

# 気候変動とグローバルヘルス

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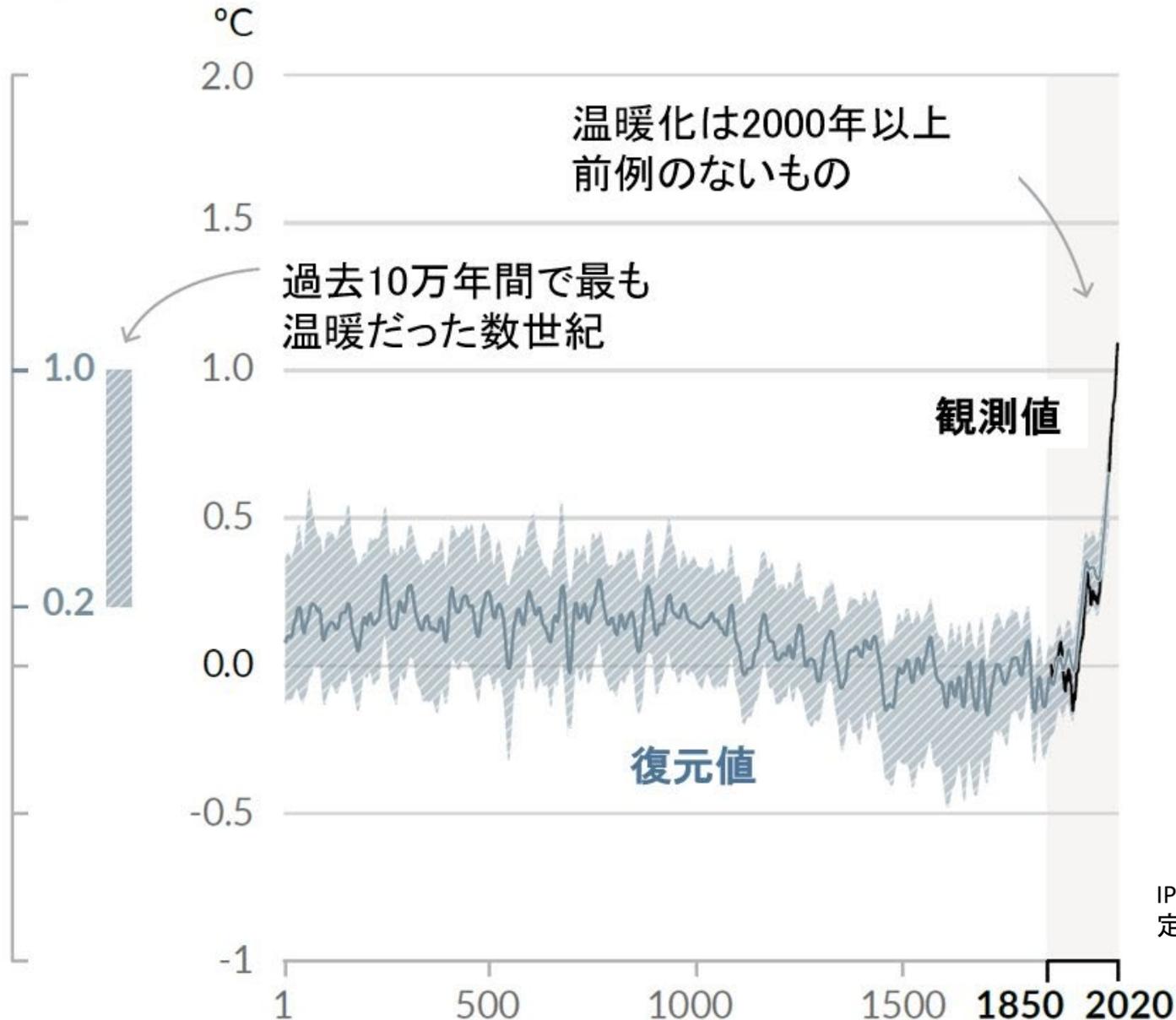
第5回 内閣府 グローバルヘルス戦略有識者タスクフォース  
令和4年2月24日

# 本日のトピックス

1. 気候変動(過去・現在・未来)
2. 気候変動の健康影響
3. 特に影響を受けやすい人々・地域
4. 緩和策と適応策

# 世界平均気温(10年平均)の変化 (1850~1900年を基準)

復元値(1~2000年)及び観測値(1850~2020年)



- **COP21(パリ協定) 2015年**

産業革命前からの地球平均気温上昇を $2^{\circ}\text{C}$ より十分下方に保持。また $1.5^{\circ}\text{C}$ に抑える努力を追及。

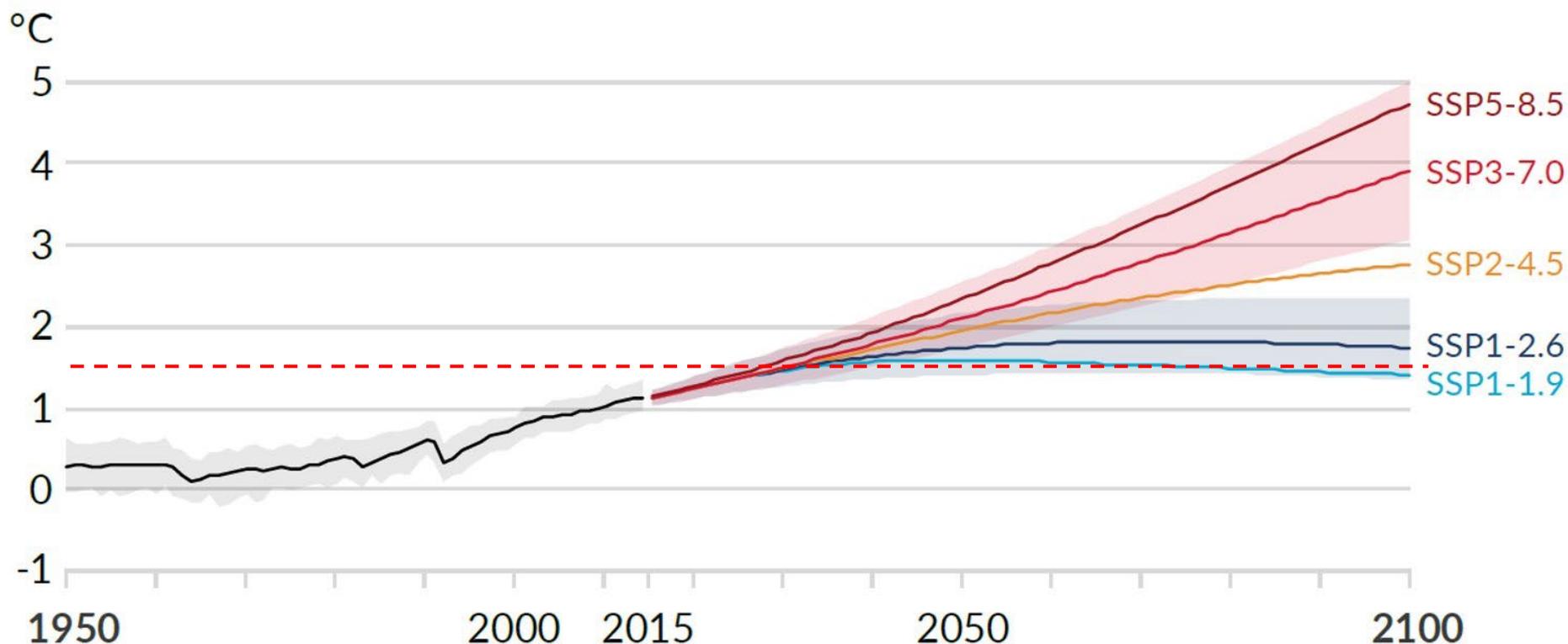


- **COP26(グラスゴー気候合意) 2021年**

$1.5^{\circ}\text{C}$ に抑える努力を追及。 **$1.5^{\circ}\text{C}$ を重視**

# 将来の気温変化

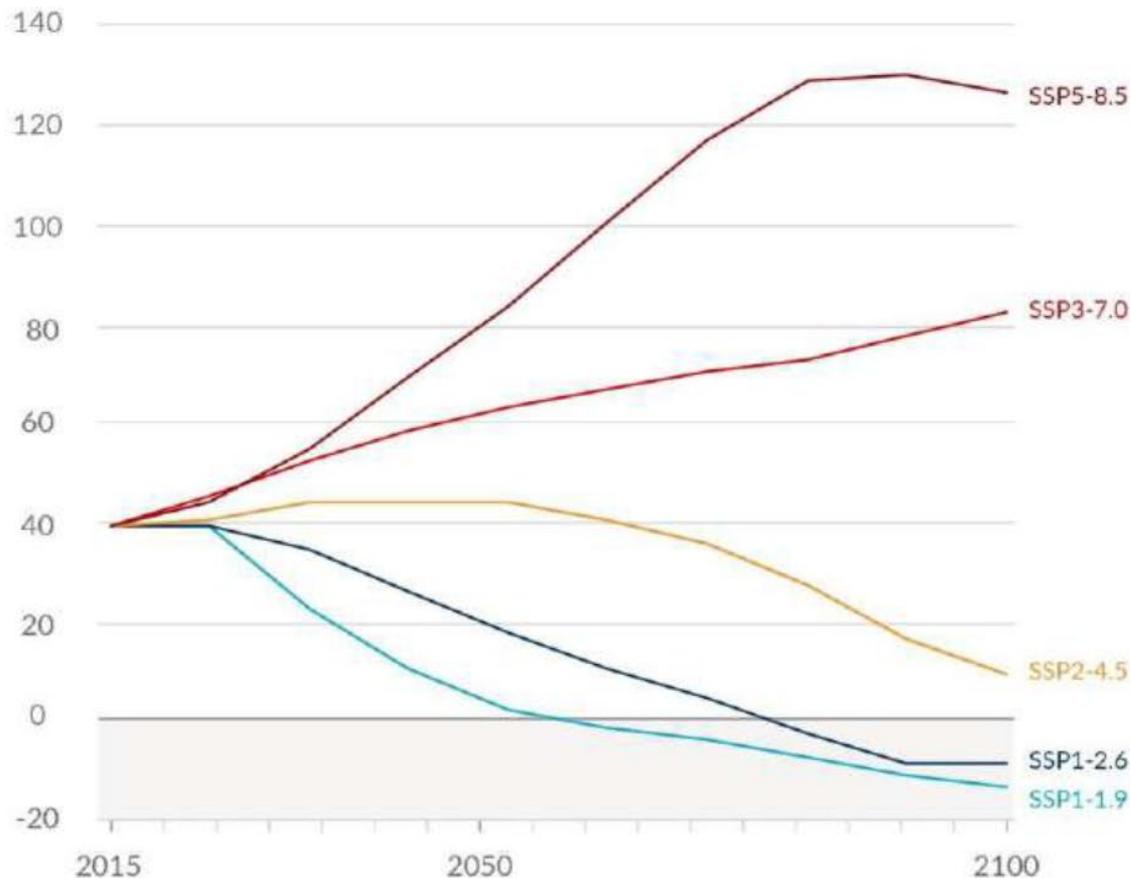
## 1850～1900年を基準とした世界の平均気温の変化



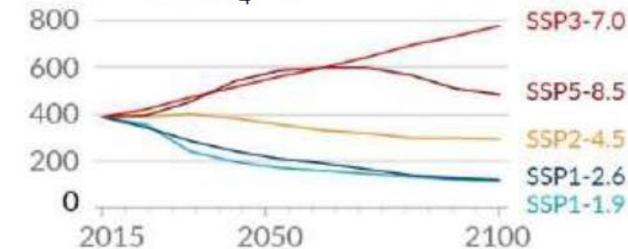
# 人為起源年間排出量 (2015~2100年)

a) 5つの例示的なシナリオにおけるCO<sub>2</sub> (左) 及び一部の主要な非CO<sub>2</sub> 駆動要因 (右) の将来の年間排出量

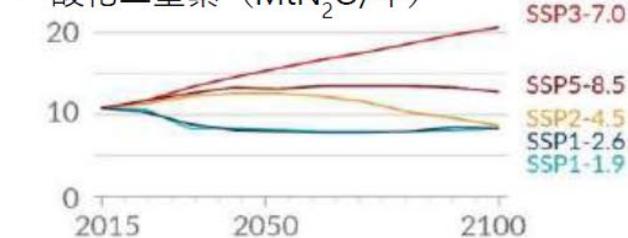
二酸化炭素 (GtCO<sub>2</sub>/年)



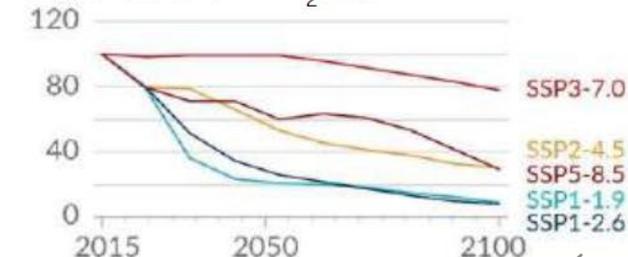
非CO<sub>2</sub> 温室効果ガス  
メタン<sup>2</sup> (MtCH<sub>4</sub>/年)



一酸化二窒素 (MtN<sub>2</sub>O/年)



大気汚染物質かつエアロゾル  
二酸化硫黄 (MtSO<sub>2</sub>/年)



# IPCC第6次評価報告書

## IPCCの構成

IPCC  
総会

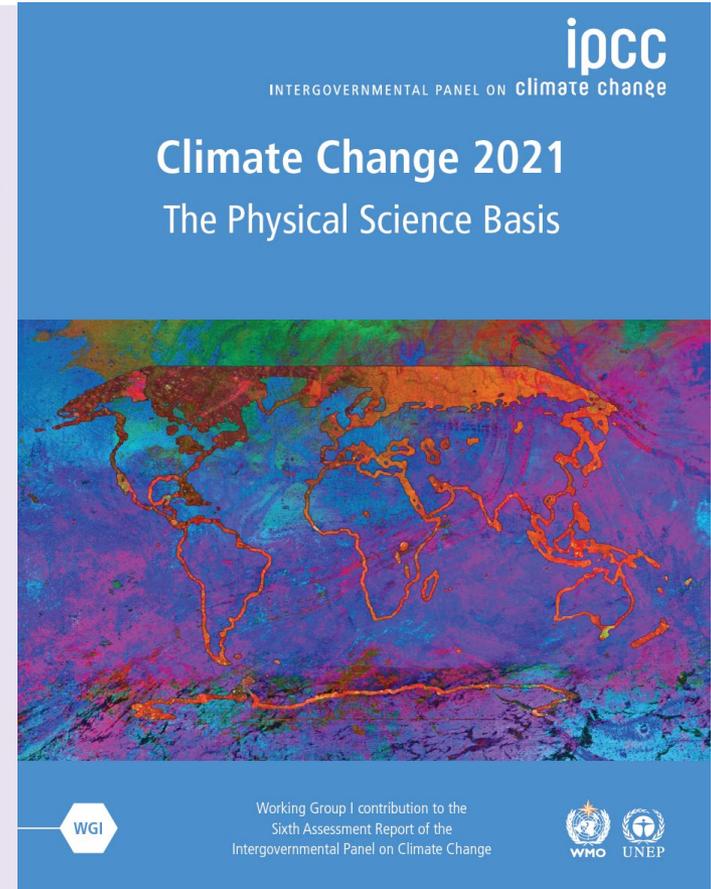
**第1作業部会(WG1) 科学的根拠**  
気候システムおよび気候変動についての評価

**第2作業部会(WG2) 影響・適応・脆弱性**  
生態系、社会・経済などの各分野における  
影響および適応策についての評価

**第3作業部会(WG3) 緩和策**  
気候変動に対する対策(緩和策)について評価

**インベントリ・タスクフォース**  
各国における温室効果ガス排出量・吸収量の  
目録に関する計画の運営委員会

<https://www.jccca.org/ipcc/>



<https://www.ipcc.ch/>

# 2009

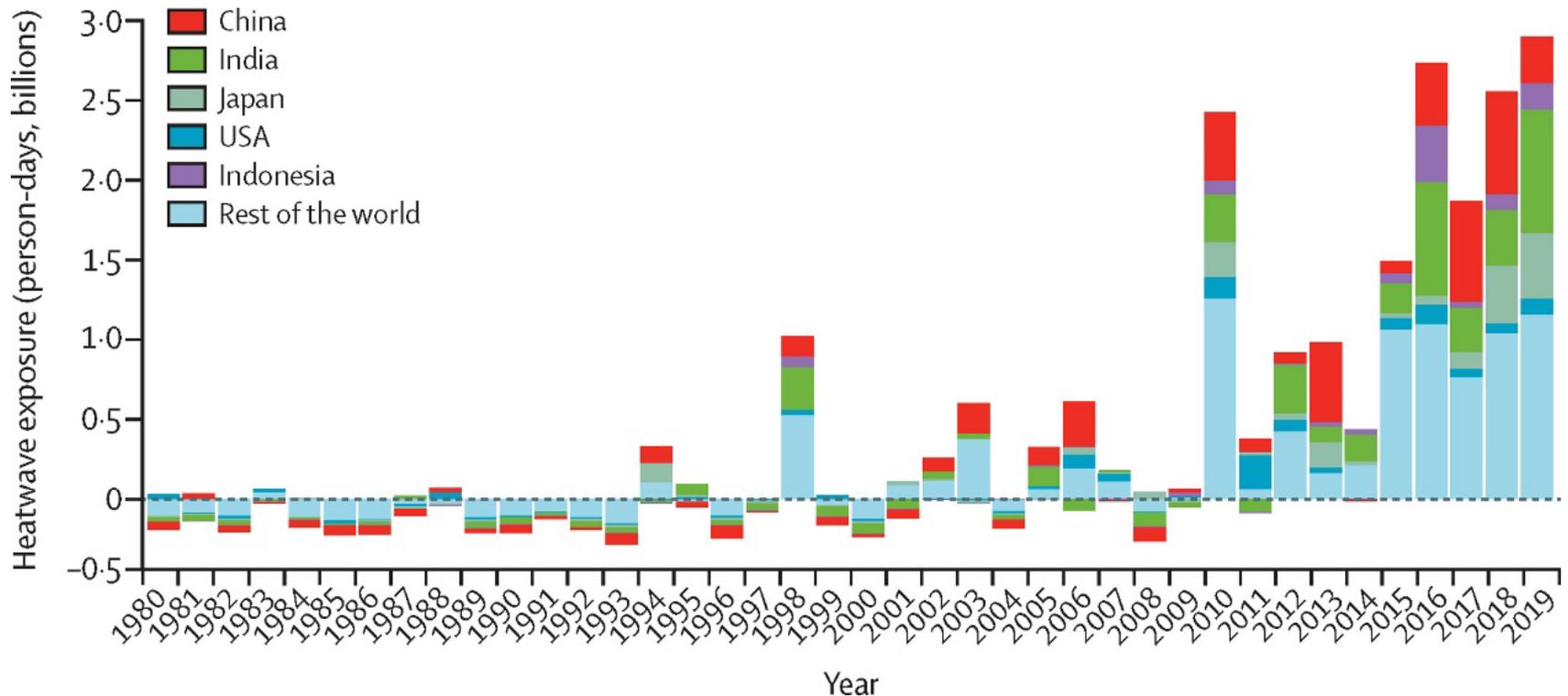


# 2015



<https://www.lancetcountdown.org/>

# 熱波への曝露



65歳以上の高齢者が熱波に曝露した年間延べ人日数の推移（1986-2005年を基準）。

Watts N, Amann M, Arnell N, et al. Lancet 2020;397:129-70.

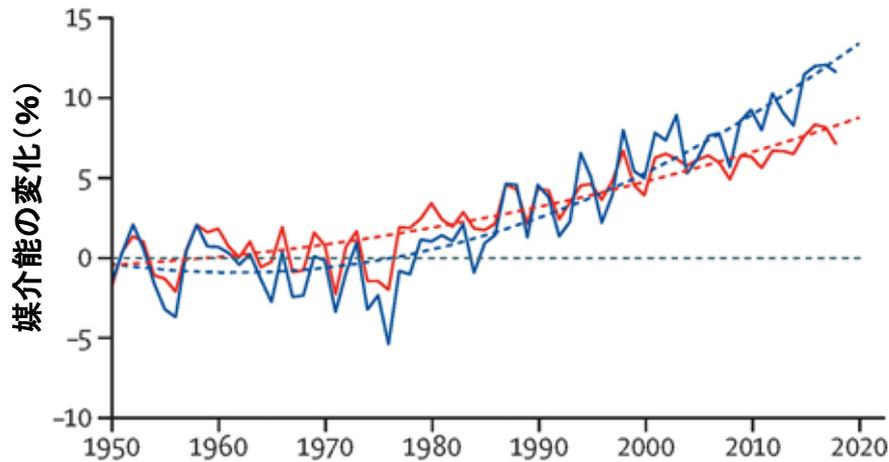
# 感染症流行のリスク変化

## デング熱媒介蚊

Dengue (global)

— *Aedes aegypti* ネットアイシマカ

— *Aedes albopictus* ヒトスジシマカ



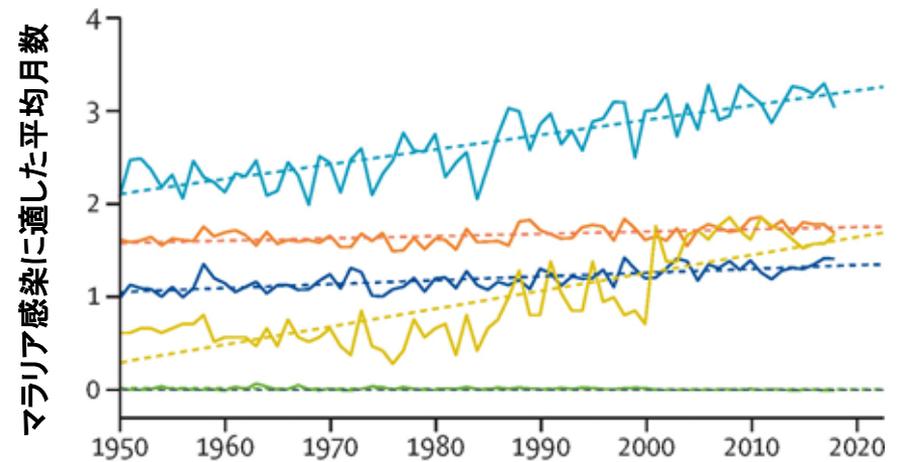
## マラリア(高地)

Malaria (highland areas)

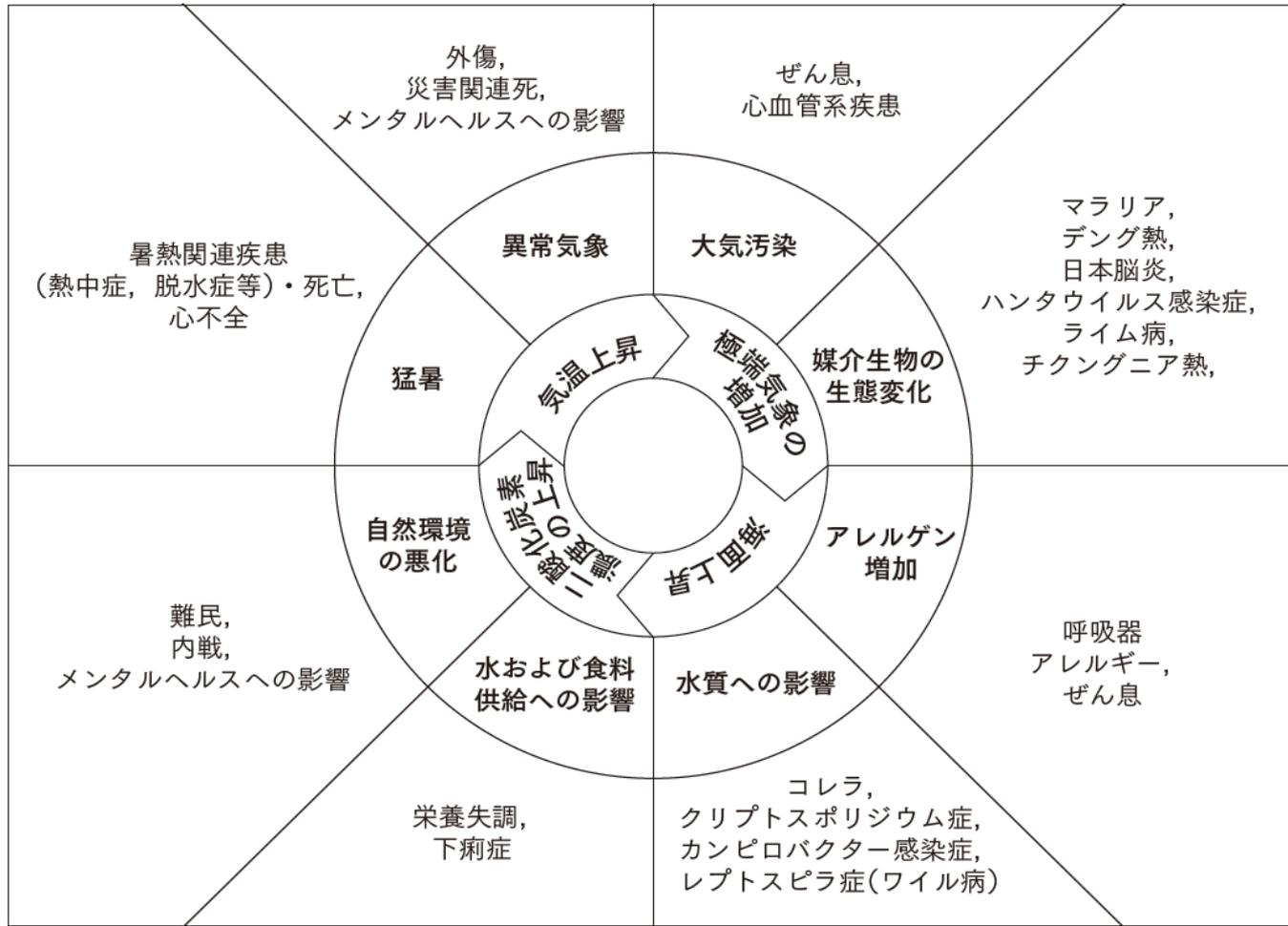
— African region — Eastern Mediterranean region

— Region of the Americas — South-East Asia region

— Western Pacific region



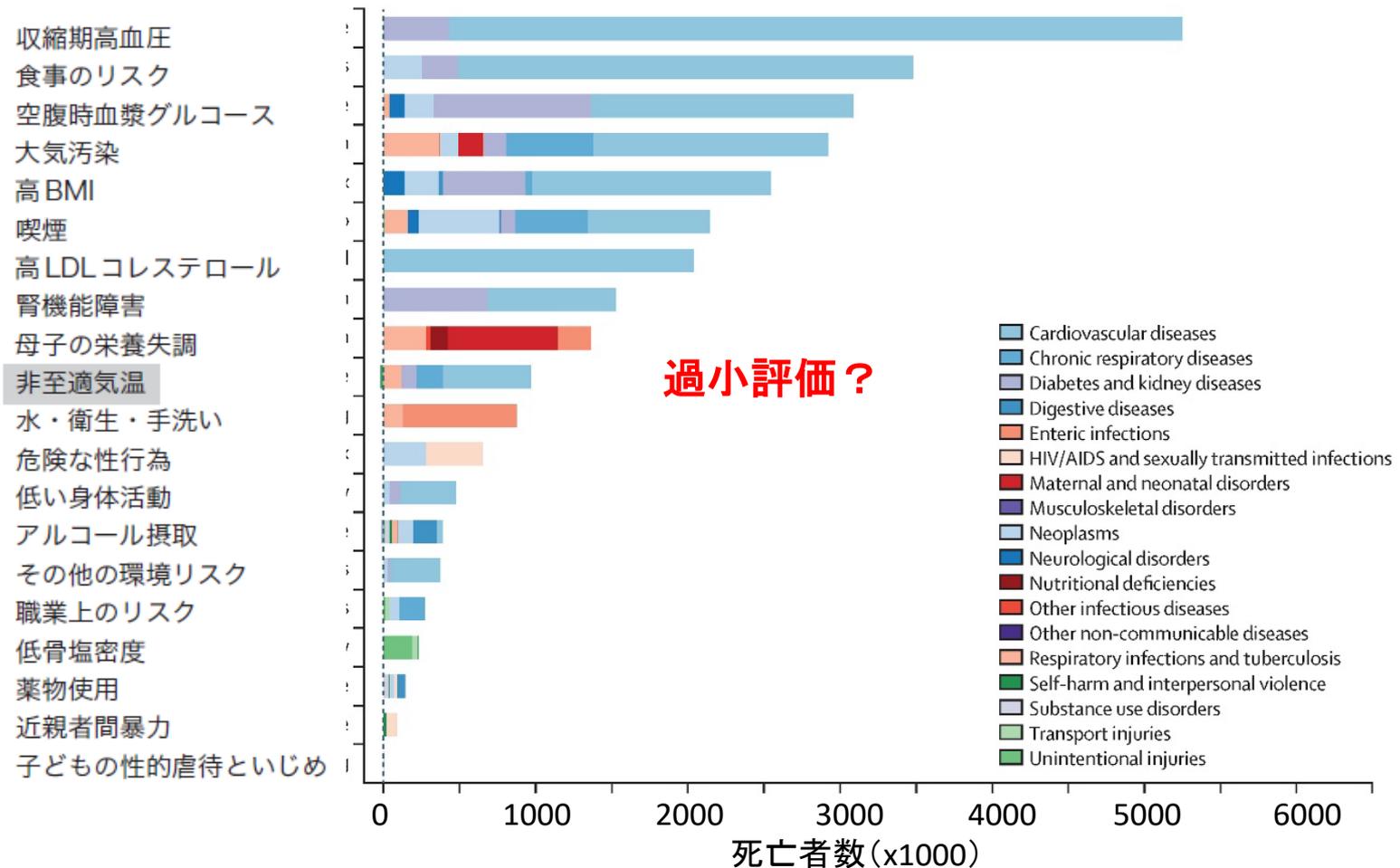
# 様々な健康影響



米国CDCの原図 (<https://www.cdc.gov/climateandhealth/effects/default.htm>)を改変

# 世界の死亡者数と主要リスク因子

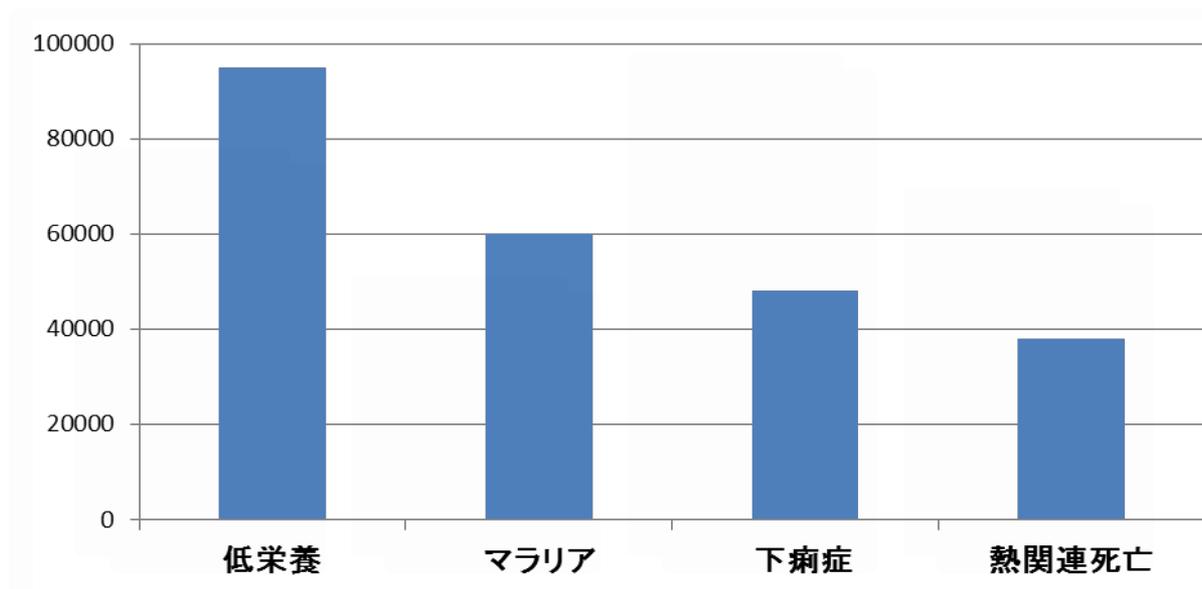
女性、2019年



# 気候変動による過剰死亡

2030-2050年

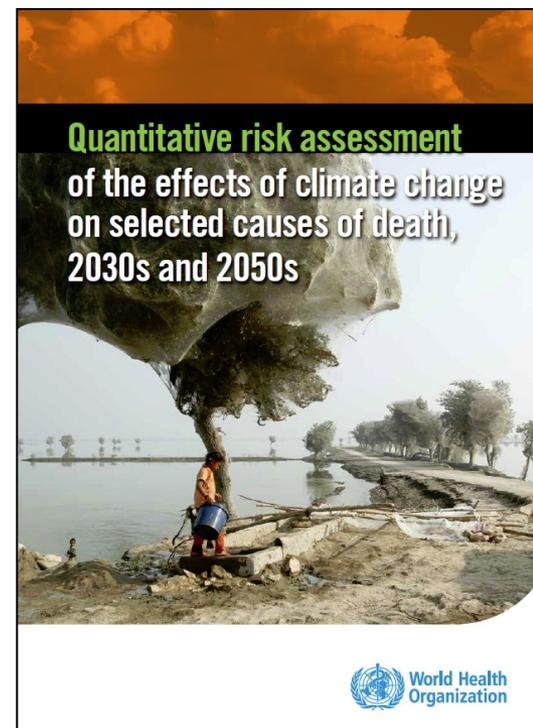
- 約25万人/年 (A1bシナリオ)



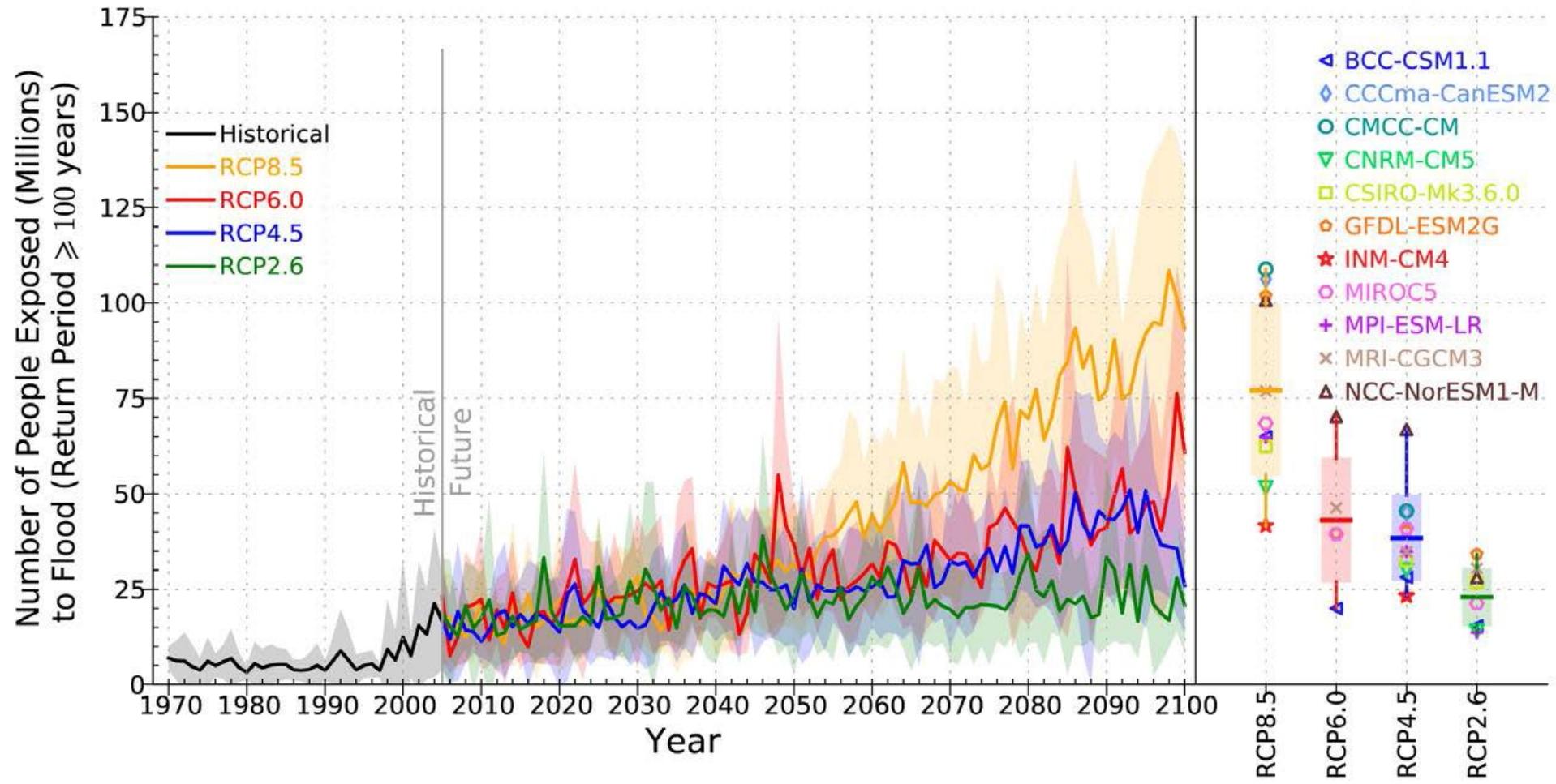
- 脆弱な集団

こども、高齢者、低所得国、都市部の貧困層(スラム地域等)、  
伝統的暮らしを営む人々、沿岸部住民(島嶼国など)

WHO 2014

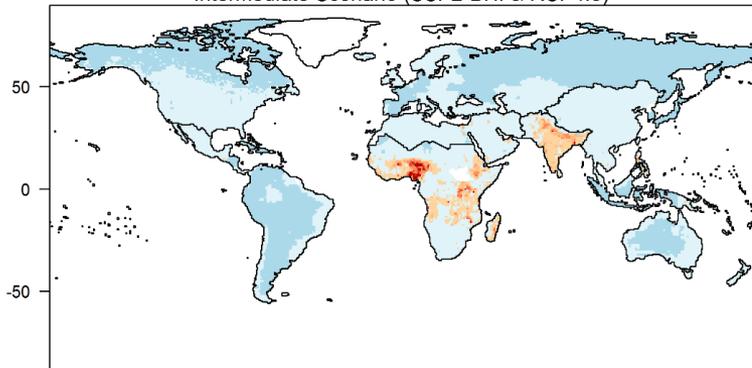


# 洪水への曝露人口



# 温暖化に伴う下痢症による過剰死亡者数

Intermediate Scenario (SSP2-BHI & RCP4.5)

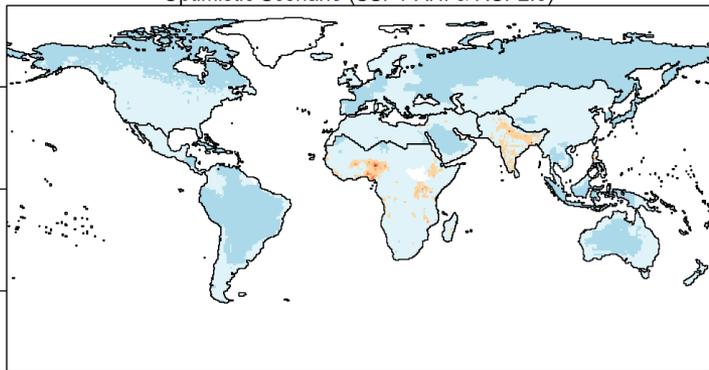


2080-2095年

中間的気温上昇シナリオ

約3.0万人 (95%予測区間 2.5万; 3.4万)

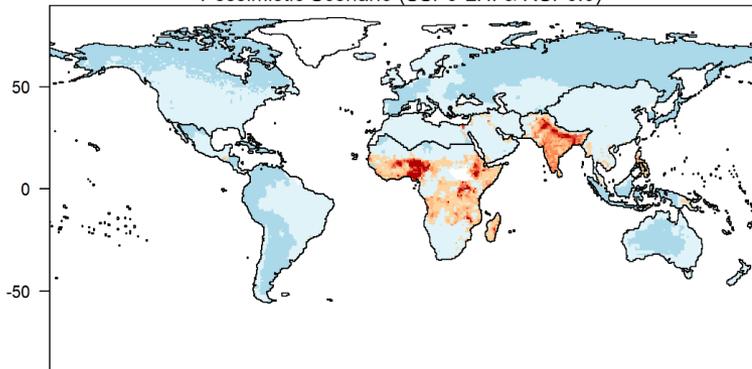
Optimistic Scenario (SSP1-AHI & RCP2.6)



楽観的気温上昇シナリオ

約0.6万人 (95%予測区間 0.5万; 0.8万)

Pessimistic Scenario (SSP3-LHI & RCP6.0)



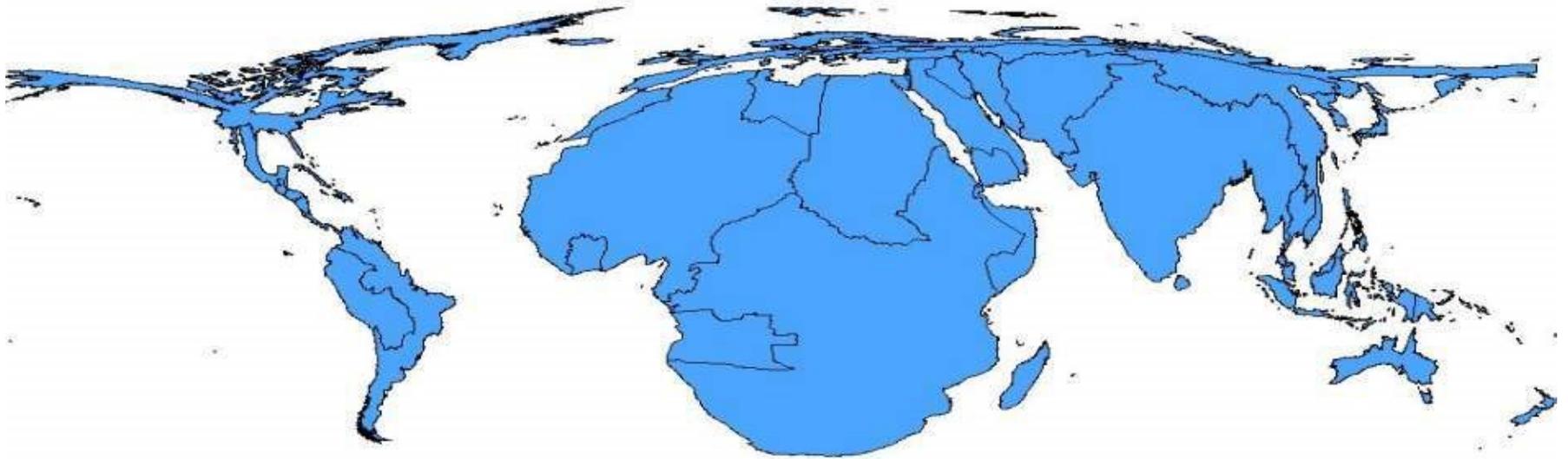
悲観的気温上昇シナリオ

約8.4万人 (95%予測区間 6.8万; 10.0万)

主に、サハラ砂漠以南アフリカと南アジア

# 特に影響を受けやすい人々・地域

マラリア、デング熱、下痢症、低栄養、洪水、熱中症による死亡



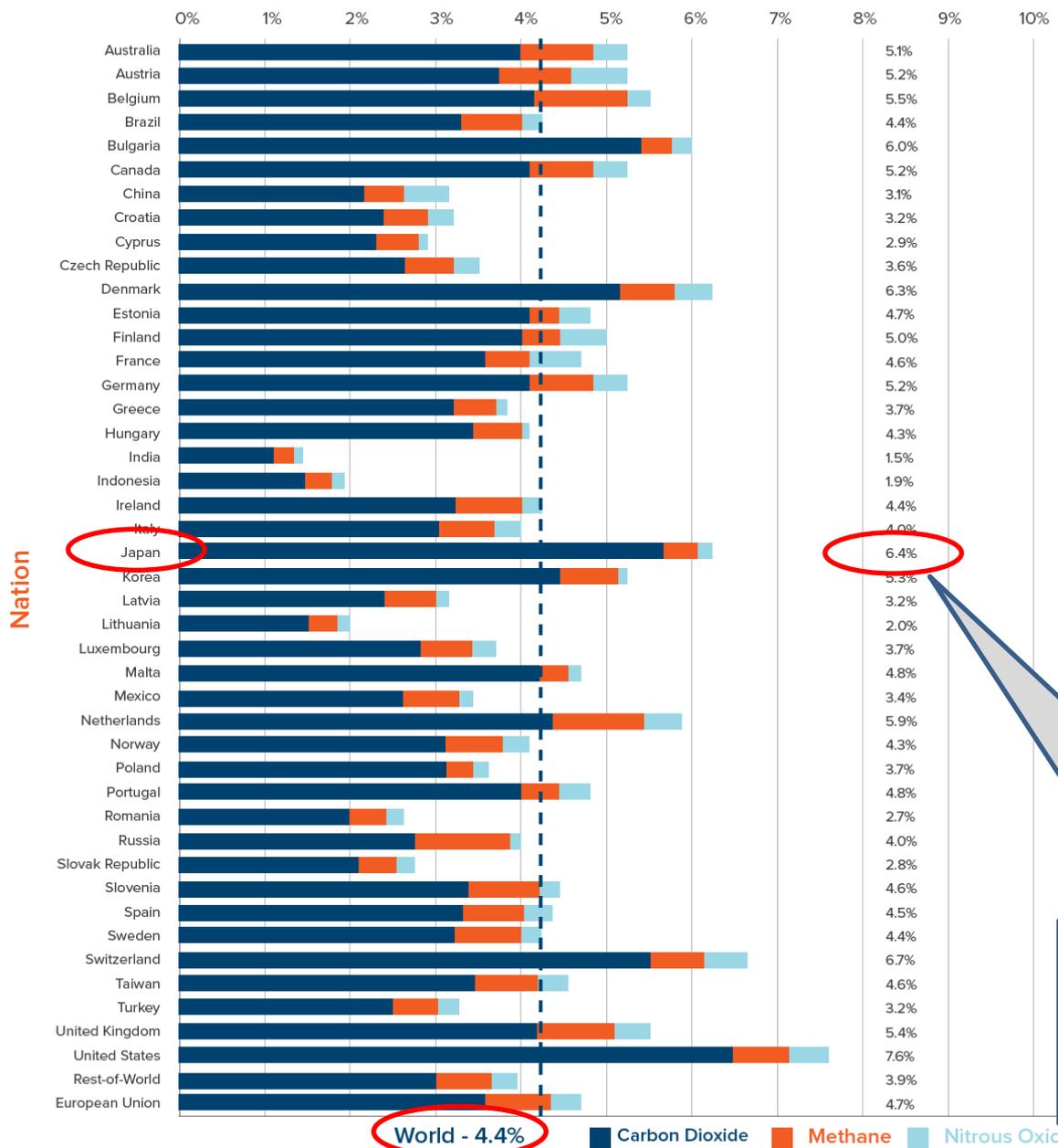
This map shows estimated mortality (per million people) attributable to climate change by the year 2000. Map is a density-equalizing cartogram in which the sizes of the 14 WHO regions are proportional to the increased mortality.

# 緩和策と適応策

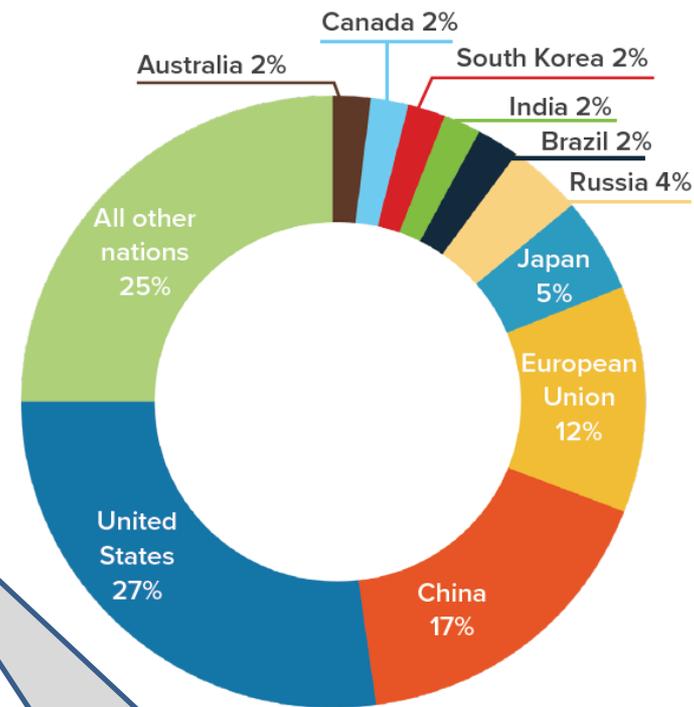
**緩和**： 気候変動の原因となる温室効果ガスの排出削減対策

**適応**： 既に生じている、あるいは、将来予測される  
気候変動の影響による被害の防止・軽減対策





医療関連排出量の  
国別割合



Top ten emitters as percentage of global health care footprint.

各国の排出量に占める医療  
関連排出量の割合  
**日本 6.4%**

Figure 7: Health care footprint as a percentage of national emissions for all nations and regions covered in this study

# コベネフィット

## co-benefits

### 温室効果ガスの排出抑制(緩和策) と 健康増進の一挙両得

- ・自動車から自転車へ  
(**大気汚染とCO<sub>2</sub>排出の同時抑制**、**運動による心肺機能強化**)
- ・肉の消費を減らす(特に反芻動物)  
(**低炭素で健康な食品**へ転換)

# 世界で多くの人々が苦しんでいる病気は 気象に影響されやすい

## 年間死亡数

- 低栄養：25万人
- 下痢症：153万人
- マラリア：64万人

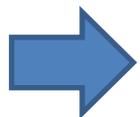
[GBD 2019]

## 気象との関連

穀物生産

洪水・渇水・病原体増殖

媒介蚊・マラリア原虫



現在行われている対策をもっと広げ、よくする。





OPEN ACCESS



For numbered affiliations see end of article.

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<http://dx.doi.org/10.1136/bmj.n1734>

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

Wealthy nations must do much more, much faster

The NEW ENGLAND JOURNAL of MEDICINE

EDITORIALS



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

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



The UN General Assembly in September, 2021, will bring countries together at a critical time for marshalling

renal function loss, dermatological malignancies, tropical infections, adverse mental health outcomes, pregnancy

Published Online  
September 6, 2021  
<https://doi.org/10.1016/>

# The health case for urgent action on climate change

Health professionals have a leading role

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 Andy.Haines@lshtm.ac.uk

It is about 30 years since warnings first appeared in prominent journals about the potential for large and wide ranging effects on human health from climate and other global environmental changes.<sup>1-3</sup> To date, global action to tackle these burgeoning threats remains inadequate both in scale and in speed. For example, the pledged nationally determined contributions to reducing greenhouse gas emissions—as enshrined in the 2015 Paris Agreement on Climate Change—are a first step, but even if fully implemented (and this is by no means certain), global average temperatures are still likely to be more than 3°C above pre-industrial levels by the end of the century.<sup>4</sup> With higher levels of heating expected over land mass than

In early 2019, *The BMJ* issued a call for papers that dealt with the challenges of the Anthropocene for human health and identified opportunities for action.<sup>10</sup> For example, phasing out fossil fuels could yield major near term health benefits from reduced air pollution, potentially averting millions of premature deaths annually,<sup>11</sup> as well as reducing greenhouse gas emissions and thus the risks of dangerous climate change. In recent months, several research papers submitted in response to the call have appeared in *The BMJ* and have discussed the effects on health of predominantly anthropogenic pollutants—including ozone and fine particulate air pollution.<sup>12-14</sup> We are now fully launching the series by publishing several more articles that emphasise potential ways to reduce the environmental footprint of society and improve public health (<https://www.bmj.com/anthropocene>), with more to follow in the next few months. These will include papers on decarbonising the NHS; capitalising on the health (co)benefits of “low

With health services accountable for about 4.4% of total greenhouse gas emissions globally (6.3% for the NHS and Public Health England in the UK),<sup>16</sup> we clearly need simultaneous transformational change in other sectors—such as energy, food, housing and transport—to make a meaningful contribution to protecting health. This will make the leading role of health professionals in tackling these issues even more pivotal for public health impact.

We hope that this series will provoke debate and discussion, and stimulate more inquiry in this critical area, especially with a focus on solutions. However, there is much more to be done. In November this year the 26th Conference of the Parties (COP) is scheduled to be hosted in Glasgow.<sup>17</sup> This will be an important opportunity to raise the profile of the interlinkages between climate change and health, and stress the opportunities—in various sectors—to contribute to protecting health in the Anthropocene.

# まとめ

- 気候変動の健康影響はすでに起こっている。
- すべての地域が影響を受けるが、開発途上国で最も顕著な影響が予測されている。
- 社会レベルでの適応(緩和に加えて)策が必要である。
- 将来の影響を正確に予測するのは難しい。
- 未来は変えられる=わたし達のおこない次第。