

## Environmental Stewardship Resource Desk

#44 | 12.8.2021 to 12.14.2021

Prepared by [System Library Services](#)

Visit the [Environmental Stewardship site](#)

---

### New Research

[Environmental Stewardship publications by Providence caregivers – see Digital Commons](#)

#### COVID-19

1. **Considering ecological determinants of youth mental health in the era of COVID-19 and the Anthropocene: A call to action from young public health professionals.** Oswald TK, Langmaid GR. Health Promot J Austr. 2021 Dec 2. doi: 10.1002/hpja.560. Online ahead of print.

<https://onlinelibrary.wiley.com/doi/10.1002/hpja.560>

In 2019, young Australians reported that two of their top concerns were 'climate change and the environment' and 'mental health'. The events of 2020/2021, such as the ongoing climate emergency, the Australian bushfires, and the COVID-19 pandemic, reflect the human-induced environmental issues young people are most worried about and have also exacerbated the mental health issues which they already reported to be at a crisis point back in 2019. Given experiences of mental illness in adolescence are associated with poorer mental health across the lifespan, it is becoming increasingly important to address ecological determinants of youth mental health in the Anthropocene. However, despite the inclusion of ecological determinants of health in seminal health promotion frameworks, health promotion has been described as 'ecologically blind', emphasising social determinants of health at the expense of ecological determinants of health. A socio-ecological model, which equally considers upstream social and ecological factors, should be applied to youth mental health issues. Using the Ottawa Charter for Health Promotion, we demonstrate how the ecological determinants of health may be incorporated into health promotion approaches targeting youth mental health. We also call for the health promotion sector to consider a number of actions to work towards achieving a transition to ecological determinants of health being at the forefront of health promotion activities. This commentary, written by young public health professionals, hopes to build on the momentum garnered by youth activists around the world and bring attention to the importance of ecological determinants of health for youth mental health promotion in the era of COVID-19 and the Anthropocene.

2. **Association of air pollution and meteorological variables with the two waves of COVID-19 pandemic in Delhi: A critical analysis.** Dutta A, Dutta G. Heliyon. 2021 Nov;7(11):e08468. doi: 10.1016/j.heliyon.2021.e08468. Epub 2021 Nov 24.

<https://www.sciencedirect.com/science/article/pii/S2405844021025718>

Various countries across the globe have been affected by different COVID-19 waves at different points in time and with varying levels of virulence. With the backdrop of the two COVID-19 waves that broke out in Delhi, this study examines the variations in the concentrations of criteria pollutants, air quality, and meteorological variables across the waves and their influence on COVID-19 morbidity/mortality. Descriptive statistics, violin plots, and Spearman rank correlation tests were employed to assess the variations in environmental parameters and investigate their associations with COVID-19 incidence under the two waves. The susceptible-infected-recovered model and multiple linear regression were used to assess the wave-wise basic reproduction number ( $R_0$ ) and infection spreading trajectory of the virus. Our results show that the first wave in Delhi had three successive peaks and valleys, and the first peak of the second wave was the tallest, indicating the severity of per-day infection cases. During the analysed period (April 2020 and April 2021), concentrations of criteria pollutants varied across the waves, and air pollution was substantially higher during the second wave. In addition, the results revealed that during the second wave,  $NO_2$  maintained a significant negative relationship with COVID-19 (cases per day), while  $SO_2$  had a negative relationship with COVID-19 (cumulative cases) during the first wave. Our results also show a significant positive association of  $O_3$  with COVID-19 deaths during the first wave and cumulative cases and deaths during the second wave. The study indicates that a higher relative humidity in Delhi had a negative relation with COVID-19 cumulative cases and mortality during the first wave. The study confirms that the estimated  $R_0$  was marginally different during the two waves, and the spread of COVID-19 new cases followed a cubic growth trajectory. The findings of this study provide valuable information for policymakers in handling COVID-19 waves in various cities.

### Health Impacts of Climate Change

3. **Managing climate change risks is imperative for human health.** Ebi KL. Nat Rev Nephrol. 2021 Dec 3:1-2. doi: 10.1038/s41581-021-00523-2. Online ahead of print.

<https://www.nature.com/articles/s41581-021-00523-2>

Climate change is already causing preventable injuries, illnesses and deaths; the health burden is projected to increase with each additional unit of warming. Our short-term future will be characterized by increasingly frequent and intense extreme weather and climate events, for which communities are ill-prepared. Indicators of the impacts of and responses to climate change provide a clear imperative for reducing greenhouse gas emissions and increasing the sustainability and climate resilience of health systems. Current investments in research and building climate-resilient health systems are insufficient to effectively manage increasing health risks. The economic value of the health benefits of policies to mitigate climate change exceeds the estimated costs of mitigation.

4. **Air pollution impairs endothelial function and blood pressure.** Parsanathan R, Palanichamy R. Hypertens Res. 2021 Dec 2. doi: 10.1038/s41440-021-00807-x. Online ahead of print.

According to the World Health Organization (WHO), ≈91% of people worldwide live in hazardous surroundings with air quality levels that exceed WHO guidelines. Every year, ≈7 million people worldwide die prematurely from noncommunicable diseases as a result of air pollution, which is a global public health issue [1], and the WHO estimated that 4.2 million people die each year from stroke, heart disease, lung cancer, and chronic respiratory disorders as a result of air pollution. Airborne particulate matter (PM) is a mixture of several chemical substances rather than a single pollutant. Combustion, such as that from diesel engines, industry, indoor culinary activities, and bushfires, is the main sources of PM [2]. Air pollution is increasingly being recognized as an independent risk factor for cardiovascular morbidity and mortality.

5. **Association of meteorological factors and ambient air pollution on medical care utilization for urolithiasis: a population-based time-series study.** Noh TI, Hong J, Kang SH, Jung J. *BMC Nephrol.* 2021 Dec 2;22(1):402. doi: 10.1186/s12882-021-02614-5.

<https://bmcnephrol.biomedcentral.com/articles/10.1186/s12882-021-02614-5>

**RESULTS:** Urolithiasis was significantly associated with average temperature, diurnal temperature range, sunshine duration, particulate matter (PM)  $\leq 2.5 \mu\text{m}$ , and carbon monoxide (CO) levels. The incidence of ureteral stones was positively correlated with average temperature, PM  $\leq 2.5 \mu\text{m}$  level, and CO level (time lags 0-9, 2-4, and 0-9 days, respectively). The incidence of renal stones was positively correlated with PM  $\leq 2.5 \mu\text{m}$  and CO levels (time lags 2-4 and 0-9 days, respectively). PM  $\leq 2.5 \mu\text{m}$  (0.05 and 0.07% per  $10 \mu\text{g}/\text{m}^3$ ) and CO (2.05 and 2.25% per 0.1 ppm) conferred the highest excess risk on ureteral and renal stones. **CONCLUSIONS:** Urolithiasis is affected by various meteorological factors and ambient air pollutants, PM  $\leq 2.5 \mu\text{m}$ , and CO levels may be novel potential risk factors for this condition.

6. **Ambient air pollution and hospitalization for chronic obstructive pulmonary disease: Benefits from Three-Year Action Plan.** Lu W, Tian Q, Xu R, Qiu L, Fan Z, Wang S, Liu T, Li J, Li Y, Wang Y, Shi C, Liu Y, Zhou Y. *Ecotoxicol Environ Saf.* 2021 Nov 30;228:113034. doi: 10.1016/j.ecoenv.2021.113034. Online ahead of print.

<https://www.sciencedirect.com/science/article/pii/S0147651321011465>

**BACKGROUND:** Chronic obstructive pulmonary disease (COPD) hospitalization has been linked with ambient air pollution. However, the evidence on respiratory health benefits from air pollution control policy in China is limited.

**OBJECTIVE:** To investigate benefits from the Three-Year Action Plan to Win the Battle for a Blue Sky (TYAP) for tackling COPD hospitalization due to ambient air pollution.

**METHODS:** We conducted a time-stratified case-crossover study of 138,015 COPD hospitalizations aged  $\geq 60$  years in Guangdong province, China during 2016-2019 to investigate respiratory health benefits from TYAP. Inverse distance weighting method was used to assess daily individual-level exposures to ambient air pollutants including particulate matter with an aerodynamic diameter  $\leq 2.5 \mu\text{m}$  (PM<sub>2.5</sub>), particulate matter with an aerodynamic diameter  $\leq 10 \mu\text{m}$  (PM<sub>10</sub>), sulfur dioxide (SO<sub>2</sub>), nitrogen dioxide (NO<sub>2</sub>), carbon monoxide (CO), and ozone (O<sub>3</sub>). Conditional logistic regression model was applied to analyze the associations between ambient air pollutants and COPD hospitalization.

RESULTS: TYAP can modify the associations. Each 10  $\mu\text{g}/\text{m}^3$  increase of exposure to PM<sub>2.5</sub>, PM<sub>10</sub>, and NO<sub>2</sub> and 1 mg/m<sup>3</sup> increase of exposure to CO were significantly associated with 2.5%, 2.0%, 3.0%, and 14.4% increase in odds of COPD hospitalization before TYAP, respectively; while 1.0%, 0.9%, 1.5%, and 5.8% increase in odds during TYAP. We found prominent declines in health burden of COPD hospitalizations due to air pollution among the elderly after TYAP implication when compared with that before TYAP.

CONCLUSION: Reduced levels of ambient air pollutants by TYAP can effectively lower the risk for COPD hospitalization among the elderly, which provides evidence on the respiratory health benefits from consistent and effective air pollution control policy.

- 7. Excess Morbidity and Mortality Associated with Air Pollution above American Thoracic Society Recommended Standards, 2017-2019.** Cromar KR, Gladson LA, Hicks EA, Marsh B, Ewart G. *Ann Am Thorac Soc.* 2021 Nov 30. doi: 10.1513/AnnalsATS.202107-860OC. Online ahead of print.

Rationale: Over the past year, the American Thoracic Society (ATS), led by its Environmental Health Policy Committee, has reviewed the most current air quality scientific evidence and has revised their recommendations to 8  $\mu\text{g}/\text{m}^3$  and 25  $\mu\text{g}/\text{m}^3$  for long- and short-term fine particulate matter (PM<sub>2.5</sub>) and reaffirmed the recommendation of 60 ppb for ozone to protect the American public from the known adverse health effects of air pollution. The current EPA standards, in contrast, expose the American public to pollution levels that are known to result in significant morbidity and mortality. Objectives: To provide county-level estimates of annual air pollution-related health outcomes across the United States using the most recent federal air quality data, and to support the ATS's recent update to the long-term PM<sub>2.5</sub> recommended standard. This study is presented as part of the annual ATS/Marron Institute "Health of the Air" report. Methods: Daily air pollution values were obtained from the U.S. Environmental Protection Agency's (EPA) Air Quality System for monitored counties in the United States from 2017-2019. Concentration-response functions used in the EPA's regulatory review process were applied to pollution increments corresponding to differences between the rolling 3-year design values and ATS-recommended levels for long-term PM<sub>2.5</sub> (8  $\mu\text{g}/\text{m}^3$ ), short-term PM<sub>2.5</sub> (25  $\mu\text{g}/\text{m}^3$ ), and ground-level ozone (O<sub>3</sub>; 60 ppb). Health impacts were estimated at the county level in locations with valid monitoring data. Results: Meeting ATS recommendations throughout the country prevents an estimated 14,650 (95% CI: 8,660 - 22,610) deaths; 2,950 (95% CI: 1,530 - 4,330) lung cancer incidence events; 33,100 (95% CI: 7,300 - 71,000) morbidities, and 39.8 million (95% CI: 14.6 - 63.3 million) impacted days annually (see Table 1). This prevents 11,850 more deaths; 2,580 more lung cancer incidence events; 25,400 more morbidities; and 27.2 million more impacted days than meeting EPA standards alone. Conclusions: Significant health benefits to be gained by U.S. communities that work to meet ATS-recommended air quality standards have now been identified under scenarios meeting the new ATS recommendation for long-term PM<sub>2.5</sub> (8  $\mu\text{g}/\text{m}^3$ ). The "Health of the Air" report presents an opportunity for air quality managers to quantify local health burdens and EPA officials to update their standards to reflect the latest science.

8. **Prenatal ambient air pollution and maternal depression at 12 months postpartum in the MADRES pregnancy cohort.** Bastain TM et al. *Environ Health*. 2021 Nov 27;20(1):121. doi: 10.1186/s12940-021-00807-x.  
<https://ehjournal.biomedcentral.com/articles/10.1186/s12940-021-00807-x>  
CONCLUSIONS: In a low-income cohort consisting of primarily Hispanic/Latina women in urban Los Angeles, we found that prenatal ambient air pollution, especially mid-pregnancy NO<sub>2</sub> and PM<sub>2.5</sub>, increased the risk of depression at 12 months after childbirth. These results underscore the need to better understand the contribution of modifiable environmental risk factors during potentially critical exposure periods.
9. **The health effects of traffic-related air pollution: A review focused the health effects of going green.** Bai X, Chen H, Oliver BG. *Chemosphere*. 2021 Nov 26:133082. doi: 10.1016/j.chemosphere.2021.133082. Online ahead of print.  
Traffic-related air pollution (TRAP) is global concern due to both the ecological damage of TRAP and the adverse health effects in Humans. Several strategies to reduce TRAP have been implemented, including the use of sustainable fuels, after-treatment technologies, and new energy vehicles. Such approaches can reduce the exhaust of particulate matter, adsorbed chemicals and a range of gases, but from a health perspective these approaches are not always successful. This review aims to discuss the approaches taken, and to then describe the likely health effects of these changes.

## WE ACT

10. **Thermal performance of energy-efficient buildings for sustainable development.** Vijayan DS, Sivasuriyan A, Patchamuthu P, Jayaseelan R. *Environ Sci Pollut Res Int*. 2021 Nov 30. doi: 10.1007/s11356-021-17602-3. Online ahead of print.  
Thermal performance of civil structure has turned out to be a demanding application in civil engineering and architecture. Thermal comfort (heating, ventilation, air cooling, airtightness, fabric performance) in buildings keeps the occupants energetic and positive. The study's objective is to maintain residents' comfort levels in their homes in the elimination of heat and humidity. Therefore, findings indicate that it is necessary to design a structure according to thermal comfort, decrease in carbon emission, air flows, electricity control, fuel, etc. This article provides detailed information about civil engineering structures' excellent and bad thermal performance, including buildings like residential, commercial, and educational institutions. This article provides an incisive assessment of the thermal performance, thermal comfort, thermal resistance, and thermal sensation of residential, commercial, and educational structures. The article contains in-depth information as well as case studies on how to improve indoor air quality and energy efficiency. Additionally, the topic of building energy consumption is discussed. The use of thermal performance of various building in various climatic circumstances has been discussed extensively in the works provided. A building's thermal performance determines how quickly heat enters the building and how quickly it is warmed. Heat travels faster through a poorly performing building, and the interior temperature is ultimately dependent on external temperature and climate changes. The thermal performance of

different types of buildings such as residential, commercial, and educational buildings was analyzed in this study.

11. **What's Next in Design for Global Health? How Design and Global Health Must Adapt for a Preferable Future.** Chauhan A, Donaldson K, Santos A, Ngigi M. *Glob Health Sci Pract.* 2021 Nov 29;9(Suppl 2):S283-S294. doi: 10.9745/GHSP-D-21-00280. Print 2021 Nov 29.

[https://www.ghspjournal.org/content/9/Supplement\\_2/S283](https://www.ghspjournal.org/content/9/Supplement_2/S283)

Integrating the practice of design with global health offers a way to ensure that all voices—from patients to policy makers—are all heard in conceiving and developing solutions that address the current misalignments and support efforts to make quality health care more affordable, accessible, and humanized for all.

12. **'Green podiatry' - reducing our carbon footprints. Lessons from a sustainability panel.** Evans AM. *J Foot Ankle Res.* 2021 Nov 29;14(1):59. doi: 10.1186/s13047-021-00497-1.

<https://jfootankleres.biomedcentral.com/articles/10.1186/s13047-021-00497-1>

BACKGROUND: The eyes of the world will be on COP26 as it meets in Glasgow in November, 2021. Our planet is displaying weather extremes due to climate change which cannot be ignored, and which are deleterious for people's health. Ironically, healthcare contributes to climate change, contributing approximately 5% of carbon emissions globally. Climate change due to global warming is 'the biggest global health threat of the 21st century'.

MAIN BODY: The Australian Podiatry Association conference held a sustainability panel, hearing perspectives of industry and science, medicine and sport, fashion, and retail. Content unified a broad planet and human health message, which is highly relevant for podiatrists. Key themes included waste as a resource, exercise as evidence-based intervention, responsibility and circular economy recycling principles for end-of-life product (footwear) purchases, and wider ethical considerations of footwear and clothing. The Anthropocene origin of climate change requires humanity to collaborate and to live more sustainably. Innovation is essential for better energy modes, cleaner air, human health and earth care. Green Podiatry joins the concerted activity of medical and health groups within Australia. The UK's NHS is an exemplar in this area, having already reduced healthcare emissions by 35%, and aiming for net zero by 2045, and perhaps sooner.

CONCLUSION: People are increasingly concerned about climate change, and COP26 is an important and imminent meeting for human and planet health. This commentary on Green Podiatry directs us all to lighten our carbon footprint. A final, and forthcoming commentary will outline practical ways of positively incorporating climate change communication into the clinical setting.

13. **Can Clinical Ethics Survive Climate Change?** Jameton A, Pierce J. *Perspect Biol Med.* 2021;64(4):511-540. doi: 10.1353/pbm.2021.0039.

The Ethics of Environmentally Responsible Health Care (2004) argued that the obligation to protect nature must be a core principle of bioethics and that the environmental harm of health-care practices should be taken seriously. In the two decades since, the accelerating pace of climate change and environmental decline has strengthened the moral case for reducing the environmental costs of health care. Nevertheless, mainstream bioethics has until recently



neglected these vital issues. In response, a field of clinical environmental bioethics is emerging that applies concepts and measures of sustainability to such key clinical ethical issues as humanizing technology, setting limits, caring for the dying, respecting patient wishes, and allocating resources justly. Bioethical analysis of these and other issues can support just and humane health-care adaptation to climate change. Health-care adaptation in turn plays an important role in helping communities and nations adapt to the inevitable forward march of climate change. This essay offers two recommendations: (1) establish a climate transition commission for health-care adaptation to climate change with bioethics participation, and (2) strengthen advocacy for health-care reform by uniting it with climate activism.

---

[Lancet Planetary Health](#) – open-access, interdisciplinary journal focused on sustainability

## News

[What humanity should eat to stay healthy and save the planet.](#) Vaidyanathan G. Nature. 2021 Dec;600(7887):22-25. doi: 10.1038/d41586-021-03565-5.

[What's the best diet for people and the planet?](#) Thompson B, Petrić Howe N. Nature. 2021 Dec 1. doi: 10.1038/d41586-021-03601-4. Online ahead of print.

[COP26 and the climate crisis: How can plastic surgeons do their bit?](#) de Berker HT, Bedford JD. J Plast Reconstr Aesthet Surg. 2021 Nov 15:S1748-6815(21)00592-1. doi: 10.1016/j.bjps.2021.11.048. Online ahead of print.

[Pollution and the developing brain.](#) Landrigan P, Grandjean P. Lancet. 2021 Nov 27;398(10315):1961. doi: 10.1016/S0140-6736(21)02393-X.

[Maternal exposure to air pollution may increase the risk of hyperbilirubinemia in her newborn.](#) Nelin T, Burris HH. J Pediatr. 2021 Nov 24:S0022-3476(21)01156-2. doi: 10.1016/j.jpeds.2021.11.057. Online ahead of print.

[Greater action on climate change by physicians needed.](#) Roy M. CMAJ. 2021 Nov 29;193(47):E1818. doi: 10.1503/cmaj.80289.

---

If you would like to receive a **customized Environmental Stewardship Topic Alert** related to your specialty or area of interest, would like a **literature search** conducted, or have difficulty **accessing** any of the above articles please contact us at [librarian@providence.org](mailto:librarian@providence.org)

Find previous weeks [here](#).