Global Supply-Chain Database Containing Detailed Information on Health-Care Sectors

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Description

Health-care services are necessary for sustaining and improving human wellbeing, yet they have an environmental footprint that contributes to environment-related threats to human health. Previous studies have quantified the carbon emissions resulting from health care at a global level. We aimed to provide a global assessment of the wide-ranging environmental impacts of this sector. In this multiregional input-output analysis, we evaluated the contribution of health-care sectors in driving environmental damage that in turn puts human health at risk. Using a global supply-chain database containing detailed information on health-care sectors, we quantified the direct and indirect supply-chain environmental damage driven by the demand for health care. We focused on seven environmental stressors with known adverse feedback cycles: greenhouse gas emissions, particulate matter, air pollutants (nitrogen oxides and sulphur dioxide), malaria risk, reactive nitrogen in water, and scarce water use. Although the health impacts of pollution and environmental change are well recognized, the environmental impacts of health care have received less attention. Health-care evaluation traditionally focuses on direct health outcomes and financial costs. However, the environmental footprint of health-care provision, which includes a wide variety of air, water, and soil pollutants, also has an unintended and negative impact on health.

Assessment of the Global Environmental Footprint of Health Care

Health care is a large economic sector and employer in many countries. The average spending on health care among member countries of the Organisation for Economic Co-operation and Development is about 9% of Gross Domestic Product (GDP). There is a pressing need to understand the health impact of the environmental footprint of health care, because as investment in health care increases around the world, there is considerable potential for increasing harm to health from pollution and environmental change. People who are harmed by the ienvironmental footprint of health care often live far away from those who benefit from the health care provided. Hence, doctors and other health sector leaders have a practical and ethical responsibility to measure, monitor, and address the environmental footprint of health care. Greenhouse gas emissions and climate change is an important pathway of the negative health impact resulting from the environmental footprint of health care. To the best of our knowledge, this is the first assessment of the global environmental footprint of health care, based on available data, and using a panel of indicators that are relevant to health outcomes and that enable a cycle of adverse feedback to be captured. These indicators include greenhouse gas emissions, Particulate Matter (PM), air pollutants, malaria risk, reactive nitrogen in water, and scarce water use. Changing climate due to an increase in greenhouse gas emissions will lead to an increase in disease and injury incidents eg, as a result of heat waves, cyclones, floods, and droughts, which in turn will lead to a potential increase in health-care costs and greenhouse gas emissions. Water scarcity is measured as water consumption weighted by a scarcity index. It is responsible for insufficient access to clean water, resulting in cholera, diarrhoea, and typhoid fever. Finally, deforestation creates favourable conditions for the spread of malaria and other vectors, which again increases health-care costs and the environmental footprint of infectious disease treatment.

Environmentally Extended Multiregional Input-Output Analyses

We have provided an assessment of the negative environmental impacts of health care, which include scarce water use, air pollution, reactive nitrogen in water, and other factors, in addition to greenhouse gas emissions. Environmentally extended multiregional input-output analyses are the only method available to consistently account for global environmental footprints of health care, yet they also have limitations. One limitation is incomplete data, which need to be estimated using reconciliation techniques, such as constrained optimisation. This limitation particularly applies to low-income countries. Another limitation is that this type of analysis provides a static, ex-post snapshot of the situation and does not in general provide a basis for future projections. Also, the sectoral disaggregation of available national input-output tables is limited and varies between countries. Aggregation biases could be introduced, leading to higher uncertainty for countries with low sectoral disaggregation. In addition, substantial differences between health-care systems across countries and the use of a global approach, such as ours, is necessarily

incompatible with identifying detailed local drivers of impact and specific recommendations of mitigation.