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COVID-19

- 1. Black Nurses Collaborative Approach to Addressing COVID-19 in Black Communities.** Dawson MA. J Racial Ethn Health Disparities. 2021 Feb 12. doi: 10.1007/s40615-021-00987-9. Online ahead of print.
<https://link.springer.com/article/10.1007/s40615-021-00987-9>
As with other national disasters, epidemics, and pandemics, the novel coronavirus SARS-CoV-2 (COVID-19) pandemic has highlighted health disparities in Black communities in the USA. Healthcare providers, community activists, politicians, members of faith-based organizations, professional athletes, and Black families are asking crucial questions about why Black and Brown people are disproportionately infected by, and dying from, the COVID-19. Evidence in healthcare and social sciences literature demonstrates that historically, systemic racism and injustices play a large role in the health and well-being of Blacks living in the USA. For decades, the National Black Nurses Association has been on the forefront, engaging our people using a collaborative community-based practice model. The healthcare goal in the USA should center on health protection, promotion, and prevention, moving toward a wellness model and away from treatment of illnesses that contribute to healthcare waste. Finally, awareness of social determinants of health has taken center stage, demonstrating how laws, policies, and practice affect health outcomes and the well-being of Black and Brown communities. In order to address social determinants of health and healthcare inequity, the National Black Nurses Association has called for an increase in the number of Black registered nurses and licensed vocational and practical nurses. The healthcare goal in the USA should center on health protection, promotion, and preventions moving toward a wellness model and away from treatment of illnesses that contributes to healthcare waste.
- 2. Climate change: how it impacts the emergence, transmission, resistance and consequences of viral infections in animals and plants.** Dash SP, Dipankar P, Burange PS, Rouse BT, Sarangi PP.

Crit Rev Microbiol. 2021 Feb 11:1-16. doi: 10.1080/1040841X.2021.1879006. Online ahead of print.

The ongoing COVID-19 pandemic has made us wonder what led to its occurrence and what can be done to avoid such events in the future. As we document, one changing circumstance that is resulting in the emergence and changing the expression of viral diseases in both plants and animals is climate change. Of note, the rapidly changing environment and weather conditions such as excessive flooding, droughts, and forest fires have raised concerns about the global ecosystem's security, sustainability, and balance. In this review, we discuss the main consequences of climate change and link these to how they impact the appearance of new viral pathogens, how they may facilitate transmission between usual and novel hosts, and how they may also affect the host's ability to manage the infection. We emphasize how changes in temperature and humidity and other events associated with climate change influence the reservoirs of viral infections, their transmission by insects and other intermediates, their survival outside the host as well the success of infection in plants and animals. We conclude that climate change has mainly detrimental consequences for the emergence, transmission, and outcome of viral infections and plead the case for halting and hopefully reversing this dangerous event.

3. **Homelessness and COVID-19: Leaving No One Behind.** Ralli M, Arcangeli A, Ercoli L. Ann Glob Health. 2021 Jan 27;87(1):11. doi: 10.5334/aogh.3186.

<https://www.annalsofglobalhealth.org/articles/10.5334/aogh.3186/>

The United Nations 2030 Agenda for Sustainable Development promotes the "Leaving no one behind" principle and sets goals in areas of critical importance. This principle has become extraordinarily important during the COVID-19 pandemic, and is especially relevant for fragile populations, such as people experiencing homelessness. Homeless persons live in congregate and poor hygiene settings that may favor virus transmission, often have underlying physical and mental comorbidities that place them at high risk of severe forms of COVID-19, and have limited access to public healthcare and social services. In addition, the homeless are often overlooked by safety and health monitoring actions. All of these factors, taken together, place homeless persons at high risk of being left behind. It is therefore of utmost importance to put in place adequate public health measures to limit spread of infection among homeless persons, rapidly identify and isolate asymptomatic and minimally symptomatic subjects, promptly and appropriately treat positive cases, and correctly handle the entire socioeconomic environment of vulnerable people.

4. **Climate change and COVID-19: global challenges and opportunities.** EClinicalMedicine. 2021 Jan 28;31:100738. doi: 10.1016/j.eclinm.2021.100738. eCollection 2021 Jan.

[https://www.thelancet.com/journals/eclinm/article/PIIS2589-5370\(21\)00018-3/fulltext](https://www.thelancet.com/journals/eclinm/article/PIIS2589-5370(21)00018-3/fulltext)

2020 was undoubtedly dominated by the COVID-19 pandemic, which has resulted in the death of more than 2 million people worldwide thus far. The year was also marked by the increasingly evident effects of climate change, including record-breaking wildfires, flooding, and more extreme temperatures. A striking parallel between these two crises is that they both resulted in loss of life that could have been prevented through global efforts. Additionally, the pandemic

may further strain livelihoods and resources already affected by climate change, requiring swift action to avoid catastrophic risks to human health.

5. **Are there similarities between the Corona and the climate crisis?** Schmidt RC. *J Environ Stud Sci*. 2021 Jan 29;1-5. doi: 10.1007/s13412-021-00666-5. Online ahead of print. <https://link.springer.com/article/10.1007/s13412-021-00666-5>
In this short paper, I look back at the early stages of the Corona crisis, around early February 2020, and compare the situation with the climate crisis. Although these two problems unfold on a completely different timescale (weeks in the case of Corona, decades in the case of climate change), I find some rather striking similarities between these two problems, related with issues such as uncertainty, free-rider incentives, and disincentives of politicians to adequately address the respective issue with early, farsighted and possibly harsh policy measures. I then argue that for complex problems with certain characteristics, it may be necessary to establish novel political decision procedures that sidestep the normal, day-to-day political proceedings. These would be procedures that actively involve experts, and lower the involvement of political parties as far as possible to minimize the decision-makers' disincentives.
6. **Unhealthy geopolitics: can the response to COVID-19 reform climate change policy?** Cole J, Dodds K. *Bull World Health Organ*. 2021 Feb 1;99(2):148-154. doi: 10.2471/BLT.20.269068. Epub 2020 Nov 30. <https://www.who.int/bulletin/volumes/99/2/20-269068/en/>
The geopolitics of pandemics and climate change intersect. Both are complex and urgent problems that demand collective action in the light of their global and trans-boundary scope. In this article we use a geopolitical framework to examine some of the tensions and contradictions in global governance and cooperation that are revealed by the pandemic of coronavirus disease 2019 (COVID-19). We argue that the pandemic provides an early warning of the dangers inherent in weakened international cooperation. The world's states, with their distinct national territories, are reacting individually rather than collectively to the COVID-19 pandemic. Many countries have introduced extraordinary measures that have closed, rather than opened up, international partnership and cooperation. Border closures, restrictions on social mixing, domestic purchase of public health supplies and subsidies for local industry and commerce may offer solutions at the national level but they do not address the global strategic issues. For the poorest countries of the world, pandemics join a list of other challenges that are exacerbated by pressures of scarce resources, population density and climate disruption. COVID-19's disproportionate impact on those living with environmental stresses, such as poor air quality, should guide more holistic approaches to the geopolitical intersection of public health and climate change. By discussing unhealthy geopolitics, we highlight the urgent need for a coordinated global response to addressing challenges that cannot be approached unilaterally.
7. **Impact of COVID-related lockdowns on environmental and climate change scenarios.** Bhat SA, Bashir O, Bilal M, Ishaq A, Din Dar MU, Kumar R, Bhat RA, Sher F. *Environ Res*. 2021 Feb 4;195:110839. doi: 10.1016/j.envres.2021.110839. Online ahead of print. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7860963/>

The outbreak of COVID-19 pandemic has emerged as a major challenge from human health perspective. The alarming exponential increase in the transmission and fatality rates related to this disease has brought the world to a halt so as to cope up with its stern consequences. This has led to the imposition of lockdown across the globe to prevent the further spread of this disease. This lock down brought about drastic impacts at social and economic fronts. However, it also posed some positive impacts on environment as well particularly in the context of air quality due to reduction in concentrations of particulate matter (PM), NO₂ and CO across the major cities of the globe as indicated by several research organizations. In China, Italy, France and Spain, there were about 20-30% reduction in NO₂ emission while in USA 30% reduction in NO₂ emission were observed. Compared to previous year, there was 11.4% improvement in the air quality in China. Drastic reductions in NO (-77.3%), NO₂ (-54.3%) and CO (-64.8%) (negative sign indicating a decline) concentrations were observed in Brazil during partial lockdown compared to the five year monthly mean. In India there were about -51.84, -53.11, -17.97, -52.68, -30.35, 0.78 and -12.33% reduction in the concentration of PM₁₀, PM_{2.5}, SO₂, NO₂, CO, O₃ and NH₃ respectively. This article highlights the impact of lockdown on the environment and also discusses the pre and post lockdown air pollution scenario across major cities of the world. Several aspect of environment such as air, water, noise pollution and waste management during, pre and post lockdown scenario were studied and evaluated comprehensively. This research would therefore serve as a guide to environmentalist, administrators and frontline warriors for fighting our the way to beat this deadly disease and minimize its long term implications on health and environment.

Health Impacts of Climate Change

8. **The public health implications of the Paris Agreement: a modelling study.** Hamilton I, Kennard H, McGushin A, Höglund-Isaksson L, Kiesewetter G, Lott M, Milner J, Purohit P, Rafaj P, Sharma R, Springmann M, Woodcock J, Watts N. *Lancet Planet Health*. 2021 Feb;5(2):e74-e83. doi: 10.1016/S2542-5196(20)30249-7.

[https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196\(20\)30249-7/fulltext](https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196(20)30249-7/fulltext)

BACKGROUND: nationally determined contributions (NDCs) serve to meet the goals of the Paris Agreement of staying "well below 2°C", which could also yield substantial health co-benefits in the process. However, existing NDC commitments are inadequate to achieve this goal. Placing health as a key focus of the NDCs could present an opportunity to increase ambition and realise health co-benefits. We modelled scenarios to analyse the health co-benefits of NDCs for the year 2040 for nine representative countries (ie, Brazil, China, Germany, India, Indonesia, Nigeria, South Africa, the UK, and the USA) that were selected for their contribution to global greenhouse gas emissions and their global or regional influence.

METHODS: Modelling the energy, food and agriculture, and transport sectors, and mortality related to risk factors of air pollution, diet, and physical activity, we analysed the health co-benefits of existing NDCs and related policies (ie, the current pathways scenario) for 2040 in nine countries around the world. We compared these health co-benefits with two alternative scenarios, one consistent with the goal of the Paris Agreement and the Sustainable Development Goals (ie, the sustainable pathways scenario), and one in line with the sustainable

pathways scenario, but also placing health as a central focus of the policies (ie, the health in all climate policies scenario).

FINDINGS: Compared with the current pathways scenario, the sustainable pathways scenario resulted in an annual reduction of 1·18 million air pollution-related deaths, 5·86 million diet-related deaths, and 1·15 million deaths due to physical inactivity, across the nine countries, by 2040. Adopting the more ambitious health in all climate policies scenario would result in a further reduction of 462 000 annual deaths attributable to air pollution, 572 000 annual deaths attributable to diet, and 943 000 annual deaths attributable to physical inactivity. These benefits were attributable to the mitigation of direct greenhouse gas emissions and the commensurate actions that reduce exposure to harmful pollutants, as well as improved diets and safe physical activity.

INTERPRETATION: A greater consideration of health in the NDCs and climate change mitigation policies has the potential to yield considerable health benefits as well as achieve the "well below 2°C" commitment across a range of regional and economic contexts.

FUNDING: This work was in part funded through an unrestricted grant from the Wellcome Trust (award number 209734/Z/17/Z) and supported by an Engineering and Physical Sciences Research Council grant (grant number EP/R035288/1).

- 9. Climate change and epilepsy: Insights from clinical and basic science studies.** Gulcebi MI, Bartolini E, Lee O, Lisgaras CP, Onat F, Mifsud J, Striano P, Vezzani A, Hildebrand MS, Jimenez-Jimenez D, Junck L, Lewis-Smith D, Scheffer IE, Thijs RD, Zuberi SM, Blenkinsop S, Fowler HJ, Foley A, Sisodiya SM; EpilepsyClimateChange Consortium. *Epilepsy Behav.* 2021 Feb 9;116:107791. doi: 10.1016/j.yebeh.2021.107791. Online ahead of print.

<https://www.clinicalkey.com/#!/content/journal/1-s2.0-S1525505021000251>

Climate change is with us. As professionals who place value on evidence-based practice, climate change is something we cannot ignore. The current pandemic of the novel coronavirus, SARS-CoV-2, has demonstrated how global crises can arise suddenly and have a significant impact on public health. Global warming, a chronic process punctuated by acute episodes of extreme weather events, is an insidious global health crisis needing at least as much attention. Many neurological diseases are complex chronic conditions influenced at many levels by changes in the environment. This review aimed to collate and evaluate reports from clinical and basic science about the relationship between climate change and epilepsy. The keywords climate change, seasonal variation, temperature, humidity, thermoregulation, biorhythm, gene, circadian rhythm, heat, and weather were used to search the published evidence. A number of climatic variables are associated with increased seizure frequency in people with epilepsy. Climate change-induced increase in seizure precipitants such as fevers, stress, and sleep deprivation (e.g. as a result of more frequent extreme weather events) or vector-borne infections may trigger or exacerbate seizures, lead to deterioration of seizure control, and affect neurological, cerebrovascular, or cardiovascular comorbidities and risk of sudden unexpected death in epilepsy. Risks are likely to be modified by many factors, ranging from individual genetic variation and temperature-dependent channel function, to housing quality and global supply chains. According to the results of the limited number of experimental studies with animal models of seizures or epilepsy, different seizure types appear to have distinct susceptibility to seasonal influences. Increased body temperature, whether in the

context of fever or not, has a critical role in seizure threshold and seizure-related brain damage. Links between climate change and epilepsy are likely to be multifactorial, complex, and often indirect, which makes predictions difficult. We need more data on possible climate-driven altered risks for seizures, epilepsy, and epileptogenesis, to identify underlying mechanisms at systems, cellular, and molecular levels for better understanding of the impact of climate change on epilepsy. Further focussed data would help us to develop evidence for mitigation methods to do more to protect people with epilepsy from the effects of climate change.

10. **Thermal performance of the Chagas disease vector, *Triatoma infestans*, under thermal variability.** Clavijo-Baquet S, Cavieres G, González A, Cattán PE, Bozinovic F. PLoS Negl Trop Dis. 2021 Feb 11;15(2):e0009148. doi: 10.1371/journal.pntd.0009148. Online ahead of print. <https://journals.plos.org/plosntds/article?id=10.1371/journal.pntd.0009148>

Vector-borne diseases (VBD) are particularly susceptible to climate change because most of the diseases' vectors are ectotherms, which themselves are susceptible to thermal changes. The Chagas disease is one neglected tropical disease caused by the protozoan parasite, *Trypanosoma cruzi*. One of the main vectors of the Chagas disease in South America is *Triatoma infestans*, a species traditionally considered to be restricted to domestic or peridomestic habitats, but sylvatic foci have also been described along its distribution. The infestation of wild individuals, together with the projections of environmental changes due to global warming, urge the need to understand the relationship between temperature and the vector's performance. Here, we evaluated the impact of temperature variability on the thermal response of *T. infestans*. We acclimated individuals to six thermal treatments for five weeks to then estimate their thermal performance curves (TPCs) by measuring the walking speed of the individuals. We found that the TPCs varied with thermal acclimation and body mass. Individuals acclimated to a low and variable ambient temperature ($18^{\circ}\text{C} \pm 5^{\circ}\text{C}$) exhibited lower performances than those individuals acclimated to an optimal temperature ($27^{\circ}\text{C} \pm 0^{\circ}\text{C}$); while those individuals acclimated to a low but constant temperature ($18^{\circ}\text{C} \pm 0^{\circ}\text{C}$) did not differ in their maximal performance from those at an optimal temperature. Additionally, thermal variability (i.e., $\pm 5^{\circ}\text{C}$) at a high temperature (30°C) increased performance. These results evidenced the plastic response of *T. infestans* to thermal acclimation. This plastic response and the non-linear effect of thermal variability on the performance of *T. infestans* posit challenges when predicting changes in the vector's distribution range under climate change.

11. **Maternal and newborn health risks of climate change: A call for awareness and global action.** Roos N, Kovats S, Hajat S, Filippi V, Chersich M, Luchters S, Scorgie F, Nakstad B, Stephansson O; Chamnha consortium. Acta Obstet Gynecol Scand. 2021 Feb 11. doi: 10.1111/aogs.14124. Online ahead of print.

<https://obgyn.onlinelibrary.wiley.com/doi/abs/10.1111/aogs.14124?af=R>

Climate change represents one of the largest global health threats of the 21st century with immediate and long-term consequences for the most vulnerable populations, especially in the poorest countries with the least capacity to adapt to climate change. Pregnant women and newborns are increasingly being recognized as vulnerable populations in the context of climate change. The effects can be direct or indirect through heat stress, extreme weather events and air pollution, potentially impacting both the immediate and long-term health of pregnant

women and newborns through a broad range of mechanisms. In 2008, the World Health Organization passed a resolution during the 61st World Health Assembly, recognizing the need for research to identify strategies and health-system strengthening to mitigate the effects of climate change on health. Climate adaptation plans need to consider vulnerable populations such as pregnant women and neonates and a broad multisectoral approach to improve overall resilience of societies.

12. **Environmental air pollution: respiratory effects.** Santos UP, Arbex MA, Braga ALF, Mizutani RF, Cançado JED, Terra-Filho M, Chatkin JM. *J Bras Pneumol.* 2021 Feb 8;47(1):e20200267. doi: 10.36416/1806-3756/e20200267. eCollection 2021.

Environmental air pollution is a major risk factor for morbidity and mortality worldwide. Environmental air pollution has a direct impact on human health, being responsible for an increase in the incidence of and number of deaths due to cardiopulmonary, neoplastic, and metabolic diseases; it also contributes to global warming and the consequent climate change associated with extreme events and environmental imbalances. In this review, we present articles that show the impact that exposure to different sources and types of air pollutants has on the respiratory system; we present the acute effects-such as increases in symptoms and in the number of emergency room visits, hospitalizations, and deaths-and the chronic effects-such as increases in the incidence of asthma, COPD, and lung cancer, as well as a rapid decline in lung function. The effects of air pollution in more susceptible populations and the effects associated with physical exercise in polluted environments are also presented and discussed. Finally, we present the major studies on the subject conducted in Brazil. Health care and disease prevention services should be aware of this important risk factor in order to counsel more susceptible individuals about protective measures that can facilitate their treatment, as well as promoting the adoption of environmental measures that contribute to the reduction of such emissions.

13. **The Need for Collective Awareness of Attempted Suicide Rates in a Warming Climate.**

Giacomini G, Aguglia A, Amerio A, Escelsior A, Capello M, Cutroneo L, Ferretti G, Scafidi D, Serafini G, Amore M. *Crisis.* 2021 Feb 10:1-4. doi: 10.1027/0227-5910/a000763. Online ahead of print.

Background: Climate factors may offer a stronger explanation of the variations in suicide rates compared with economic variables, even in the case of patients admitted involuntarily. Aims: We assessed the role of temperature as a determinant of the increased prevalence of suicide attempts (SA). Method: The sample comprised all cases of hospitalization for SA at the Psychiatric Clinic of the IRCCS Ospedale Policlinico San Martino between August 2013 and July 2018. For ambient temperature, data were provided by the Meteorological Observatory of the University of Genoa. Results: We noted a peak in suicides that was typically found in late spring and early summer due to global warming. Limitations: Other environmental/psychological factors contributing to the onset of an acute clinical event were not considered. The cross-sectional design of the study is another limitation. Conclusion: Further studies are needed to clarify the impact of climatic factors on suicide behavior and implement early intervention and preventive strategies for mental health.

14. **Chronic Mental Health Sequelae of Climate Change Extremes: A Case Study of the Deadliest Californian Wildfire.** Silveira S, Kornbluh M, Withers MC, Grennan G, Ramanathan V, Mishra J. *Int J Environ Res Public Health*. 2021 Feb 4;18(4):1487. doi: 10.3390/ijerph18041487. <https://www.mdpi.com/1660-4601/18/4/1487>

Introduction. Weather-related disasters, such as wildfires exacerbated by a rise in global temperatures, need to be better studied in terms of their mental health impacts. This study focuses on the mental health sequelae of the deadliest wildfire in California to date, the Camp Fire of 2018. Methods. We investigated a sample of 725 California residents with different degrees of disaster exposure and measured mental health using clinically validated scales for post-traumatic stress disorder (PTSD), major depressive disorder (MDD) and generalized anxiety disorder (GAD). Data were collected at a chronic time-point, six months post-wildfire. We used multiple regression analyses to predict the mental health outcomes based on self-reported fire exposure. Additionally, we included vulnerability and resilience factors in hierarchical regression analyses. Results. Our primary finding is that direct exposure to large scale fires significantly increased the risk for mental health disorders, particularly for PTSD and depression. Additionally, the inclusion of vulnerability and resilience factors in the hierarchical regression analyses led to the significantly improved prediction of all mental health outcomes. Childhood trauma and sleep disturbances exacerbated mental health symptoms. Notably, self-reported resilience had a positive effect on mental health, and mindfulness was associated with significantly lower depression and anxiety symptoms. Conclusion. Overall, our study demonstrated that climate-related extreme events, such as wildfires, can have severe mental illness sequelae. Moreover, we found that pre-existing stressful life events, resilient personality traits and lifestyle factors can play an important role in the prevalence of psychopathology after such disasters. Unchecked climate change projected for the latter half of this century may severely impact the mental wellbeing of the global population, and we must find ways to foster individual resiliency.

WE ACT

15. **Health care's response to climate change: a carbon footprint assessment of the NHS in England.** Tennison I, Roschnik S, Ashby B, Boyd R, Hamilton I, Oreszczyn T, Owen A, Romanello M, Ruyssevelt P, Sherman JD, Smith AZP, Steele K, Watts N, Eckelman MJ. *Lancet Planet Health*. 2021 Feb;5(2):e84-e92. doi: 10.1016/S2542-5196(20)30271-0. [https://www.thelancet.com/pdfs/journals/lanplh/PIIS2542-5196\(20\)30271-0.pdf](https://www.thelancet.com/pdfs/journals/lanplh/PIIS2542-5196(20)30271-0.pdf)

BACKGROUND: Climate change threatens to undermine the past 50 years of gains in public health. In response, the National Health Service (NHS) in England has been working since 2008 to quantify and reduce its carbon footprint. This Article presents the latest update to its greenhouse gas accounting, identifying interventions for mitigation efforts and describing an approach applicable to other health systems across the world.

METHODS: A hybrid model was used to quantify emissions within Scopes 1, 2, and 3 of the Greenhouse Gas Protocol, as well as patient and visitor travel emissions, from 1990 to 2019. This approach complements the broad coverage of top-down economic modelling with the high accuracy of bottom-up data wherever available. Available data were backcasted or forecasted

to cover all years. To enable the identification of measures to reduce carbon emissions, results were disaggregated by organisation type.

FINDINGS: In 2019, the health service's emissions totalled 25 megatonnes of carbon dioxide equivalent, a reduction of 26% since 1990, and a decrease of 64% in the emissions per inpatient finished admission episode. Of the 2019 footprint, 62% came from the supply chain, 24% from the direct delivery of care, 10% from staff commute and patient and visitor travel, and 4% from private health and care services commissioned by the NHS.

INTERPRETATION: This work represents the longest and most comprehensive accounting of national health-care emissions globally, and underscores the importance of incorporating bottom-up data to improve the accuracy of top-down modelling and enabling detailed monitoring of progress as health systems act to reduce emissions.

FUNDING: Wellcome Trust.

16. **Planetary health care: a framework for sustainable health systems.** MacNeill AJ, McGain F, Sherman JD. *Lancet Planet Health*. 2021 Feb;5(2):e66-e68. doi: 10.1016/S2542-5196(21)00005-X.

[https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196\(21\)00005-X/fulltext](https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196(21)00005-X/fulltext)

In 2018, the Intergovernmental Panel on Climate Change announced that to restrict global temperature rise to 1.5°C, greenhouse gas emissions must decrease 45% by 2030 compared with 2010, and reach net zero by 2050.¹ In 2020, the UK National Health Service (NHS) committed to achieving net zero greenhouse gas emissions by 2040.² This precedent-setting decision by one of the world's largest health systems firmly positions the health sector at the vanguard of environmental sustainability and affirms the indivisibility of planetary health and health-care delivery. Other health systems must follow suit, committing to ambitious emissions targets and sharing best practices. The race to zero is on.

17. **(Broken) Promises of Sustainable Food and Agriculture through New Biotechnologies: The CRISPR Case.** Kuiken T, Barrangou R, Grieger K. *CRISPR J*. 2021 Feb 10:1-7. doi: 10.1089/crispr.2020.0098. Online ahead of print.

In recent years, the development of diverse CRISPR-based technologies has revolutionized genome manipulation and enabled a broad scientific community in industry, academia, and beyond to redefine research and development for biotechnology products encompassing food, agriculture, and medicine. CRISPR-based genome editing affords tremendous opportunities in agriculture for the breeding of crops and livestock across the food supply chain that could benefit larger portions of the population compared to CRISPR applications in medicine, for example by helping to feed a growing global population, reach sustainability goals, and possibly mitigate the effects of climate change. These promises come alongside concerns of risks and adverse impacts associated with CRISPR-based genome editing and concerns that governance systems that are ill equipped or not well suited to evaluate these risks. The international community will continue to gather, in multiple venues, in the coming years to discuss these concerns. At the same time, responsible research and innovation paradigms also promise to evaluate the risks and benefits better while incorporating broad stakeholder engagement across the research and development process. The CRISPR community therefore must actively engage with these international deliberations, society, and national governance systems that

have promised to build better agricultural systems and provide better food products to achieve equitable outcomes while protecting the environment. Without this active engagement, the promises discussed in this paper are sure to be broken.

18. **Climate Change Impacts and Workforce Development Needs in Federal Region X: A Qualitative Study of Occupational Health and Safety Professionals' Perceptions.** Pedersen KM, Busch Isaksen TM, Baker MG, Seixas N, Errett NA. Int J Environ Res Public Health. 2021 Feb 5;18(4):1513. doi: 10.3390/ijerph18041513.

<https://www.mdpi.com/1660-4601/18/4/1513>

Climate change is considered one of the top health threats in the United States. This research sought to (1) to understand the perceptions of occupational health and safety (OHS) professionals regarding the impacts of climate-related hazards on OHS in Region X, and (2) to explore the ideas of these OHS professionals regarding the content of future training programs that would better prepare OHS professionals to identify and mitigate climate-related hazards in Region X. Key informant (KI) interviews with 17 OHS professionals familiar with the climate-related hazards and impacts to OHS in Region X were coded and thematically analyzed. Climate hazards, social and economic impacts from climate-related hazards, and sector-specific worker and workplace impacts from climate-related hazards were described as having interacting relationships that influenced worker health and safety impacts. KIs further described how workplace controls could be used to mitigate OHS impacts of climate-related hazards, and how training of the OHS workforce could influence the ability to successfully implement such controls. Our findings suggest that OHS impacts are sector-specific, influenced by social and economic factors, and can be mitigated through workplace controls designed and implemented by a trained OHS workforce. The findings from this work should inform future educational and training programming and additional research and translation activities in the region, while our approach can inform other regions as they develop regionally specific OHS climate change training and programming.

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