of harm rather than vectors of assistance. While the literature on aid worker insecurity tends to prioritize attention to armed non-state actors as the perpetrators of such violence, in our database, civilian groups and state security forces carried out most acts of violence. Information remains limited on the gendered dimensions of such attacks.

T.2 COVID-19 Ceasefires

Authors: George Polanyi-Williamson & Val Percival

On March 23, 2020, UN Secretary-General António Guterres called for a universal push towards

peace and reconciliation and a Global COVID-19 Ceasefire, the first global ceasefire call in the history of the United Nations. The Secretary-General directed the machinery of the United Nations to support this call. In July 2020, the United Nations Security Council followed with a resolution calling upon parties to armed conflict to cease hostilities for 90 days to enable the delivery of humanitarian assistance.[8]

To assess the success of this call, the Commission prospectively analysed fifteen instances where parties to a conflict called for a COVID-19 cessation of hostilities. Unfortunately, violent conflict returned in some form to all of these cases. Libya was a slight exception to this trend: while violence erupted after the initial ceasefire call, the subsequent UN brokered ceasefire led to a settlement and the establishment of a national unity government. Such a pattern is common, as mediators often require multiple attempts before ceasefire agreements can be leveraged to lay the foundation for peace agreements.

Why did these COVID ceasefires largely fail? Ceasefires depend to a large extent on what International Crisis Group calls a 'ceasefire architecture,'[4] namely diplomacy and third party enforcement. Diplomacy requires human and financial resources to initiate confidence building measures and dispute settlement processes. Civil wars also require an effort to address the underlying causes of the conflict for ceasefires to hold. The speed and global scope of the pandemic both undermined the capacity and overwhelmed the need for international diplomatic processes. Moreover, diplomacy is a profoundly personal exercise that requires the establishment of relationships of trust. Restrictions on travel and physical distancing undermined these processes for both multilateral agencies and foreign diplomats.[2, 5, 6]

T.3 Cybersecurity and Health

Authors: Casey Babb & Val Percival

Through a review of open-source material, the Commission examined the relationship among cyberspace, cybersecurity, and health in the context of the COVID-19 pandemic.[1] Cyberspace is the 'environment' where communication over computer networks occurs. Cybersecurity is the protection of that environment, namely the security of computer networks and systems from information disclosure, theft or other forms of misuse. While not an arena of 'violent conflict', the COVID-19 pandemic demonstrated the devastating social and economic consequences of health-related cyber attacks.

Our research showed that during the pandemic, cybersecurity was undermined by three trends, namely the economic and social reliance on 'cyberspace;' the novelty of the pandemic; and the subsequent importance of health information, healthcare infrastructure and health research to social well-being and economic security. These three trends heightened the vulnerability of health systems and the strategic importance of health information, services and research.

During pandemic lockdowns, 'cyberspace' became the forum that enabled the continuation of personal and organizational activities. Many members of the public relied on online platforms and social media for news on this novel virus and the efficacy of public health measures. Organizations, including healthcare institutions, needed this secure online space to maintain their operations and to manage their employees. Governments used the internet to communicate public health information

and measures to the public, as well as information about economic support measures. And the internet enabled individuals to continue to work, go to school, shop and do their banking.

This heightened reliance on 'cyberspace' made it a vulnerable and compelling target for state and non-state actors. In an effort to delegitimize governments and heighten distrust, these actors undertook disinformation campaigns that capitalized on increased user connectivity and the need for information on the virus. End-users faced an overabundance of online material, designed to deceive. Many members of the public were unable to differentiate between accurate information from deliberately planted falsehoods, which included conspiracy theories on the origins of the virus as well as false information on testing, prevention and treatment.

According to intelligence agencies, some state and non-state actors also employed hacking efforts to acquire sensitive intellectual property, research and medical information from scientists engaged in the pandemic response. Criminal actors exploited healthcare's reliance on information technology to undertake 'ransomware' attacks against health infrastructure, demanding significant sums of money for the restoration of cyber systems at hospitals, research institutions and laboratories.

Going forward, the field of health security will be forced to more effectively confront cybersecurity and mitigate the pernicious impact of digital operations.

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U Priorities for Future Research

U.1 Statistical Findings that Warrant Further Investigation

Some of the statistical associations uncovered by our cross-sectional and panel analyses were contrary to our expectations. These associations did not match the general trend of evidence in the literature or our broader statistical findings. These unexpected findings may result from several factors, namely issues with data quality, the fact that our gender, health, and violence indicators also capture other important social dynamics associated with violence/peace, or specific country dynamics driving these incongruent associations. Further investigation is warranted.

For example, our statistical analysis uncovered some puzzling associations between indicators of gender equality and violence. Our cross-sectional analyses also uncovered some weakly positive associations between the pre-1995 indicators of internal conflict and one-sided violence with subsequent improvements in life expectancy. While these associations suggest that conflict increased health performance, they could also indicate a rapid improvement in health performance after conflict. Such an association may represent the recovery from conflict hypothesis: the violence from previous conflicts had significantly reduced life expectancy, and this allowed for rapid subsequent improvements in life expectancy measures.

U.2 Research on The Commission's Conceptual Framework

The Report provides supportive evidence for our conceptual framework. Yet more research is clearly needed into the dynamics of these relationships. We highlight two specific areas that require attention.

First, our theory of change suggests that improvements in gender equality and health equity can change self-reinforcing cycles, nudging communities and societies out of harmful and into beneficial cycles. We demonstrate the power of economic and social effects and the complexity of political processes. In-depth quantitative and qualitative research of cases that have moved from harmful into beneficial cycles are needed to explore the dynamics and facilitative conditions for such transitions. Mixed methods research that formally links the selection of such cases for in-depth study to large-N analysis across cases would provide additional rigour.

Second, further research is needed on the relationship between health services in communities, social capital, and levels of trust. Specifically, we need to better understand how to facilitate the transference of ideas across contexts in a manner that incorporates the cultural and historical context and manages the role of informal institutions in processes of gender equality and health equity. We also need to better understand how social trust varies by identity, including among sexual and gender minorities, and the complex array of factors which contribute to social trust, including the contributing role of gender equality and health equity.

U.3 Research on Gender and Health Sector Responses

The Commission shows that the health sector is not currently responsive to gendered health needs and provides suggested benchmarks for gender equal health engagement. The health sector has the

ability – and the responsibility– to improve gender equality in multiple ways: by acknowledging the importance of gender equality for healthy individuals and communities, through its gender equal human resource policies, and by adopting benchmarks for gender equal health engagement.

Further research is needed to examine how to integrate gendered vulnerabilities into pandemic models. In addition, how sexual and gender identity, class, race, religion, ethnicity, or other forms of identity influence health service access and delivery needs to be better understood by researchers. Data needs to measure and include the experiences of sexual and gender minorities to understand how structural discrimination impacts on access to care.

V Acknowledgements

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V.1 Background Analysis

V.1.1 Indicator Templates (Panel 6)

These graduate students from the Norman Paterson School of International Affairs, Carleton University, contributed to the development of the indicator templates:

Olivia Adams
Yassen Atallah
Christopher Belanger
Kaia Counter
Cassandra Cunningham
Jamie Desauteis
Janice Fu
Audrey Guerot
Olivia Hall
Samuel Henderson
Emily MacGregor
Samuel MacIsaac
George Polanyi Williamson
Morgan Pommells
Carlyn Rust
Madison Shaddock
Melanie Singarayer
Kevin Soetemans
Sarah Tenus
Nicole Tumaine
Amber Warnat

V.1.2 Research on Gender and Health Systems (Panel 12)

This Panel is based on a paper written by Valerie Percival and the following coauthors:

Kate Hawkins, MA, Pamoja Communications
Linda Waldman, PhD, Institute of Development Studies, University of Sussex
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Haja Wurie, College of Medicine and Allied Health Sciences, University of Sierra Leone
Sassy Molyneux, PhD, Oxford University & Kemri-Wellcome Trust
Erica Nelson, PhD, London School of Hygiene and Tropical Medicine
Sally Theobald, PhD, Liverpool School of Hygiene and Tropical Medicine
Rosemary Morgan, PhD, Bloomberg School of Public Health, Johns Hopkins University

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V.1.3 Contributors to Analysis in Report Panels

Panel 6 Indicator Analysis: Francois Daudelin and Samuel MacIsaac
Panel 8 Women in Peace Processes: Alisha Chopra, Sia Nowrojee, Geeta Rao Gupta. Funding for this study was provided to the UN Foundation by the Bill and Melinda Gates Foundation.
Panel 9 Cross-national evidence on the impact of health service delivery on institutional trust: Ben Oppenheim, Armand Zimmerman, Matthew Clance, Stephanie Buell, Carolyn Chisadza, Jaclyn Guerrero, Jessica Hagen-Zanker, Sara Fewer, and Mareike Schomerus
Panel 10 Transforming Humanitarian Action to Address Gender Differences and Inequalities: Geeta Rao Gupta, Caren Grown, Sara Fewer, Reena Gupta, Sia Nowrojee. Funding for this study was provided to the UN Foundation by the Bill and Melinda Gates Foundation.
Panel 11 Sexual and Gender Minorities: Health Care Access in Ghana: Toni Joe Lebbos
Panel 14 The Integration of Gender Norms in Humanitarian Health Responses: Adèle Cassola, Leah Watson, Andrea Morales
Panel 15 Development Assistance for Health and Conflict Recurrence: Kehinde Oluwaseun Omotoso
Panel 16 Female Leaders and the Management of COVID-19: Samuel Henderson
Panel 18 The Mobile Internet and Gender Norm Transformation in Afghanistan from 2014-2019: Maseh Hadef

V.1.4 Contributors to Case Study Research

Afghanistan: Maseh Hadaf and Ghazal Zazai
El Salvador: Emperatriz Crespin, Luiz Leomil, Camie LaMarche, Neil Arya
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Kosovo: Erveina Golsalci
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COVID-19 Pandemic Models: Francois Daudelin and Patrick Saunders Hastings
COVID-19 and Cybersecurity: Casey Babb

COVID-19 Ceasefires and Review of Data Use by Policy Actors: George Polanyi-Williamson
Literature Review of Gender and Informal Institutions: Amber Warnat
Literature Review of Institutions: Benjamin Oyebde, Chevaugn van der Westhuizen, and Tendai Zawaira at the University of Pretoria
Literature Review of Women, Peace, and Security Policy Agenda: Vilja Myllyviita, University of Helsinki
Review of Sexual and Gender Based Violence, Data Reviews: Kaia Counter
Sexual Violence against Men and Boys in Humanitarian Settings: Morgan Pommells

V.2 Feedback on Report Research

The following individuals participated in a faculty discussion of the statistical analysis at the Norman Paterson School of International Affairs, Carleton University:

Professor Jean Daudelin
Professor Fen Hampson
Professor Meredith Lilly
Professor David Long
Professor David Mendeloff
Professor Lama Mourad
Professor Yiagadeesen Samy

The following individuals participated in discussions of the policy implications of our report at the Wilson Center:

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Jeffrey Kucik
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Manuel Fontaine, Director of the Office of Emergency Programmes, UNICEF
Elizabeth Cousens, United Nations Foundation
Caren Grown, Brookings Institute
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V.3 Contributions of Stockholm International Peace Research Institute (SIPRI)

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V.4 Former Swedish Institute for Global Health Transformation (SIGHT)

The following individuals provided strategic and administrative support:

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2019–2023

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