Medinfo 2023

Climate change and health: A public health emergency but you can make a difference

Nicholas J. Talley AC

University of Newcastle, Australia and Hunter Medical Research Institute

I acknowledge the Traditional Owners of the lands on which we meet today

I pay my respects to Elders past and present

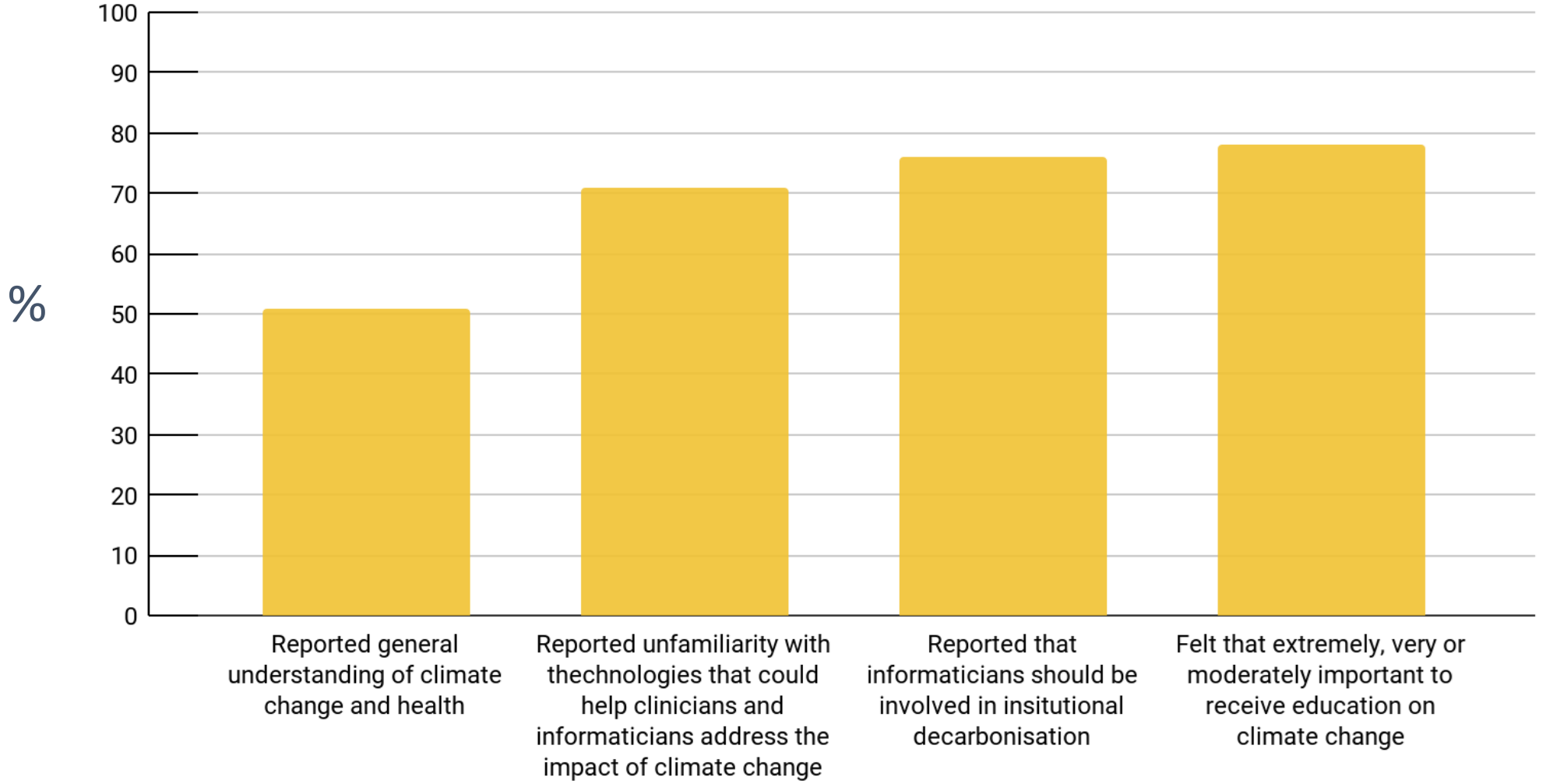
Your views on the importance of climate change?

- ❑Unimportant
- ❑Feel no one can do anything really anyway, so ignore
- ❑Waiting for others to do something
- ❑Believe technology will solve the problem, leave it to “them”
- ❑Taking tentative steps to do something
- ❑Actively taken steps at home and/or work and/or community to make a major difference

Views on the importance of climate change

- Unimportant – I can't change your mind
- Feel no one can do anything really anyway, so ignore
- Waiting for others to do something
- Believe technology will solve the problem, leave it to "them"
- Taking tentative steps to do something
- Actively taken steps at home and/or work and/or community to make a major difference – I don't want to change your mind

Climate change and health informatics: pilot survey of perspectives across the field



N= 85 Participants

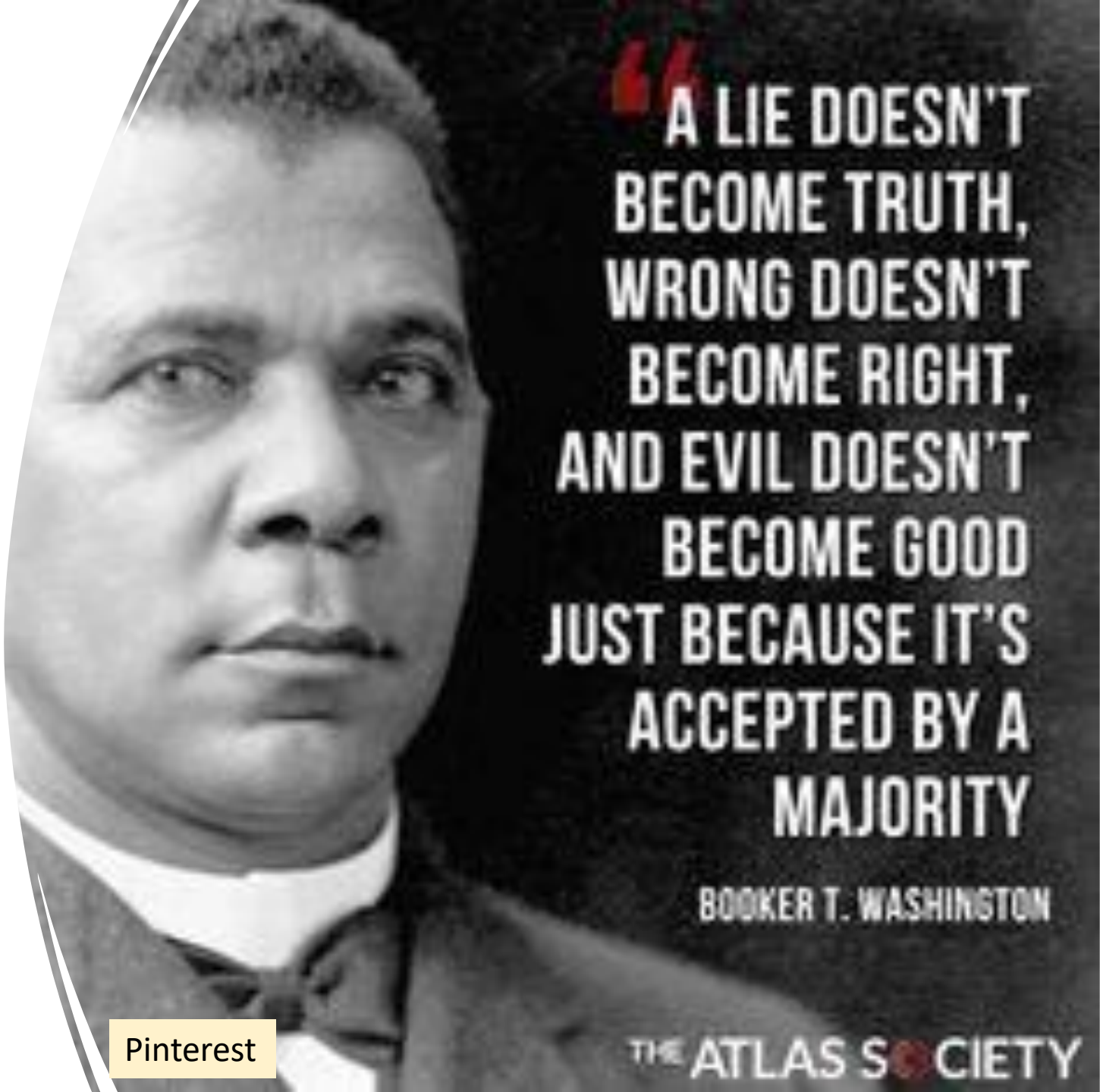
Sarabu C, Deonarine A, Leitner S, Fayanju O, Fisun M, Nadeau K. J Am Med Inform Assoc. 2022 Nov 14;29(12):2117-2123. doi: 10.1093/jamia/ocac199. PMID: 36264269; PMCID: PMC9667170.

We have one home – a tiny blue dot

- Pale Blue Dot: photograph of Earth taken Feb. 14, 1990, by NASA's Voyager 1 at distance of 3.7 billion miles (6 billion kilometers) from Sun
- Inspired the title of scientist Carl Sagan's book, "Pale Blue Dot: A Vision of the Human Future in Space," in which he wrote: "Look again at that dot. That's here. That's home. That's us."
- Everyone you know, everyone and everything that has ever lived…

https://solarsystem.nasa.gov/resources/536/voyager-1s-pale-blue-dot/

Living in a post truth society



Pinterest

“There is no climate emergency”

FACEBOOK 2020

"WHY ARE THEY IGNORING 500 SCIENTISTS & PROFESSIONALS?" Mr. Kelly reproduced in full a petition known as the European Climate Declaration, declaring there is "no climate emergency".

RMIT ABC Fact Check Feb 2020

Who are the 75 Australian 'scientists and professionals' who say there is no climate

- Many of the Australian signatories have current or former connections to the mining industry
- Less than 19% of Australian signatories were verified by Fact Check to have held an academic position, or published peer-reviewed research
- The majority are listed as working or previously working in fields unrelated to climate science or the environment


GOT SNOW IDEA

ALARMISTS GIVEN BIG CHILL

Children just aren't going to know what snow is

East Anglia University expert in 2020

I have never seen the Village so covered in snow ahead of the June long weekend

Thredbo manager Stuart Diver

Sky News Australia is a global hub for climate misinformation

https://www.theguardian.com/media/2022/jun/14/sky-news-australia-is-a-global-hub-for-climate-misinformation-report-says

September 27, 2021
'The global warming cult is getting very dangerous'

Sky News host Andrew Bolt says the "global warming cult" is getting very dangerous
His comments come ahead of the COP26 Climate Change Conference in Glasgow

AAP FactCheck Investigation FALSE
"According to this graph, there has been no net warming in the last 22 years."
Rowan Dean, Sky News host, January 19, 2021

May 3rd, 2021
Evidence shows global warming scare may be 'wildly exaggerated'

Sky News host Andrew Bolt says there is news today which doesn't fit the script of the "global warming scare" as evidence shows the fear may be "wildly exaggerated"

Sky News Australia is a global hub for climate misinformation

September 27, 2021
'The global warming

Sky News host Andre
getting very dangero
His comments come
Conference in Glasgo

22/jun/14/sky-news-
nformation-report-says

arming scare may

AAP FactCheck Inves
"According to this gra
last 22 years."
Rowan Dean, Sky Ne

ys there is news today
he "global warming
ear may be "wildly

Cherry pick the data, don't appear to deeply understand scientific methods, can't interpret data, belief trumps evidence?

Yes, CO_2 is good for plants…
but the greenhouse gas effect is deadly

- Rays of the sun that make it through the atmosphere are absorbed on the earth's surface
- Radiated back towards space with a longer wavelength than incoming solar radiation - what was visible light becomes infrared light
- Molecules of CO_2, N_2O, and CH_4 as well as other greenhouse gases are better able to absorb energy at the wavelengths of the radiation coming off the earth's surface and heading back to space than they are at the wavelengths of incoming solar radiation

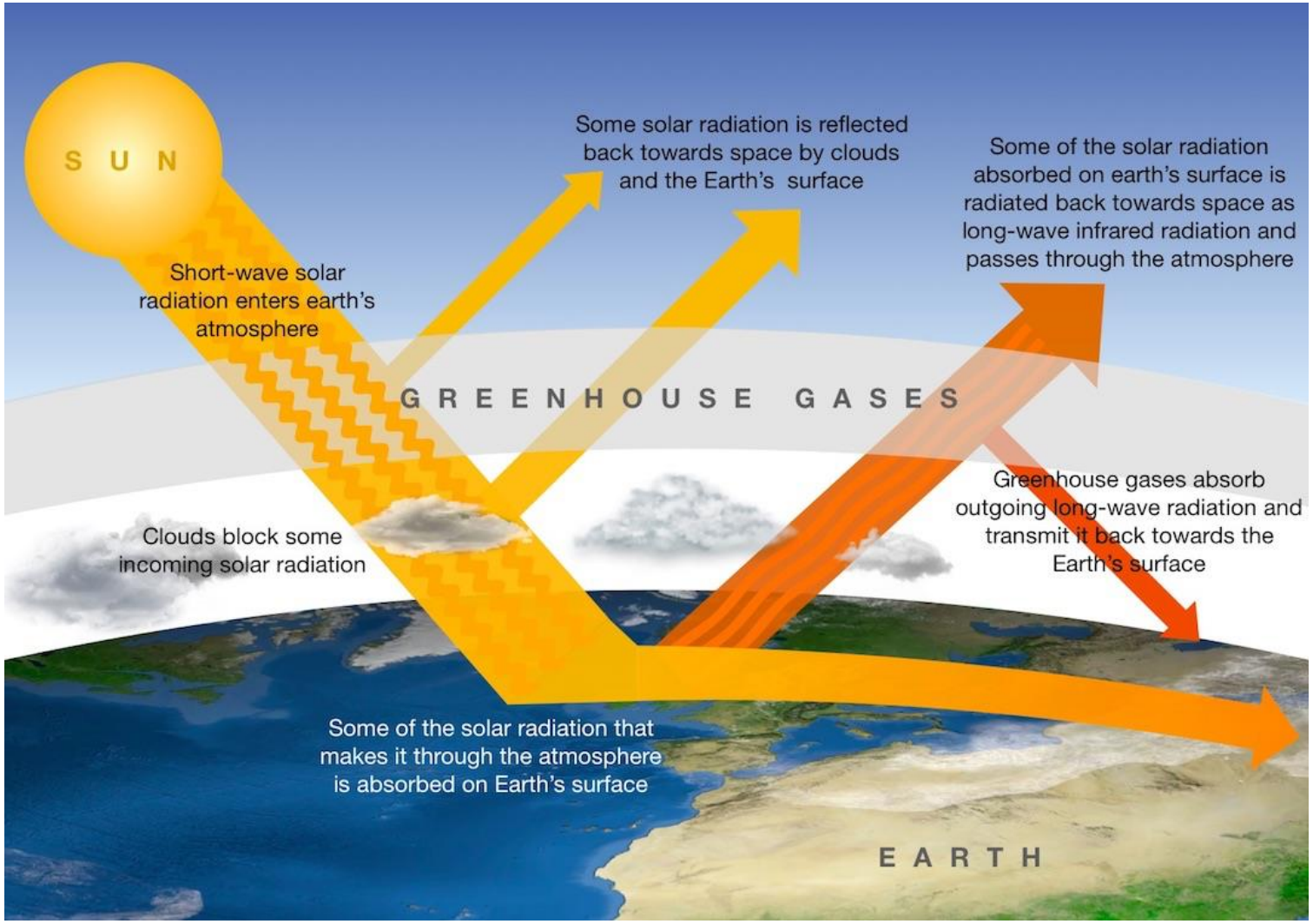
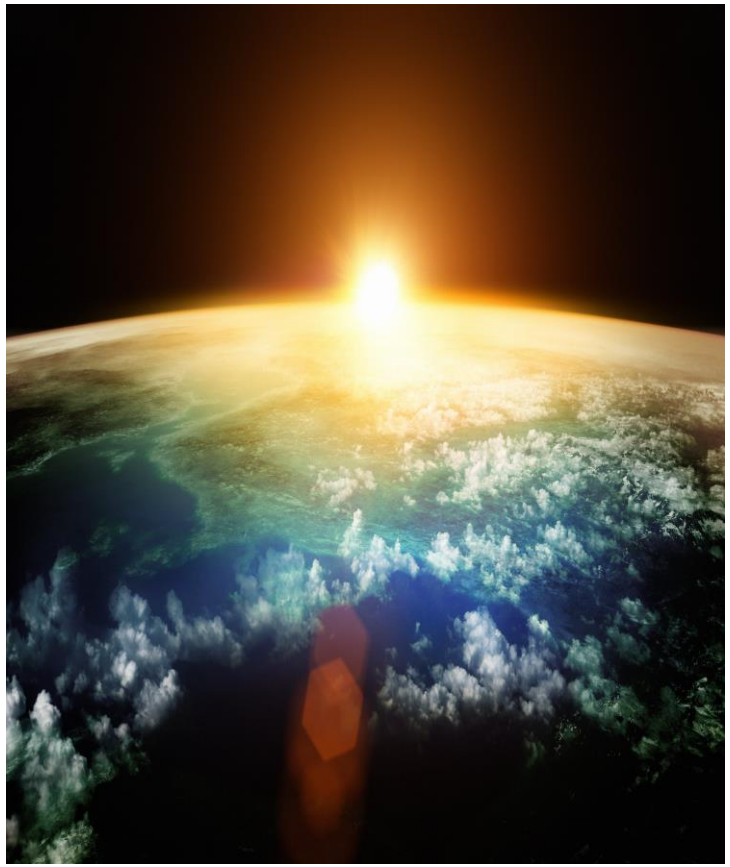


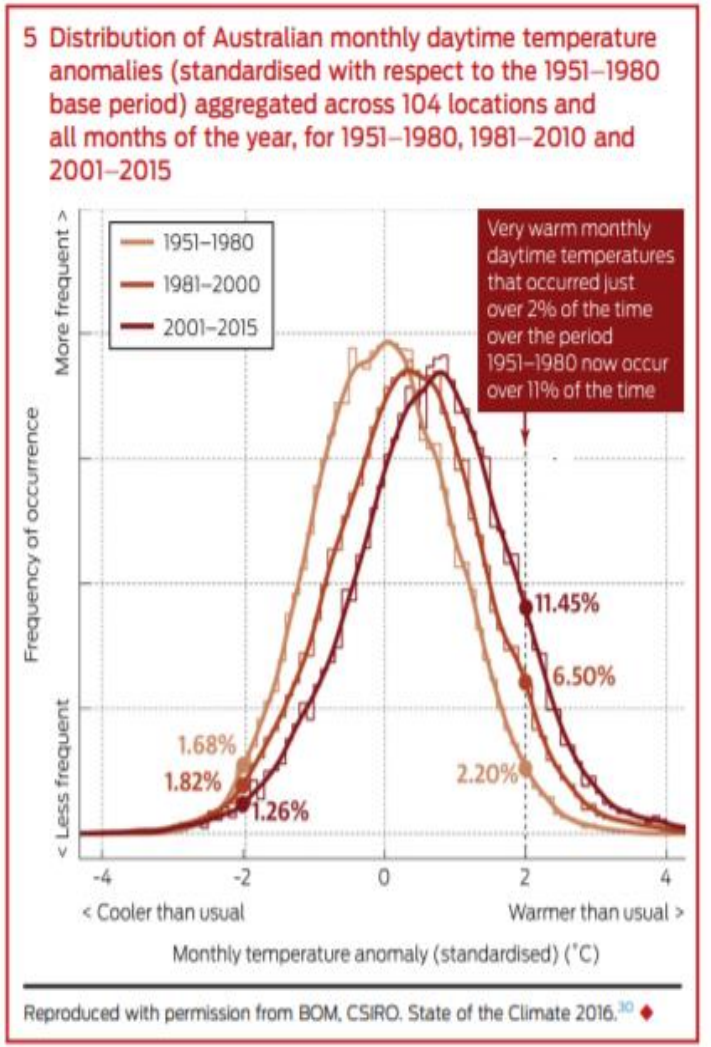
Image courtesy of Harvard, based on image from US EPA

The science for health professionals in the MJA: it's GLOBAL warming

Hanna EG, McIver LJ. Climate change: a brief overview of the science and health impacts for Australia. Med J Aust. 2018 Apr 16;208(7):311-315.

- Current greenhouse gas emissions highest on the planet in 2 million years
- Current temperatures would be 1.5° C higher except for "cooling" air pollution (e.g. sulphates)
- A temperature increase of 5° C – worst case: will change the face of the globe
- Heading now to a temperature increase of 3-4° C
- Not only do we need to go to NET ZERO – we now need to take CO_2 out of our atmosphere to prevent severe outcomes

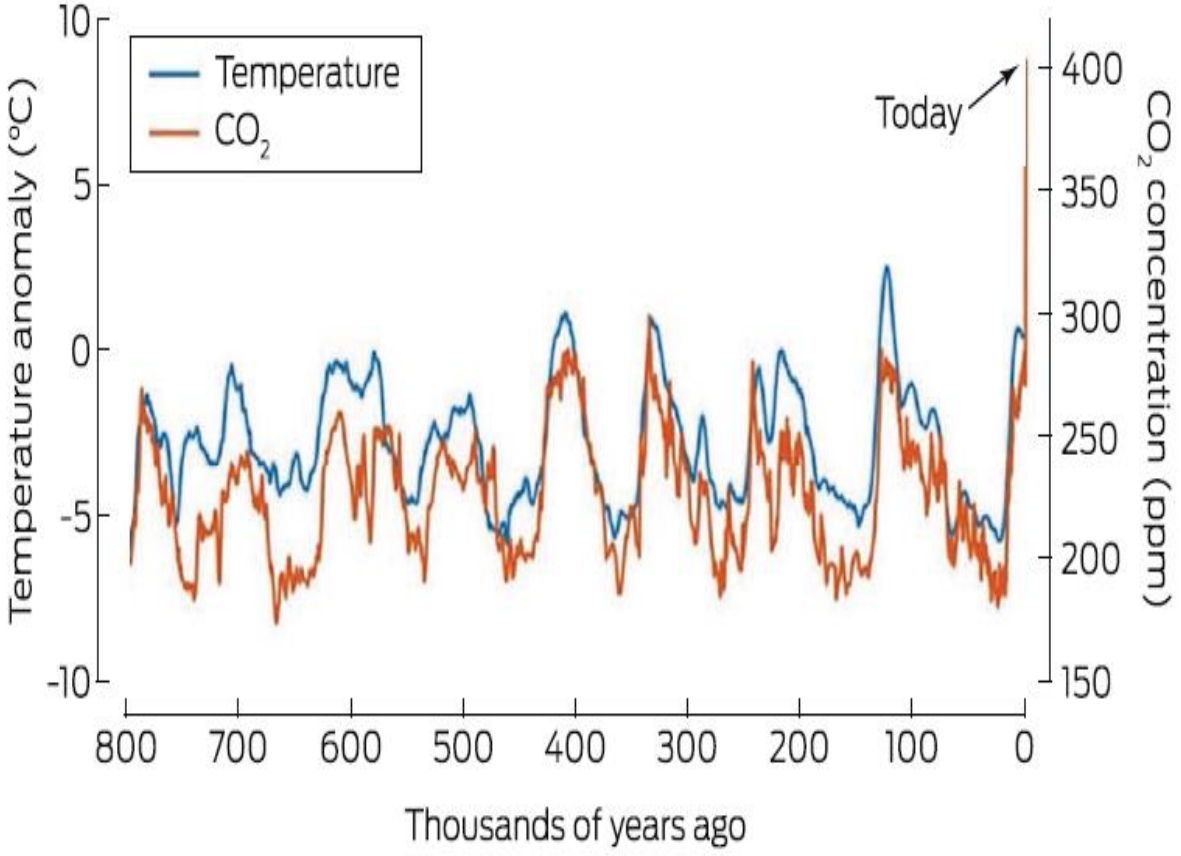




If you are not frightened, you should be…

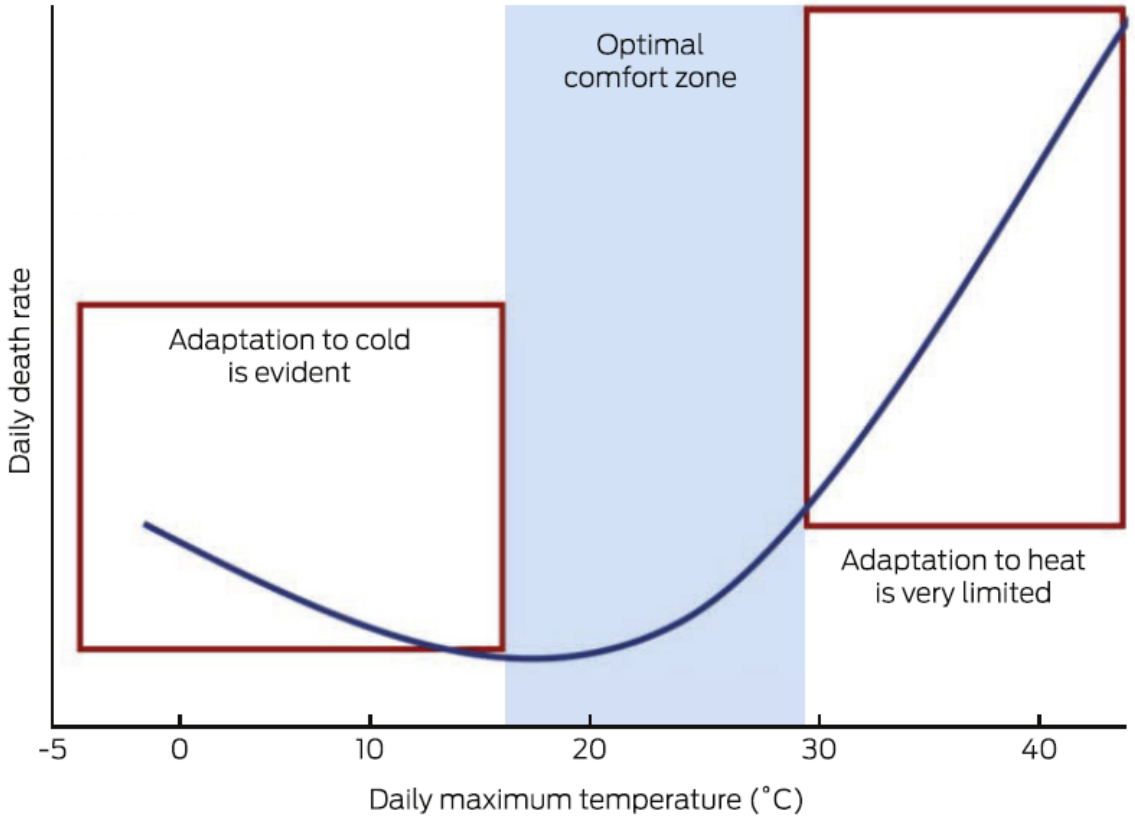
GLOBAL warming is real

1 Global average temperatures and atmospheric CO_2 levels for the past 800 000 years



Reproduced with permission from Henley and Abram.[5]

6 Schematic representation of temperature–mortality curve based on study data[34,35]



FACT | EXTREME WEATHER EVENTS

- Extreme weather events likely to increase causing illness, injury, and loss of life
- Reduced air quality, changes to spread of infectious diseases and possibly adverse mental health impacts

Carey MG, Monaghan MP, Stanley FJ. Extreme heat threatens the health of Australians. Med J Aust. 2017 Sep 18;207(6):232-234.

Perspective

Extreme heat threatens the health of Australians

Heatwaves have serious health impacts and we need a better approach to prevention and management

Last year was the world's hottest on record, with anthropogenic global warming raising average temperatures about 1°C above pre-industrial levels.[1] Even small increases in the average temperature influence extremes of hot weather. Heatwaves are becoming hotter, longer and more frequent, and are increasing the risk of bushfires.[2] The number of record hot days in Australia has doubled in the past 50 years,[3] and marine heatwaves are causing severe coral bleaching in the Great Barrier Reef.[3]

The recent summer of 2016–17 saw the highest monthly mean temperatures on record for Sydney and Brisbane. On 11 February, the average maximum temperature across New South Wales was 44°C, making it one of the hottest places on earth at the time.[4]

Heatwaves affect continuity of electricity supply and transport infrastructure,[5,6] but often less visible is the accompanying surge in morbidity and mortality which in turn places enormous stresses on the health care system.

To understand extreme heat and its impacts, we need the geographical context. A heatwave is defined as three or more days of high maximum and minimum temperatures that are unusual for a particular location.[7] Heatwaves of longer duration and higher intensity, and which occur earlier in the season, have higher impacts on mortality. Health impacts can be exacerbated by high relative humidity and poor air quality from urban pollution or bushfire smoke.

Human susceptibility to heat depends on the acclimatisation, age and existing disease burden of the population, and on local environmental factors. Extreme heat can affect health directly through heat-related illnesses when the body's thermoregulatory mechanisms are unable to maintain a normal core temperature, or indirectly through exacerbation of pre-existing conditions in people with increased vulnerability.[7]

Direct heat illness ranges from syncope, muscle cramps and heat exhaustion, to life-threatening heat stroke and exertional heat stroke, with loss of internal temperature control, rhabdomyolysis, multi-organ failure, altered mental state and risk of death. It may be accompanied by dehydration and disorders of fluid, electrolyte or acid–base balance.[8] High ambient temperatures may affect also perinatal outcomes such as pre-term birth.[9]

There are recognised categories of people who are more vulnerable to illness and death when exposed to very high ambient temperatures: older people; very young people; those with chronic comorbidities such as cardiovascular, respiratory and metabolic disorders; those with cognitive disorders and mental illnesses; and those taking a range of medications. The homeless and socially isolated, people of lower socio-economic status, and those living in poorly adapted urban environments are also at increased risk.[7,10-12] Extreme heat can pose serious health risks for outdoor workers.[13]

Individual physiological factors such as age or chronic disease may increase risk in multiple ways, such as diminished cardiovascular reserve, and decreased mobility and decreased capacity to seek cooler environments or adequate hydration. Use of certain medications such as anticholinergics, neuroleptic agents, β-blockers, vasodilators and vasoconstrictors, diuretics and lithium add to the risk via mechanisms such as reducing sweating, altering central thermoregulation, reducing cardiac output, inducing postural hypotension, reducing peripheral blood flow, and increasing diuresis.[7,13]

Factors in the general and built environments are also extremely important. Parts of densely populated cities with dark absorptive surfaces and little green space tend to be several degrees hotter than surrounding areas, constituting an "urban heat island".[11] Heat absorbed during the day is radiated at night, interfering with cooling — a factor known to contribute to heat-related mortality. Access to air-conditioned cool spaces is protective, but may be unreliable during electricity outages in a heatwave.

Direct and indirect impacts on health have significant implications for our health care system. Our larger cities have experienced repeated heatwave events where health services have been severely stretched due to surges in illness and deaths. A summary of some recent reported impacts are shown in the Box. While direct comparisons are difficult due to lack of standardised reporting, increases are evident in ambulance and emergency department (ED) services, and mortality rates, with older people most severely affected. Direct heat-related conditions tend to be more easily identified and recorded compared with exacerbations of pre-existing conditions precipitated by heat. Excess deaths above expected numbers and increases in all-cause mortality have been reported.[14]

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Heatwave health impacts: reported increases in ambulance calls, emergency department (ED) presentations, direct heat-related illness and mortality in Australia, 2009–2014

Heatwave	Ambulance calls	ED presentations: Total	ED presentations: People aged ≥ 75 years	Direct heat-related illness	Mortality
Melbourne 2009[14]	25%*	12%	37%	x 8, ED presentations	62%
Adelaide 2009[16]	16%†		17%‡	x 14, admissions	10%, total; 37%, people aged 15–64 years
Sydney 2011[17]	14%*	2%	8%		13%
Melbourne 2014[19]	25%†	7%	23%	x 5, ED presentations	24%

* Emergency dispatches. † All-cause ambulance calls. ‡ ED presentations only increased in people aged ≥ 75 years. ♦

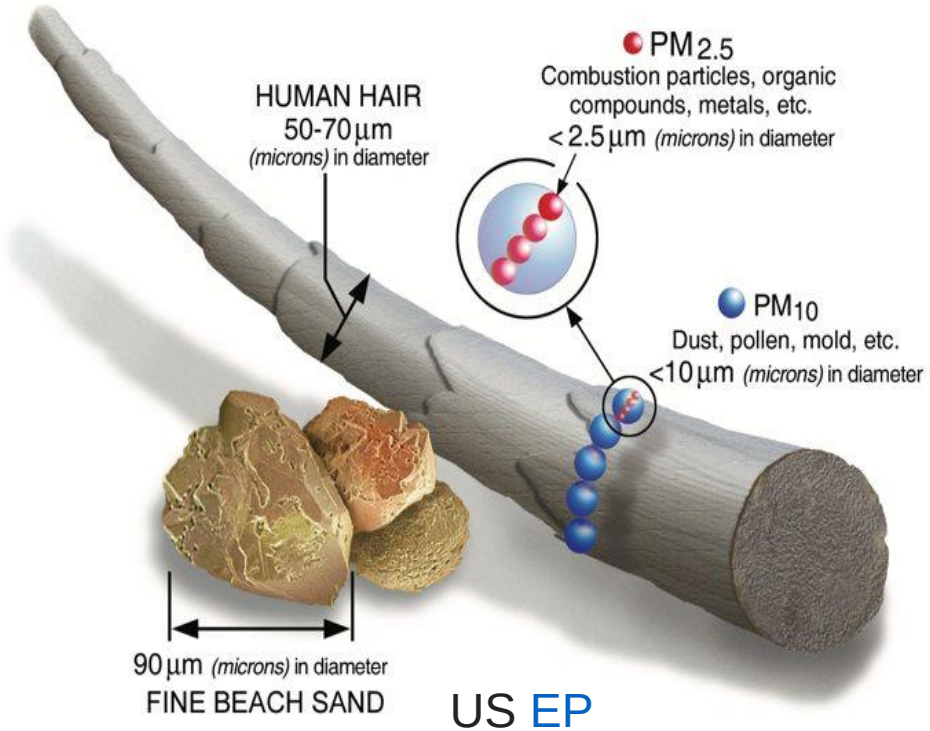
FACT | AIR POLLUTION

- Impact on global temperatures and rainfall affects formation and dispersion of air pollutants
- Exacerbates rates of cardiovascular and respiratory disease
- Thunderstorm asthma (pollen)

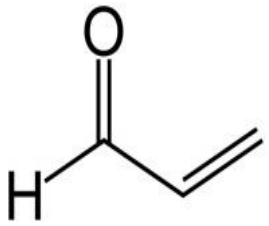
Wildfires in Canada, New York and Washington June 7th, 2023

Toxic material in smoke

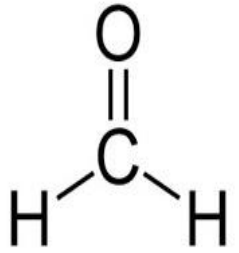
- Worldwide, PM exposures is responsible for millions of death annually



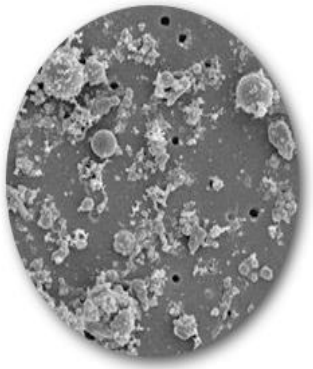
US EPA



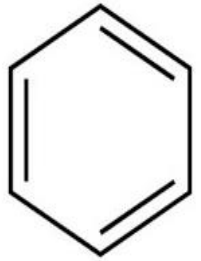
acrolein



formaldehyde



$PM_{2.5}$



benzene/PAHs

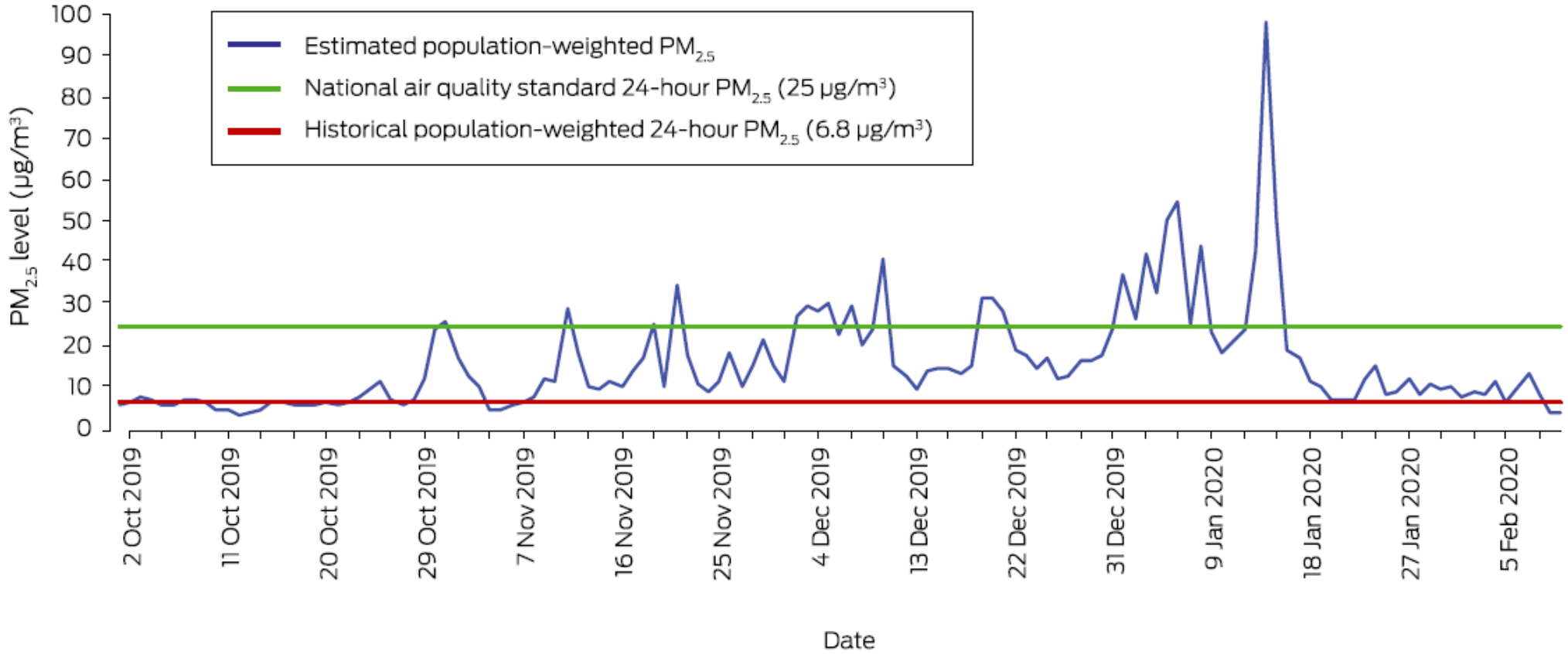
C≡O

carbon monoxide

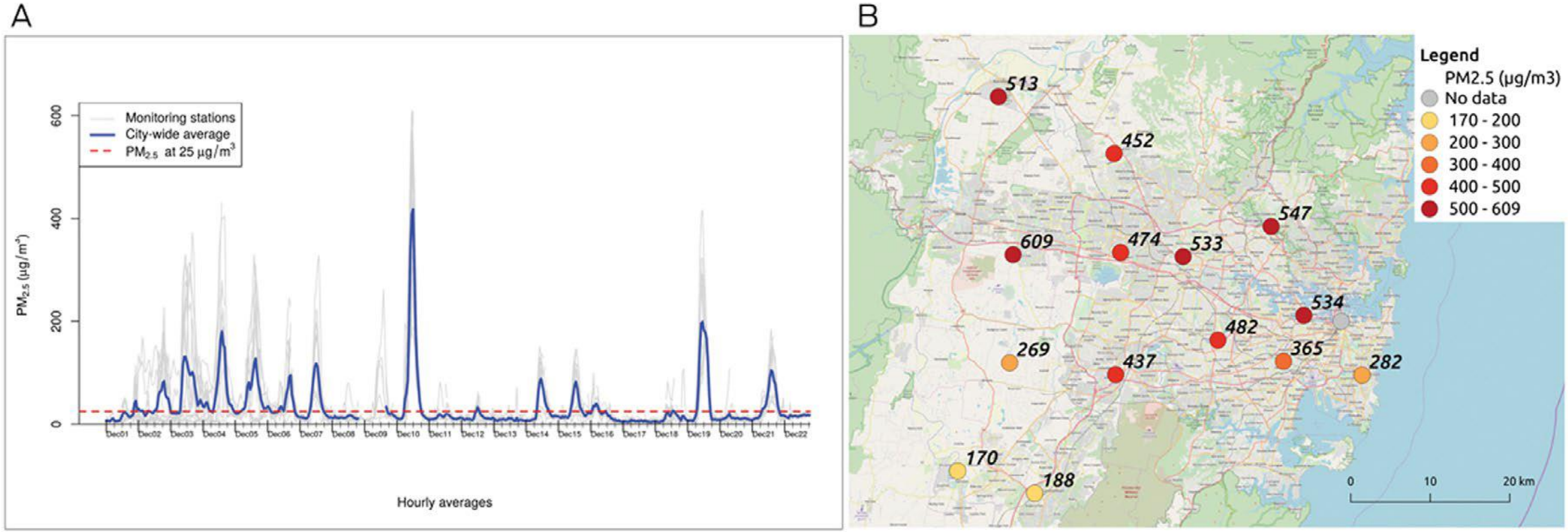
Figure courtesy of Harvard

Smoke-related health burden associated with the 2019–20 bushfires in eastern Australia

1 Population-weighted $PM_{2.5}$ levels, New South Wales, Queensland, the Australian Capital Territory and Victoria, 1 October 2019 – 10 February 2020*



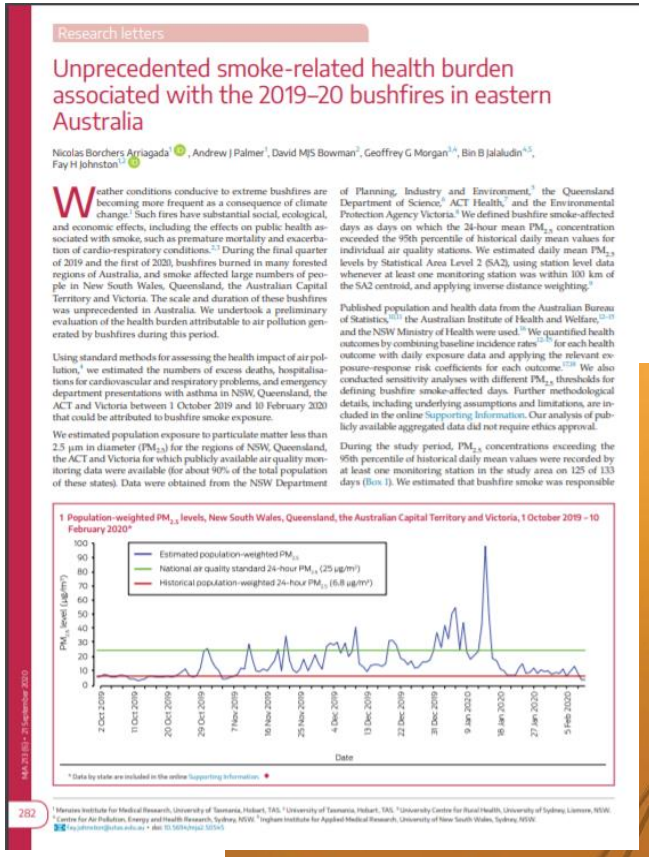
Hourly average PM2.5 levels, Sydney region December 2019



There is NO safe level of exposure to PM2.5 and any reduction in exposure reduces the risk of mortality and morbidity

Med J Aust. 2020;213(6):282-283

Bushfire Smoke



Research letters

Unprecedented smoke-related health burden associated with the 2019–20 bushfires in eastern Australia

Nicolas Borchers Arriagada[1], Andrew J Palmer[1], David MJS Bowman[2], Geoffrey G Morgan[3,4], Bin B Jalaludin[4,5], Fay H Johnston[1,6]

Weather conditions conducive to extreme bushfires are becoming more frequent as a consequence of climate change.[1] Such fires have substantial social, ecological, and economic effects, including the effects on public health associated with smoke, such as premature mortality and exacerbation of cardio-respiratory conditions.[2,3] During the final quarter of 2019 and the first of 2020, bushfires burned in many forested regions of Australia, and smoke affected large numbers of people in New South Wales, Queensland, the Australian Capital Territory and Victoria. The scale and duration of these bushfires was unprecedented in Australia. We undertook a preliminary evaluation of the health burden attributable to air pollution generated by bushfires during this period.

Using standard methods for assessing the health impact of air pollution,[4] we estimated the numbers of excess deaths, hospitalisations for cardiovascular and respiratory problems, and emergency department presentations with asthma in NSW, Queensland, the ACT and Victoria between 1 October 2019 and 10 February 2020 that could be attributed to bushfire smoke exposure.

We estimated population exposure to particulate matter less than 2.5 μm in diameter ($PM_{2.5}$) for the regions of NSW, Queensland, the ACT and Victoria for which publicly available air quality monitoring data were available (for about 90% of the total population of these states). Data were obtained from the NSW Department of Planning, Industry and Environment,[5] the Queensland Department of Science,[6] ACT Health,[7] and the Environmental Protection Agency Victoria.[8] We defined bushfire smoke-affected days as days on which the 24-hour mean $PM_{2.5}$ concentration exceeded the 95th percentile of historical daily mean values for individual air quality stations. We estimated daily mean $PM_{2.5}$ levels by Statistical Area Level 2 (SA2), using station level data whenever at least one monitoring station was within 100 km of the SA2 centroid, and applying inverse distance weighting.[9]

Published population and health data from the Australian Bureau of Statistics,[10,11] the Australian Institute of Health and Welfare,[12–15] and the NSW Ministry of Health were used.[16] We quantified health outcomes by combining baseline incidence rates[17,18] for each health outcome with daily exposure data and applying the relevant exposure–response risk coefficients for each outcome.[17,18] We also conducted sensitivity analyses with different $PM_{2.5}$ thresholds for defining bushfire smoke-affected days. Further methodological details, including underlying assumptions and limitations, are included in the online Supporting Information. Our analysis of publicly available aggregated data did not require ethics approval.

During the study period, $PM_{2.5}$ concentrations exceeding the 95th percentile of historical daily mean values were recorded by at least one monitoring station in the study area on 125 of 133 days (Box 1). We estimated that bushfire smoke was responsible

1 Population-weighted $PM_{2.5}$ levels, New South Wales, Queensland, the Australian Capital Territory and Victoria, 1 October 2019 – 10 February 2020*

* Data by state are included in the online Supporting Information.

[1] Menzies Institute for Medical Research, University of Tasmania, Hobart, TAS. [2] University of Tasmania, Hobart, TAS. [3] University Centre for Rural Health, University of Sydney, Lismore, NSW. [4] Centre for Air Pollution, Energy and Health Research, Sydney, NSW. [5] Ingham Institute for Applied Medical Research, University of New South Wales, Sydney, NSW.
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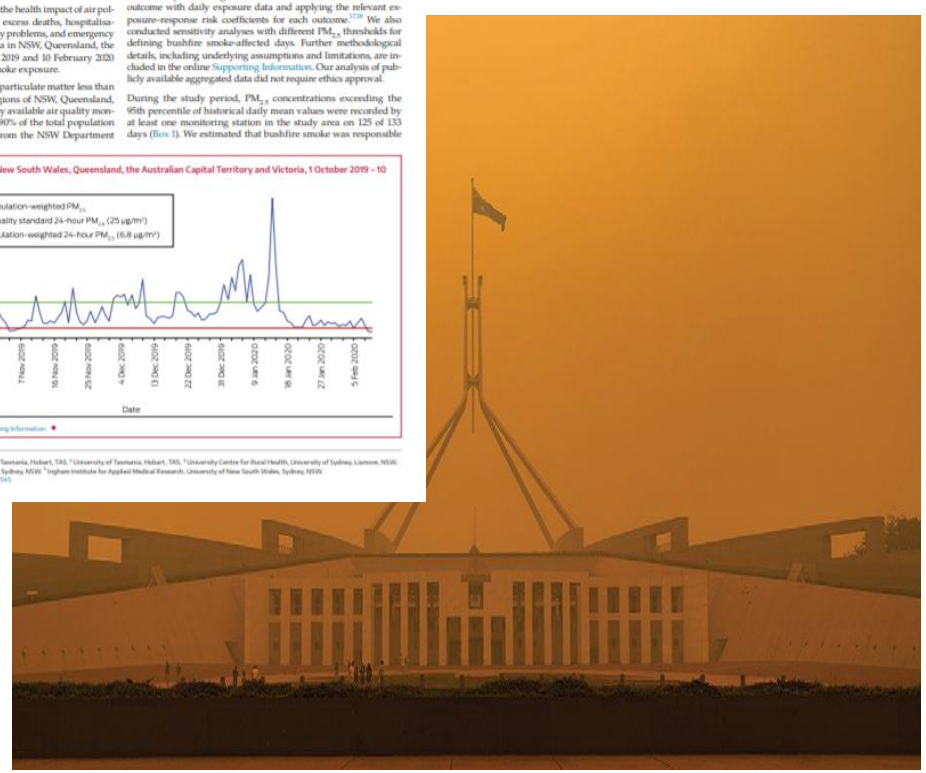
MJA 213(6): 21 September 2020
doi: 10.5694/mja2.50545



- A major public health concern is population exposure to atmospheric particulate matter (PM) with a diameter < 2.5μm (PM2.5), which can penetrate deep into the lungs
- Mortality rates have been found to increase in Sydney on days with high bushfire smoke pollution
- Hospital admissions, emergency department attendances, ambulance call-outs and general practitioner consultations, particularly for respiratory conditions, all increase during periods of severe PM2.5 levels from bushfires
- Risks from air pollution are amplified when combined with high temperatures during heatwaves, with an increased effect on mortality

Med J Aust. 2020;213(6):282-283

FACT | BURNING AND TRANSPORTING COAL HAS SERIOUS HEALTH IMPACTS

- Reporters often ask: why bother cutting emissions as it won't affect the global climate very much (on its own)? Coal is a major source of our emissions
- True! But coal mining, hauling, preparation at the power plant, combustion, and the disposal of post-combustion waste is established to contribute to mortality ("*silent killer*")
- Of the air pollutants from coal burning (e.g. sulphur dioxide, nitrogen oxides), the major killer is exposure to particulate matter smaller than 2·5 µm in aerodynamic diameter

- Ambient $PM_{2.5}$ was the fifth-ranking global mortality risk factor in 2015: Exposure to $PM_{2.5}$ caused 4·2 million (95% uncertainty interval [UI] 3·7-4·8 million) deaths and 103·1 million (90·8 -115·1 million) disability-adjusted life-years (DALYs), representing 7·6% of total global deaths
- 24 people die for every terawatt hours (TWh) of coal burnt

Kushta *et al* 2021 *Environ. Res. Lett.* **16** 045010; Cohen et al. *Lancet* 2017; 389: 1907

https://theconversation.com/why-coal-fired-power-stations-need-to-shut-on-health-grounds-68809

FACT | FOOD AND WATER INSECURITY

- Increases in global temperature and changes to rainfall patterns will disrupt agricultural production, leading to food shortages and increased levels of malnutrition
- Mass migration already started

Enteric infections and climate change

- Meta-analysis: 40 studies were eligible for pathogen-specific meta-analyses
- Overall increased risks of incidence per 1°C temperature rise, expressed as relative risks:
  - 1·05 (95% CI 1·04–1·07; I^2 97%) for salmonellosis
  - 1·07 (1·04–1·10; I^2 99%) for shigellosis
  - 1·02 (1·01–1·04; I^2 98%) for campylobacteriosis
  - 1·05 (1·04–1·07; I^2 36%) for cholera
  - 1·04 (1·01–1·07; I^2 98%) for *Escherichia coli* enteritis
  - 1·15 (1·07–1·24; I^2 0%) for typhoid
- Reduced risks per 1°C temperature increase:
  - 0·96 (95% CI 0·90–1·02; I^2 97%) for rotaviral enteritis
  - 0·89 (0·81–0·99; I^2 96%) for noroviral enteritis

Lancet Planetary Health 2022 DOI: https://doi.org/10.1016/S2542-5196(22)00003-1

FACT | PLASTIC POLLUTION EVERYWHERE INCLUDING INSIDE YOU AND EVERYONE YOU LOVE

10% of all waste is plastic, but 80% of waste that accumulates in the oceans and seabed is plastic

Seafood, alcohol and plastic-bottled water are the greatest sources of microplastic ingestion in humans

Component monomers such as bisphenol A (BPA): 95% of humans have detectable serum and urinary levels of BPA (you and me!)

Health impacts still being determined but potentially carcinogenic and neurotoxic

Associated with infertility, obesity and oestrogen mimicking (breast cancer)

Aust NZ J Pub Health 2021; 45: 535-7

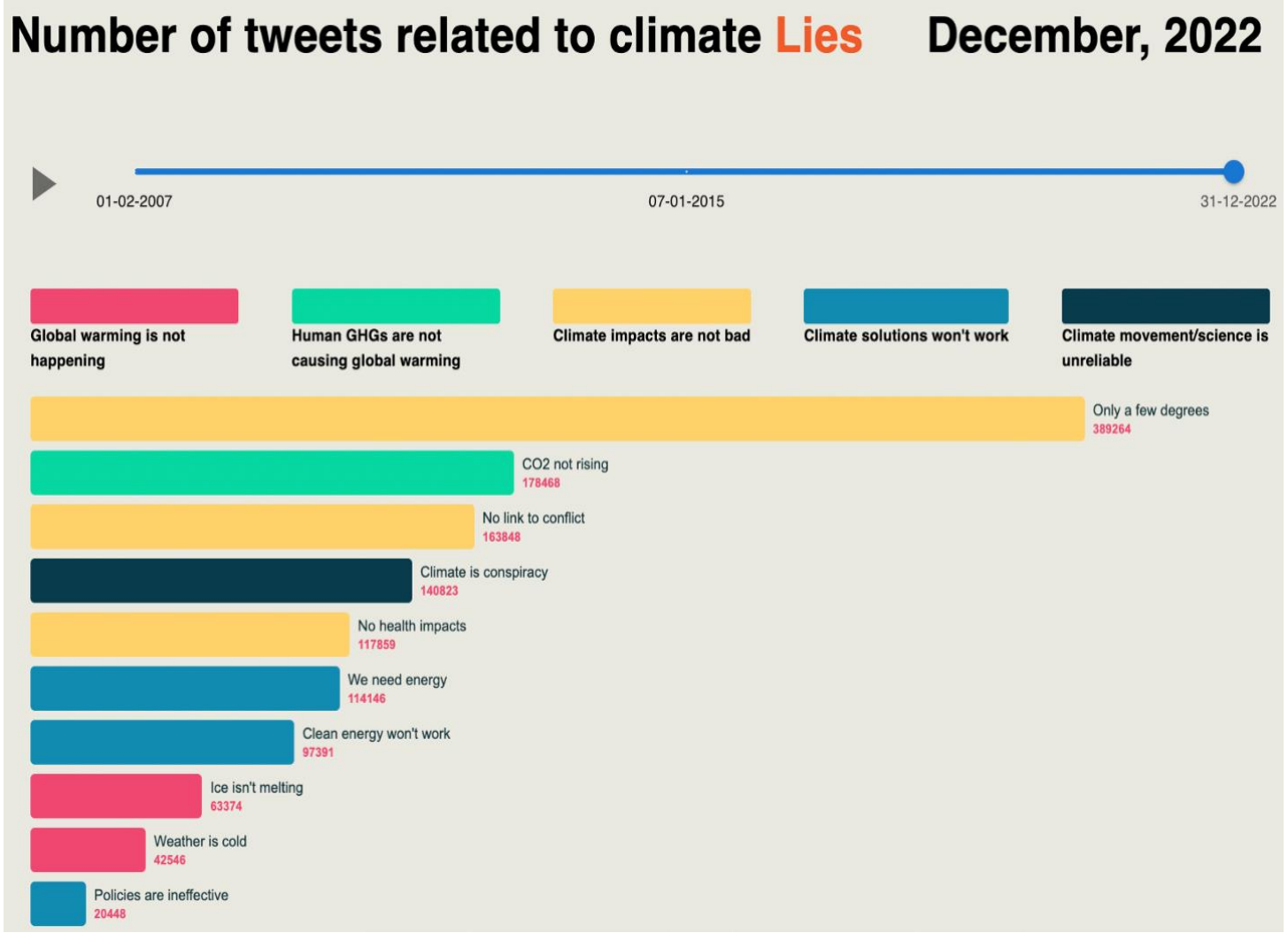
https://www.nationalgeographic.com/environment/article/microplastics-are-in-our-bodies-how-much-do-they-harm-us

Taking on climate lies? Twitter won't

> 60 Twitter accounts funded by ExxonMobil that promote false and misleading information about the climate crisis

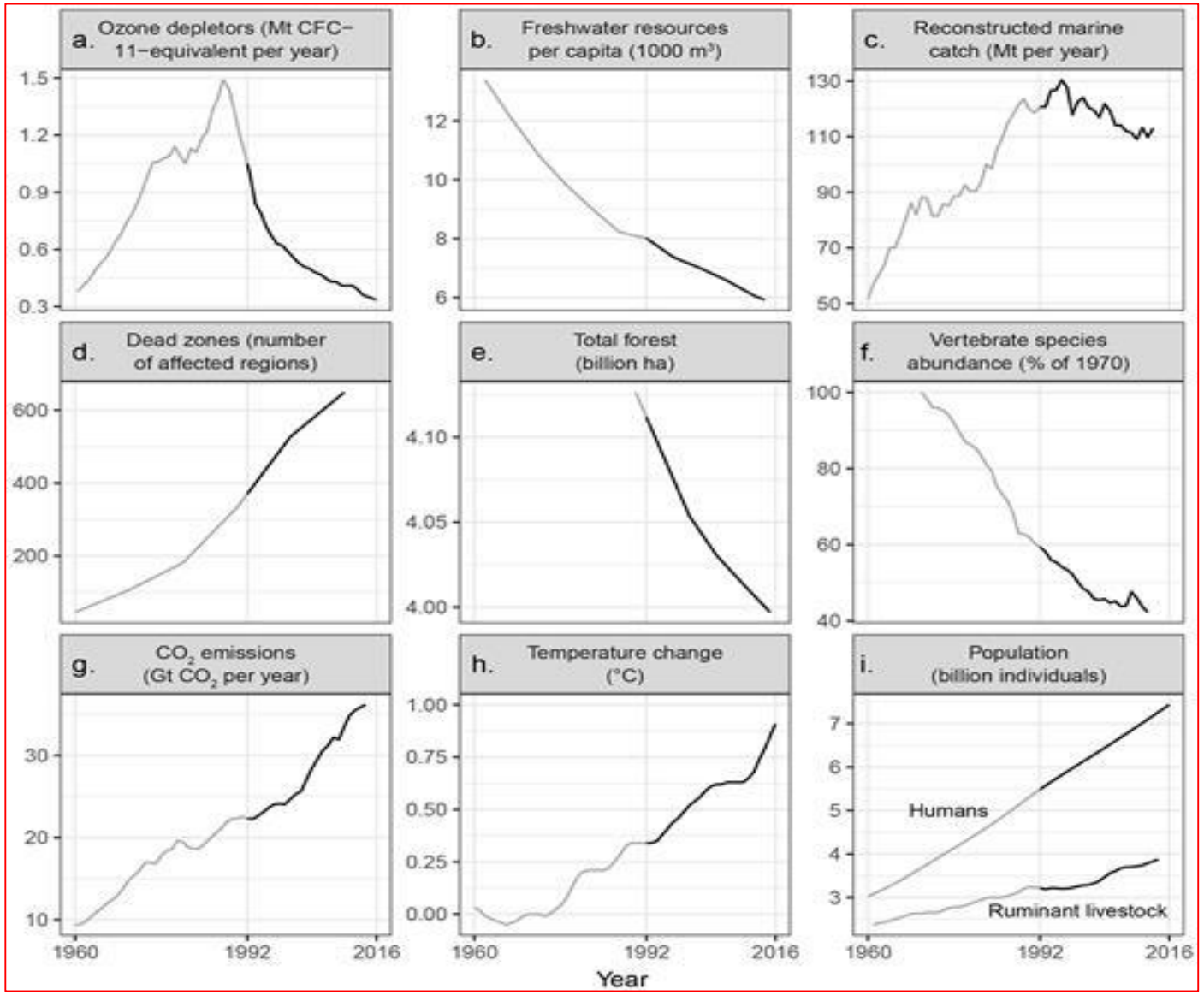
Alongside social media, one of the most effective ways climate lies spread is through native advertising—a type of paid content that looks deceivingly like real news

PAID POST by ExxonMobil — The Future of Energy? It May Come From Where You Least Expect
https://www.nytimes.com/paidpost/exxonmobil/the-future-of-energy-it-may-come-from-where-you-least-expect.html?smid=tw-share



https://www.bu.edu/articles/2023/tweets-ads-and-lies-researchers-are-fighting-against-climate-misinformation/

World Scientists' Warning to Humanity: A Second Notice



"Twenty-five years ago, the Union of Concerned Scientists and more than 1700 independent scientists, including the majority of living Nobel laureates in the sciences, penned the 1992 World Scientists' Warning to Humanity."

"Since 1992, with the exception of stabilizing the stratospheric ozone layer, humanity has failed to make sufficient progress in generally solving these foreseen environmental challenges, and alarmingly, most of them are getting far worse."

Ripple WJ et al. *BioScience 2017;* 67; 1026–1028

Global academic alarm:
Editorial >200 medical journals worldwide


Editorials

Call for emergency action to limit global temperature increases, restore biodiversity, and protect health

Lukoye Atwoli[1], Abdullah H Baqui[2], Thomas Benfield[3], Raffaella Bosurgi[4], Fiona Godlee[5], Stephen Hancocks[6], Richard C Horton[7], Laurie Laybourn-Langton[8], Carlos A Monteiro[9], Ian Norman[10], Kirsten Patrick[11], Nigel Praities[12], Marcel GM Olde Rikkert[13], Eric Rubin[14], Peush Sahni[15], Richard SW Smith[16], Nicholas J Talley AC[17], Sue Turale[18], Damián Vázquez[19]

Wealthy nations must do much more, much faster

The UN General Assembly in September 2021 will bring countries together at a critical time for marshalling collective action to tackle the global environmental crisis. They will meet again at the biodiversity summit in Kunming, China, and the climate conference (COP26) in Glasgow, UK. Ahead of these pivotal meetings, we — the editors of health journals worldwide — call for urgent action to keep average global temperature increases below 1.5°C, halt the destruction of nature, and protect health.

Health is already being harmed by global temperature increases and the destruction of the natural world, a state of affairs health professionals have been bringing attention to for decades.[1] The science is unequivocal; a global increase of 1.5°C above the pre-industrial average and the continued loss of biodiversity risk catastrophic harm to health that will be impossible to reverse.[2,3] Despite the world's necessary preoccupation with COVID-19, we cannot wait for the pandemic to pass to rapidly reduce emissions.

Reflecting the severity of the moment, this editorial appears in health journals across the world. We are united in recognising that only fundamental and equitable changes to societies will reverse our current trajectory.

The risks to health of increases above 1.5°C are now well established.[4] Indeed, no temperature rise is "safe". In the past 20 years, heat-related mortality among people aged over 65 has increased by more than 50%.[5] Higher temperatures have brought increased dehydration and renal function loss, dermatological malignancies, tropical infections, adverse mental health outcomes, pregnancy complications, allergies, and cardiovascular and pulmonary morbidity and mortality.[6,7] Harms disproportionately affect the most vulnerable, including among children, older populations, ethnic minorities, poorer communities, and those with underlying health problems.[8,9]

Global heating is also contributing to the decline in global yield potential for major crops, falling by 1.8–5.6% since 1981. Together with the effects of extreme weather and soil depletion, is hampering efforts to reduce undernutrition.[10] Thriving ecosystems are essential to human health, and the widespread destruction of nature, including habitats and species, is eroding water and food security and increasing the chance of pandemics.[11,12]

The consequences of the environmental crisis fall disproportionately on those countries and communities that have contributed least to the problem and are least able to mitigate the harms. No country, no matter how wealthy, can shield itself from these impacts. Allowing the consequences to fall disproportionately on the most vulnerable will breed more conflict, food insecurity, forced displacement, and zoonotic disease — with severe implications for all countries and communities. As with the COVID-19 pandemic, we are globally as strong as our weakest member.

Rises above 1.5°C increase the chance of reaching tipping points in natural systems that could lock the world into an acutely unstable state. This would critically impair our ability to mitigate harms and to prevent catastrophic, runaway environmental change.[3,13]

Global targets are not enough

Encouragingly, many governments, financial institutions, and businesses are setting targets to reach net-zero emissions, including targets for 2050. The cost of renewable energy is dropping rapidly. Many countries are aiming to protect at least 30% of the world's land and oceans by 2030.[14]

These promises are not enough. Targets are easy to set and hard to achieve. They are yet to be matched with credible short and long-term plans to accelerate cleaner technologies and transform societies. Emissions reduction plans do not adequately incorporate health considerations.[15] Concern is growing that temperatures rises above 1.5°C are beginning to be seen as inevitable, or even acceptable, to powerful members of the global community.[16] Relatedly, current strategies for reducing emissions to net-zero by the middle of the century implausibly assume that the world will acquire great capabilities to remove greenhouse gases from the atmosphere.[17,18]

This insufficient action means that temperature increases are likely to be well in excess of 2°C,[19] a catastrophic outcome for health and environmental stability. Critically, the destruction of nature does not have parity of esteem with the climate element of the crisis, and every single global target to restore biodiversity lost by 2020 was missed.[3] This is an overall environmental crisis.[20]

290

Call for Emergency Action to Limit Global Temperature Increases, Restore Biodiversity, and Protect Health

N Engl J Med 385;12 (September 16, 2021)

"The greatest threat to global public health is the continued failure of world leaders to keep the global temperature rise below 1.5° C and to restore nature. Urgent, society-wide changes must be made and will lead to a fairer and healthier world. We, as editors of health journals, call for governments and other leaders to act, marking 2021 as the year that the world finally changes course".

"More than 200 health journals across the world have simultaneously published an editorial calling for greater government action on climate change to reduce global temperature increases and the hazards to health and nature that warming poses. Medical Journal of Australia, The Lancet and The BMJ are some of the journals taking part in the lead-up to the UN General Assembly in Glasgow next week. The number of journals participating in this joint action has never been seen before".

scimex.org

https://www.nejm.org/doi/pdf/10.1056/NEJMe2113200?articleTools=true

MJA-Lancet Countdown 2022

"In Australia the crises of 2020 were unprecedented, shocking and predictable".

"Interrogating successes and failures nationally in the *MJA–Lancet* annual Australian Countdown provides a robust model for monitoring and positive change".

"The flow on benefits to health and wellbeing, the economy and society from such change will be enormous".

2022

MJA–Lancet Countdown on Health and Climate Change

Australia unprepared and paying the price

https://www.mja.com.au/system/files/issues/214_02/mja250895.pdf

IPCC report 2021

- 6th cycle since 1990
- Now NO DOUBT global warming is occurring and human-made
- More frequent and intense extreme heat events, heavy rains/cyclones, droughts, fires, ocean warming & acidifying will occur

INTERGOVERNMENTAL PANEL ON climate change

Climate Change 2021

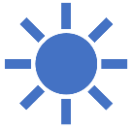
The Physical Science Basis

Some signs of hope in 2023 – but this alone won't avoid catastrophe

IEA reported for the first time in history investment in solar this year would outstrip investment in oil: for every dollar invested in fossil fuels, about 1.7 dollars are now going into clean energy

United States pumped almost US$750 billion into its own green energy economy via President Biden's Inflation Reduction Act

Share of electric vehicles in sales of new passenger vehicles is set to more than double globally in the next few years — to 30% in 2026



Solar is now the low-cost source of new electricity generation

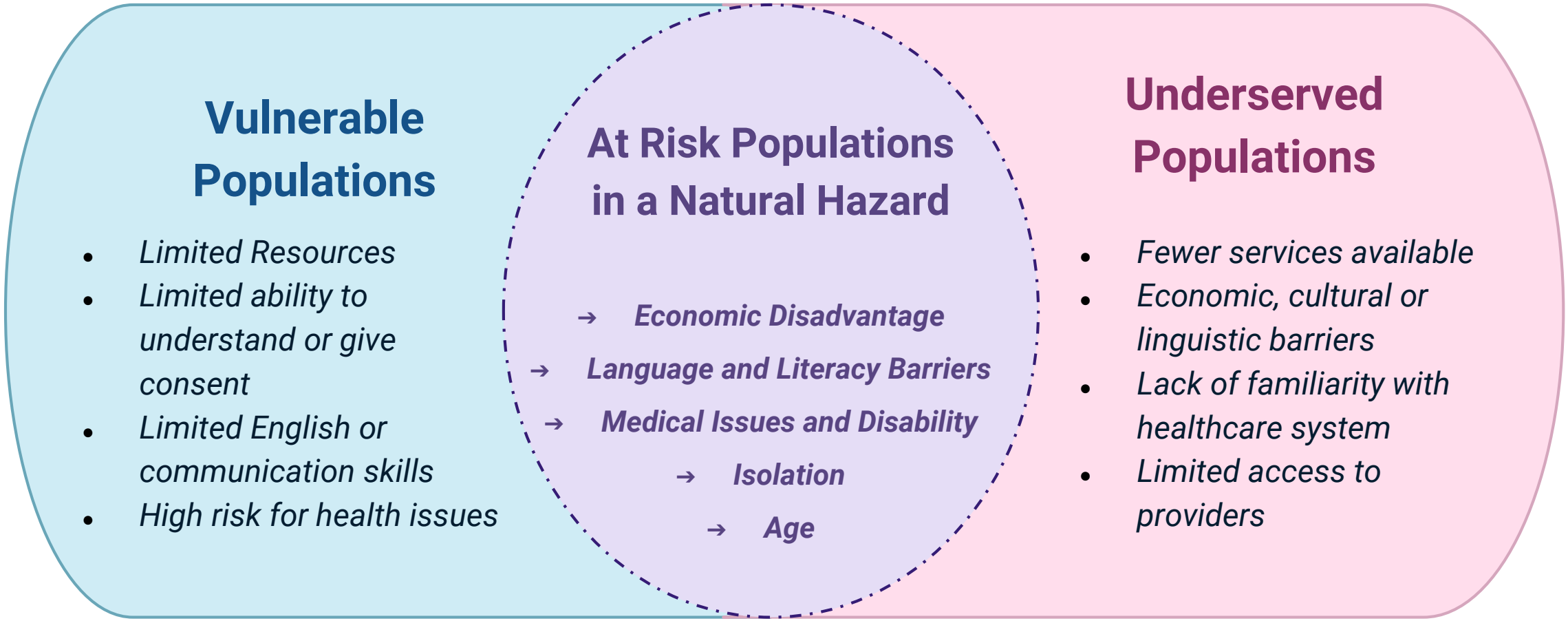
Firming capacity (to store the new green energy) and negative emissions technologies – machines to strip carbon dioxide from the atmosphere – remain slow in development and deployment

If the world was to have any hope of holding warming to 1.5 degrees there is now no space for new fossil fuel investment but many nations, including Australia, continue to develop new fossil fuel capacity (IEA)

Judging by the world's actual policies we still face catastrophic warming of over 2 degrees

https://www.smh.com.au/environment/climate-change/finally-some-seriously-good-news-on-climate-and-some-not-so-good-20230608-p5df15.html

At-risk populations: greater risk of negative health outcomes due to disparities in social determinants of health and/or physical health compared to majority facing same disaster



Adapted from - Phuong J, Riches NO, Calzoni L, Datta G, Duran D, Lin AY, Singh RP, Solomonides AE, Whysel NY, Kavuluru R. J Am Med Inform Assoc. 2022 Nov 14;29(12):2161-2167. doi: 10.1093/jamia/ocac162.

Health impact

- **Adaptation** - protect health from climate impact
- **Mitigation** - reducing emissions
- **Health co-benefits** - reaping health gains from climate-friendly policies and individual behaviour e.g. increased exercise

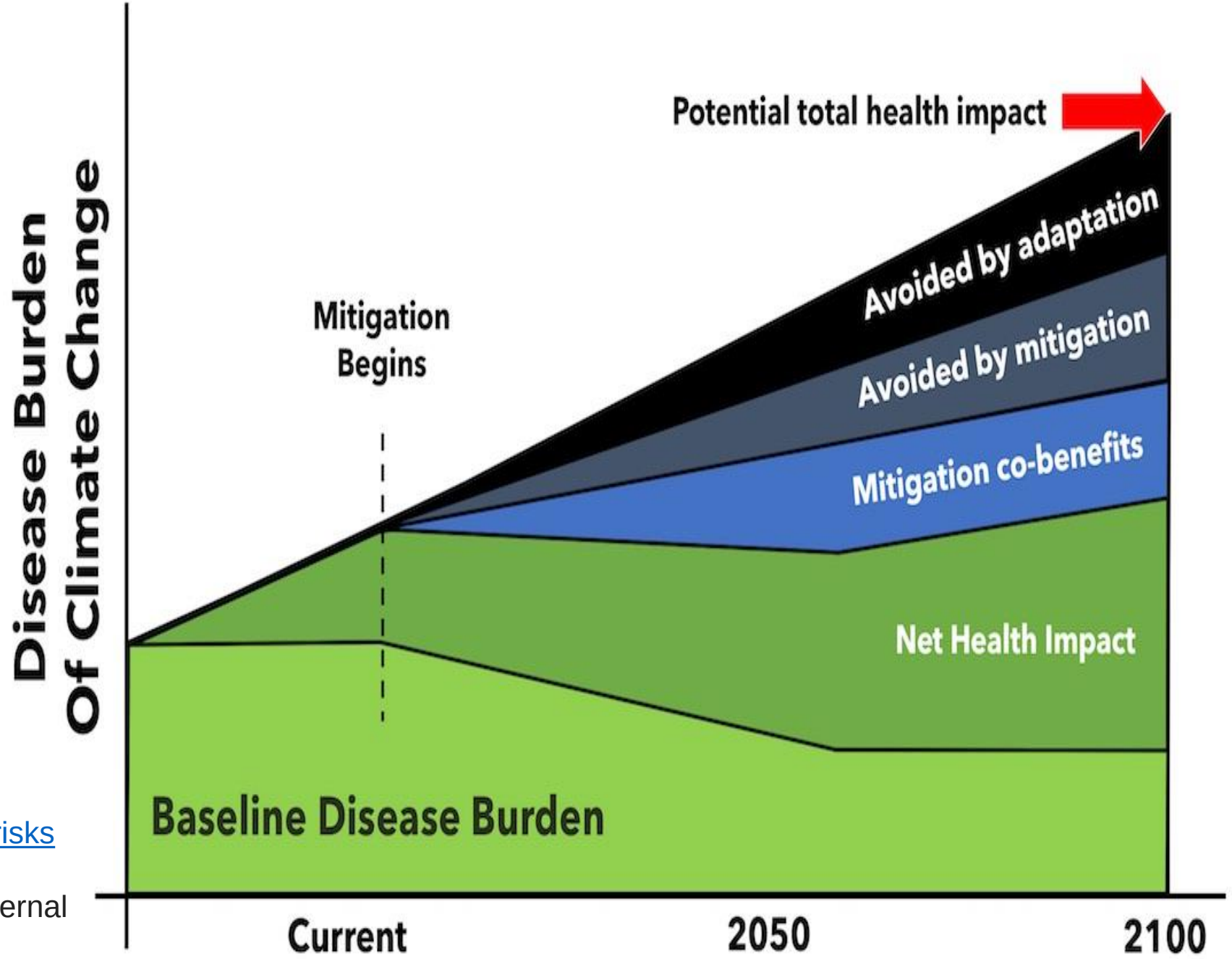
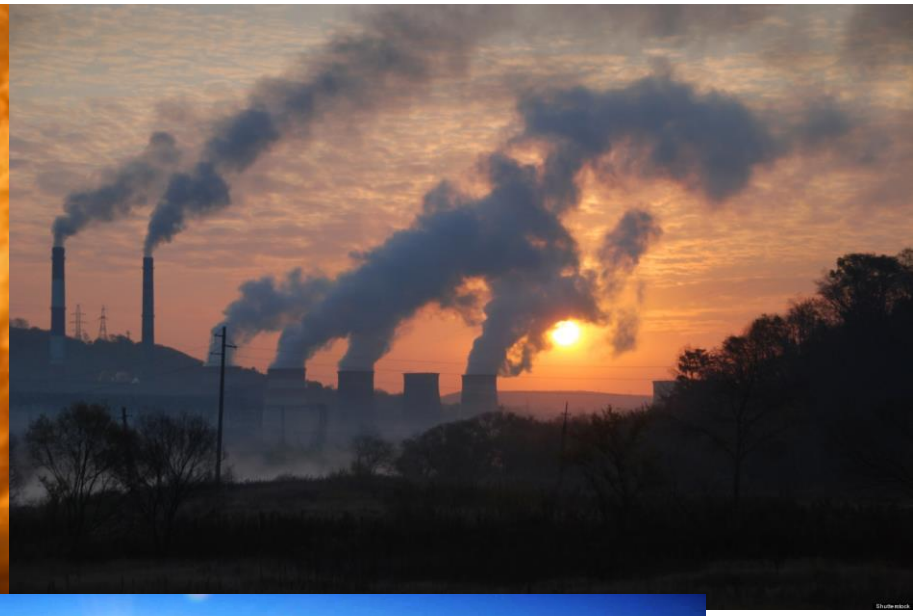


Figure courtesy of Harvard. Adapted from Climate change: present and future risks to health, and necessary responses, A. J. McMichael and E. Lindgren, Journal of Internal Medicine 2011

What can YOU do?
Advocacy on climate change

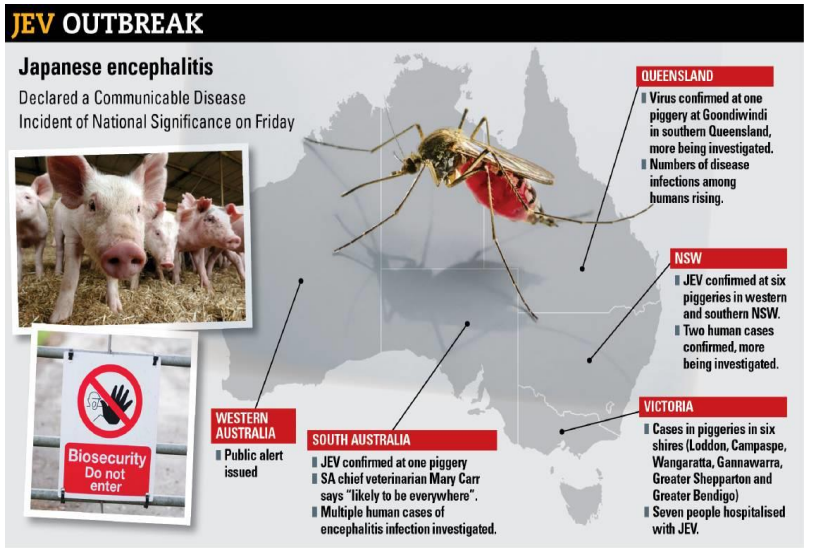


Talk? Is this the best we can all do in a public health emergency right now?

All HIGH RISK in 21st Century:

- Droughts (more severe)
- Fires (more severe)
- Floods (“rivers from the sky”)
- Pestilence
- Famine
- Migration
- Major wars over resources

https://www.manningrivertimes.com.au/story/5634233/nsw-still-in-drought-despite-rainfall/



https://www.farmonline.com.au/story/7647361/disease-outbreak-a-reminder-we-cant-keep-everything-out/

https://www.smh.com.au/national/nsw/nsw-to-go-it-alone-on-flood-funding-after-federal-government-refused-20220403-p5aagu.html

Lots of promises, not enough action

The Guardian

Revealed: the 'carbon bombs' set to trigger catastrophic climate breakdown (May 12, 2022)

Exclusive: Oil and gas majors are planning scores of vast projects that threaten to shatter the 1.5C climate goal. If governments do not act, these firms will continue to cash in as the world burns

https://www.theguardian.com/environment/ng-interactive/2022/may/11/fossil-fuel-carbon-bombs-climate-breakdown-oil-gas

- The Paris climate agreement seeks to limit global warming to 1.5℃ this century
- A report by the World Meteorological Organisation warns this limit may be exceeded by 2024 – and the risk is growing
- This first overshoot beyond 1.5℃ would be temporary, likely aided by a major climate anomaly such as an El Niño weather pattern
- However, it casts new doubt on whether Earth's climate can be permanently stabilised at 1.5℃ warming

https://theconversation.com/earth-may-temporarily-pass-dangerous-1-5-warming-limit-by-2024-major-new-report-says-145450?gclid=EAIaIQobChMIveL26IfZ9wIVQSlyCh2ITwiHEAAYBCAAEgLnc_D_BwE

"We are on a pathway to global warming of more than double the 1.5-degree limit agreed in Paris. Some government and business leaders are saying one thing – but doing another. Simply put, they are lying".

Antonio Guterres
UN Secretary General
April 5, 2022

Duty of Care: 5 pillars of responsibility

Educate	Grow research	Resilience	Decarbonise	Voice
Educate yourself: While more health professional students and practitioners are learning about the health effects of climate change, most still do not	Support and encourage research: too few studies on climate change and health despite high health impacts	Drive building health care resilience: prepare, prevent See WHO - https://www.who.int/publications/i/item/9789240012226	Promote decarbonising at your institution & practice: health care carbon intensive, polluting e.g. heating, cooling; food	Use your voice loudly: you have a duty of care e.g. better health arrives within days after fossil fuel pollution stops

Bernstein. Cell. 2021 https://www.cell.com/med/fulltext/S2666-6340(21)00114-8#.YkYx6u5O3bw.twitter

Health System needs change – for us and future generations: and we need to lead it

If the global health sector were a country, it would be the fifth-largest greenhouse gas emitter on the planet

This carbon footprint is impacted by a variety of factors including procurement processes, such as the supply chains involved in sourcing medical materials, as well as the energy sources used, which in Australia still rely predominantly on coal and gas

Perspectives

Acting on climate change and health in Victoria

Victorian legislation will help the health sector reduce emissions and adapt to climate change

Victoria is taking decisive action to address the significant risks posed by climate change. In part, the *Climate Change Act 2017* (Vic) requires the Victorian government to:

- contribute to whole-of-government emissions reduction to meet net zero emissions by 2050;
- prepare whole-of-government and sector emission reduction pledges;
- develop and implement adaptation action plans, detailing the risks and impacts on systems (including health and human services); and
- endeavour to ensure that any decision made by the Victorian government and any policy, program or process developed or implemented takes account of climate change.

Victoria is one of four Australian states and territories, along with the Australian Capital Territory, Tasmania and South Australia, with emission reduction targets specified in legislation. After the ACT, which has a target of net zero emissions by 2045, Victoria has the next most ambitious target prescribed in legislation.[1]

Importantly, the Climate Change Act requires decision makers to have regard to climate change in their administration of other legislation scheduled under the Act. For example, the requirement to prepare state and municipal public health and wellbeing plans under the *Public Health and Wellbeing Act 2008* (Vic) has been scheduled under the Climate Change Act for this purpose.

The critical role of public health in driving action on climate change

Public health is focused on protecting and promoting the health of the whole population, and preventing illness, injury and disability.[2] The climate crisis is a fundamental threat to public health, and Victoria is experiencing significant impacts from events which are becoming more frequent and intense due to climate change. For example:

- the 2009 Victorian heatwave resulted in 374 excess estimated deaths and a 12% increase in public hospital emergency department presentations (compared with the 5-year average);[3]
- the 2014 Victorian heatwave resulted in 167 excess estimated deaths, and resulted in a fivefold increase in heat-related public hospital emergency department presentations compared with what was expected;[4] and
- following the 2016–2017 Victorian floods, there was a large increase in mosquitos, which resulted in a 7.5-fold increase in Ross River virus disease compared with the previous year.[5]

Further, the 2019–20 bushfires in Australia, which were preceded by record springtime fire danger weather,[6] caused hazardous air quality in population centres, bringing health concerns from smoke exposure into sharp focus, in addition to the tragic direct loss of life. These and other events highlight the central role of public health in driving action on climate change, seeking solutions and supporting the community to adapt to its impacts.

In August 2019, the Victorian Department of Health and Human Services published a public health and wellbeing plan for 2019–2023.[7] The plan recognises that climate and environmental conditions have a profound influence on a population's health. The growing threats to health from our changing climate, therefore, need to be central to our thinking and actions into the future.

Climate change is included as one of four key focus areas in the new plan, which aims to achieve resilient and safe communities that are adapting to the public health impacts of climate change, decreased health impacts associated with climate change, and increased action to reduce greenhouse gas emissions and realise health co-benefits.[7]

The new plan also continues to recognise the current pressing problems of public health including obesity, harms from tobacco, and our sedentary lifestyle. Continued action in these areas will both improve the health and wellbeing of Victorians and reduce downstream health system costs and environmental impacts. For example, in 2018–19 every occupied bed-day in a Victorian public hospital generated on average 120 kg of carbon dioxide equivalents and 3.65 kg of waste, and used 630 L of water.[8] As a result, investment in initiatives to reduce rates of preventable diseases will also contribute to emissions reductions in the health sector.

Victoria's health and human services climate change strategy

More broadly, the Victorian Department of Health and Human Services is undertaking comprehensive climate change planning and is currently preparing a climate change strategy, which comprises an

Brett Sutton
Vanora Mulvenna
Daniel Voronoff
Tiernan Humphrys

Department of Health and Human Services, State Government of Victoria, Melbourne, VIC.
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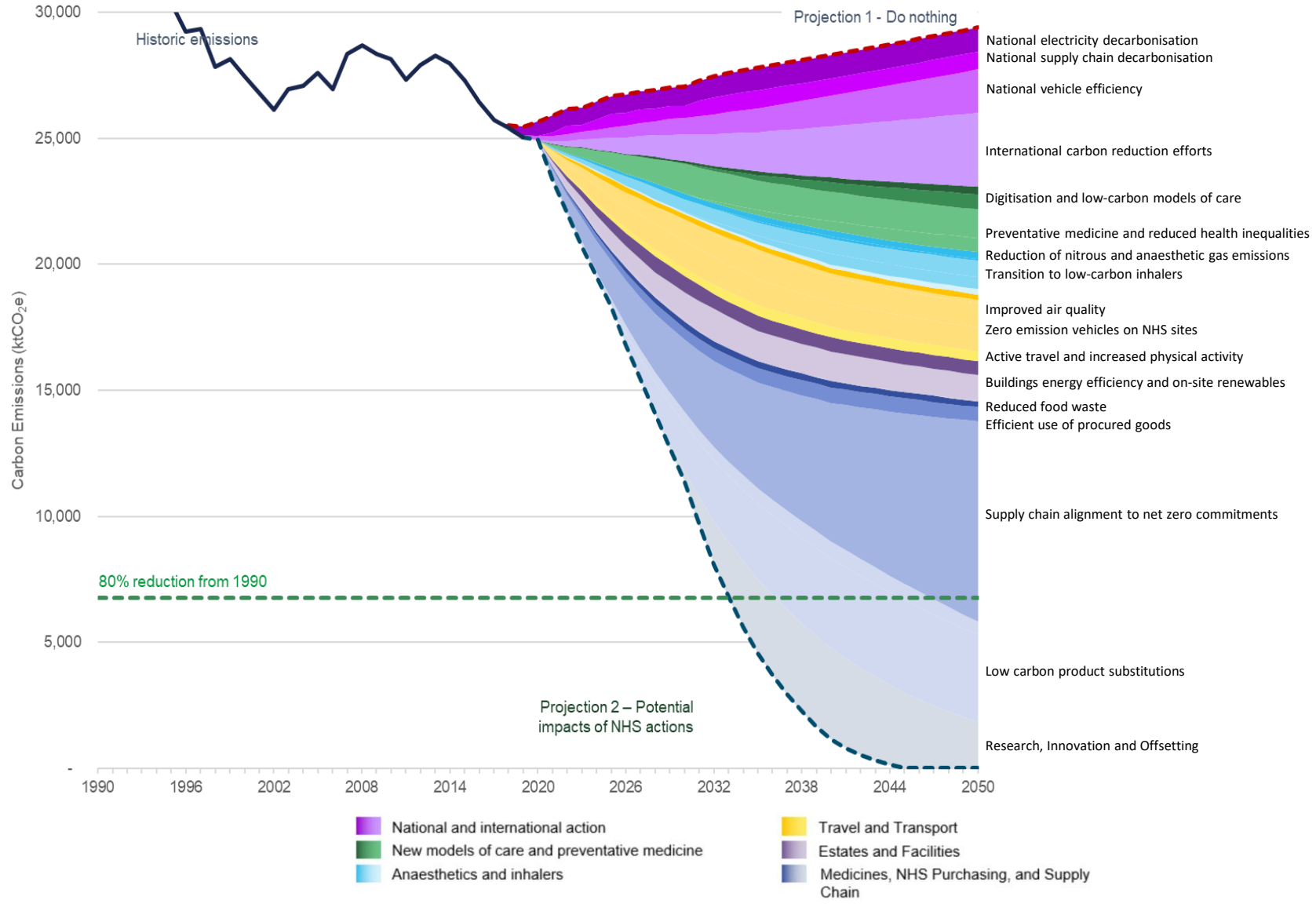
If they can do it, why not all of us? NHS established a trajectory to net zero by 2045, with annualised targets and an 80% reduction commitment



If the global health sector were a country, it would be the fifth-largest greenhouse gas emitter on the planet

Dr Nick Watts, NHS England's first Chief Sustainability Officer

Since the NHS became the first healthcare system to commit to net zero, it has:

Ensured that 100% of trusts and ICS have net zero strategies and board-level leads, to support and assure the delivery of local net zero plans.

Stimulated £31m innovation, to decarbonise care pathways

Delivered the world's first net zero ambulance, emergency rapid response vehicles and the UK's first HGV electric truck, reducing air pollution to protect our patients from increased risk of major health conditions.

Secured over £677m of government funding for the NHS, to decarbonise the estate and capture long term revenue savings to fund care for our patients.

NHS

Faculty of Medical Leadership and Management

Chief Sustainability Officer's clinical fellowship scheme was launched, to embed sustainability at the heart of clinical leadership.

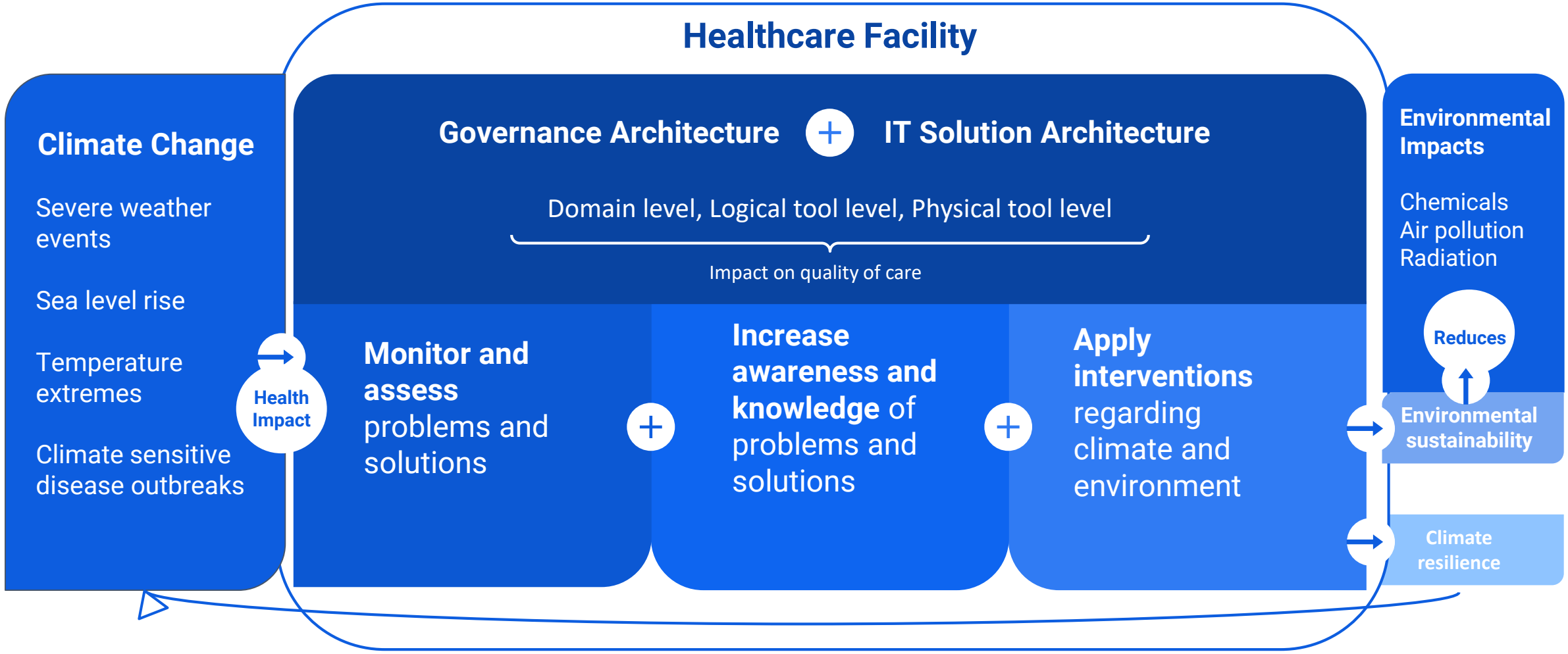
Microsoft

AstraZeneca

Signed up 15 suppliers to match NHS net zero commitments, with combined emissions the size of the country of Belgium, **and embedded a 10% carbon weighting into all procurements**, using the NHS' size and purchasing power to maximise our impact.

Built international support, with the US, Germany, France, and 17 other countries aligning to the NHS trajectory.

…and hit its first year target, saving 1.2m tonnes of carbon



Green-MIssion (Medical Informatics Solutions) framework

Sijm-Eeken ME, Arkenaar W, Jaspers MW, Peute LW. J Am Med Inform Assoc. 2022 Nov 14;29(12):2083-2088.

Emissions and health: What is YOUR hospital doing? And who is leading?

- Many of us hold leadership or positions of influence
- You are trusted voices in your health system
- Do you know if YOUR hospital/health system is taking positive action? What exactly?
- Have YOU taken action?

Carbon and waste neutral by 2030

Hunter New England Local Health District will be carbon and waste neutral by 2030

Under the ambitious new initiative, **Sustainable Healthcare: Together Towards Zero**, we are setting our sights on an environmentally sustainable future

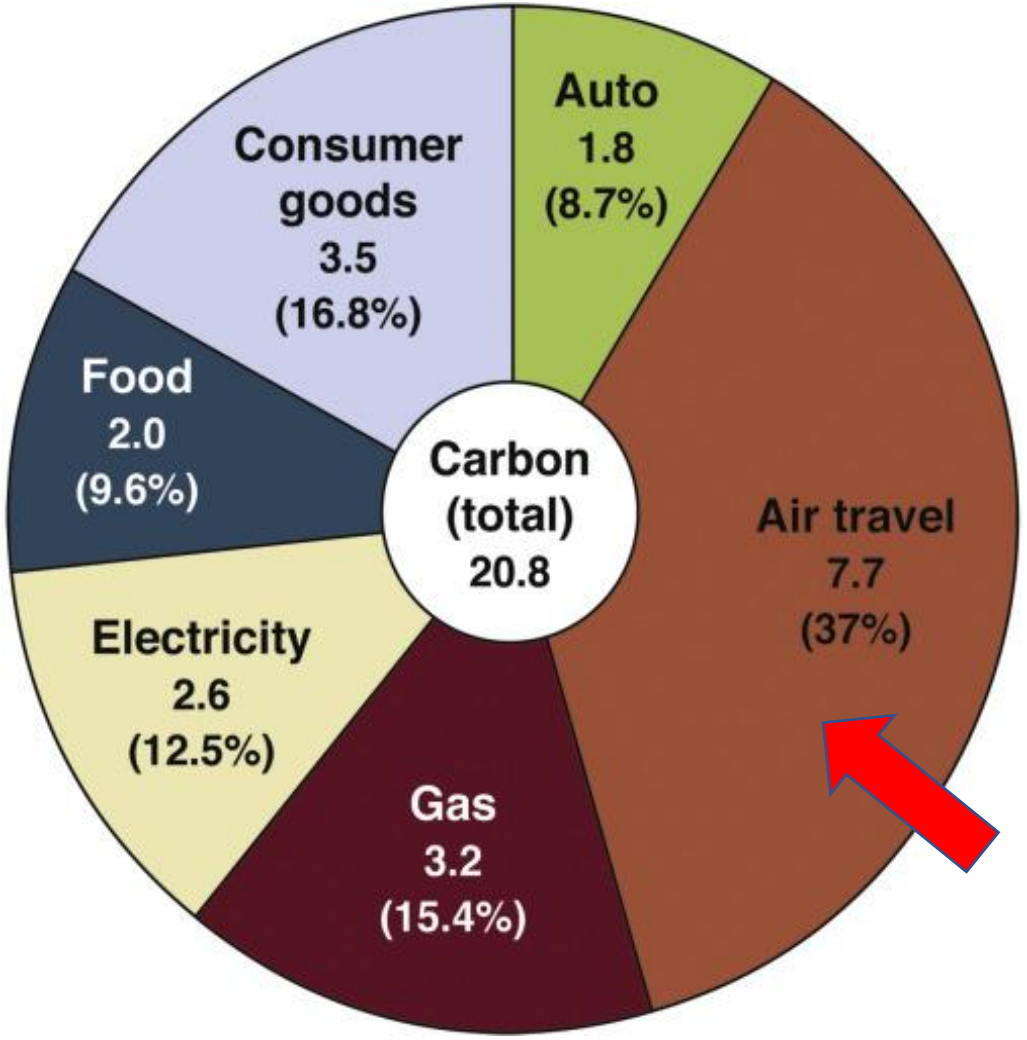
Significant investments will be made in solar power, water sustainability and energy efficient practices during the next decade to lighten and, eventually, eliminate the organisation's carbon footprint

We will be doing a huge amount of work in the coming years to achieve this green vision and take our place as an industry and community leader in sustainability

Personal responsibility: Carbon footprint of an academic GI scientist in metric tons of CO2 equivalents

Components of a Carbon Footprint

Individual or Family	Business or Hospital
Electricity	Electricity
Heating and Cooling	Heating and cooling
Personal transportation	Transportation
Long-distance travel	Equipment and Supplies
Food	
Consumer Goods	



The individual, whose 2018 carbon footprint is summarized, lives with his partner in the northern United States in a duplex condo of 2500 square feet. They own an EV.

Williams, John A.Omary, M. Bishr et al.
How Can Individuals and the GI Community Reduce Climate Change?
Gastroenterology, Volume 158, Issue 1, 14 - 17

Horrific! Stop producing and mailing paper journals with plastic covers, and reduce waste

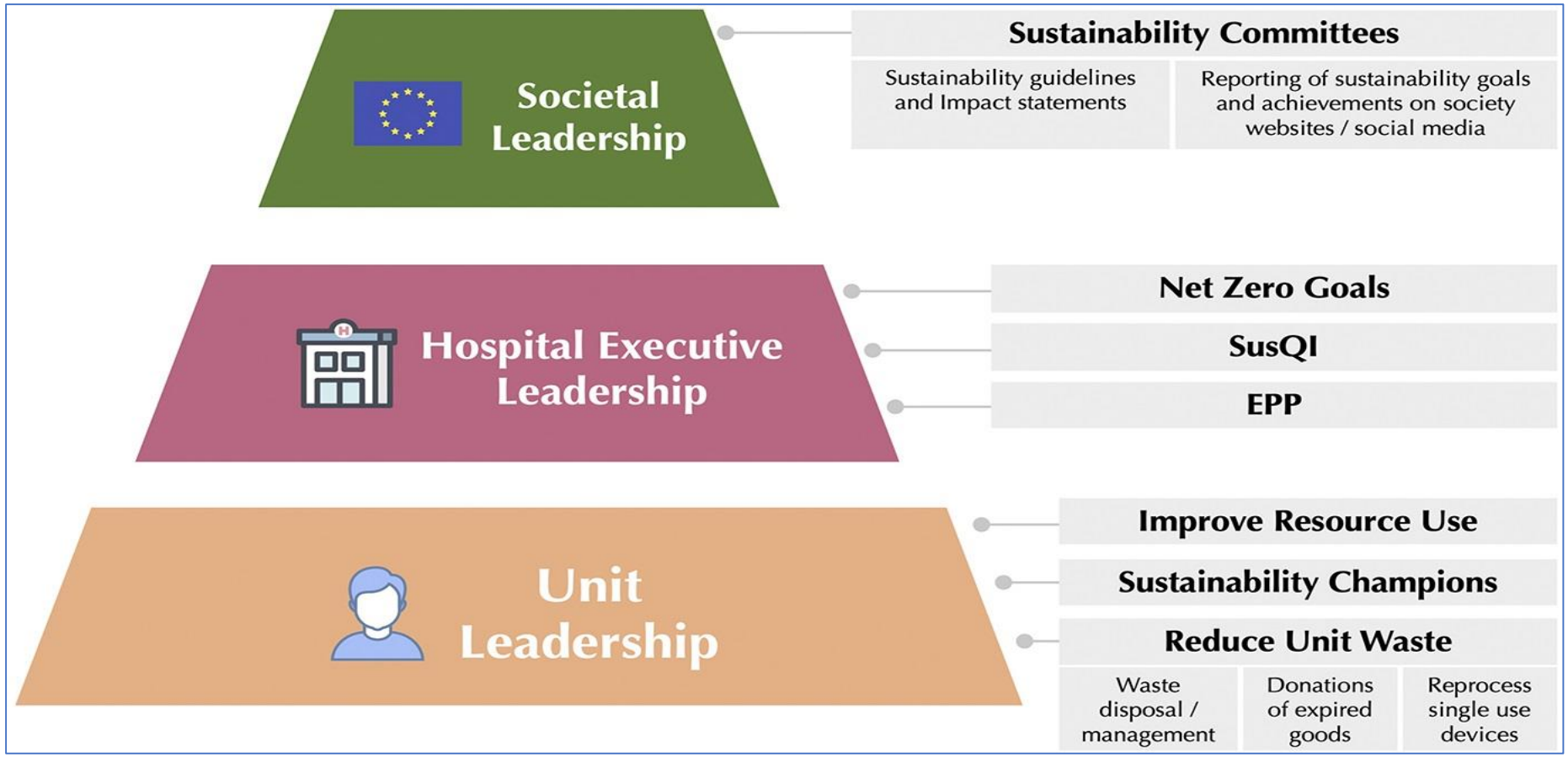
Conversion of plastic journal covers to paper, and waste generated by endoscopy procedures. A, The plastic covers of 2 typical journals weigh 13.6 g. B and C, Some of the major gastrointestinal journals have switched from using plastic covers to either paper labels (Gastroenterology) or a paper cover (Gut). D, Three bins of endoscopy-generated waste from an endoscopy unit in Melbourne, Australia (for 9 colonoscopies with polypectomies and 1 upper endoscopy, excluding the suction and drainage tubing and canisters). The bins shown in (D) were then weighed after emptying their contents (E). The net weight of waste per procedure was 0.54 kg

Journal of Clinical Gastroenterology 2021; 55(10):823-829.

Boards are paying attention!

- I'm a Graduate of the AICD and have Board experience
- Increasing pressure on companies to disclose their climate impacts and exposure to risk
- Sustainability expectations
- SMEs to large multinationals
- Profit impact
- Legal risks e.g. greenwashing
- Shareholder demands

Sustainable leadership model that can be mirrored



Haddock, R et al. American Journal of Gastroenterology 2022; 117(3):394-400

EPP, environmentally preferable purchasing;
SusQI, sustainability quality improvement.

Climate Change and Health: Planetary Primum Non Nocere and How Business/Industry Must Help

Qualities required for sustainable leaders that can guide selection of future leaders

Haddock, R et al. American Journal of Gastroenterology 2022; 117(3):394-400

Insist ALL your organisations and companies you invest in divest from fossil fuels and focus on sustainability

Editorial

A sustainable future in health: ensuring as health professionals our own house is in order and leading by example

Nicholas J Talley

It is time for health professionals to step up and lead to ensure a sustainable environment and health

The year 2020 is fast becoming the year of planetary crises, from global warming and the unprecedented bushfire season in Australia over the summer to the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) pandemic striking around the globe, with its health and financial implications.[1-3] Social media is littered with often uninformed opinions about both issues, from those unconcerned and arguing the problems are exaggerated or worse to those who are deeply concerned and searching for better solutions. The facts about the climate crisis and health are more stark, as pointed out by Madden and Capon[4] in this issue of the Journal and by the most recent *Lancet–MJA* countdown report[5] — overwhelming evidence points to a warming planet because of human activity and to the potential for very severe adverse health consequences, including other infectious disease outbreaks, if prompt action is not taken now. The recent unprecedented bushfire season may have shifted views about the potential for severe impacts of global warming on health, just as the unfolding health crisis with COVID-19 has highlighted how vulnerable our health systems are to new pathogens. There has not been political inertia in the United Kingdom, where all sides of politics recognise the global emergency we all face because of climate change.[6] However, more effective political action is needed here and around the world in terms of ensuring a sustainable future.

Of Australia's carbon emissions, the health care system accounts for about 7%.[7] As individual health practitioners, we can each make a difference in terms of the carbon footprint.[8] We can lead by example in our homes and practices and with how we travel. We can educate our patients and those we work with and train. And we can influence the health system we are a key part of too, for example, by working on strategies to drive down carbon emissions, waste and pollution from our hospitals. With a concerted effort, the Australian health system could achieve zero net emissions and relatively soon, and we applaud all the ongoing state initiatives.[9,10]

The *MJA* pledges to do our part. AMPCo — the company that publishes the *MJA* — has an investment policy that rules out any direct investment in fossil fuels. We plan a staged reduction in print to reduce the impact on forests while providing a high quality digital alternative, and although we wrap the print version of the *MJA* in biodegradable plastic, avoidance of waste is also a priority. And we will work collectively to promote a sustainable planet for us and for future generations, presenting the emerging data and updating them regularly to help drive optimal evidence-based policy. This is the theme of the current issue and we look forward to your feedback.

The SARS-CoV-2 pandemic has made it very clear we must be ready to step up and deliver additional high quality care and public health in a crisis, but wherever possible, we need to be able to do so without causing ecological damage or depleting precious resources required by those most in need.[11] In a crisis, both system and individual change is necessary but it would seem unethical to do otherwise. The impact of global warming, like COVID-19, is an ongoing global crisis, as over 11 000 scientists have warned.[12]

The time for complacent acceptance of the status quo must end; it is time for health professionals to step up and lead on a sustainable environment and health. At the *MJA* we hope every health professional will work to do so with us.

Competing interests: Nicholas Talley is Editor-in-Chief of the *Medical Journal of Australia*. A complete list of disclosures is available at https://www.mja.com.au/journal/staff/editor-chief-professor-nick-talley. ●

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3 Chang A, Williamson D. An outbreak of COVID-19 caused by a new coronavirus: what we know so far. *Med J Aust* 2020; https://doi.org/10.5694/mja2.50530 [Epub ahead of print]. https://www.mja.com.au/journal/2020/212/10/outbreak-covid-19-caused-new-coronavirus-what-we-know-so-far

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University of Newcastle, Newcastle, NSW. Nicholas.Talley@newcastle.edu.au • doi: 10.5694/mja2.50574

2020 – "The *MJA* pledges to do our part:

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- And *we will work collectively to promote a sustainable planet for us and for future generations, presenting the emerging data and updating them regularly to help drive optimal evidence-based poli*cy
- This is the theme of the current issue and we look forward to your feedback"

I am not an activist…
Doctors for Climate Action

"Now is the moment to make our voices heard."

"Professor Nicholas Talley was speaking in Sydney last week at the launch of Doctors for Climate Action, an initiative led by the Royal Australasian College of Physicians (RACP). Nicholas Talley is not an obvious climate activist. He is an academic gastroenterologist who is currently President of the RACP. He wears a tie (unusual in Australia)."

Richard Horton, Editor. The Lancet. 2015

https://images.app.goo.gl/R2jueJbAG2qkf1gx8

“The power of one”

Australian Financial Review

The inside story of how Mark Vaile fell back to earth

Julie Hare *Education editor*
Jun 23, 2021

Newcastle is a city dependent on coal. But when a coal chief was appointed chancellor of the local university, all hell broke loose.

Federal Education Minister Alan Tudge entered the fray: “At a time when we are trying to promote and enforce free speech and academic freedom on campus, we should not have a very competent person forced out of an important job because of this cancel culture,” he said.
Which is a contrarian point of view, given that the right to freedom of speech for the opponents of Vaile is being brought into question by someone defending the right of Vaile not to be “cancelled”.

The June 4 email to staff and students naming Vaile, a former deputy prime minister and current chairman of Whitehaven Coal, as the replacement came without too much fanfare.

Two days later, on June 6, the full council was no more. Prof. **Jennifer Martin**, a prominent local physician and elected member of the council, abruptly resigned after being besieged by messages from colleagues and community members who saw Vaile’s appointment as a betrayal of the university’s critical role in leading the region’s transition away from coal.

But by then the drama was unfolding. The Newcastle University Students Association started to rally their numbers. On June 9, Richard Denniss, chief economist with the progressive think tank the Australia Institute, returned his alumni award for national leadership. A distinguished laureate professor, Nick Talley, added his name to the growing list of objectors. Lucy Turnbull somehow got thrown into the mix as someone who had been considered for the role. The local Gomeroi people got more than 2000 signatures on a petition.

By June 18, another council member had resigned and a loose coalition of 16 anti-coal philanthropists took out a full-page open letter in the *Newcastle Herald* saying they “would not support a university who would choose as their leader someone who is determined to build new coal mines when most of the world is determined to reduce fossil fuel use”.

Prof. J. Martin: President –Elect

Digital health professionals can play a significant role in addressing climate change and making a positive difference!

Here are some actions YOU can take according to ChatGPT:

Promote Telehealth:

Encourage the use of telehealth services and remote consultations to reduce the need for physical travel

https://www.health.gov.au/news/permanent-telehealth-for-all-australians
https://www.digitalhealth.gov.au/healthcare-providers/initiatives-and-programs/telehealth

Digital health professionals can play a significant role in addressing climate change and making a positive difference!

Here are some actions YOU can take according to ChatGPT:

Advocate for Sustainable Practices:

Raise awareness among healthcare organizations about the environmental impact of their operations and advocate for sustainable practices. This includes reducing energy consumption, implementing waste reduction strategies, and promoting eco-friendly procurement policies.

https://currentaffairs.adda247.com/world-environment-day-2023/

Digital health professionals can play a significant role in addressing climate change and making a positive difference!

Here are some actions YOU can take according to ChatGPT:

Promote Green Data Centers:

Advocate for the use of energy-efficient infrastructure, such as green data centers, to reduce the carbon footprint of digital health systems

Green data centers use renewable energy sources and employ energy-efficient technologies to minimize environmental impact

https://in.pinterest.com/webwerksdata/green-data-center/

Digital health professionals can play a significant role in addressing climate change and making a positive difference!

Here are some actions YOU can take according to ChatGPT:

Develop Digital Health Solutions:

Innovate and develop digital health technologies that support environmental sustainability

e.g. design mobile apps or wearable devices that encourage sustainable behaviors like walking or cycling instead of driving

Work with professionals from other sectors, such as environmental science, urban planning, and public policy, to develop comprehensive strategies for addressing climate change: can lead to holistic solutions

https://digitalhealth.org.au/blog/health-informaticians-have-a-role-in-contributing-to-climate-justice/

Digital health professionals can play a significant role in addressing climate change and making a positive difference!

Here are some actions YOU can take according to ChatGPT:

Support Research and Education:

Contribute to research on the health impacts of climate change and the effectiveness of interventions

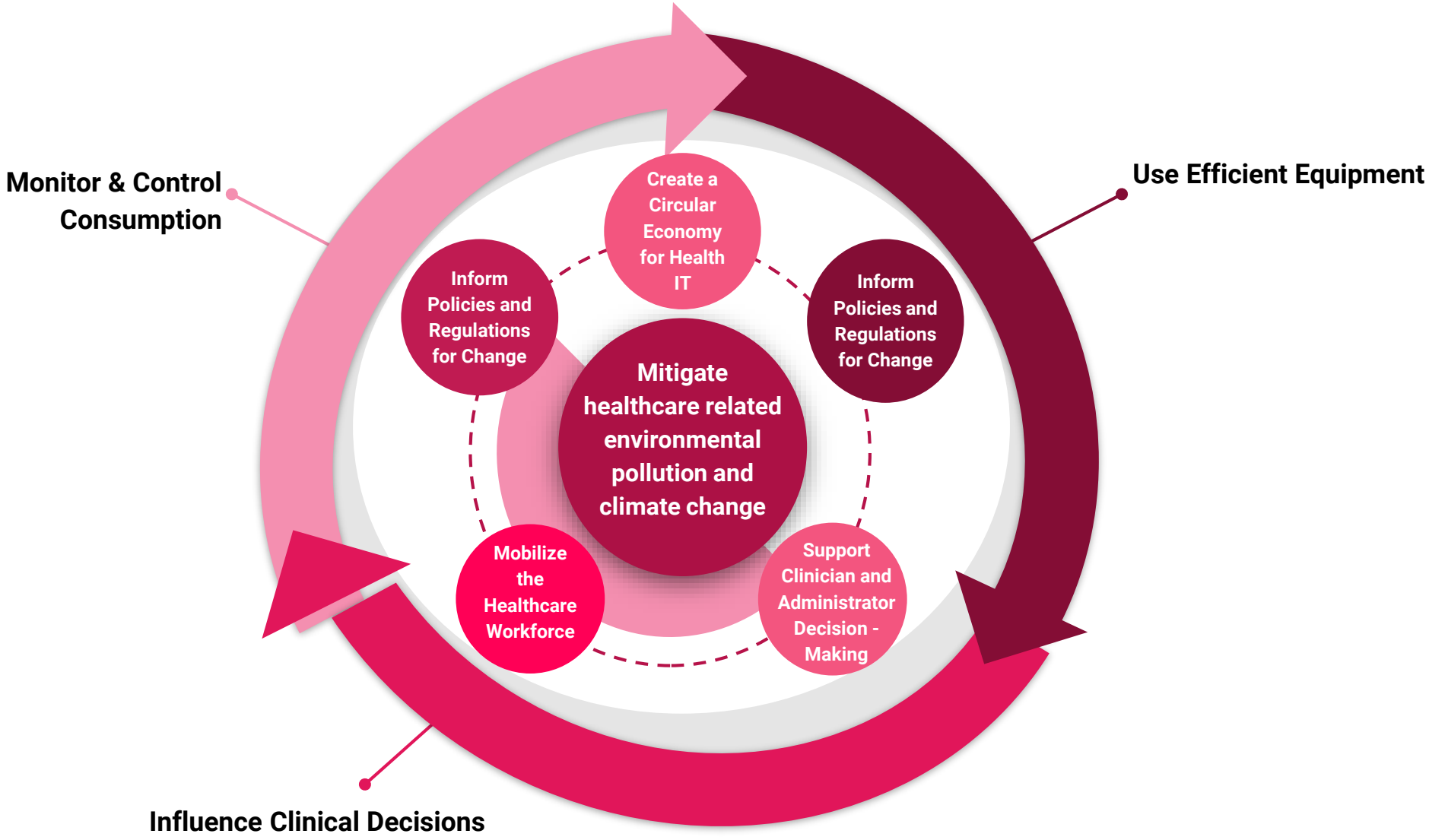
Collaborate with public health agencies, universities, and non-governmental organizations to generate evidence and raise awareness about the connection between climate change and health

Use data analytics to identify patterns and trends related to climate change and health outcomes: analyzing large datasets can help identify vulnerable populations, assess the effectiveness of interventions, and inform public health policies to mitigate climate change's health impacts

Educate colleagues, friends, everyone

https://www.monash.edu/medicine/news/latest/2021-articles/the-urgent-need-to-transform-healthcare-education-to-address-climate-change-lens

”Clinical climate informatics" action framework to reduce environmental pollution from healthcare (“virtuous circle”)



Sittig DF, Sherman JD, Eckelman MJ, Draper A, Singh HJ Am Med Inform Assoc. 2022 Nov 14;29(12):2153-2160.

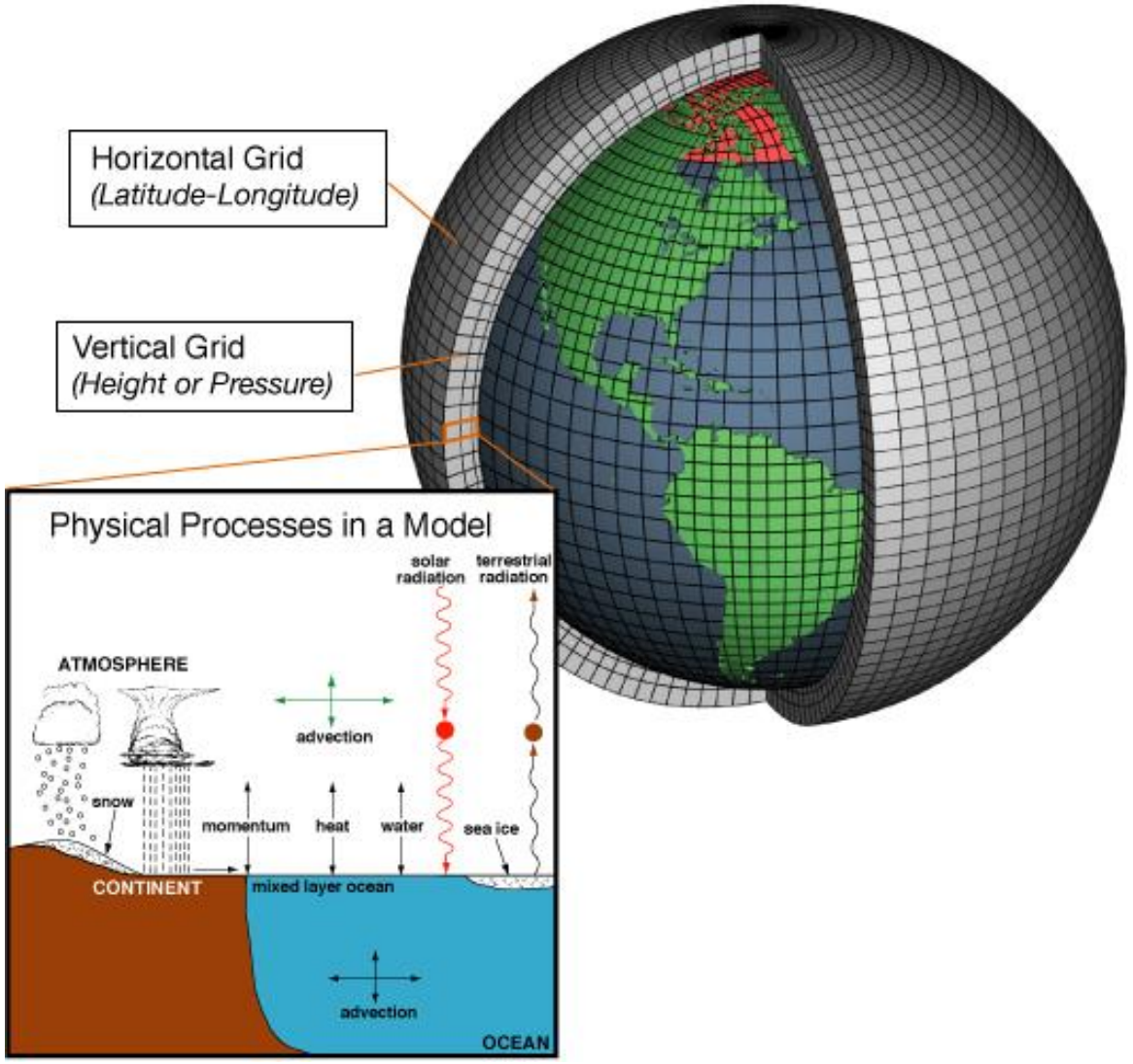
Can technology save us?

Maybe!

AI has the potential to play a role in addressing climate change and its associated challenges (according to ChatGPT)

Climate Modelling/Prediction:

- AI can assist in developing more accurate climate models by analyzing vast amounts of climate data, identifying patterns, and predicting future climate scenarios: inform policy decisions

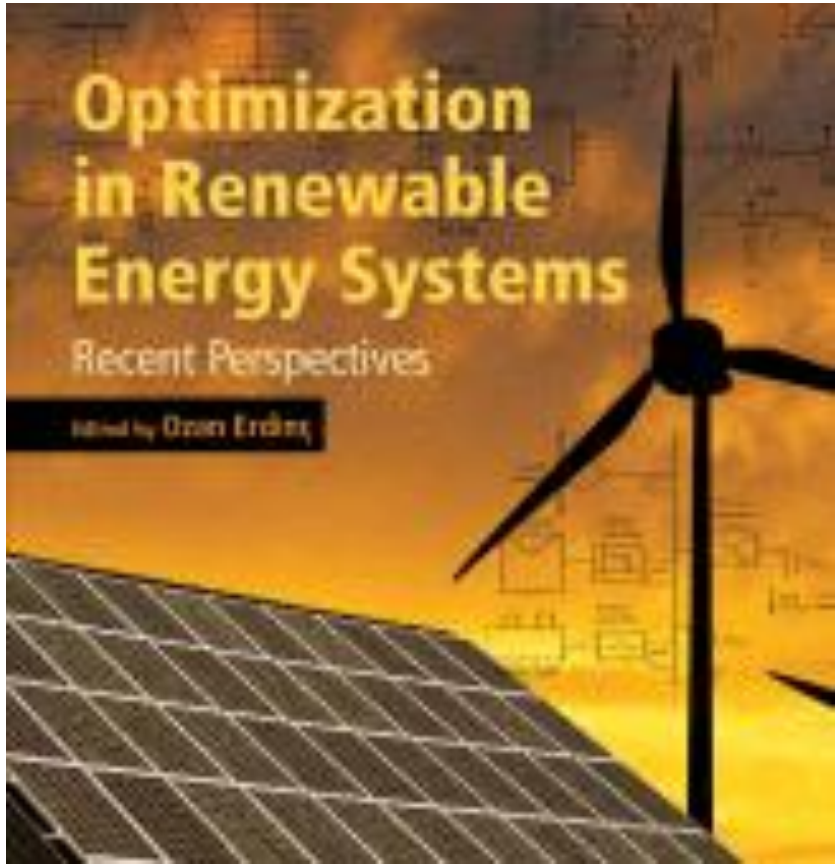


https://www.climate.gov/maps-data/climate-data-primer/predicting-climate/climate-models

AI has the potential to play a role in addressing climate change and its associated challenges (according to ChatGPT)

Renewable Energy Optimization:

- AI algorithms can optimize the generation, distribution, and consumption of renewable energy
- Analyze energy consumption patterns in buildings, transportation systems, and industrial processes
- Analyze data from weather patterns, energy demand, and supply sources to maximize the efficiency and reliability of renewable energy systems



https://www.sciencedirect.com/book/9780081010419/optimization-in-renewable-energy-systems

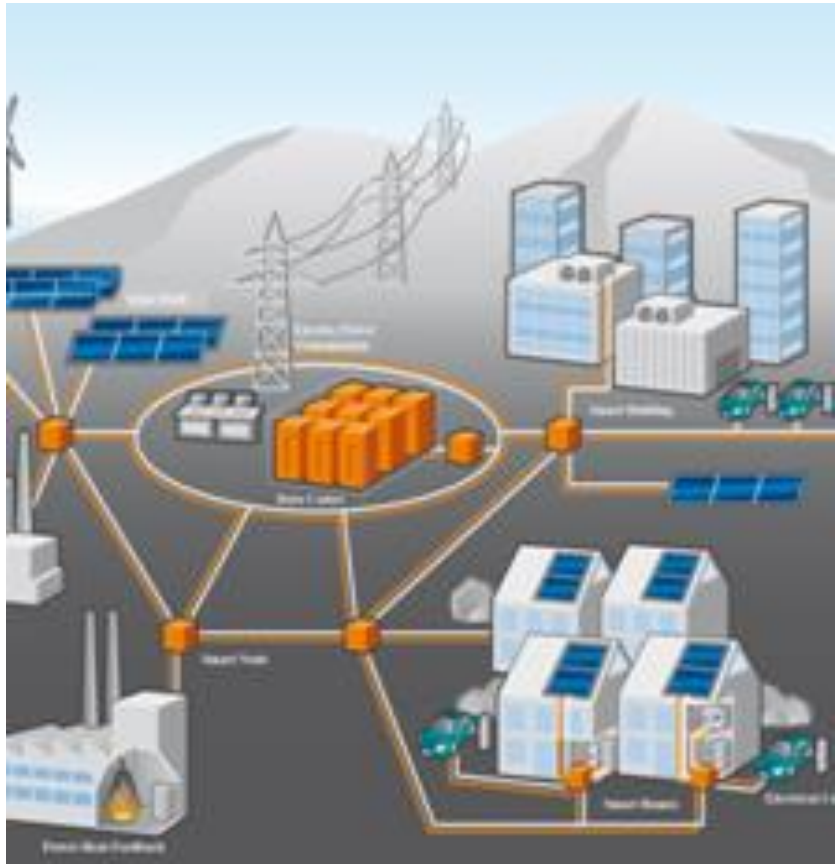
AI has the potential to play a role in addressing climate change and its associated challenges (according to ChatGPT)

Smart Grid Management:

- AI can enhance the management of energy grids by optimizing energy distribution, predicting demand patterns, and facilitating energy storage
- Help integrate renewable energy sources into the grid effectively, reduce energy waste, and improve overall grid efficiency

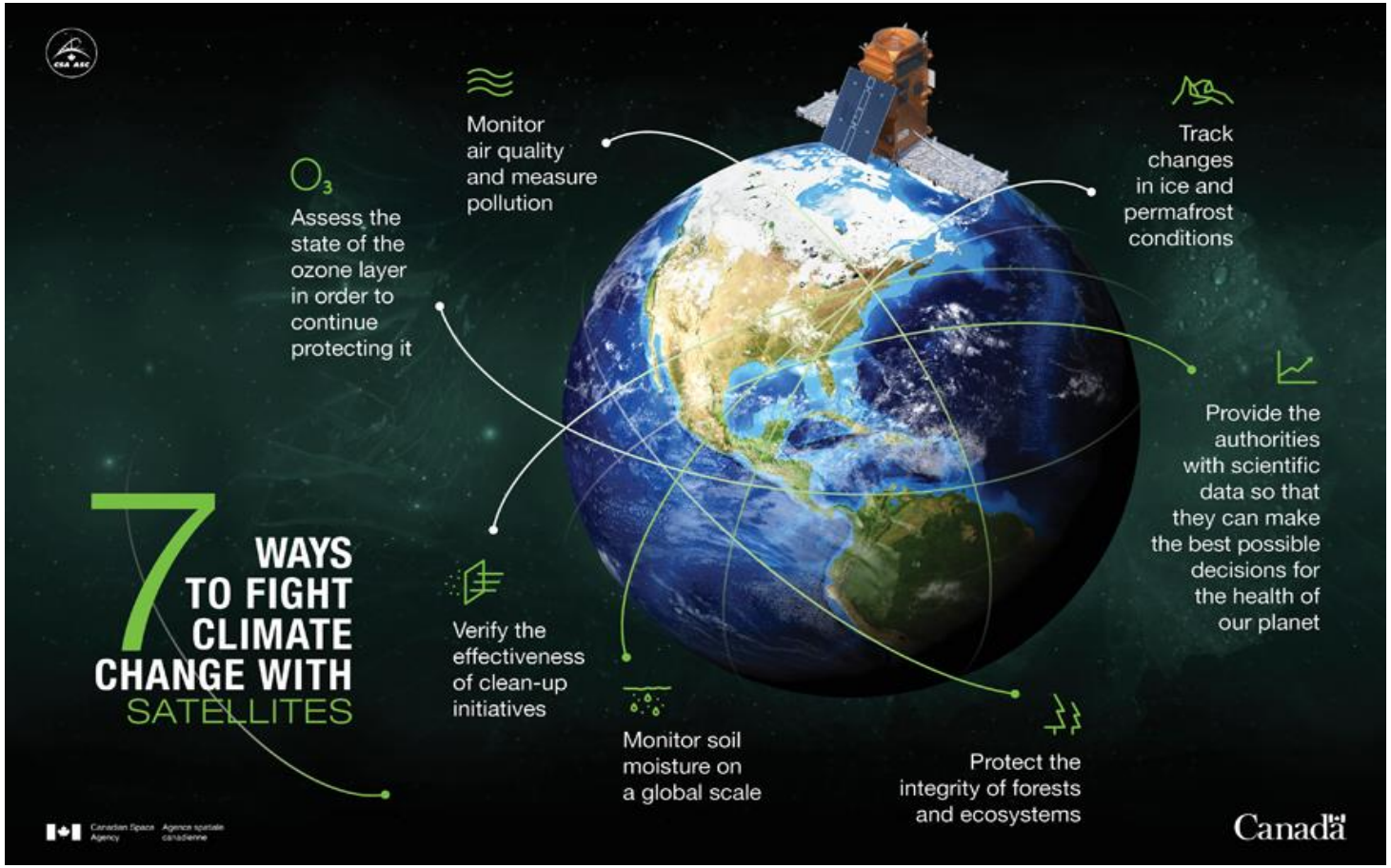
Promote Sustainable Agriculture and Land Management:

- Optimizing agricultural practices, improving crop yields, reducing water usage, and minimizing the use of pesticides



https://article.sciencepublishinggroup.com/html/10.11648.j.ijefm.s.2015030501.12.html

AI has the potential to play a role in addressing climate change and its associated challenges (according to Chat GPT)



Climate Change Monitoring:

- AI can analyze satellite imagery, remote sensing data, and other sources of information to monitor changes in the environment e.g. natural disaster prediction
- Help detect deforestation, track wildlife habitats, assess land use patterns, and identify areas vulnerable to climate change impacts

https://www.asc-csa.gc.ca/eng/satellites/everyday-lives/climate-change.asp

AI has the potential to play a role in addressing climate change and its associated challenges (according to ChatGPT)

Behaviour Change and Awareness:

- AI-powered applications and tools can raise awareness about climate change, educate individuals on sustainable practices, and promote behaviour change towards more eco-friendly lifestyles
- Collaboration between scientists, policymakers, and AI experts is crucial to harness AI capabilities effectively and ensure ethical and responsible deployment

Is Skynet about to be for real?

Skynet is a fictional artificial neural network based conscious group mind and artificial general superintelligence system that serves as the antagonistic force of the *Terminator* *(Wikipedia)*

Here's Why AI May Be Extremely Dangerous—Whether It's Conscious or Not

"A 2023 survey of AI experts found that 3% fear that AI development may result in a nuclear-level catastrophe"

"Almost 28,000 people have signed on to an open letter written by the Future of Life Institute, including Steve Wozniak, Elon Musk, the CEOs of several AI companies and many other prominent technologists, asking for a six-month pause or a moratorium on new advanced AI development"

"*If we get it wrong, we may not live to tell the tale. This is not hyperbole*"

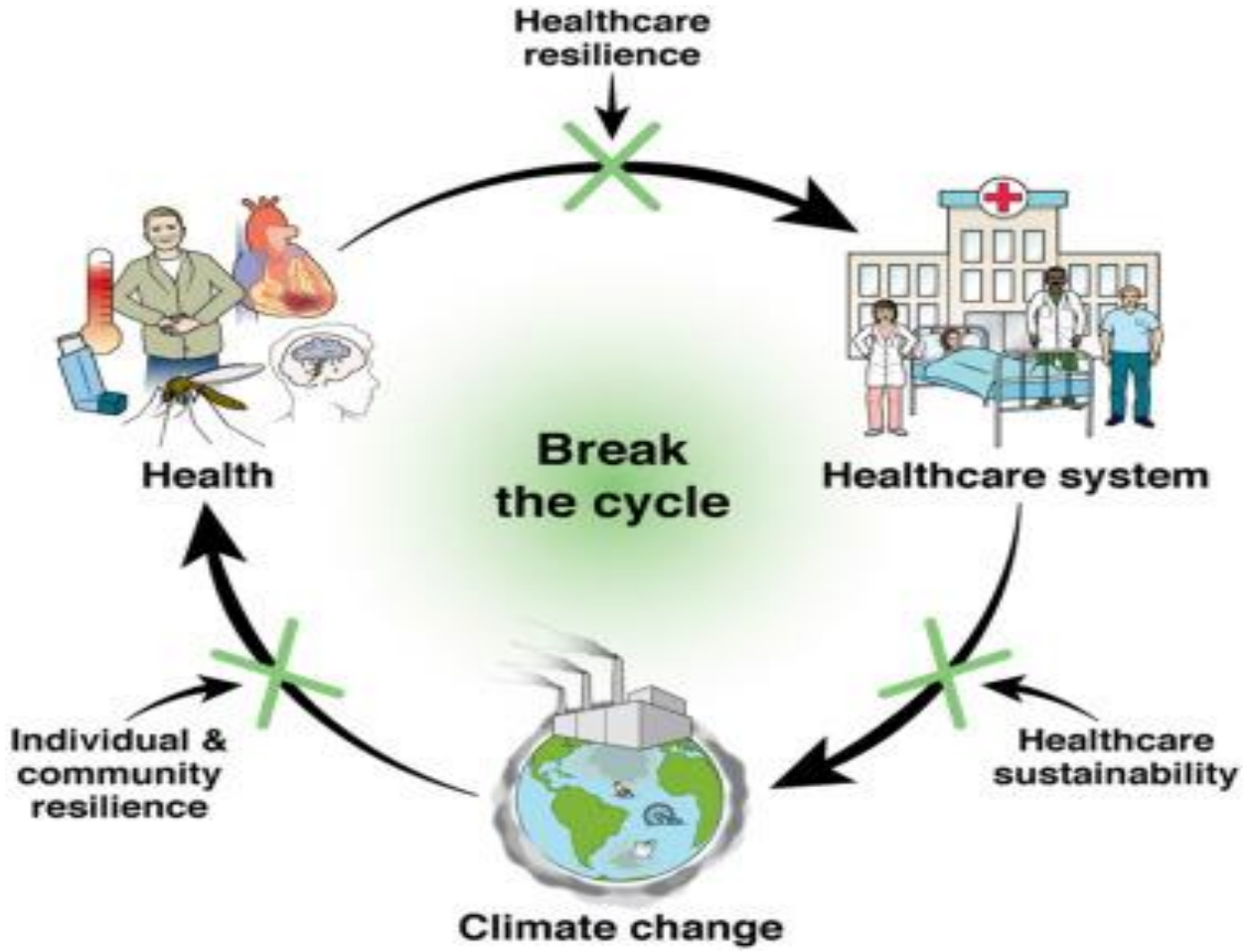
Tamlyn Hunt
Scientific American
May 25, 2023

https://www.scientificamerican.com/article/heres-why-ai-may-be-extremely-dangerous-whether-its-conscious-or-not/

Climate emergency is a real health issue requiring real action now: Doctors and all health and hospital professionals need to lead to net zero

- It's not the argument but HOW you frame it
- Talking *not* enough: action will save lives
- Reducing emissions/waste saves the health system money (e.g. NHS)
- Staff "love it" and "want emissions targeted"

We must break the cycle: Climate change, health, and health care and what we need to do to minimize adverse health effects and mitigate climate change



The figure illustrates the impact of climate change on health care and vice versa, which requires interventions to break the cycle of climate change → human health → health system → climate change. Such interventions will lead to health care sustainability and resilience, and to community and individual resilience

Setoguchi S et al. Gastroenterology, 162:1549 - 1555

A sustainable future in health: ensuring as health and hospital professionals our own house is in order and leading by example.

Med J Aust. 2020; 212(8):344

Editorial

A sustainable future in health: ensuring as health professionals our own house is in order and leading by example

Nicholas J Talley

It is time for health professionals to step up and lead to ensure a sustainable environment and health

The year 2020 is fast becoming the year of planetary crises, from global warming and the unprecedented bushfire season in Australia over the summer to the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) pandemic striking around the globe, with its health and financial implications.[1–3] Social media is littered with often uninformed opinions about both issues, from those unconcerned and arguing the problems are exaggerated or worse to those who are deeply concerned and searching for better solutions. The facts about the climate crisis and health are more stark, as pointed out by Madden and Capon[4] in this issue of the Journal and by the most recent *Lancet–MJA* countdown report[5] — overwhelming evidence points to a warming planet because of human activity and to the potential for very severe adverse health consequences, including other infectious disease outbreaks, if prompt action is not taken now. The recent unprecedented bushfire season may have shifted views about the potential for severe impacts of global warming on health, just as the unfolding health crisis with COVID-19 has highlighted how vulnerable our health systems are to new pathogens. There has not been political inertia in the United Kingdom, where all sides of politics recognise the global emergency we all face because of climate change.[6] However, more effective political action is needed here and around the world in terms of ensuring a sustainable future.

Of Australia's carbon emissions, the health care system accounts for about 7%.[7] As individual health practitioners, we can each make a difference in terms of the carbon footprint.[7] We can lead by example in our homes and practices and with how we travel. We can educate our patients and those we work with and train. And we can influence the health system we are a key part of too, for example, by working on strategies to drive down carbon emissions, waste and pollution from our hospitals. With a concerted effort, the Australian health system could achieve zero net emissions and relatively soon, and we applaud all the ongoing state initiatives.[8,9]

The *MJA* pledges to do our part. AMPCo — the company that publishes the *MJA* — has an investment policy that rules out any direct investment in fossil fuels. We plan a staged reduction in print to reduce the impact on forests while providing a high quality digital alternative, and although we wrap the print version of the *MJA* in biodegradable plastic, avoidance of waste is also a priority. And we will work collectively to promote a sustainable planet for us and for future generations, presenting the emerging data and updating them regularly to help drive optimal evidence-based policy. This is the theme of the current issue and we look forward to your feedback.

The SARS-CoV-2 pandemic has made it very clear we must be ready to step up and deliver additional high quality care and public health in a crisis, but wherever possible, we need to be able to do so without causing ecological damage or depleting precious resources required by those most in need.[10] In a crisis, both system and individual change is necessary but it would seem unethical to do otherwise. The impact of global warming, like COVID-19, is an ongoing global crisis, as over 11 000 scientists have warned.[12]

The time for complacent acceptance of the status quo must end; it is time for health professionals to step up and lead on a sustainable environment and health. At the *MJA* we hope every health professional will work to do so with us.

Competing interests: Nicholas Talley is Editor-in-Chief of the *Medical Journal of Australia*. A complete list of disclosures is available at https://www.mja.com.au/journal/staff/editor-chief-professor-nick-talley. •

1 Yu P, Xu R, Abramson MJ, et al. Bushfires in Australia: a serious health emergency under climate change. *Lancet Planet Health* 2020; 4: e47–e48.
2 Vardoulakis S, Jalaludin BB, Morgan GG, et al. Bushfire smoke: urgent need for a national health protection strategy. *Med J Aust* 2020; 212: 349–353.
3 Cheng A, Williamson D. An outbreak of COVID-19 caused by a new coronavirus: what we know so far. *Med J Aust* 2020; https://doi.org/10.5694/mja2.50530 [Epub ahead of print]. https://www.mja.com.au/journal/2020/212/10/outbreak-covid-19-caused-new-coronavirus-what-we-know-so-far
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6 BBC News. UK Parliament declares climate emergency. *BBC News* 2019, 1 May. https://www.bbc.com/news/uk-politics-48126677 [viewed Mar 2020].
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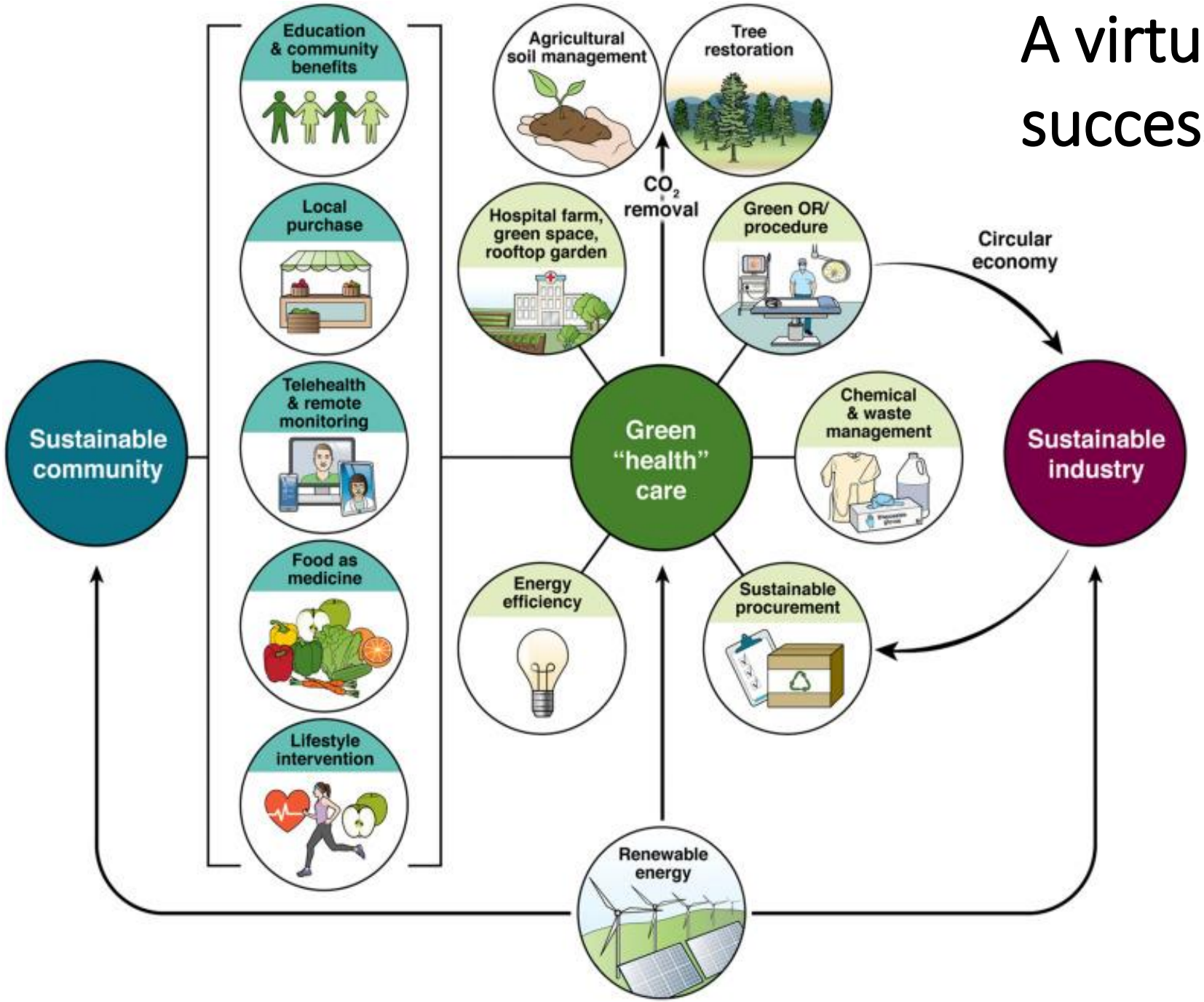
12 Ripple WJ, Wolf C, Newsome TM, et al. World scientists' warning of a climate emergency. *BioScience* 2020; 70: 8–12. •

University of Newcastle, Newcastle, NSW. Nicholas.Talley@newcastle.edu.au • doi: 10.5694/mja2.50574

Of Australia's carbon emissions, the health care system accounts for about 7%:

- As individual health practitioners, we can each make a difference in terms of the carbon footprint
- We can lead by example in our homes and practices and with how we travel
- We can educate our patients and those we work with and train
- And we can influence the health system we are a key part of too, for example, by working on strategies to drive down carbon emissions, waste and pollution from our hospitals
- With a concerted effort, the health system could achieve zero net emissions and relatively soon, and we applaud all the ongoing initiatives

A virtuous cycle: This is what success could look like



From high-emission "sick" care to green "health" care systems. The schematic highlights the interface between the contributors to green health care and the contributors that help provide a sustainable and resilient community. An important contributor to the success of this interface is having in place a sustainable industry

Setoguchi S et al. Gastroenterology, 162:1549 - 1555

https://climate.nasa.gov/effects/

https://epha.org/lancet-countdown-epha-policy-briefing-i-tackling-climate-change-and-air-pollution/

Prof. Nick Talley
@Prof_NickTalley

As physicians, we have an obligation to educate ourselves about health effects of climate change. If we don't understand the science, how can we educate our patients, colleagues & leaders in the health systems we work in to change? #MedTwitter @edXOnline courses.edx.org/certificates/0...

6:14 pm · 1/4/2022 · Twitter Web App

View Tweet activity

https://www.nature.com/articles/d41586-021-02649-6

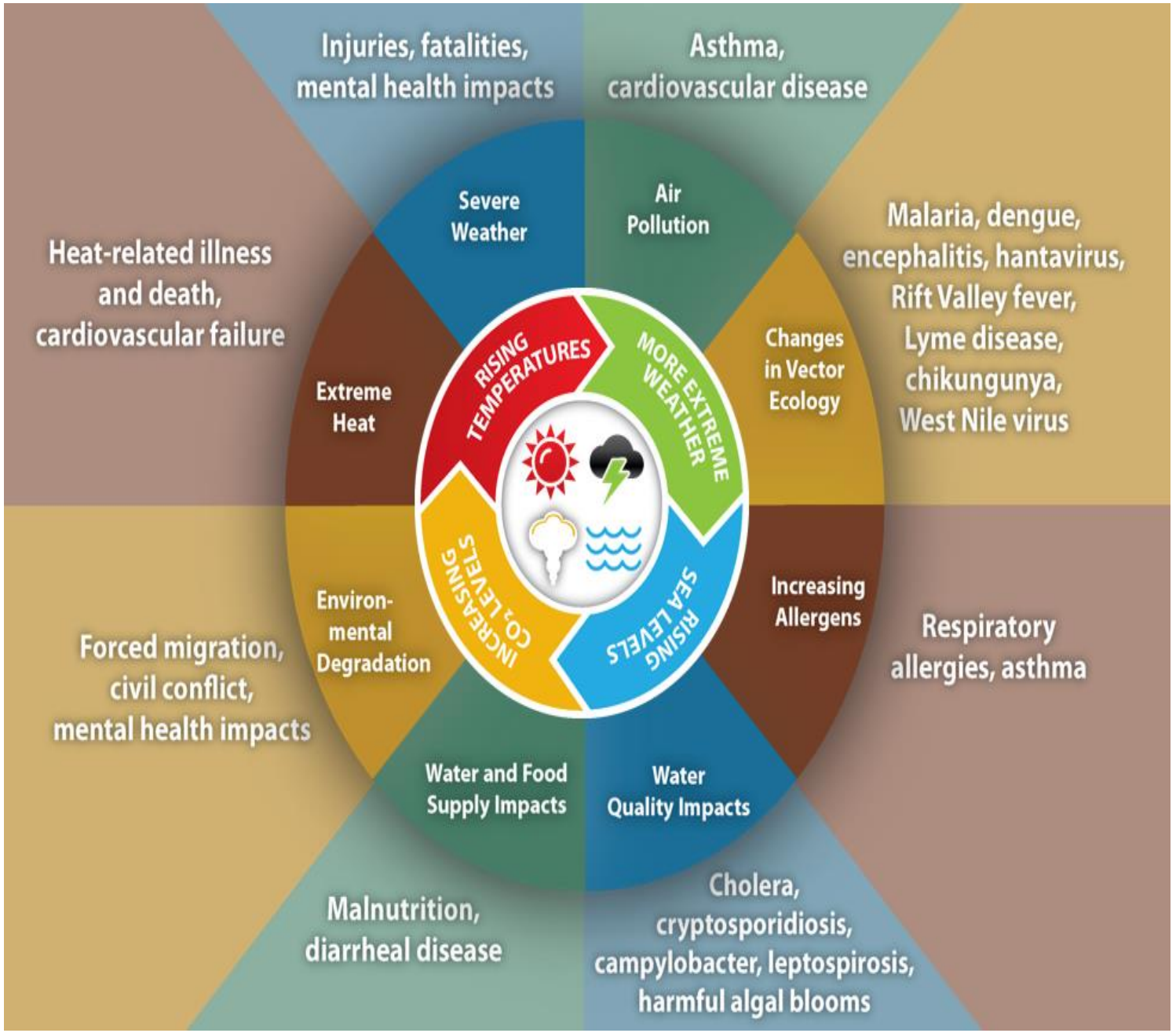
Advocacy on climate change: We have a duty of care

- *We can all make a difference and improve health too*
- *Educate yourself*
- *<u>You</u> should get involved! Advocate through YOUR organizations – aim to lead (don't leave it to others)*
- *What in the world could be more important than saving it? Who is going to if you don't?*

Climate change and health: Medicine on the frontline

- What will YOU say when the next generation asks you: *What did YOU do about climate change?*
- Hopefully - “we acted with foresight, courage and haste”

Salas et a. Academic Emergency Medicine 2019; 26: 838



Academic Life in Emergency Medicine 2018