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COVID-19

1. **Plastic waste release caused by COVID-19 and its fate in the global ocean.** Peng Y, Wu P, Schartup AT, Zhang Y. Proc Natl Acad Sci U S A. 2021 Nov 23;118(47):e2111530118. doi: 10.1073/pnas.2111530118.
   https://www.pnas.org/content/118/47/e2111530118
   The COVID-19 pandemic has led to an increased demand for single-use plastics that intensifies pressure on an already out-of-control global plastic waste problem. While it is suspected to be large, the magnitude and fate of this pandemic-associated mismanaged plastic waste are unknown. Here, we use our MITgcm ocean plastic model to quantify the impact of the pandemic on plastic discharge. We show that 8.4 ± 1.4 million tons of pandemic-associated plastic waste have been generated from 193 countries as of August 23, 2021, with 25.9 ± 3.8 thousand tons released into the global ocean representing 1.5 ± 0.2% of the global total riverine plastic discharge. The model projects that the spatial distribution of the discharge changes rapidly in the global ocean within 3 y, with a significant portion of plastic debris landing on the beach and seabed later and a circumpolar plastic accumulation zone will be formed in the Arctic. We find hospital waste represents the bulk of the global discharge (73%), and most of the global discharge is from Asia (72%), which calls for better management of medical waste in developing countries.

2. **The COVID-19 pandemic is intricately linked to biodiversity loss and ecosystem health.** Lawler OK et al. Lancet Planet Health. 2021 Nov;5(11):e840-e850. doi: 10.1016/S2542-5196(21)00258-8.
   https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196(21)00258-8/fulltext
   The ongoing COVID-19 pandemic, caused by zoonotic SARS-CoV-2, has important links to biodiversity loss and ecosystem health. These links range from anthropogenic activities driving zoonotic disease emergence and extend to the pandemic affecting biodiversity conservation, environmental policy, ecosystem services, and multiple conservation facets. Crucially, such

effects can exacerbate the initial drivers, resulting in feedback loops that are likely to promote future zoonotic disease outbreaks. We explore these feedback loops and relationships, highlighting known and potential zoonotic disease emergence drivers (eg, land-use change, intensive livestock production, wildlife trade, and climate change), and discuss direct and indirect effects of the ongoing pandemic on biodiversity loss and ecosystem health. We stress that responses to COVID-19 must include actions aimed at safeguarding biodiversity and ecosystems, in order to avoid future emergence of zoonoses and prevent their wide-ranging effects on human health, economies, and society. Such responses would benefit from adopting a One Health approach, enhancing cross-sector, transboundary communication, as well as from collaboration among multiple actors, promoting planetary and human health.

3. **Beyond building back better: imagining a future for human and planetary health.** de León EA, Shriwise A, Tomson G, Morton S, Lemos DS, Menne B, Dooris M. Lancet Planet Health. 2021 Nov;5(11):e827-e839. doi: 10.1016/S2542-5196(21)00262-X.
https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196(21)00262-X/fulltext
COVID-19 is disrupting and transforming the world. We argue that transformations catalysed by this pandemic should be used to improve human and planetary health and wellbeing. This paradigm shift requires decision makers and policy makers to go beyond building back better, by nesting the economic domain of sustainable development within social and environmental domains. Drawing on the engage, assess, align, accelerate, and account (E4As) approach to implementing the 2030 Agenda for Sustainable Development, we explore the implications of this kind of radical transformative change, focusing particularly on the role of the health sector. We conclude that a recovery and transition from the COVID-19 pandemic that delivers the future humanity wants and needs requires more than a technical understanding of the transformation at hand. It also requires commitment and courage from leaders and policy makers to challenge dominant constructs and to work towards a truly thriving, equitable, and sustainable future to create a world where economic development is not an end goal itself, but a means to secure the health and wellbeing of people and the planet.

4. **The Potential Impact of Smog Spell on Humans' Health Amid COVID-19 Rages.** Javed A et al. Int J Environ Res Public Health. 2021 Oct 29;18(21):11408. doi: 10.3390/ijerph182111408.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8583367/
Rapid and unchecked industrialization and the combustion of fossil fuels have engendered a state of fear in urban settlements. Smog is a visible form of air pollution that arises due to the over-emissions of some primary pollutants like volatile organic compounds (VOCs), hydrocarbons, SO2, NO, and NO2 which further react in the atmosphere and give rise to toxic and carcinogenic secondary smog components. Smog reduces the visibility on roads and results in road accidents and cancellation of flights. Uptake of primary and secondary pollutants of smog is responsible for several deleterious diseases of which respiratory disorders, cardiovascular dysfunction, neurological disorders, and cancer are discussed here. Children and pregnant women are more prone to the hazards of smog. The worsening menace of smog on one hand and occurrence of pandemic i.e., COVID-19 on the other may increase the mortality rate. But the implementation of lockdown during pandemics has favored the atmosphere in

some ways, which will be highlighted in the article. On the whole, the focus of this article will be on the dubious relationship between smog and coronavirus.

Health Impacts of Climate Change

5. **Long-term nonlinear relationship between PM(2.5) and ten leading causes of death.** Lin YC, Shih HS, Lai CY. Environ Geochem Health. 2021 Nov 13. doi: 10.1007/s10653-021-01136-1. Online ahead of print.
   Linear models indicate that increasing PM2.5 concentration increased malignant neoplasm, pneumonia, and chronic lower respiratory disease mortalities; chronic liver diseases; and cirrhosis; whereas heart diseases and esophagus cancer mortality decreased. For the nonlinear model results, it can be found that there were also significant nonlinear relationships between PM2.5 concentration and malignant mortalities for neoplasm, heart disease, diabetes; and trachea, bronchus, lung, liver, intrahepatic bile duct, and esophagus cancer. Thus, long-term exposure to PM2.5 may be a significant risk factor for multiple acute and chronic diseases. Results from this study can be directly applied worldwide to provide air quality and health management references for governments, and important information on long-term health risks for local residents in the study area.

6. **Health impacts of wildfire-related air pollution in Brazil: a nationwide study of more than 2 million hospital admissions between 2008 and 2018.** Requia WJ, Amini H, Mukherjee R, Gold DR, Schwartz JD. Nat Commun. 2021 Nov 12;12(1):6555. doi: 10.1038/s41467-021-26822-7. https://www.nature.com/articles/s41467-021-26822-7
   We quantified the impacts of wildfire-related PM2.5 on 2 million hospital admissions records due to cardiorespiratory diseases in Brazil between 2008 and 2018. The national analysis shows that wildfire waves are associated with an increase of 23% (95%CI: 12%-33%) in respiratory hospital admissions and an increase of 21% (95%CI: 8%-35%) in circulatory hospital admissions. In the North (where most of the Amazon region is located), we estimate an increase of 38% (95%CI: 30%-47%) in respiratory hospital admissions and 27% (95%CI: 15%-39%) in circulatory hospital admissions. Here we report epidemiological evidence that air pollution emitted by wildfires is significantly associated with a higher risk of cardiorespiratory hospital admissions.

7. **Pollution and the Heart.** Rajagopalan S, Landrigan PJ. N Engl J Med. 2021 Nov 11;385(20):1881-1892. doi: 10.1056/NEJMra2030281.
   https://www.nejm.org/doi/full/10.1056/NEJMra2030281
   In this review, we summarize current evidence linking pollution to cardiovascular disease and suggest evidence-based strategies for disease prevention. We discuss strategies for reducing exposure to pollution in individual persons but argue that lasting prevention of pollution-related cardiovascular disease can be achieved only through government-supported interventions on a societal scale that control pollution at its source and encourage a rapid transition to clean energy. We note that these actions will also slow the pace of climate change and will thus produce a double benefit. Only through a multipronged strategy that combines pollution prevention with control of individual risk factors can the global epidemic of cardiovascular disease be contained.

8. **Climate change and zoonoses: A review of the current status, knowledge gaps, and future trends.** Rupasinghe R, Chomel BB, Martínez-López B. Acta Trop. 2021 Nov 7:106225. doi: 10.1016/j.actatropica.2021.106225. Online ahead of print.
https://www.sciencedirect.com/science/article/pii/S0001706X21004034
Emerging infectious diseases (EIDs), especially those with zoonotic potential, are a growing threat to global health, economy, and safety. The influence of global warming and geoclimatic variations on zoonotic disease epidemiology is evident by alterations in the host, vector, and pathogen dynamics and their interactions. The objective of this article is to review the current literature on the observed impacts of climate change on zoonoses and discuss future trends. We evaluated several climate models to assess the projections of various zoonoses driven by the predicted climate variations. Many climate projections revealed potential geographical expansion and the severity of vector-borne, waterborne, foodborne, rodent-borne, and airborne zoonoses. However, there are still some knowledge gaps, and further research needs to be conducted to fully understand the magnitude and consequences of some of these changes. Certainly, by understanding the impact of climate change on zoonosis emergence and distribution, we could better plan for climate mitigation and climate adaptation strategies.

9. **Long-term exposure to PM(2.5) major components and mortality in the southeastern United States.** Wang Y et al. Environ Int. 2021 Nov 4;158:106969. doi: 10.1016/j.envint.2021.106969. Online ahead of print.
https://www.sciencedirect.com/science/article/pii/S0160412021005948
RESULTS: The cohort comprised 13,590,387 Medicare enrollees and a total of 107,191,652 person-years. In single-component models, all five major PM2.5 components were significantly associated with elevated all-cause mortality. The hazard ratios (HR) per interquartile range (IQR) increase in exposure were 1.027 (95% CI: 1.025-1.030), 1.012 (95% CI: 1.010-1.013), 1.018 (95% CI: 1.017-1.020), 1.021 (95% CI: 1.017-1.024), and 1.004 (95% CI: 1.003-1.006) for BC, NIT, OM, SO4, and soil particles, respectively. While the effect estimate of soil component was statistically significant, it is much smaller than those of combustion-related components. CONCLUSION: Our study provides epidemiological evidence that long-term exposure to major PM2.5 components is significantly associated with elevated mortality.

10. **Particulate Air Pollution and Risk of Neuropsychiatric Outcomes. What We Breathe, Swallow, and Put on Our Skin Matters.** Calderón-Garcidueñas L, Stommel EW, Rajkumar RP, Mukherjee PS, Ayala A. Int J Environ Res Public Health. 2021 Nov 3;18(21):11568. doi: 10.3390/ijerph182111568.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8583112/
Overall, the literature supports that particle pollution contributes to targeted neurological and psychiatric outcomes and highlights the complexity of the pathophysiologic mechanisms and the marked differences in pollution profiles inducing neural damage. Factors such as emission source intensity, genetics, nutrition, comorbidities, and others also play a role. PM2.5 is a threat for neurological and psychiatric diseases. Thus, future research should address specifically the potential role of UFPs/NPs in inducing neural damage.

11. **The impact of environmental injustice and social determinants of health on the role of air pollution in asthma and allergic disease in the United States.** Cook Q, Argenio K, Lovinsky-Desir S. J Allergy Clin Immunol. 2021 Nov;148(5):1089-1101.e5. doi: 10.1016/j.jaci.2021.09.018. https://www.clinicalkey.com/#!/content/journal/1-s2.0-S0091674921014482
There is clear evidence that exposure to environmental air pollution is associated with immune dysregulation, asthma, and other allergic diseases. However, the burden of air pollution exposure is not equally distributed across the United States. Many social and environmental factors place communities of color and people who are in poverty at increased risk of exposure to pollution and morbidity from asthma and allergies. Here, we review the evidence that supports the relationship between air pollution and asthma, while considering the social determinants of health that contribute to disparities in exposures and outcomes.

12. **Associations Between Air Pollution Exposure and Empirically Derived Profiles of Cognitive Performance in Older Women.** Petkus AJ et al. J Alzheimers Dis. 2021 Oct 30. doi: 10.3233/JAD-210518. Online ahead of print.
CONCLUSION: Exposure to PM2.5 and NO2 are associated with patterns of cognitive performance characterized by worse verbal episodic memory relative to performance in other domains.

WE ACT

13. **Nursing: The critical need to address climate change and to protect health.** Chaiard J, Turale S. J Nurs Scholarsh. 2021 Nov 12. doi: 10.1111/jnu.12739. Online ahead of print.
https://sigmapubs.onlinelibrary.wiley.com/doi/10.1111/jnu.12739
As health professionals, we have a moral and professional responsibility to act now to diminish the effects of climate change on human health and to implement strategies to protect humans and the planet. It is also relevant that the Sustainable Development Goals (SDGs) emphasizes promoting the health and well-being of all people. Nurses should be encouraged to be concerned and pay attention to global health and how to implement nursing practices to improve the health of individuals, families, and community. Moreover, as global citizens, nurses need to become climate change activists.

14. **Addressing our planetary crisis: Consensus statement from the presenters and International Advisory Committee of the Regional Action on Climate Change (RACC) Symposium held in conjunction with the Kyoto-based Science and Technology in Society (STS) Forum, 1 October 2021.** Falk J et al. Sustain Sci. 2021 Nov 1:1-3. doi: 10.1007/s11625-021-01059-x. Online ahead of print.
https://link.springer.com/article/10.1007/s11625-021-01059-x
The Earth's climatic, ecological, and human systems are converging towards an existential crisis for global civilization within the lifetimes of children now living. Precursors of that crisis are already evident and likely to be further amplified as human population peaks around the end of the twenty-first century. A year ago, the statement from the Regional Action on Climate Change (RACC) Symposium declared "2020 is the year when humanity is experiencing …converging

impacts of climate change, biodiversity loss, pollution, inadequate global health infrastructures, and stark inequalities" (Falk et al. 2020).

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News & Commentary

Restoring biodiversity and slowing climate change are crucial to protect health. Butler CD, Jaakkola JJK, Boylan S, McFarlane RA, Potter JD. Lancet. 2021 Nov 13;398(10313):1802. doi: 10.1016/S0140-6736(21)02250-9.

Climate special: the past and future of the Earth's climate. Thompson B, Bundell S. Nature. 2021 Nov 10. doi: 10.1038/d41586-021-03406-5. Online ahead of print.

COP26 scientist: How much carbon can the ocean absorb? Tollefson J. Nature. 2021 Nov 8. doi: 10.1038/d41586-021-03029-w. Online ahead of print.

COP26 diary: making health central to tackling climate change. Smith R. BMJ. 2021 Nov 8;375:n2728. doi: 10.1136/bmj.n2728.

Household Air Pollution: The Importance of Intervening Early. Mortimer K. Chest. 2021 Nov;160(5):1579-1580. doi: 10.1016/j.chest.2021.08.049.

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