



The Berlin principles on one health – Bridging global health and conservation

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HIGHLIGHTS

- The Berlin Principles update the Manhattan Principles from 2004, which first coined the term One Health for a broader public.
- The Berlin Principles reconnect the health of humans, animals, and ecosystems in an economic and socio-political context.
- Global environmental changes and the COVID-19 pandemic starkly remind the world of these foundational interconnections.
- An urgent One Health call-to-action for cooperative, multilateral, and democratic engagement at all levels of society.

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ABSTRACT

For over 15-years, proponents of the One Health approach have worked to consistently interweave components that should never have been separated and now more than ever need to be re-connected: the health of humans, non-human animals, and ecosystems. We have failed to heed the warning signs. A One Health approach is paramount in directing our future health in this acutely and irrevocably changed world. COVID-19 has shown us the exorbitant cost of inaction. The time to act is now.

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1. Introduction

In 2018, the World Health Organization (WHO) added to its priority watchlist ‘Disease X’: ‘... a serious international epidemic caused by a pathogen currently unknown to cause human disease’ (<http://origin>.

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[who.int/emergencies/diseases/2018prioritization-report.pdf](https://www.who.int/emergencies/diseases/2018prioritization-report.pdf), n.d.). Today, a Disease X, COVID-19, is ravaging human populations and economies in a pandemic. This was foretold, but not prevented. In 2008, we were warned that the frequency of viral spill-overs from wildlife had increased significantly in the past decades (Johnson et al., 2015). Researchers repeatedly cautioned the global community of the massive health and economic impacts if a viral spill-over one day sparked a pandemic (Machalaba et al., 2017; Wang et al., 2018; Bird and Mazet, 2018). If we had adopted a precautionary approach to hazards and coordinated in advance a global preparedness plan that bridged all the normal sectoral silos, we would have greatly reduced the risks and impacts of a pandemic. Instead, due to the disconnect between science, economics and politics, we collectively failed.

2. Determinants of health in a globalized world

Current population growth, massive land-use changes, and patterns of overconsumption are unsustainable (Ganivet, 2019). Rapid and profound human-driven socio-economic changes are driving climate change (Masson-Delmotte et al., 2018). This is coupled with a species-extinction crisis, habitat and soil degradation, pollution, extensive destruction of forests and of coral reefs, exploitation of wild species through proliferation of wildlife trade and markets which severely jeopardizes life on our planet (Díaz et al., 2019; Shukla et al., 2019; Cohen et al., 2017). The international spread of Emerging Infectious Diseases—impacting people, wildlife, domesticated animals, and plants, including, among many, COVID-19, Ebola virus disease, avian influenza, peste des petits ruminants, African swine fever, chytridiomycosis, wheat rust, cassava mosaic disease—and the emergent threat of antimicrobial resistance have created a world where regular outbreak and spillover events are the new norms. We are starkly reminded of the basic fact: Human, animal, plant, and environmental health and well-being are intrinsically connected.

Environmental changes such as rapid urbanization and the burning of fossil fuels increase greenhouse gas emissions, air pollution, and deposition of persistent particulates which worsen the impact of non-communicable diseases (NCDs) in humans (Cohen et al., 2017; Losacco and Perillo, 2018), animals (Losacco and Perillo, 2018), and plants (Pautasso et al., 2010). Heat spikes give rise to dehydration which subsequently compromises the cardiovascular systems of people (Watts et al., 2019) as well as other animals. Air pollution causes respiratory diseases such as chronic obstructive airway disease (COPD) and exacerbates diabetes, cardiovascular disease, stroke and COVID-19 (Lelieveld et al., 2020). Beyond cities, increased frequency of extreme events (drought, floods) leads to harvest losses causing undernutrition and micronutrient deficiencies among poor populations (Watts et al., 2019). We are failing the poor—the Bottom Billion—together with the environment on which they directly depend, through unbridled, harmful, and ever-increasing consumption patterns and associated environmental destruction.

To address the myriad of 21st century global health challenges, while ensuring the biological integrity of the planet for current and future generations, an urgent transformation is required in our thinking, values, and practices based on recognition of our interdependence and the interconnectedness of the threats we face. This is all the more critical now in the face of the COVID-19 pandemic.

3. From Manhattan to Berlin

In 2004, the Wildlife Conservation Society (WCS) brought together stakeholders to discuss global health challenges at the nexus of human, animal, and ecosystem health. The symposium “Building Interdisciplinary Bridges to Health in a Globalized World” at The Rockefeller University gave birth to the “Manhattan Principles” (http://www.oneworlddonehealth.org/sept2004/owoh_sept04.html, n.d.). These

detailed a collaborative, trans-disciplinary approach, coined ‘One World – One Health’, or simply ‘One Health’.

Since 2004, the planet has undergone massive and existential changes – notably increasing climate change and biodiversity loss. To revisit the Manhattan Principles in the light of these fundamental changes, the Climate and Environmental Foreign Policy Division at the German Federal Foreign Office and the Wildlife Conservation Society (WCS) convened the *One Planet, One Health, One Future* conference on October 25th, 2019. The meeting was attended by close to 200 individuals from government, academia, policy and civil society, from 47 countries. It sought to bring together the One Health community with researchers and advocates of similar integrated health approaches such as EcoHealth and Planetary Health to join forces. Prior to the meeting, a group of 12 experts from diverse fields, including policy, sociology, philosophy, economics, ecology, meteorology, and human and veterinary medicine prepared a Call to Action, the “Berlin Principles on One Health”. These principles are an update of the Manhattan Principles, reintegrating ecosystem health and integrity while also addressing current pressing issues, such as pathogen spillover, climate change, and antimicrobial resistance. Notably, these discussions and the derivation of the Berlin Principles predate the COVID-19 outbreak and subsequent pandemic by several months; although the wording of the Principles might seem prescient, this pandemic was predicted and largely inevitable, and will happen again if decisive actions are not taken.

4. Why Berlin?

Over the past 10 years, the Government of Germany has become a key player in the global health landscape (Kickbusch et al., 2017). This development was triggered by strong governance, opportunities provided by the G7 and G20 presidencies, and Germany's commitment to combat the Ebola outbreak in 2014/15. The motivation for German involvement in global health is similar to that which has led to Germany's past leadership role in environmental issues: the recognition of the importance of pervasive interconnectedness in the age of globalization, supported by a strong and unwavering commitment to multilateralism.

It is obvious that no singular country, group, discipline or sector of society holds enough knowledge and resources to single-handedly prevent the emergence or spread of diseases while maintaining and improving the health and well-being of all species and ecosystems in today's globalized world. No one country can reverse environmental pollution, carbon release, marine degradation, patterns of land-use change, soil degradation, and species overexploitation and extinctions that, if left unmitigated, will continue to undermine the health of people, animals, and the environment. Intensive work within and across many disciplines is essential to develop expertise. The good news is that a whole range of levers and leverage points have now been identified with which decision-makers in global and national politics, and in business and civil society, can contribute to a fundamental transformation, e.g., natural climate solutions as laid out by the IPBES Global Assessment 2019 (Díaz et al., 2019; Griscom et al., 2017).

5. Ethical foundations

Underpinning the Berlin Principles is a broad One Health ethical framework that aims to foster the health of humans, animals and their shared environments and to endorse collaboration that breaks down disciplinary and policy silos to this end (Johnson and Degeling, 2019; Rock and Degeling, 2015; Degeling et al., 2016; Verweij and Bovenkerk, 2016). The current entwined emergencies of public health, biodiversity loss and climate change clearly illustrate the impossibility of protecting human health in isolation from the health of other animals and the environment. But these three emergencies also bring to the forefront two related values that are key to developing joined-up ethical

thinking in the context of One Health: *solidarity and environmental justice* (Lysaght et al., 2017).

Solidarity has recently played an important (though contested) role in public health ethics; one leading interpretation sees solidarity as publicly 'standing up beside' others (Dawson and Jennings, 2012). Effectively tackling health at the nexus of climate change, biodiversity loss and a global pandemic requires public action, shared commitment and positive identification with others, especially those disproportionately affected by these three global emergencies (Dawson and Jennings, 2012). 'Standing up beside' others also involves improving or correcting past or present disadvantage or injustice (Dawson and Jennings, 2012). And climate change, biodiversity loss and the current pandemic have starkly revealed high levels of environmental injustice, within and between nations. Communities exposed to disproportionate environmental pollution have suffered significant health impacts from Covid-19; biodiversity loss poses very serious risks to subsistence farmers, the rural poor and to members of traditional societies; while climate change is damaging economically disadvantaged communities who have contributed very little to bringing it about (Díaz et al., 2006). And climate change, biodiversity loss and the global pandemic also raise questions about the justice of many current human relationships with other animals (Johnson and Degeling, 2019; Verweij and Bovenkerk, 2016). The joined-up ethics of One Health provides an opportunity to promote justice and solidarity where humans, other animals, and the environment meet.

6. Towards health for all

Below we present the Berlin Principles formulated in late 2019: ten principles to overcome the most important systemic policy and societal barriers, to transform and enable the world community to tackle increasing health threats at a global scale.

We urge world leaders, governments, civil society, the global health and conservation communities, academia and scientific institutions, business, finance leaders, and investment holders to:

- 1) Recognize and take action to retain the essential health links between humans, wildlife, domesticated animals and plants, and all nature; and ensure the conservation and protection of biodiversity which, interwoven with intact and functional ecosystems, provides the critical foundational infrastructure of life, health, and well-being on our planet;
- 2) Take action to develop strong institutions that integrate understanding of human and animal health with the health of the environment, and invest in the translation of robust science-based knowledge into policy and practice;
- 3) Take action to combat the current climate crisis, which is creating new severe threats to human, animal, and environmental health, and exacerbating existing challenges;
- 4) Recognize that decisions regarding the use of land, air, sea, and freshwater directly impact health and well-being of humans, animals, and ecosystems and that alterations in ecosystems paired with decreased resilience generate shifts in communicable and non-communicable disease emergence, exacerbation and spread; and take action to eliminate or mitigate these impacts;
- 5) Devise adaptive, holistic, and forward-looking approaches to the detection, prevention, monitoring, control, and mitigation of emerging/resurging diseases and exacerbating communicable and non-communicable diseases, that incorporate the complex interconnections among species, ecosystems, and human society, while accounting fully for harmful economic drivers, and perverse subsidies;
- 6) Take action to meaningfully integrate biodiversity conservation perspectives and human health and well-being when developing solutions for communicable and non-communicable disease threats;

- 7) Increase cross-sectoral investment in the global human, livestock, wildlife, plant, and ecosystem health infrastructure and international funding mechanisms for the protection of ecosystems, commensurate with the serious nature of emerging/resurging and exacerbating communicable and non-communicable disease threats to life on our planet;
- 8) Enhance capacity for cross-sectoral and trans-disciplinary health surveillance and clear, timely information-sharing to improve co-ordination of responses among governments and non-governmental organizations, health, academia and other institutions, the private sector and other stakeholders;
- 9) Form participatory, collaborative relationships among governments, NGOs, Indigenous Peoples, and local communities while strengthening the public sector to meet the challenges of global health and biodiversity conservation;
- 10) Invest in educating and raising awareness for global citizenship and holistic planetary health approaches among children and adults in schools, communities, and universities while also influencing policy processes to increase recognition that human health ultimately depends on ecosystem integrity and a healthy planet.

7. Conclusion

The quality of current and future human and animal health and well-being depend on humanity's respectful, humble and responsible environmental stewardship. Taking the UN Sustainable Development Goals as guidance, we must overcome sectoral and disciplinary silos, entrenched interests, and power dynamics to protect and promote One Health and well-being, to prevent disease and disability, to eliminate harmful drivers and perverse incentives, while promoting resilience and adaptation. We need cooperative, multilateral, and engaged democratic action at all levels of society, in every country, and at the international level.

COVID-19 is a wake-up call. We need a global paradigm shift, a giant step towards a safer and healthier future. China and Vietnam have publicly committed to a permanent ban of wildlife trade and associated markets related to human consumption. Other countries will and should surely follow, catalyzing opportunities to dramatically reduce the incidence of virus-spillover events between animals and humans and to significantly reduce the risk of a future pandemic. COVID-19 has conveyed a clear message to every person on this planet: Humanity is one part of a bigger entity and needs to very carefully consider every one of its actions. Today we must stop exploitive and destructive practices in agriculture, extractive industries, and land-use planning; and development programs must follow. Operationalizing the One Health approach is paramount in directing our future health in this acutely and irrevocably changed world. COVID-19 has shown us the exorbitant cost of inaction. The time to act is now.

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CRedit authorship contribution statement

KG conceived of the idea, identified co-authors and set up a working group for manuscript development, wrote the first draft, except for the principles themselves, collated and revised co-author contributions.

WBK, JHA, AA, AF, SG, JJ, SL, CP, and AW substantially contributed to discussions, revised the manuscript critically for important intellectual content.

CW supervised KG in all stages of the development, repeatedly revised the manuscript, drafted the first version and coordinated the Berlin Principles White Paper development.

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests:

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