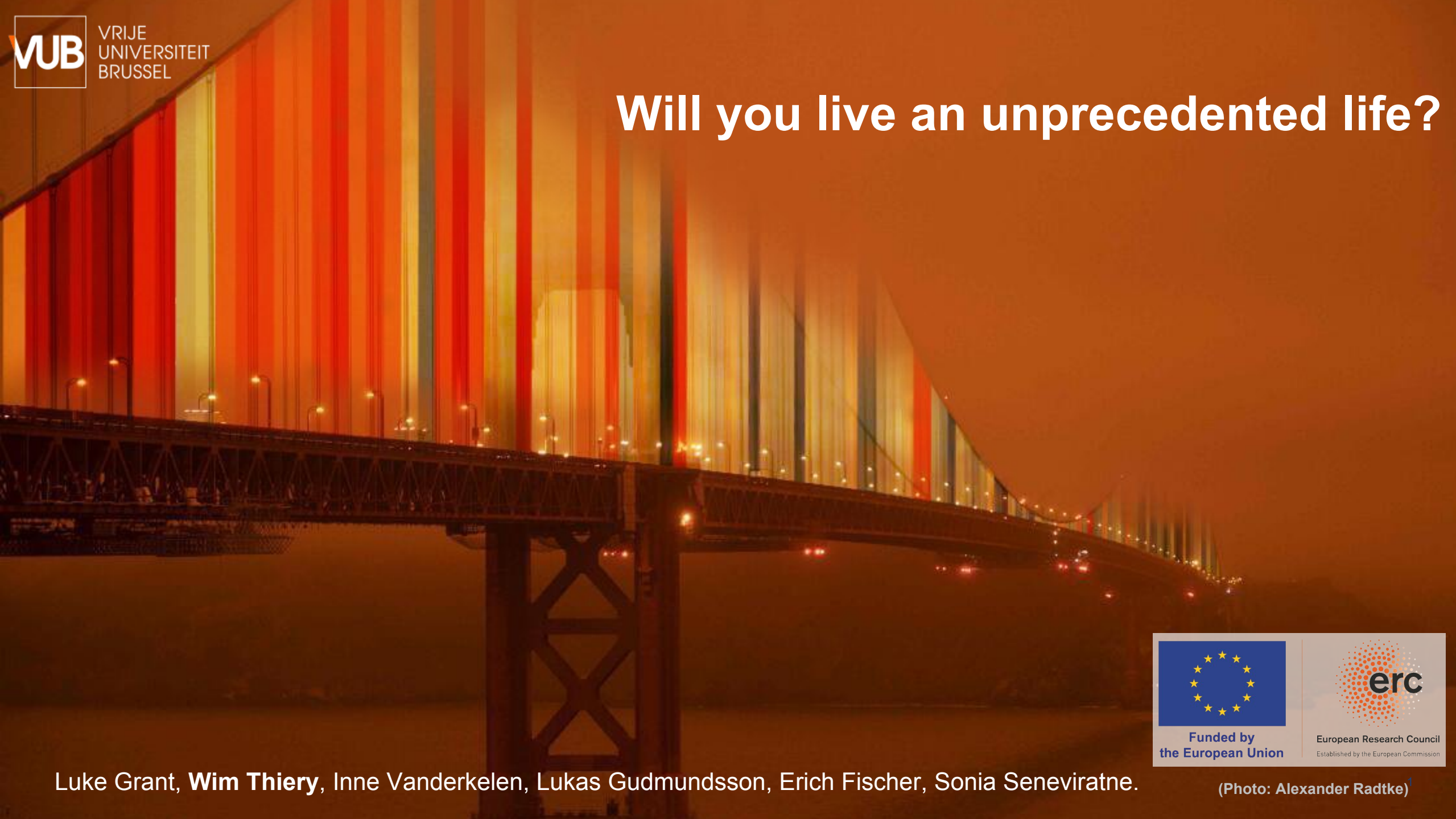
VRIJE UNIVERSITEIT BRUSSEL

Will you live an unprecedented life?

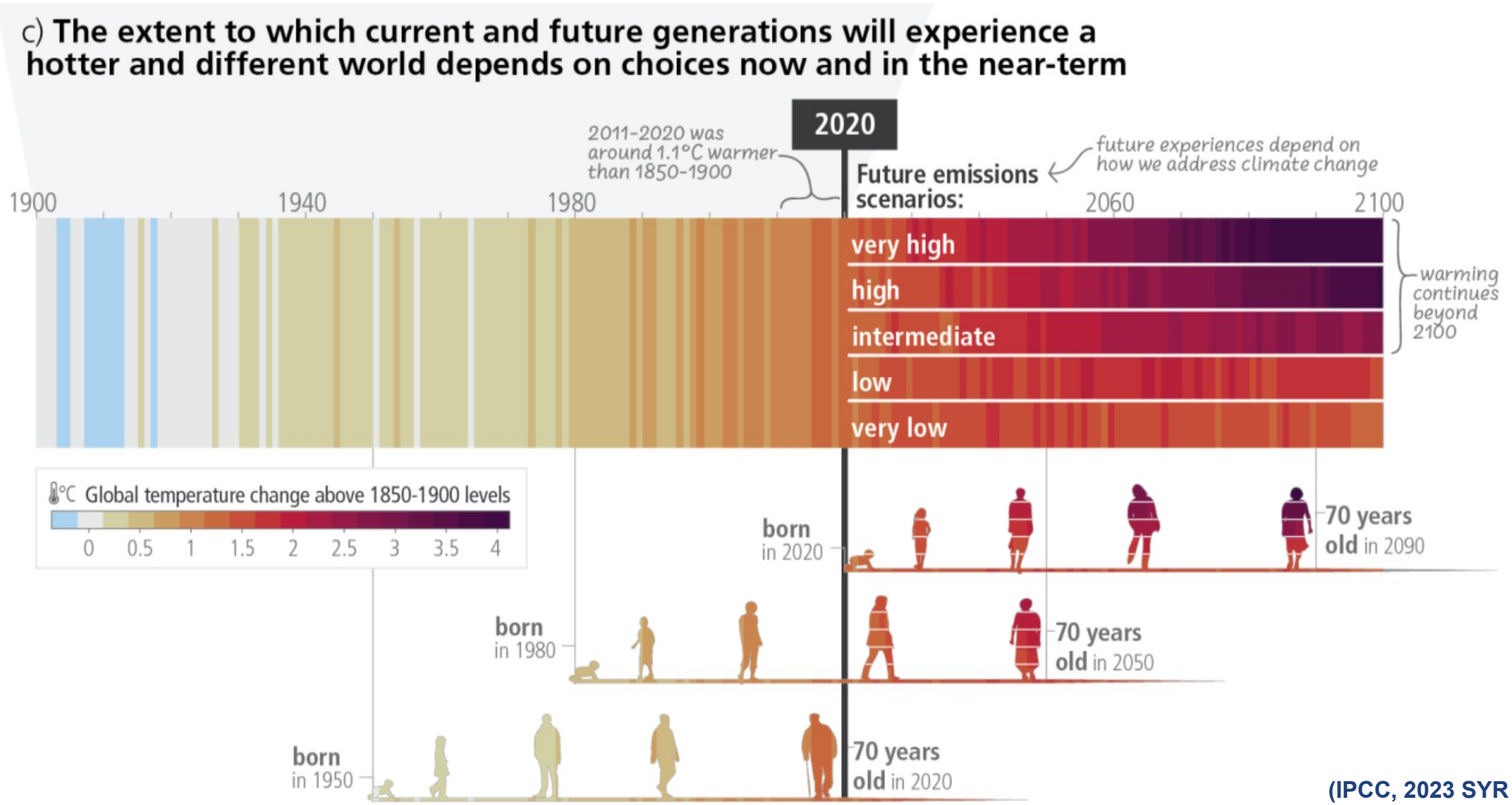


Funded by the European Union

European Research Council
Established by the European Commission

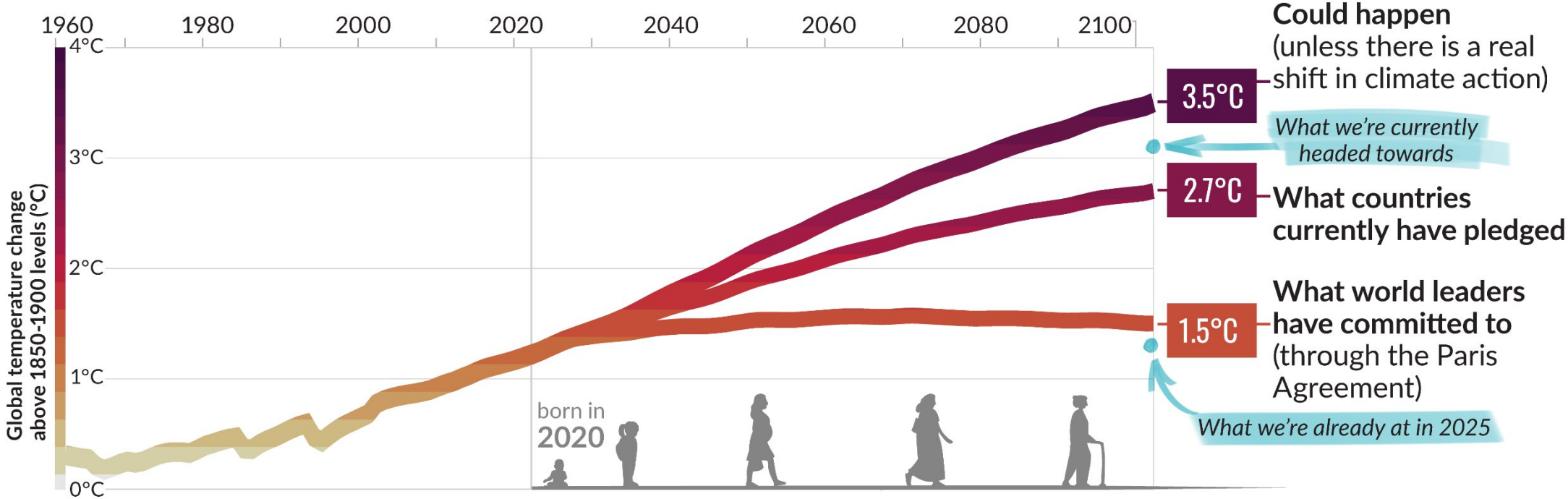
Luke Grant, **Wim Thiery**, Inne Vanderkelen, Lukas Gudmundsson, Erich Fischer, Sonia Seneviratne.

(Photo: Alexander Radtke)[1]



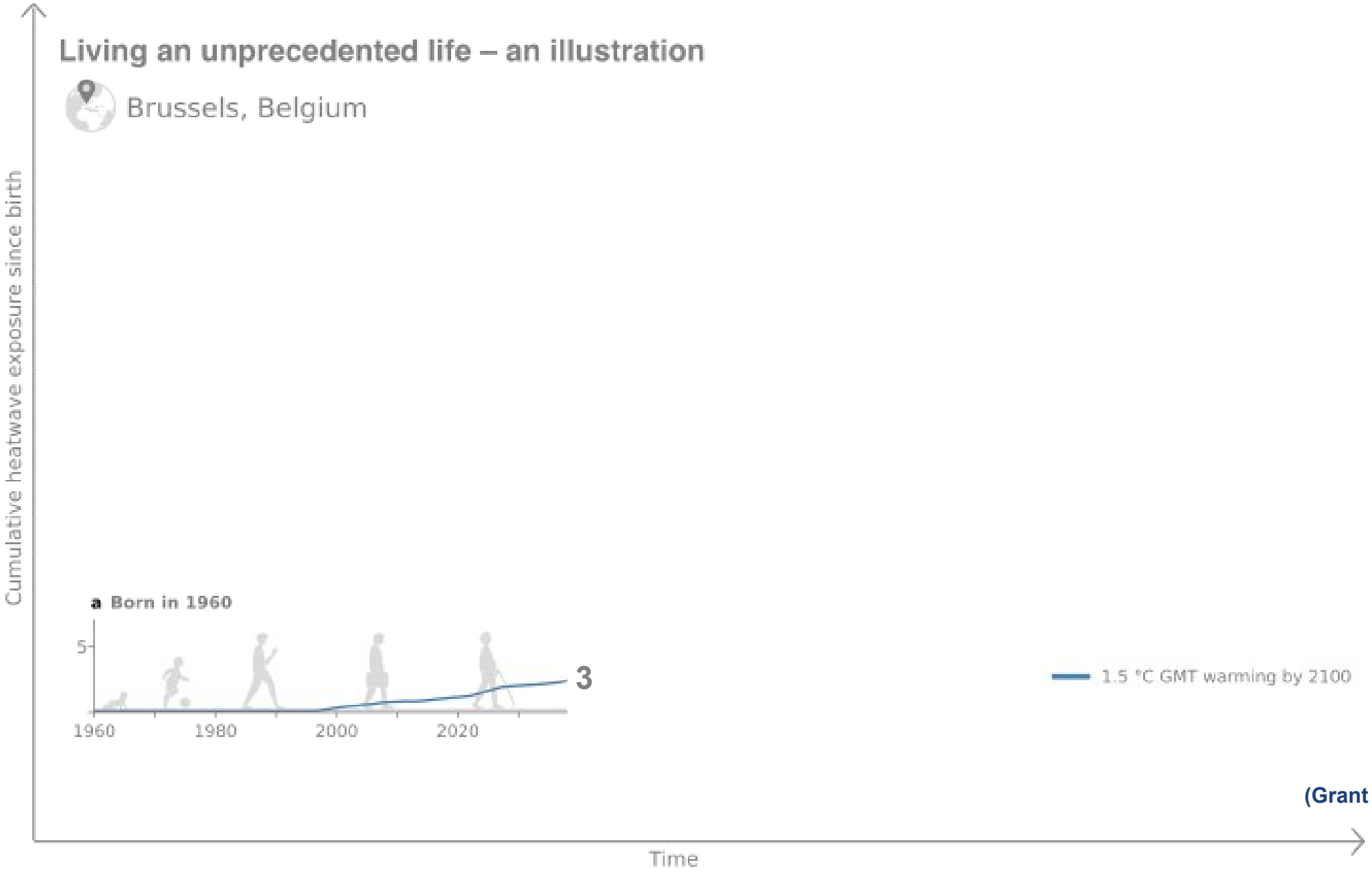
(IPCC, 2023 SYR SPM)

Three temperature scenarios show how the future will impact children

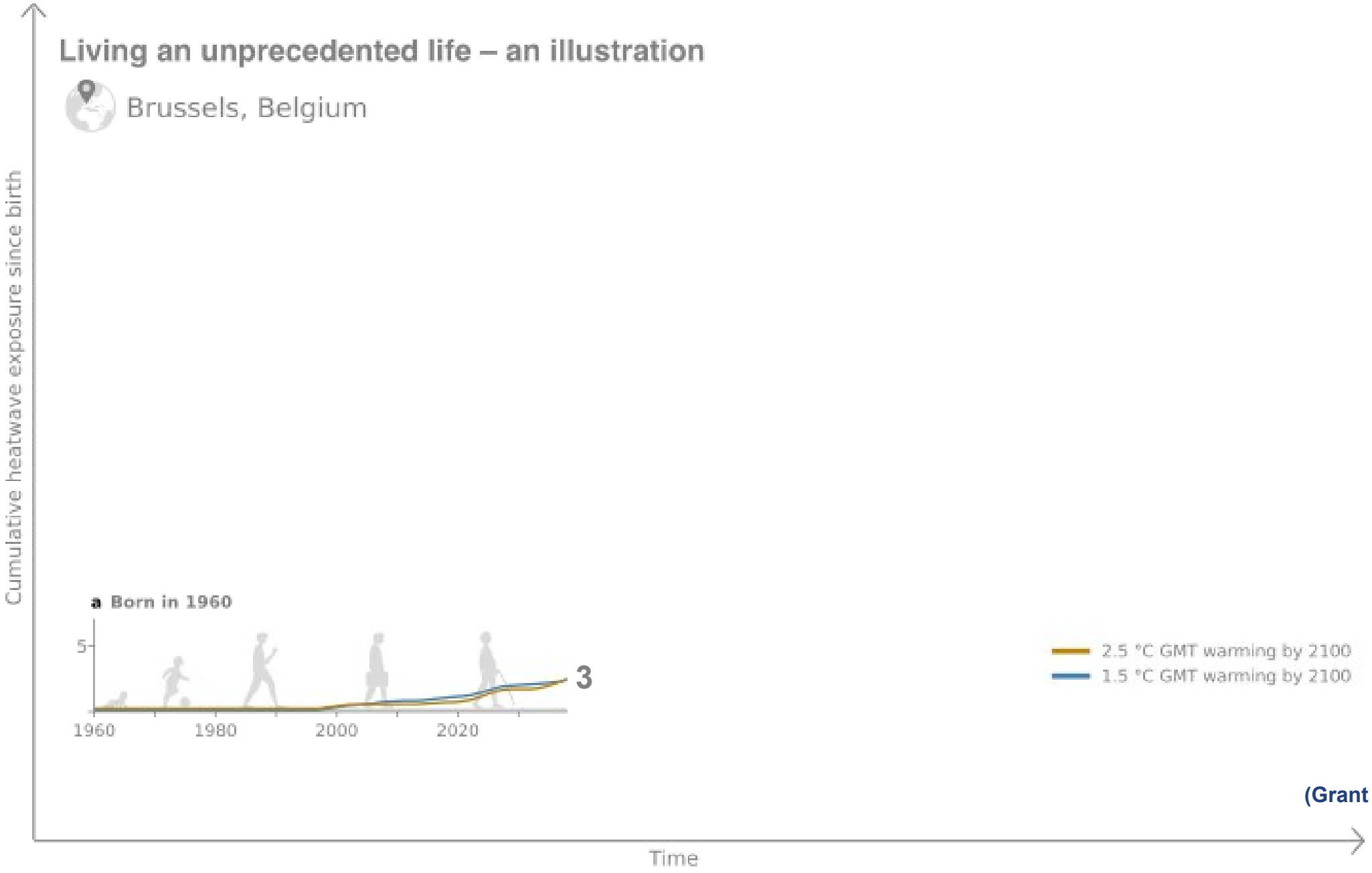


Temperature scenarios from this paper.

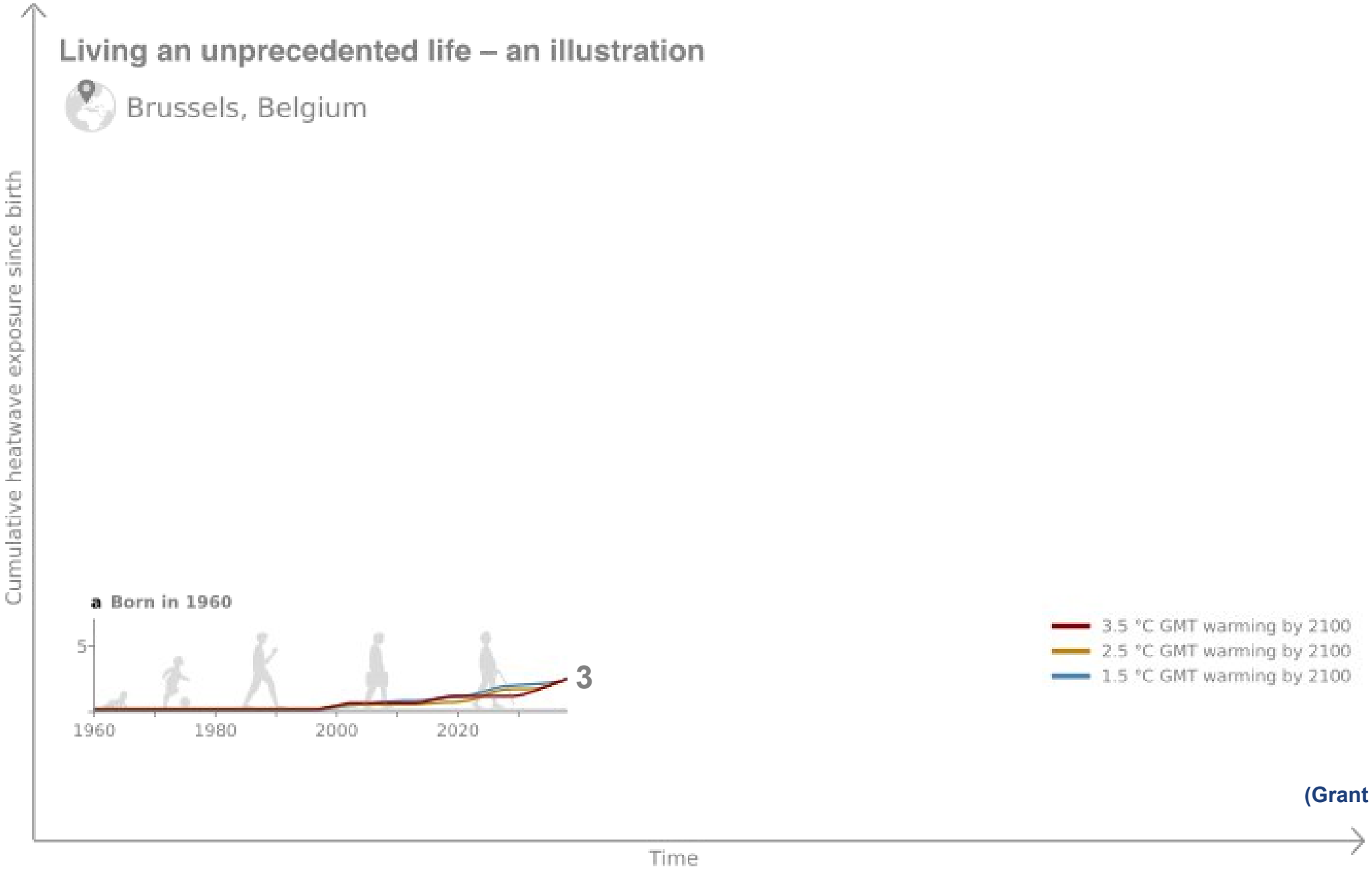
(Save the Children, 2025)



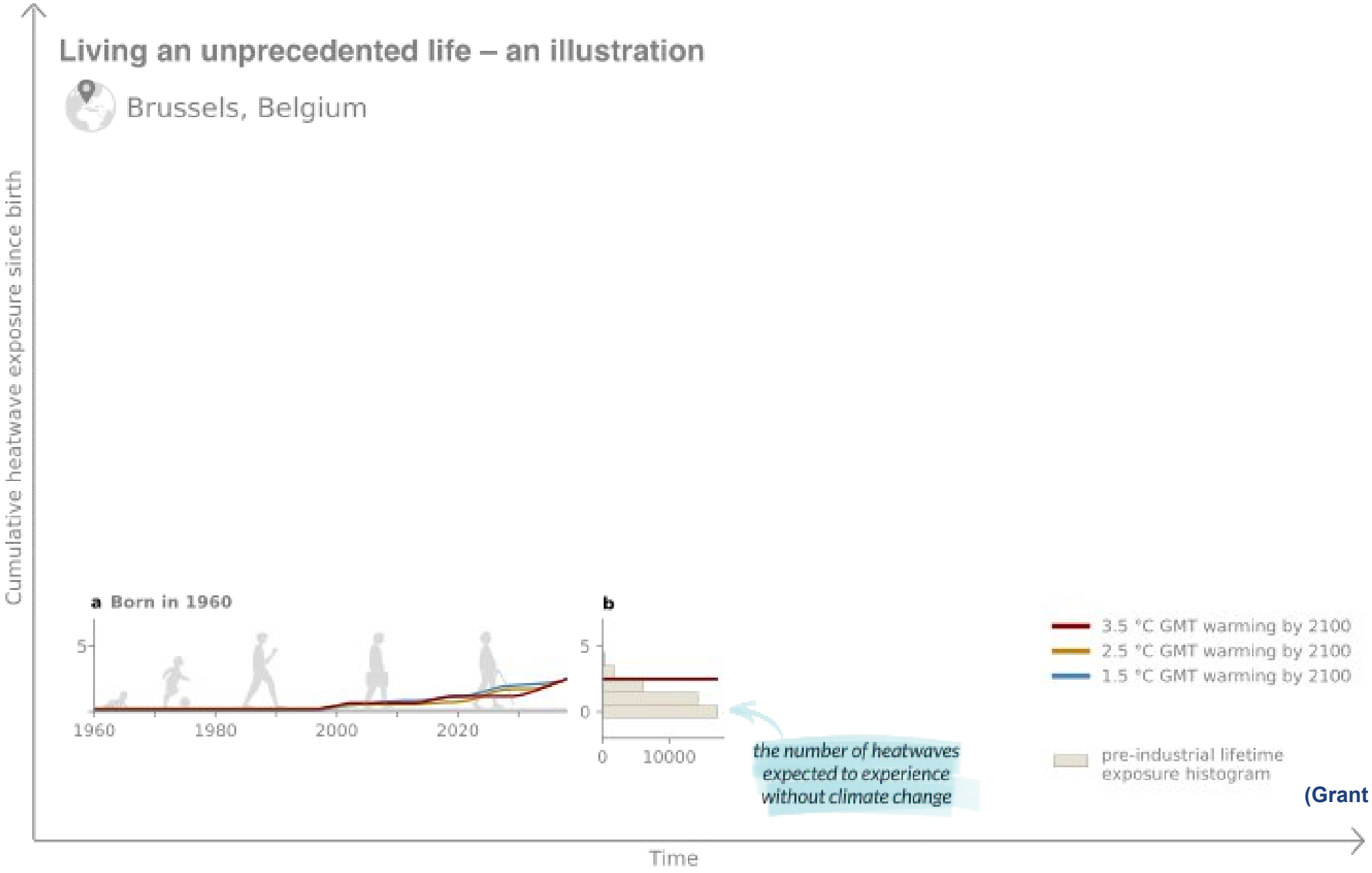
(Grant et al., in press)



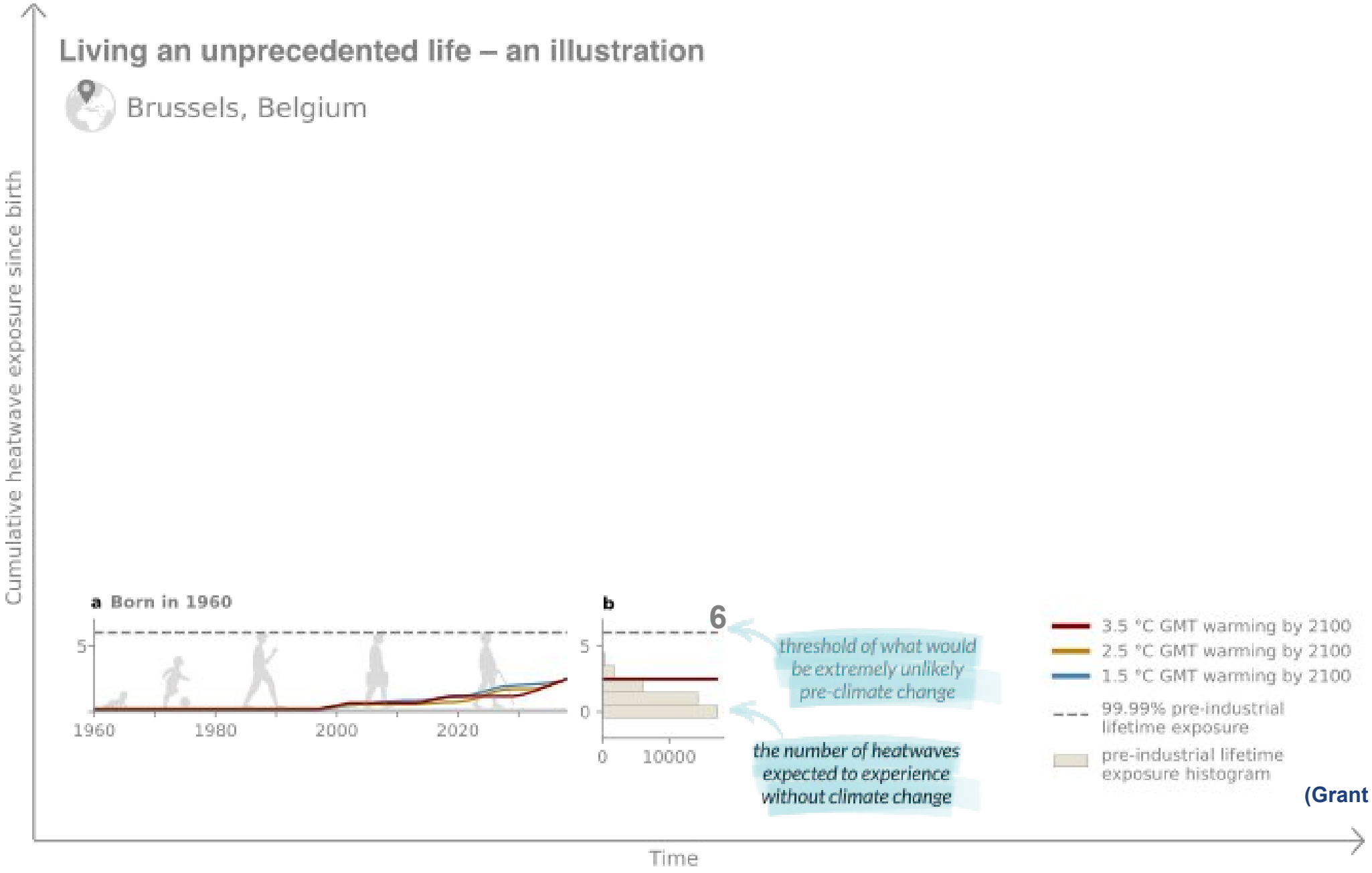
(Grant et al., in press)



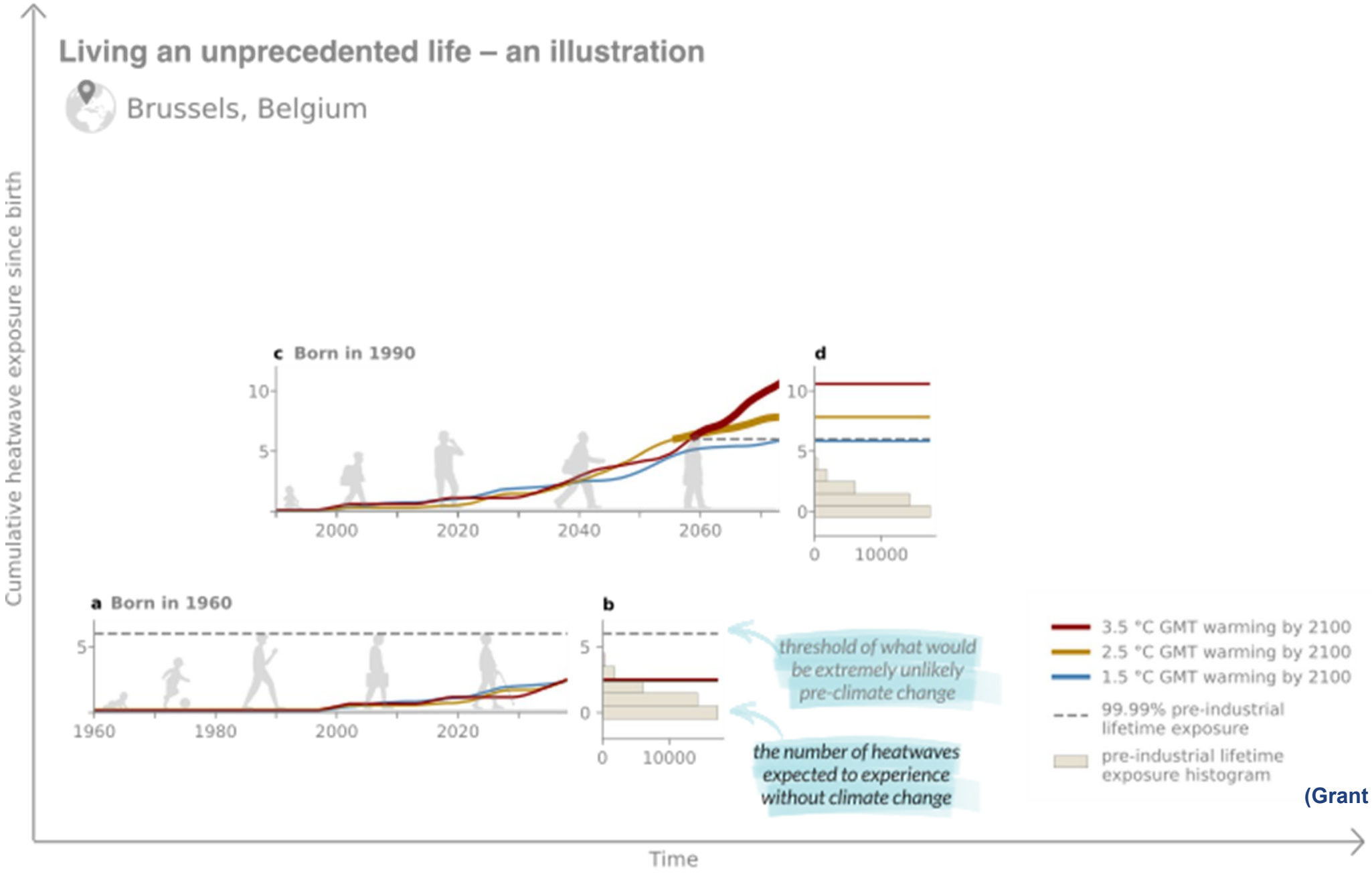
(Grant et al., in press)



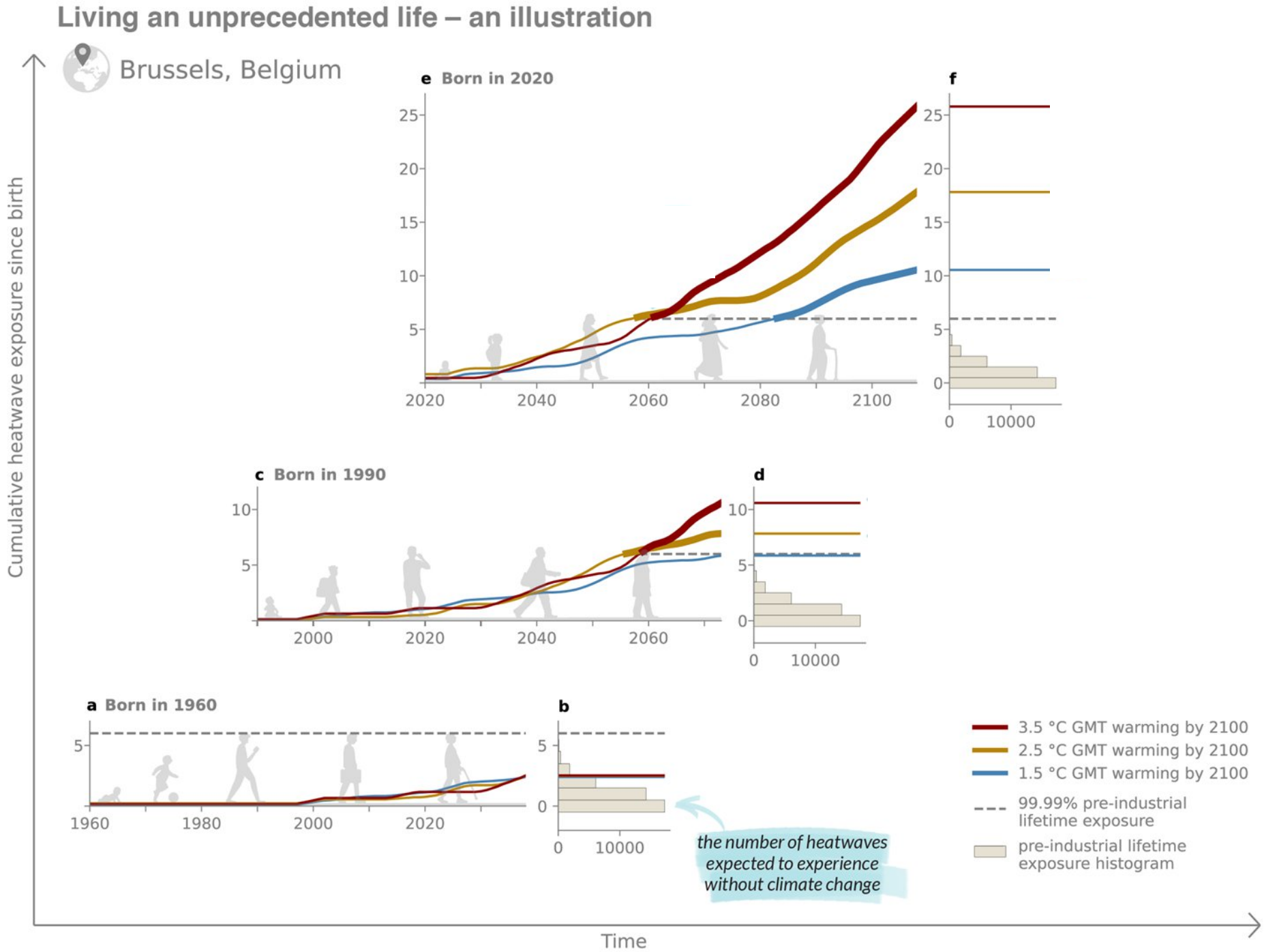
(Grant et al., in press)



(Grant et al., in press)



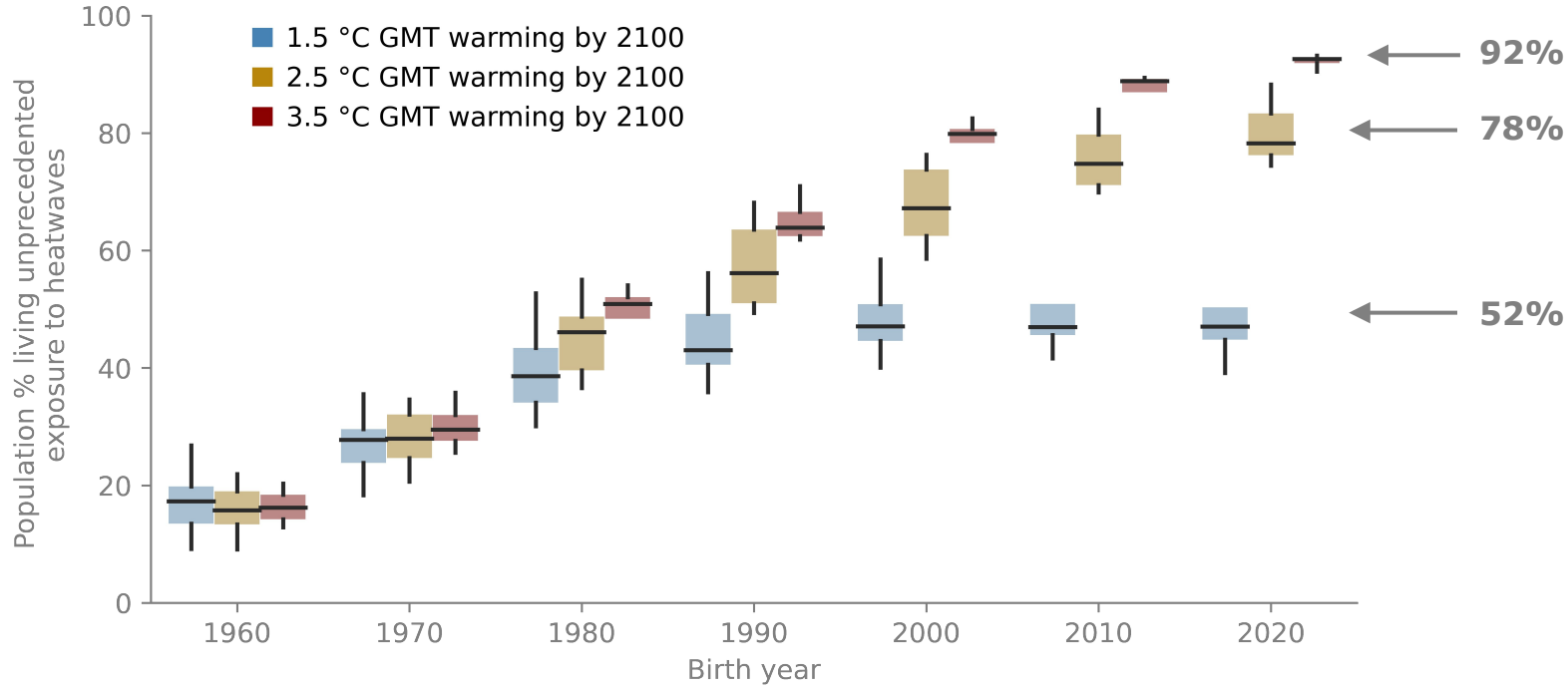
(Grant et al., in press)



(Grant et al., in press)

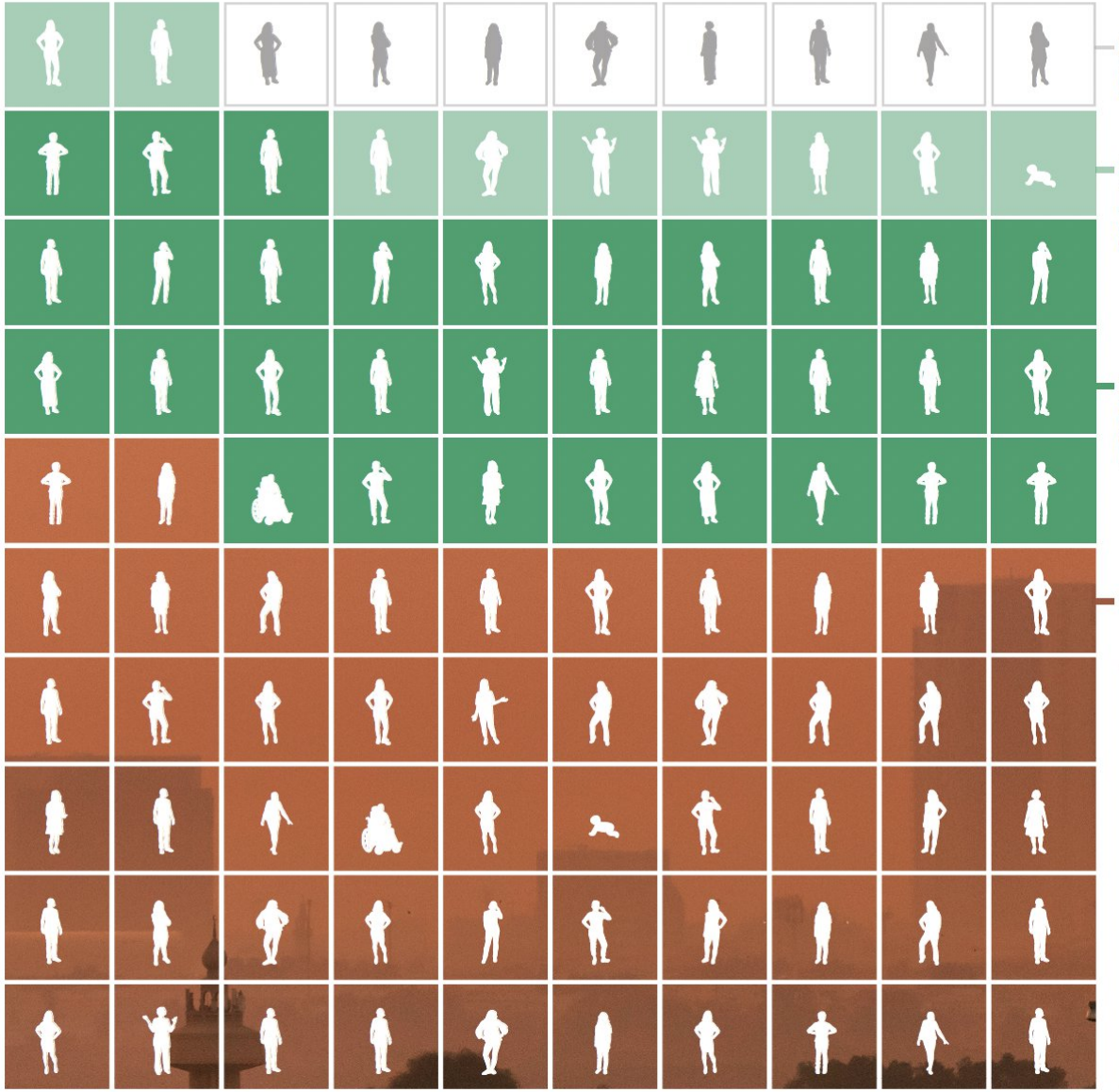
Fraction of global population

facing unprecedented heatwave exposure



(Grant et al., in press)

Of 100 children, limiting warming to 1.5°C protects 40 from unprecedented lifetime heatwave exposure



8 children not impacted
(up to 3.5°C of warming)

9 children protected by limiting warming to 2.7°C
(who would be impacted at 3.5°C)

31 children protected by limiting warming to 1.5°C
(who would be impacted at 2.7°C)

52 children impacted at 1.5°C

Adapting to increasing heatwaves

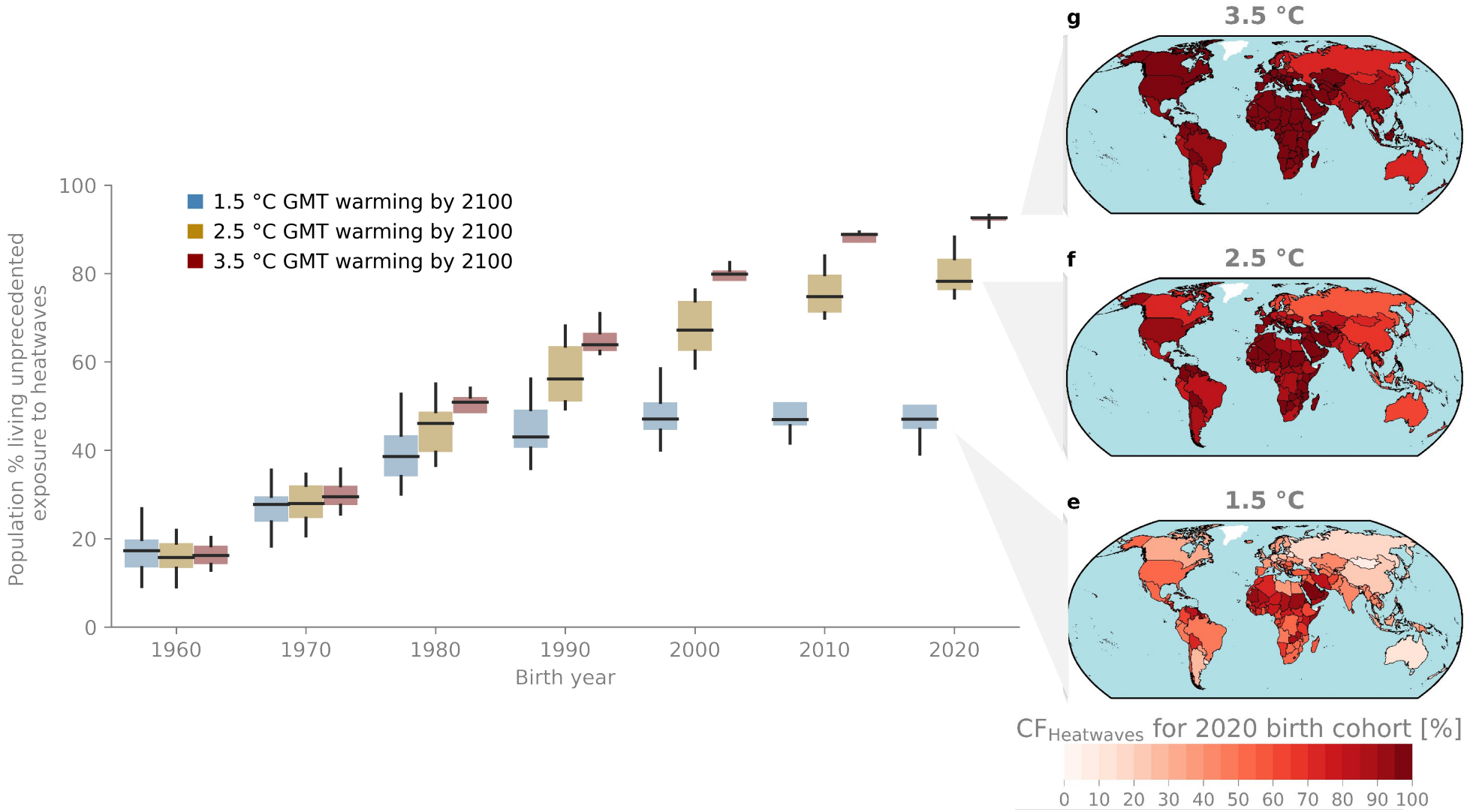
Strategies & investments needed in:

- Public health
- Urban & rural design
- Community heatwave awareness
- Early preventative action
- Emergency response
- Cooling infrastructure
- Heat alert systems
- Green spaces
- Child-centred nature-based solutions

e the Children, 2025)

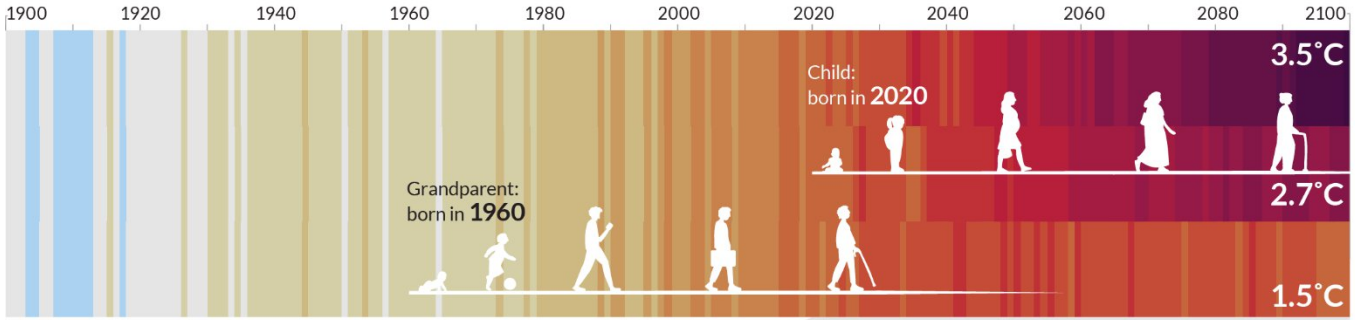
Fraction of global population

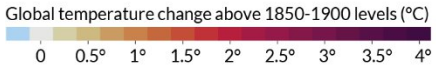
facing unprecedented heatwave exposure



(Grant et al., in press)

Global temperatures differ across the lifetime of two generations





Warming stripes from 2023 IPCC Synthesis Report GHG emissions scenarios: high (SSP3-7.0) [3.6°C], intermediate (SSP2-4.5) [2.7°C], and very low (SSP1-1.9) [1.5°C].

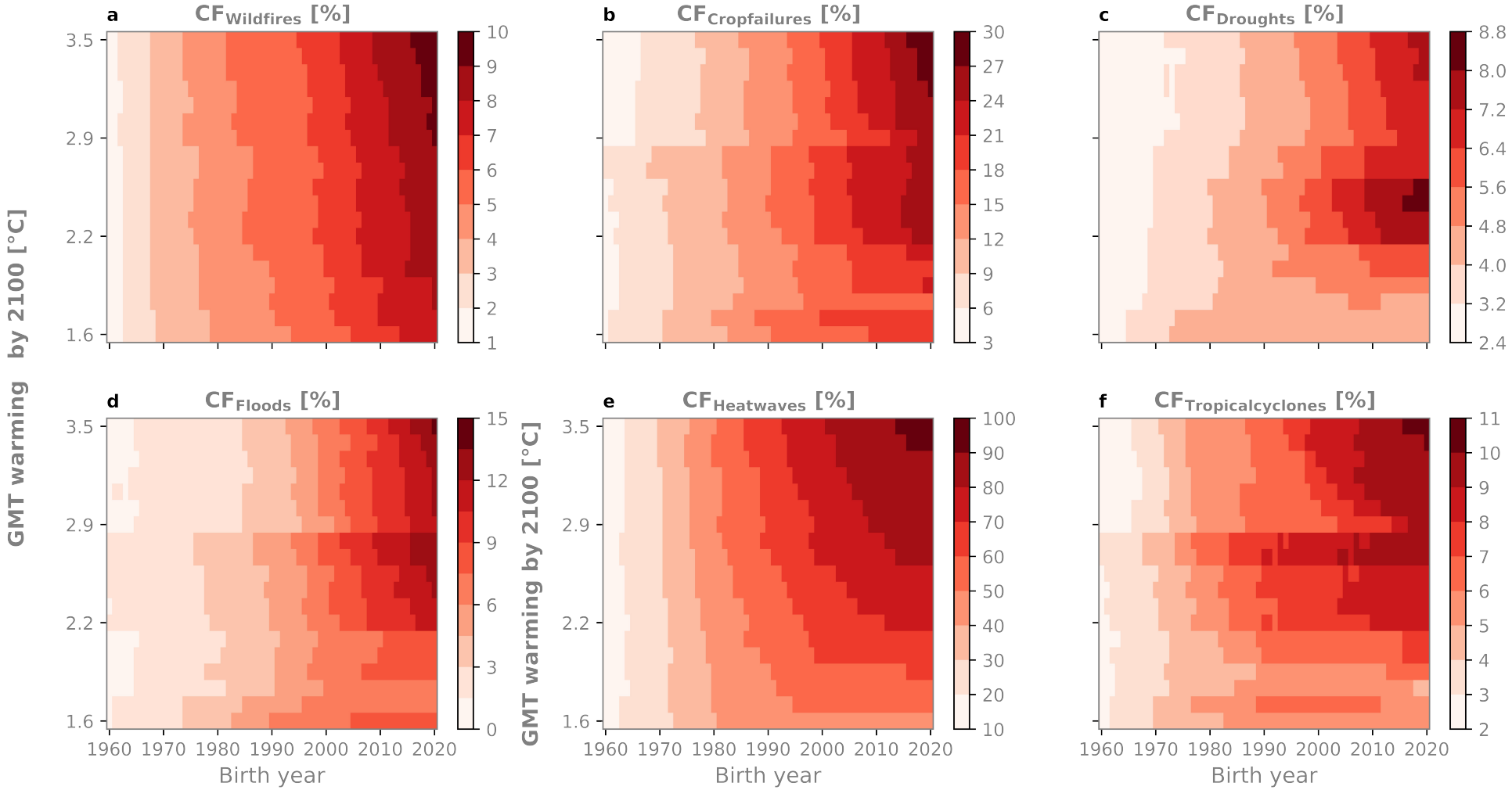
In a world without climate change, there would only be a 1 in 10,000 chance of experiencing this level of unprecedented exposure

Throughout their lifetimes, children born from today will experience new levels of climate extremes never seen before

(Save the Children, 2025)

Fraction of global population

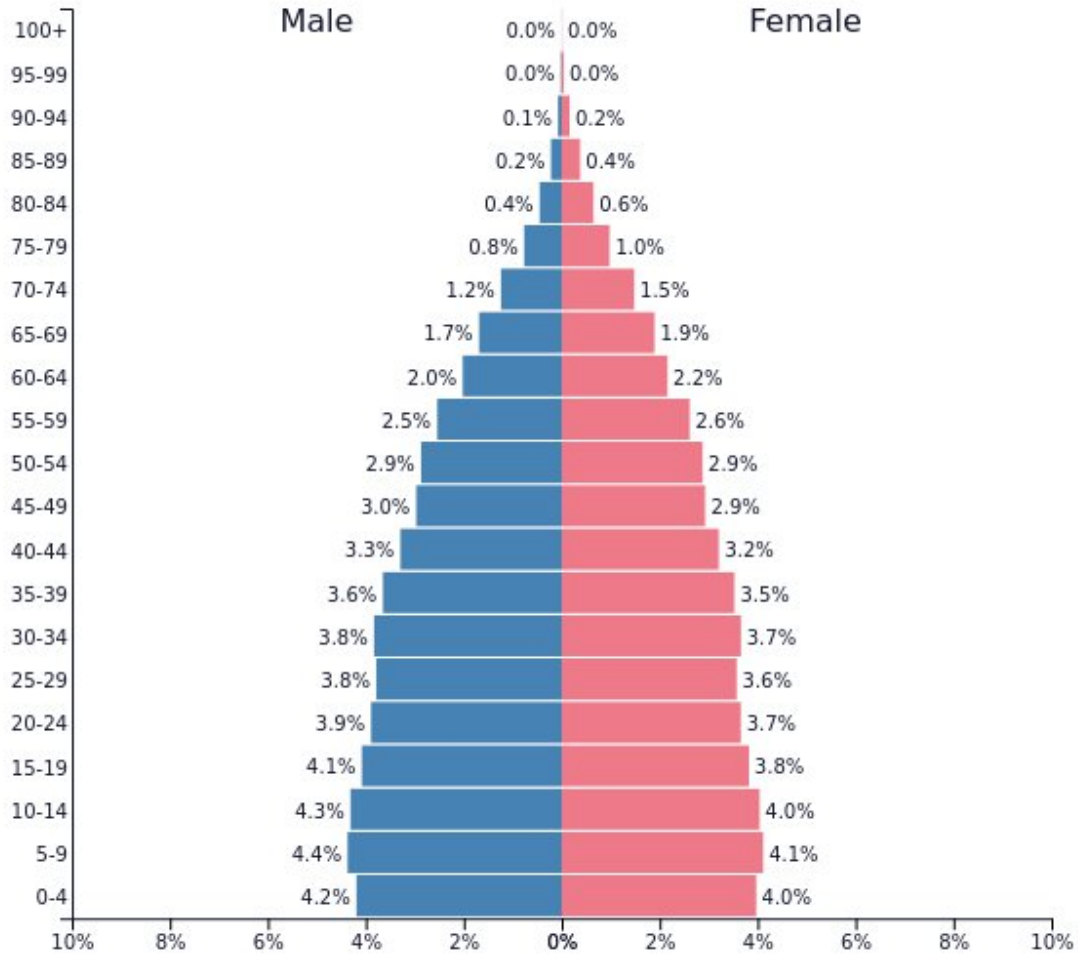
facing unprecedented exposure to climate extremes



(Grant et al., in press)

You know this one from high school

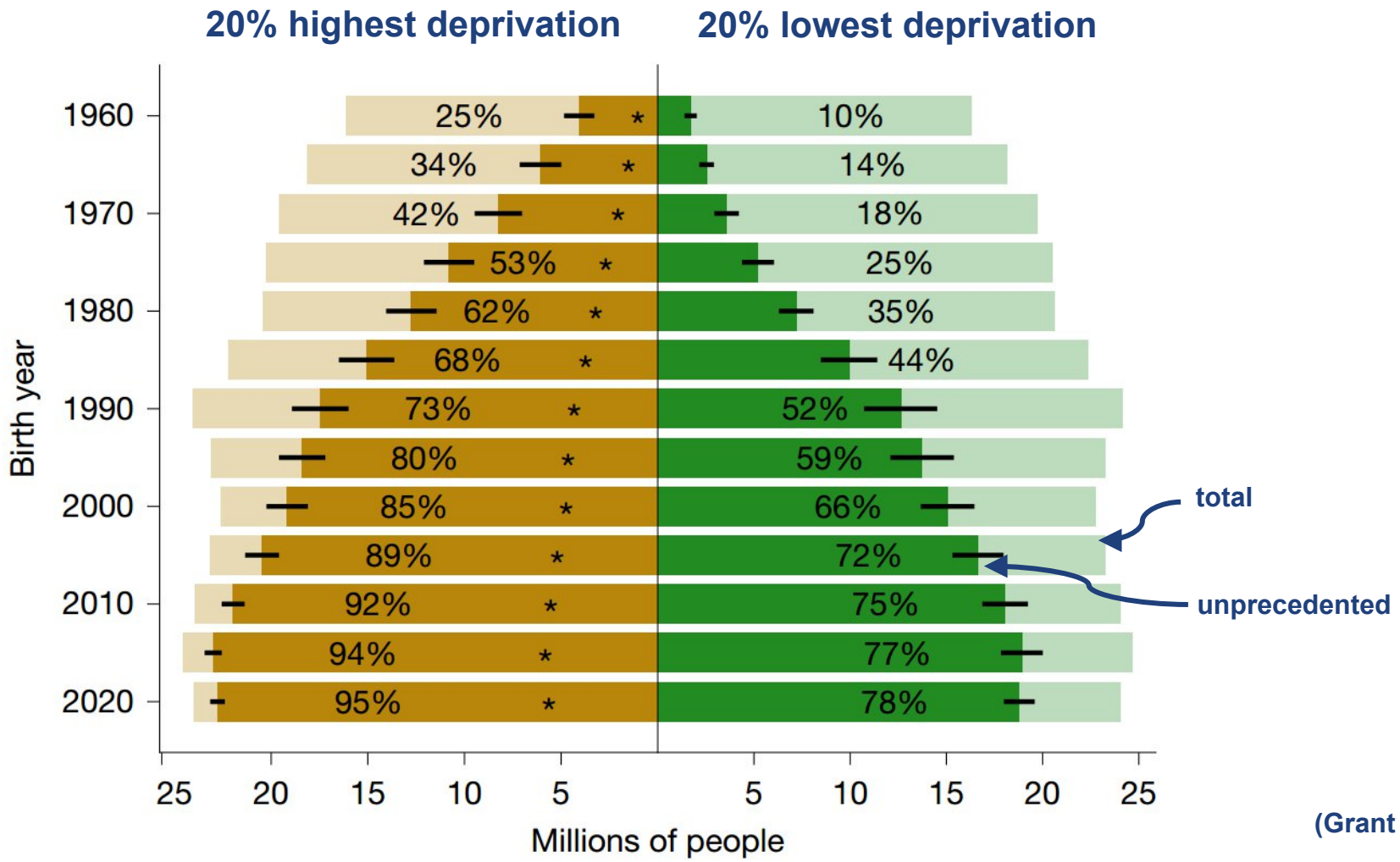
the age pyramid



(https://www.populationpyramid.net/)

You normally don’t know this one from high school

the unprecedented life pyramid



(Grant et al., in press)

outcome

Article

nature

Global emergence of unprecedented lifetime exposure to climate extremes

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Check for updates

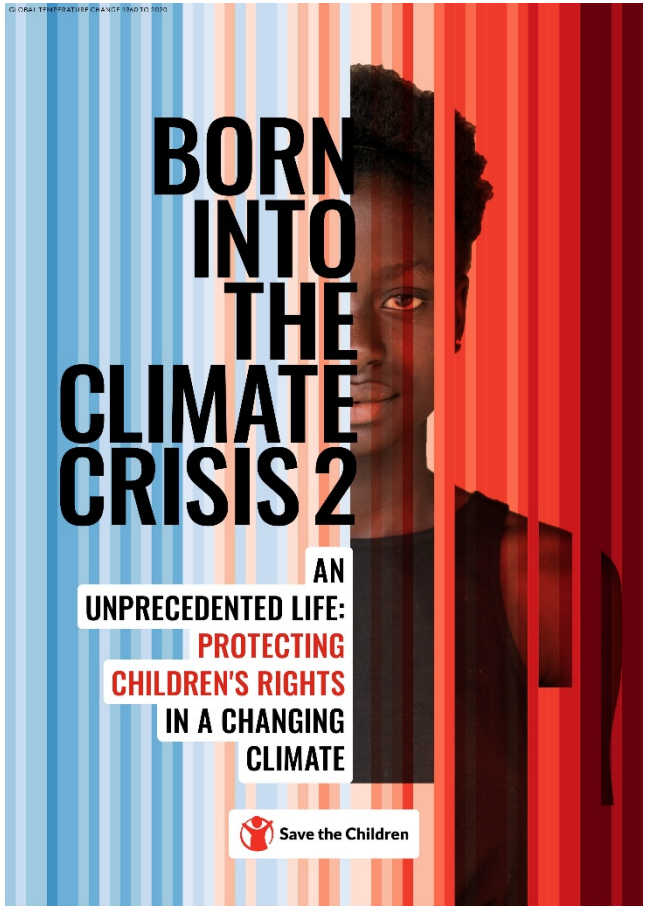
Luke Grant[1,2✉], Inne Vanderkelen[1,3,4], Lukas Gudmundsson[5], Erich Fischer[5], Sonia I. Seneviratne[5] & Wim Thiery[1]

Climate extremes are escalating under anthropogenic climate change[1]. Yet, how this translates into unprecedented cumulative extreme event exposure in a person's lifetime remains unclear. Here we use climate models, impact models and demographic data to project the number of people experiencing cumulative lifetime exposure to climate extremes above the 99.99th percentile of exposure expected in a pre-industrial climate. We project that the birth cohort fraction facing this unprecedented lifetime exposure to heatwaves, crop failures, river floods, droughts, wildfires and tropical cyclones will at least double from 1960 to 2020 under current mitigation policies aligned with a global warming pathway reaching 2.7 °C above pre-industrial temperatures by 2100. Under a 1.5 °C pathway, 52% of people born in 2020 will experience unprecedented lifetime exposure to heatwaves. If global warming reaches 3.5 °C by 2100, this fraction rises to 92% for heatwaves, 29% for crop failures and 14% for river floods. The chance of facing unprecedented lifetime exposure to heatwaves is substantially larger among population groups characterized by high socioeconomic vulnerabilities. Our results call for deep and sustained greenhouse gas emissions reductions to lower the burden of climate change on current young generations.

Climate extremes have detrimental effects on society and are a foremost concern around climate change[1]. Anthropogenic influences have been identified in heatwaves, river floods, droughts, crop failures and certain aspects of wildfires and tropical cyclones[2,3]. With continued atmospheric warming, the intensity, frequency and duration of some of these events are projected to increase further[4–9], with varying lev-

Unprecedented exposure to heatwaves

We illustrate what ULE means for extreme heatwaves in one grid cell (0.5° × 0.5°) located over Brussels, Belgium, for three GMT pathways in which warming above pre-industrial temperatures reaches 1.5 °C, 2.5 °C and 3.5 °C by the year 2100. People born in 1960 and spending their life



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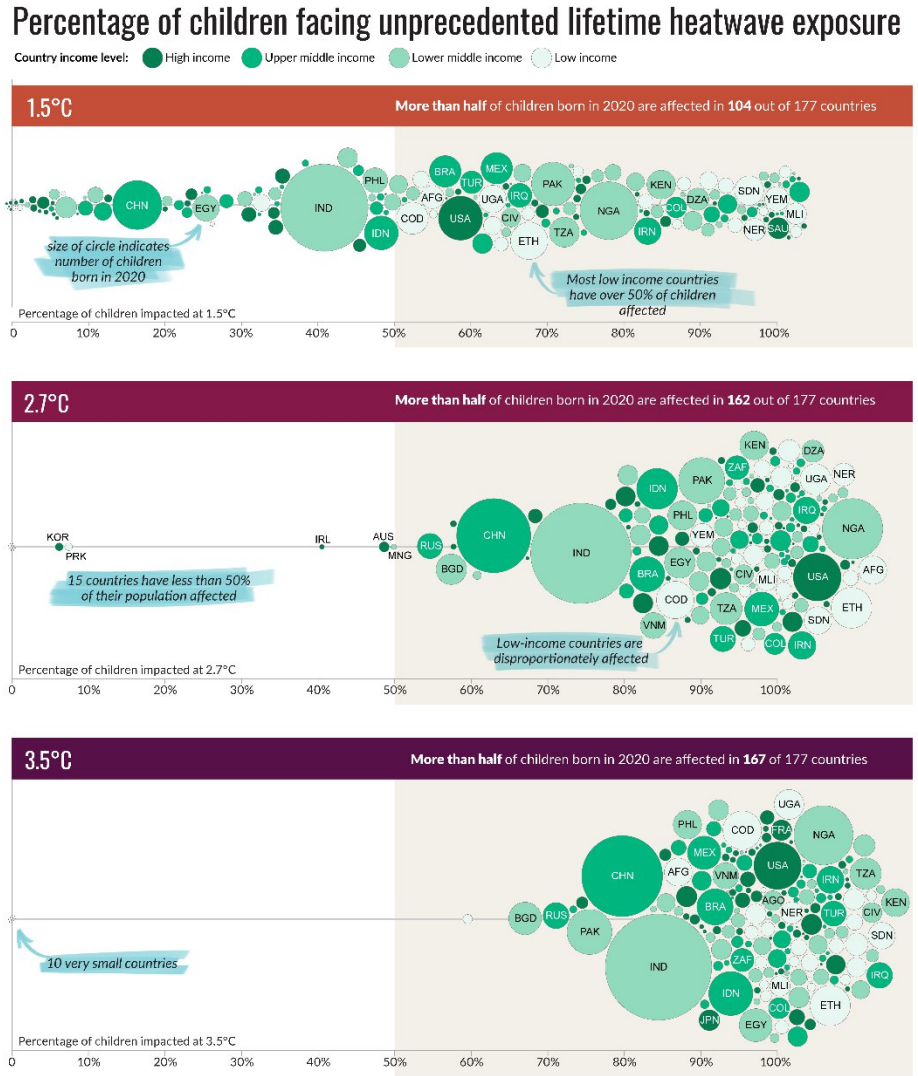
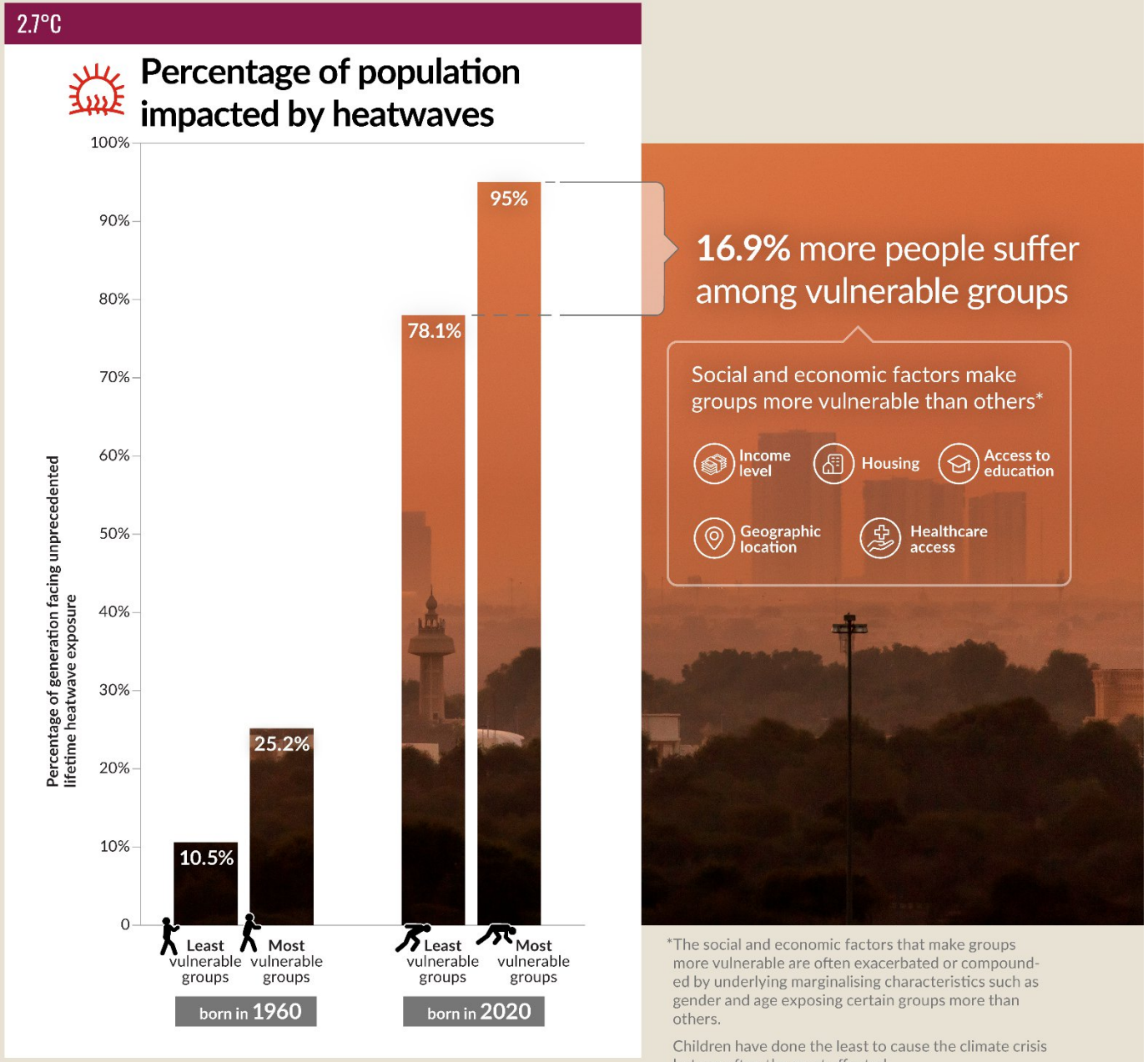
Children in most countries are affected by unprecedented lifetime heatwave exposure when warming passes 1.5°C



(Save the Children, 2025)



Vulnerability from Global Gridded Relative Deprivation Index (GRDI)

(Save the Children, 2025)