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 For the [Global Alliance on Health and Pollution](#) see <http://www.gahp.net/>

data, the report examines the health effects and economic costs of multiple forms of pollution for the first time, including air (ambient and household), water, soil, and workplace. Additionally, the report presents troubling new data on the extent of chemical and pesticide pollution, including pollution by toxic chemicals at contaminated sites. The nature of pollution is changing, and is worsening in places. Many effects of chemical pollutants are yet to be determined but much is still known. The Commission estimates welfare losses due to pollution to be more than US\$4.6 trillion per year, which is equivalent to 6.2% of global economic output.¹

The linkages between pollution, climate, and planetary health (the health of human civilisations and the natural systems on which they depend) are made throughout the Commission report. Pollution is a major theme within planetary health because the drivers of climate change, such as the combustion of fossil fuels or land use change, are also important contributors to pollution. Pollution itself has effects, which are still incompletely understood, on a range of natural systems—for example, toxic chemicals can cause reduced ecosystem function that can indirectly affect human health.²

In 2006, the Stern review commissioned by the UK Government was influential in reframing climate change as an economic issue, and not merely an environmental challenge.³ The Stern review improved our understanding of the economic costs of climate change, and inspired a huge amount of subsequent work. We hope that the findings and recommendations from this *Lancet* Commission will also marshal action in the health and development sectors, and persuade leaders at the national, state, provincial, and city levels to make pollution a priority. Although there is some activity on pollution internationally, much more is needed. The *Lancet* Commission is launched in New York, USA, at a worrisome time, when the US Government's

Environmental Protection Agency, headed by Scott Pruitt, is undermining established environmental regulations. This year's annual UN Environment Assembly will convene in Nairobi, Kenya, on Dec 4–6, 2017. Ministers of Environment from member states, alongside civil society and the private sector, will be in attendance. For the first time, the overarching conference theme is "Towards a Pollution-Free Planet". Recommendations from this *Lancet* Commission are under consideration, and it is hoped that the outcomes will prioritise pollution from a health perspective.

This *Lancet* Commission should inform policy makers and serve as a timely call to action. Pollution is a winnable battle. In the latest results of the Global Burden of Disease, for example, the age-standardised death rates for all causes of air pollution were reported to have fallen by 23% between 2006 and 2016.⁴ Now is the moment to accelerate our collective response. Current and future generations deserve a pollution-free world.

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- 1 Landrigan PJ, Fuller R, Acosta NJR, et al. The *Lancet* Commission on pollution and health. *Lancet* 2017, published online Oct 19. [http://dx.doi.org/10.1016/S0140-6736\(17\)32345-0](http://dx.doi.org/10.1016/S0140-6736(17)32345-0).
- 2 Whitmee S, Haines A, Beyrer C, et al. Safeguarding human health in the Anthropocene epoch: report of The Rockefeller Foundation–*Lancet* Commission on planetary health. *Lancet* 2015; **386**: 1973–2028.
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Towards a healthier and safer environment

The *Lancet* Commission on pollution and health by Philip Landrigan and colleagues¹ is an immensely important piece of work highlighting the impact that environmental pollution has on death and disease and the related need to scale up political will if we are to effectively confront this issue.

WHO has long recognised the important influence that environmental integrity has on human health and development. We know from WHO's most recent environmental burden of disease assessment that at least 12.6 million people die each year because of preventable environmental causes.² This is almost a

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quarter of all annual deaths globally. Environmental risk factors—mainly due to the influence of air pollution on non-communicable diseases—are driving up health-care costs, which consume nearly 10% of global gross domestic product.^{3,4} Moreover, as highlighted by this Commission, it is vulnerable populations in low-income and middle-income countries (LMICs) that are most heavily affected. This is an unacceptable loss of lives and human development potential.

Today, we have more knowledge, evidence, and understanding than ever before about how and through what pathways climate and environmental change impact health. We know which sector policies and interventions effectively address environmental root causes of disease (eg, energy, transport, housing, and agriculture) and in which settings (eg, cities, workplaces, and homes) these interventions will likely have the greatest impact. For instance, energy policies that facilitate or scale up household access to clean fuels for cooking, heating, and lighting in LMICs will help avert the 3.5 million deaths per year that result from exposure to household air pollution.⁵ We also know many of the co-benefits to health, the environment, and the economy that could accrue with a more integrated approach to development policy and planning.

This is particularly the case in cities that are home to about 4 billion people—nearly half of the world's population.⁶ People who live in cities are exposed to a range of environmental threats such as those arising from lack of adequate housing and transport and poor water, sanitation, and waste management. Nearly 90% of the population living in cities worldwide is breathing air that fails to meet WHO air quality guideline limits.⁷ Since most future population growth will take place in cities, urban expansion needs to be planned and designed in ways that make cities a centre of health and wellbeing. Specific sector policies such as energy, urban planning, transport, and infrastructure should be designed and implemented with clear and tangible health and environmental objectives in mind.

Governance of environmental threats to health is, however, also more challenging today than ever before. As argued persuasively in the *Lancet* Commission, environmental risk factors are changing in nature, origin, and influence. Some countries now face a combination of unresolved and new environmental and health challenges, where, for example, the poorest



Greg Baker/AFP/Getty Images

populations do not have access to clean water, clean household energy, and sanitation, and other populations are being increasingly exposed to chemicals, radiation, air pollution, and new and more complex occupational hazards. Conflict and natural disasters are adding further complexity to these governance challenges.

Simply put, the ways environmental threats to health are governed are no longer suited to today's development context. We need a different approach. Although we do need more pollution-control strategies to set and regulate environmental emission thresholds and to foster increased use of best available techniques and best environmental practices, pollution is not the root driver of ill health. Pollution is a symptom and unintended consequence of unhealthy and unsustainable development. If we want to substantially reduce the global environmental burden of disease, we need to act further upstream and address the drivers and sources of pollution to ensure that development policies and investments are healthy and sustainable by design and that the choices we make—at the government, private sector, and individual levels—cultivate a healthier and safer environment. In other words, we need to move beyond a “do-no-harm” approach and ensure that development actively and explicitly improves the environmental and social conditions that give rise to, and expose populations to, disease.

The timing of this *Lancet* Commission could not be better given the clear need to scale up action in support of this agenda. There is growing global momentum around the Paris Agreement on Climate Change, arguably one of

the most important treaties for public health in decades. This momentum, together with increased global demand for universal access to clean energy and more sustainable urban development, as reflected in the New Urban Agenda,⁸ provide a strategic opportunity for health actors to influence development policies and investments that can give rise to major environmental threats to health.

For its part, WHO has prioritised such action, having placed particular focus on addressing the “health impacts of climate and environmental change”⁹ as one of four top health priorities for the next 5 years. WHO is also scaling up its programme of work on health and environment, placing greater focus on advocacy and awareness raising, the provision of technical support to countries, particularly those most vulnerable to climate and environmental change, and leveraging of key partnerships and constituencies such as in the energy, environment, water and sanitation, and urban planning sectors. In this, and through greater alignment of its focus with the 2030 Agenda for Sustainable Development, WHO is reaffirming its commitment to reshape health and the determinants of health in today’s sustainable development context.

The transition to a healthier and safer environment will require coordinated action and inputs from a range of actors from within and outside of the health sector. This action needs to be underpinned by scientifically sound and compelling evidence. WHO applauds and welcomes the timely *Lancet* Commission on pollution and health for its contribution to this global effort on both fronts.

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Should basic science matter to clinicians?



We have observed declining interest in discovery science by our medical colleagues. Across a range of top medical journals, the number of basic science articles decreased by 40–60% from 1994 to 2013,¹ while a major North American university recorded a 60% decrease in clinician-investigator trainees pursuing basic science training between 1987 and 2016.² The decline of basic science research in the medical literature and a disregard for it in continuing education programmes³ are allowing mastery of science to be lost by practising clinicians.

There are some common misconceptions about basic science. Some clinicians think that discovery science should be left to bench scientists or that those who engage in both basic science and clinical practice

are doomed to mediocrity. However, clinicians bring a unique perspective to biomedical research, deriving focus and motivation from their experience of caring for patients. Stanley Prusiner’s characterisation of prion disease⁴ and Barry Marshall and Robin Warren’s discovery of *Helicobacter pylori*⁵ stand as classic examples of how a clinical perspective can focus scientific energy towards a question with immediate relevance to human health.

Many physicians are disinterested in questions that seem unlikely to change clinical practice. How could studying algal flagella, for instance, have anything to do with health? Yet Keith Kozminski and Joel Rosenbaum’s observation of intraflagellar transport in