WEBINAR GREEN HOSPITALS

SUSTAINABLE HEALTHCARE

Hans C Ossebaard | 07 March 2023

VU VRIJE UNIVERSITEIT AMSTERDAM | Faculteit der Bètawetenschappen

CONFLICT OF INTEREST?

‘No conflict of interest declared’

Hans C. Ossebaard

NATIONAL HEALTH CARE INSTITUTE

- Advice and clarify on issues **basic health care package**
- Advance **quality** and transparancy in care / HTA
- Develop **information standards** for information exchange
- Implement **funding** statutory health insurance schemes
    - Health Insurance Act
    - Longterm Care Act

Taking care of good health care

Amsterdam UMC
Universitair Medische Centra

Dept. Medical Informatics

- Medicine
- Data-analysis
- Healthcare system

> ‘Organisational settings of health care’

> Sustainability as innovation (Clinical informatics)

VRIJE UNIVERSITEIT AMSTERDAM

Science for Sustainability

Science Faculty | **Athena Institute**

Life Sciences & Health: new specialization Health & Life sciences:

Sustainable Health and Healthcare (> 2021)

Athena Institute
Connecting science and society
for a better tomorrow

SCIENTIST REBELLION - NON-VIOLENT DIRECT ACTION

The privilege to know, the duty to act

what are you doing about the climate crisis?

Scientists have known for decades the catastrophic consequences of the current climate crisis. We have no excuse for inaction. Join us in civil disobedience.

scientist rebellion_

CAPE TOWN 2019

ISQua | International Society for Quality in Health Care

ISQua Statement on Sustainability in Health Care

As part of its mission to improve health worldwide, ISQua concurs with the following principles regarding Climate Change.

1. ISQua recognises the serious consequences of climate change and pollution for the health of individuals and populations across the planet;
2. ISQua recognises that the healthcare sector has a responsibility to minimise its impact on climate change and pollution;
3. ISQua recognises the urgency and importance of climate change as part of its mission to inspire and empower people to advocate for and facilitate health and improvements, in the quality and safety of healthcare worldwide;
4. ISQua believes that inspiring and empowering people to advocate for, and facilitate health and improvements includes the promotion of climate sustainability and implementation of climate-friendly interventions;
5. ISQua will support the promotion of climate sustainability in the health care sector.

We, therefore, invite our Members to provide us with good practices and evidence on how to innovate patient care while enhancing

Hugu
35-38 St Step
Dublir

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Tel: +353 (0

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doi: 10.1093/intqhc/mzaa036
Advance Access Publication Date: 00 Month 0000
Frontiers Improve

ISQua

Frontiers Improve

Climate change, environmental sustainability and health care quality

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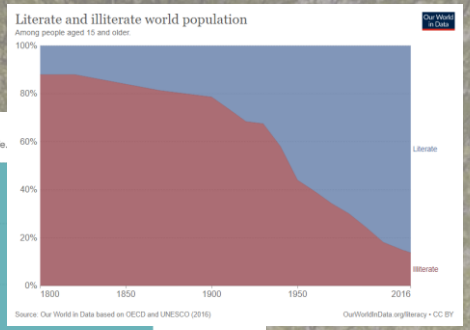
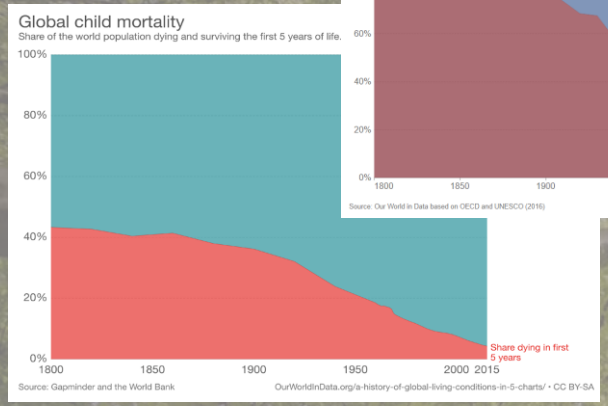
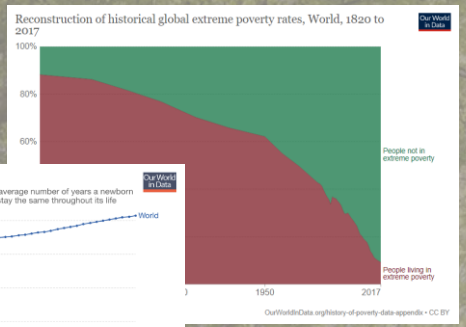
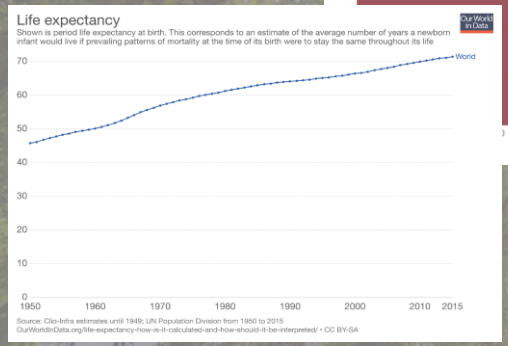








Humanity has made tremendous public health gains by traditional measures such as global child mortality and life expectancy…

Yet at the same time,

we've disrupted Earth's natural systems

Anthropogenic environmental changes include:

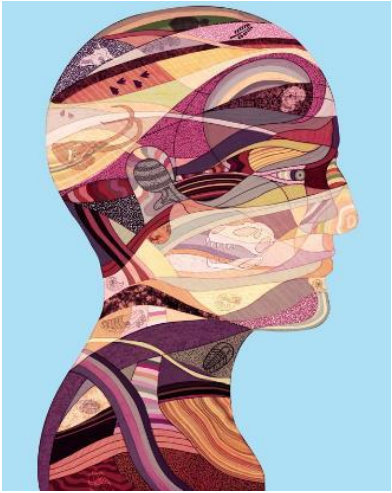
- Biodiversity loss
- Changing biogeochemical flows
- Changing land use and land cover
- Global pollution
- Climate change
- Depletion of natural resources

ANTHROPOCENE

The age of man

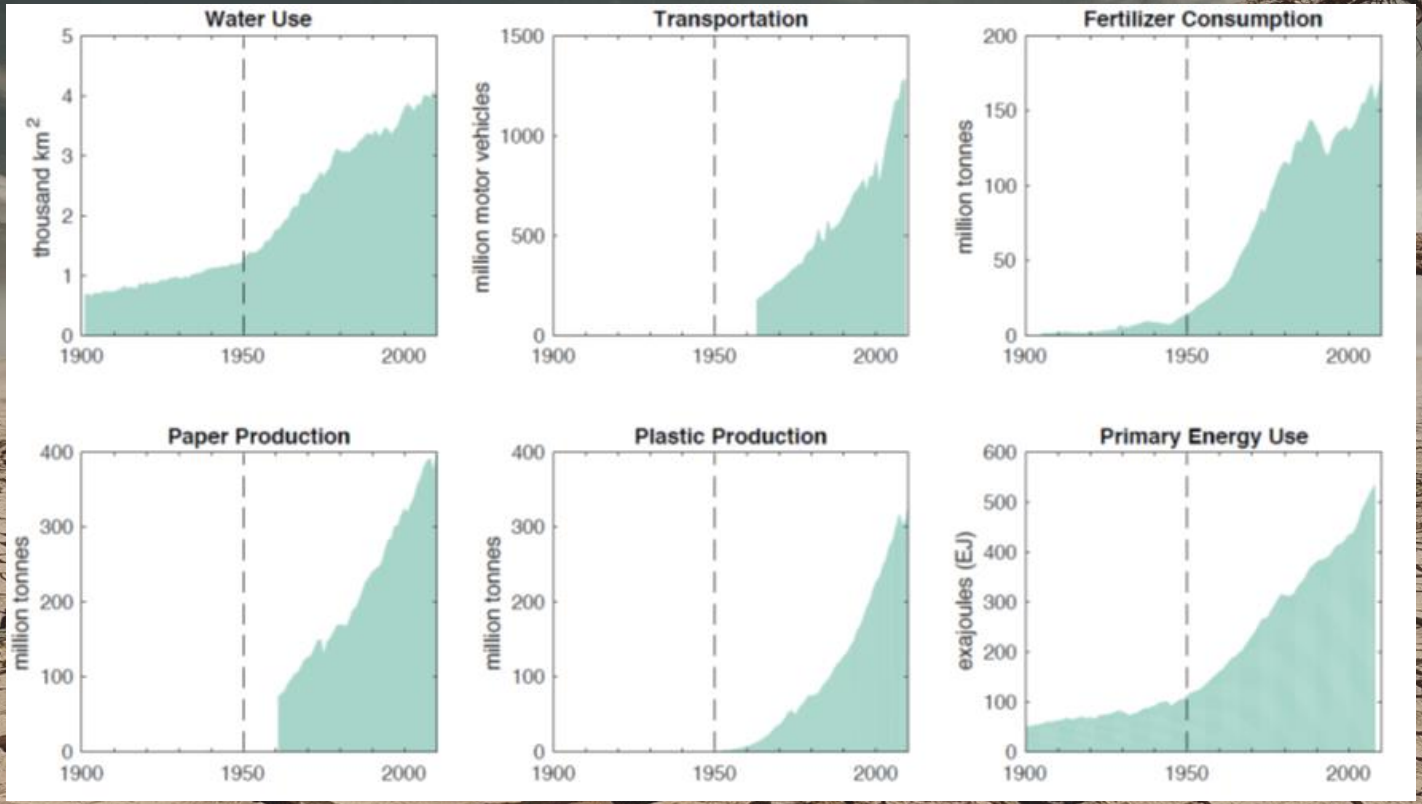
- Demography
- Consumption
- Technology

The planet is changing

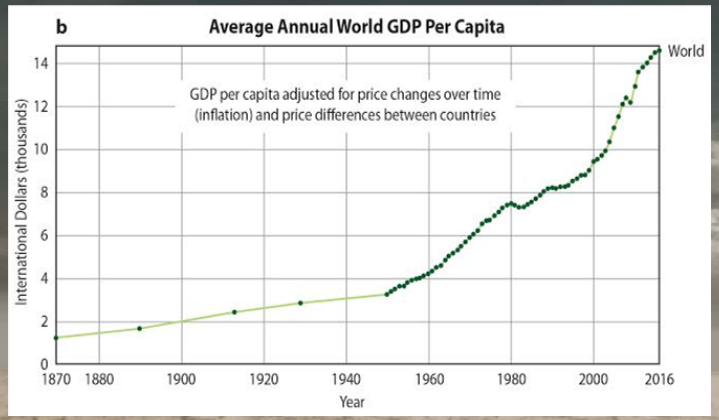


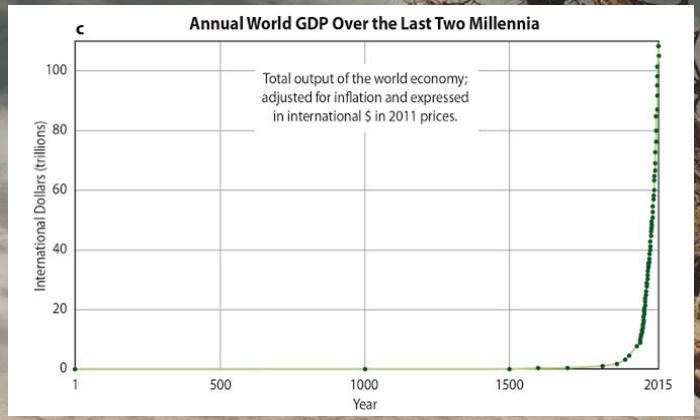
https://theanthropocene.org/

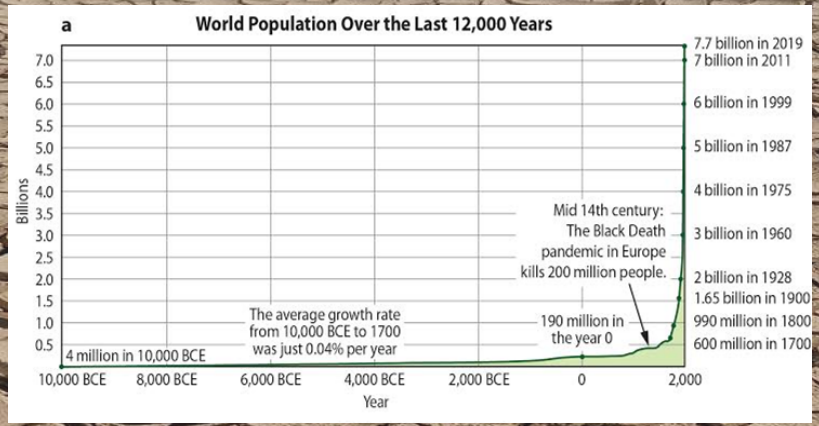
The Great Acceleration: Consumption patterns skyrocket after 1950



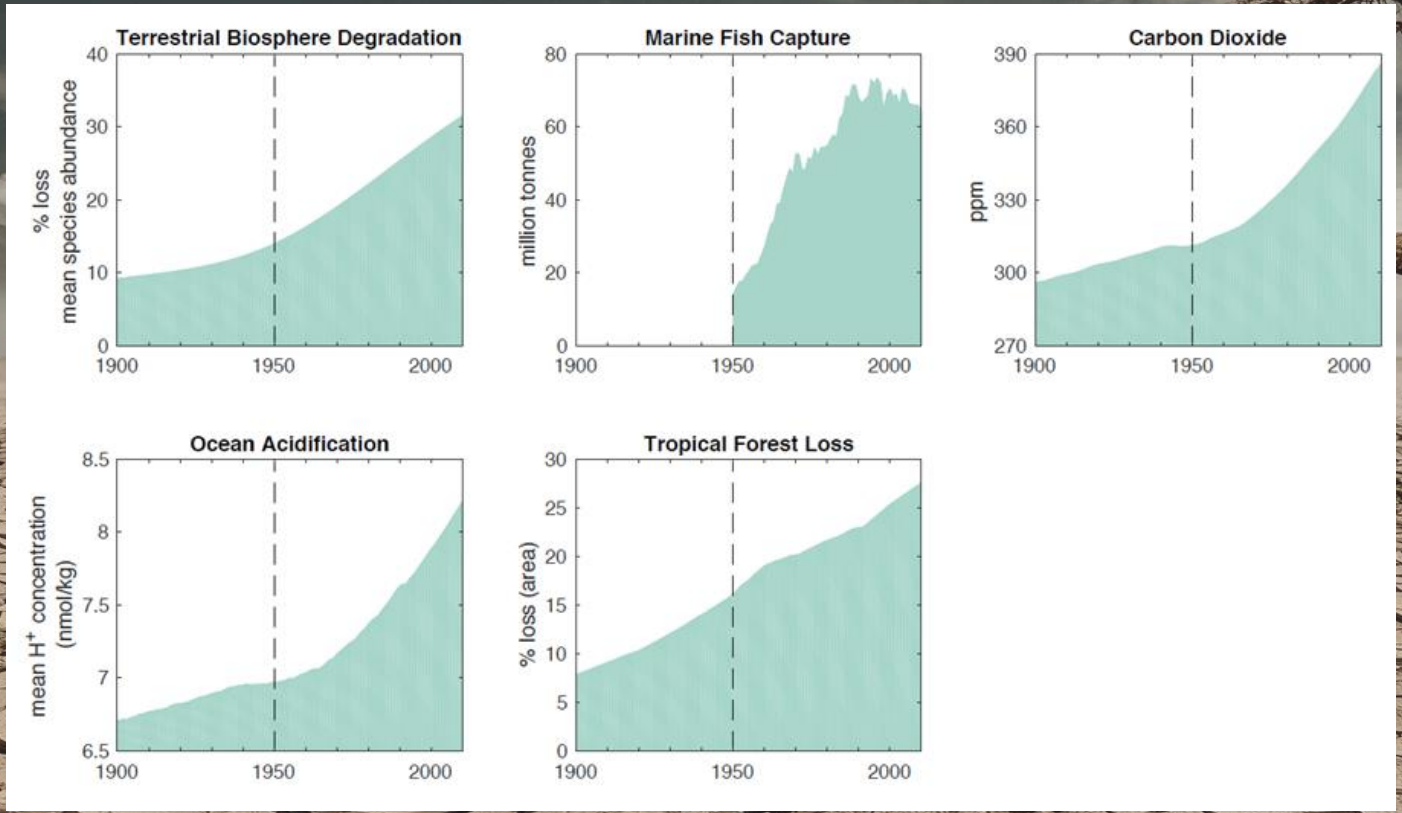
The Great Acceleration: Exponential growth in population and world GDP





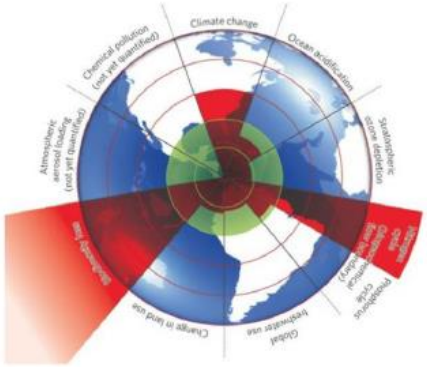


The Great Acceleration: Accelerated human impacts on natural systems



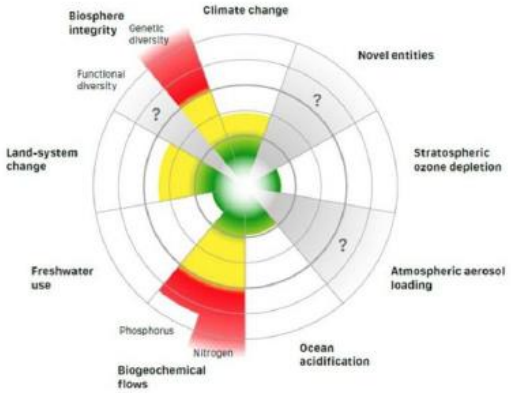
PLANETARY BOUNDARIES

2009



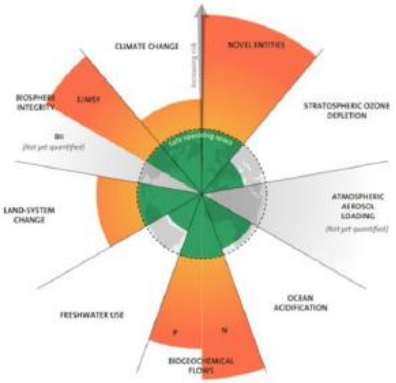
3 boundaries crossed

2015



4 boundaries crossed

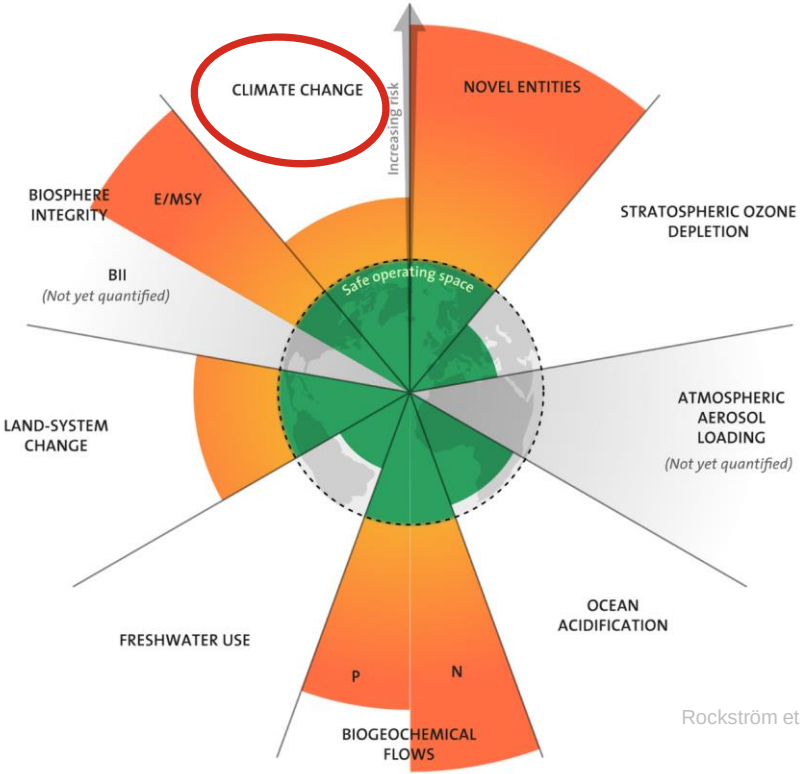
2022



5 boundaries crossed

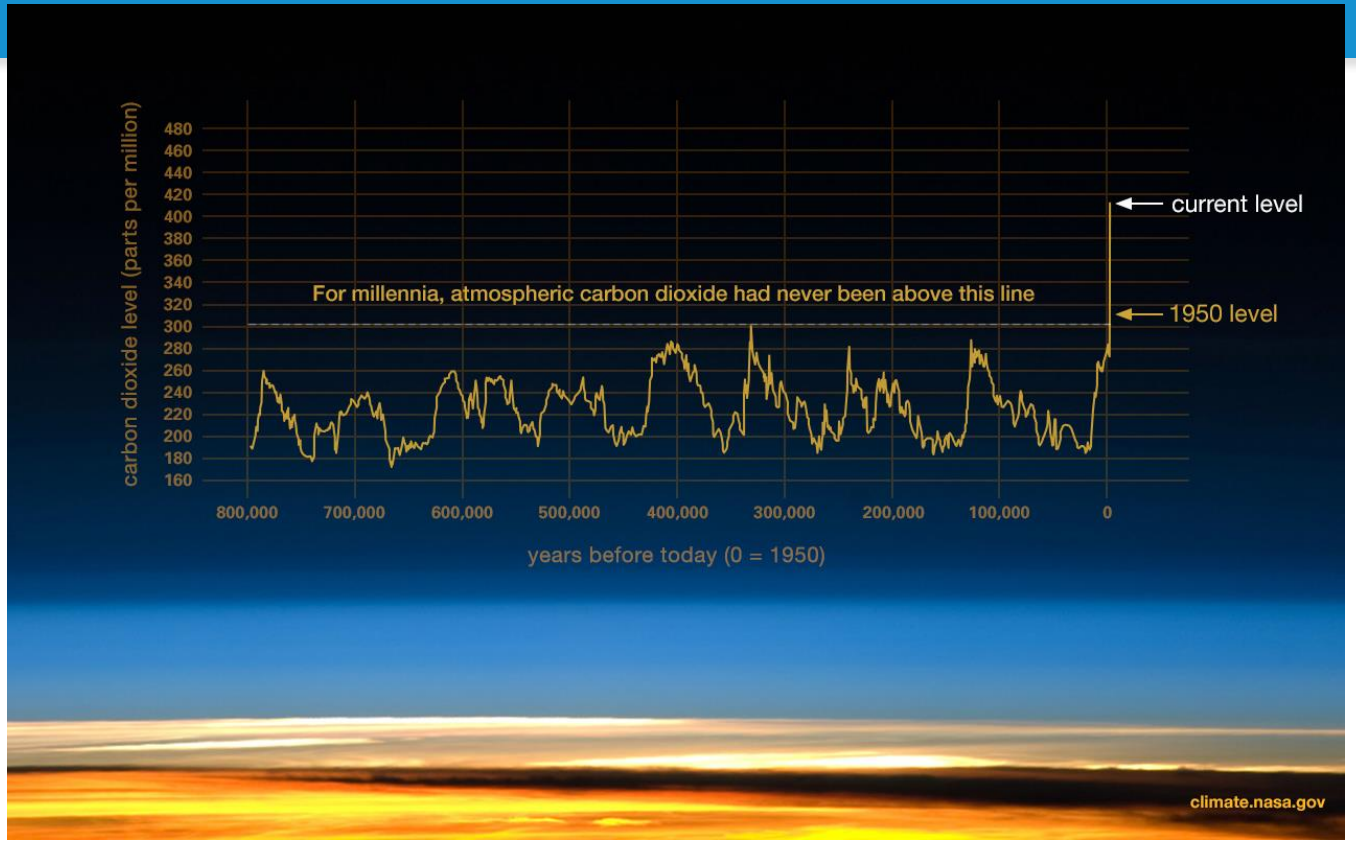
Rockström et al., 2022

PLANETARY BOUNDARIES

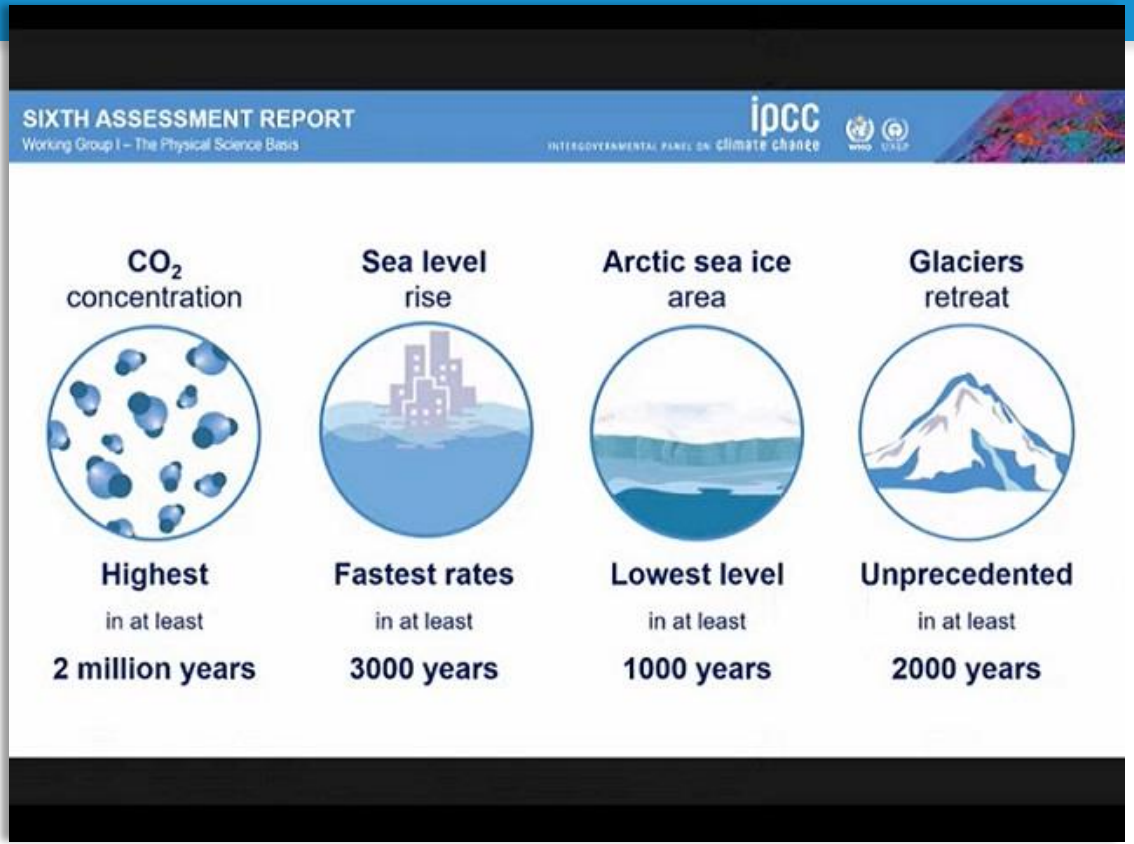


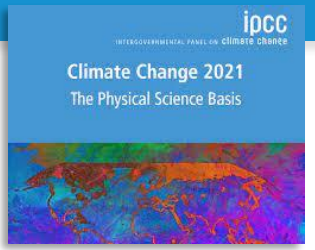
Rockström et al., 2022

ATMOSPHERIC CARBON DIOXIDE

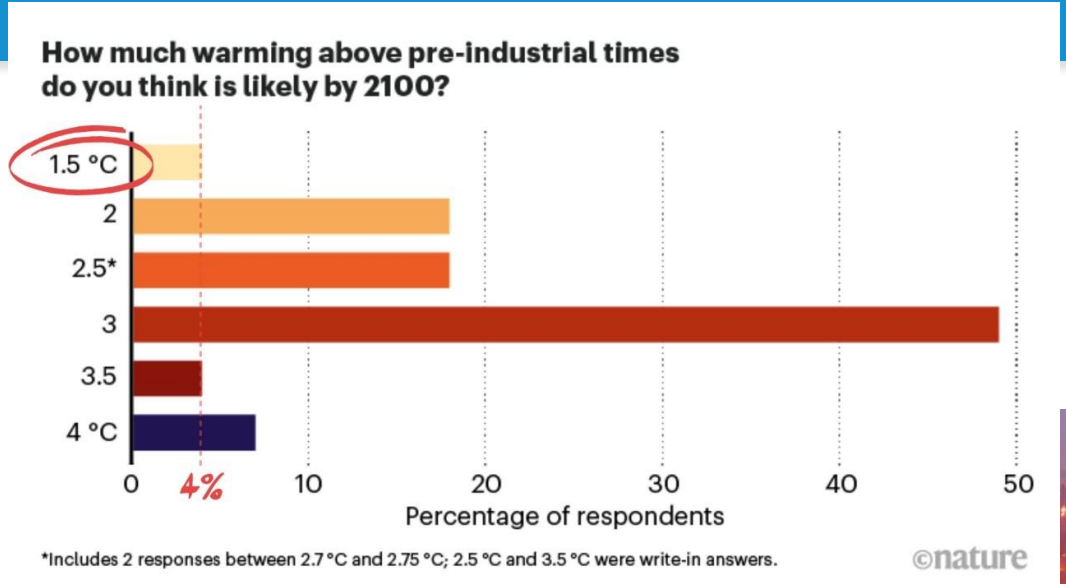


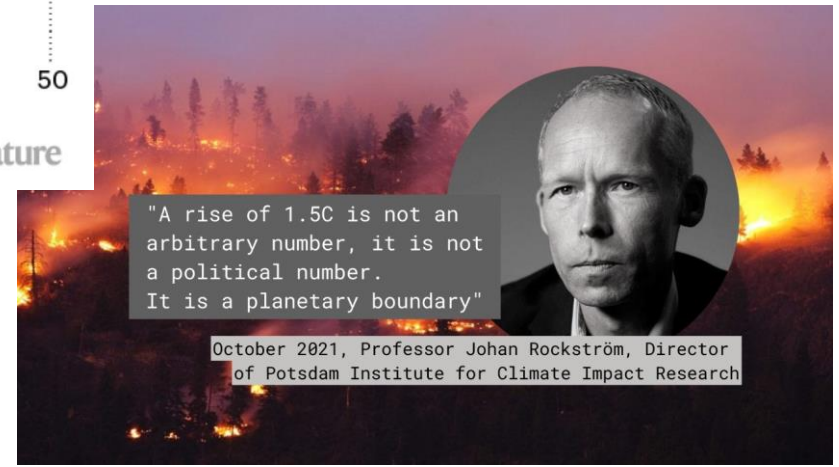
IPCC 2021


SIXTH ASSESSMENT REPORT
Working Group I – The Physical Science Basis
ipcc
INTERGOVERNMENTAL PANEL ON climate change
CO_2 concentration
Sea level rise
Arctic sea ice area
Glaciers retreat
Highest
in at least
2 million years
Fastest rates
in at least
3000 years
Lowest level
in at least
1000 years
Unprecedented
in at least
2000 years


ipcc
INTERGOVERNMENTAL PANEL ON climate change
Climate Change 2021
The Physical Science Basis

GLOBAL WARMING > CHANGES CLIMATE





‘TIPPING POINTS’

UNESCO 2022: accelerated melting of glaciers in World Heritage sites, with glaciers in a third of sites set to disappear by 2050

Photo courtesy Ove Hoegh-Guldberg

NONETHELESS

Key messages IPCC Special Report on 1.5°C (update AR6)

Already 1.1°C of global warming

At current rate, would reach 1.5°C between ~~2030 and 2052~~ 2021 and 2040

Clear benefits to limiting warming to 1.5°C

We can still limit warming to 1.5°C but this requires unprecedented ~~changes~~ system transformations

Waiting for NDCs means missing 1.5°C

Limiting warming to 1.5°C would mostly go hand in hand with achieving other societal goals

ipcc INTERGOVERNMENTAL PANEL ON climate change

WHO UNEP

TU/e

"We have mortgaged the health of future generations to realize economic and development gains in the present."

The ***Rockefeller Foundation–Lancet Commission*** on Planetary Health (2015)*

*This commission introduced the concept of 'planetary health' to the health and medical sciences

Our environment is changing — and it's not just our climate.

- We've cleared nearly half of temperate & tropical forests
- Biodiversity is rapidly disappearing: ~150 species lost daily
- Our oceans have become 30% more acidic since the Industrial Revolution
- Land is desertifying: we use over two-thirds of the world's ice free surface for ag
- Soil, air, and water ecosystems are being polluted
- Biogeochemical cycles are being altered: CO2 levels increased 25% since the 1950s and we've exceeded the planetary boundaries for nitrogen and phosphorus
- We've dammed over 60% of our rivers
- Extreme weather events wreak havoc on communities
- Temperatures are increasing
- Sea levels are rising

These changes in our environment severely **affect our health** and jeopardize decades of public health gains:

Human health impacts include, but aren't limited to:

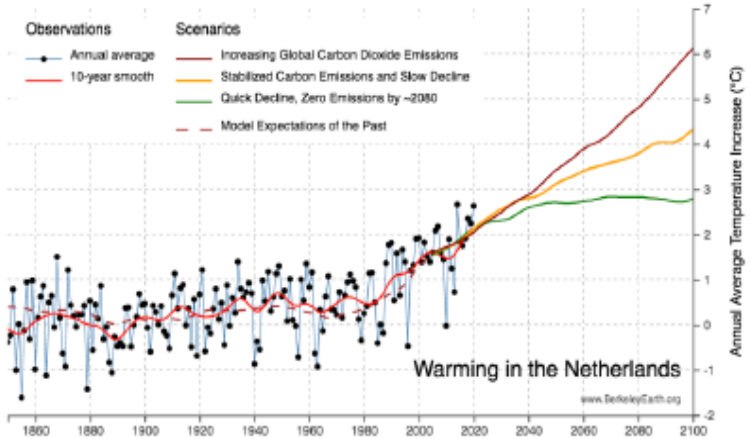
- Cardiovascular diseases
- Respiratory diseases, like asthma and COPD
- Infectious zoonotic and diarrheal diseases
- Antimicrobial resistance
- Toxic and dioxin exposures
- Heat strokes
- Mental health effects
- Malnutrition
- Forced displacement and migration
- Civil strife and trauma

GLOBAL WARMING > CHANGES CLIMATE

The Netherlands

Already +2.1 °C in 2020

Heading for around +4.3 °C in 2100



GLOBAL WARMING > CHANGES CLIMATE (IPCC, 2022)

WHAT DOES THIS MEAN FOR INDIA?

- The country is expected to see an **increase in frequency and severity of hot extremes**
- **Incidents of forest fire may go up** because of heat wave conditions
- Increase in rainfall will be more severe over the southern parts of India
- **Rain could also increase by 20%** in the southwest coast compared to 1850-1900 level

- Monsoon precipitation is projected to go up in the mid- to long-term over south Asia
- This can increase the occurrence of **glacial lake outbursts, floods and landslides** over moraine-dammed lakes
- Snowline elevations will rise and **glacier volumes will decline**
- Regional mean sea level in south Asia will continue to rise

VU

GLOBAL WARMING > CHANGES CLIMATE

• M**ore than 100, have already announced their intentions to achieve net-zero emissions by 2050.** These include major emitters like the United States, China and the **European Union.**

•**India, the third largest emitter in the world,** has been holding out, arguing that it was already doing much more than it was required to do, performing better, in relative terms, than other countries.

• Any further burden would **jeopardise its continuing efforts to pull its millions out of poverty.**

•IPCC has informed that a global net-zero by 2050 was the minimum required to keep the temperature rise to 1.5° C. **Without India, this would not be possible.**

WHAT TO DO?


BIHAR
UN environment programme
SHAKTI SUSTAINABLE ENERGY FOUNDATION
WRI INDIA
CEEW THE COUNCIL
IPCC AR6 WGIII Report
Highlights & Implications for India and Bihar
4 May 2022 | 1100 – 1230 IST
Dipak Kumar Singh
Department of Environment, Forest and Climate Change Government of Bihar
Ashok Ghosh
Bihar State Pollution Control Board
S. Chandrasekar
Bihar State Pollution Control Board
Ritu Mathur
NITI Aayog
Aviral Tiwari
IIM Bodh Gaya
Bachu Anilkumar
IIT Patna
Parag Sharma
O2 Power
Anurag Bajpai
Green Tree Building Energy Pvt Ltd
Vaibhav Chaturvedi
CEEW

THE ANTROPOCENE - THE HUMAN ENTREPRISE

Planet in **crisis**

Science must help

Planetary health is a scientific field and global movement focused on understanding and quantifying the growing human health impacts of anthropogenic global environmental change, and developing solutions that will allow humanity and the natural systems we depend on to thrive now and in the future.

Planetary health maintains a **sharp focus on human health**, while blurring the boundaries between humans and all life with which we share this planet.

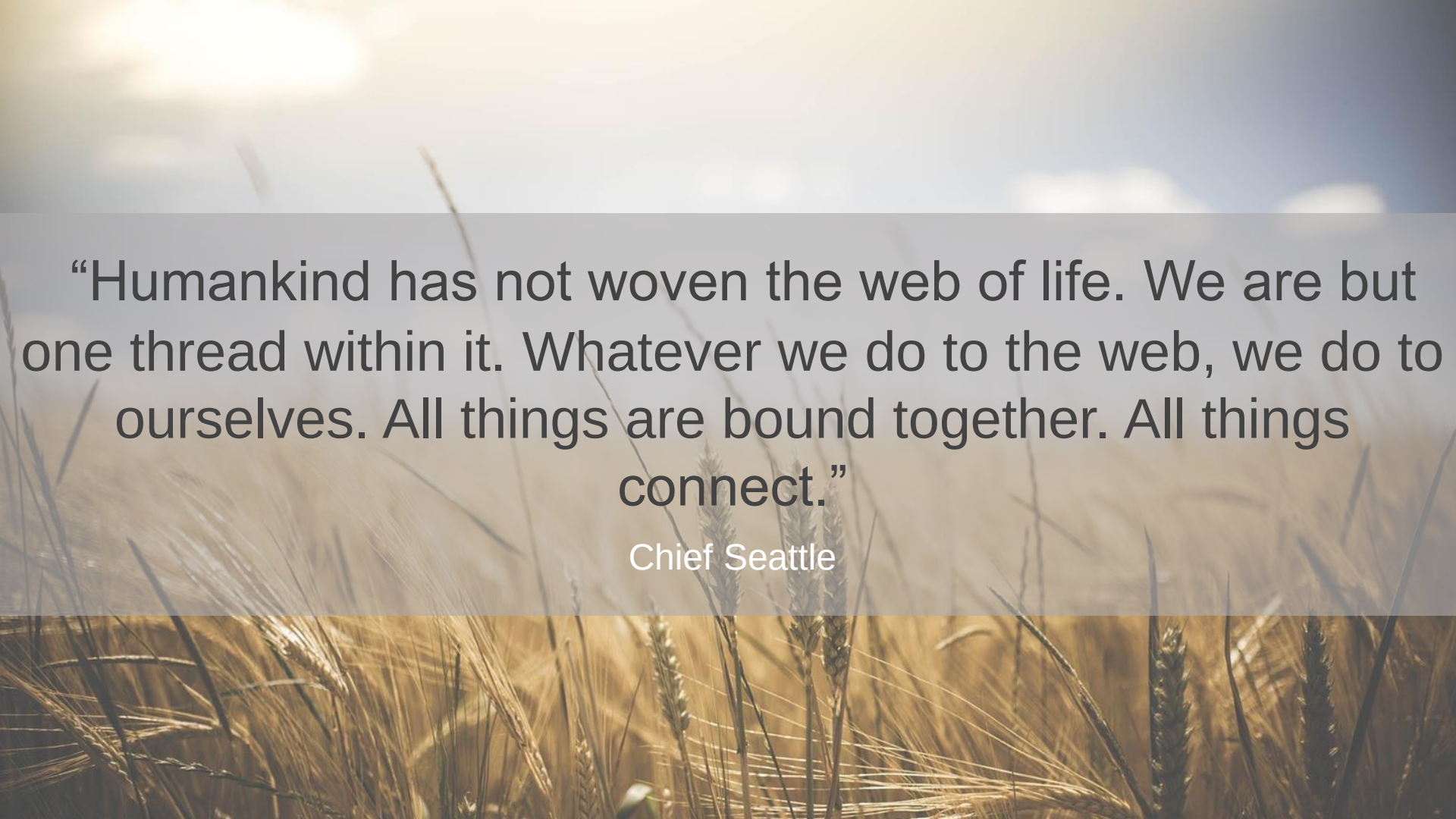
By harming our natural systems, we harm ourselves and future generations.

Planetary hea le blurring the

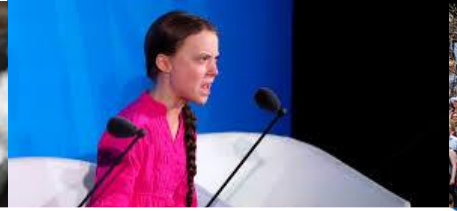
boundaries betv lanet. This aligns

with many Ind screte concept.

By harming generations.

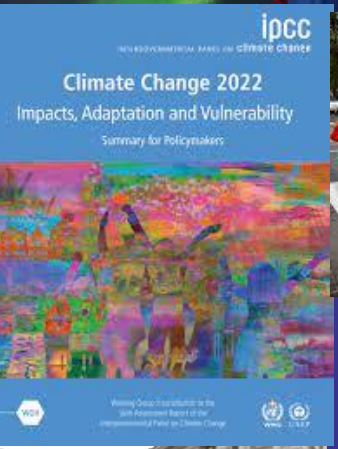

“Humankind has not woven the web of life. We are but one thread within it. Whatever we do to the web, we do to ourselves. All things are bound together. All things connect.”
Chief Seattle

PUBLIC



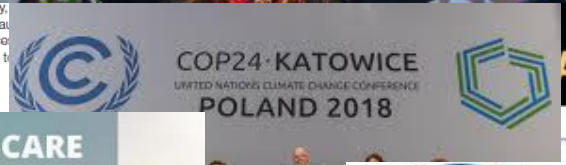
World Health Organization

SDG target 1.5: by 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters.



UN 2019

A RACE WE CAN WIN



Achieving planetary health will require a **Great Transition** where we all learn to do nearly everything differently, such as:

How we produce and consume food, manufactured products, and energy;

How we redesign our healthcare;

How we construct and live in our cities;

How we manage our natural landscapes and resources;

And the stories we tell ourselves about our place in the world, our relationship to Nature, and what it means to live a good life.

The Great Transition will require both:

Major innovation across fields:

- Energy and waste infrastructure
- Food systems and agriculture
- Land use and conservation
- **Healthcare and biotechnology**
- Manufacturing and supply chains
- Chemistry and materials science
- Business and economics
- Technology and digital media
- Urban planning and architecture

Profound collaboration across social sectors:

- Policy and governance
- Business and economics
- Natural sciences
- **Health sciences**
- Faith leaders
- Indigenous communities
- Tech and entrepreneurship
- Arts and humanities
- Education

Many of our best efforts remain siloed, fragmented, or rivalrous

— but it will take all of us.

Policymakers
Storytellers
Businesspeople
Faith leaders
Technologists
Engineers
Artists

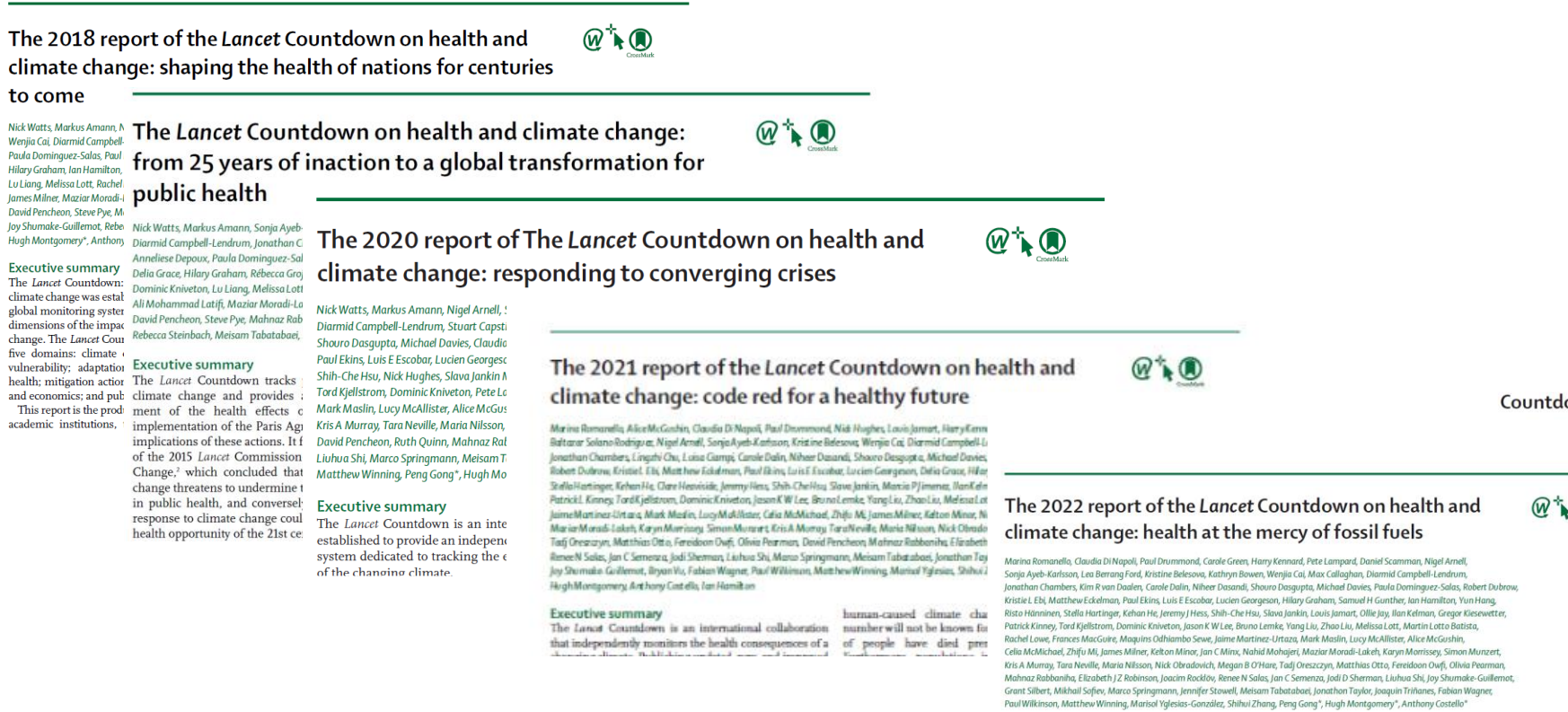
- Farmers
- Activists
- Researchers
- Journalists
- Military
- Healers
- Politicians

- **Doctors**
- Fashion designers
- Law enforcement
- Actors
- Indigenous leaders
- Librarians
- Scientists

- **Students**
- **Nurses**
- **Educators**
- Youth
- Writers
- Chefs
- Manufacturers

We need common terms, objectives, and visions for the future

CLIMATE CRISIS = HEALTH EMERGENCY



The 2018 report of the *Lancet* Countdown on health and climate change: shaping the health of nations for centuries to come

Nick Watts, Markus Amann, N
Wenjia Cai, Diarmid Campbell-
Paula Dominguez-Salas, Paul
Hilary Graham, Ian Hamilton,
Lu Liang, Melissa Lott, Rachel
James Milner, Maziar Moradi-
David Pencheon, Steve Pye, M
Joy Shumake-Guillemot, Rebe
Hugh Montgomery*, Anthony

Executive summary

The *Lancet* Countdown:
climate change was estab
global monitoring syste
dimensions of the impac
change. The *Lancet* Cou
five domains: climate
vulnerability; adaptatio
health; mitigation actio
and economics; and pub
This report is the prod
academic institutions,

The *Lancet* Countdown on health and climate change: from 25 years of inaction to a global transformation for public health

Nick Watts, Markus Amann, Sonja Ayeb-
Diarmid Campbell-Lendrum, Jonathan C
Anneliese Depoux, Paula Dominguez-Sal
Delia Grace, Hilary Graham, Rébecca Gro
Dominic Kniveton, Lu Liang, Melissa Lott
Ali Mohammad Latifi, Maziar Moradi-La
David Pencheon, Steve Pye, Mahnaz Rab
Rebecca Steinbach, Meisam Tabatabaei,

Executive summary

The *Lancet* Countdown tracks
climate change and provides
ment of the health effects
implementation of the Paris Ag
implications of these actions. It f
of the 2015 *Lancet* Commission
Change,[2] which concluded that
change threatens to undermine
in public health, and conversel
response to climate change coul
health opportunity of the 21st ce

The 2020 report of The *Lancet* Countdown on health and climate change: responding to converging crises

Nick Watts, Markus Amann, Nigel Arnell,
Diarmid Campbell-Lendrum, Stuart Capst
Shouro Dasgupta, Michael Davies, Claudia
Paul Ekins, Luis E Escobar, Lucien Georgesc
Shih-Che Hsu, Nick Hughes, Slava Jankin
Tord Kjellstrom, Dominic Kniveton, Pete La
Mark Maslin, Lucy McAllister, Alice McGus
Kris A Murray, Tara Neville, Maria Nilsson,
David Pencheon, Ruth Quinn, Mahnaz Rab
Liuhua Shi, Marco Springmann, Meisam T
Matthew Winning, Peng Gong*, Hugh Mo

Executive summary

The *Lancet* Countdown is an inte
established to provide an indepen
system dedicated to tracking the
of the changing climate

The 2021 report of the *Lancet* Countdown on health and climate change: code red for a healthy future

Marina Romanello, Alice McGushin, Claudia Di Napoli, Paul Drummond, Nick Hughes, Louis Jamart, Harry Kenn
Baltazar Solano-Rodriguez, Nigel Arnell, Sonja Ayeb-Karlsson, Kristine Belesova, Wenjia Cai, Diarmid Campbell-L
Jonathan Chambers, Lingzhi Chu, Luisa Ciampi, Carole Dalin, Niheer Dasandi, Shouro Dasgupta, Michael Davies,
Robert Dubrow, Kristie L Ebi, Matthew Eckelman, Paul Ekins, Luis E Escobar, Lucien Georgeson, Delia Grace, Hilar
Stella Hartinger, Kehan He, Clare Heaviside, Jeremy Hess, Shih-Che Hsu, Slava Jankin, Marcia P Jimenez, Ilan Kelm
Patrick L Kinney, Tord Kjellstrom, Dominic Kniveton, Jason K W Lee, Bruno Lemke, Yang Liu, Zhao Liu, Melissa Lot
Jaime Martinez-Urtaza, Mark Maslin, Lucy McAllister, Celia McMichael, Zhifu Mi, James Milner, Kelton Minor, Ni
Maziar Moradi-Lakeh, Karyn Morrissey, Simon Munzert, Kris A Murray, Tara Neville, Maria Nilsson, Nick Obrado
Tadj Oreszczyn, Matthias Otto, Fereidoon Owfi, Olivia Pearman, David Pencheon, Mahnaz Rabbaniha, Elizabeth
Renee N Salas, Jan C Semenza, Jodi Sherman, Liuhua Shi, Marco Springmann, Meisam Tabatabaei, Jonathan Tay
Joy Shumake-Guillemot, Bryan Vu, Fabian Wagner, Paul Wilkinson, Matthew Winning, Marisol Yglesias, Shihui
Hugh Montgomery, Anthony Costello, Ian Hamilton

Executive summary

The *Lancet* Countdown is an international collaboration that independently monitors the health consequences of a

human-caused climate cha
number will not be known fo
of people have died pre

Countdo

The 2022 report of the *Lancet* Countdown on health and climate change: health at the mercy of fossil fuels

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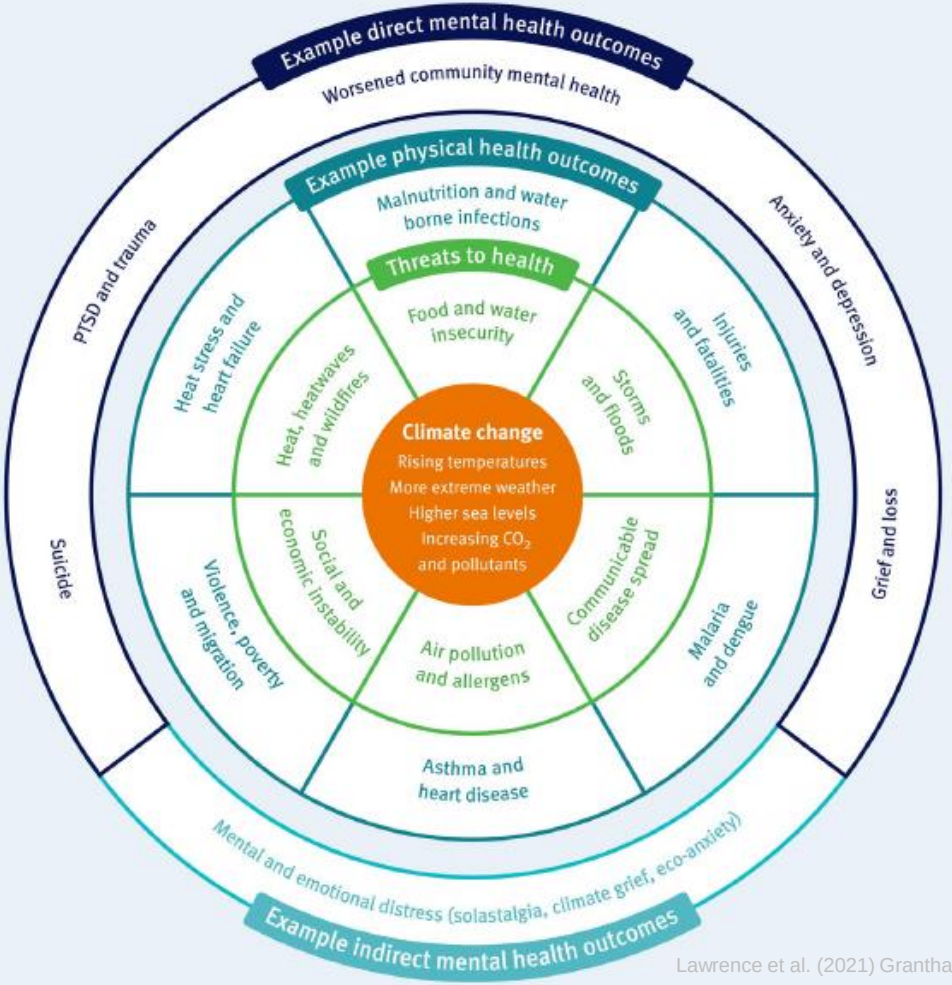
Sonja Ayeb-Karlsson, Lea Berrang Ford, Kristine Belesova, Kathryn Bowen, Wenjia Cai, Max Callaghan, Diarmid Campbell-Lendrum,
Jonathan Chambers, Kim R van Daalen, Carole Dalin, Niheer Dasandi, Shouro Dasgupta, Michael Davies, Paula Dominguez-Salas, Robert Dubrow,
Kristie L Ebi, Matthew Eckelman, Paul Ekins, Luis E Escobar, Lucien Georgeson, Hilary Graham, Samuel H Gunther, Ian Hamilton, Yun Hang,
Risto Hänninen, Stella Hartinger, Kehan He, Jeremy J Hess, Shih-Che Hsu, Slava Jankin, Louis Jamart, Ollie Jay, Ilan Kelman, Gregor Kiesewetter,
Patrick Kinney, Tord Kjellstrom, Dominic Kniveton, Jason K W Lee, Bruno Lemke, Yang Liu, Zhao Liu, Melissa Lott, Martin Lotto Batista,
Rachel Lowe, Frances MacGuire, Maquins Odhiambo Sewe, Jaime Martinez-Urtaza, Mark Maslin, Lucy McAllister, Alice McGushin,
Celia McMichael, Zhifu Mi, James Milner, Kelton Minor, Jan C Minx, Nahid Mohajeri, Maziar Moradi-Lakeh, Karyn Morrissey, Simon Munzert,
Kris A Murray, Tara Neville, Maria Nilsson, Nick Obradovich, Megan B O'Hare, Tadj Oreszczyn, Matthias Otto, Fereidoon Owfi, Olivia Pearman,
Mahnaz Rabbaniha, Elizabeth J Z Robinson, Joaquin Robles, Renee N Salas, Jan C Semenza, Jodi D Sherman, Liuhua Shi, Joy Shumake-Guillemot,
Grant Silbert, Mikhail Sofiev, Marco Springmann, Jennifer Stowell, Meisam Tabatabaei, Jonathan Taylor, Joaquin Triñanes, Fabian Wagner,
Paul Wilkinson, Matthew Winning, Marisol Yglesias-González, Shihui Zhang, Peng Gong*, Hugh Montgomery*, Anthony Costello*

HEALTH EFFECTS

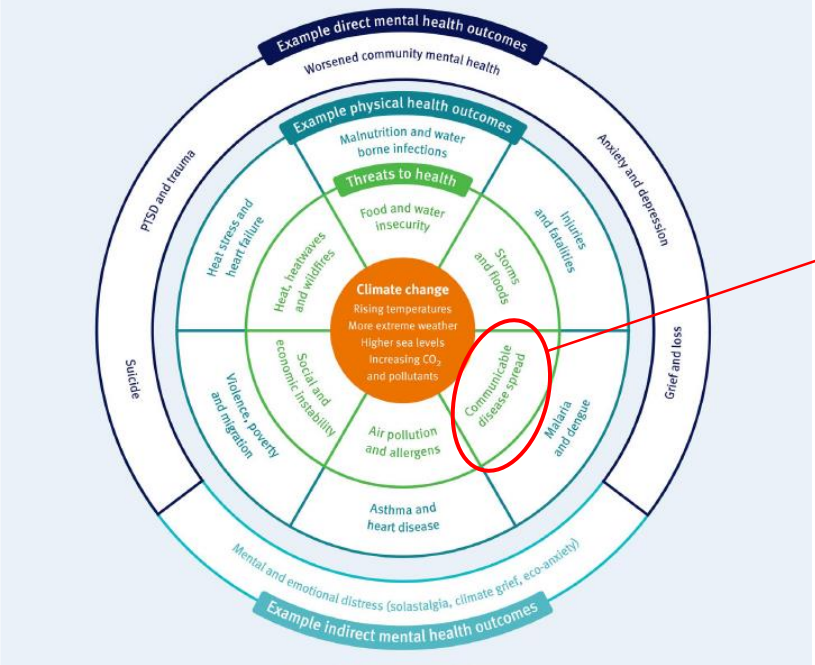
Lawrence et al. (2021) Grantham Institute

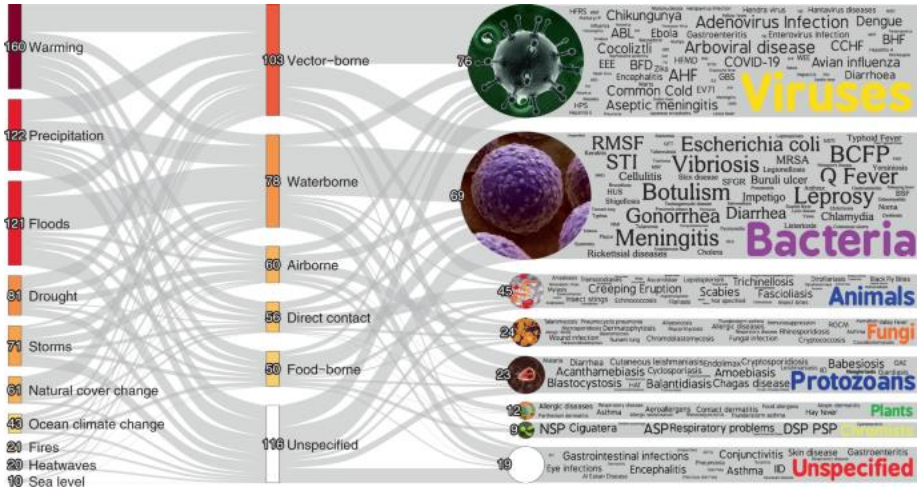
MENTAL HEALTH EFFECTS



Lawrence et al. (2021) Grantham Institute

INCREASED CHANCE FOR INFECTIONS





Mora et al. (2022) Over half of known human pathogenic diseases can be aggravated by climate change. *Nature Climate Change*

TRANSITION TO SUSTAINABILITY

Reducing the ecological footprint of healthcare

#WE TOO

The environmental footprint of health care: a global assessment

Manfred Lenzen, Arunima Malik, Mengyu Li, Jacob Fry, Helga Weisz, Peter-Paul Pichler, Leonardo Suveges Moreira Chaves, Anthony Capon, David Pencheon

Summary

Background Health-care services are necessary for sustaining and improvi
environmental footprint that contributes to environment-related threats to
quantified the carbon emissions resulting from health care at a global level. W
of the wide-ranging environmental impacts of this sector.

Methods In this multiregional input-output analysis, we evaluated the contri
environmental damage that in turn puts human health at risk. Using a gl
detailed information on health-care sectors, we quantified the direct and indir
driven by the demand for health care. We focused on seven environmental
cycles: greenhouse gas emissions, particulate matter, air pollutants (nitroge
risk, reactive nitrogen in water, and scarce water use.

Findings Health care causes global environmental impacts that, depending c
between 1% and 5% of total global impacts, and are more than 5% for some r

Interpretation Enhancing health-care expenditure to mitigate negative heal
often promoted by health-care practitioners. However, global supply chains
health-care sectors in turn initiate adverse feedback cycles by increasing th
thus counteracting the mission of health care.

Funding Australian Research Council, National eResearch Collaboration Tools

https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196(20)30121-2/fulltext

BMJ 2019;366:l5560 doi: 10.1136/bmj.l5560 (Published 13 September 2019)

NEWS

Climate crisis: healthcare is a major contributor, global report finds

Raffaella Bosurgi

The BMJ

The global healthcare sector's carbon footprint is equivalent to 4.4% of global net emissions, making it a major contributor to the climate crisis, a landmark international report[1] has found.

If the healthcare sector was a country it would be the fifth largest emitter on the planet, the report by the non-governmental organisation Health Care Without Harm and the consultancy firm Arup found.

The report, launched at the Wellcome Trust in London on 10 September, analysed spending and other data from 43 countries to estimate healthcare's global climate footprint for the first time.

Healthcare's climate footprint is roughly 2 gigatons of carbon dioxide—the equivalent of 514 coal plant emissions. This makes it a significant contributor to the burden of diseases related to climate change, the report says.

The European Union healthcare sector contributes 12% of healthcare's emissions, while the US contributes 27%, and China 17%, the report finds.

Josh Karliner, Health Care Without Harm's international director of programme and strategy, said: "We know that the climate crisis is also a health crisis but what we know less about is how much healthcare contributes to greenhouse gas emissions overall."

He explained that the report was conceived with this in mind. "The health sector has a responsibility now," he said.

Will Clark, executive director of Health Care Without Harm's Europe team, said education is needed to ensure that tackling the carbon footprint was prioritised.

Howard Frumkin, head of the Our Planet, Our Health team at the Wellcome Trust, asked the panel to discuss UK healthcare's approach to tackling climate change.

Jenny Harries, England's deputy chief medical officer, said: "In the UK, in the context of the NHS, we have opportunities, a strong political interest, and also a strong policy imperative."

Mandeep Daliwhal, director of the United Nations Development Programme's HIV, Health, and Development Group, said a wide range of sectors needed to be involved. "The health sector can't do it alone and there is a need for a cross sectoral dialogue," she said.

"Around 71% of the emission comes from supply chains—we need sustainable procurement," she added.

Gary Cohen, president and co-founder of Health Care Without Harm, said the narrative around climate change must change. "We need to understand that the climate crisis will have an impact on our health," he said. "It is a public health and human rights intervention. Everybody's right to have clean water, clean air, and to live in a healthy community has to supersede rights to fossil fuels."

1 Health Care Without Harm. Healthcare climate footprint report. 2019. https://noharm-global.org/documents/health-care-climate-footprint-report.

INDIA EN NL:

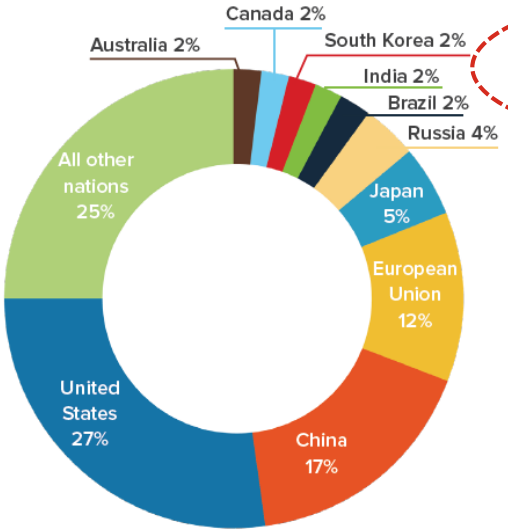
Healthcare: 4.4% of global net emission

Health care emissions per capita by country				
Top emitters: (over 1t per capita)	**Major emitters** (between the 0.50t and 1t per capita)	**Higher than average emitters** (between global average 0.28t and 0.50t per capita)	**Lower than average emitters**	**Unknown**
Australia	Austria	Bulgaria	Brazil	Rest of World (ROW)
Canada	Belgium	Cyprus	China	
Switzerland	Denmark	Czech Republic	Croatia	
United States	Estonia	France	Hungary	
	Finland	Greece	India	
	Germany	Italy	Indonesia	
	Ireland	Malta	Latvia	
	Japan	Poland	Lithuania	
	Korea	Portugal	Mexico	
	Luxembourg	Slovenia	Romania	
	Netherlands	Spain	Slovak Republic	
	Norway	Sweden	Turkey	
	Russia	European Union		
	Taiwan			
	United Kingdom			

Health Care Without Harm (2019) Health care's climate footprint

TOP 10 HEALTH CARE CARBON EMITTERS

COMPARED TO TOTAL TOP 10 EMITTERRS



	Health care country/region emissions by ranking	Total country/region emissions by ranking
	United States	China
	China	United States
	European Union	European Union
	Japan	India
	Russia	Russia
	Brazil	Japan
	India	Brazil
	South Korea	Canada
	Canada	South Korea
	Australia	Mexico
	Mexico (11)	Australia (17)

Health Care Without Harm (2019) Health care's climate footprint

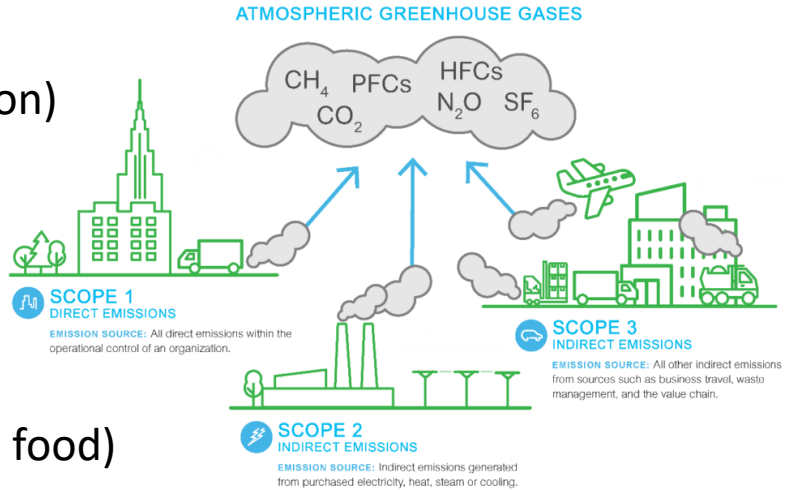
ASSESSMENT GHG EMISSION OF HEALTHCARE (LCA)

Scope 1
Direct CO2-eq. emissions (buildings, transport, production)

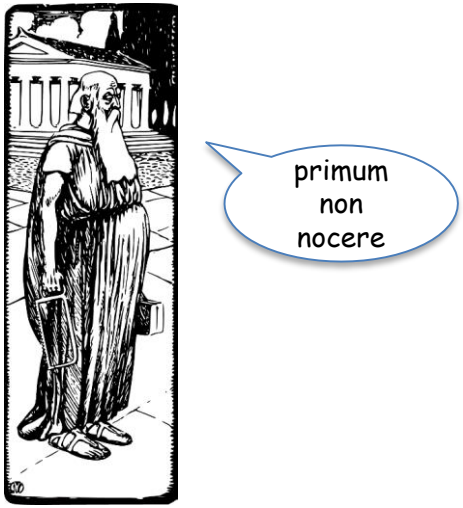
Scope 2
Indirect CO2-eq. emissions (electricity, airco)

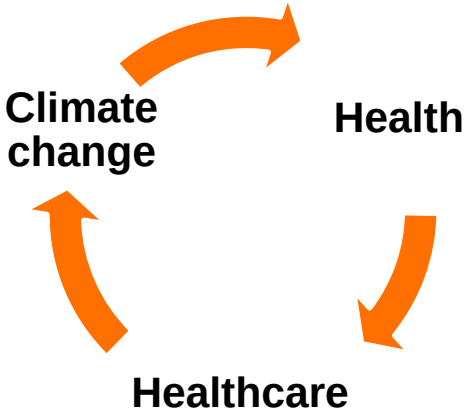
Scope 3
Indirect CO2-eq. emissions (production of goods, waste, food)

[Greenhouse Gas Protocol]



HEALTHCARE INDUSTRY

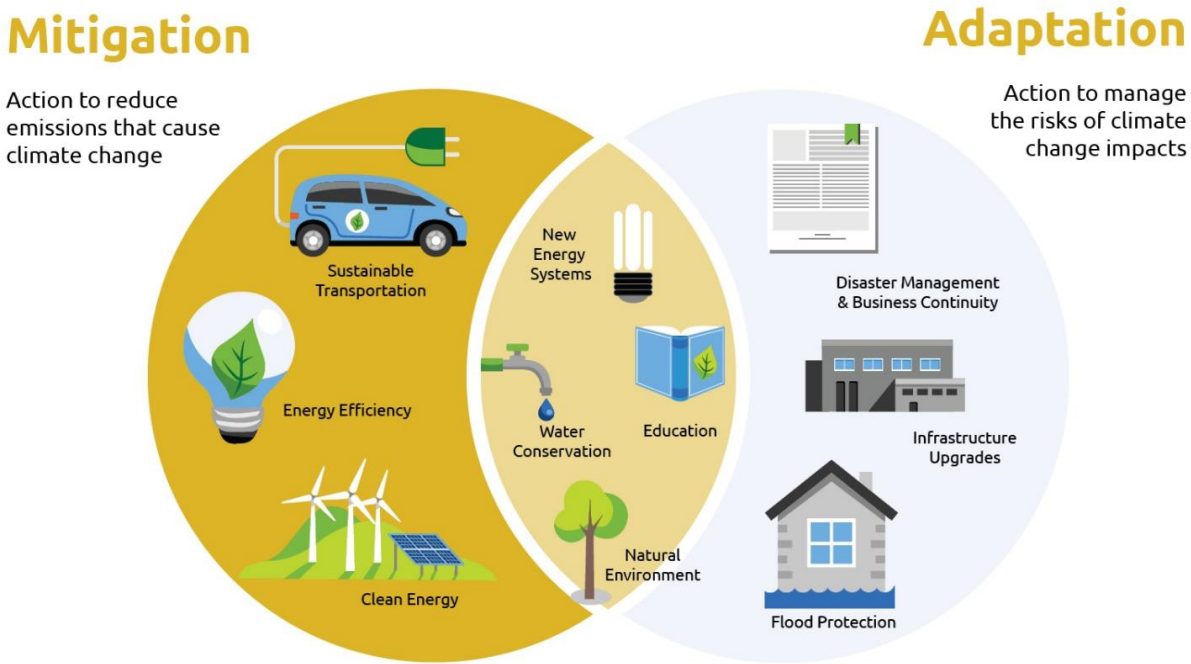




Please see this:

[Look at me! - YouTube]

RESPONSE: SUSTAINABILITY



TRANSITION/REDESIGN: AWARENESS-KNOWLEDGE-IMPLEMENTATION

1. How to design a system that delivers quality health services in harmony with the environment

2. How to design a supply chain, transportation, operations infrastructure delivering quality health services in harmony with the environment

3. How to design financial mechanisms for delivering quality health services in harmony with the environment

IN HEALTHCARE WE MUST ACT NOW

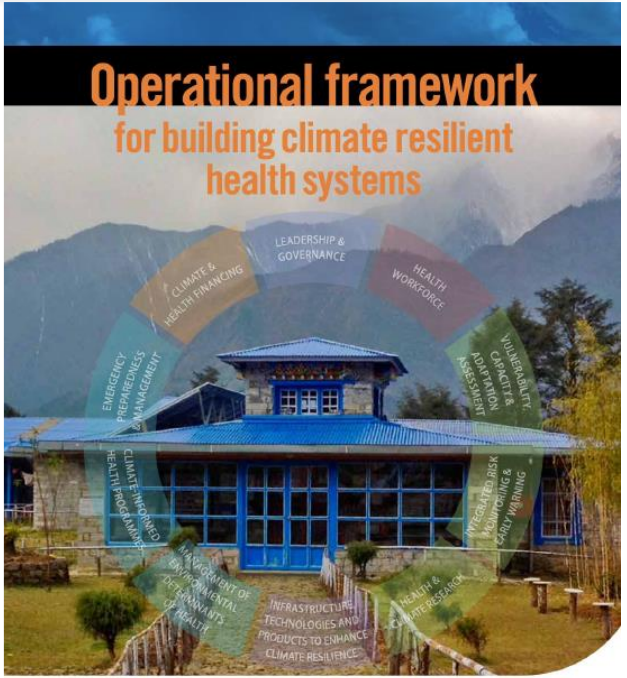
Business operation

- Air conditioning (emissions)
- Medicine residues in surface water
- Waste culture / non-circular processes
- Estate/buildings
- Transport
- Food
- Procurement
- Inappropraie catre

CLIMATE RESILIENCE

Healtcare must

- Prepare for health impacts such as extreme weather
- Populatie health over bio-medical approach (co-benefits, prevention, food, exercise etc.)
- Own house in order (climate neutrality)
- Prepare for impact on health system's components:



World Health Organization

RESILIENCE

- What are effective mitigation and adaptation strategies
- Emerging from the crisis in better shape
- Sustainability strengthens system resilience

World Health Organisation building blocks of health systems (World Health Organisation, 2015).

NO NEED TO REINVENT A GREEN WHEEL

Make use of what is there

- The **WHO framework** for climate-resilient and environmentally sustainability in health care facilities

World Health Organization

FOUR KEY DOMAINS FOR CLIMATE ACTION

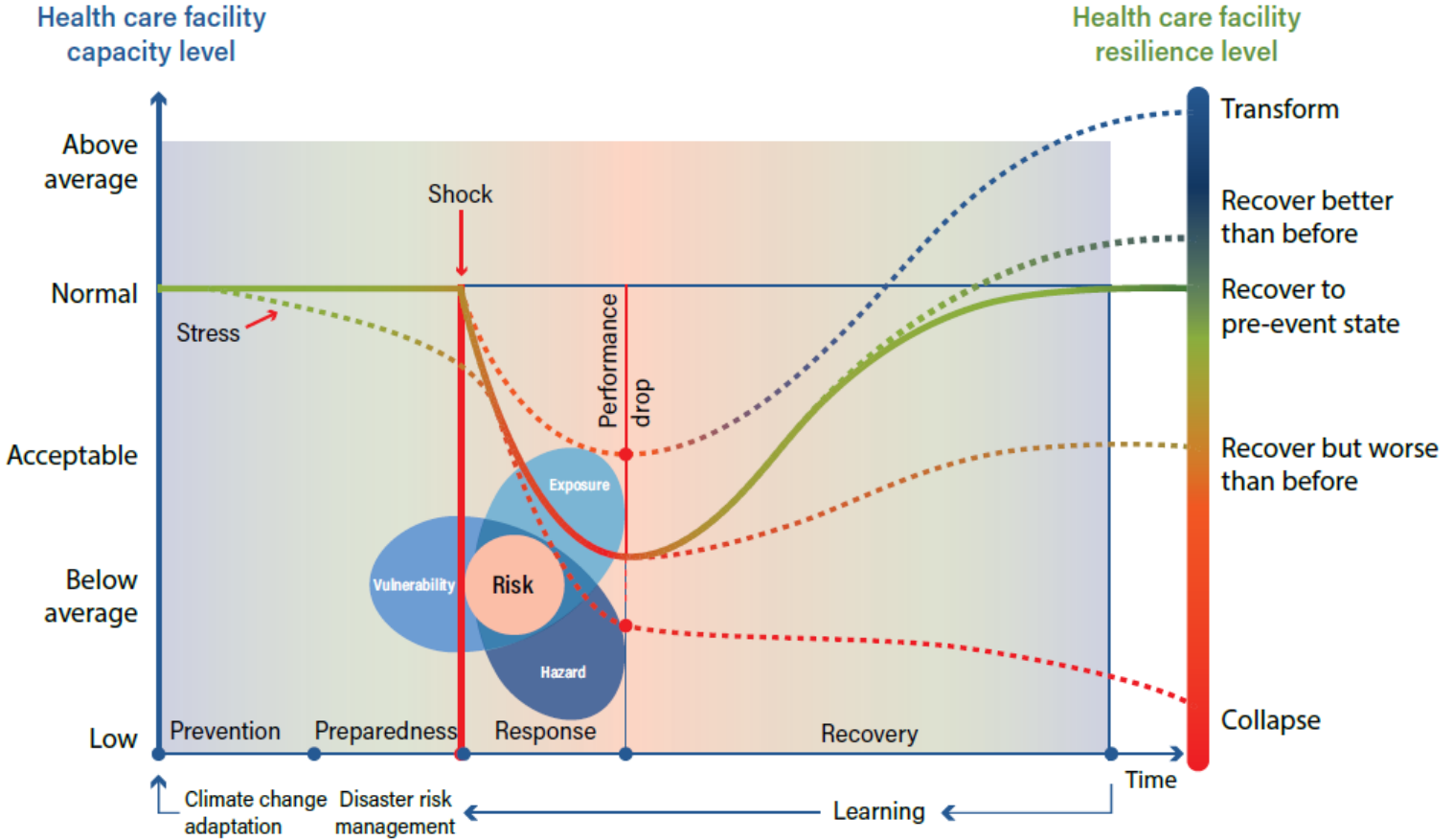
HEALTH WORKFORCE:
adequate numbers of skilled human resources with decent working conditions, empowered and informed to respond to these environmental challenges.

WATER, SANITATION, HYGIENE AND HEALTH CARE WASTE MANAGEMENT:
sustainable and safe management of water, sanitation and health care waste services.

ENERGY:
sustainable energy services.

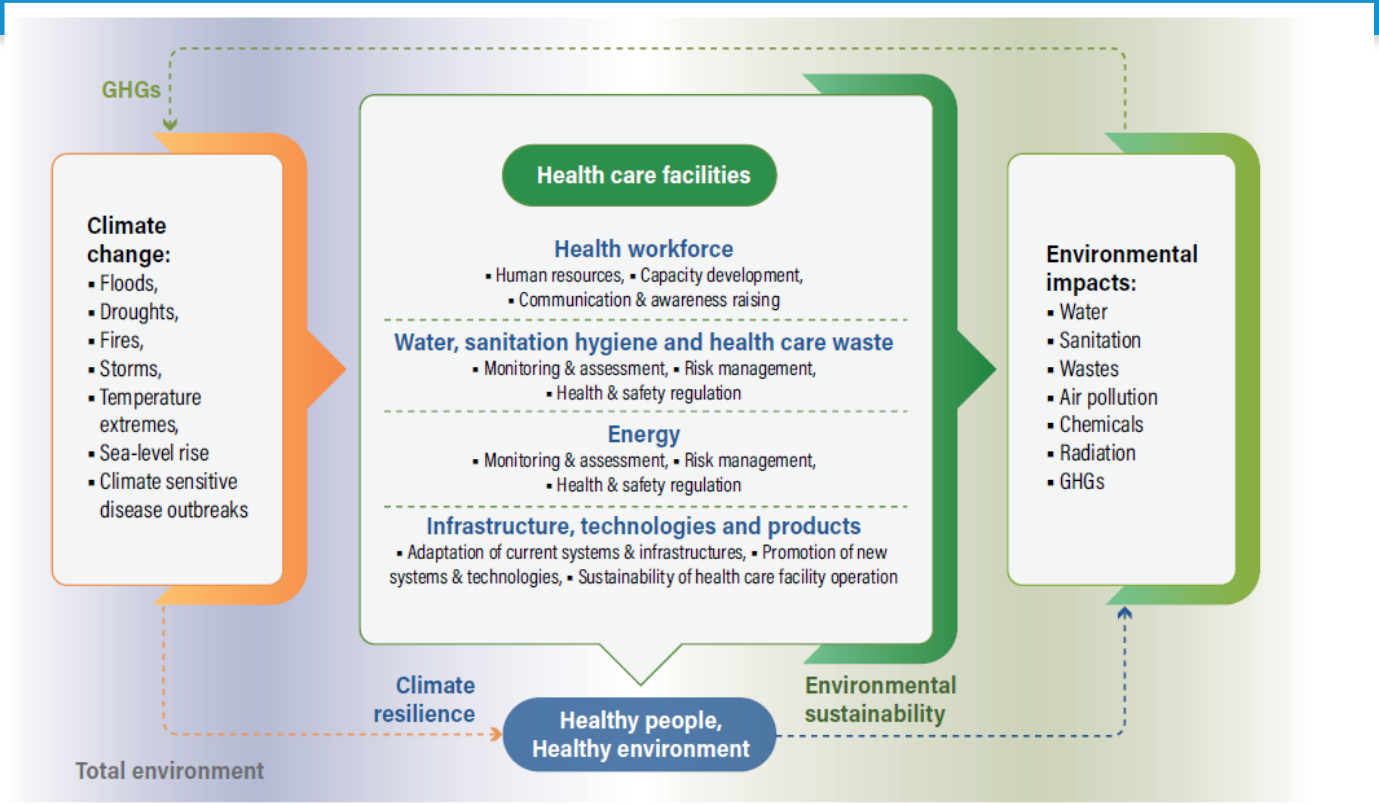
INFRASTRUCTURE, TECHNOLOGIES AND PRODUCTS:
appropriate infrastructure, technologies, products and processes, including all the operations that allow for the efficient functioning of the health care facility.

RESILIENCE AND SUSTAINBILITY IN HEALTHCARE



WHO FRAMEWORK

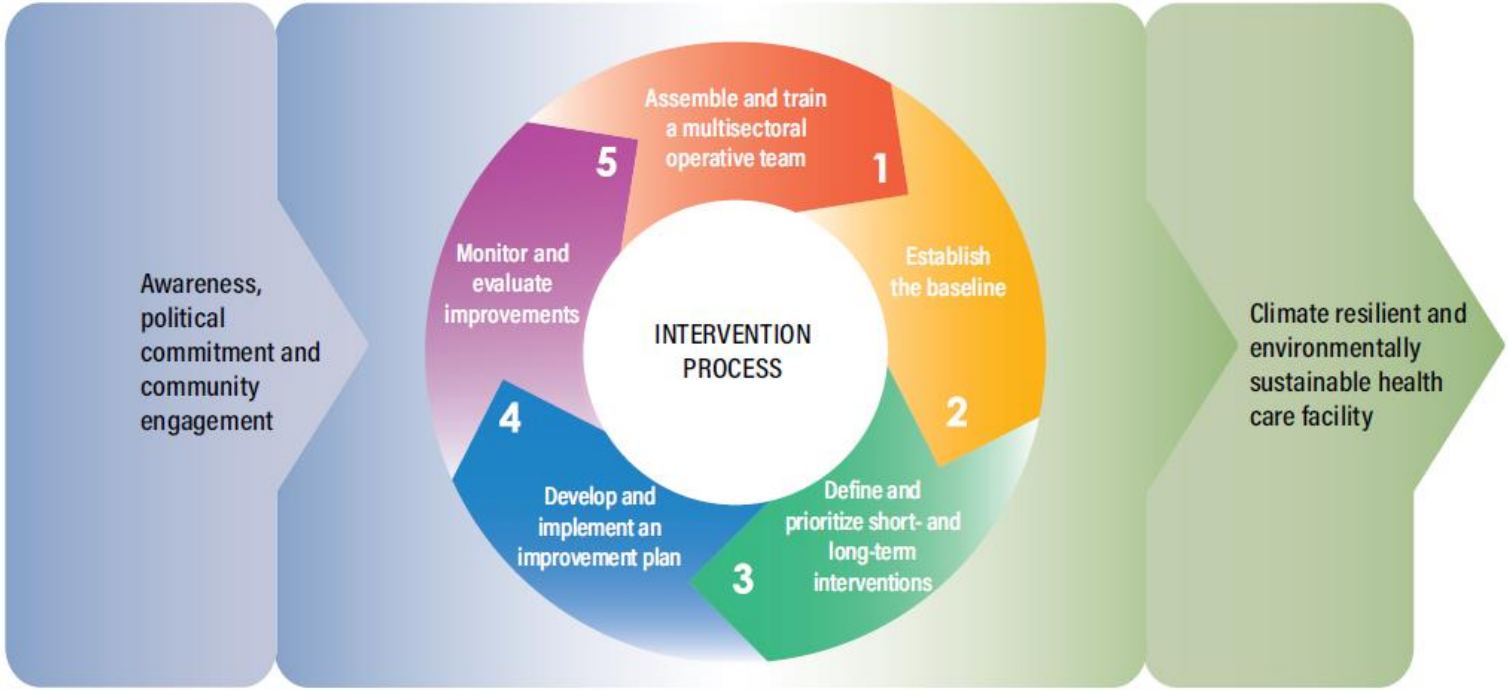
FOR BUILDING CLIMATE-RESILIENT AND ENVIRONMENTALLY SUSTAINABLE HEALTH CARE FACILITIES



https://www.who.int/publications/i/item/9789240012226

PROCESS TO STRENTHEN

CLIMATE-RESILIENT AND ENVIRONMENTALLY SUSTAINABILITY IN HEALTH CARE FACILITIES

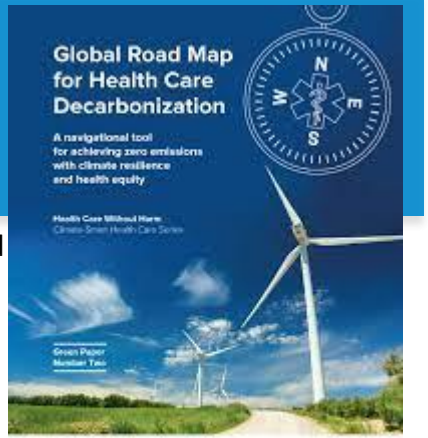


NO NEED TO REINVENT A GREEN WHEEL

Make use of what is there

- The WHO framwork for climate-resilient and environmentally sustainability in health care facilities
- **Global Road Map** for Health Care Decarbonization (HCWH/ARUP, 2021)

Global Road Map for Health Care Decarbonization
(HCWH/ARUP, 2021)



1. Power health care with **100% clean, renewable electricity**. Ensure that health care is powered by zero emissions electricity across the three pathways.
2. Invest in **zero emissions buildings and infrastructure**. Ensure every health care building and health product manufacturing facility and their infrastructure promote energy efficiency, zero emissions, and climate resilience.
3. Transition to zero emissions, sustainable travel and transport. Transition to 100% low or zero emission fleet vehicles and infrastructure, while encouraging active **travel and public transport** for patients and staff wherever feasible.
4. Provide healthy, **sustainably grown food**. Provide healthy, locally, and sustainably produced fresh and seasonal food with zero food waste.
5. Incentivize and produce **low-carbon pharmaceuticals**. Reduce unnecessary pharmaceutical use, substitute high emissions products with more climate-friendly alternatives, and incentivize the production of affordable green, climate-smart medicine.
6. Implement circular health care and **sustainable health care waste management**. Implement circular economy principles to procure supplies, deploy clean technologies, reduce the volume and toxicity of health care waste, and manage waste sustainably.
7. Establish greater **health system effectiveness**: Reduce emissions by improving system effectiveness, including eliminating inefficient and unnecessary practices, linking carbon reduction and quality of care, and bolstering resilience.

NO NEED TO REINVENT A GREEN WHEEL

Make use of what is there

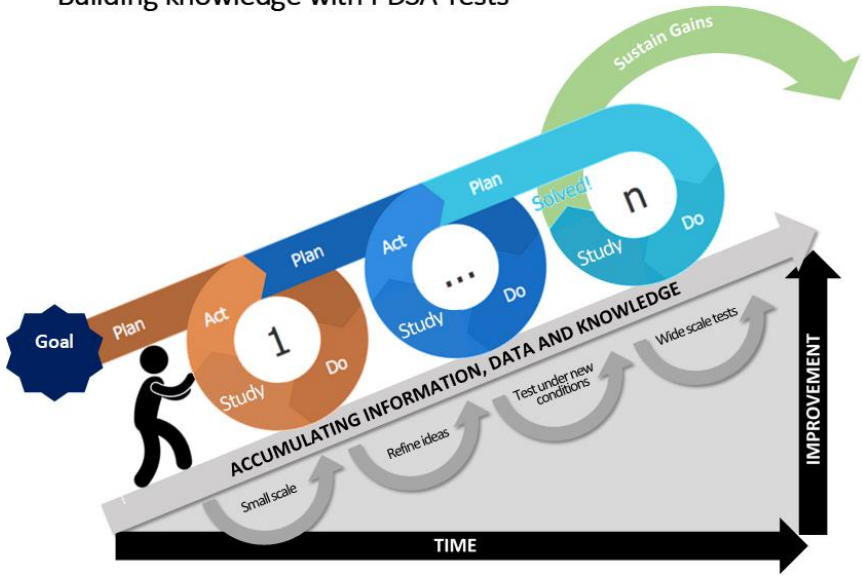
- The WHO framwork for climate-resilient and environmentally sustainability in health care facilities;
- Global Road Map for Health Care Decarbonization (HCWH/ARUP, 2021);
- **Quality Improvement (QI)** tools and concepts

SUSTAINABILITY = QUALITY IMPROVEMENT

- PDSA
- Fishbone diagram
- Driver diagram
- Process mapping

- EBM
- Co-production
- Accreditation standards
- HTA

Building knowledge with PDSA Tests



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Make use of what is there

- The WHO framwork for climate-resilient and environmentally sustainability in health care facilities;
- Global Road Map for Health Care Decarbonization (HCWH/ARUP, 2021);
- Quality Improvement (QI) tools and concepts
- Circularity assessment: **the R-ladder**

ELLEN MACARTHUR FOUNDATION

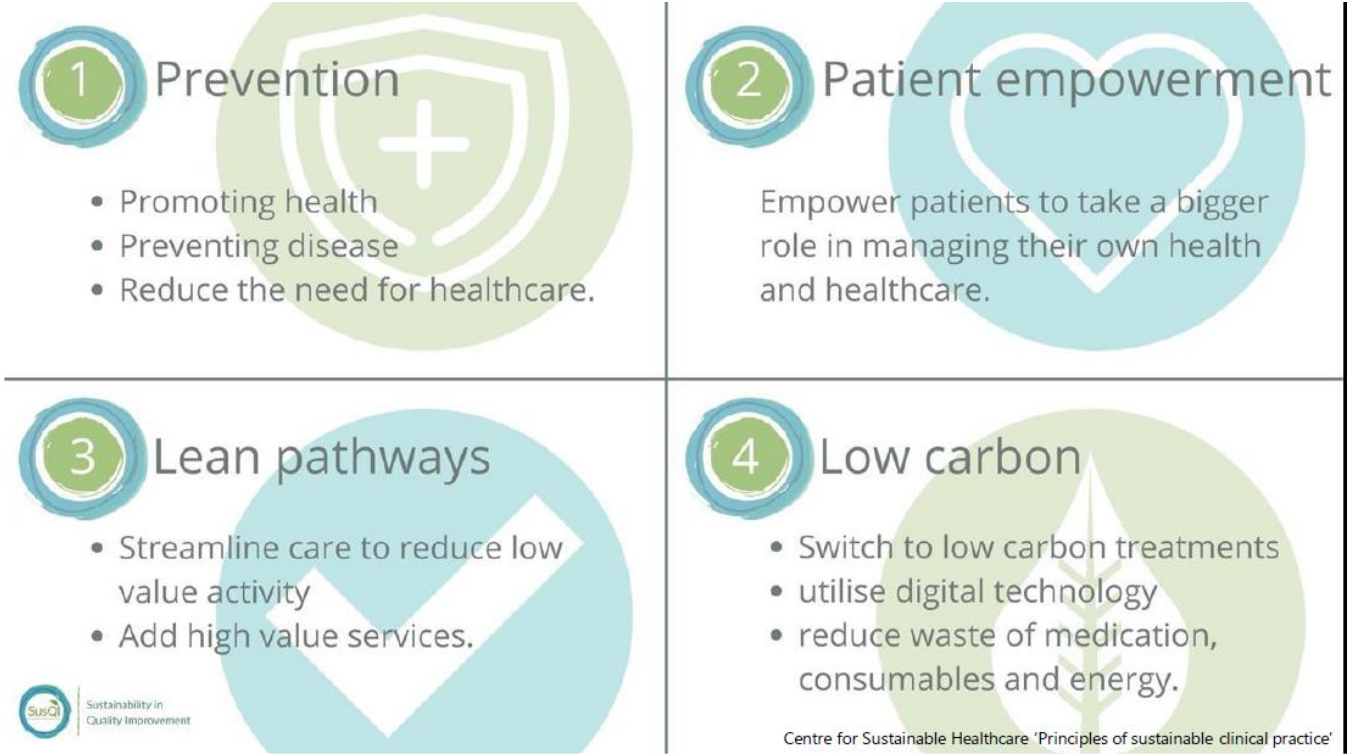
PRESERVING VALUE: THE R-LADDER

NO NEED TO REINVENT A GREEN WHEEL

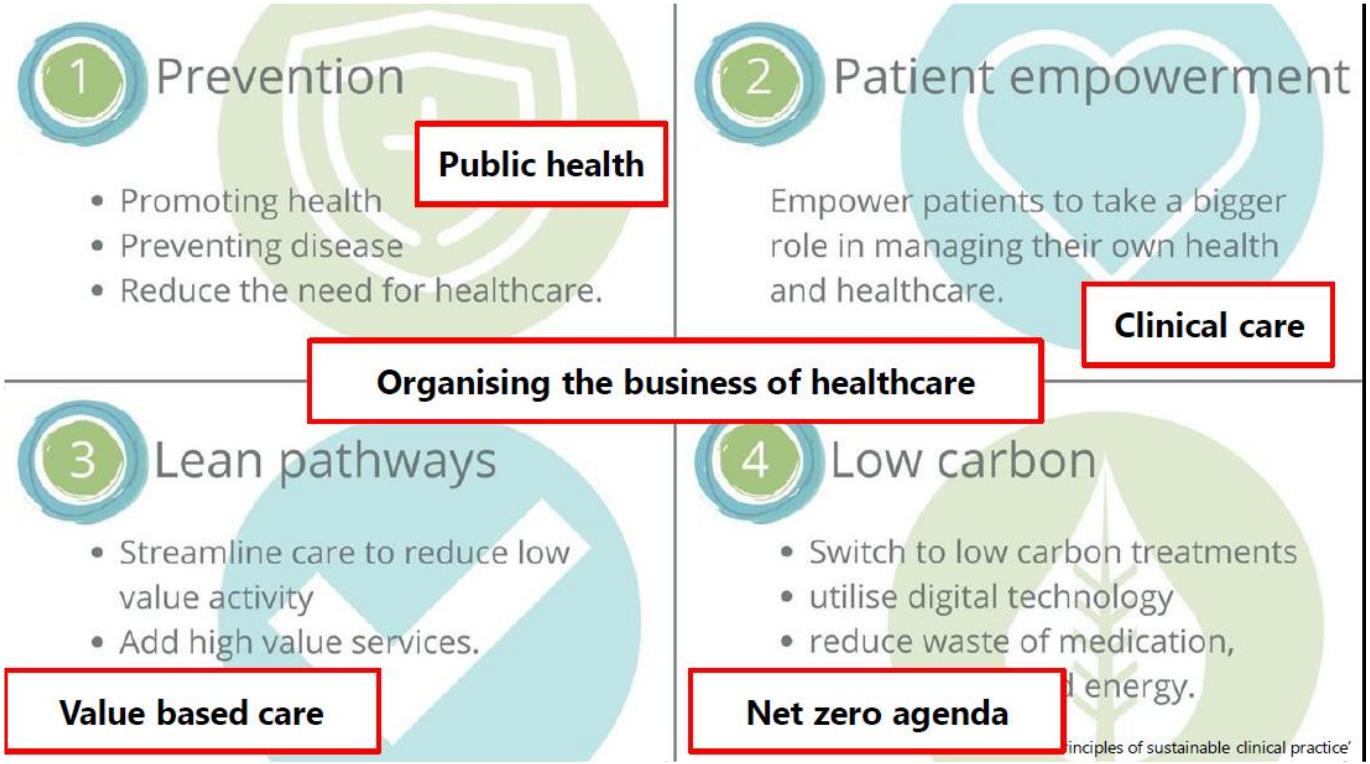
Make use of what is there

- The WHO framework for climate-resilient and environmentally sustainability in health care facilities;
- Global Road Map for Health Care Decarbonization (HCWH/ARUP, 2021);
- Quality Improvement (QI) tools and concepts (ISQua et al.)
- Circularity assessment: the R-ladder
- **Sustainable Quality Improvement** (CSH, NHS)

SUSTAINABLE QUALITY IMPROVEMENT (SUSQI)

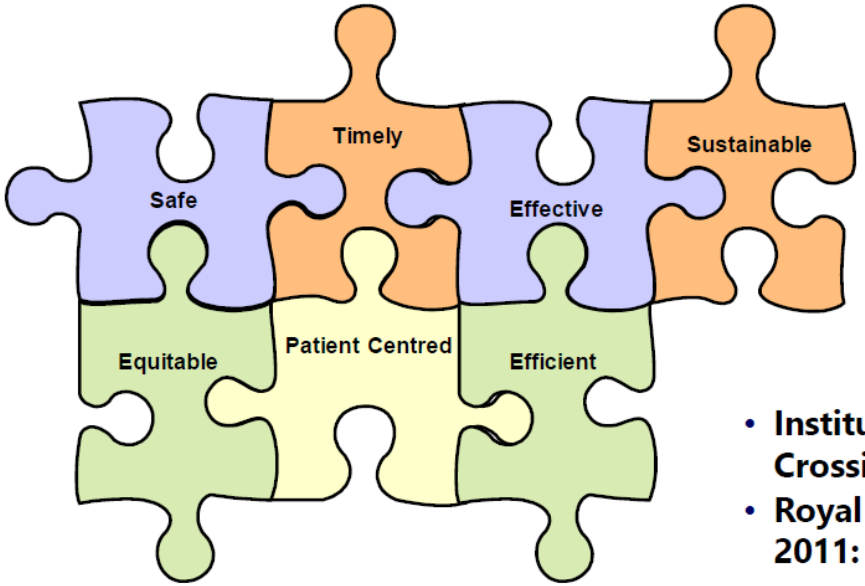


SUSTAINABLE QUALITY IMPROVEMENT (SUSQI)



SUSTAINABLE QUALITY IMPROVEMENT (SUSQI)

Sustainability as a domain of quality



- Institute of Medicine 2001: Crossing the Quality Chasm
- Royal College of Physicians 2011: A strategy for quality

GREEN CARE= HIGH VALUE CARE

Value-based healthcare	Porter & Teisberg, 2006
Triple aim	Berwick et al, 2008
Quadruple aim	Bodenheimer & Sinsky, 2014
Sustainable value in healthcare	**Mortimer et al, 2018**

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Make use of what is there

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- Global Road Map for Health Care Decarbonization (HCWH/ARUP, 2021);
- Quality Improvement (QI) tools and concepts (ISQua et al.)
- The R-ladder
- Sustainable Quality Improvement (CSH, NHS)
- **Examples** (NL)

VU

GREEN CARE

= Appropriate care

Avoiding
Unnecessary care
Overtreatment
Undertreatment
Overdiagnostics
Research waste

Promoting
Selfcare
Precare / prehabilitation
Lifestyle medicine
Prevention & education

anything *to responibly reduce consumption and production of care reduces the ecological footprint of the healthcare industry*

GREEN CARE

Chemobike

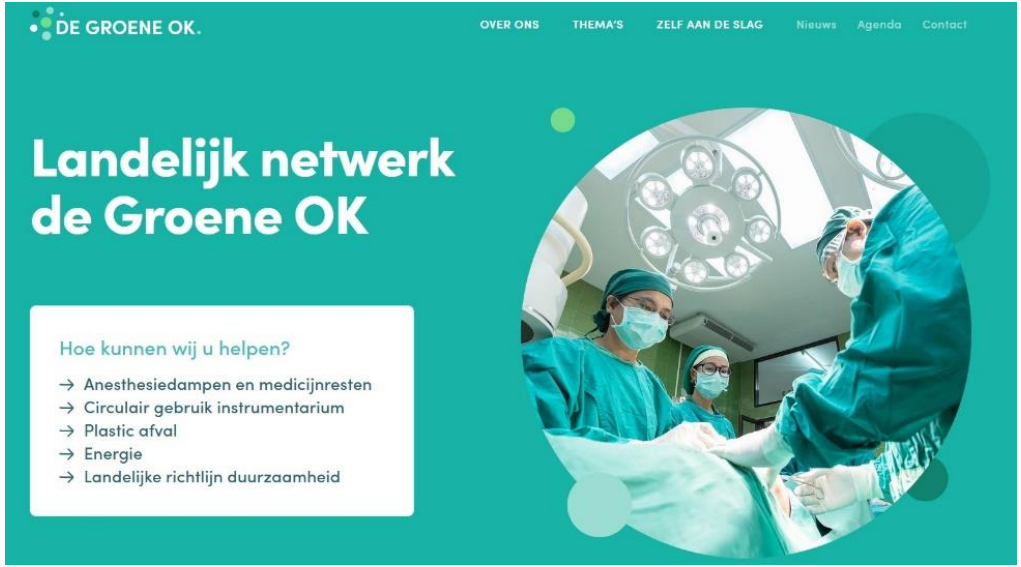
2019-2022
900 treatments

- Less time
- Less strenuous
- Domestic environment
- Less CO2 emission

https://www.olvg.nl/nieuws/olvg-verpleegkundige-brengt-chemo-thuis-bakfiets

GREEN CARE

- 16 surgical med associations
- Waste reduction, plastics
- F-gases (anesthesiology)
- Circular instruments
- Energy use
- Guideline development



GREEN CARE

Green GP practice

Climate

Responsible

Entrepreneurship

https://www.nhg.org/duurzaamheid

GREEN CARE

Digital solutions

- More self management
- Less visiting/travelling by car
- Better adherence
- Low cost
- Green IT
- Prevention

GREEN CARE

Respiratory care

What would be the carbon and cost impact

of safely replacing MDIs with NPIs among COPD/asthma pts?

- ✓ 63 milj kg CO2eq. ~ emission of 8400 Dutch households
- ✓ €49 milj cost reduction

Ten Have P et al. Turning green: the impact of changing to more eco-friendly respiratory healthcare. A carbon and cost analysis of Dutch prescription data. *BMJ Open* 2022;12:e055546.

GREEN CARE

External preventive and precare action

- Food and nutrition
- Nature
- Domesticity
- Animals
- Air | Sound | Light
- Architecture | Interior

evidence based

Gezondheids-
bevorderende
zorgomgeving
een beknopte verkenning

https://www.rivm.nl/zorg/duurzame-zorg

THANK YOU

h.c.ossebaard@vu.nl

No quality without climate responsibility