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COVID-19

1. **On the emergence of a health-pollutant-climate nexus in the wake of a global pandemic.**
   VishnuRadhan R, Thresyamma DD, Eldho TI, Dhiman R, Bhavan SG. Environ Sci Pollut Res Int. 2021 Sep 14:1-13. doi: 10.1007/s11356-021-16392-y. Online ahead of print.
   https://link.springer.com/article/10.1007/s11356-021-16392-y
   COVID-19 has wreaked havoc throughout the planet within a short time frame, inducing substantial morbidity and mortality in the global population. The primary procedures commonly used to manage the pandemic can produce various environmental pollutants, primarily contaminants of emerging concern such as plastics, chemical disinfectants, and pharmaceutical waste. There is a huge influx of various environmental pollutants due to the pandemic effect. We, therefore, introduce the term "envirodemics" depicting the exacerbated surge in the amount of pandemic-induced pollutants. The general toxicity pattern of common chemical ingredients in widely used disinfectants shows negative impacts on the environment. We have identified some of the significant imprints of the pandemic on localizing the Sustainable Development Goals-environment interaction and their implications on achieving the goals in terms of environmental benefits. Climate change impacts are now widespread and have a profound effect on pollutant fluxes and distribution. The climate change signatures will impact the pandemic-induced enhanced fluxes of pollutants in the global waters, such as their transport and transformation. In this study, possible interactions and emerging pathways involving an emerging climate-health-pollutant nexus are discussed. The nexus is further elaborated by considering plastic as an example of an emerging pollutant that is produced in huge quantities as a by-product of COVID management and disaster risk reduction. Additionally, regulatory implications and future perspectives concerning the unleashed nexus are also discussed. We hope that this communication shall call for incisive investigations in the less explored realm concerning the health-pollutant-climate nexus.

2. **Air pollution impact on the Covid-19 mortality in Iran considering the comorbidity (obesity, diabetes, and hypertension) correlations.** Norouzi N, Asadi Z. Environ Res. 2021 Sep 9;204(Pt A):112020. doi: 10.1016/j.envres.2021.112020. Online ahead of print.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8426329/
Since the rise of the Covid-19 pandemic, several researchers stated the possibility of a positive relationship between Covid-19 spread and climatic parameters. An ecological study in 12 Iranian cities using the report of daily deaths from Covid-19 (March to August 2020) and validated data on air pollutants, considering average concentrations in each city in the last year used to analyze the association between chronic exposure to air pollutants and the death rate from Covid-19 in Iran. Poisson regression models were used, with generalized additive models and adjustment variables. A significant increase of 2.7% (IC(95%) 2.6-4.4) was found in the mortality rate due to Covid-19 due to an increase of 1 μg/m3 of NO2. The results suggest an association between Covid-19 mortality and NO2 exposure. As a risk approximation associated with air pollution, more precise analysis is done. The results also show a good consistency with studies from other regions; this paper's results can be useful for the public health policymakers and decision-making to control the Covid-19 spread.

3. **Long-term health impact of PM(2.5) under whole-year COVID-19 lockdown in China.** Hao X, Li J, Wang H, Liao H, Yin Z, Hu J, Wei Y, Dang R. Environ Pollut. 2021 Sep 6;290:118118. doi: 10.1016/j.envpol.2021.118118. Online ahead of print.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8419199/
The health impact of changes in particulate matter with an aerodynamic diameter <2.5 μm (PM2.5) pollution associated with the COVID-19 lockdown has aroused great interest, but the estimation of the long-term health effects is difficult because of the lack of an annual mean air pollutant concentration under a whole-year lockdown scenario. We employed a time series decomposition method to predict the monthly PM2.5 concentrations in urban cities under permanent lockdown in 2020. The premature mortality attributable to long-term exposure to ambient PM2.5 was quantified by the risk factor model from the latest epidemiological studies. Under a whole-year lockdown scenario, annual mean PM2.5 concentrations in cites ranged from 5.4 to 68.0 μg m-3, and the national mean concentration was reduced by 32.2% compared to the 2015-2019 mean. The Global Exposure Mortality Model estimated that 837.3 (95% CI: 699.8-968.4) thousand people in Chinese cities would die prematurely from illnesses attributable to long-term exposure to ambient PM2.5. Compared to 2015-2019 mean levels, 140.2 (95% CI: 122.2-156.0) thousand premature deaths (14.4% of the annual mean deaths from 2015 to 2019) attributable to long-term exposure to PM2.5 were avoided. Because PM2.5 concentrations were still high under the whole-year lockdown scenario, the health benefit is limited, indicating that continuous emission-cutting efforts are required to reduce the health risks of air pollution. Since a similar scenario may be achieved through promotion of electric vehicles and the innovation of industrial technology in the future, the estimated long-term health impact under the whole year lockdown scenario can establish an emission-air quality-health impact linkage and provide guidance for future emission control strategies from a health protection perspective.

4. **Impact of COVID-19 Lockdown Restrictions: Ambient NO2 and Asthma Hospital Admissions.** Quintyne KI, Kelly C, Sheridan A, Kenny P, O'Dwyer M. Ir Med J. 2021 Aug 19;114(7):413. Aim The World Health Organization (WHO) declared the COVID-19 pandemic a global health emergency. Many countries of the world, including Ireland, closed their borders and imposed nationwide lockdown. During this period, all major anthropogenic transport activities, which contribute to atmospheric pollution, were restricted. The current study examines the impact of the transport restrictions on ambient nitrogen dioxide (NO2) concentrations and hospital admissions for asthma across Ireland. Methods This is a retrospective population-based cohort study. National ambient air quality monitoring network data were analysed to investigation variations in NO2 concentrations. Asthma hospital admissions data were collected from the HSE Hospital In-patient Enquiry (HIPE) for Cork, Dublin, and Meath. Results During the period of transport restrictions, there were reductions in the annual mean NO2 for Cork, Dublin and Meath (i.e. 12µg/m3 to 11µg/m3 (p = 1); 25µg/m3 to 17µg/m3 (p < 0.001); and 23µg/m3 to 21µg/m3 (p = 1)). Reductions in asthma hospital admissions were also observed. Among the 8,471 patient episodes included in this study, the mean [SD] age at admission was 47.2[22.9] years; 61% were female (n=5,134); mean [SD] length of stay was 4.9[10.9] days. Conclusion The findings of this study provide an opportunity to explore the impact of NO2 emissions for Cork, Dublin and Meath on asthma hospital admissions, in order to improve air quality modelling and policy development of management of asthma.

5. **Interactions between two existential threats: COVID-19 and climate change.** Ebi KL, Bowen KJ, Calkins J, Chen M, Huq S, Nalau J, Palutikof JP, Rosenzweig C. Clim Risk Manag. 2021;34:100363. doi: 10.1016/j.crm.2021.100363. Epub 2021 Sep 6.
https://www.sciencedirect.com/science/article/pii/S2212096321000929
The COVID-19 pandemic and climate change are complex existential threats, unpredictable in many ways and unprecedented in modern times. There are parallels between the scale and scope of their impacts and responses. Understanding shared drivers, coupled vulnerabilities, and criteria for effective responses will help societies worldwide prepare for the simultaneous threats of climate change and future pandemics. We summarize some shared characteristics of COVID-19 and climate change impacts and interventions and discuss key policy implications and recommendations.

6. **Short-term associations of air pollution and meteorological variables on the incidence and severity of COVID-19 in Madrid (Spain): a time series study.** Linares C, Belda F, López-Bueno JA, Luna MY, Sánchez-Martínez G, Hervella B, Culqui D, Díaz J. Environ Sci Eur. 2021;33(1):107. doi: 10.1186/s12302-021-00548-1. Epub 2021 Sep 6.
https://enveurope.springeropen.com/articles/10.1186/s12302-021-00548-1
BACKGROUND: There are studies that analyze the role of meteorological variables on the incidence and severity of COVID-19, and others that explore the role played by air pollutants, but currently there are very few studies that analyze the impact of both effects together. This is the aim of the current study. We analyzed data corresponding to the period from February 1 to May 31, 2020 for the City of Madrid. As meteorological variables, maximum daily temperature (Tmax) in ºC and mean daily absolute humidity (AH) in g/m3 were used corresponding to the mean values recorded by all Spanish Meteorological Agency (AEMET) observatories in the

Madrid region. Atmospheric pollutant data for PM10 and NO2 in μg/m3 for the Madrid region were provided by the Spanish Environmental Ministry (MITECO). Daily incidence, daily hospital admissions per 100.000 inhabitants, daily ICU admissions and daily death rates per million inhabitants were used as dependent variables. These data were provided by the ISCIII Spanish National Epidemiology Center. Generalized linear models with Poisson link were performed between the dependent and independent variables, controlling for seasonality, trend and the autoregressive nature of the series.

RESULTS: The results of the single-variable models showed a negative association between Tmax and all of the dependent variables considered, except in the case of deaths, in which lower temperatures were associated with higher rates. AH also showed the same behavior with the COVID-19 variables analyzed and with the lags, similar to those obtained with Tmax. In terms of atmospheric pollutants PM10 and NO2, both showed a positive association with the dependent variables. Only PM10 was associated with the death rate. Associations were established between lags 12 and 21 for PM10 and between 0 and 28 for NO2, indicating a short-term association of NO2 with the disease. In the two-variable models, the role of NO2 was predominant compared to PM10.

CONCLUSIONS: The results of this study indicate that the environmental variables analyzed are related to the incidence and severity of COVID-19 in the Community of Madrid. In general, low temperatures and low humidity in the atmosphere affect the spread of the virus. Air pollution, especially NO2, is associated with a higher incidence and severity of the disease. The impact that these environmental factors are small (in terms of relative risk) and by themselves cannot explain the behavior of the incidence and severity of COVID-19.

Health Impacts of Climate Change

7. **Time: A Key Driver of Uncertainty When Assessing the Risk of Environmental Plastics to Human Health.** Halden RU, Rolsky C, Khan FR. Environ Sci Technol. 2021 Sep 14. doi: 10.1021/acs.est.1c02580. Online ahead of print.
https://pubs.acs.org/doi/10.1021/acs.est.1c02580
The "shadow" of plastic pollution looms large over environmental and human health research, but time is an overlooked variable as we attempt to understand, assess and mitigate the adverse impacts of synthetic polymer ubiquity. Plastic debris has infiltrated the environment to a level where we find it in air, water, soil, and food; yet, we still have only a rudimentary understanding of how environmental plastics affect human health. Here, we argue that time is the principal but currently underappreciated determinant that is impeding a reliable assessment of human health risks posed by environmental plastics. Time changes plastics, impacting both their physicochemical properties and their role as environmental toxicants, thereby creating a barrier to performing reliable risk assessment (Figure 1). However, the importance of time has yet to be realized and its impact integrated into the life-cycle and risk assessments of present-day plastic polymers.

8. **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. 2021 Sep 11;204(Pt A):112023. doi: 10.1016/j.envres.2021.112023. Online ahead of print.

INTRODUCTION: Understanding the latest global spatio-temporal pattern of lung cancer burden attributable to ambient fine particulate matter pollution (PM2.5) is crucial to prioritize global lung cancer prevention, as well as environment improvement.

METHODS: Data on lung cancer attributable to ambient PM2.5 were downloaded from the Global Burden of Disease Study (GBD) 2019. The numbers and age-standardized rates on lung cancer mortality (ASMR) and disability-adjusted life years (ASDR) were estimated by age, sex, region, and country. We used estimated annual percentage change (EAPC) to quantify the temporal trends of ASMR and ASDR from 1990 to 2019.

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.

9. **The impact of climate change and emerging infectious diseases on the blood supply.** Jacobs JW. Transfus Apher Sci. 2021 Sep 6:103272. doi: 10.1016/j.transci.2021.103272. Online ahead of print.
The blood supply is under constant threat from myriad infectious diseases, evidenced by the devastating consequences wrought by hepatitis and human immunodeficiency virus (HIV) during the mid-to-late 20th century. More recently, malaria, West Nile, and Zika have influenced the blood donation and infectious disease screening process. For the previous 18 months, attention has focused on COVID-19 as the most recent possible transfusion-transmitted infection. Fortunately, there is no evidence that this disease is transmitted via blood transfusion. Nevertheless, these examples illustrate the ever-present risk of the introduction of new or unknown pathogens into the blood supply.

10. **Long-Term Exposures to Air Pollution and the Risk of Atrial Fibrillation in the Women's Health Initiative Cohort.** Hart JE, Hohensee C, Laden F, Holland I, Whitsel EA, Wellenius GA, Winkelmayer WC, Sarto GE, Warsinger Martin L, Manson JE, Greenland P, Kaufman J, Albert C, Perez MV. Environ Health Perspect. 2021 Sep;129(9):97007. doi: 10.1289/EHP7683. Epub 2021 Sep 15.

BACKGROUND: Atrial fibrillation (AF) is associated with substantial morbidity and mortality. Short-term exposures to air pollution have been associated with AF triggering; less is known regarding associations between long-term air pollution exposures and AF incidence.
OBJECTIVES: Our objective was to assess the association between long-term exposures to air pollution and distance to road on incidence of AF in a cohort of U.S. women.
METHODS: We assessed the association of high resolution spatiotemporal model predictions of long-term exposures to particulate matter (PM10 and PM2.5), sulfur dioxide (SO2), nitrogen dioxide (NO2), and distance to major roads with incidence of AF diagnosis, identified through Medicare linkage, among 83,117 women in the prospective Women's Health Initiative cohort, followed from enrollment in Medicare through December 2012, incidence of AF, or death. Using time-varying Cox proportional hazards models adjusted for age, race/ethnicity, study component, body mass index, physical activity, menopausal hormone therapy, smoking, diet quality, alcohol consumption, educational attainment, and neighborhood socioeconomic status, we estimated the relative risk of incident AF in association with each pollutant.
RESULTS: A total of 16,348 incident AF cases were observed over 660,236 person-years of follow-up. Most exposure-response associations were nonlinear. NO2 was associated with risk of AF in multivariable adjusted models [Hazard Ratio (HR) = 1.18; 95% confidence interval (CI): 1.13, 1.24, comparing the top to bottom quartile, p-for-trend = < 0.0001]. Women living closer to roadways were at higher risk of AF (e.g., HR = 1.07; 95% CI: 1.01, 1.13 for living within 50 m of A3 roads, compared with ≥ 1,000 m, p-for-trend = 0.02), but we did not observe adverse associations with exposures to PM10, PM2.5, or SO2. There were adverse associations with PM10 (top quartile HR = 1.10; 95% CI: 1.05, 1.16, p-for-trend = < 0.0001) and PM2.5 (top quartile HR = 1.09; 95% CI: 1.03, 1.14, p-for-trend = 0.002) in sensitivity models adjusting for census region.
DISCUSSION: In this study of postmenopausal women, NO2 and distance to road were consistently associated with higher risk of AF. https://doi.org/10.1289/EHP7683.

11. **Long-term air pollution exposure and decreased kidney function: A longitudinal cohort study in Bangkok Metropolitan Region, Thailand from 2002 to 2012.** Paoin K, Ueda K, Vathesatogkit P, Ingviya T, Buya S, Dejchanchaiwong R, Phosri A, Seposo XT, Kitiyakara C, Thongmung N, Honda A, Takano H, Sritara P, Tekasakul P. Chemosphere. 2021 Sep 1;287(Pt 1):132117. doi: 10.1016/j.chemosphere.2021.132117. Online ahead of print.
https://www.sciencedirect.com/science/article/pii/S0013935120312275
BACKGROUND: Kidney dysfunction is considered a cardiovascular risk factor. However, few longitudinal studies have examined the effects of air pollution on kidney function. We evaluated associations between long-term air pollution exposure and estimated glomerular filtration rate (eGFR) using data from a cohort of the Electricity Generating Authority of Thailand (EGAT) study in Bangkok Metropolitan Region, Thailand.
METHODS: This longitudinal study included 1839 subjects (aged 52-71 years in 2002) from the EGAT1 cohort study during 2002-2012. eGFR, based on creatinine, was measured in 2002, 2007, and 2012. Annual mean concentrations of air pollutants (i.e., particulate matter with an aerodynamic diameter ≤10 μm (PM10), ozone (O3), nitrogen dioxide (NO2), sulfur dioxide (SO2), and carbon monoxide (CO)) prior to a measurement of creatinine were assessed with the ordinary kriging method. Mixed-effect linear regression models were used to assess

associations between air pollutants and eGFR, while controlling for potential covariates. eGFR values are expressed as percent change per interquartile range (IQR) increments of each pollutant.

RESULTS: Lower eGFR was associated with higher concentrations of PM10 (-1.99%, 95% confidence interval (CI): -3.33, -0.63), SO2 (-4.89%, 95%CI: -6.69, -3.07), and CO (-0.97%, 95%CI: -1.96, 0.03). However, after adjusting for temperature, relative humidity, PM10, and SO2, no significant association was observed between CO and eGFR.

CONCLUSIONS: Our findings support the hypothesis that long-term exposure to high concentrations of PM10 and SO2 is associated with the progression of kidney dysfunction in subjects of the EGAT cohort study.

12. **Ambient Air Pollution and Long-Term Trajectories of Episodic Memory Decline among Older Women in the WHIMS-ECHO Cohort.** Wang X, Younan D, Petkus AJ, Beavers DP, Espeland MA, Chui HC, Resnick SM, Gatz M, Kaufman JD, Wellenius GA, Whitsel EA, Manson JE, Chen JC. Environ Health Perspect. 2021 Sep;129(9):97009. doi: 10.1289/EHP7668. Epub 2021 Sep 13.
https://ehp.niehs.nih.gov/doi/full/10.1289/EHP7668

BACKGROUND: Episodic memory decline varies by age and underlying neuropathology. Whether ambient air pollution contributes to the heterogeneity of episodic memory decline in older populations remains unclear.

OBJECTIVES: We estimated associations between air pollution exposures and episodic memory decline according to pollutant, exposure time window, age, and latent class subgroups defined by episodic memory trajectories.

METHODS: Participants were from the Women's Health Initiative Memory Study-Epidemiology of Cognitive Health Outcomes. Older women (n = 2,056; 74-92 years of age) completed annual (2008-2018) episodic memory assessments using the telephone-based California Verbal Learning Test (CVLT). We estimated 3-y average fine particulate matter [PM with an aerodynamic diameter of ≤ 2.5 µm (PM2.5)] and nitrogen dioxide (NO2) exposures at baseline and 10 y earlier (recent and remote exposures, respectively), using regionalized national universal kriging. Separate latent class mixed models were used to estimate associations between interquartile range increases in exposures and CVLT trajectories in women ≤ 80 and > 80 years of age, adjusting for covariates.

RESULTS: Two latent classes were identified for women ≤ 80 years of age (n = 828), "slow-decliners" {slope = - 0.12/y [95% confidence interval (CI): - 0.23, - 0.01] and "fast-decliners" [slope = - 1.79/y (95% CI: - 2.08, - 1.50)]}. In the slow-decliner class, but not the fast-decliner class, PM2.5 exposures were associated with a greater decline in CVLT scores over time, with a stronger association for recent vs. remote exposures [- 0.16/y (95% CI: - 2.08, - 0.03) per 2.88 µg/m3 and - 0.11/y (95% CI: - 0.22, 0.01) per 3.27 µg/m3, respectively]. Among women ≥ 80 years of age (n = 1,128), the largest latent class comprised "steady-decliners" [slope = - 1.35/y (95% CI: - 1.53, - 1.17)], whereas the second class, "cognitively resilient", had no decline in CVLT on average. PM2.5 was not associated with episodic memory decline in either class. A 6.25-ppb increase in recent NO2 was associated with nonsignificant acceleration of episodic memory decline in the ≤ 80-y-old fast-decliner class [- 0.21/y (95% CI: - 0.45, 0.04)], and in the > 80-y-old cognitively resilient class [- 0.10/y (95% CI: - 0.24, 0.03)] and steady-decliner class [- 0.11/y (95% CI: - 0.27, 0.05)]. Associations with recent NO2 exposure in women > 80 years of

age were stronger and statistically significant when 267 women with incident probable dementia were excluded [e.g., - 0.12/y (95% CI: - 0.22, - 0.02) for the cognitively resilient class]. In contrast with changes in CVLT over time, there were no associations between exposures and CVLT scores during follow-up in any subgroup.

DISCUSSION: In a community-dwelling U.S. population of older women, associations between late-life exposure to ambient air pollution and episodic memory decline varied by age-related cognitive trajectories, exposure time windows, and pollutants.

https://doi.org/10.1289/EHP7668.

WE ACT

13. **Sustainable food systems and nutrition in the 21st century: A report from the 22nd annual Harvard nutrition obesity symposium.** Fanzo J, Rudie C, Sigman I, Grinspoon S, Benton TG, Brown ME, Covic N, Fitch K, Golden CD, Grace D, Hivert MF, Huybers P, Jaacks LM, Masters WA, Nisbett N, Richardson RA, Singleton CR, Webb P, Willett WC. Am J Clin Nutr. 2021 Sep 15:nqab315. doi: 10.1093/ajcn/nqab315. Online ahead of print.
https://academic.oup.com/ajcn/advance-article/doi/10.1093/ajcn/nqab315/6370594
Food systems are at the center of a brewing storm consisting of a rapidly changing climate, rising hunger and malnutrition and significant social inequits. At the same time, there are vast opportunities to ensure that food systems produce healthy and safe food in equitable ways that promote environmental sustainability, especially if the world can come together at the UN Food Systems Summit in late 2021 and make strong and binding commitments towards food system transformation. The NIH-funded Nutrition Obesity Research Center at Harvard and the Harvard Medical School Division of Nutrition held their 22nd Annual Harvard Nutrition Obesity Symposium entitled "Global Food Systems and Sustainable Nutrition in the 21st Century" in June 2021. This paper presents a synthesis of this symposium and highlights the importance of food systems to address the burden of malnutrition and non-communicable diseases, climate change, and the economic and social inequits. Transformation of food systems is possible, and the nutrition and health communities have a significant role to play in this transformative process.

14. **Pro-environmental habits: An underexplored research agenda in sustainability science.** Linder N, Giusti M, Samuelsson K, Barthel S. Ambio. 2021 Sep 14. doi: 10.1007/s13280-021-01619-6. Online ahead of print.
https://link.springer.com/article/10.1007/s13280-021-01619-6
Habits are the fundamental basis for many of our daily actions and can be powerful barriers to behavioural change. Still, habits are not included in most narratives, theories, and interventions applied to sustainable behaviour. One reason societies struggle to reach policy goals and people fail to change towards more pro-environmental lifestyles might be that many behaviours are now bound by strong habits that override knowledge and intentions to act. In this perspective article, we provide three arguments for why pro-environmental habits are a needed research agenda in sustainability science: (1) habit theory highlights how behaviour is heavily reliant on automatic processes, (2) the environmental context sets boundary conditions for behaviour, shape habits, and cues action responses, and (3) our habits and past behaviour shape our

values and self-identity. These arguments highlight the transformative potential of looking at sustainable behaviours through a habit lens. We believe a research agenda on pro-environmental habits could generate a more holistic understanding of sustainable behaviours and complement today's dominating approaches which emphasize reasoned decisions and intrinsic motivations such as values, norms, and intentions to understand and predict pro-environmental behaviour. We highlight evident knowledge gaps and practical benefits of considering habit theory to promote pro-environmental behaviours, and how habit architecture could be utilized as a strong leverage point when designing, modifying, and building urban environments.

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News & Commentary

Why air pollution is an important issue for all nurses. Waterall J, Rhodes D, Exley K. Br J Nurs. 2021 Sep 9;30(16):982-983. doi: 10.12968/bjon.2021.30.16.982.

Transformational ecology and climate change. Jackson ST. Science. 2021 Sep 3;373(6559):1085-1086. doi: 10.1126/science.abj6777. Epub 2021 Sep 1.

Pivotal climate summit dogged by COVID and equity concerns. Tollefson J. Nature. 2021 Sep;597(7876):315. doi: 10.1038/d41586-021-02465-y.

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