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COVID-19

1. **Reduction of air pollutants and associated mortality during and after the COVID-19 lockdown in China: Impacts and implications.** Chen G, Tao J, Wang J, Dong M, Li X, Sun X, Cheng S, Fan J, Ye Y, Xiao J, Hu J, He G, Sun J, Lu J, Guo L, Li X, Rong Z, Zeng W, Zhou H, Chen D, Li J, Yuan L, Bi P, Du Q, Ma W, Liu T. Environ Res. 2021 Jun 2:111457. doi: 10.1016/j.envres.2021.111457. Online ahead of print.
https://www.sciencedirect.com/science/article/pii/S0013935121007519
Although strict lockdown measurements implemented during the COVID-19 pandemic have dramatically reduced the anthropogenic-based emissions, changes in air quality and its health impacts remain unclear in China. We comprehensively described air pollution during and after the lockdown periods in 2020 compared with 2018-2019, and estimated the mortality burden indicated by the number of deaths and years of life lost (YLL) related to the air pollution changes. The mean air quality index (AQI), PM10, PM2.5, NO2, SO2 and CO concentrations during the lockdown across China declined by 18.2 (21.2%), 27.0 µg/m3 (28.9%), 10.5 µg/m3 (18.3%), 8.4 µg/m3 (44.2%), 13.1 µg/m3 (38.8%), and 0.3 mg/m3 (27.3%) respectively, when compared to the same periods during 2018-2019. We observed an increase in O3 concentration during the lockdown by 5.5 µg/m3 (10.4%), and a slight decrease after the lockdown by 3.4 µg/m3 (4.4%). As a result, there were 51.3 (95%CI: 32.2, 70.1) thousand fewer premature deaths (16.2 thousand during and 35.1 thousand after the lockdown), and 1066.8 (95%CI: 668.7, 1456.8) thousand fewer YLLs (343.3 thousand during and 723.5 thousand after the lockdown) than these in 2018-2019. Our findings suggest that the COVID-19 lockdown has caused substantial decreases in air pollutants except for O3, and that substantial human health benefits can be achieved when strict control measures for air pollution are taken to reduce emissions from vehicles and industries. Stricter tailored policy solutions of air pollution are urgently needed in China and other countries, especially in well-developed industrial regions, such as upgrading industry structure and promoting green transportation.

2. **Used disposable face masks are significant sources of microplastics to environment.** Chen X, Chen X, Liu Q, Zhao Q, Xiong X, Wu C. Environ Pollut. 2021 May 31;285:117485. doi: 10.1016/j.envpol.2021.117485. Online ahead of print.

The consumption of disposable face masks increases greatly because of the outbreak of the COVID-19 pandemic. Inappropriate disposal of wasted face masks has already caused the pollution of the environment. As made from plastic nonwoven fabrics, disposable face masks could be a potential source of microplastics for the environment. In this study, we evaluated the ability of new and used disposable face masks of different types to release microplastics into the water. The microplastic release capacity of the used masks increased significantly from 183.00 ± 78.42 particles/piece for the new masks to 1246.62 ± 403.50 particles/piece. Most microplastics released from the face masks were medium size transparent polypropylene fibers originated from the nonwoven fabrics. The abrasion and aging during the using of face masks enhanced the releasing of microplastics since the increasing of medium size and blue microplastics. The face masks could also accumulate airborne microplastics during use. Our results indicated that used disposable masks without effective disposal could be a critical source of microplastics in the environment. The efficient allocation of mask resources and the proper disposal of wasted masks are not only beneficial to pandemic control but also to environmental safety.

3. **PM(2.5) Pollution Strongly Predicted COVID-19 Incidence in Four High-Polluted Urbanized Italian Cities during the Pre-Lockdown and Lockdown Periods.** Kotsiou OS, Kotsios VS, Lampropoulos I, Zidros T, Zarogiannis SG, Gourgoulianis KI. Int J Environ Res Public Health. 2021 May 11;18(10):5088. doi:10.3390/ijerph18105088.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8151137/

BACKGROUND: The coronavirus disease in 2019 (COVID-19) heavily hit Italy, one of Europe's most polluted countries. The extent to which PM pollution contributed to COVID-19 diffusion is needing further clarification. We aimed to investigate the particular matter (PM) pollution and its correlation with COVID-19 incidence across four Italian cities: Milan, Rome, Naples, and Salerno, during the pre-lockdown and lockdown periods.

METHODS: We performed a comparative analysis followed by correlation and regression analyses of the daily average PM10, PM2.5 concentrations, and COVID-19 incidence across four cities from 1 January 2020 to 8 April 2020, adjusting for several factors, taking a two-week time lag into account.

RESULTS: Milan had significantly higher average daily PM10 and PM2.5 levels than Rome, Naples, and Salerno. Rome, Naples, and Salerno maintained safe PM10 levels. The daily PM2.5 levels exceeded the legislative standards in all cities during the entire period. PM2.5 pollution was related to COVID-19 incidence. The PM2.5 levels and sampling rate were strong predictors of COVID-19 incidence during the pre-lockdown period. The PM2.5 levels, population's age, and density strongly predicted COVID-19 incidence during lockdown.

CONCLUSIONS: Italy serves as a noteworthy paradigm illustrating that PM2.5 pollution impacts COVID-19 spread. Even in lockdown, PM2.5 levels negatively impacted COVID-19 incidence.

Health Impacts of Climate Change

4. **Short-term exposure to air pollution and hospital admission for heart failure among older adults in metropolitan cities: a time-series study.** Lee DW, Han CW, Hong YC, Oh JM, Bae HJ, Kim S, Lim YH. Int Arch Occup Environ Health. 2021 Jun 5. doi: 10.1007/s00420-021-01724-9. Online ahead of print.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7792212/
PURPOSE: We aimed to investigate the association between air pollution concentration levels and hospital admissions for heart failure (HF) among older adults in metropolitan cities in South Korea.
METHODS: We used hospital admission data of 1.8 million older adults in seven metropolitan cities from 2008 to 2016, derived from the National Health Insurance Service of South Korea. Daily HF admission data were linked to air pollutants concentrations for the respective dates, including particulate matter less than 2.5 μm in size (PM2.5), 10 μm (PM10), sulfur dioxide (SO2), nitrogen dioxide (NO2), carbon monoxide (CO), and ozone. We estimated the association between air pollutants and daily HF admissions using quasi-Poisson generalized additive models for each city.
RESULTS: During the study period, 142,490 hospital admissions for HF were noted. Increases of 10 μg/m3 of PM2.5 and PM10, and 10 ppb of SO2, NO2, and CO were associated with an increased risk of HF admission by 0.93% ([95% confidence intervals 0.51-1.36], 0.55% [0.31-0.80], 6.04% [2.15-10.08], 1.10% [0.38-1.82], and 0.05% [0.01-0.09]), respectively, on the same day. Increases in mean exposure to PM2.5, PM10, and SO2 for 8 days from the concurrent day were also significantly associated with HF admissions. During the warm season, the risk of HF admissions increased shortly after an increase in PM2.5, whereas prolonged effects were observed during the cold season.
CONCLUSION: Our study suggests the adverse effects of air pollution on HF. Moreover, the evidence of seasonality may help tailor protection guidelines for older adults.

5. **Long-term exposure to low-level air pollution and incidence of asthma: the ELAPSE project.** Liu S et al. Eur Respir J. 2021 Jun 4;57(6):2003099. doi: 10.1183/13993003.03099-2020. Print 2021 Jun.
BACKGROUND: Long-term exposure to ambient air pollution has been linked to childhood-onset asthma, although evidence is still insufficient. Within the multicentre project Effects of Low-Level Air Pollution: A Study in Europe (ELAPSE), we examined the associations of long-term exposures to particulate matter with a diameter <2.5 μm (PM2.5), nitrogen dioxide (NO2) and black carbon (BC) with asthma incidence in adults.
METHODS: We pooled data from three cohorts in Denmark and Sweden with information on asthma hospital diagnoses. The average concentrations of air pollutants in 2010 were modelled by hybrid land-use regression models at participants' baseline residential addresses. Associations of air pollution exposures with asthma incidence were explored with Cox proportional hazard models, adjusting for potential confounders.
RESULTS: Of 98 326 participants, 1965 developed asthma during a mean follow-up of 16.6 years. We observed associations in fully adjusted models with hazard ratios of 1.22 (95% CI 1.04-1.43) per 5 μg·m-3 for PM2.5, 1.17 (95% CI 1.10-1.25) per 10 μg·m-3 for NO2 and 1.15 (95% CI 1.08-1.23) per 0.5×10-5 m-1 for BC. Hazard ratios were larger in cohort subsets with exposure levels below the European Union and US limit values and possibly World Health

Organization guidelines for PM2.5 and NO2. NO2 and BC estimates remained unchanged in two-pollutant models with PM2.5, whereas PM2.5 estimates were attenuated to unity. The concentration-response curves showed no evidence of a threshold.

CONCLUSIONS: Long-term exposure to air pollution, especially from fossil fuel combustion sources such as motorised traffic, was associated with adult-onset asthma, even at levels below the current limit values.

6. **Exposure to air pollution and renal function.** Kuźma Ł, Małyszko J, Bachórzewska-Gajewska H, Kralisz P, Dobrzycki S. Sci Rep. 2021 Jun 1;11(1):11419. doi: 10.1038/s41598-021-91000-0.
https://www.nature.com/articles/s41598-021-91000-0
Air pollution contributes to the premature death of approximately 428,000 citizens of Europe every year. The adverse effects of air pollution can be observed in respiratory, circulatory systems but also in renal function. We decide to investigate the hypothesis indicating that we can observe not only long- but also short-term impact of air pollution on kidney function. We used linear, log-linear, and logistic regression models to assess the association between renal function and NO2, SO2, and PMs. Results are reported as beta (β) coefficients and odds ratios (OR) for an increase in interquartile range (IQR) concentration. 3554 patients (median age 66, men 53.2%) were included into final analysis. Chronic kidney disease (CKD) was diagnosed in 21.5%. The odds of CKD increased with increase in annual concentration of PM2.5 (OR for IQR increase = 1.07; 95% CI 1.01-1.15, P = 0.037) and NO2 (OR for IQR increase = 1.05; 95% CI 1.01-1.10, P = 0.047). The IQR increase in weekly PM2.5 concentration was associated with 2% reduction in expected eGFR (β = 0.02, 95% CI - 0.03; - 0.01). Medium- and short-term exposure to elevated air pollution levels was associated with a decrease in eGFR and development CKD. The main pollutants affecting the kidneys were PM2.5 and NO2.

7. **Environmental Pollution and Peripheral Artery Disease.** Serra R, Abramo A, Ielapi N, Procopio S, Marino P. Risk Manag Healthc Policy. 2021 May 27;14:2181-2190. doi: 10.2147/RMHP.S307150. eCollection 2021.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8166356/
Peripheral artery disease (PAD) of the lower limbs represents one of the most important clinical conditions among vascular disease and can negatively impact quality of life of affected patients, representing also an important socioeconomic burden. Several risk factors predispose to PAD and its complications. Nevertheless, the role of pollution in this context has not been fully evaluated and this article explored the most updated information on epidemiology and environmental pollution in order to hypothesize the possible contribution of air pollution in the onset of PAD. Pollution is an important problem for the global community and has harmful effects on human health and cardiovascular system, and, specifically, particulate matter 10 (PM10) was found significantly associated with PAD.

8. **Air Pollution Reduces Interpersonal Trust: The Roles of Emotion and Emotional Susceptibility.** Hou Y, Gao M, Huang L, Wang Q. Int J Environ Res Public Health. 2021 May 25;18(11):5631. doi: 10.3390/ijerph18115631.
https://www.mdpi.com/1660-4601/18/11/5631

Air pollution has been shown to have detrimental effects on physical and mental health, yet little is known about how air pollution affects psychosocial functioning in everyday life. We conducted three studies that utilized experimental methods and web crawler technology to examine the effect of hazy environmental conditions on perceived interpersonal trust, and to investigate the roles of emotion and emotional susceptibility in mediating or moderating the negative impact of air pollution. In Study 1, participants were presented with landscape photos that showed either hazy scenes or clear scenes. Those who viewed photos of hazy scenes reduced their levels of interpersonal trust. In Study 2, emotion data were collected from social media with web crawler technology, in connection with meteorological monitoring data during the same period. Hazy conditions were associated with reduced expressions of positive emotion on social media, whereas clearer conditions were associated with enhanced positive emotional expressions. In Study 3, we simulated Weibo communications in the laboratory. The findings showed that emotional susceptibility moderated the negative effect of hazy conditions on interpersonal trust, and negative emotion mediated the effect of hazy conditions on interpersonal trust. The findings advance the understanding of the impact of air pollution on interpersonal trust and social relations and the associated psychological mechanisms and boundary conditions. They have important real-life implications.

9. **The Consequences of Our Changing Environment on Life Threatening and Debilitating Fungal Diseases in Humans.** van Rhijn N, Bromley M. J Fungi (Basel). 2021 May 7;7(5):367. doi: 10.3390/jof7050367.
https://www.mdpi.com/2309-608X/7/5/367
Human activities have significantly impacted the environment and are changing our climate in ways that will have major consequences for ourselves, and endanger animal, plant and microbial life on Earth. Rising global temperatures and pollution have been highlighted as potential drivers for increases in infectious diseases. Although infrequently highlighted, fungi are amongst the leading causes of infectious disease mortality, resulting in more than 1.5 million deaths every year. In this review we evaluate the evidence linking anthropomorphic impacts with changing epidemiology of fungal disease. We highlight how the geographic footprint of endemic mycosis has expanded, how populations susceptible to fungal infection and fungal allergy may increase and how climate change may select for pathogenic traits and indirectly contribute to the emergence of drug resistance.

10. **Exploration of the Global Burden of Dementia Attributable to PM2.5: What Do We Know Based on Current Evidence?** Ru M, Brauer M, Lamarque JF, Shindell D. Geohealth. 2021 May 1;5(5):e2020GH000356. doi: 10.1029/2020GH000356. eCollection 2021 May.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8143277/
Exposure to ambient PM2.5 pollution has been linked to multiple adverse health effects. Additional effects have been identified in the literature and there is a need to understand its potential role in high prevalence diseases. In response to recent indications of PM2.5 as a risk factor for dementia, we examine the evidence by systematically reviewing the epidemiologic literature, in relation to exposure from ambient air pollution, household air pollution, secondhand smoke, and active smoking. We develop preliminary exposure-response functions, estimate the uncertainty, and discuss sensitivities and model selection. We estimate the likely

impact to be 2.1 M (1.4 M, 2.5 M; 5%-95% confidence) global incident dementia cases and 0.6 M (0.4 M, 0.8 M) deaths attributable to ambient PM2.5 pollution in 2015. This implies a combined toll from morbidity and mortality of dementia of 7.3 M (5.0 M, 9.1 M) lost disability-adjusted life years. China, Japan, India, and the United States had the highest estimated total burden, and the per capita burden was highest in developed countries with large elderly populations. Compared to 2000, most countries in Europe, the Americas, and Southern Africa reduced the burden in 2015, while other regions had a net increase. Based on a recent systematic review of cost of illness studies for dementia, our estimates imply economic costs of US$ 26 billion worldwide in 2015. Based on this estimation, ambient PM2.5 pollution may be responsible for 15% of premature deaths and 7% of DALYs associated with dementia. Our estimates also indicate substantial uncertainty in this relationship, and future epidemiological studies at high exposure levels are especially needed.

11. **Predicting Paradise: Modeling future wildfire disasters in the western US.** Ager AA, Day MA, Alcasena FJ, Evers CR, Short KC, Grenfell I. Sci Total Environ. 2021 Aug 25;784:147057. doi: 10.1016/j.scitotenv.2021.147057. Epub 2021 Apr 13.
The 2018 Camp fire destroyed the town of Paradise, California and resulted in 82 fatalities, the worst wildfire disaster in the US to date. Future disasters of similar or greater magnitude are inevitable given predicted climate change but remain highly uncertain in terms of location and timing. As with other natural disasters, simulation models are one of the primary tools to map risk and design prevention strategies. However, risk assessments have focused on estimation of mean values rather than predicting extreme events that are increasingly becoming a reality in many parts of the globe. Using the western US as a study area, we synthesized newer wildfire simulation and building location data (54 million fires, 25 million building locations) and compared the outputs to several sources of observed exposure data. The simulations used synchronized weather among spatial simulation subunits, thereby providing estimates of extreme fire seasons, fire events within them, and exceedance probabilities at multiple scales. We found that annual area burned was accurately replicated by simulations but building exposure was substantially overestimated, although the relatively small historical sample size might have influenced the comparison. We identified extreme fire seasons in the simulation record (10,000 fire years) that exceeded historical fire seasons by 278% in terms of area burned, and 1255% in terms of buildings exposed, under contemporary climate. Simulated building exposure peaked in specific regions along gradients of building density and burnable fuels. The study is the first to explore large scale extreme wildfire exposure in terms of both annual variability and magnitude, providing a broad foundation of methods to advance wildfire disaster prediction.

WE ACT

12. **Nurses and Midwives as Global Partners to Achieve the Sustainable Development Goals in the Anthropocene.** Rosa WE, Catton H, Davidson PM, Hannaway CJ, Iro E, Klopper HC, Madigan EA, McConville FE, Stilwell B, Kurth AE. J Nurs Scholarsh. 2021 May 31. doi: 10.1111/jnu.12672. Online ahead of print.

PURPOSE: To highlight ongoing and emergent roles of nurses and midwives in advancing the United Nations 17 Sustainable Development Goals by 2030 at the intersection of social and economic inequity, the climate crisis, interprofessional partnership building, and the rising status and visibility of the professions worldwide.

DESIGN: Discussion paper.

METHODS: Literature review.

FINDINGS: Realizing the Sustainable Development Goals will require all nurses and midwives to leverage their roles and responsibility as advocates, leaders, clinicians, scholars, and full partners with multidisciplinary actors and sectors across health systems.

CONCLUSIONS: Making measurable progress toward the Sustainable Development Goals is critical to human survival, as well as the survival of the planet. Nurses and midwives play an integral part of this agenda at local and global levels.

CLINICAL RELEVANCE: Nurses and midwives can integrate the targets of the Sustainable Development Goals into their everyday clinical work in various contexts and settings. With increased attention to social justice, environmental health, and partnership building, they can achieve exemplary clinical outcomes directly while contributing to the United Nations 2030 Agenda on a global scale and raising the profile of their professions.

13. **Nursing and the Sustainable Development Goals: A Scoping Review.** Fields L, Perkiss S, Dean BA, Moroney T. J Nurs Scholarsh. 2021 May 30. doi: 10.1111/jnu.12675. Online ahead of print.
https://sigmapubs.onlinelibrary.wiley.com/doi/full/10.1111/jnu.12675

PURPOSE: In 2015, all member states that comprise the United Nations unanimously adopted the Sustainable Development Goals (SDGs), a set of ambitious and inclusive targets toward global economic, social, and environmental betterment. Nurses have a key role to play in the achievement of the SDGs. The aim of this article was to conduct a scoping review to synthesize the literature related to nursing and the SDGs.

METHODS: This scoping review utilized Arksey and O'Malley's five-stage framework. Several electronic databases were searched for literature published from 2015 to 2020 using the key words "nurse OR nurses OR nursing" and "Sustainable Development Goals OR SDGs".

FINDINGS: A total of 447 articles were identified through the databases searches, of which 35 articles were deemed relevant and included for final review and content analysis. Analysis of relevant literature on nursing and the SDGs revealed two distinct, yet connected, perspectives: the nurse and the profession.

CONCLUSIONS: Individual nurses may feel disconnected from the SDGs and struggle to relate the goals to their clinical role, calling for an increase in awareness and education on the goals. The wider profession could also increase both research and policy with relation to the SDGs, strengthening nursing's position to have a voice in and contribute towards achievement of the goals.

CLINICAL RELEVANCE: Individual nurses and the wider nursing profession have opportunities to more meaningfully contribute to the SDGs, beginning with an increased awareness through education and a commitment to research and participation in local and global decision making.

14. **Assessing the Impact of Green Hiring on Sustainable Performance: Mediating Role of Green Performance Management and Compensation.** Martins JM, Aftab H, Mata MN, Majeed MU, Aslam S, Correia AB, Mata PN. Int J Environ Res Public Health. 2021 May 25;18(11):5654. doi: 10.3390/ijerph18115654.
https://www.mdpi.com/1660-4601/18/11/5654
The global need to preserve ecology has propelled the green movement across the globe. An emerging managerial challenge for all organizations is to protect natural resources by reducing their negative impact on the environment and increase sustainable performance. Greening is the need of the age to conserve natural resources. This study investigates the impact of green human resource management practice-i.e., green hiring-on the sustainable performance of public and private healthcare organizations. A quantitative research approach was used for data collection. Scale survey of 160 responses was gathered from public and private healthcare organizations. Partial least square-structural equation modeling was used for data analysis. The study results suggest that green recruitment has a positive and significant impact on environmental performance, economic performance, and social performance. Path coefficients test also revealed that green performance management and compensation significantly mediate the relationship between green hiring and sustainable performance of public and private healthcare organizations. This study is helpful for organizations in adapting GHRM practices that will benefit the organizations in all ways. This study also provides a better understanding to policymakers on how to promote GHRM practices and increase sustainability in organizations.

15. **From values to climate action.** Bouman T, Steg L, Perlaviciute G. Curr Opin Psychol. 2021 May 1;42:102-107. doi: 10.1016/j.copsyc.2021.04.010. Online ahead of print.
https://www.sciencedirect.com/science/article/pii/S2352250X21000579
To mitigate anthropogenic climate change, it is important to know what motivates individuals to support and take climate action. Values reflect universal, general, desirable goals which guide individuals' preferences and actions. Stronger biospheric values (caring about the environment), in particular, predict stronger engagement in climate action. Although many individuals have strong biospheric values, contextual barriers can inhibit their climate actions. Notably, policies and contextual changes that reduce contextual barriers can motivate and enable individuals to act on their biospheric values. In addition, public participation may better engage public values in climate policies and actions as to increase their acceptability. Finally, correcting biases that others have weaker biospheric values than oneself may also motivate individuals to support and take climate action.

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News & Commentary

Despite pandemic, level of carbon dioxide in the atmosphere hits historic levels

More than one-third of heat deaths blamed on climate change

Evidence of air pollution exposure and new asthma onset: further justification for cleaner air. Thurston GD, Lee A. Eur Respir J. 2021 Jun 4;57(6):2100064. doi: 10.1183/13993003.00064-2021. Print 2021 Jun.