

## The Role of Health Informatics in Tackling Climate Change



Farah Magrabi

Macquarie University

Facilitator



Julia Farrington

NSW Health



Hania Rahimi-Ardabili

Macquarie University



Zerina Lokmic-Tomkins

Monash University



Robab Abdolkhani

RMIT University





[@twitterhandle](#)

## The intersection between climate change and health

---

**Julia Farrington**

Principal Policy Officer  
*NSW Ministry of Health*



# Climate Change is a Risk to Health

## Scientists deliver 'final warning' on climate crisis: act now or it's too late

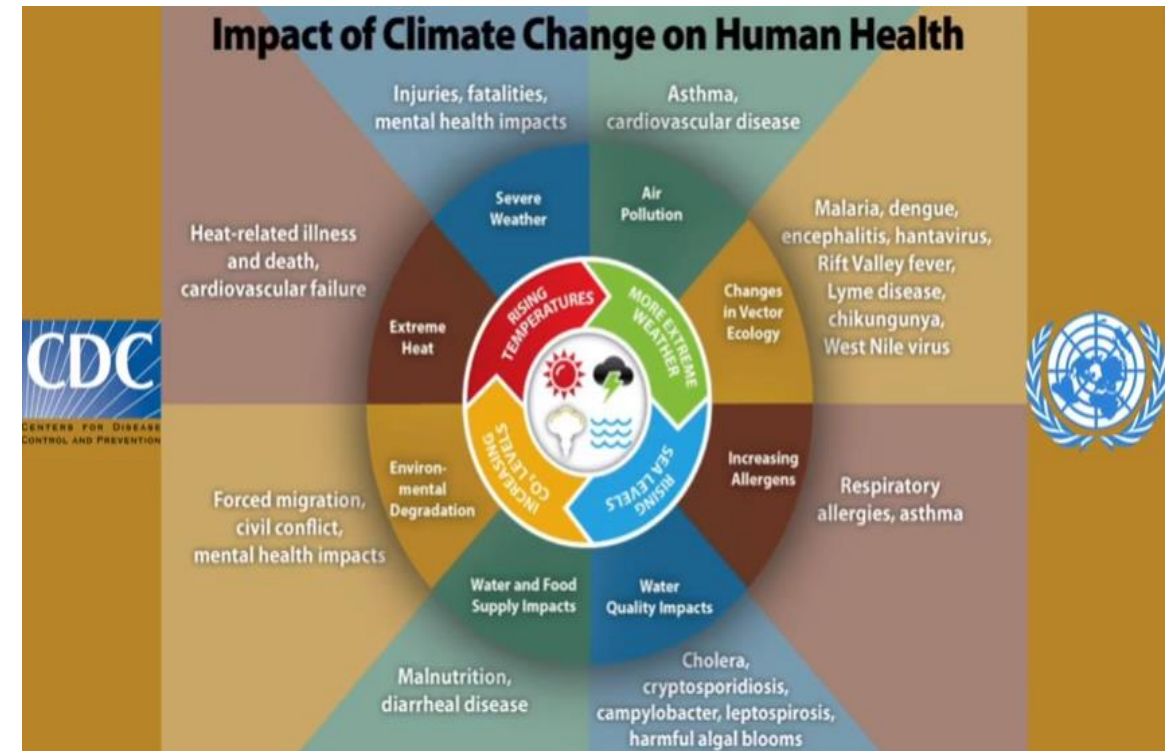


**Fiona Harvey** *Environment editor*

Tue 21 Mar 2023 00.00 AEDT

1.5C above pre-industrial levels is the threshold beyond which our damage to the climate will rapidly become irreversible. Photograph: Janez Volmajer/Alamy

Scientists have delivered a “final warning” on the climate crisis, as rising greenhouse gas emissions push the world to the brink of irrevocable damage that only swift and drastic action can avert.



# Carbon Emissions in Healthcare

THE LANCET  
Planetary Health

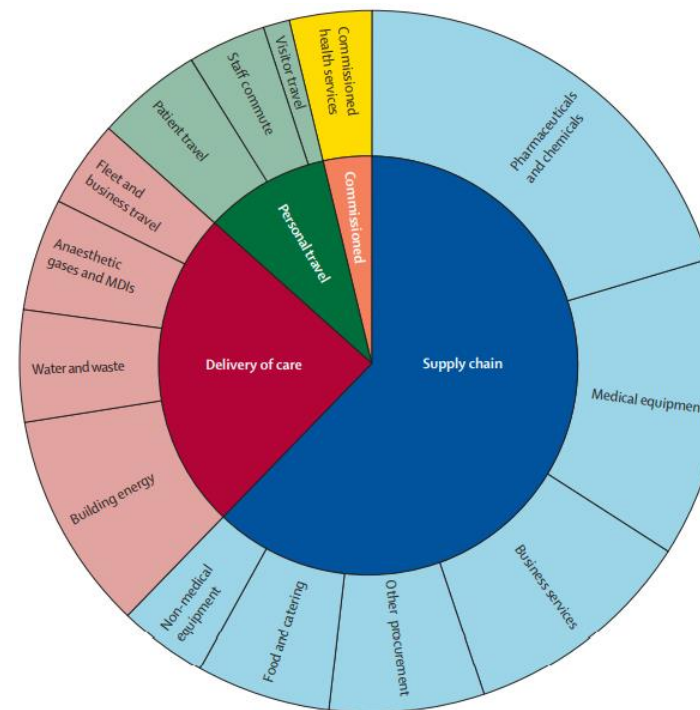
## The carbon footprint of Australian health care

Arunima Malik, PhD • Prof Manfred Lenzen, PhD • Scott McAlister, MEngSci • Forbes McGain, PhD

Open Access • Published: January, 2018 • DOI: [https://doi.org/10.1016/S2542-5196\(17\)30180-8](https://doi.org/10.1016/S2542-5196(17)30180-8)

### Findings

In 2014–15 Australia spent \$161.6 billion on health care that led to CO<sub>2</sub>e emissions of about 35 772 (68% CI 25 398–46 146) kilotonnes. Australia's total CO<sub>2</sub>e emissions in 2014–15 were 494 930 kilotonnes, thus health care represented 35 772 (7%) of 494 930 kilotonnes total CO<sub>2</sub>e emissions in Australia. The five most important sectors within health care in decreasing order of total CO<sub>2</sub>e emissions were: public hospitals (12 295 [34%] of 35 772 kilotonnes CO<sub>2</sub>e), private hospitals (3635 kilotonnes [10%]), other medications (3347 kilotonnes [9%]), benefit-paid drugs (3257 kilotonnes [9%]), and capital expenditure for buildings (2776 kilotonnes [8%]).



**Figure 1: Total and relative CO<sub>2</sub>e emissions for 13 health-care expenditure categories**

# NSW Health's progress in reaching net zero

## Harnessing renewable energy: Australia's largest hospital solar power system to be installed in Port Macquarie

ABC Mid North Coast / By Emma Siossian  
Posted Sat 9 Jun 2018 at 7:43am



More than 2,000 photovoltaic panels are being installed at the Port Macquarie Base Hospital. (ABC News: Emma Siossian)



## Net Zero Leads program



# MEDINFO23

8 – 12 JULY 2023 | SYDNEY, AUSTRALIA



**MACQUARIE**  
University  
SYDNEY · AUSTRALIA

@HaniaRahimi

Research evidence on the role of digital health  
for climate change mitigation and response

---

Hania Rahimi-Ardabili, PhD

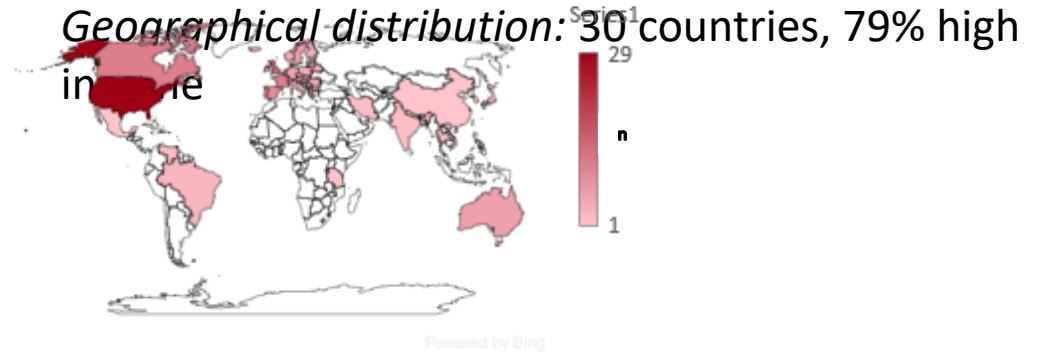
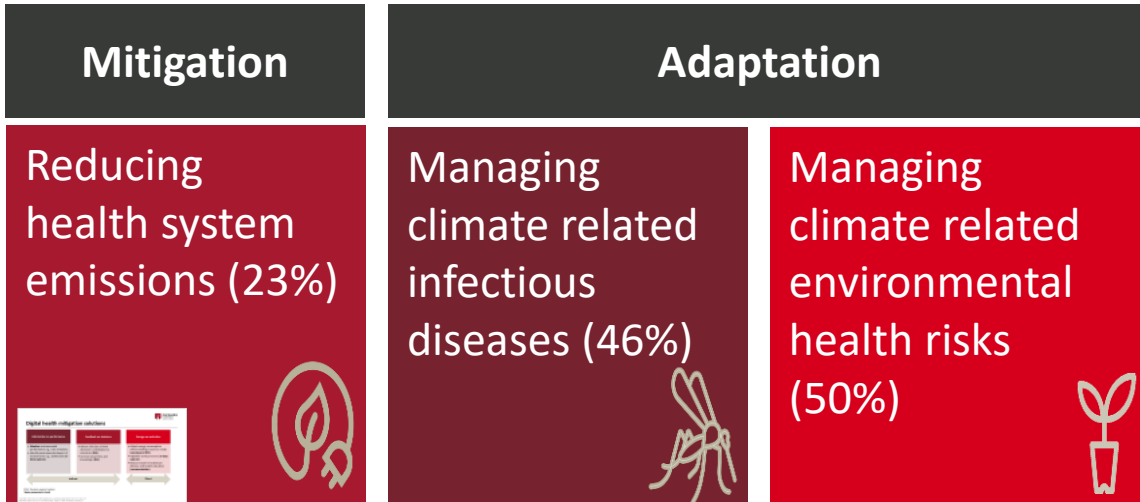
Research Fellow

*Centre for Health Informatics, Macquarie University*

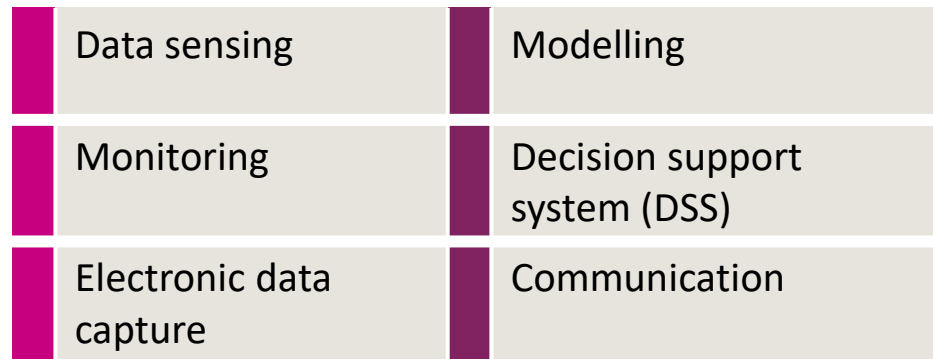


# Aim and characteristics (n=142, 62% empirical)

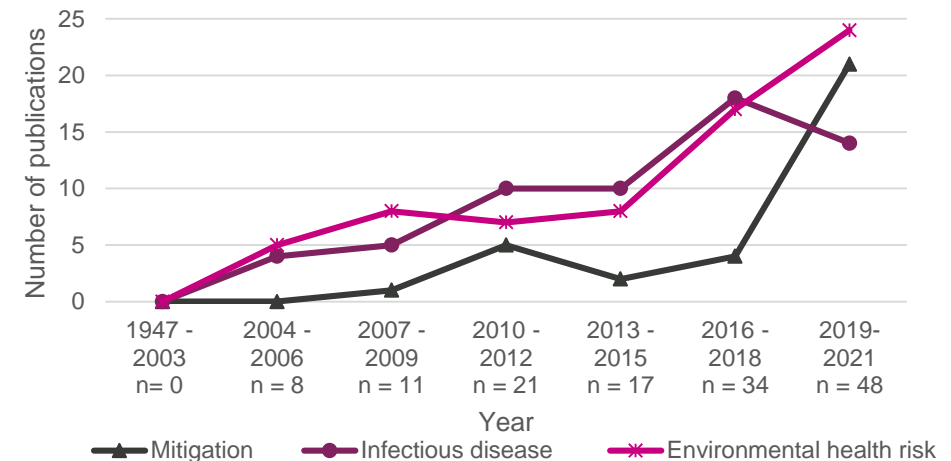
## Roles for digital health



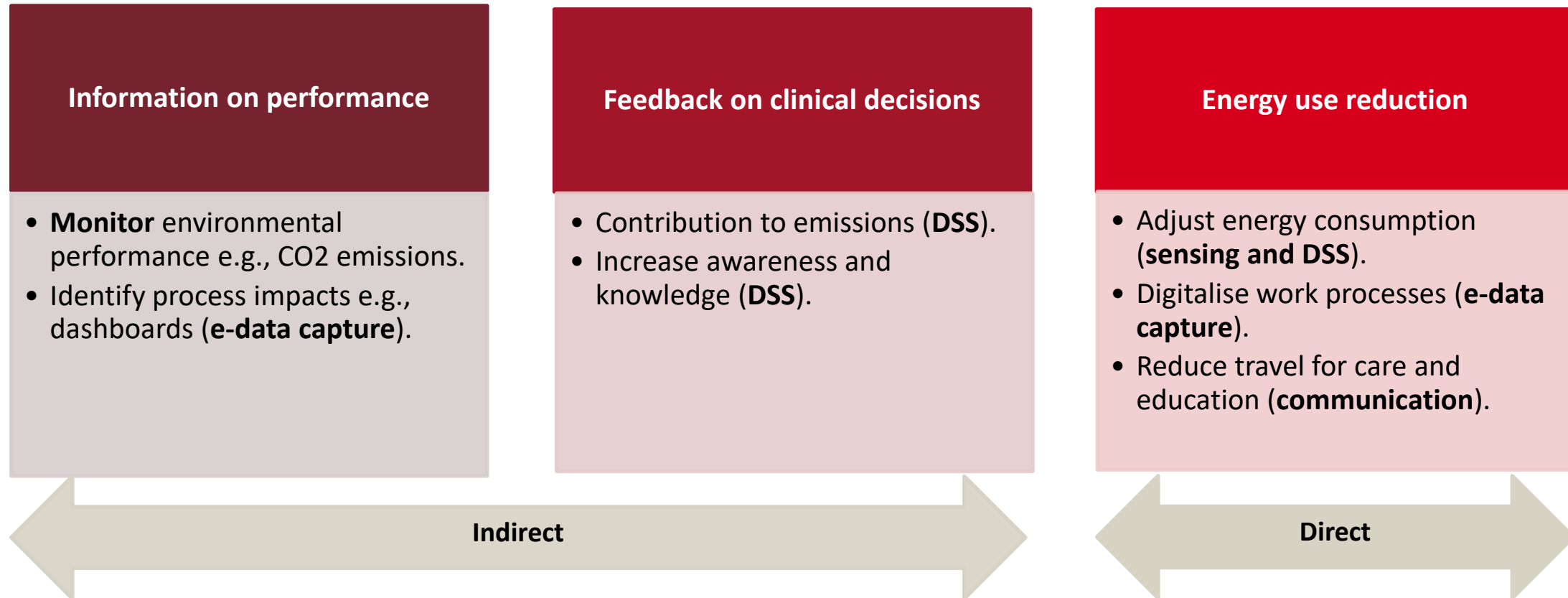
## Tasks supported



## Publication trend



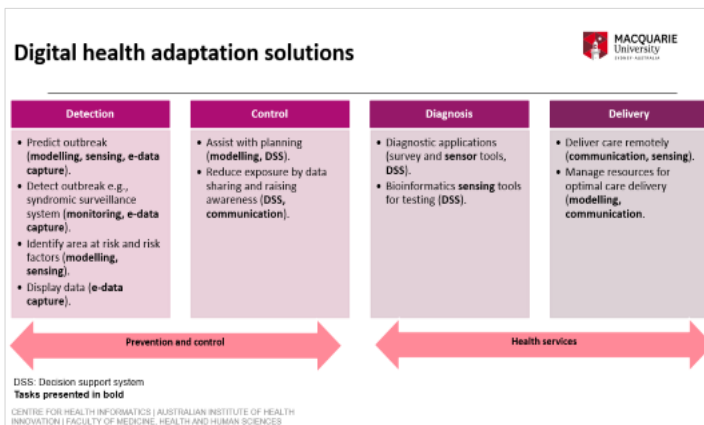
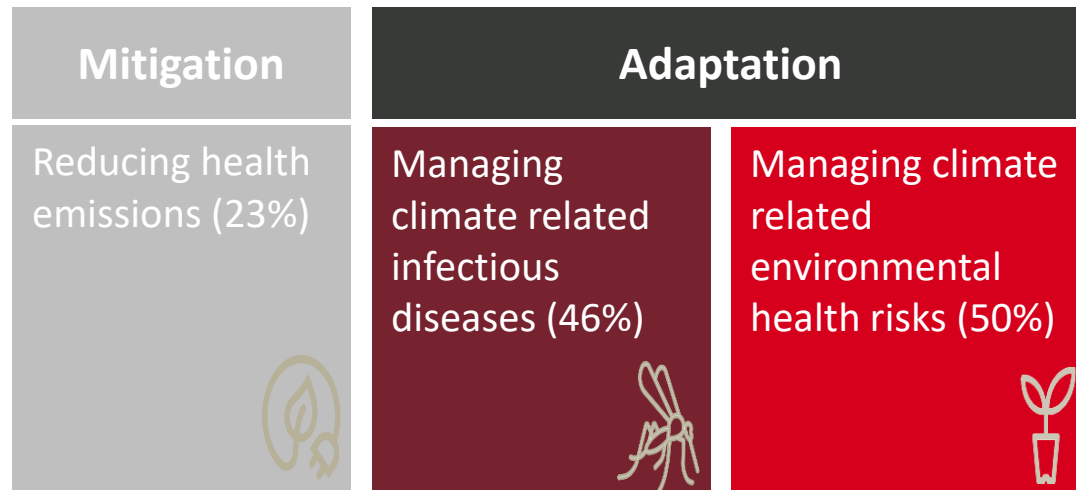
# Digital health mitigation solutions



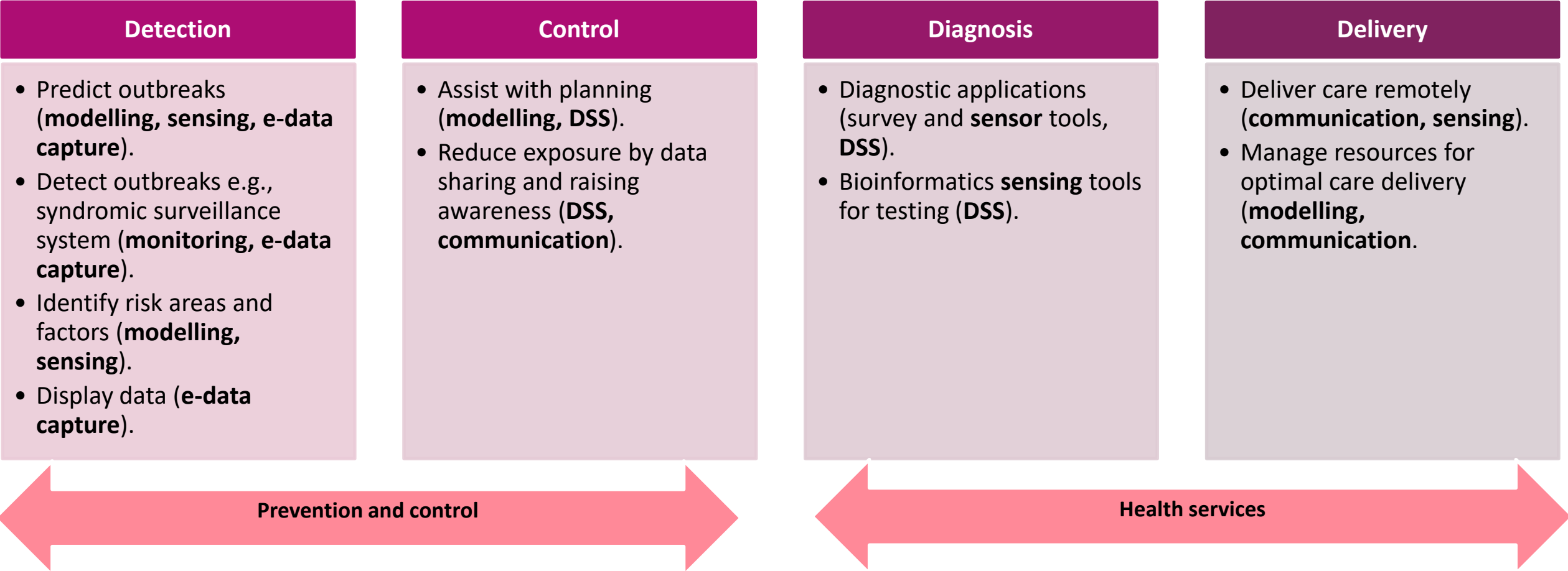
DSS: Decision support system  
Tasks in bold

# Aim and characteristics (n=142, 62% empirical)

## Roles for digital health



# Digital health adaptation solutions



DSS: Decision support system  
**Tasks in bold**

# Measuring carbon footprint of digital health interventions

A/Prof Zerina Lokmic-Tomkins

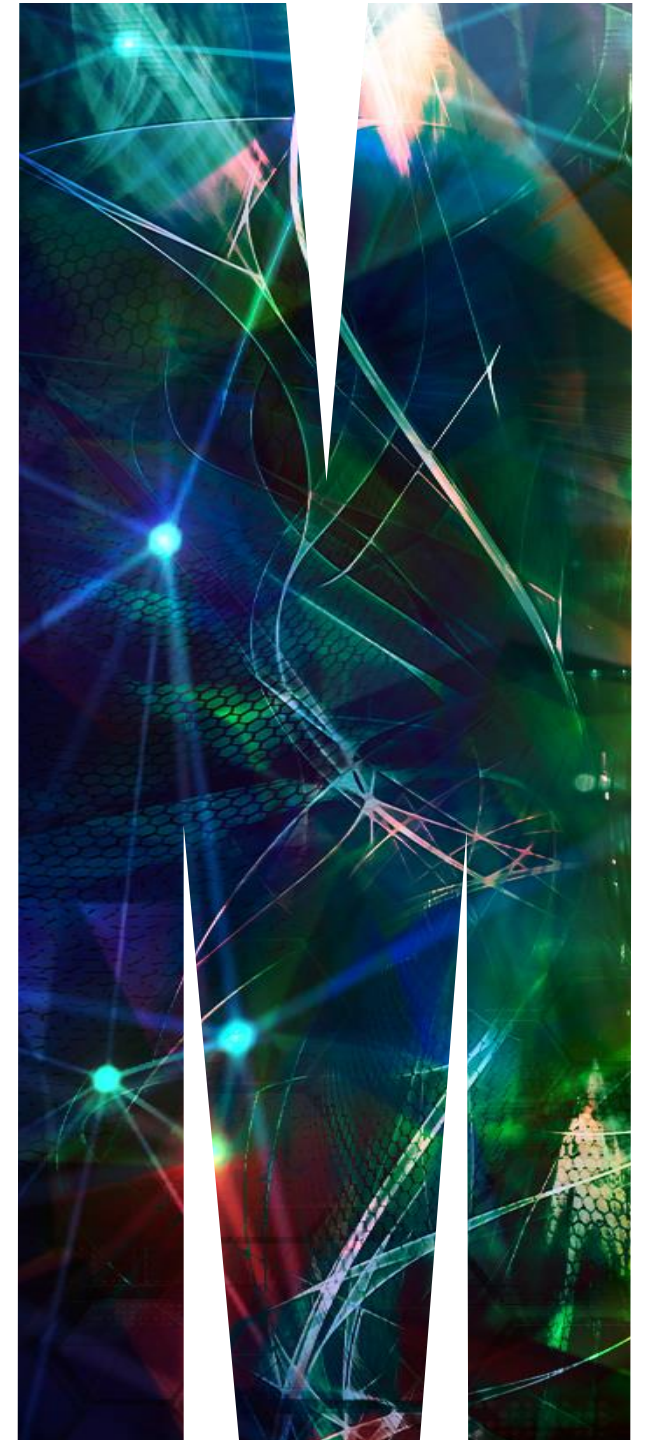
Faculty of Medicine, Nursing and Health Sciences

School of Nursing and Midwifery

E: [zerina.tomkins@monash.edu](mailto:zerina.tomkins@monash.edu)

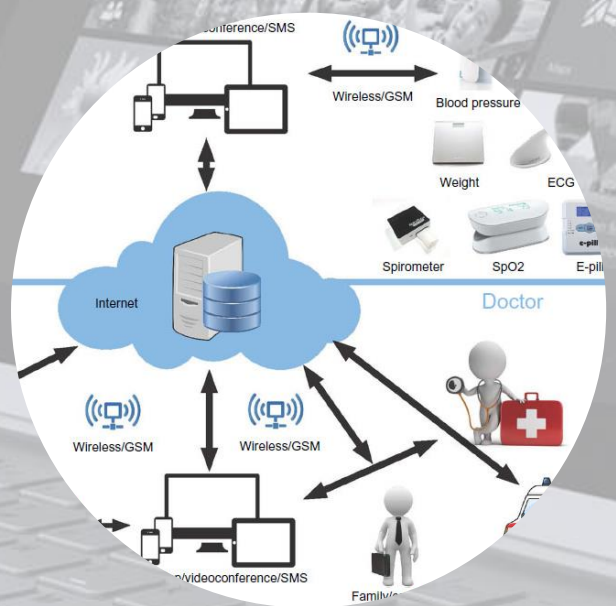
Twitter: @TomkinsZerina

MEDINFO2023, Sydney, 8<sup>th</sup> of July, 2023





# The environmental impact of digital health



---

Devices: The production & disposal of wearable technologies, robotics, devices used for digital health (smartphone, tablets, laptops, desktops)

---

Storage of data: Health data & biometric data storage on cloud (electricity use)

---

Digital health communication infrastructures that facilitate digital health , including telehealth call centres

---

Lokmic-Tomkins Z, Davies S, Block LJ, et al. Assessing the carbon footprint of digital health interventions: a scoping review. *J Am Med Inform Assoc.* 2022;29(12):2128-2139. doi:10.1093/jamia/ocac196

# Frameworks, methodologies & tools in healthcare

## Frameworks identified by Lokmic-Tomkins *et al*

Lifecycle Assessment of Technology

Comprehensive Environmental Assessment (CEA)

Environmentally Extended Input-Output Analysis (EEIOA)

Lokmic-Tomkins Z, et al. Assessing the carbon footprint of digital health interventions: a scoping review. *J Am Med Inform Assoc.* 2022;29(12):2128-2139.

The Eco-Health Footprint

The green synthesis framework

Energy Efficient Tester and Framework for Energy Efficiency Testing to Improve eNvironmental Goals of the Software Engineering

The Greenhouse Gas Protocol

## Frameworks reported since Lokmic-Tomkins *et al* publication

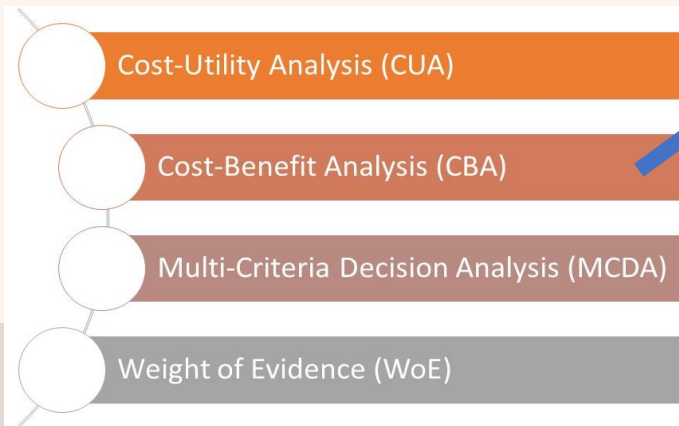
### i-Climate

Sittig, D. F., Sherman, J. D., Eckelman, M. J., Draper, A., & Singh, H. (2022). i-CLIMATE: a "clinical climate informatics" action framework to reduce environmental pollution from healthcare. *Journal of the American Medical Informatics Association : JAMIA*, 29(12), 2153–2160. <https://doi.org/10.1093/jamia/ocac137>

### Green-Mission framework

Sijm-Eeken, M. E., Arkenaar, W., Jaspers, M. W., & Peute, L. W. (2022). Medical informatics and climate change: a framework for modeling green healthcare solutions. *Journal of the American Medical Informatics Association : JAMIA*, 29(12), 2083–2088. <https://doi.org/10.1093/jamia/ocac182>

## Methods identified by Lokmic-Tomkins *et al*



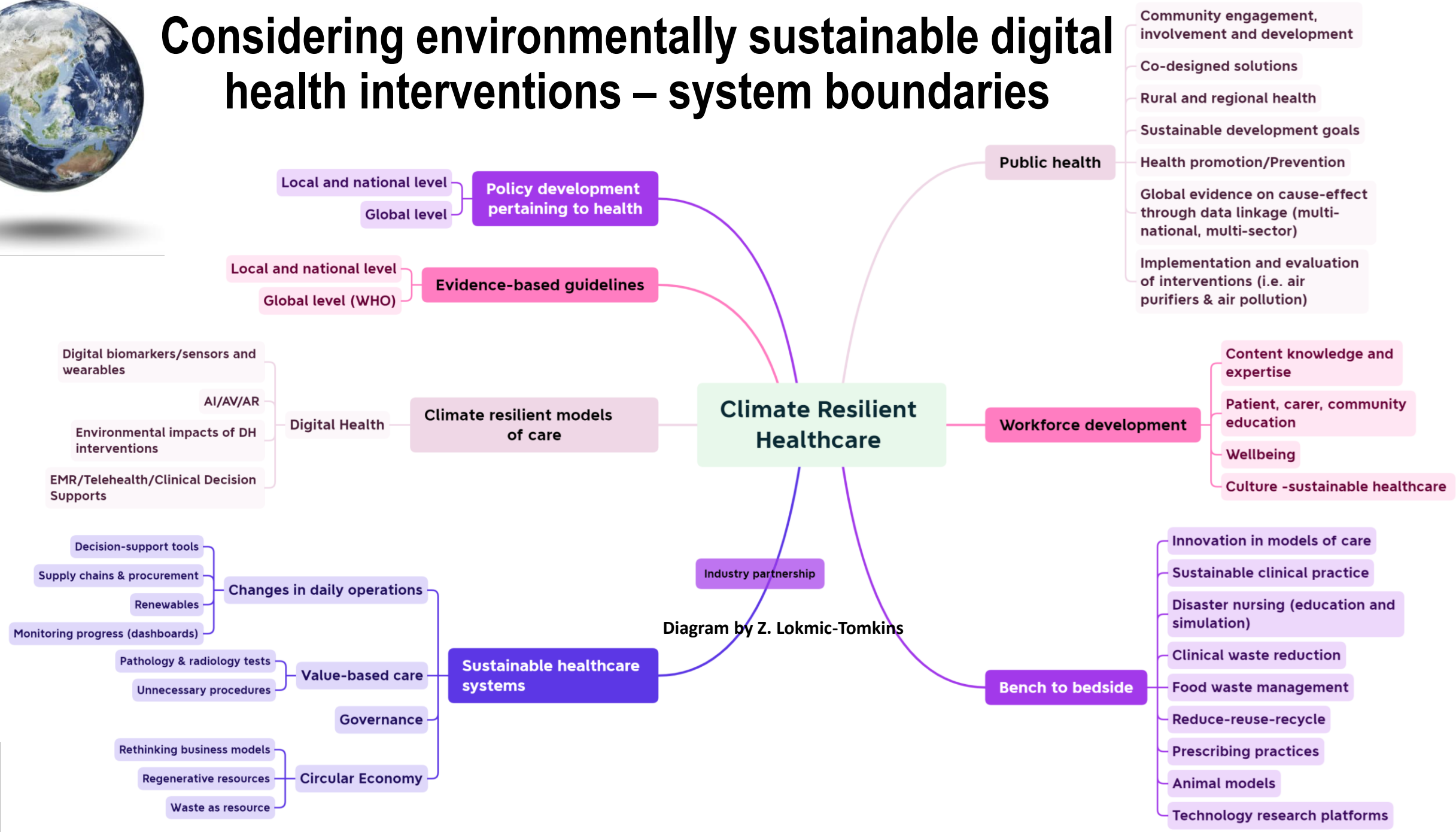
Not applied to DHT/HIT in clinical settings

Validated, reliable instruments/tools – not identified

Carbon calculators?



# Considering environmentally sustainable digital health interventions – system boundaries



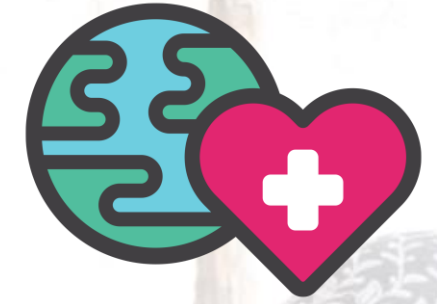
# Advancing Women's Participation in Climate Action through Digital Health Literacy

Robab Abdolkhani, Dawn Choo, Cecily Gilbert, Ann Borda

[robab.abdolkhani@rmit.edu.au](mailto:robab.abdolkhani@rmit.edu.au)





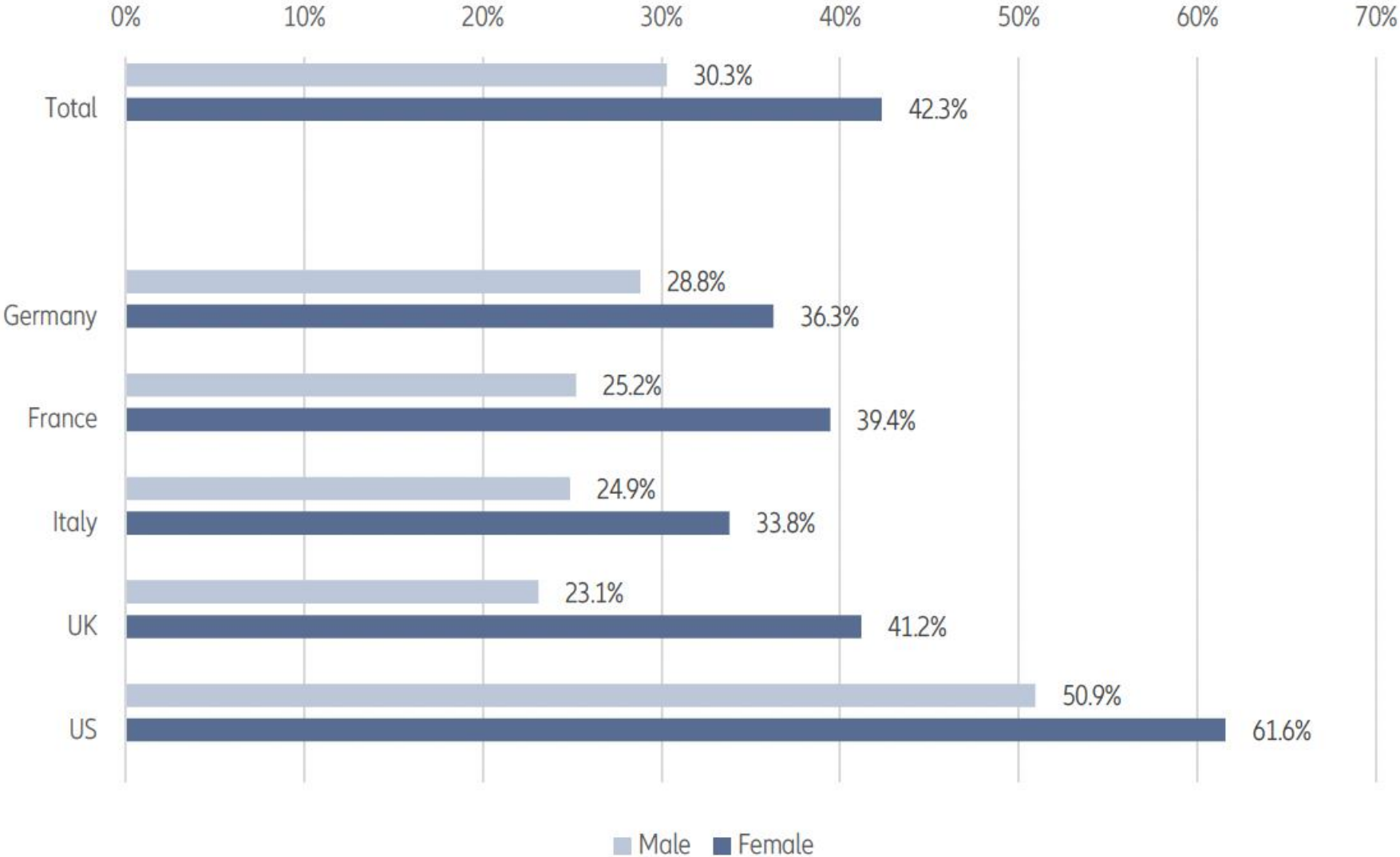


# Climate Literacy

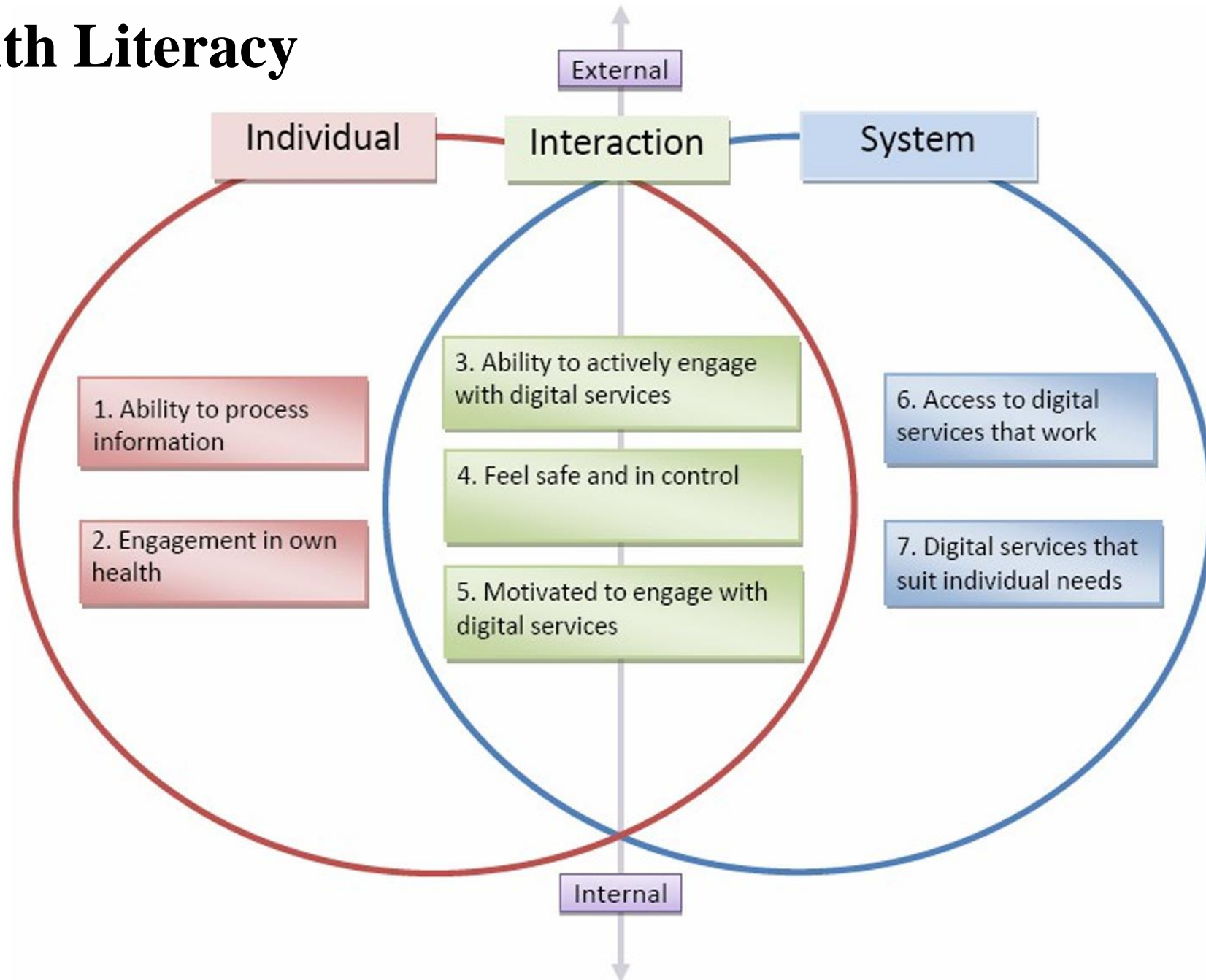
## A climate-literate woman:

- Has a clear understanding of the linkages between climate change and health
- Is able to communicate risk
- Can assess data
- Comprehends uncertainty
- Makes informed and responsible decisions or advocate for broader policies that protect health

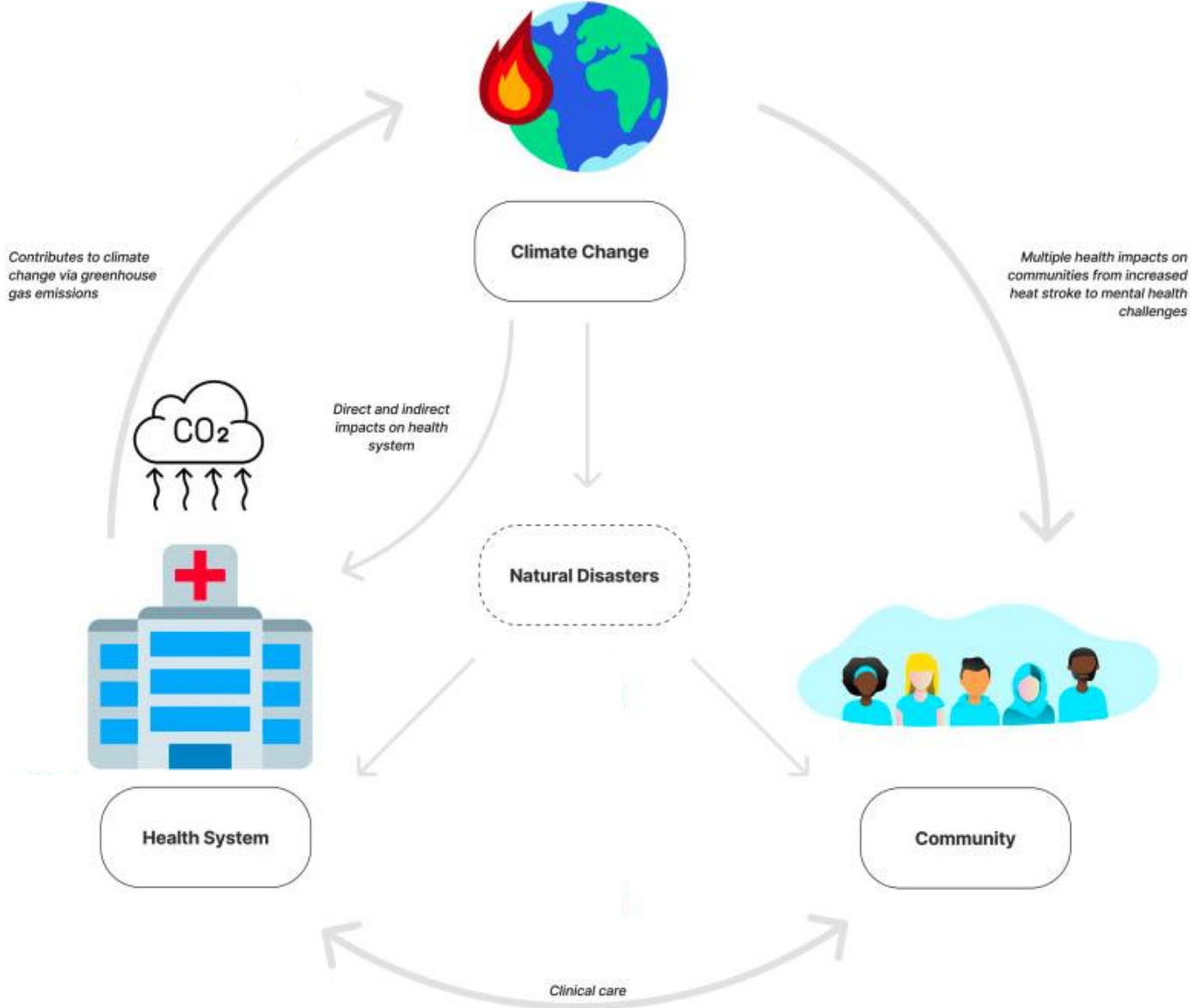
# Allianz Climate Literacy Survey 2021 – By gender, % of respondents with low level of climate literacy

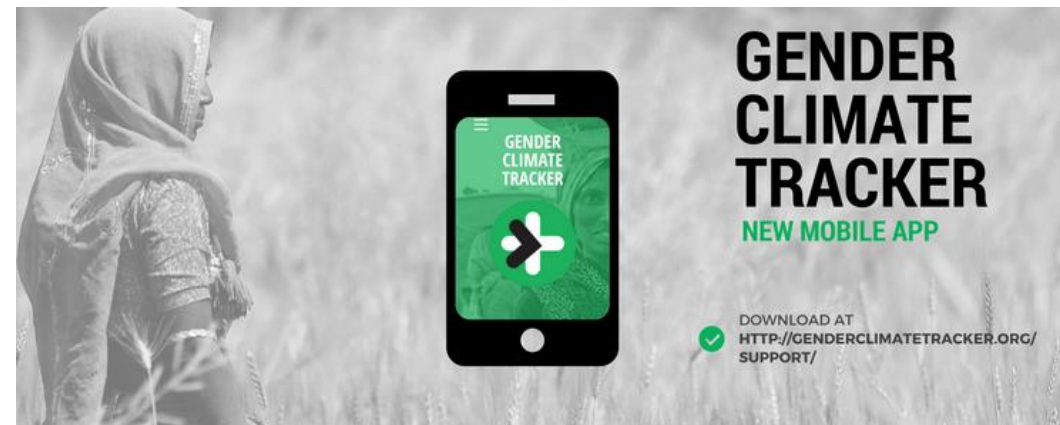
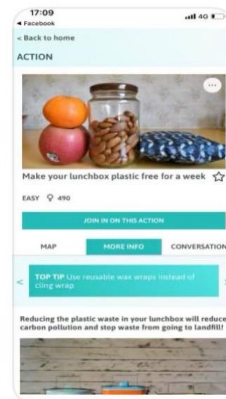
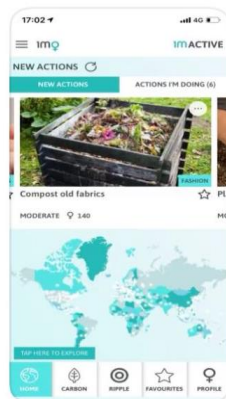
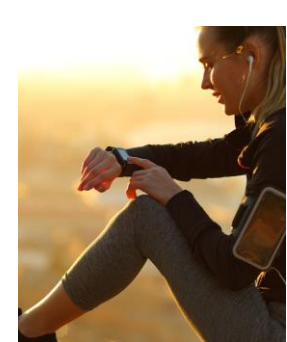


# Digital Health Literacy



# When, Where, and How to Consider Digital Health and Climate Literacy?





**Digital Health Literacy**  
+  
**Climate Literacy**

**Sufficiently resilient health communities**

# MEDINFO23

8 – 12 JULY 2023 | SYDNEY, AUSTRALIA

## PANEL DISCUSSION



Farah Magrabi



Julia Farrington



Hania Rahimi-Ardabili



Zerina Lokmic-Tomkins



Robab Abdolkhani

#MedInfo23 #ClimateChange

@FarahMagrabi @j\_farrington333  
@TomkinsZerina @HaniaRahimi

