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COVID-19

1. **The effect of air pollution on Covid-19 severity in a sample of patients with Multiple Sclerosis.** Bergamaschi R et al. Eur J Neurol. 2021 Nov 4. doi: 10.1111/ene.15167. Online ahead of print. https://onlinelibrary.wiley.com/doi/abs/10.1111/ene.15167
   RESULTS: We included 1087 patients, of whom 13% required hospitalization and 2% were admitted to intensive care unit or died. Based on the multivariate analysis, higher concentrations of PM2.5 increased the risk of worst Covid-19 course (OR=1.90; p=0.009). CONCLUSIONS: Even if several other factors explain the unfavorable course of Covid-19 in PwMS, the role of air pollutants must be considered and further investigated.

2. **Short-term air pollution exposure and COVID-19 infection in the United States.** Xu L, Taylor JE, Kaiser J. Environ Pollut. 2021 Nov 2:118369. doi: 10.1016/j.envpol.2021.118369. Online ahead of print.
   https://www.sciencedirect.com/science/article/pii/S0269749121019515
   In this study, we conduct a nationwide analysis to examine the association between short-term air pollution exposure and COVID-19 infection in the United States. Daily confirmed cases, air pollution information, and meteorological factors at the county level were collected between March 1st and June 30th, 2020. A total of 806 (out of 3143) counties were included in this study, with 554 counties for PM2.5, 670 counties for ozone (O3), and 418 counties for both, accounting for around 2.1 million cumulative confirmed cases. This accounts for about 80% of all confirmed cases in the U.S. over the study period. A generalized additive model was applied to investigate the relationship between short-term exposure to PM2.5/O3 and COVID-19 confirmed cases. The statistically significant results indicate that, with every 10 μg/m3 increase in mean pollutant concentration, the number of daily confirmed cases increases by 9.41% (CI: 8.77%-10.04%) for PM2.5 and by 2.42% (CI: 1.56%-3.28%) for O3. The relative risks associated with short-term PM2.5 exposure remain positive after isolating the impacts of long-term exposure. The findings of this study suggest that short-term exposure to air pollution, especially

to PM2.5, is likely contributing to the spread and course of the pandemic. This finding has important implications for policymakers and the public to take preventive measures such as staying at home on polluted days while improving ventilation indoors to lower the probability of infection.

Health Impacts of Climate Change

3. **Environmental Exposures and Lung Aging: Molecular Mechanisms and Implications for Improving Respiratory Health.** Eckhardt CM, Wu H. Curr Environ Health Rep. 2021 Nov 4:1-13. doi: 10.1007/s40572-021-00328-2. Online ahead of print.
https://link.springer.com/article/10.1007/s40572-021-00328-2
RECENT FINDINGS: Environmental exposures related to fossil fuel and tobacco combustion and occupational exposures related to silica and coal mining generate oxidative stress and inflammation in the lungs. Sustained oxidative stress causes DNA damage, epigenetic instability, mitochondrial dysfunction, and cell cycle arrest in key progenitor cells in the lung. As a result, critical repair mechanisms are impaired, leading to premature destruction of the lung parenchyma. Inhaled environmental exposures accelerate lung aging by injuring the lungs and damaging the cells responsible for wound healing. Interventions that minimize exposure to noxious antigens are critical to improve lung health, and novel research is required to expand our knowledge of therapies that may slow or prevent premature lung aging.

4. **Safe in the womb? Effects of air pollution to the unborn child and neonates.** Veras M, Waked D, Saldiva P. J Pediatr (Rio J). 2021 Nov 2:S0021-7557(21)00140-6. doi: 10.1016/j.jped.2021.09.004. Online ahead of print.
https://www.sciencedirect.com/science/article/pii/S0021755721001406
SUMMARY OF THE FINDINGS: Epidemiological and experimental evidence agree that gestational exposure to air pollution in urban increases the risks for low birth weight, preterm birth, congenital malformation, intrauterine growth restriction, and neonatal mortality. Furthermore, exposures are associated with increased risks for preeclampsia, hypertension, gestational diabetes.
CONCLUSIONS: Therefore, it is time for greater involvement and engagement of the health sector in the discussion of public policies that may affect the quality of the environment, and that directly or indirectly impact the health of those who were not yet born.

5. **Consumption in the G20 nations causes particulate air pollution resulting in two million premature deaths annually.** Nansai K, Tohno S, Chatani S, Kanemoto K, Kagawa S, Kondo Y, Takayanagi W, Lenzen M. Nat Commun. 2021 Nov 2;12(1):6286. doi: 10.1038/s41467-021-26348-y.
https://www.nature.com/articles/s41467-021-26348-y
Worldwide exposure to ambient PM2.5 causes over 4 million premature deaths annually. As most of these deaths are in developing countries, without internationally coordinated efforts this polarized situation will continue. As yet, however, no studies have quantified nation-to-nation consumer responsibility for global mortality due to both primary and secondary PM2.5 particles. Here we quantify the global footprint of PM2.5-driven premature deaths for the 19

G20 nations in a position to lead such efforts. G20 consumption in 2010 was responsible for 1.983 [95% Confidence Interval: 1.685-2.285] million premature deaths, at an average age of 67, including 78.6 [71.5-84.8] thousand infant deaths, implying that the G20 lifetime consumption of about 28 [24-33] people claims one life. Our results indicate that G20 nations should take responsibility for their footprint rather than focusing solely on transboundary air pollution, as this would expand opportunities for reducing PM2.5-driven premature mortality. Given the infant mortality footprint identified, it would moreover contribute to ensuring infant lives are not unfairly left behind in countries like South Africa, which have a weak relationship with G20 nations.

6. **Climate Change and Health of Children: Our Borrowed Future.** Leffers JM. J Pediatr Health Care. 2021 Nov 1:S0891-5245(21)00213-3. doi: 10.1016/j.pedhc.2021.09.002. Online ahead of print.
   https://www.jpedhc.org/article/S0891-5245(21)00213-3/fulltext
   Children are disproportionately vulnerable to the impacts of climate change because of physiological, developmental, behavioral, and social factors. In addition, they are likely to bear the consequences of these impacts over their life course. This paper reviews the health impacts of climate change on children's health, highlights specific vulnerabilities and offers recommendations to pediatric health care professionals for mitigation, adaptation, policy, and personal interventions to address our changing climate. Health care professionals can help families in mitigation and adaptation strategies to reduce their risk from climate change.

7. **The Impact of Environmental Pollutants on Barrier Dysfunction in Respiratory Disease.** Lee PH, Park S, Lee YG, Choi SM, An MH, Jang AS. Allergy Asthma Immunol Res. 2021 Nov;13(6):850-862. doi: 10.4168/aair.2021.13.6.850.
   https://e-aair.org/DOIx.php?id=10.4168/aair.2021.13.6.850
   Pollutants accumulating in the lungs exacerbate the symptoms of respiratory diseases, including asthma and chronic obstructive lung disease. Biological contaminants include bacteria, viruses, animal dander and cat saliva, house dust mites, cockroaches, and pollen. Allergic inflammation develops in tissues such as the lung and skin with large epithelial surface areas exposed to the environment. Barrier dysfunction in the lung allows allergens and environmental pollutants to activate the epithelium and produce cytokines that promote the induction and development of immune responses. In this article, we review the impact of environmental pollutants on the cell barrier in respiratory diseases.

8. **Years of life lost due to premature deaths associated with air pollution: an ecological time-series study.** Nascimento LFC, Vieira LCPF. Sao Paulo Med J. 2021 Oct 29:S1516-31802021005026102. doi: 10.1590/1516-3180.2021.0129.090422021. Online ahead of print.
   RESULTS: Exposure to particulate matter was significant at lag 3 days. There were 2177 hospitalizations over the study period, with 201 deaths (9.2%). Premature deaths led to 2035.69 years of life lost. A 10 µg/m3 increase in PM10 concentrations was correlated with 8.0% of the hospitalizations, which corresponded to 152.67 YLL (81.67 for males and 71.00 for females). The cost generated was approximately US$ 9.1 million in 2016.

CONCLUSION: In this first study conducted in a medium-sized Brazilian city, using the YLL methodology, we identified an excess expense attributable to air pollution.

9. **Preventing Parkinson's Disease: An Environmental Agenda.** De Miranda BR, Goldman SM, Miller GW, Greenamyre JT, Dorsey ER. J Parkinsons Dis. 2021 Oct 26. doi: 10.3233/JPD-212922. Online ahead of print.
https://content.iospress.com/articles/journal-of-parkinsons-disease/jpd212922
Fueled by aging populations and continued environmental contamination, the global burden of Parkinson's disease (PD) is increasing. The disease, or more appropriately diseases, have multiple environmental and genetic influences but no approved disease modifying therapy. Additionally, efforts to prevent this debilitating disease have been limited. As numerous environmental contaminants (e.g., pesticides, metals, industrial chemicals) are implicated in PD, disease prevention is possible. To reduce the burden of PD, we have compiled preclinical and clinical research priorities that highlight both disease prediction and primary prevention. Though not exhaustive, the "PD prevention agenda" builds upon many years of research by our colleagues and proposes next steps through the lens of modifiable risk factors. The agenda identifies ten specific areas of further inquiry and considers the funding and policy changes that will be necessary to help prevent the world's fastest growing brain disease.

10. **Impact of the 2019/2020 Australian Megafires on Air Quality and Health.** Graham AM et al. Geohealth. 2021 Oct 1;5(10):e2021GH000454. doi: 10.1029/2021GH000454. eCollection 2021 Oct.
https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2021GH000454
The Australian 2019/2020 bushfires were unprecedented in their extent and intensity, causing a catastrophic loss of habitat, human and animal life across eastern-Australia. We use a regional air quality model to assess the impact of the bushfires on particulate matter with a diameter less than 2.5 µm (PM2.5) concentrations and the associated health impact from short-term population exposure to bushfire PM2.5. The mean population Air Quality Index (AQI) exposure between September and February in the fires and no fires simulations indicates an additional ~437,000 people were exposed to "Poor" or worse AQI levels due to the fires. The AQ impact was concentrated in the cities of Sydney, Newcastle-Maitland, Canberra-Queanbeyan and Melbourne. Between October and February 171 (95% CI: 66-291) deaths were brought forward due to short-term exposure to bushfire PM2.5. The health burden was largest in New South Wales (NSW) (109 (95% CI: 41-176) deaths brought forward), Queensland (15 (95% CI: 5-24)), and Victoria (35 (95% CI: 13-56)). This represents 38%, 13% and 30% of the total deaths brought forward by short-term exposure to all PM2.5. At a city-level 65 (95% CI: 24-105), 23 (95% CI: 9-38) and 9 (95% CI: 4-14) deaths were brought forward from short-term exposure to bushfire PM2.5, accounting for 36%, 20%, and 64% of the total deaths brought forward from all PM2.5. Thus, the bushfires caused substantial AQ and health impacts across eastern-Australia. Climate change is projected to increase bushfire risk, therefore future fire management policies should consider this.

11. **Characteristics of nano-plastics in bottled drinking water.** Huang Y, Wong KK, Li W, Zhao H, Wang T, Stanescu S, Boult S, van Dongen B, Mativenga P, Li L. J Hazard Mater. 2021 Sep 30;424(Pt C):127404. doi: 10.1016/j.jhazmat.2021.127404. Online ahead of print.
Plastic pollution in water is threatening the environment and human health. Previous relevant studies mainly focus on macro and micro plastic pollutions and their characteristics. Little is known about the extent and characteristics of nano-scale plastics in our drinking water systems, mainly due to difficulties in their isolation and analysis. These nano-plastics may pose higher risk to human health than micro-plastics. Here we report the collection and analysis of organic nanoparticles from commercial bottled water of two brands. Novel nano-plastic particle imaging and molecular structure analysis techniques have been applied. The findings show the existence of organic nanoparticles, and a likely source has been identified to be the degradation of plastic water bottles.

WE ACT

12. **How Can We Make Hand Surgery Carbon Neutral?** Borg TM. Hand (N Y). 2021 Nov 5:15589447211054134. doi: 10.1177/15589447211054134. Online ahead of print.
https://journals.sagepub.com/doi/full/10.1177/15589447211054134
RESULTS: Surgeons can make hand surgery more carbon neutral through various measures that have been categorized as pre-, intra-, and postoperative interventions. With all changes, the aims are to minimize waste and costs while optimizing patient outcomes.
CONCLUSIONS: Administrative obstacles to implementing pro-climate hospital changes may be overcome by also considering likely cost benefits with many environmentally friendly measures. New measures in hand surgery should consider patient safety, clinical efficacy, cost effectiveness, and the environmental impact.

13. **Principles of environmentally-sustainable anaesthesia: a global consensus statement from the World Federation of Societies of Anaesthesiologists.** White SM, Shelton CL, Gelb AW, Lawson C, McGain F, Muret J, Sherman JD; representing the World Federation of Societies of Anaesthesiologists Global Working Group on Environmental Sustainability in Anaesthesia. Anaesthesia. 2021 Nov 1. doi: 10.1111/anae.15598. Online ahead of print.
https://associationofanaesthetists-publications.onlinelibrary.wiley.com/doi/10.1111/anae.15598
We set out seven fundamental principles to guide anaesthesia providers in the move to environmentally sustainable practice, including: choice of medications and equipment; minimising waste and overuse of resources; and addressing environmental sustainability in anaesthetists' education, research, quality improvement and local healthcare leadership activities. These changes are achievable with minimal material resource and financial investment, and should undergo re-evaluation and updates as better evidence is published. This paper discusses each principle individually, and directs readers towards further important references.

14. **Environmental Pollution, Climate Change, and a Critical Role for the Endocrinologist.** Stewart PM, Mirmira RG, Kaiser UB. J Clin Endocrinol Metab. 2021 Oct 27:dgab721. doi: 10.1210/clinem/dgab721. Online ahead of print.
https://academic.oup.com/jcem/advance-article/doi/10.1210/clinem/dgab721/6410138
It is an appropriate moment to be highlighting the impact of climate change on our lives, with a particular focus on endocrinology in its broadest sense. Many who read this may have a skeptical view—likely not about the underlying premise of the harmful effects of climate change, but perhaps stemming from a sense of personal futility regarding our ability to have an impact on such an overwhelming issue, particularly one for which the responsibility can all too easily be ascribed to others. But the challenge is real, the evidence base is compelling, and we can all play our part, not least in fulfilling our professional responsibility to shape and nurture tomorrow's workforce; climate change is the single most important concern of our younger colleagues (Millennials and Generation Z) (1).

15. **The Drivers of Environmentally Sustainable Hospital Foodservices.** Carino S, Malekpour S, Porter J, Collins J. Front Nutr. 2021 Oct 15;8:740376. doi: 10.3389/fnut.2021.740376. eCollection 2021.
https://www.frontiersin.org/articles/10.3389/fnut.2021.740376/full
Findings: There were 21 participants from 14 hospitals recruited across nine countries. Sustainable foodservice practices included local and organic food procurement, gardens onsite, vegetarian menus, re-serving unopened portion-controlled items, traditional foods, and food waste composting. Four themes were identified: initiating drivers, supporting enablers, challenges, and influence. Initiating drivers that "sparked" sustainable practices included the values of individuals or the hospital (e.g., community, environmental, or religious values), logical solutions to a problem, or government requirements. Enablers that facilitated success included motivated individuals, dedicated personnel, supportive leadership, internal protocols, and perceived benefits. External enablers included being part of member organizations, government requirements, and learning from other hospitals. Exemplar hospitals had broader influence, including educating the hospital community, supporting other hospitals, and influencing government policies/targets. Common challenges were staff resistance and inadequate policy directive. Interpretation: These findings examine the successful international cases of sustainable hospital foodservices to provide a global overview to assist with strategic planning both within hospitals and within governing bodies.

Lancet Planetary Health – ***open-access, interdisciplinary journal focused on sustainability***

News & Commentary

COP26 climate pledges: What scientists think so far. Masood E, Tollefson J. Nature. 2021 Nov 5. doi: 10.1038/d41586-021-03034-z. Online ahead of print.

Why tackling climate change mitigation and human health together is the best way forward. Mulcahy E. BMJ. 2021 Nov 5;375:n2707. doi: 10.1136/bmj.n2707.

Abating ammonia is more cost-effective than nitrogen oxides for mitigating PM(2.5) air pollution. Gu B et al. Science. 2021 Nov 5;374(6568):758-762. doi: 10.1126/science.abf8623. Epub 2021 Nov 4.

Carbon emissions rapidly rebounded following COVID pandemic dip. Tollefson J. Nature. 2021 Nov 4. doi: 10.1038/d41586-021-03036-x. Online ahead of print.

COVID-19 hospitalizations: Another adverse impact of ambient air pollution? Perret J, Dharmage S. Respirology. 2021 Nov 3. doi: 10.1111/resp.14179. Online ahead of print.

There is no silver bullet against climate change. Nair C. Nature. 2021 Nov;599(7883):32. doi: 10.1038/d41586-021-02980-y.

Top climate scientists are sceptical that nations will rein in global warming. Tollefson J. Nature. 2021 Nov;599(7883):22-24. doi: 10.1038/d41586-021-02990-w.

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