

## One Health and planetary health research: leveraging differences to grow together



The COVID-19 pandemic and the anthropogenic impact on Earth's life-support systems and planetary boundaries have reinigorated the One Health and planetary health concepts, propelling them to the forefront of the global health and sustainable development agendas. Although both concepts build on equivalent systemic principles, there is an ongoing debate and emerging confusion around their differences and application areas.<sup>1-3</sup>

The One Health approach, historically focused on zoonoses, initiated and led by the veterinary and disease ecology communities, is not new.<sup>4</sup> Yet the concept has evolved since the new millennium, particularly in the recent past.<sup>5</sup> In June, 2021, the G7 supported One Health and, in December of the same year, the One Health High-Level Expert Panel and the Quadripartite (Food and Agriculture Organization of the UN, the World Organisation for Animal Health [formerly the Office International des Epizooties], the UN Environment Programme, and WHO) proposed a novel One Health definition: "One Health is an integrated, unifying approach that aims to sustainably balance and optimize the health of people, animals, and ecosystems. It recognizes the health of humans, domestic and wild animals, plants, and the wider environment (including ecosystems) are closely linked and interdependent. The approach mobilizes multiple sectors, disciplines, and communities at varying levels of society to work together to foster well-being and tackle threats to health and ecosystems, while addressing the collective need for healthy food, water, energy, and air, taking action on climate change and contributing to sustainable development."<sup>6</sup>

Planetary health is a younger concept proposed in 2015 by The Rockefeller Foundation-Lancet Commission, coinciding with the launch of the UN Sustainable Development Goals.<sup>7</sup> Planetary health was defined as: "the health of human civilisation and the state of the natural systems on which it depends."<sup>7</sup> In 2021, the Planetary Health Alliance redefined planetary health as: "a solutions-oriented, transdisciplinary field and social movement focused on analyzing and addressing the impacts of human disruptions to Earth's natural systems on human health and all life on Earth."<sup>8</sup>

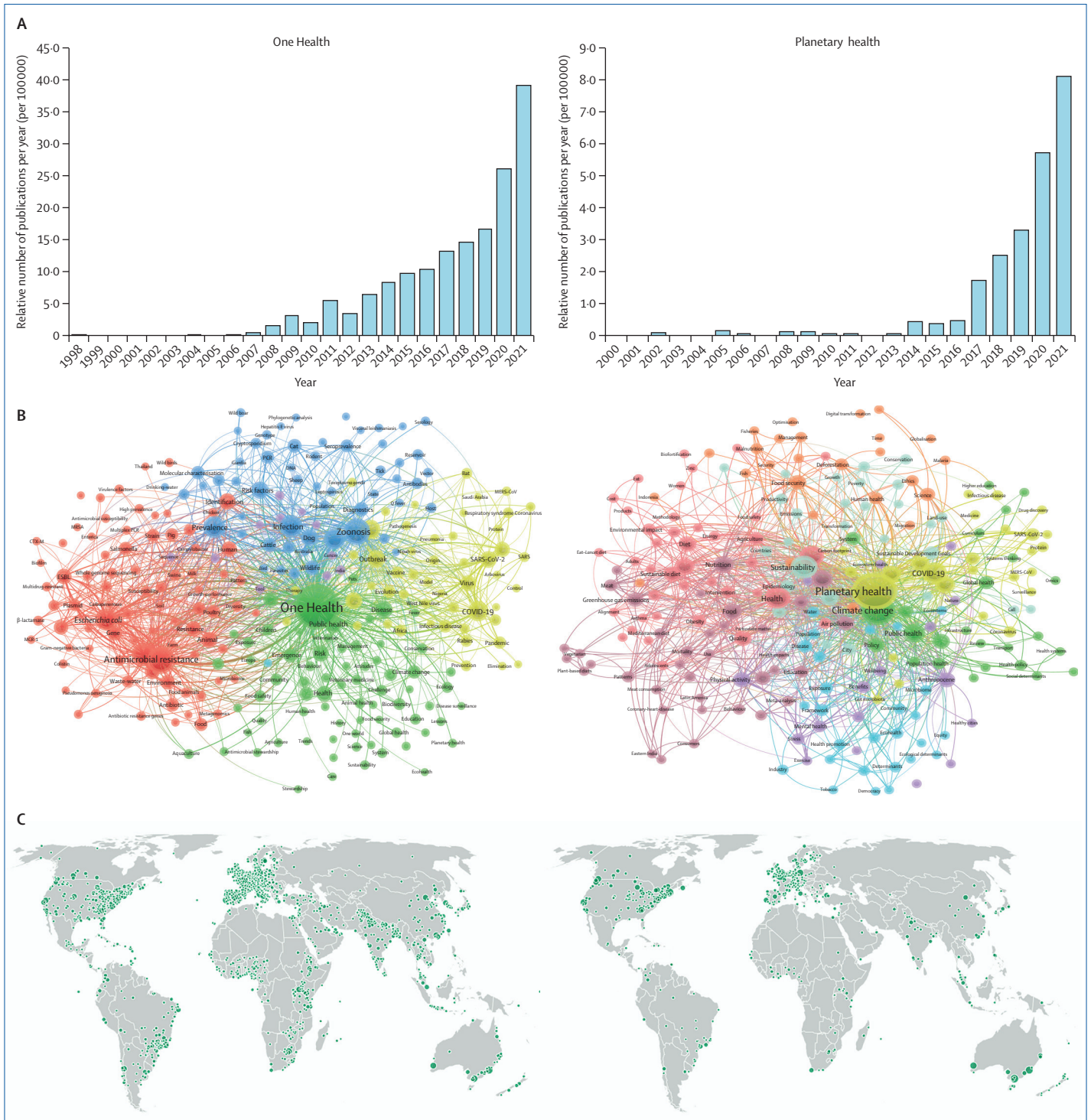
To better understand the evolution of One Health and planetary health, we conducted a bibliometric analysis in the Web of Science since the emergence of COVID-19 in December, 2019, to identify common and unique research areas, leading institutions, networks, and countries (appendix pp 1-2).

Our analysis shows a strong increase in One Health and planetary health research in 2020 and 2021, both in absolute numbers of publications (an increase of 137% for One Health and 170% for planetary health compared with 2018 and 2019 combined) and relative to the total number of publications indexed in Web of Science (figure A). All topics related to infectious diseases were the most represented in One Health publications (eg, COVID-19, antimicrobial resistance, and zoonoses; figure B). Planetary health publications also addressed COVID-19, but climate change was the dominant topic. Non-communicable diseases and issues related to food systems or physical activity and inactivity were part of planetary health, but not One Health, research.

Academic institutions, mainly European and North American, dominated One Health and planetary health publications (76% and 92% of publications, respectively; appendix p 2). Non-academic actors were less represented and heterogeneous, including, for example, in the case of One Health: research institutions (11%; eg, Institut Pasteur in France and the Oswaldo Cruz Foundation in Brazil), governmental institutions (10%; eg, the US Centers for Disease Control and Prevention and the Public Health Agency of Canada), the former Tripartite Alliance (2%; the Food and Agriculture Organization of the UN, the Office International des Epizooties, and WHO), and non-governmental organisations (1%; eg, EcoHealth Alliance and Wildlife Conservation Society). There was a geographical overlap between One Health and planetary health research, but scientists in emerging infectious disease hotspot countries (ie, those in east and west Africa, Brazil, China, and India)<sup>9</sup> were more productive in One Health than in planetary health (figure C).

Our results provide the first visual representation of One Health and planetary health research fields and the interconnections between these fields and a global

See Online for appendix



**Figure: One Health and planetary health research trends, topics, and global distribution**

(A) One Health and planetary health publications relative to the total number of publications indexed in the Web of Science per year (per 100 000). (B) Keyword co-occurrence network graph of One Health and planetary health research topics (created with Vosviewer, version 1.6.17). The size of the nodes represents the number of publications in which a keyword occurs. The closer the nodes to each other, the stronger the link between the keywords. The keywords are grouped in clusters depending on their inter-relation, and these clusters are represented with different colours. (C) Geographical distribution of institutions active in One Health (left panel) and planetary health (right panel) research in 2020 and 2021 by urban areas (created with Netscity). The counting method is normalised number of publications (agglomeration): the maximum value is 47.14 and minimum value is 0.04 for One Health; and the maximum value is 22.78 and minimum value is 0.04 for planetary health.

map of the most productive research hubs during the pandemic. Animal health, specifically zoonoses (eg antimicrobial resistance and emerging infectious diseases), remains the most prominent One Health research field, whereas planetary health research does not address animal health. Planetary health focuses more on the environment, particularly climate change and human health, and on social determinants of human health. Yet climate change is not unique to planetary health research, and we observe increasing overlaps with the broadening of One Health. These overlaps can generate confusion, and it would be helpful to further clarify the relative focus of One Health and planetary health research, mainly because they often involve different disciplines and communities.

Yet this diversity should not be a reason to diverge or compete but to collaborate.<sup>10,11</sup> Overall, One Health and planetary health are highly complementary fields of scientific inquiry with solid leverage for translation into policy and practice. There is an opportunity to build a stronger research community and transdisciplinary evidence to collectively address pressing public and global health issues in a truly integrated way. Above all, life on Earth is at risk, and our diversity will only make us stronger.

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