

Session 1: Opening

HIV and Climate Change: the Research Opportunities

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HIV and Climate Change: Research Priorities

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Conflict of Interest statement

I hold investments in the fossil fuel industry through my pension funds.
The University of the Witwatersrand holds investments in the fossil fuel industry through their endowments and other financial reserves.

Talk outline

1. Climate change triad
2. HIV and climate change framework
3. Three broad research areas
4. Are we just researchers?

Global temperatures



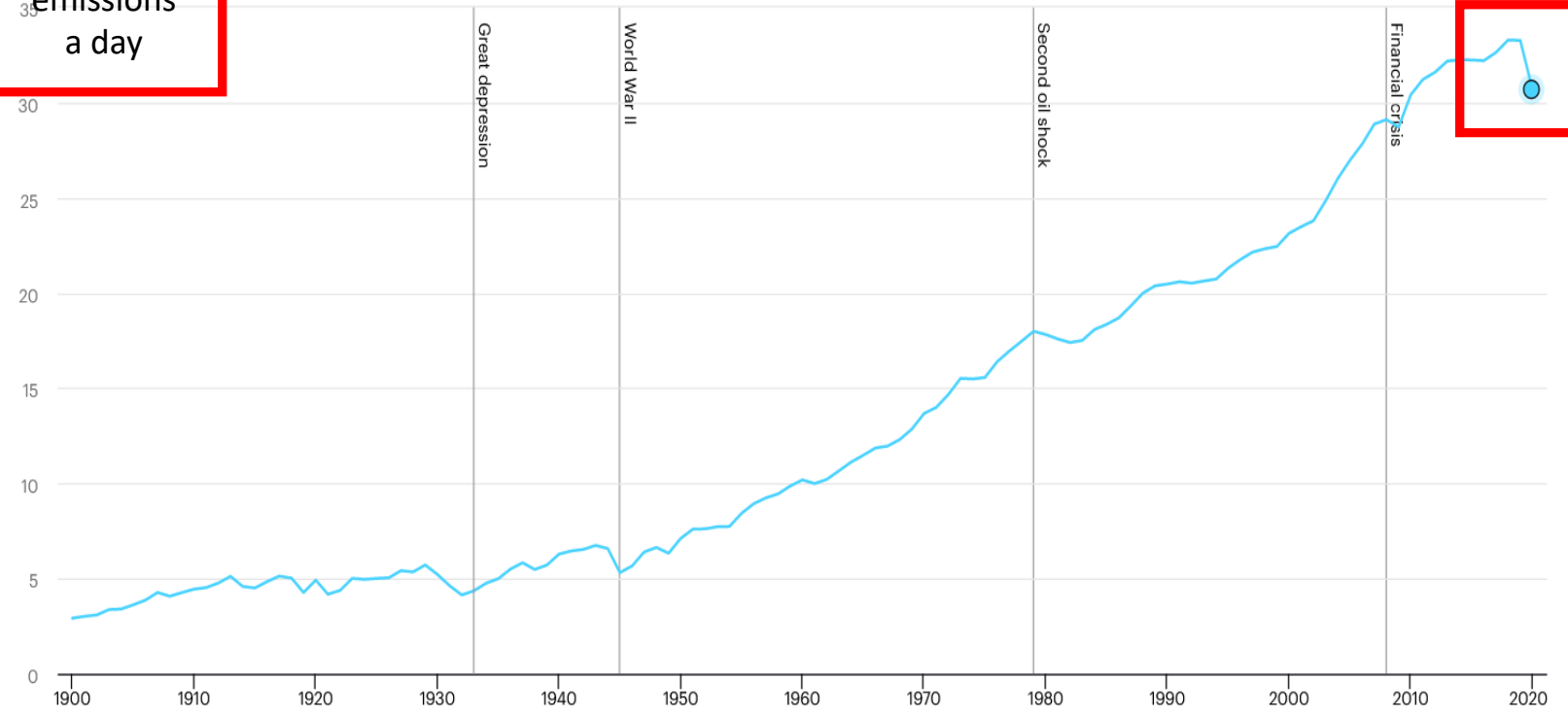
CO₂
emissions
(Mt/day)

Climate change triad

CO₂
atmospheric
levels (PPM)




35 Mt CO₂ emissions a day



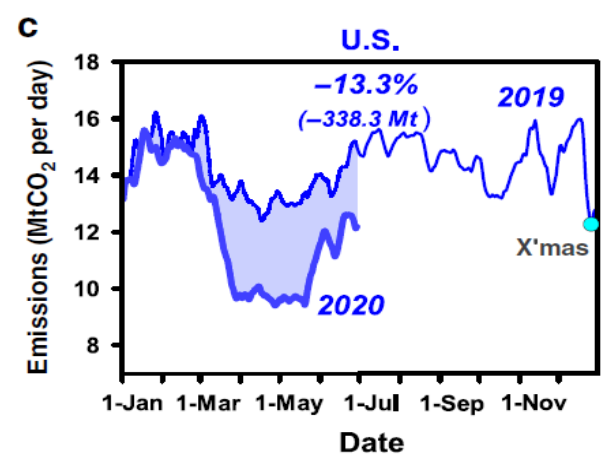
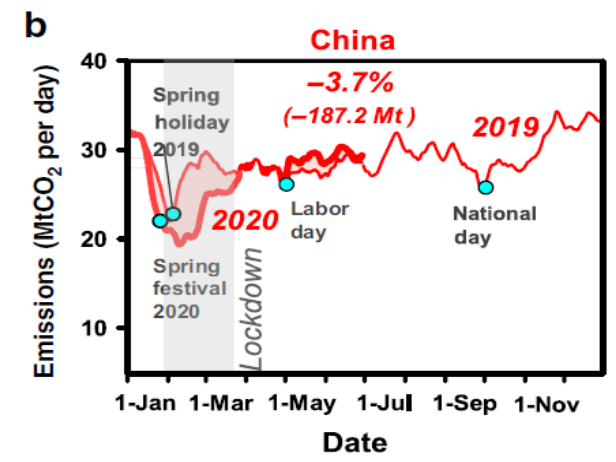
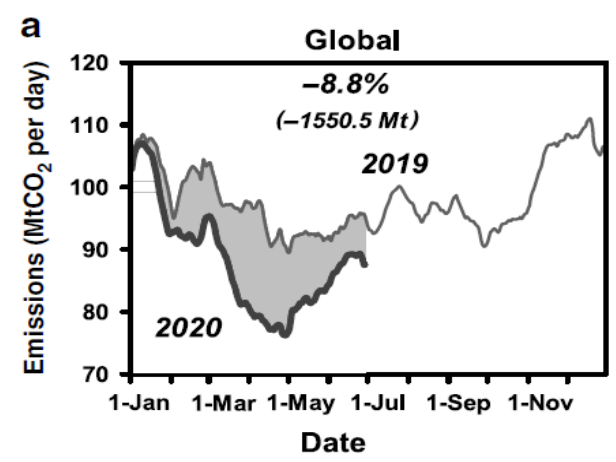
What scale of societal change is required to prevent further warming?

Article | [Open Access](#) | Published: 14 October 2020

Near-real-time monitoring of global CO₂ emissions reveals the effects of the COVID-19 pandemic

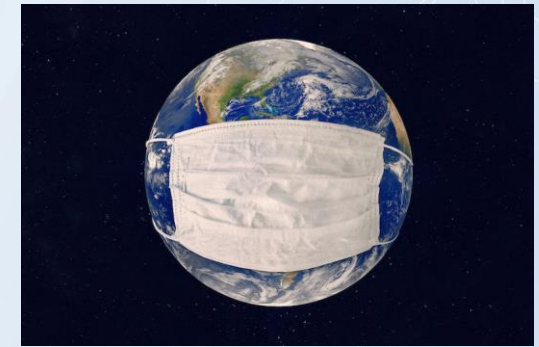
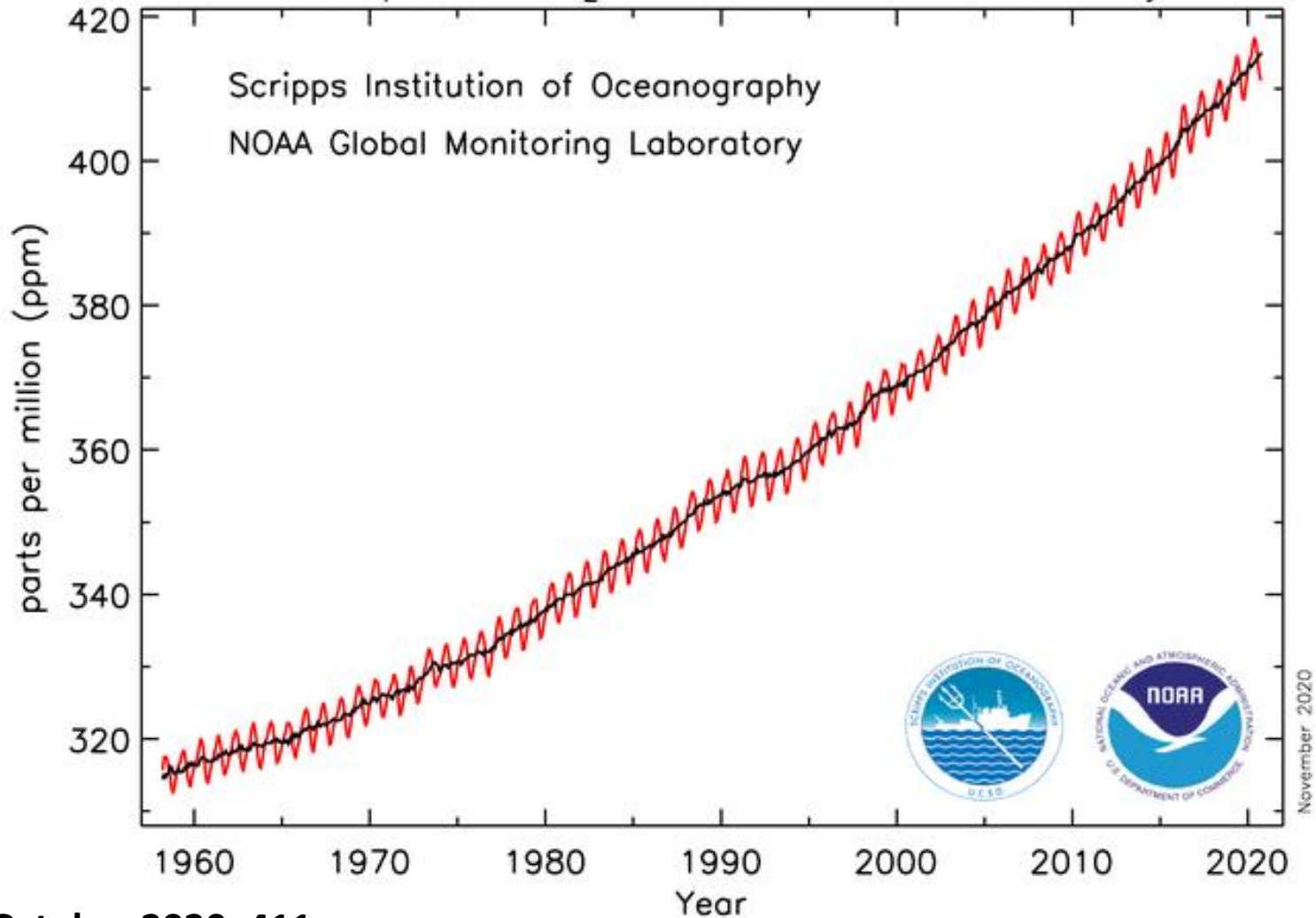
Zhu Liu , Philippe Ciais, [...] Hans Joachim Schellnhuber

nature communications

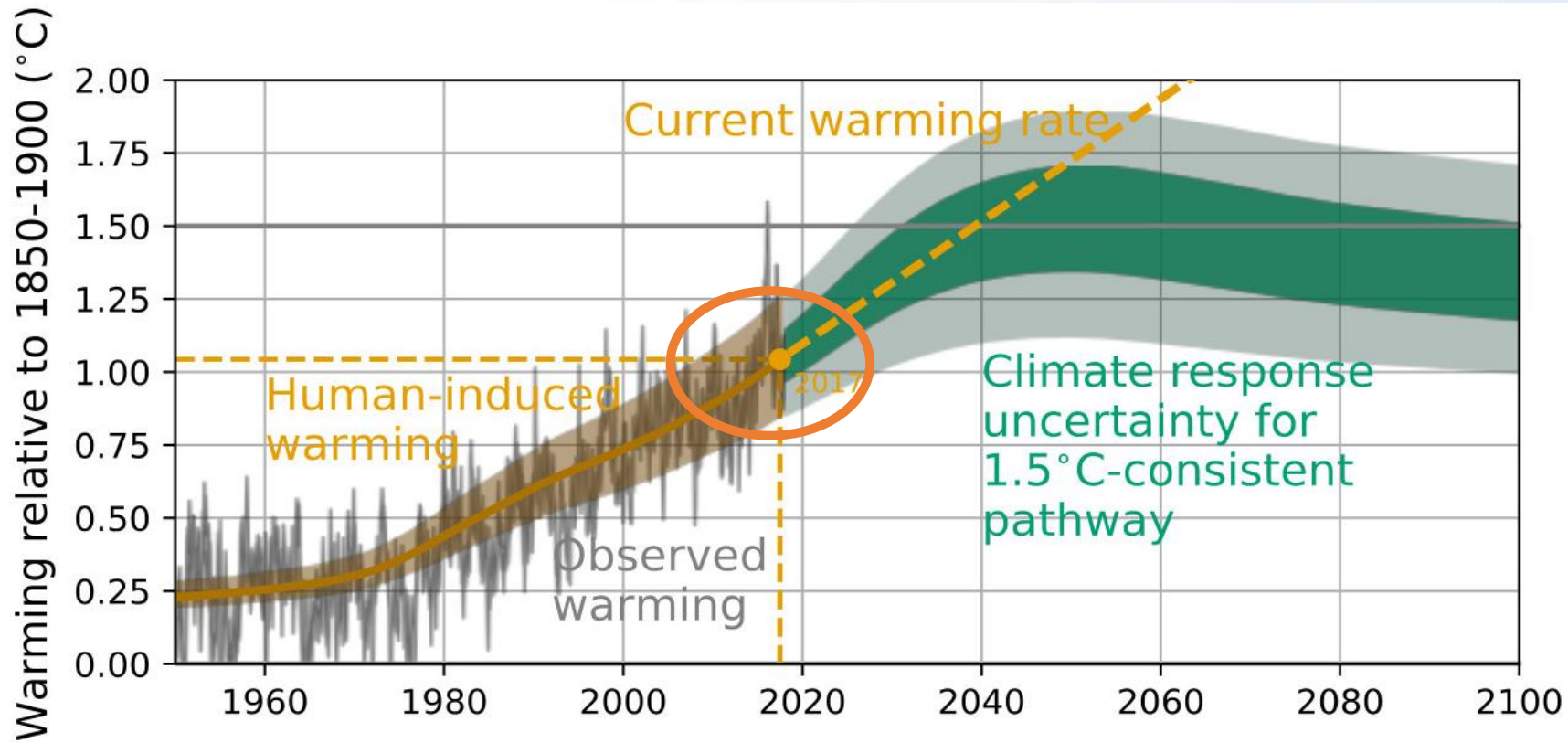


INTEREST 2020

Atmospheric CO₂ at Mauna Loa Observatory



Global temperatures: IPCC 1.5°C Report



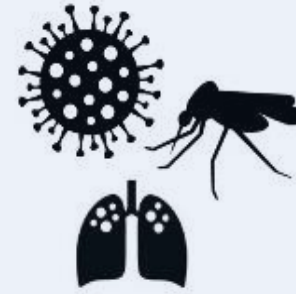
HIV and climate change: pathways, impact and priorities



Damage to health and other infrastructure from 'natural disasters'



Poverty and social disruption from drought, food insecurity, migration, conflict and gender disparities



Risk of infection with climate-sensitive pathogens



Direct exposure to high temperatures

HIV treatment

HIV prevention

HIV Care

Social sciences

Implementation research

Data science


Research priorities

Priority 1: Quantify the impacts of increased temperatures of the health of people living with HIV

Burden disease

‘Whoever wishes to investigate medicine properly, should proceed thus: in the first place to consider the seasons of the year, and what effect each of them produces’ *Hippocrates 460-370 BC*

Outcome (N studies)	Seasonal impacts
PCP (n=6)	Heterogenous, varies by genotype
Cryptosporidiosis (n=7)	Rainy and summer
Penicillium marneffeii (n=7)	Rainy and hot
Increased TB transmission (n=7)	Winter
Lower CD4 count (n=4)	Rainy season, summer
Higher viral load (n=1)	Dry season
HIV deaths (n=2)	Winter and hottest month
Increased MTCT of HIV (n=2)	3 months after heavy rain, possible malaria
Service uptake: VMMC, HIV testing, harm reductio (n=6)	Range of seasonal impacts

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SAMJ GUEST EDITORIAL

Matthew Chersich

Will global warming undo the hard-won gains of prevention of mother-to-child transmission of HIV?

Direct heat impacts on health

Example of Temperature and mortality in South Africa



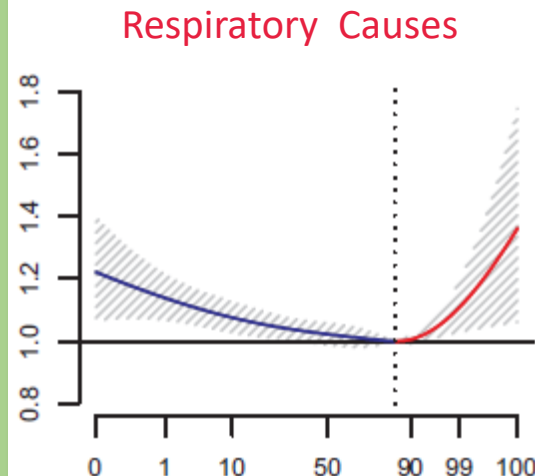
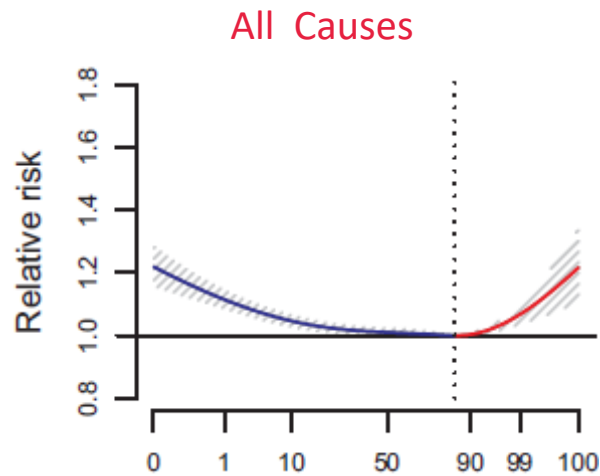
Contents lists available at ScienceDirect

Environmental Research

journal homepage: www.elsevier.com/locate/envres

The association between ambient temperature and mortality in South Africa:
A time-series analysis

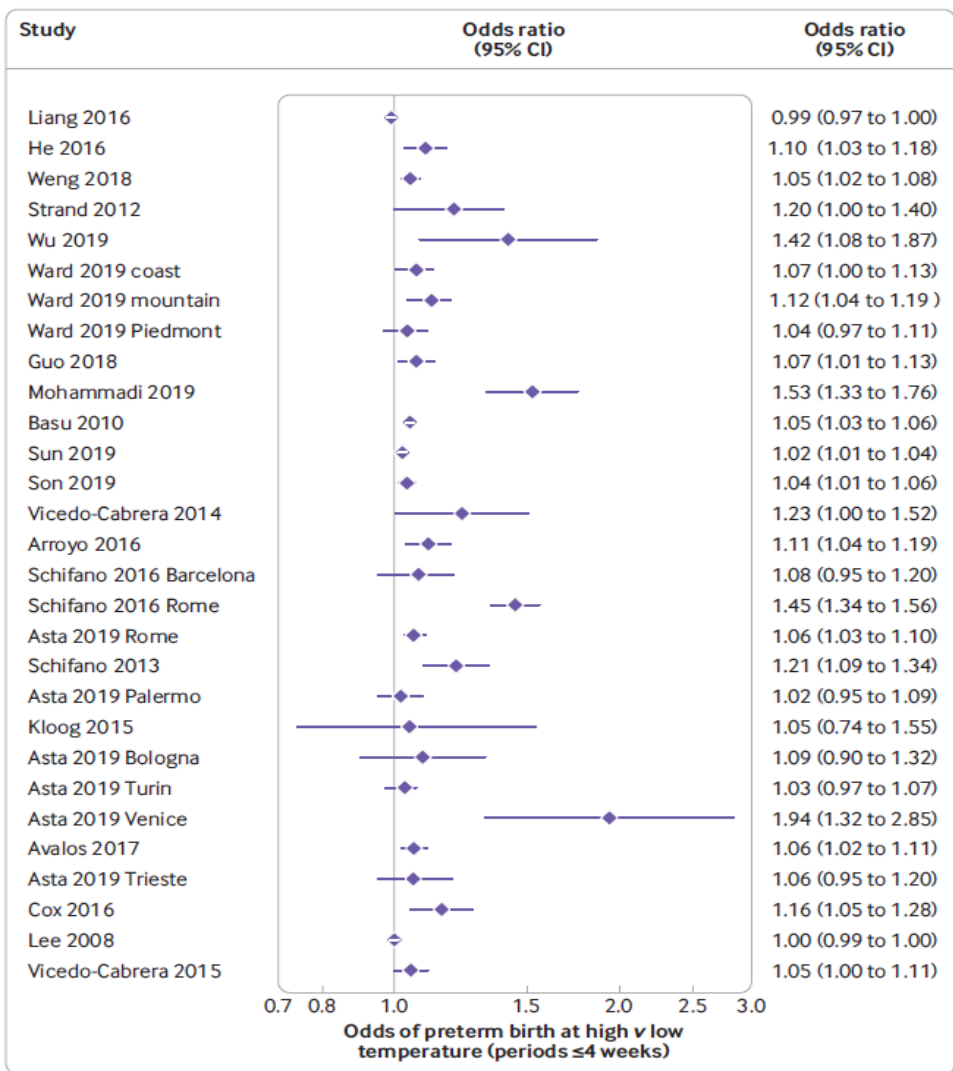
Noah Scovronick^{a,*}, Francesco Sera^b, Fiorella Acquaotta^c, Diego Garzena^c, Simona Fratianni^c,
Caradee Y. Wright^d, Antonio Gasparrini^b



Is the temperature mortality curve in HIV-infected people also U-shaped, and how steep are the arms?

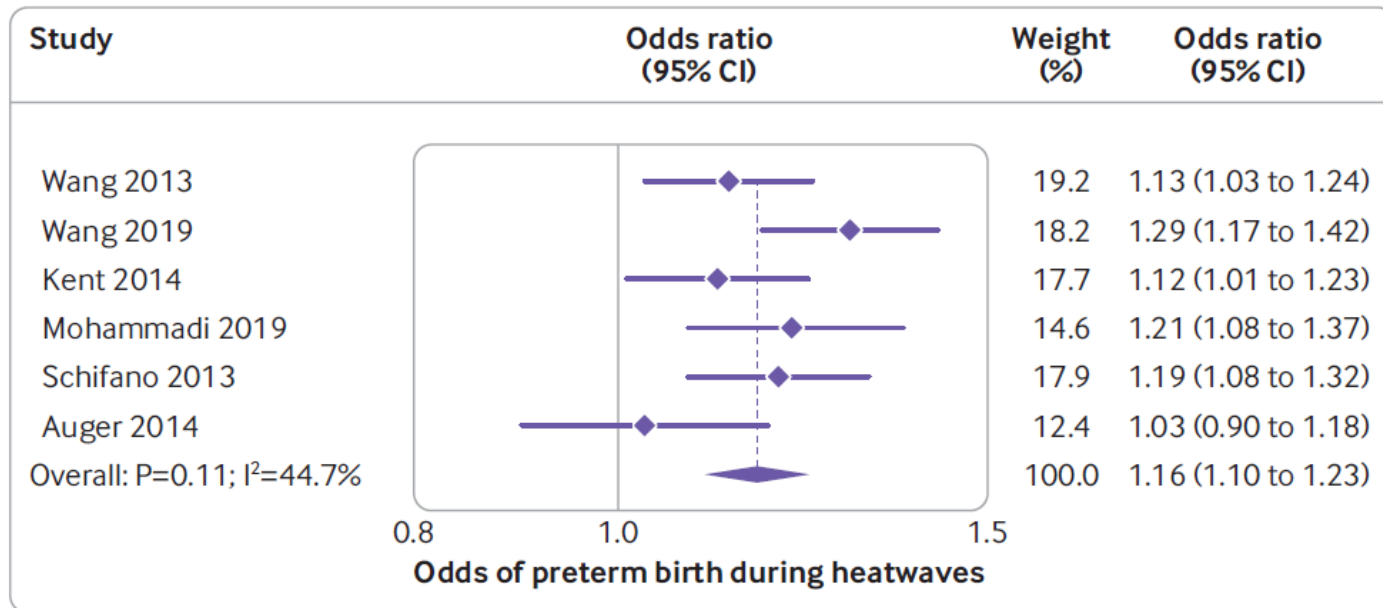


Analyses compare the number of cases of condition X on a day and temperature Y on that day, over time



Associations between high temperatures in pregnancy and risk of preterm birth, low birth weight, and stillbirths: systematic review and meta-analysis

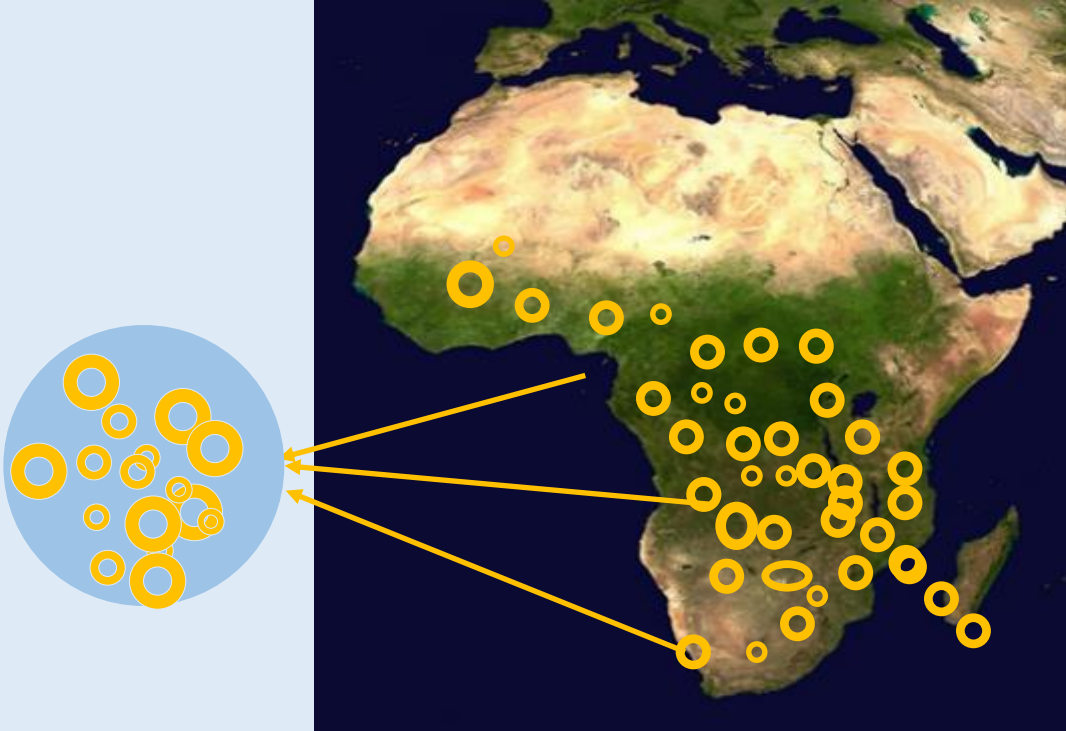
Matthew Francis Chersich,¹ Minh Duc Pham,^{2,3} Ashtyn Area,⁴ Marjan Mosalam Haghighi,⁵ Albert Manyuchi,⁶ Callum P Swift,⁷ Bianca Wernecke,^{8,9} Matthew Robinson,¹⁰ Robyn Hetem,¹¹ Melanie Boeckmann,¹² Shakoor Hajat,¹³ on behalf of the Climate Change and Heat-Health Study Group



thebmj



Data science: going from ‘cottage industry’ to Individual Participant Data and Machine Learning



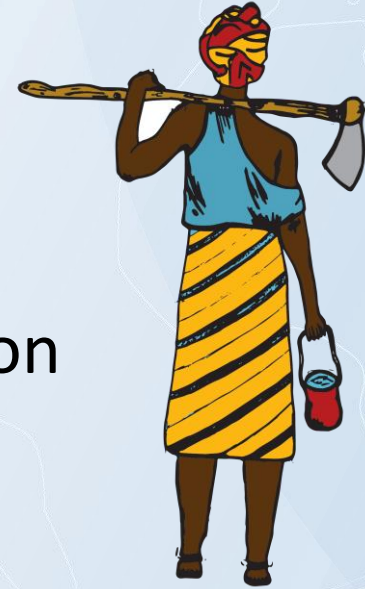
Priority 2. Social sciences: Population mobility

1. 'Climate refugees', eco-migrants

Impacts and interventions among women

2. Seasonal workers

High risk for heat-related diseases and for HIV acquisition



Climate refugees or 'eco-migrants'

- Men migrate earlier than women (heightened risks for both)^
- HIV-infected people are more vulnerable to food and water insecurity during droughts*
- During famine HIV prevalence rises in rural areas, but reduces in non-rural areas&
- Interruptions in ART access



*HIV and severity of seasonal household food-related coping behaviors in rural Ghana. *Ecology of food and nutrition*. Akrofi S, Price LL, Struik PC. 2012;51(2):148-175

The relationship between HIV and AIDS and water scarcity in Nyamakate resettlements land, north-central Zimbabwe. *African journal of AIDS research : AJAR*. Mbereko A, Scott D, John Chimbari M. Dec 2016;15(4):349-357

^A review of transactional sex for natural resources: Under-researched, overstated, or unique to fishing economies? *Global public health*. Fiorella KJ, Desai P, Miller JD, Okeyo NO, Young SL. Dec 2019;14(12):1803-1814

Food Insecurity and Intimate Partner Violence Among HIV-Positive Individuals in Rural Kenya. *American journal of preventive medicine*. Hatcher AM, Weiser SD, Cohen CR, Hagey J, et al. Oct 1 2020

&The 2001-03 Famine and the Dynamics of HIV in Malawi: A Natural Experiment. *PloS one*. Loevinsohn M. 2015;10(9):e0135108

Implementation research:

1. Disaster responses
2. Settings approach to heat resilience
3. Service delivery models to reduce climate change and HIV impacts

Post-disaster response

unicef
for every child



CYCLONE IDAI

Integration of HIV into the humanitarian response in Malawi, Mozambique and Zimbabwe

CASE STUDY
JANUARY 2020

Cash transfers for women:
- HIV risk and service access

THE LANCET

Anton Pozniak, Andrea Atzori, Claudia Marotta, *Francesco Di Gennaro, Giovanni Putoto

HIV continuity of care after Cyclone Idai in Mozambique

No person from Mozambique will forget March 14, 2019, the day Cyclone Idai devastated Beira, the capital of Sofala Province and the second largest city in Mozambique.¹



Home > What we do > News & stories

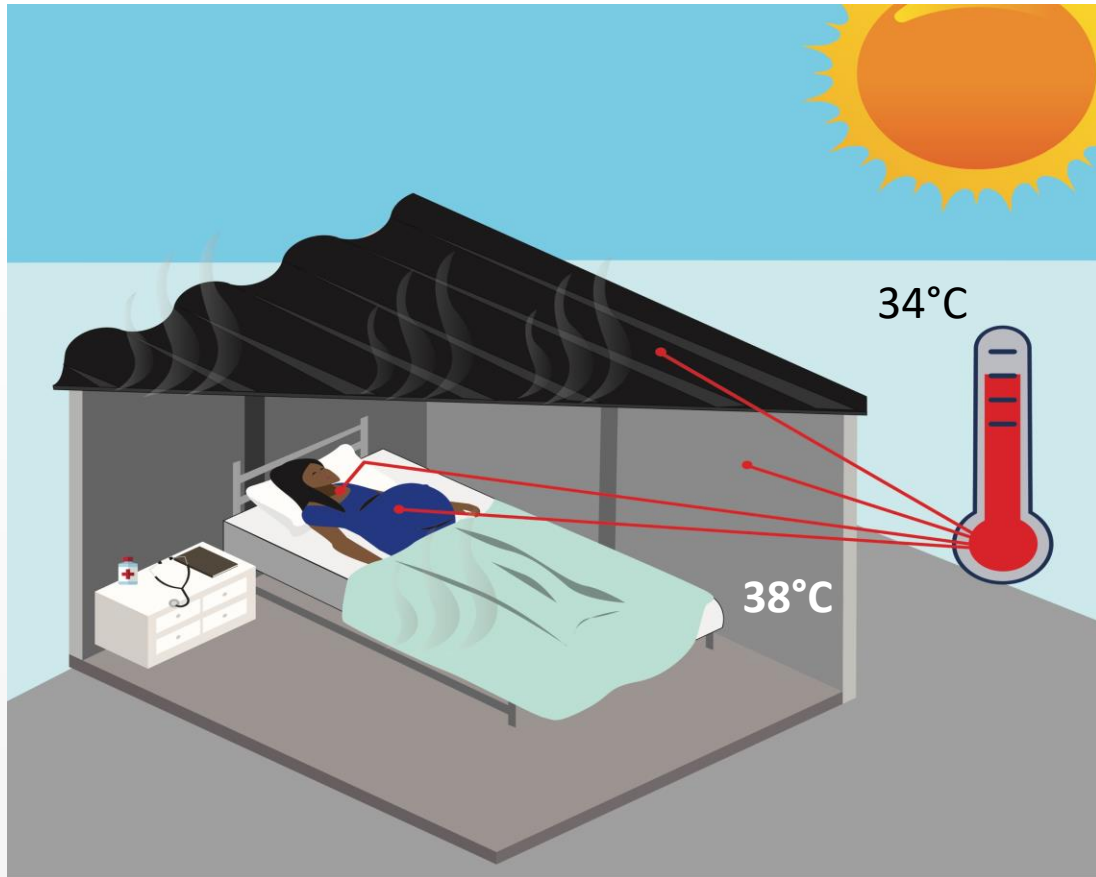
Mozambique: Treating HIV in the wake of Cyclone Idai

MAY 10, 2019

 **MEDECINS SANS FRONTIERES**
DOCTORS WITHOUT BORDERS



Settings approach: built environment

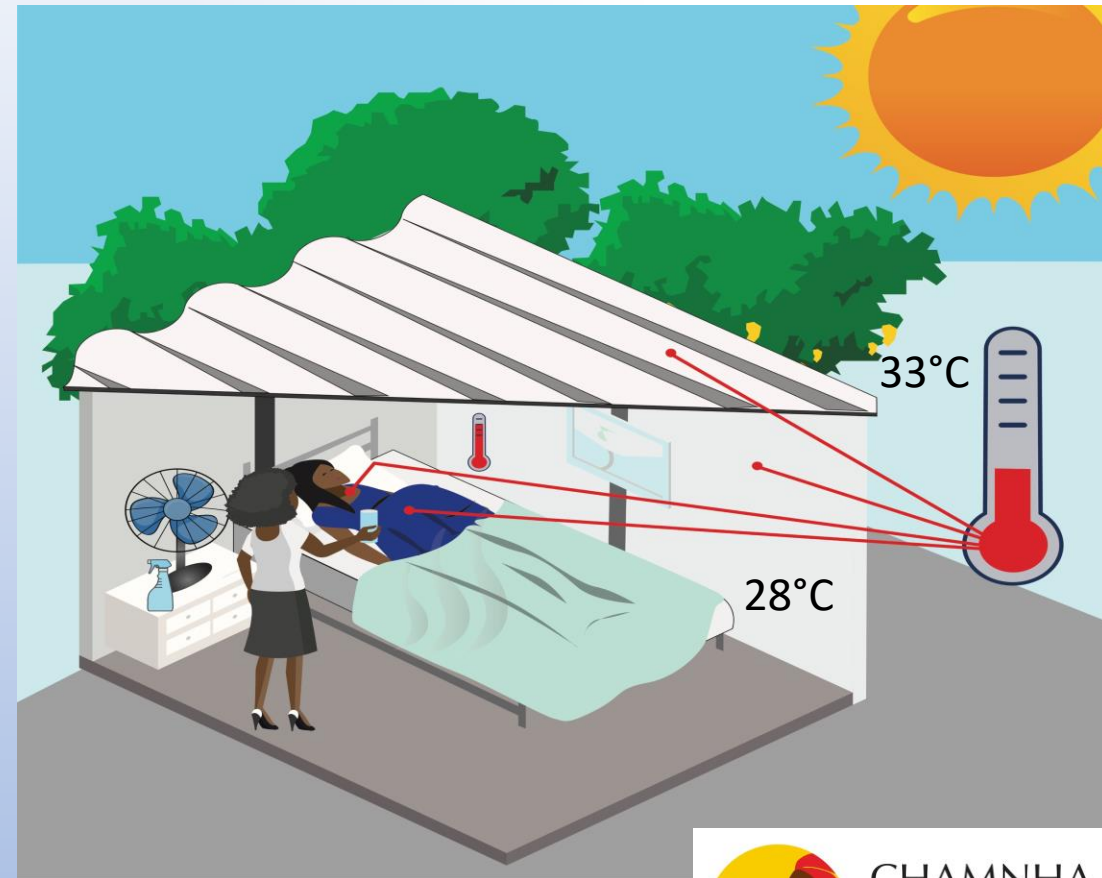
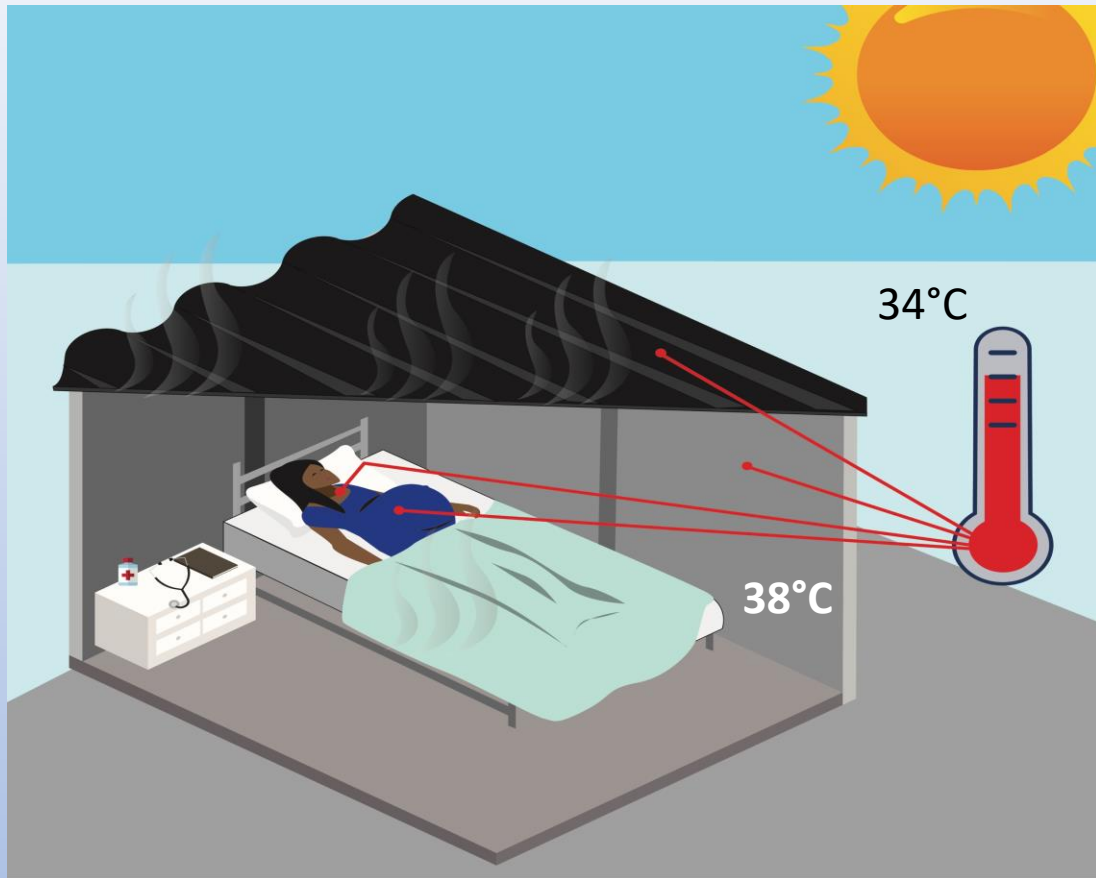


AJPH PERSPECTIVES

An Overlooked Crisis: Extreme
Temperature Exposures in
Incarceration Settings

*Julianne Skarha, BA&Sc
Meghan Peterson, MPH
Josiah D. Rich, MD, MPH
David Dosa, MD, MPH*

Settings approach: health facilities



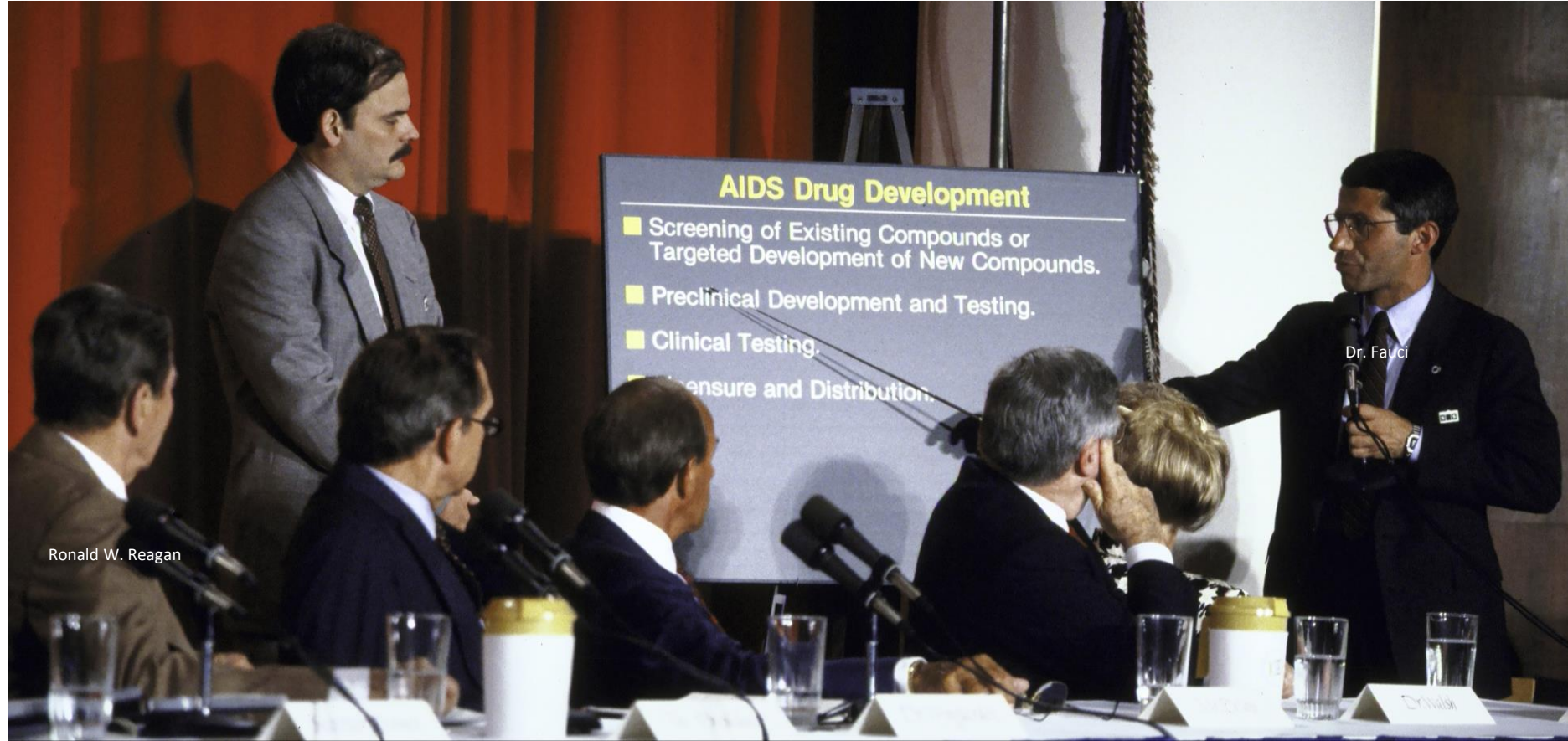
While you are at it:

1. Task shifting for HIV counsellors to include climate and health services
2. Integrated HIV, family planning and 'environment services' provided by community health workers
3. Indicators for measuring climate impacts on health at a district level



Are we just
researchers?

Our work has
never been
apolitical!



Paris Agreement states “Article 8 of the Agreement does not involve or provide a basis for any liability or compensation.”

Acknowledgements

Elmari Briedenhann, Nakita
Sheobalak and Ricardo
Subramoney for the graphics
Stanley MF Luchters
Helen Rees
Francois Venter
Fiona Scorgie
Peter Knox



‘Mother Earth sustains and rules us’
St Francis of Assisi 1181-1226

We are the earth’s subjects, not her object used for pleasure and profit