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#49 | 1.12.2022 to 1.18.2022

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COVID-19

1. **Climate change and COVID-19: shared challenges, divergent perspectives, and proposed collaborative solutions.** Wahaj Z, Alam MM, Al-Amin AQ. Environ Sci Pollut Res Int. 2022 Jan 6:1-10. doi: 10.1007/s11356-021-18402-5. Online ahead of print.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8733923/
Pandemics leave their mark quickly. This is true for all pandemics, including COVID-19. Its multifarious presence has wreaked havoc on people's physical, economic, and social life since late 2019. Despite the need for social science to save lives, it is also critical to ensure future generations are protected. COVID-19 appeared as the world grappled with the epidemic of climate change. This study suggests policymakers and practitioners address climate change and COVID-19 together. This article offers a narrative review of both pandemics' impacts. Scopus and Web of Science were sought databases. The findings are reported analytically using important works of contemporary social theorists. The analysis focuses on three interconnected themes: technology advancements have harmed vulnerable people; pandemics have macro- and micro-dimensions; and structural disparities. To conclude, we believe that collaborative effort is the key to combating COVID-19 and climate change, while understanding the lessons learnt from the industrialised world. Finally, policymakers can decrease the impact of global catastrophes by addressing many socioeconomic concerns concurrently.

2. **Assessing face masks in the environment by means of the DPSIR framework.** Tesfaldet YT, Ndeh NT. Sci Total Environ. 2022 Jan 4;814:152859. doi: 10.1016/j.scitotenv.2021.152859. Online ahead of print.
https://www.sciencedirect.com/science/article/pii/S0048969721079389
The use of face masks outside the health care facility dates back a century ago. However, face masks use noticeably soared due to the COVID-19 (Coronavirus disease 2019) pandemic. As a result, an unprecedented influx of discarded face masks is ending up in the environment. This review paper delves into face masks in the environment using the DPSIR (driving forces, pressures, states, impacts, and responses) framework to simplify and communicate the

environmental indicators. Firstly, the historical, and briefly the economic trajectory of face masks are discussed. Secondly, the main driving forces of face masks use with an emphasis on public health are explored. Then, the pressures exerted by efforts to fulfill the human needs (driving forces) are explored. In turn, the state of the environment due to the influx of masks along with the impacts are examined. Furthermore, the upstream, and downstream societal responses to mitigate the environmental damages of the driving forces, pressures, states, and impacts are reviewed. In summary, it has been shown from this review that the COVID-19 pandemic has been causing a surge in face mask usage, which translates to face masks pollution in both terrestrial and aquatic environments. This implies proper usage and disposal of face masks is paramount to the quality of human health and the environment, respectively. Moreover, further research on eco-friendly face masks is indispensable to mitigating the environmental damages occurring due to the mass use of surgical masks worldwide.

3. **Environmental Factors Influencing COVID-19 Incidence and Severity.** Weaver AK, Head JR, Gould CF, Carlton EJ, Remais JV. Annu Rev Public Health. 2022 Jan 4. doi: 10.1146/annurev-publhealth-052120-101420. Online ahead of print.
   Emerging evidence supports a link between environmental factors-including air pollution and chemical exposures, climate, and the built environment-and severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) transmission and coronavirus disease 2019 (COVID-19) susceptibility and severity. Climate, air pollution, and the built environment have long been recognized to influence viral respiratory infections, and studies have established similar associations with COVID-19 outcomes. More limited evidence links chemical exposures to COVID-19. Environmental factors were found to influence COVID-19 through four major interlinking mechanisms: increased risk of preexisting conditions associated with disease severity; immune system impairment; viral survival and transport; and behaviors that increase viral exposure. Both data and methodologic issues complicate the investigation of these relationships, including reliance on coarse COVID-19 surveillance data; gaps in mechanistic studies; and the predominance of ecological designs. We evaluate the strength of evidence for environment-COVID-19 relationships and discuss environmental actions that might simultaneously address the COVID-19 pandemic, environmental determinants of health, and health disparities.

4. **Impacts of air pollution on COVID-19 case fatality rate: a global analysis.** Li C, Managi S. Environ Sci Pollut Res Int. 2022 Jan 4:1-14. doi: 10.1007/s11356-021-18442-x. Online ahead of print.
   https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8724597/
   The coronavirus disease 2019 (COVID-19) pandemic is still rapidly spreading globally. To probe high-risk cities and the impacts of air pollution on public health, this study explores the relationship between the long-term average concentration of air pollution and the city-level case fatality rate (CFR) of COVID-19 globally. Then, geographically weighted regression (GWR) is applied to examine the spatial variability of the relationships. Six air pollution factors, including nitrogen dioxide (NO2), sulfur dioxide (SO2), ozone (O3), PM2.5 (particles with diameter ≤2.5 μm), PM10 (particles with diameter ≤10 μm), and air quality index (AQI), are positively associated with the city-level COVID-19 CFR. Our results indicate that a 1-unit increase in NO2

(part per billion, PPB), SO2 (PPB), O3 (PPB), PM2.5 (microgram per cubic meter, μg/m3), PM10 (μg/m3), AQI (score), is related to a 1.450%, 1.005%, 0.992%, 0.860%, 0.568%, and 0.776% increase in the city-level COVID-19 CFR, respectively. Additionally, the effects of NO2, O3, PM2.5, AQI, and probability of living with poor AQI on COVID-19 spatially vary in view of the estimation of the GWR. In other words, the adverse impacts of air pollution on health are different among the cities. In summary, long-term exposure to air pollution is negatively related to the COVID-19 health outcome, and the relationship is spatially non-stationary. Our research sheds light on the impacts of slashing air pollution on public health in the COVID-19 pandemic to help governments formulate air pollution policies in light of the local situations.

5. **Wet wipes and disposable surgical masks are becoming new sources of fiber microplastic pollution during global COVID-19.** Hu T, Shen M, Tang W. Environ Sci Pollut Res Int. 2022 Jan;29(1):284-292. doi: 10.1007/s11356-021-17408-3. Epub 2021 Nov 10.
https://www.sciencedirect.com/science/article/pii/S2667010021002468
The demand of wet wipes and masks has been rising worldwide since the outbreak of global COVID-19; however, with more reports about improper handling of wipes and masks, their potential threats to the environment are gradually emerging. Wipes and masks are made of a large number of plastic fibers, which are easily broken and fragmented into microplastic fibers under the influence of environmental factors. Weathered wipes or masks can release billions of microplastic fibers, which is a great challenge to the local ecological security. Wipes and masks as new microplastic pollution sources and their potential role in the ecosystem have not been fully recognized and considered. Microplastic fiber pollution is a huge environmental issue, and how to prevent a large number of discarded wipes and masks from entering the environment and how to deal with them are an important issue for all countries and regions in the world. In the post era of global COVID-19, disposable wipes and masks, as new sources of environmental microplastic fiber pollution, should be given concern. It is urgent to recognize this potential environmental threat and prevent it from becoming the next microplastic problem.

Health Impacts of Climate Change

6. **Global burden of lung cancer attributable to ambient fine particulate matter pollution in 204 countries and territories, 1990-2019.** Yang X, Zhang T, Zhang X, Chu C, Sang S. Environ Res. 2022 Mar;204(Pt A):112023. doi: 10.1016/j.envres.2021.112023. Epub 2021 Sep 11.
https://www.sciencedirect.com/science/article/pii/S0013935121013189
RESULTS: In 2019, the number of global lung cancer deaths and DALYs attributable to ambient PM2.5 was approximately 0.31 million and 7.02 million respectively, among which more deaths and DALYs occurred in males. At GBD region level, the heaviest burden occurred in East Asia, accounting for over 50% worldwide, with China ranked first worldwide. The number of ambient PM2.5 attributable lung cancer deaths and DALYs has over doubled from 1990 to 2019, but high sociodemographic index (SDI) region had a rapid decrease, with EAPC -2.21 in ASMR (95% CI: -2.32, -2.09). The age-specific mortality rate or DALY rate has increased in all age groups in low to middle SDI regions from 1990 to 2019. The ASMR or ASDR showed an inverted V-shaped association with SDI. The EAPC in ASMR or ASDR was highly negatively correlated with ASMR or ASDR in 1990 and SDI in 2019, with coefficients around 0.70.

CONCLUSIONS: The number of ambient PM2.5-related lung cancer deaths and DALYs has largely increased because of the increase of exposure to PM2.5, population growth, and aging. Local governments should do economic activities under the consideration of public health, especially in high-burden areas.

7. **Ambient air pollution and the risk of acute myocardial infarction and stroke: A national cohort study.** Olaniyan T et al. Environ Res. 2022 Mar;204(Pt A):111975. doi: 10.1016/j.envres.2021.111975. Epub 2021 Aug 31.
We used a large national cohort in Canada to assess the incidence of acute myocardial infarction (AMI) and stroke hospitalizations in association with long-term exposure to fine particulate matter (PM2.5), nitrogen dioxide (NO2), and ozone (O3). The study population comprised 2.7 million respondents from the 2006 Canadian Census Health and Environment Cohort (CanCHEC), followed for incident hospitalizations of AMI or stroke between 2006 and 2016. We estimated 10-year moving average estimates of PM2.5, NO2, and O3, annually. We used Cox proportional hazards models to examine the associations adjusting for various covariates. For AMI, each interquartile range (IQR) increase in exposure was found to be associated with a hazard ratio of 1.026 (95% CI: 1.007-1.046) for PM2.5, 1.025 (95% CI: 1.001-1.050) for NO2, and 1.062 (95% CI: 1.041-1.084) for O3, respectively. Similarly, for stroke, an IQR increase in exposure was associated with a hazard ratio of 1.078 (95% CI: 1.052-1.105) for PM2.5, 0.995 (95% CI: 0.965-1.030) for NO2, and 1.055 (95% CI: 1.028-1.082) for O3, respectively. We found consistent evidence of positive associations between long-term exposures to PM2.5, and O3, and to a lesser degree NO2, with incident AMI and stroke hospitalizations.

8. **Association of improved air quality with lower dementia risk in older women.** Wang X et al. Proc Natl Acad Sci U S A. 2022 Jan 11;119(2):e2107833119. doi: 10.1073/pnas.2107833119.
https://www.pnas.org/content/119/2/e2107833119
Late-life ambient air pollution is a risk factor for brain aging, but it remains unknown if improved air quality (AQ) lowers dementia risk. We studied a geographically diverse cohort of older women dementia free at baseline in 2008 to 2012 (n = 2,239, aged 74 to 92). Incident dementia was centrally adjudicated annually. Yearly mean concentrations of fine particulate matter (PM2.5) and nitrogen dioxide (NO2) were estimated using regionalized national universal kriging models and averaged over the 3-y period before baseline (recent exposure) and 10 y earlier (remote exposure). Reduction from remote to recent exposures was used as the indicator of improved AQ. Cox proportional hazard ratios (HRs) for dementia risk associated with AQ measures were estimated, adjusting for sociodemographic, lifestyle, and clinical characteristics. We identified 398 dementia cases during follow up (median = 6.1 y). PM2.5 and NO2 reduced significantly over the 10 y before baseline. Larger AQ improvement was associated with reduced dementia risks (HRPM2.5 0.80 per 1.78 μg/m3, 95% CI 0.71-0.91; HRNO2 0.80 per 3.91 parts per billion, 95% CI 0.71-0.90), equivalent to the lower risk observed in women 2.4 y younger at baseline. Higher PM2.5 at baseline was associated with higher dementia risk (HRPM2.5 1.16 per 2.90 μg/m3, 95% CI 0.98-1.38), but the lower dementia risk associated with improved AQ remained after further adjusting for recent exposure. The observed associations did not substantially differ by age, education, geographic region,

Apolipoprotein E e4 genotypes, or cardiovascular risk factors. Long-term AQ improvement in late life was associated with lower dementia risk in older women.

9. **Structural Racism as an Environmental Justice Issue: A Multilevel Analysis of the State Racism Index and Environmental Health Risk from Air Toxics.** Alvarez CH. J Racial Ethn Health Disparities. 2022 Jan 6. doi: 10.1007/s40615-021-01215-0. Online ahead of print.
Communities of color and poor neighborhoods are disproportionately exposed to more air pollution-a pattern known as environmental injustices. Environmental injustices increase susceptibility to negative health outcomes among residents in affected communities. The structural mechanisms distributing environmental injustices in the USA are understudied. Bridging the literatures on the social determinants of health and environmental justice highlights the importance of the environmental conditions for health inequalities and sheds light on the institutional mechanisms driving environmental health inequalities. Employing a critical quantitative methods approach, we use data from an innovative state racism index to argue that systematic racialized inequalities in areas from housing to employment increase outdoor airborne environmental health risks in neighborhoods. Results of a multilevel analysis in over 65,000 census tracts demonstrate that tracts in states with higher levels of state-level Black-white gaps report greater environmental health risk exposure to outdoor air pollution. The state racism index explains four-to-ten percent of county- and state-level variation in carcinogenic risk and noncarcinogenic respiratory system risks from outdoor air toxics. The findings suggest that the disproportional exposure across communities is tied to systematic inequalities in environmental regulation and other structural elements such as housing and incarceration. Structural racism is an environmental justice issue.

10. **Does air pollution increase child mortality? Evidence from 58 developing countries.** Hassan N, Murad SMW. Environ Sci Pollut Res Int. 2022 Jan 6. doi: 10.1007/s11356-021-18319-z. Online ahead of print.
This study aims to investigate the effects of air quality on child mortality in developing countries. We consider annual data covering the period from 2010 to 2016 of 58 countries and estimate the empirical models using recently developed panel quantile regression with the method of moments (MM-QR). It is found that outdoor air quality (measured by the concentration of PM2.5 in the air) has a positive and significant effect on total child mortality, post-neonatal mortality, and under-five child mortality. However, its effect on neonatal mortality is not statistically significant at lower quantiles. Furthermore, Household air pollution (HAP) also has a positive and significant effect on total child mortality, neonatal mortality, and under-five child mortality. The effect of HAP on post-neonatal mortality is not significant in most cases. Overall, the adverse effect of HAP is larger than the PM2.5. For instance, a 1% increase of PM2.5 concentration in the outdoor causes 0.231% total child mortality due to respiratory diseases at [Formula: see text], while a 1% increase of HAP causes 0.532% total child mortality at the same quantile. In many cases, the coefficients of PM2.5 and HAP increase at the higher quantiles, supporting asymmetric effects of pollutants on child mortality. However, per capita income, access to basic drinking water and sanitation facilities, and domestic and external health expenditures significantly reduce child mortality. On the contrary, open defecation increases mortality. Consequently, policymakers should take adequate measures to

improve indoor and outdoor air quality to combat child mortality due to respiratory diseases in developing countries. They should also take initiatives to enhance per capita income, basic drinking water, and sanitation facilities, domestic and external health expenditures, and public awareness against open defecation.

11. **Climate change and Indigenous mental health in the Circumpolar North: A systematic review to inform clinical practice.** Lebel L, Paquin V, Kenny TA, Fletcher C, Nadeau L, Chachamovich E, Lemire M. Transcult Psychiatry. 2022 Jan 6:13634615211066698. doi: 10.1177/13634615211066698. Online ahead of print.
https://journals.sagepub.com/doi/10.1177/13634615211066698
Climate change is disproportionally impacting the Circumpolar North, with particular impacts among Indigenous populations. Environmental changes are felt in many aspects of daily life of Northern communities, including both physical and mental health. Thus, health institutions from around the Arctic must meet emerging needs, while the phenomenon remains marginal to their southern counterparts. In this systematic review, we aimed to review current scientific knowledge on the mental health impacts of climate change in Indigenous Peoples across the Circumpolar North. Seven databases were searched. Original peer-reviewed research articles were included if they addressed links between climate change and mental health in Arctic or Subarctic Indigenous Populations. After extraction, data were synthesized using thematic analysis. Of the 26 articles that met inclusion criteria, 16 focused on Canadian Inuit communities and 21 were exclusively qualitative. Being on the land was identified as a central determinant of wellbeing. Immediate impacts of climate change on mental health were felt through restricted mobility and disrupted livelihoods. Effects on mental health were further felt through changes in culture and identity, food insecurity, interpersonal stress and conflicts, and housing problems. Various ways in how communities and individuals are coping with these effects were reported. Understanding climate-related pathways of mental health risks in the Arctic is crucial to better identify vulnerable groups and to foster resilience. Clinicians can play a role in recognizing and providing support for patients affected by these disruptions. Policies sensitive to the climate-mental health relationship must be advocated for.

12. **Association between long-term exposure to ambient particulate matter and blood pressure, hypertension: an updated systematic review and meta-analysis.** Niu Z, Duan Z, Yu H, Xue L, Liu F, Yu D, Zhang K, Han D, Wen W, Xiang H, Qin W. Int J Environ Health Res. 2022 Jan 4:1-16. doi: 10.1080/09603123.2021.2022106. Online ahead of print.
Evidence of more recent studies should be updated to evaluate the effect of long-term exposure to particulate matter (PM) on blood pressure and hypertension. Studies of long-term effects of PM1, PM2.5 and PM10 on blood pressure (SBP, DBP, MAP), hypertension were searched in Pubmed, Web of Science and Embase before May, 2021. Meta-analysis of 41 studies showed that exposure to PM1, PM2.5 was associated with SBP (1.76 mmHg (95%CI:0.71, 2.80) and 0.63 mmHg (95%CI:0.40, 0.85), per 10 μg/m3 increase in PM), all three air pollutants (PM1, PM2.5, PM10) was associated with DBP (1.16 mmHg (95%CI:0.34, 1.99), 0.31 mmHg (95%CI:0.16, 0.47), 1.17 mmHg (95%CI:0.24, 2.09), respectively. As for hypertension, PM1, PM2.5 and PM10 were all significantly associated with higher risk of hypertension (OR=1.27 (95%CI:1.06, 1.52), 1.15 (95%CI:1.10, 1.20) and 1.11 (95%CI:1.07, 1.16).

In conclusion, our study indicated a positive association between long-term exposure to particulate matter and increased blood pressure, hypertension.

13. **Raising the Alarm: Environmental Factors in the Onset and Maintenance of Chronic (Low-Grade) Inflammation in the Gastrointestinal Tract.** Sandys O, Te Velde A. Dig Dis Sci. 2022 Jan 4. doi: 10.1007/s10620-021-07327-1. Online ahead of print.
Chronic inflammatory disease of the gastrointestinal (GI) tract is defined by several pathophysiological characteristics, such as dysbiosis of the microbiota, epithelial barrier hyperpermeability, systemic dissemination of endotoxins and chronic inflammation. In addition to well-reported environmental factors in non-communicable disease, such as smoking, diet, and exercise, humans are frequently exposed to myriads more environmental factors, from pesticides to food additives. Such factors are ubiquitous across both our diet and indoor/outdoor environments. A major route of human exposure to these factors is ingestion, which frequently occurs due to their intentional addition (intentional food additives) and/or unintentional contamination (unintentional food contaminants) of food products-often linked to environmental pollution. Understanding how this persistent, diverse exposure impacts GI health is of paramount importance, as deterioration of the GI barrier is proposed to be the first step towards systemic inflammation and chronic disease. Therefore, we aim to evaluate the impact of ingestion of environmental factors on inflammatory processes in the GI tract. In this review, we highlight human exposure to intentional food additives (e.g. emulsifiers, bulking agents) and unintentional food contaminants (e.g. persistent organic pollutants, pesticides, microplastics), then present evidence for their association with chronic disease, modification of the GI microbiota, increased permeability of the GI barrier, systemic dissemination of endotoxins, local (and distal) pro-inflammatory signalling, and induction of oxidative stress and/or endoplasmic reticulum stress. We also propose a link to NLRP3-inflammasome activation. These findings highlight the contribution of common environmental factors towards deterioration of GI health and the induction of pathophysiology associated with onset and maintenance of chronic inflammation in the GI tract.

14. **Charting the evidence for climate change impacts on the global spread of malaria and dengue and adaptive responses: a scoping review of reviews.** Kulkarni MA, Duguay C, Ost K. Global Health. 2022 Jan 3;18(1):1. doi: 10.1186/s12992-021-00793-2.
https://globalizationandhealth.biomedcentral.com/articles/10.1186/s12992-021-00793-2
RESULTS: A total of 32 reviews met the inclusion criteria. Evidence for the impacts of climate change (including climate variability) on dengue was greatest in the Southeast Asian region, while evidence for the impacts of climate change on malaria was greatest in the African region, particularly in highland areas. Few reviews explicitly addressed the implementation of adaptation strategies to address climate change-driven disease transmission, however suggested strategies included enhanced surveillance, early warning systems, predictive models and enhanced vector control.
CONCLUSIONS: There is strong evidence for the impacts of climate change, including climate variability, on the transmission and future spread of malaria and dengue, two of the most globally important vector-borne diseases. Further efforts are needed to develop multi-sectoral climate change adaptation strategies to enhance the capacity and resilience of health systems

and communities, especially in regions with predicted climatic suitability for future emergence and re-emergence of malaria and dengue. This scoping review may serve as a useful precursor to inform future systematic reviews of the primary literature.

15. **The Impact of Climate Change on the Prevalence of Mental Illness Symptoms.** Monsour M, Clarke-Rubright E, Lieberman-Cribbin W, Timmins C, Taioli E, Schwartz RM, Corley SS, Laucis AM, Morey RA. J Affect Disord. 2022 Jan 2:S0165-0327(21)01442-7. doi: 10.1016/j.jad.2021.12.124. Online ahead of print.
    RESULTS: We found an elevated risk of mental illness symptoms from exposure to more high-intensity TCs and identified demographic variables that may contribute to this risk. Furthermore, inundation mapping demonstrated severe and widespread impact of SLR and SS on the mental health of communities.
    LIMITATIONS: This study did not include data directly measuring comorbidity, resilience, preparedness, or ability to adapt to climate change. Also, multiple imputation using chained equations may have been imperfect. Furthermore, there is uncertainty in predicting and mapping SLR and TC intensity, which limits complete confidence in our SS predictions.
    CONCLUSION: The impacts of climate change have been frequently studied in terms of physical health, natural disaster prevalence, and economic impacts, but rarely on mental health burden. However, it is vital that national, state, and local governments develop and deploy plans to address mental health needs along with expenditures for protecting infrastructure, the economy, and physical health from the combined effects of SLR and climate change-induced natural disasters.

16. **Residential particulate matter, proximity to major roads, traffic density and traffic volume as risk factors for preterm birth in California.** Costello JM, Steurer MA, Baer RJ, Witte JS, Jelliffe-Pawlowski LL. Paediatr Perinat Epidemiol. 2022 Jan;36(1):70-79. doi: 10.1111/ppe.12820. Epub 2021 Nov 19.
    https://onlinelibrary.wiley.com/doi/pdf/10.1111/ppe.12820
    RESULTS: Findings showed that whereas higher mean levels of PM2.5 and diesel PM by census tract were associated with a higher risk of preterm birth, living closer to roads or living in higher traffic density areas was not associated with higher risk. Residence in a census tract with a mean PM2.5 in the top quartile compared with the lowest quartile was associated with the highest observed risk of preterm birth (aRR 1.04, 95% CI 1.04, 1.05).
    CONCLUSIONS: Over a large geographical region with a diverse population, PM2.5 and diesel PM were associated with preterm birth, while measures of distance to major road were not, suggesting that these distance measures do not serve as a proxy for measures of particulate matter in the context of preterm birth.

17. **Long-term exposure to PM(2.5) major components and mortality in the southeastern United States.** Wang Y, Xiao S, Zhang Y, Chang H, Martin RV, Van Donkelaar A, Gaskins A, Liu Y, Liu P, Shi L. Environ Int. 2022 Jan;158:106969. doi: 10.1016/j.envint.2021.106969. Epub 2021 Nov 4.
    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.

18. **Global water shortage and potable water safety; Today's concern and tomorrow's crisis.** Salehi M. Environ Int. 2022 Jan;158:106936. doi: 10.1016/j.envint.2021.106936. Epub 2021 Oct 14.
https://www.sciencedirect.com/science/article/pii/S0160412021005614
Climate change, severe droughts, population growth, demand increase, and poor management during the recent decades have further stressed the scarce freshwater resources worldwide and resulted in severe water shortages in many regions. The water utilities address the water shortage by providing alternative source of water, augment the supplied water, supply intermittently, and even bulk water delivery under severe water shortage conditions. On the other hand, many households store water in building storage tanks to cope with insufficient delivery of potable water due to frequent interruptions. All these practices could pose crucial risks to the chemical and microbiological quality of the water. However, consistent monitoring and implementation of mitigation strategies could lower the potential risks associated with these practices. It is critical to identify the potential hazards resulting from the alternative water supplies and distribution practices to develop temporary and long-term monitoring and mitigation plans and reduce the microbial and chemical contamination of potable water delivered to the consumers. This paper provides a holistic review of the significant hazards associated with the practices employed by the water utilities and water consumers to alleviate the potable water shortage and discusses the required monitoring and mitigation practices.

19. **Current and future threats to human health in the Anthropocene.** Tong S, Bambrick H, Beggs PJ, Chen L, Hu Y, Ma W, Steffen W, Tan J. Environ Int. 2022 Jan;158:106892. doi: 10.1016/j.envint.2021.106892. Epub 2021 Sep 25.
https://www.sciencedirect.com/science/article/pii/S0160412021005171
It has been widely recognised that the threats to human health from global environmental changes (GECs) are increasing in the Anthropocene epoch, and urgent actions are required to tackle these pressing challenges. A scoping review was conducted to provide an overview of the nine planetary boundaries and the threats to population health posed by human activities that are exceeding these boundaries in the Anthropocene. The research progress and key knowledge gaps were identified in this emerging field. Over the past three decades, there has been a great deal of research progress on health risks from climate change, land-use change and urbanisation, biodiversity loss and other GECs. However, several significant challenges remain, including the misperception of the relationship between human and nature; assessment of the compounding risks of GECs; strategies to reduce and prevent the potential health impacts of GECs; and uncertainties in fulfilling the commitments to the Paris Agreement. Confronting these challenges will require rigorous scientific research that is well-coordinated

across different disciplines and various sectors. It is imperative for the international community to work together to develop informed policies to avert crises and ensure a safe and sustainable planet for the present and future generations.

WE ACT

20. **Trends in National Institutes of Health Funding on the Health-Related Effects of Climate Change and Natural Disasters.** Ghosh AK, Shapiro MF, Abramson DM. J Gen Intern Med. 2022 Jan 3:1-3. doi: 10.1007/s11606-021-07223-4. Online ahead of print.
https://link.springer.com/article/10.1007/s11606-021-07223-4
Climate change represents one of the greatest challenges to humans this century. Heat waves and wildfires in the West, unseasonably cold weather leading to massive infrastructure failure in Texas, and the increasing frequency and destructiveness of hurricanes in the South underline this concerning phenomenon. Its widespread public health impact, particularly on vulnerable individuals, has been acknowledged at the highest levels of the federal government.1,2 Moreover, the health-related effects of climate change in general and natural disasters specifically are increasingly recognized, exacerbating risks from wide ranging conditions such as hypertension and depression, to infectious disease risk.3 However, scientific evidence to inform mitigation of the health-related effects of climate change and natural disasters is scant.

21. **Global priorities for climate change and mental health research.** Charlson F et al. Environ Int. 2022 Jan;158:106984. doi: 10.1016/j.envint.2021.106984. Epub 2021 Nov 20.
https://www.sciencedirect.com/science/article/pii/S0160412021006097
CONCLUSION: While climate change is considered the biggest threat to global mental health in the coming century, tackling this threat could be the most significant opportunity to shape our mental health for centuries to come because of health co-benefits of transitioning to more sustainable ways of living. Research on the impacts of climate change on mental health and mental health-related systems will assist decision-makers to develop robust evidence-based mitigation and adaptation policies and plans with the potential for broad benefits to society and the environment.

22. **Informed decision-making in delivery of dialysis: combining clinical outcomes with sustainability.** Apel C, Hornig C, Maddux FW, Ketchersid T, Yeung J, Guinsburg A. Clin Kidney J. 2021 Dec 27;14(Suppl 4):i98-i113. doi: 10.1093/ckj/sfab193. eCollection 2021 Dec.
https://academic.oup.com/ckj/article/14/Supplement_4/i98/6484929
As the prevalence of chronic kidney disease is expected to rise worldwide over the next decades, provision of renal replacement therapy (RRT), will further challenge budgets of all healthcare systems. Most patients today requiring RRT are treated with haemodialysis (HD) therapy and are elderly. This article demonstrates the interdependence of clinical and sustainability criteria that need to be considered to prepare for the future challenges of delivering dialysis to all patients in need. Newer, more sustainable models of high-value care need to be devised, whereby delivery of dialysis is based on value-based healthcare (VBHC) principles, i.e. improving patient outcomes while restricting costs. Essentially, this entails maximizing patient outcomes per amount of money spent or available. To bring such a

meaningful change, revised strategies having the involvement of multiple stakeholders (i.e. patients, providers, payers and policymakers) need to be adopted. Although each stakeholder has a vested interest in the value agenda often with conflicting expectations and motivations (or motives) between each other, progress is only achieved if the multiple blocs of the delivery system are advanced as mutually reinforcing entities. Clinical considerations of delivery of dialysis need to be based on the entire patient disease pathway and evidence-based medicine, while the non-clinical sustainability criteria entail, in addition to economics, the societal and ecological implications of HD therapy. We discuss how selection of appropriate modes and features of delivery of HD (e.g. treatment modalities and schedules, selection of consumables, product life cycle assessment) could positively impact decision-making towards value-based renal care. Although the delivery of HD therapy is multifactorial and complex, applying cost-effectiveness analyses for the different HD modalities (conventional in-centre and home HD) can support in guiding payability (balance between clinical value and costs) for health systems. For a resource intensive therapy like HD, concerted and fully integrated care strategies need to be urgently implemented to cope with the global demand and burden of HD therapy.

23. **Deploy heat officers, policies and metrics.** Keith L, Meerow S, Hondula DM, Turner VK, Arnott JC. Nature. 2021 Oct;598(7879):29-31. doi: 10.1038/d41586-021-02677-2.
https://www.nature.com/articles/d41586-021-02677-2
In June, the blistering 'heat dome' that sat for weeks over western states of North America saw temperatures soar 20 °C higher than average in some places. Lytton, a village in British Columbia, reached 49.6 °C smashing Canada's previous national high, before the town was destroyed by a wildfire (see Nature 595, 331–332; 2021). More than 1,000 people died from the heatwave across the region.

24. **Ambient air pollution and ovarian cancer survival in California.** Villanueva C, Chang J, Ziogas A, Bristow RE, Vieira VM. Gynecol Oncol. 2021 Oct;163(1):155-161. doi: 10.1016/j.ygyno.2021.07.036. Epub 2021 Jul 28.
https://www.clinicalkey.com/#!/content/playContent/1-s2.0-S0090825821006028
METHODS: Women diagnosed with epithelial ovarian cancer from 1996 to 2014 were identified through the California Cancer Registry and followed through 2016. Women's geocoded addresses were linked to pollutant exposure data and averaged over the follow-up period. Pollutants were considered independently and in multi-pollutant models. Cox proportional hazards models assessed hazards of disease-specific death due to environmental exposures, controlling for important covariates, with additional models stratified by stage at diagnosis, race/ethnicity and socioeconomic status.
RESULTS: PM2.5 and NO2, but not ozone or DTR, were significantly associated with survival in univariate models. In a multi-pollutant model for PM2.5, ozone, and DTR, an interquartile range increase in PM2.5 (Hazard Ratio [HR], 1.45; 95% Confidence Interval [CI], 1.41-1.49) was associated with worse prognosis. Similarly, in the multi-pollutant model with NO2, ozone, and DTR, women with higher NO2 exposures (HR for 20.0-30.0 ppb, 1.30; 95% CI, 1.25-1.36 and HR for >30.0 ppb, 2.48; 95% CI, 2.32-2.66) had greater mortality compared to the lowest exposed (<20.0 ppb). Stratified results show the effects of the pollutants differed by race/ethnicity and were magnified among women diagnosed in early stages.

CONCLUSIONS: Our analyses suggest that greater exposure to NO2 and PM2.5 may adversely impact ovarian cancer-specific survival, independent of sociodemographic and treatment factors. These findings warrant further study.

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Debate: Climate impacts on mental health - a youth perspective. Wright L, Rodgers A. Child Adolesc Ment Health. 2022 Jan 3. doi: 10.1111/camh.12541. Online ahead of print.

How researchers can help fight climate change in 2022 and beyond. Nature. 2022 Jan;601(7891):7. doi: 10.1038/d41586-021-03817-4.

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