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COVID-19

1. **Implications of COVID-19 on global environmental pollution and carbon emissions with strategies for sustainability in the COVID-19 era.** Yang M, Chen L, Msigwa G, Tang KHD, Yap PS. Sci Total Environ. 2021 Nov 15:151657. doi: 10.1016/j.scitotenv.2021.151657. Online ahead of print.
   https://www.sciencedirect.com/science/article/pii/S0048969721067334
   The impacts of COVID-19 on global environmental pollution since its onset in December 2019 require special attention. The rapid spread of COVID-19 globally has led countries to lock down cities, restrict traffic travel and impose strict safety measures, all of which have implications on the environment. This article aims to systematically and comprehensively present and analyze the positive and negative impacts of COVID-19 on global environmental pollution and carbon emissions. It also aims to propose strategies to prolong the beneficial, while minimize the adverse environmental impacts of COVID-19.

2. **Ambient Air Pollution in Relation to SARS-CoV-2 Infection, Antibody Response, and COVID-19 Disease: A Cohort Study in Catalonia, Spain (COVICAT Study).** Kogevinas M et al. Environ Health Perspect. 2021 Nov;129(11):117003. doi: 10.1289/EHP9726.
   https://ehp.niehs.nih.gov/doi/10.1289/EHP9726
   RESULTS: Among those tested for SARS-CoV-2 antibodies, 743 (18.1%) were seropositive. Air pollution levels were not statistically significantly associated with SARS-CoV-2 infection: Adjusted RRs per interquartile range were 1.07 (95% CI: 0.97, 1.18) for NO2, 1.04 (95% CI: 0.94, 1.14) for PM2.5, 1.00 (95% CI: 0.92, 1.09) for BC, and 0.97 (95% CI: 0.89, 1.06) for O3. Among infected participants, exposure to NO2 and PM2.5 were positively associated with IgG levels for all viral target antigens. Among all participants, 481 (5.0%) had COVID-19 disease. Air pollution levels were associated with COVID-19 disease: adjusted RRs = 1.14 (95% CI: 1.00, 1.29) for NO2 and 1.17 (95% CI: 1.03, 1.32) for PM2.5. Exposure to O3 was associated with a slightly decreased risk (RR = 0.92; 95% CI: 0.83, 1.03). Associations of air pollution with COVID-19

disease were more pronounced for severe COVID-19, with RRs = 1.26 (95% CI: 0.89, 1.79) for NO2 and 1.51 (95% CI: 1.06, 2.16) for PM2.5.
DISCUSSION: Exposure to air pollution was associated with a higher risk of COVID-19 disease and level of antibody response among infected but not with SARS-CoV-2 infection.

3. **Long-term exposure to air pollution and COVID-19 incidence: A multi-country study.** Huang G, Blangiardo M, Brown PE, Pirani M. Spat Spatiotemporal Epidemiol. 2021 Nov;39:100443. doi: 10.1016/j.sste.2021.100443. Epub 2021 Aug 11.
https://www.sciencedirect.com/science/article/pii/S1877584521000423
The study of the impacts of air pollution on COVID-19 has gained increasing attention. However, most of the existing studies are based on a single country, with a high degree of variation in the results reported in different papers. We attempt to inform the debate about the long-term effects of air pollution on COVID-19 by conducting a multi-country analysis using a spatial ecological design, including Canada, Italy, England and the United States. The model allows the residual spatial autocorrelation after accounting for covariates. It is concluded that the effects of PM2.5 and NO2 are inconsistent across countries. Specifically, NO2 was not found to be an important factor affecting COVID-19 infection, while a large effect for PM2.5 in the US is not found in the other three countries. The Population Attributable Fraction for COVID-19 incidence ranges from 3.4% in Canada to 45.9% in Italy, although with considerable uncertainty in these estimates.

Health Impacts of Climate Change

4. **A national cohort study (2000-2018) of long-term air pollution exposure and incident dementia in older adults in the United States.** Shi L et al. Nat Commun. 2021 Nov 19;12(1):6754. doi: 10.1038/s41467-021-27049-2.
https://www.nature.com/articles/s41467-021-27049-2
Air pollution may increase risk of Alzheimer's disease and related dementias (ADRD) in the U.S., but the extent of this relationship is unclear. Here, we constructed two national U.S. population-based cohorts of those aged ≥65 from the Medicare Chronic Conditions Warehouse (2000-2018), combined with high-resolution air pollution datasets, to investigate the association of long-term exposure to ambient fine particulate matter (PM2.5), nitrogen dioxide (NO2), and ozone (O3) with dementia and AD incidence, respectively. We identified ~2.0 million incident dementia cases (N = 12,233,371; dementia cohort) and ~0.8 million incident AD cases (N = 12,456,447; AD cohort). Per interquartile range (IQR) increase in the 5-year average PM2.5 (3.2 μg/m3), NO2 (11.6 ppb), and warm-season O3 (5.3 ppb) over the past 5 years prior to diagnosis, the hazard ratios (HRs) were 1.060 (95% confidence interval [CI]: 1.054, 1.066), 1.019 (95% CI: 1.012, 1.026), and 0.990 (95% CI: 0.987, 0.993) for incident dementias, and 1.078 (95% CI: 1.070, 1.086), 1.031 (95% CI: 1.023, 1.039), and 0.982 (95%CI: 0.977, 0.986) for incident AD, respectively, for the three pollutants. For both outcomes, concentration-response relationships for PM2.5 and NO2 were approximately linear. Our study suggests that exposures to PM2.5 and NO2 are associated with incidence of dementia and AD.

5. **Plague risk in the western United States over seven decades of environmental change.** Carlson CJ, Bevins SN, Schmid BV. Glob Chang Biol. 2021 Nov 18. doi: 10.1111/gcb.15966. Online ahead of print.
https://onlinelibrary.wiley.com/doi/full/10.1111/gcb.15966
After several pandemics over the last two millennia, the wildlife reservoirs of plague (Yersinia pestis) now persist around the world, including in the western United States. Routine surveillance in this region has generated comprehensive records of human cases and animal seroprevalence, creating a unique opportunity to test how plague reservoirs are responding to environmental change. Here, we test whether animal and human data suggest that plague reservoirs and spillover risk have shifted since 1950. To do so, we develop a new method for detecting the impact of climate change on infectious disease distributions, capable of disentangling long-term trends (signal) and interannual variation in both weather and sampling (noise). We find that plague foci are associated with high-elevation rodent communities, and soil biochemistry may play a key role in the geography of long-term persistence. In addition, we find that human cases are concentrated only in a small subset of endemic areas, and that spillover events are driven by higher rodent species richness (the amplification hypothesis) and climatic anomalies (the trophic cascade hypothesis). Using our detection model, we find that due to the changing climate, rodent communities at high elevations have become more conducive to the establishment of plague reservoirs-with suitability increasing up to 40% in some places-and that spillover risk to humans at mid-elevations has increased as well, although more gradually. These results highlight opportunities for deeper investigation of plague ecology, the value of integrative surveillance for infectious disease geography, and the need for further research into ongoing climate change impacts.

6. **Combined effects of air pollutants on gestational diabetes mellitus: A prospective cohort study.** Liu W, Lu J, He J, Zhang L, Wei D, Wang C, Xiao X, Xia H, Qiu X. Environ Res. 2021 Nov 16:112393. doi: 10.1016/j.envres.2021.112393. Online ahead of print.
Exposures to multiple air pollutants during pregnancy have been associated with the risk of gestational diabetes mellitus (GDM). However, their combined effects are unclear. We aimed to evaluate the combined associations of five air pollutants from pre-pregnancy to the 2nd trimester with GDM. This study included 20,113 participants from the Born in Guangzhou Cohort Study (BIGCS). The inverse distance-weighted models were used to estimated individual air pollutant exposure, namely ozone (O3), nitrogen dioxide (NO2), sulfur dioxide (SO2), particulate matter less than 10 microns in diameter (PM10), and less than 2.5 microns in diameter (PM2.5). We estimated stage-specific associations of air pollutants with GDM using generalized estimating equation, and departures from additive joint effects were assessed using the relative excess risk (RERI) and the joint relative risk (JRR). Of the 20,113 participants, 3440 women (17.1%) were diagnosed with GDM. In the adjusted model, increased concentrations of O3 and SO2 3-6 months before pregnancy were associated with GDM occurrence, as well as O3 and PM10 in the 1st trimester, the adjusted relative risk (95% confident intervals) [RRs (95%CI)] ranged from 1.05 (1.00, 1.09) to 1.21 (1.04, 1.40). The largest JRR for GDM was the combination of SO2, NO2, and PM10 in the 1st trimester (JRR = 1.32, 95% CI: 1.10, 1.59). The JRR for O3 and SO2 was less than their additive joint effects [RERI = -0.25 (-0.47, -0.04), P for interaction = 0.048]. Associations of air pollutants with GDM differed somewhat by pre-

pregnancy BMI and season. This study added new evidence to the current understanding of the combined effects of multiple air pollutants on GDM. Public health strategies were needed to reduce the adverse effects of air pollution exposure on pregnant women.

7. **Buy-now-pay-later: Hazards to human and planetary health from plastics production, use and waste.** Symeonides C et al. J Paediatr Child Health. 2021 Nov;57(11):1795-1804. doi: 10.1111/jpc.15777.
https://onlinelibrary.wiley.com/doi/10.1111/jpc.15777
More than 8 billion tonnes of plastic were produced between 1950 and 2015, that is 1 tonne for every man, woman and child on our planet. Global plastic production has been growing exponentially with an annual growth rate of 8.4% since 1950, equating to approximately 380 million tonnes per annum. A further 50 kg of plastic is now being produced for each person every year with production continuing to accelerate. Here, we discuss the human and planetary health hazards of all that plastic. We consider each step in the journey of these complex and pervasive industrial materials: from their synthesis predominantly from fossil fuel feedstocks, through an often-brief consumer use as plastic products, and onto waste streams as fuel, permanent landfill or as unmanaged waste in our environment, food, air and bodies.

WE ACT

8. **Addressing Climate-Related Health Impacts During the Patient Encounter: A Practical Guide for Pediatric Dermatologists.** Sun MD, Boos MD, Coates SJ. Dermatol Clin. 2022 Jan;40(1):109-116. doi: 10.1016/j.det.2021.09.007. Epub 2021 Oct 22.
Pediatric populations are expected to bear most of the climate change impacts, with racial minorities and children living in poorer countries being particularly vulnerable. Given their relevance to cutaneous disease, dermatologists should be aware of these climate-sensitive health impacts and the ways in which they intersect with social factors. Strategies including targeted risk communication, motivational interviewing, and storytelling can help facilitate climate discussions during the patient encounter. In this article the authors summarize common dermatologic health impacts related to environmental exposures and provide sample scripts for climate messaging.

9. **Narrative Matters: Fighting not drowning - facing a harsh climate future with wisdom, hope and courage.** Wiseman J. Child Adolesc Ment Health. 2021 Nov 18. doi: 10.1111/camh.12523. Online ahead of print.
The most recent 2021 IPCC climate science update reminds us yet again that accelerating the transition to a just and resilient zero-carbon future clearly remains humanity's most urgent task. A great deal of hard work and a lot of luck may enable us to avoid some of the most dangerous climate change and ecological tipping points. Current and future generations are however on a journey into a world of more frequent and severe extreme weather events; more heatwaves, fires, floods and famines and more rapid extinctions of animals, birds and insects. Awareness, that this is going to be a very long emergency is a source of deep distress for many people passionately committed to decisive climate action. A rapidly expanding body of research highlights the extent to which this distress is experienced most acutely by children and young

people with large numbers reporting deeply pessimistic views about the future. This article explores diverse sources of learning and wisdom - from climate scientists and activists; philosophers and social theorists; Indigenous cultures and ways of life; faith-based and spiritual traditions; artists and writers - which can strengthen our capacity to live courageous, compassionate and creative lives in a world of rapidly accelerating climatic and ecological risk.

10. **Surveying the Attitudes of Dermatologists Regarding Climate Change.** Mieczkowska K, Stringer T, Barbieri JS, Williams M, Rosenbach M. Br J Dermatol. 2021 Nov 17. doi: 10.1111/bjd.20900. Online ahead of print.
https://onlinelibrary.wiley.com/doi/10.1111/bjd.20900
Anthropogenic climate change affects our environment through higher temperatures, poorer air quality, polluted waters, and increased extreme weather events. These changes in our environment negatively influence the health of the population.1 The integument is not spared by climate change. Higher temperatures, decreased ozone protection, increased airborne pollutants, and decreased ultraviolet (UV) protection can cause flares of atopic dermatitis, pemphigus, lupus, and other inflammatory diseases, and increase rates of skin cancer.2.

11. **Carbon emissions and hospital pathology stewardship: a retrospective cohort analysis.** McAlister S, Smyth B, Koprivic I, Luca Di Tanna G, McGain F, Charlesworth K, Brown MA, Konecny P. Intern Med J. 2021 Nov 15. doi: 10.1111/imj.15622. Online ahead of print.
https://onlinelibrary.wiley.com/doi/abs/10.1111/imj.15622
CONCLUSIONS: Reduction in unnecessary hospital pathology collections was associated with both carbon emission and cost savings. Pathology stewardship warrants further study as a potentially scalable, cost-effective, and incentivising pathway to lowering healthcare associated greenhouse gas emissions.

12. **Sustainable medicines use in clinical practice - a clinical pharmacological view on eco-pharmaco-stewardship.** Adeyeye E, New BJM, Chen F, Kulkarni S, Fisk M, Coleman JJ. Br J Clin Pharmacol. 2021 Nov 15. doi: 10.1111/bcp.15140. Online ahead of print.
Climate change continues to pose a dangerous threat to human health. However, not only is health impacted by this crisis, healthcare itself adds to the problem, through significant contributions to greenhouse gas emissions. In the UK, the National Health Service (NHS) is responsible for an estimated 4% of the overall national carbon footprint. Medicines account for a quarter of this and whilst they are vital for health now, through sustainable use they can also positively influence the environmental health of the future. In this review, we explore how clinical pharmacologists and other health care professionals can practice sustainable medicines use or eco-pharmaco-stewardship. We will discuss current and near future environmental practices within the NHS, which we suspect will resonate with other health systems. We will suggest approaches for championing eco-pharmaco-stewardship in drug manufacturing, clinical practices and patient use, to achieve a more a sustainable healthcare system.

13. **Ethical considerations regarding the effects of climate change and planetary health on children.** Williams PC, Marais B, Isaacs D, Preisz A. J Paediatr Child Health. 2021 Nov;57(11):1775-1780. doi: 10.1111/jpc.15704.

https://onlinelibrary.wiley.com/doi/10.1111/jpc.15704
Climate change represents one of the most significant health challenges and global inequities of our generation. As a 'wicked' problem, climate change imposes an involuntary exposure on vulnerable individuals and societies that is regressive in its nature, with those least responsible for destroying planetary health at greatest risk of suffering the direct and indirect health consequences of unabated warming of the planet. The current and future generations of children are the most vulnerable population to suffer the effects of climate change. By 2030, there will be 131 000 additional child deaths each year if climate mitigation strategies are not enacted, driven by the synergy of an increasing burden of infectious diseases, food insecurity and political instability. Over half a billion of the world's children live in areas vulnerable to extreme weather events, and there is a pressing risk that our current lack of action to mitigate and adapt to climate change will result in today's children, and future generations, being the first to have poorer physical and mental health than previous generations - creating a significant intergenerational ethical dilemma. Child health-care professionals need to advocate for policies to address climate change that consider the complex health, planetary and ethical considerations necessary to solve the most significant risk to our children's health today. Without immediate action, the health of the current and future generations of children is perilous.

14. **Delivering environmental sustainability in healthcare for future generations: Time to clean up our own cubby house.** Kiang KM, Behne C. J Paediatr Child Health. 2021 Nov;57(11):1767-1774. doi: 10.1111/jpc.15746.
https://onlinelibrary.wiley.com/doi/10.1111/jpc.15746
Children and future generations will be those most affected by climate change, and paediatricians have a moral responsibility to preserve a secure and habitable world for them. Despite our pledge to 'first do no harm', the health-care sector itself is a major contributor to global warming and environmental degradation. These contributions are projected to rise unless urgent measures are undertaken to decarbonise. Fortunately, an increasing number of individuals, health institutions, organisations and government agencies are taking action to shift this trajectory. Opportunities to reduce emissions and improve environmental sustainability in the health-care sector are vast. If done well, sustainable climate-smart health care offers opportunities for financial, environmental, and social gains - a 'triple win'. By getting our own house in order, the health sector can influence action throughout our economy and society, realise the health co-benefits of climate action and fulfil our obligation to help minimise the growing health impacts of climate change.

15. **Lighting a candle, or cursing the darkness? Delivering a climate friendly anaesthetic.** Skowno J, Weatherall A. J Paediatr Child Health. 2021 Nov;57(11):1781-1784. doi: 10.1111/jpc.15760.
https://onlinelibrary.wiley.com/doi/10.1111/jpc.15760
With up to 7% of national emissions coming from health care in industrial nations, and volatile anaesthetics and nitrous oxide being particularly effective greenhouse gases, anaesthetists can potentially reduce their medical carbon footprint substantially. Operating theatres create 25% of hospital waste, and there are many other avenues for 'greening' in the perioperative environment, including recycling and avoiding unnecessary operations. However, it is vital to

understand how to produce a real change in practice that continues into the future and is normalised. Health-care choices we make in 2021 cannot be allowed to lead to a climate catastrophe in 2050.

16. **Doctors and climate change: First do no harm.** Skinner JR. J Paediatr Child Health. 2021 Nov;57(11):1754-1758. doi: 10.1111/jpc.15658. https://onlinelibrary.wiley.com/doi/full/10.1111/jpc.15658
Imagine a herd of cows in a fenced, lush green meadow shared with birds, bees and other small animals. Now imagine that everything the cows eat or drink comes in a plastic container. Humanity is on an appalling trajectory. Most of us are now aware that a crisis is upon us. If you are like me, you are struggling to consider what you should do about it. Those who read this journal are for the most part child health professionals; it is our job to look after children. This job must surely include caring for their future. Yet we, like most of the rest of human society, are actively supporting behaviours which will deprive children of their future, and potentially the future of much of the animal kingdom along with them.

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News & Commentary

WHO, Global Health Workers Demand Urgent Action on Climate Change. Kuehn BM. JAMA. 2021 Nov 16;326(19):1898. doi: 10.1001/jama.2021.20063.

Covid-19 and Climate Change: Crises of Structural Racism. Healy JP, Jensen A, Power MB, McKibben B, Cohen G, Basu G. J Clim Chang Health. 2021 Nov 2:100092. doi: 10.1016/j.joclim.2021.100092. Online ahead of print.

Invited Perspective: Ambient Air Pollution and SARS-CoV-2: Research Challenges and Public Health Implications. Hansell AL, Villeneuve PJ. Environ Health Perspect. 2021 Nov;129(11):111303. doi: 10.1289/EHP10540. Epub 2021 Nov 19.

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Climate change, migration, and health(care) in primary care training. Scheerens C, Madzimbamuto FD. Afr J Prim Health Care Fam Med. 2021 Oct 19;13(1):e1-e2. doi: 10.4102/phcfm.v13i1.3227.

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