TB & climate change

Implications for research, policy, & practice

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We know climate change matters for TB







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We know climate change matters for TB

Displacement



20 million internally displaced due to weather-related hazards

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Food insecurity



733 million faced hunger

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Disruptions



3.5 billion lived in areas highly vulnerable to climate change

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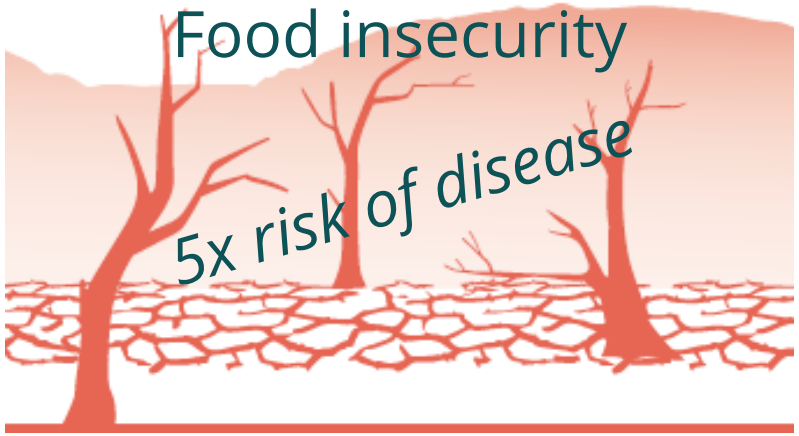
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Displacement



20 million internally displaced due to weather-related hazards

Food insecurity

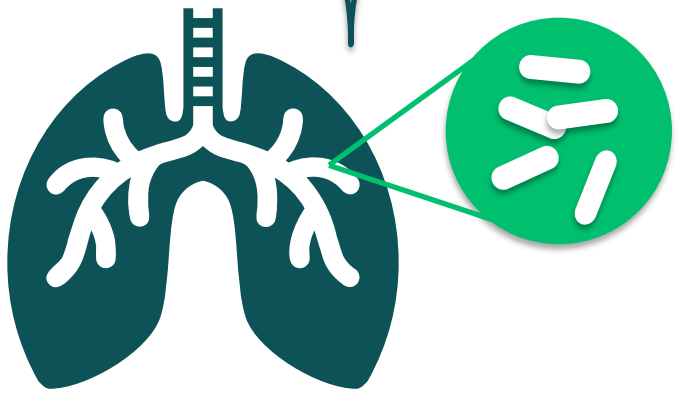


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Disruptions



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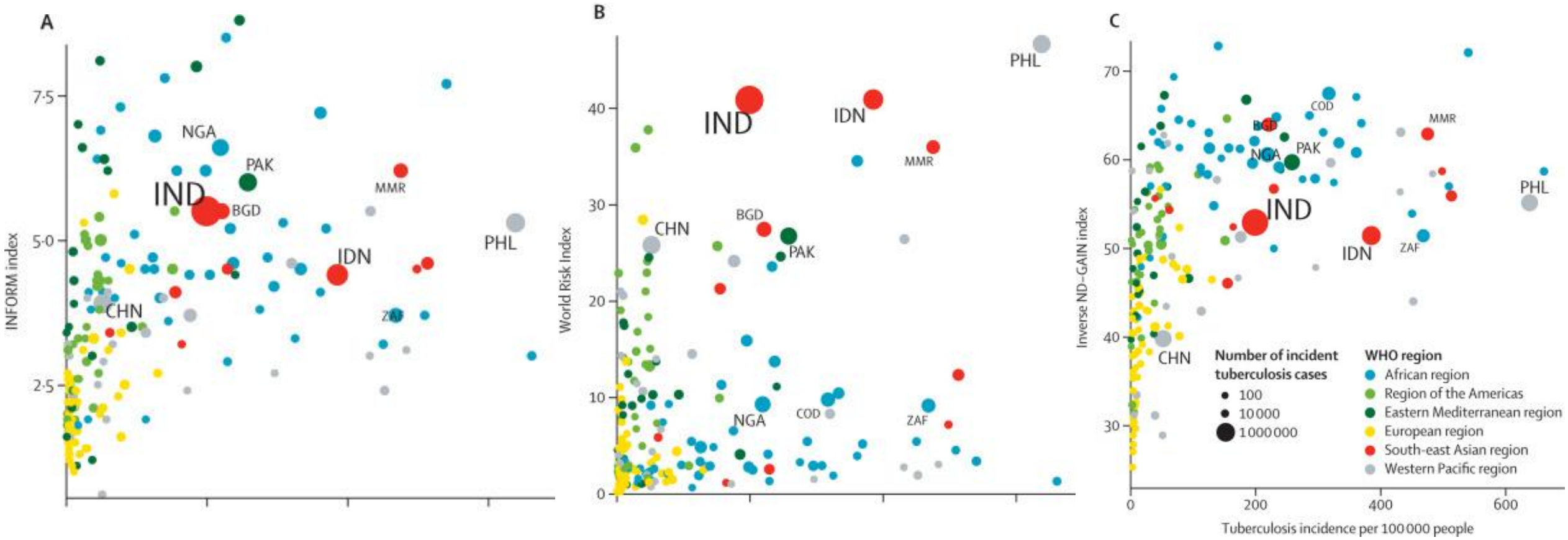


We know climate change matters for TB

Indigenous pop: 300x risk of disease
Arctic: 4x faster warming



We know climate change matters for TB



Saunders et al (2026) Lancet RM

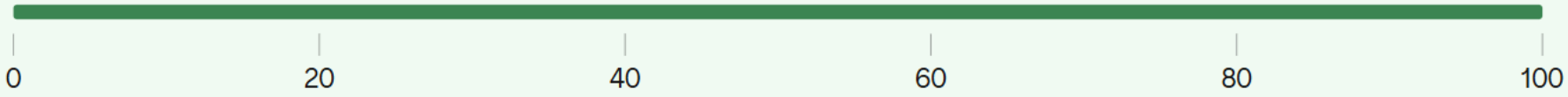
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What % of people with TB live in a country highly vulnerable to climate change?



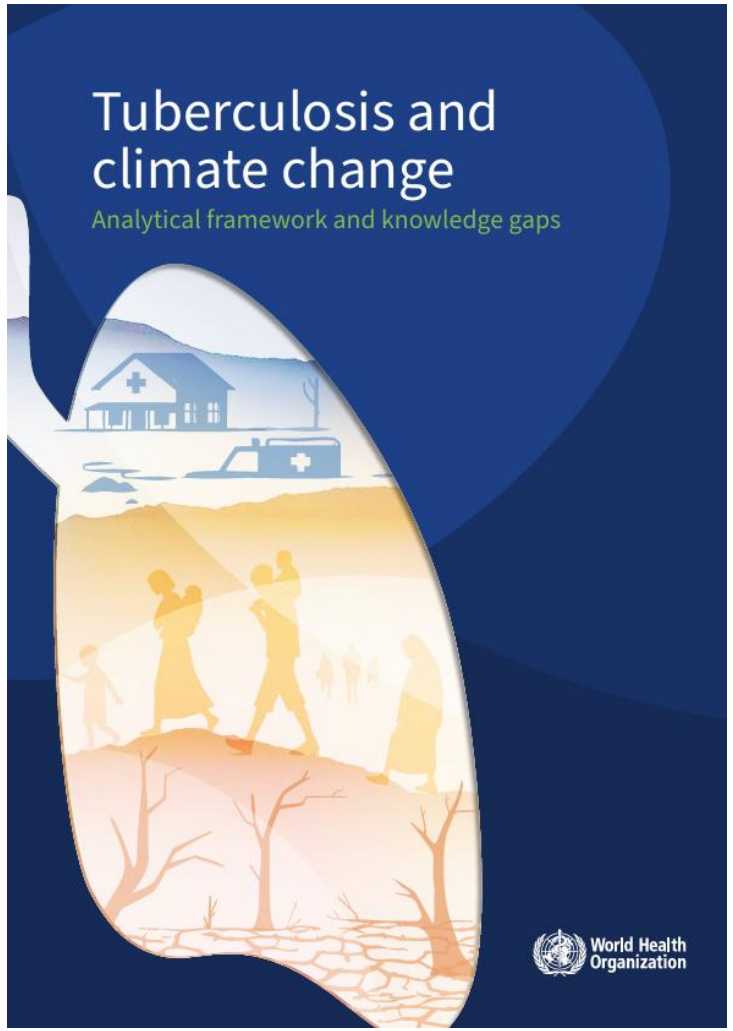
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Waiting for participants

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We need to understand the mechanisms

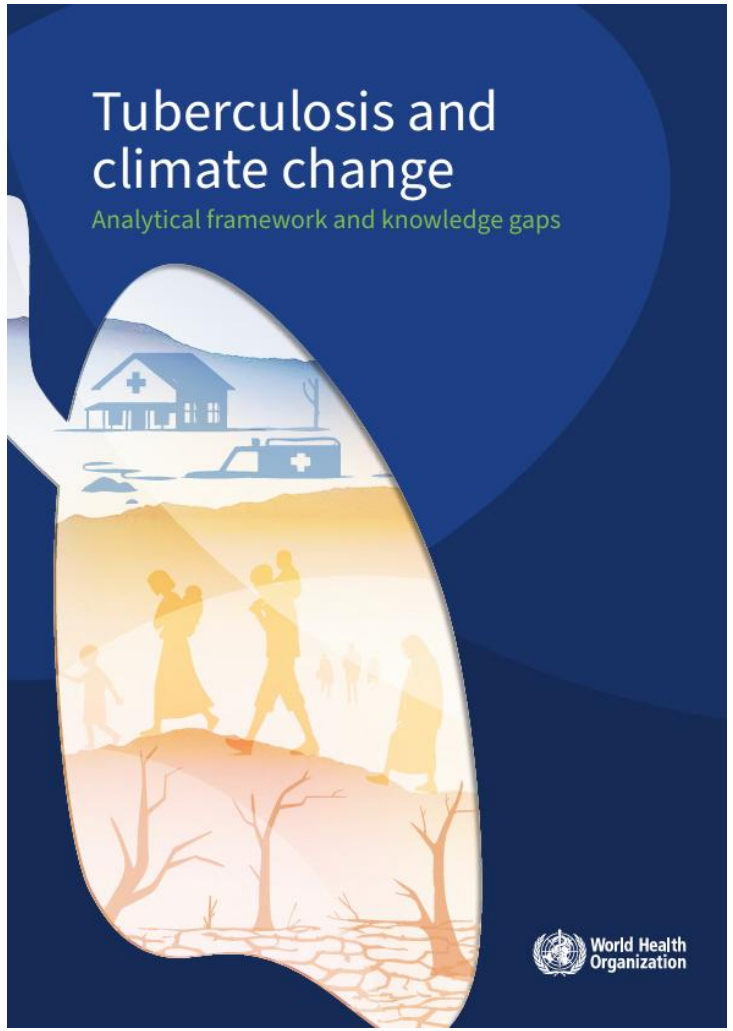


- Expand knowledge
- Provide actionable information
- Raise awareness



[Saunders et al (2026) Lancet RM]

We need to understand the mechanisms

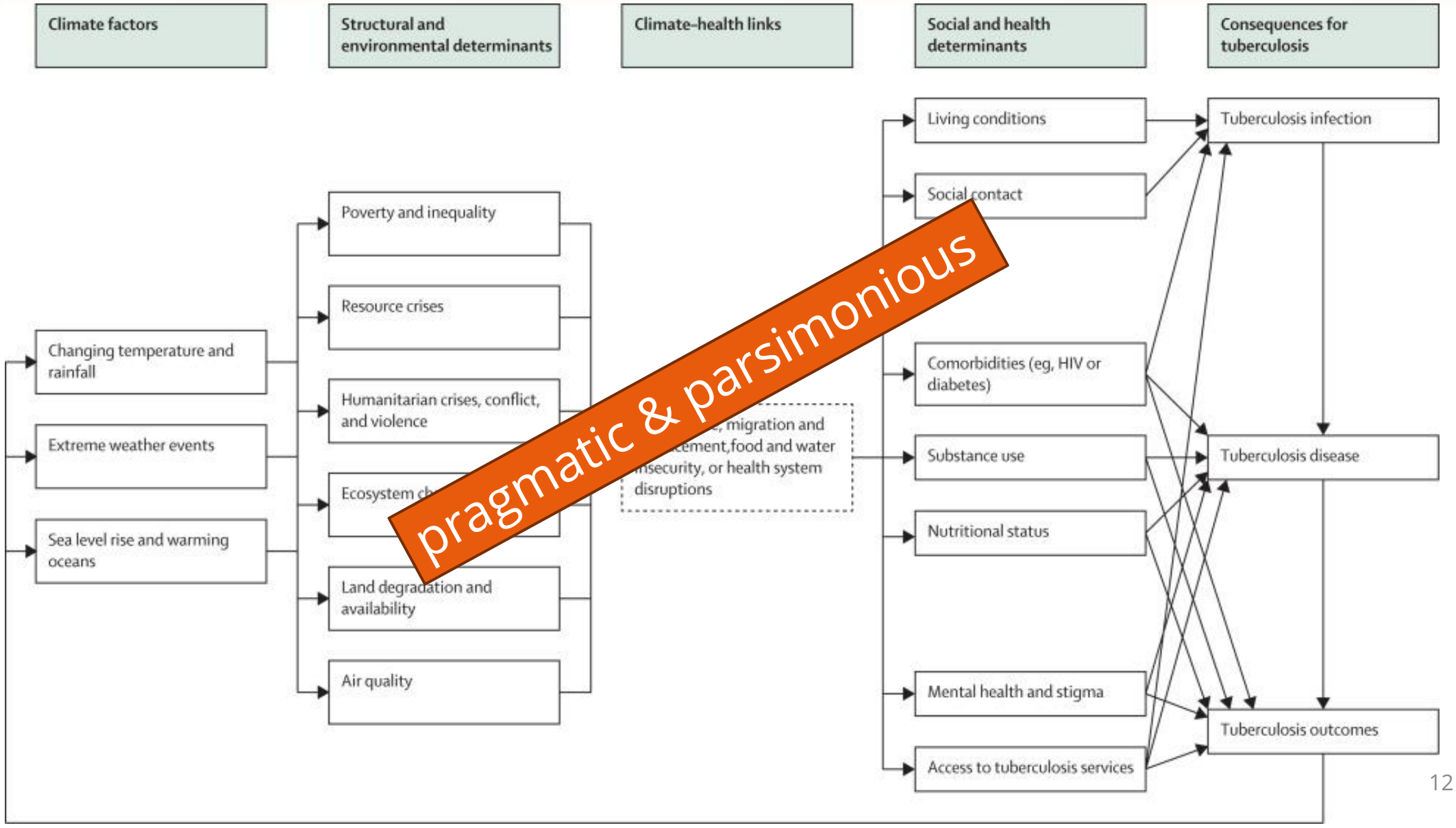


- Convened working group to identify principal mechanisms
- Hypotheses developed
- Narrative literature review
- Stakeholder meeting

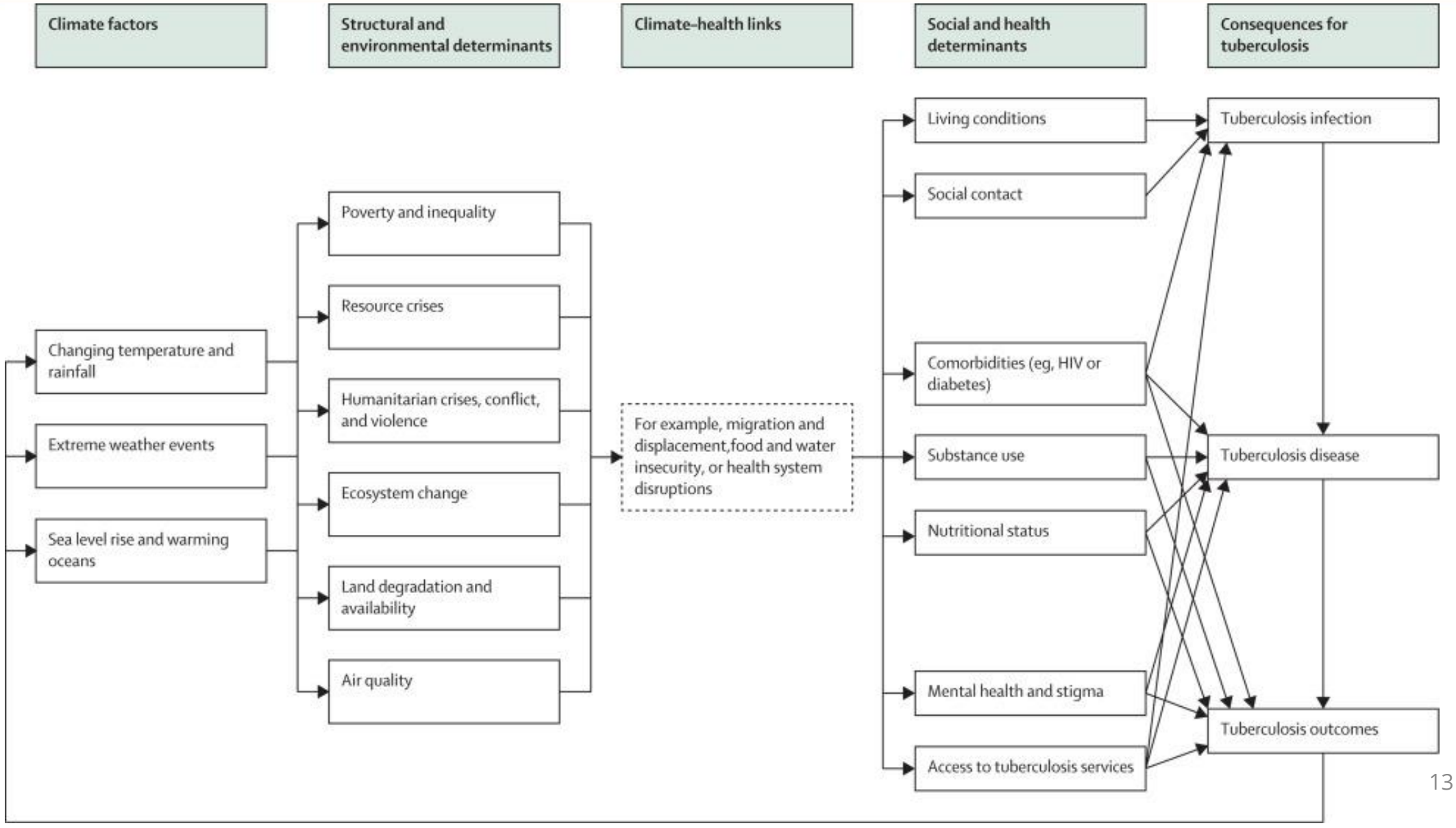


[Saunders et al (2026) Lancet RM]

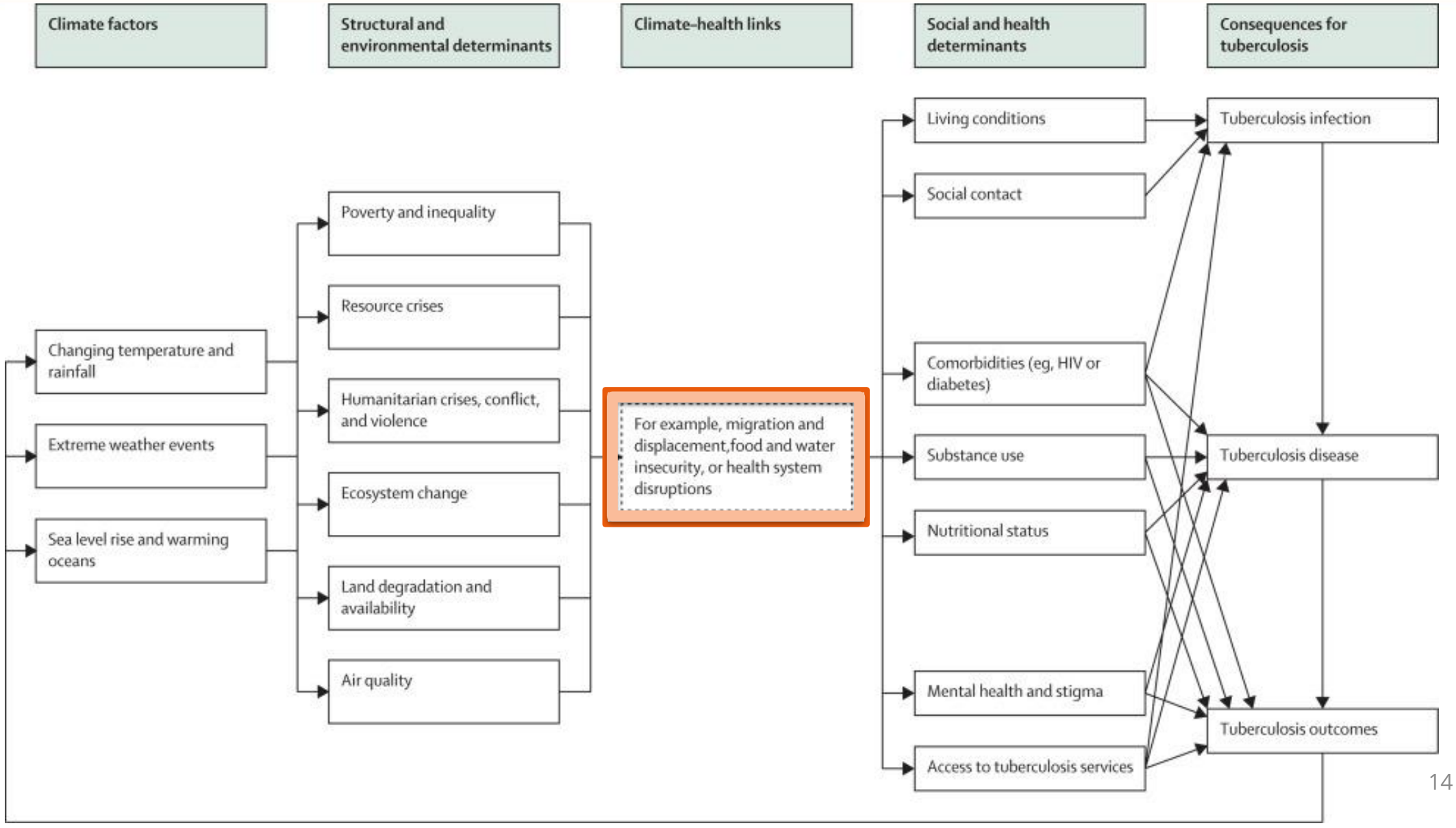
We need to understand the mechanisms



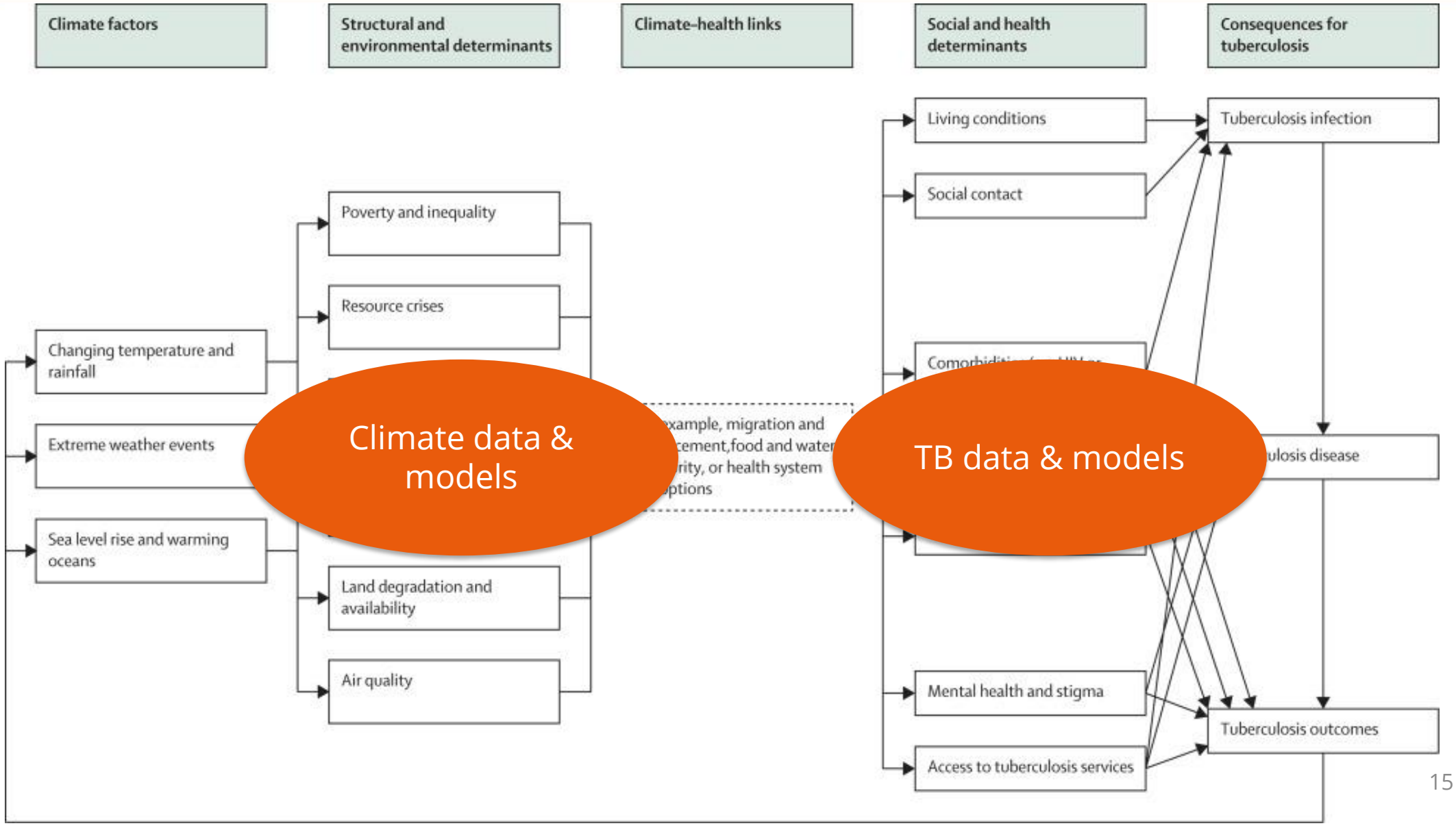
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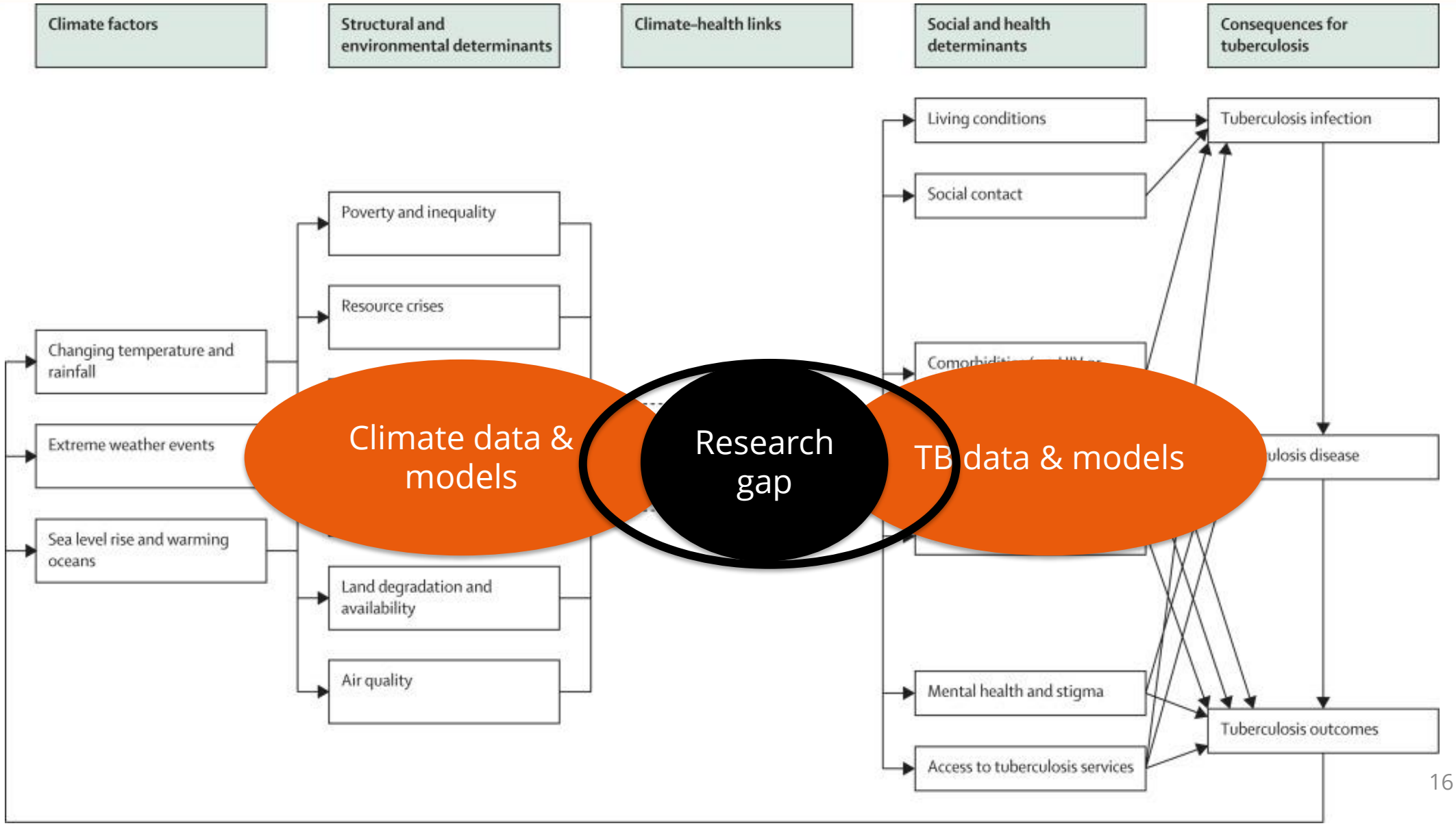
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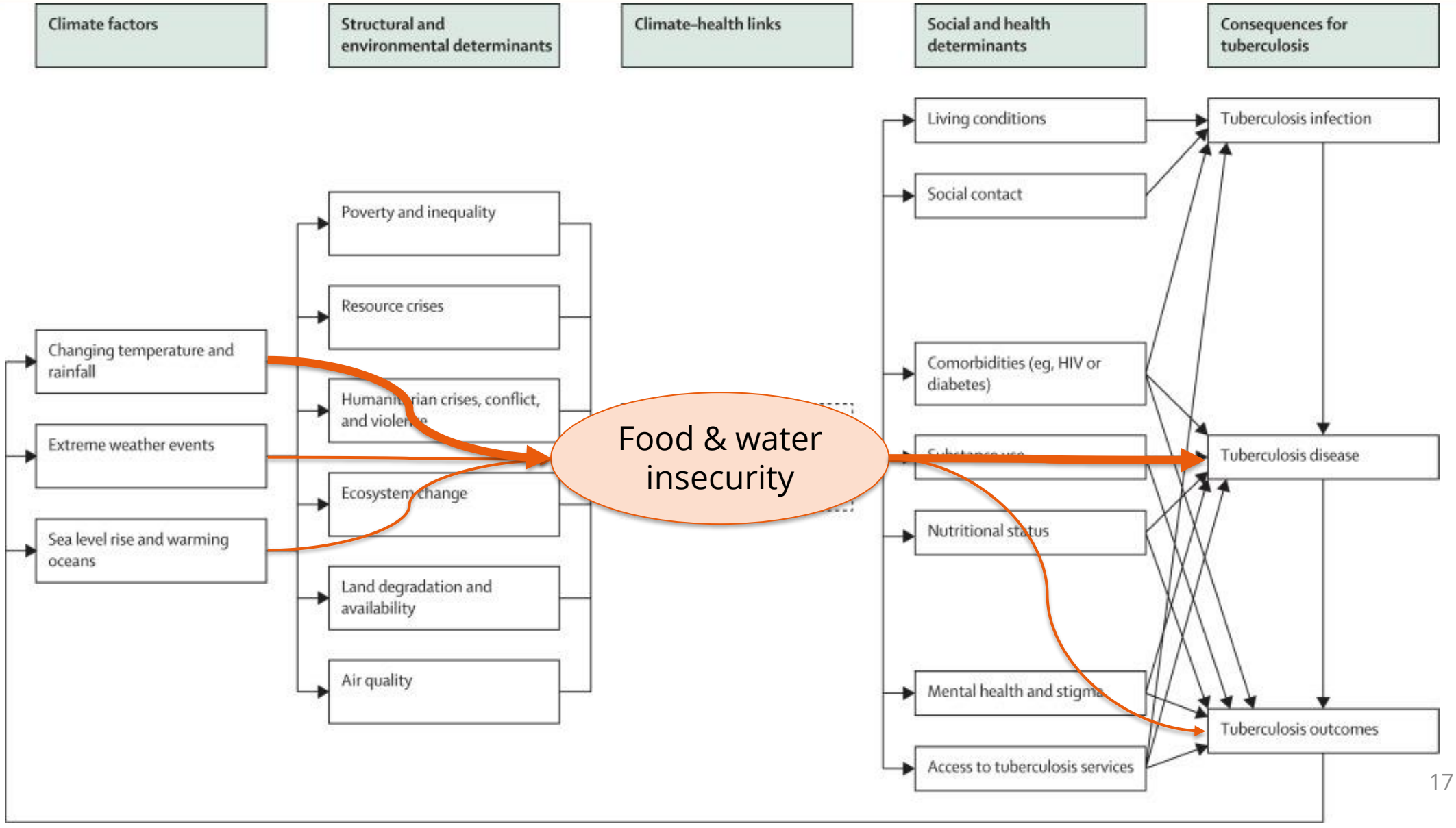
We know critical evidence gaps remain



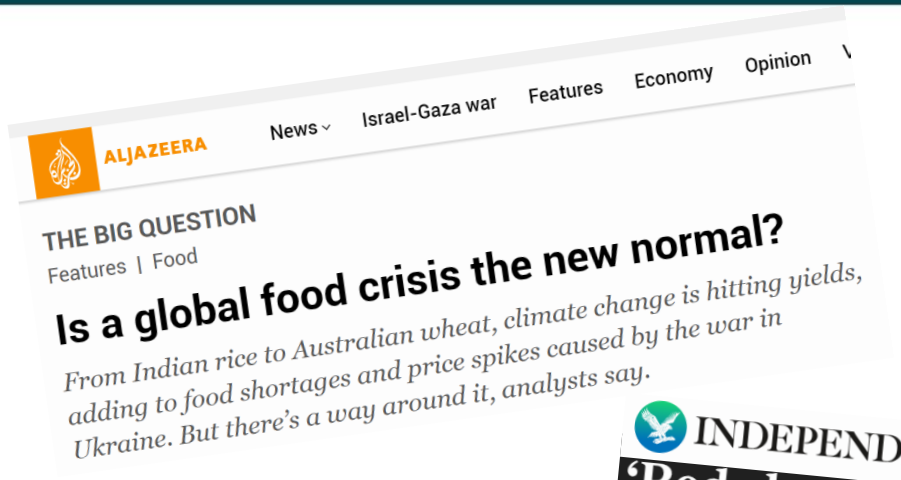
We know critical evidence gaps remain



Here is how we could fill one gap



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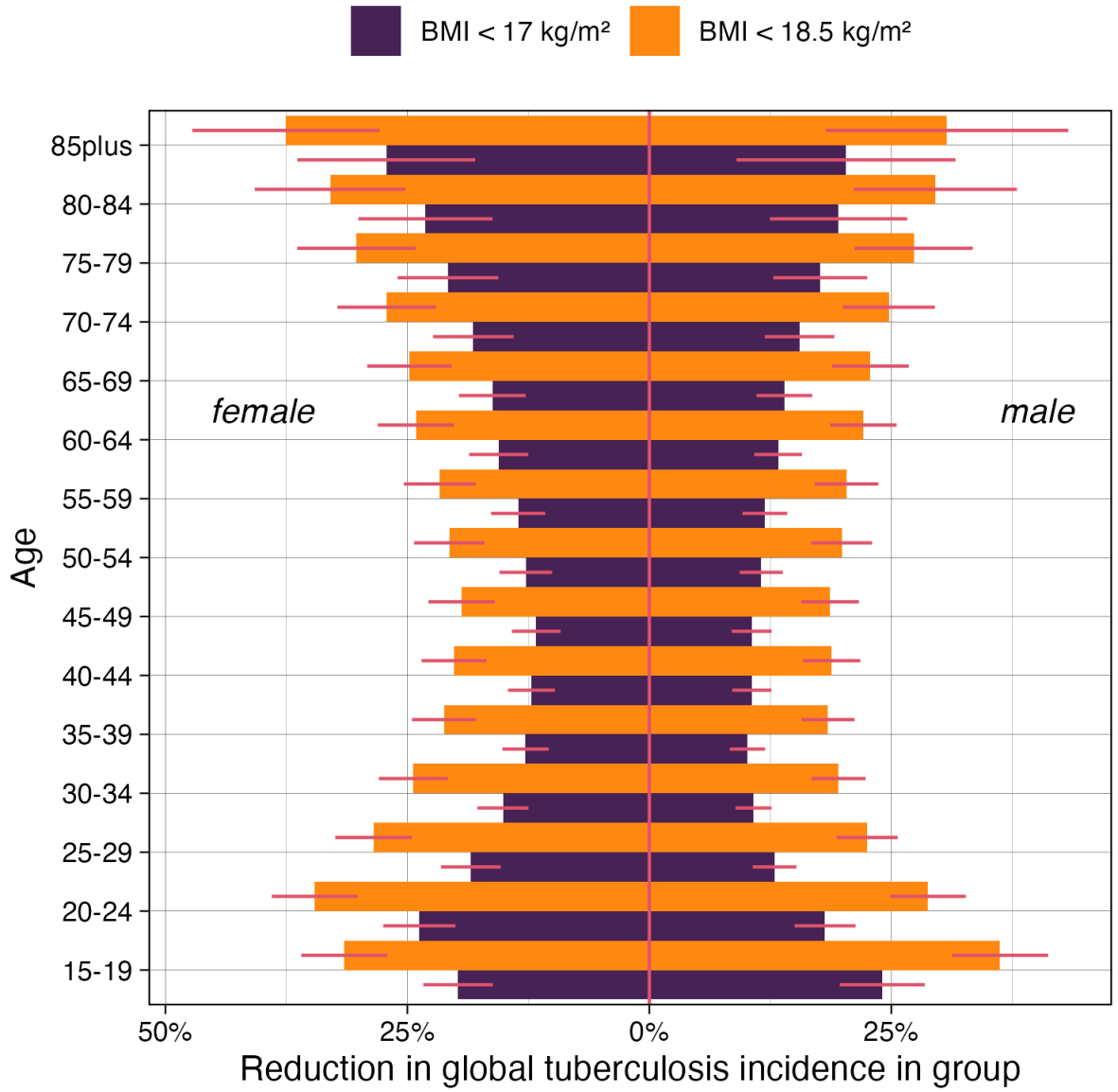








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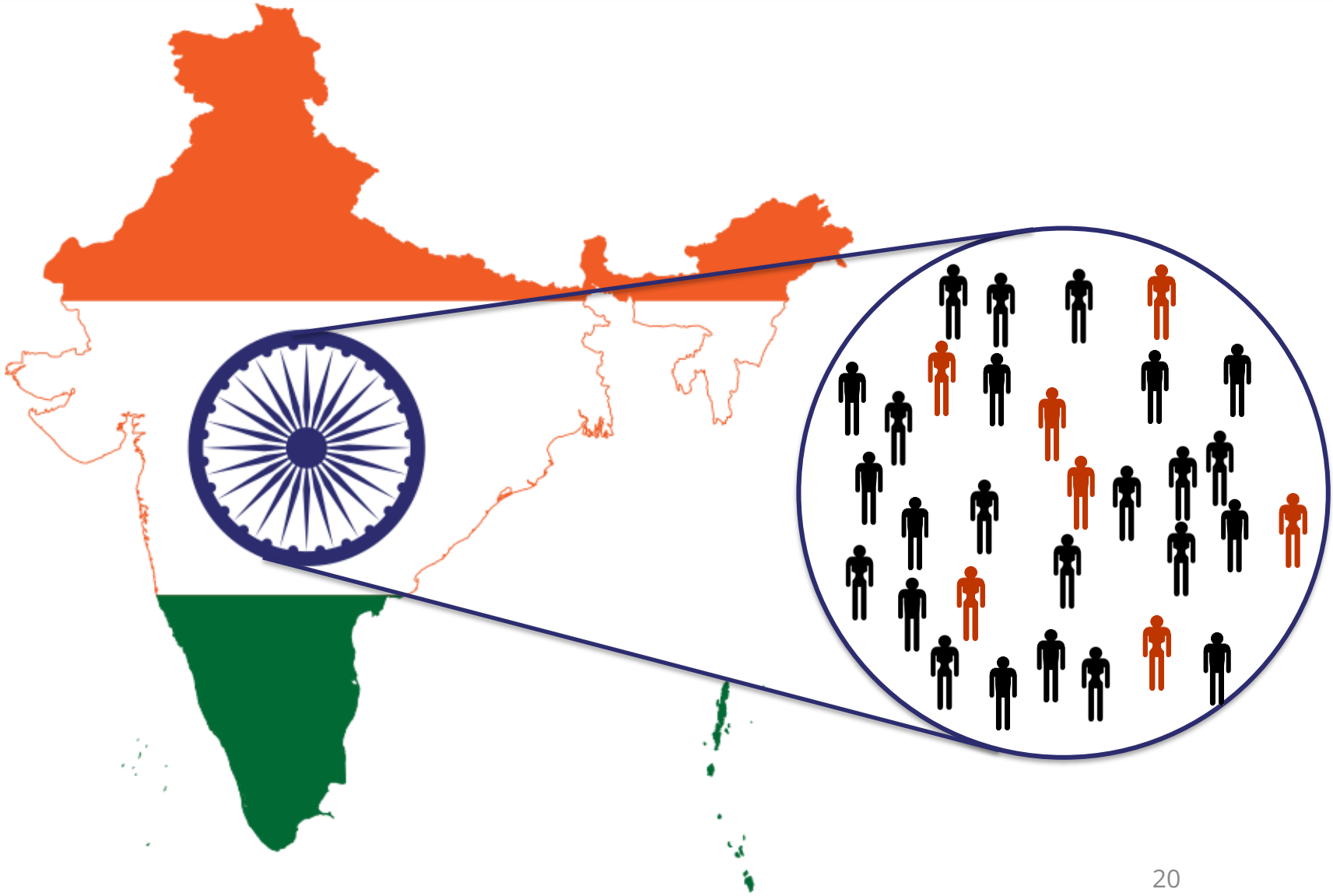




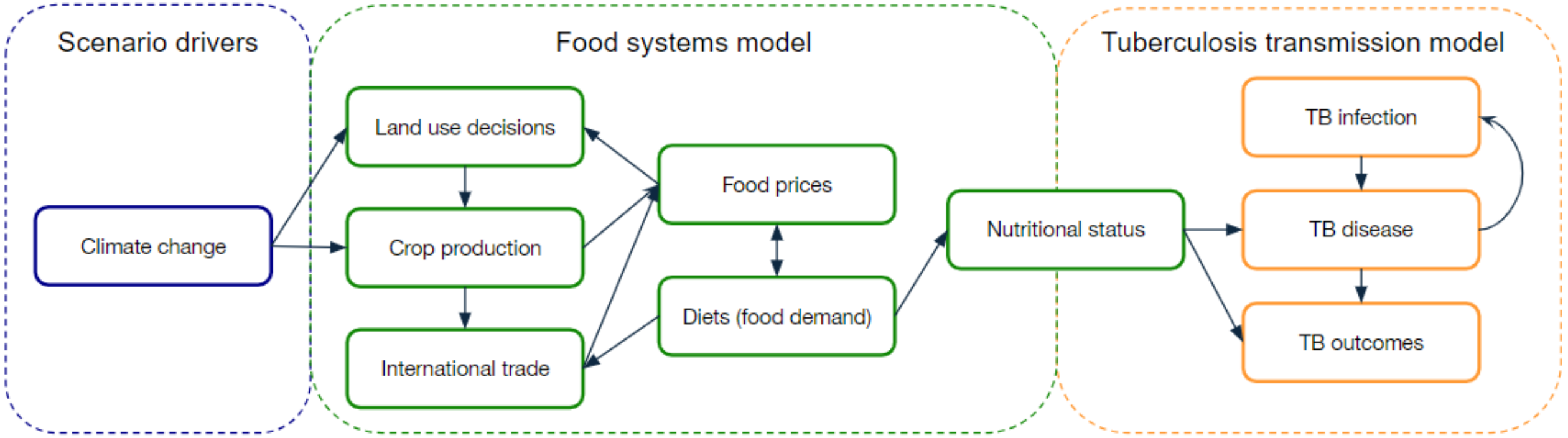
Saunders et al (2026) Lancet GH

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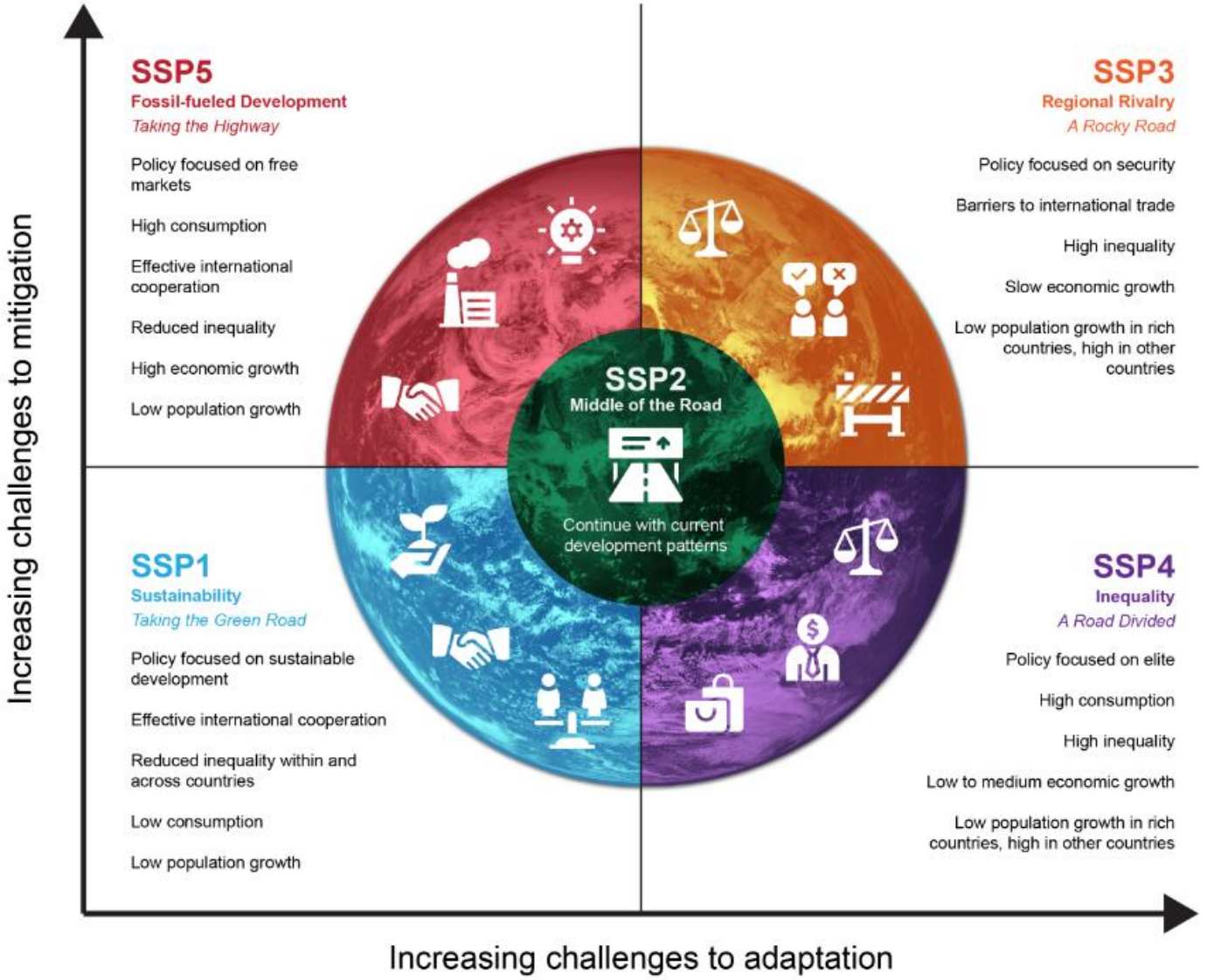




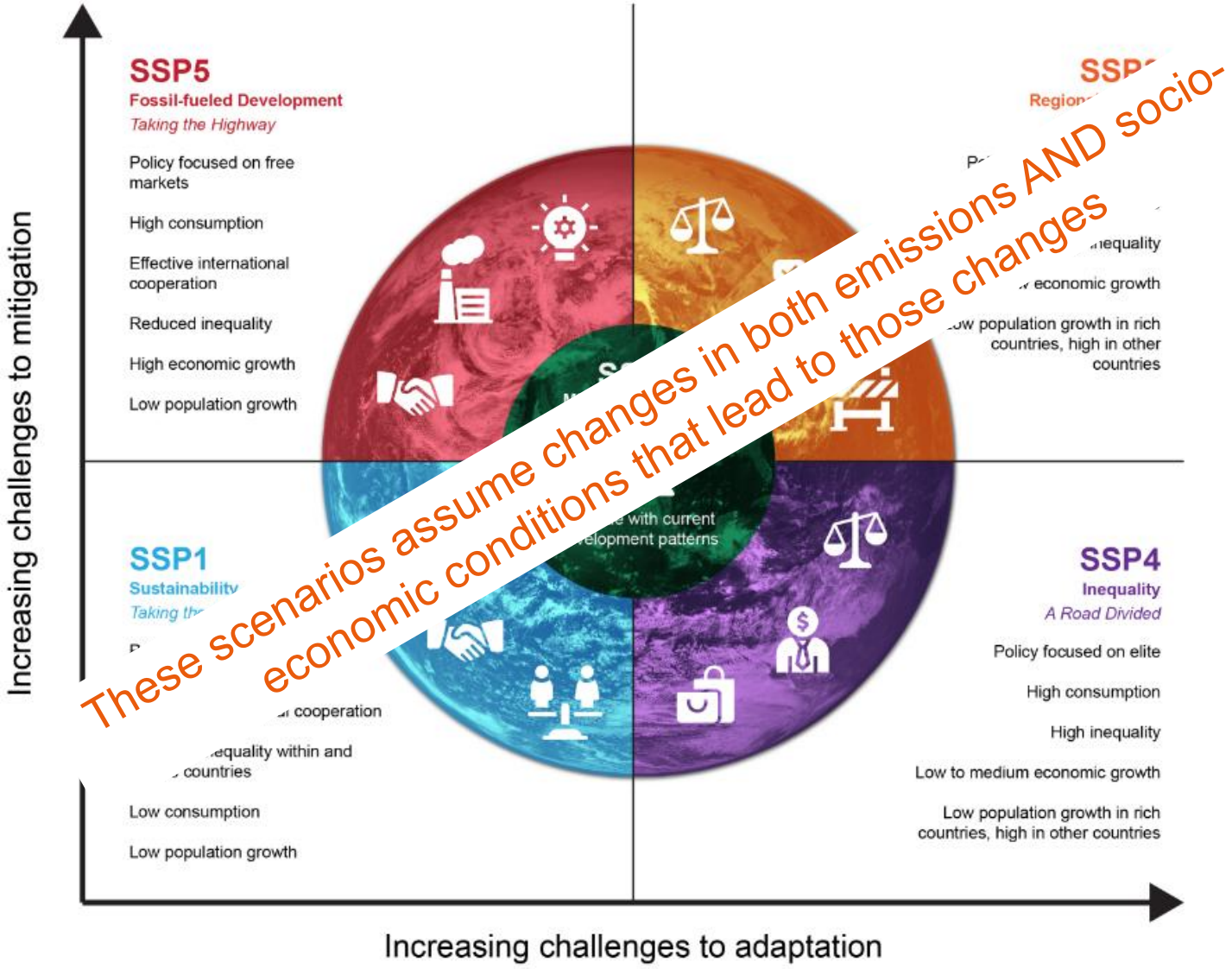
Here is how we could fill one gap: the model



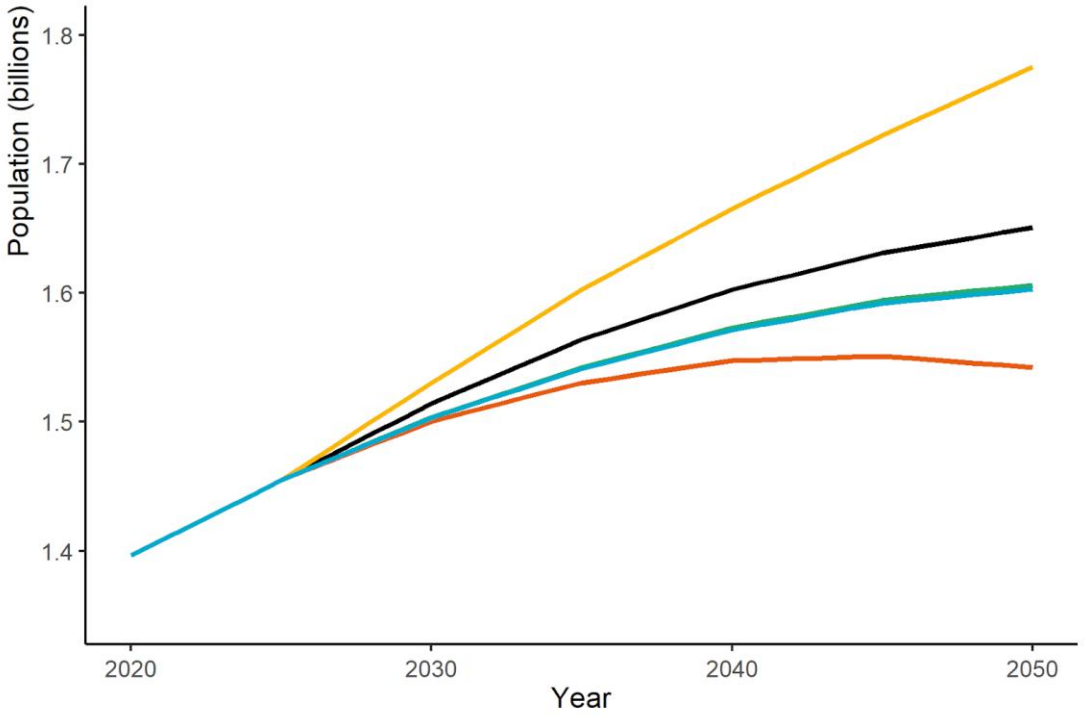
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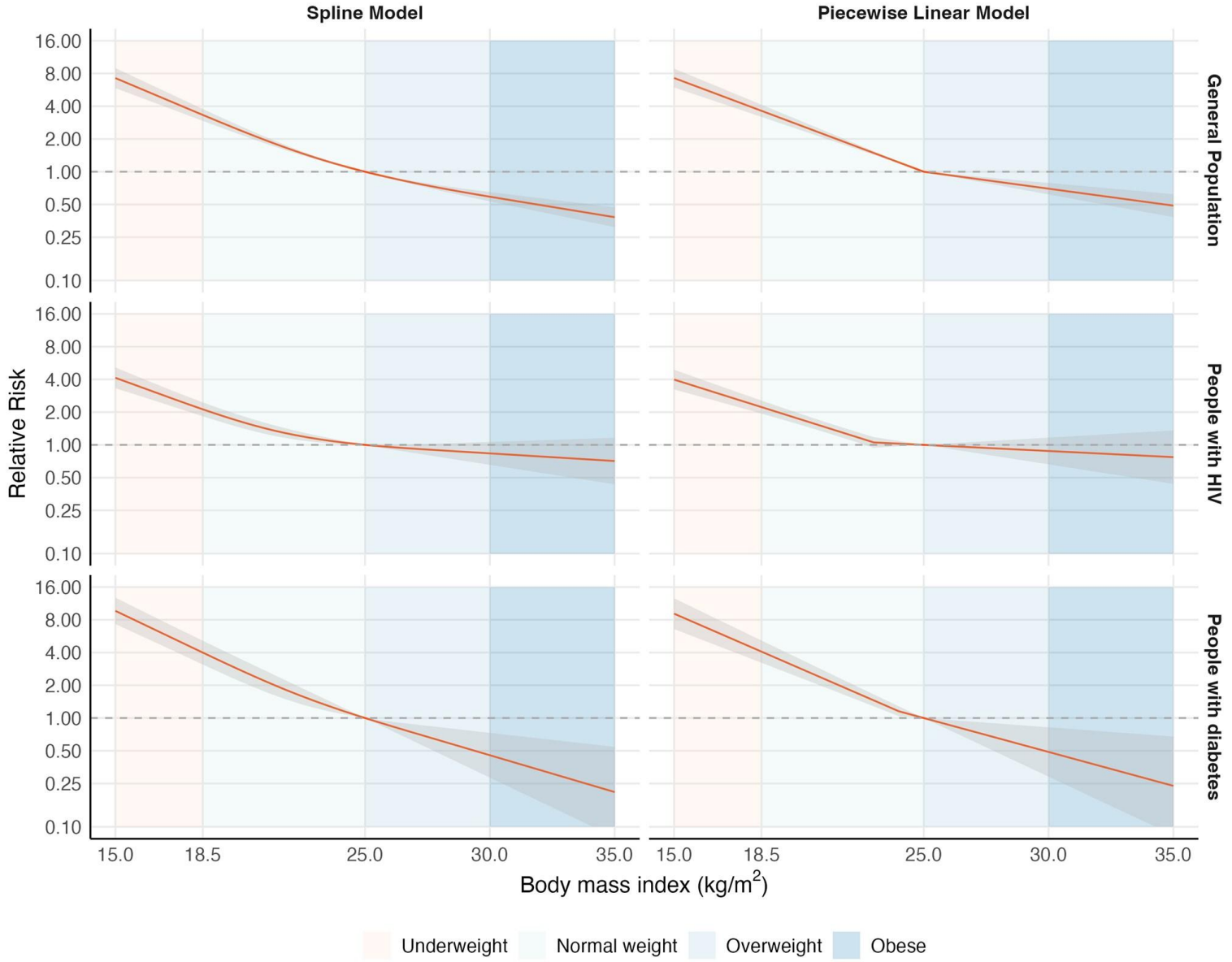
Climate scenario

- Sustainability
- Middle of the road
- Regional rivalry
- Inequality
- Fossil-fueled development





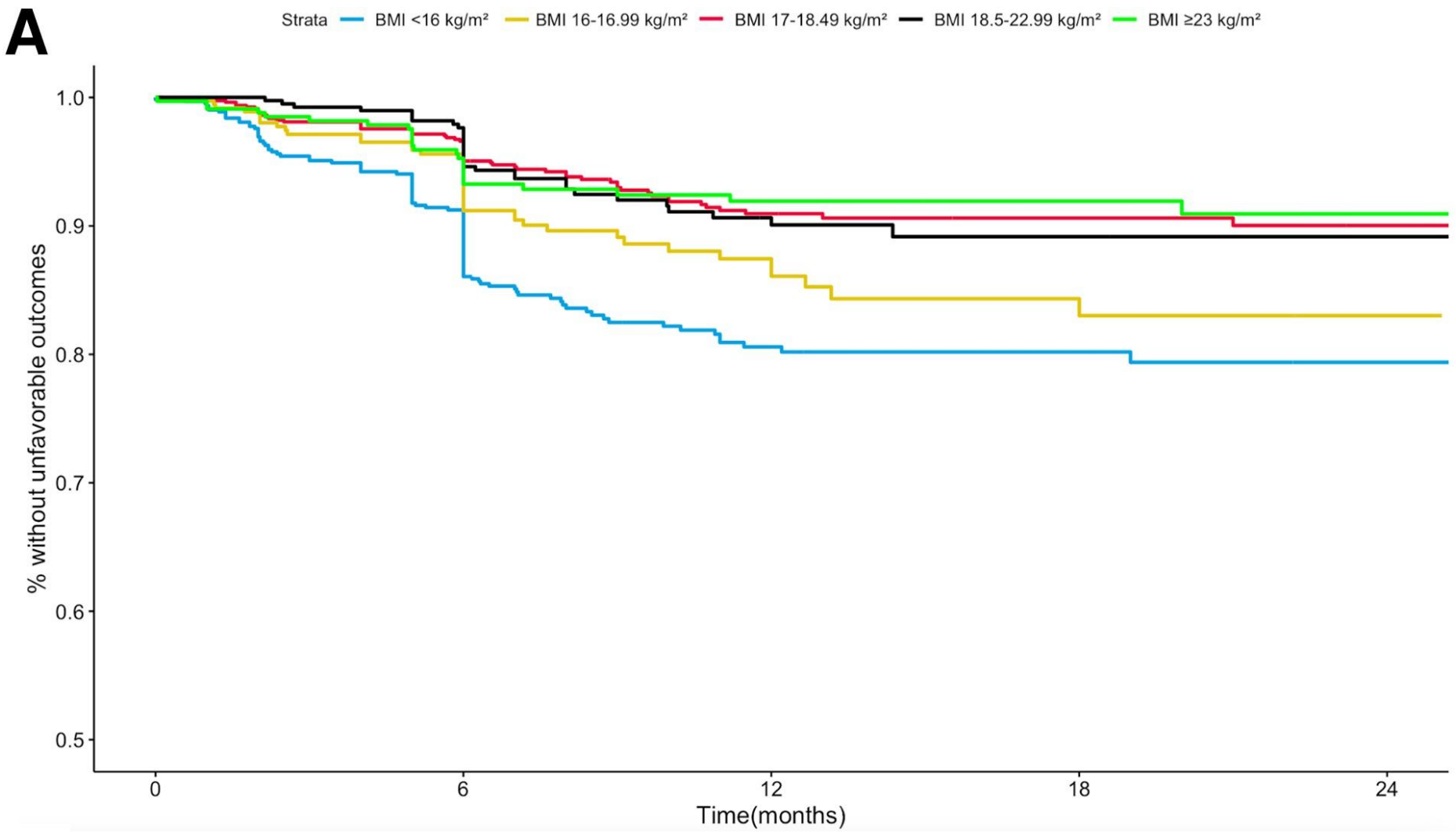
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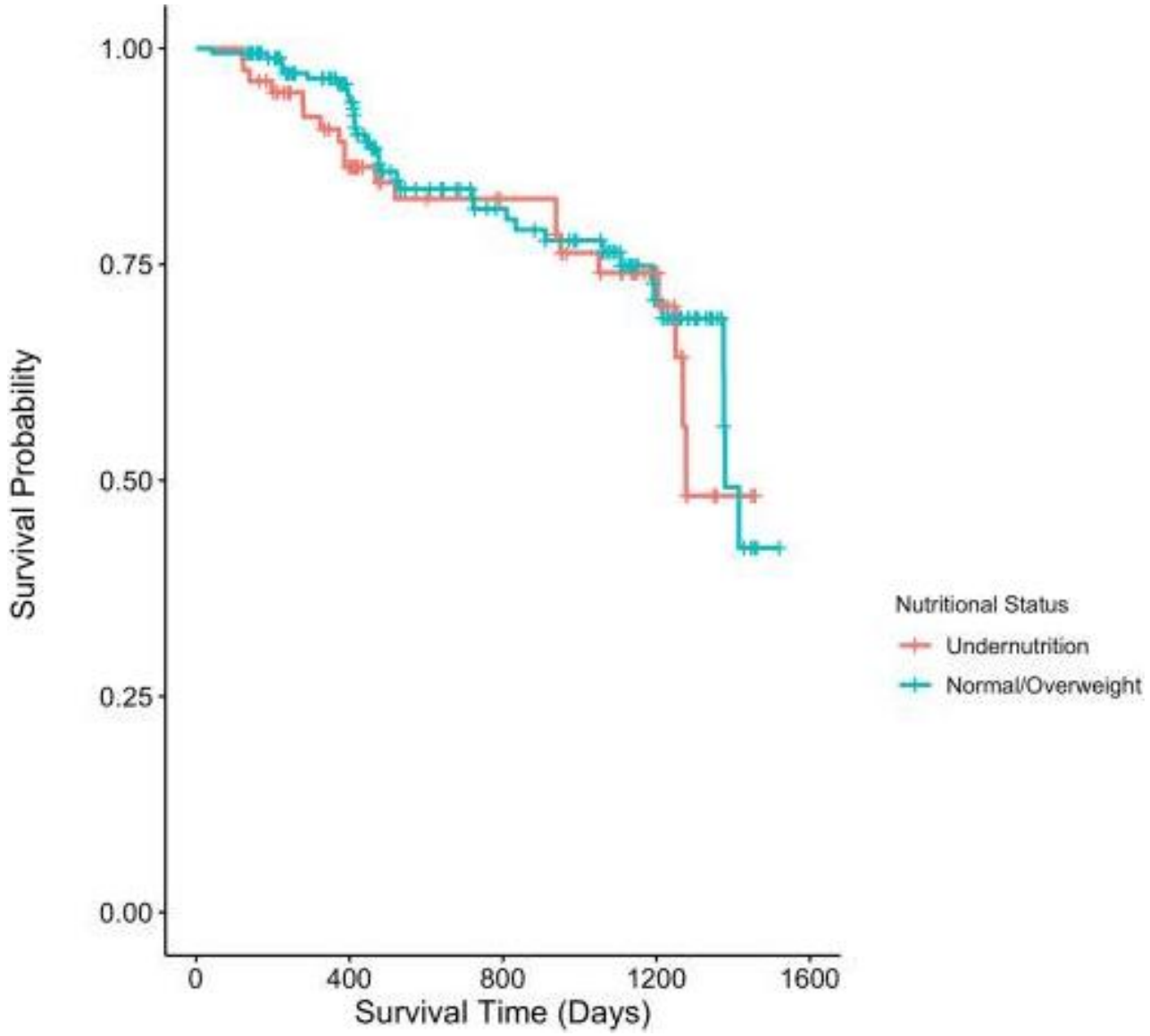
Saunders et al (2025) IJE

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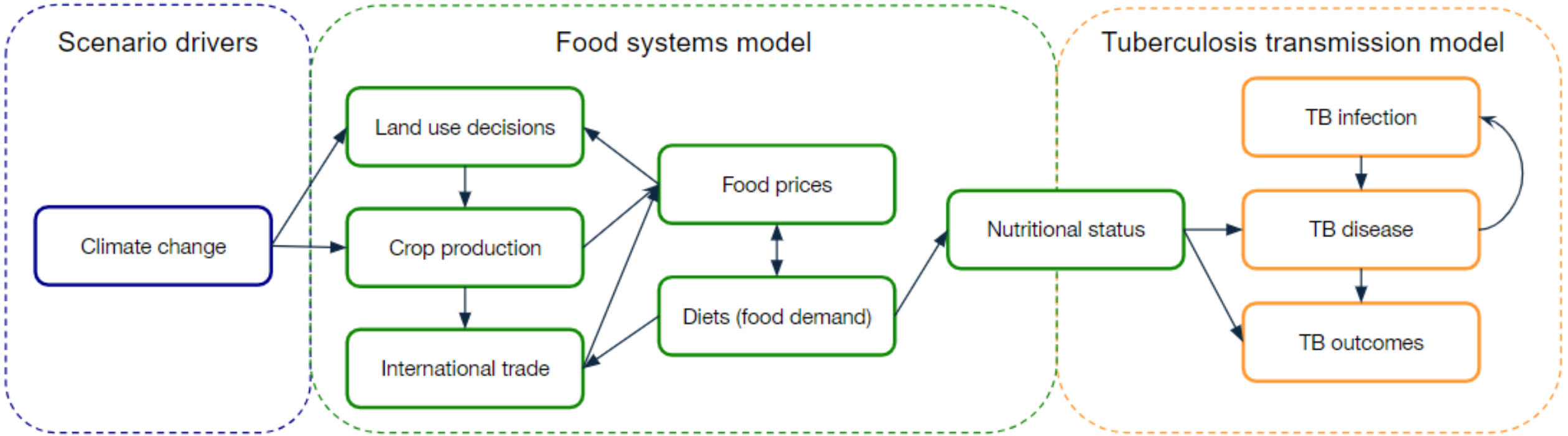
Sinha et al (2023) CID

Here is how we could fill one gap: the model

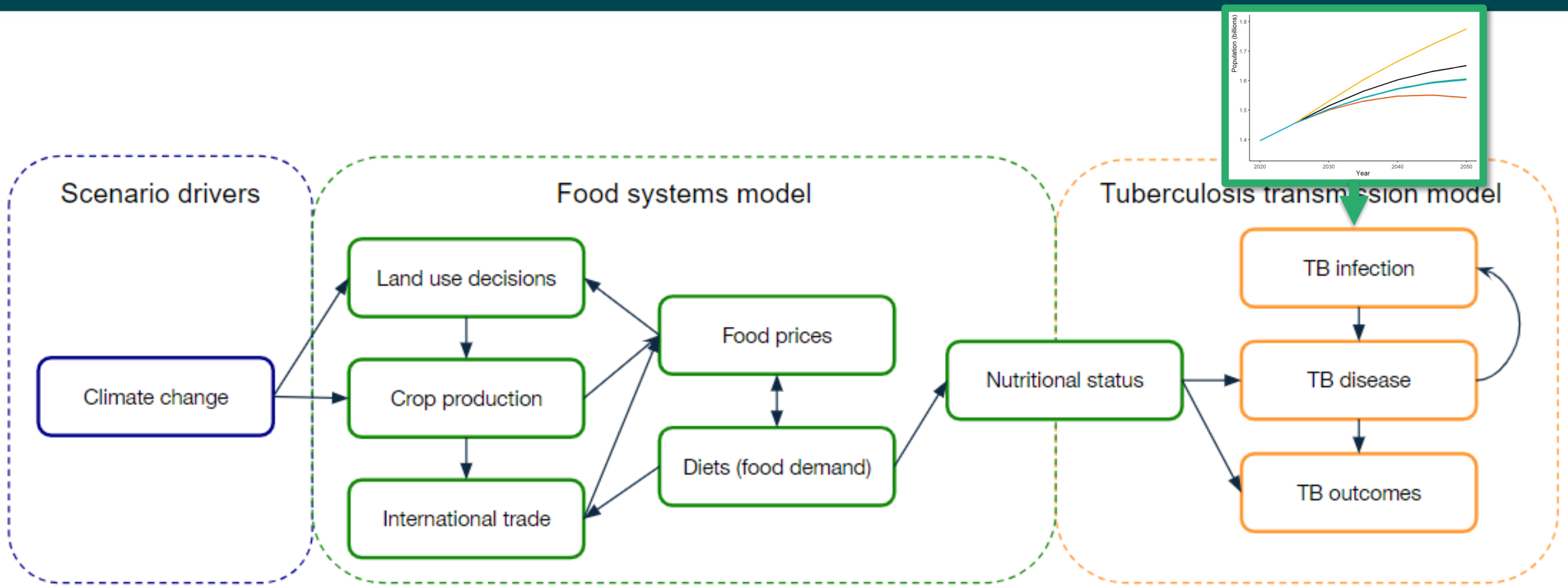


Sinha et al (2024) CID

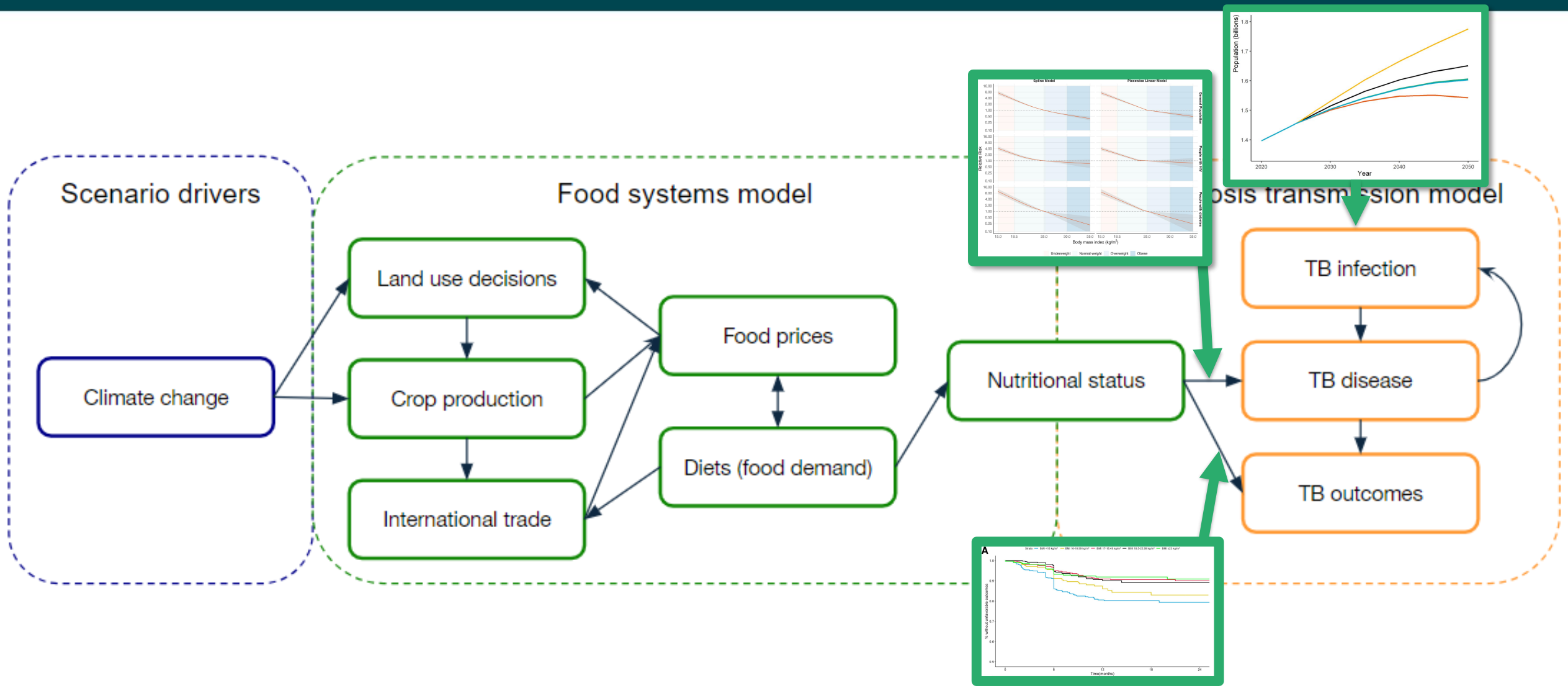
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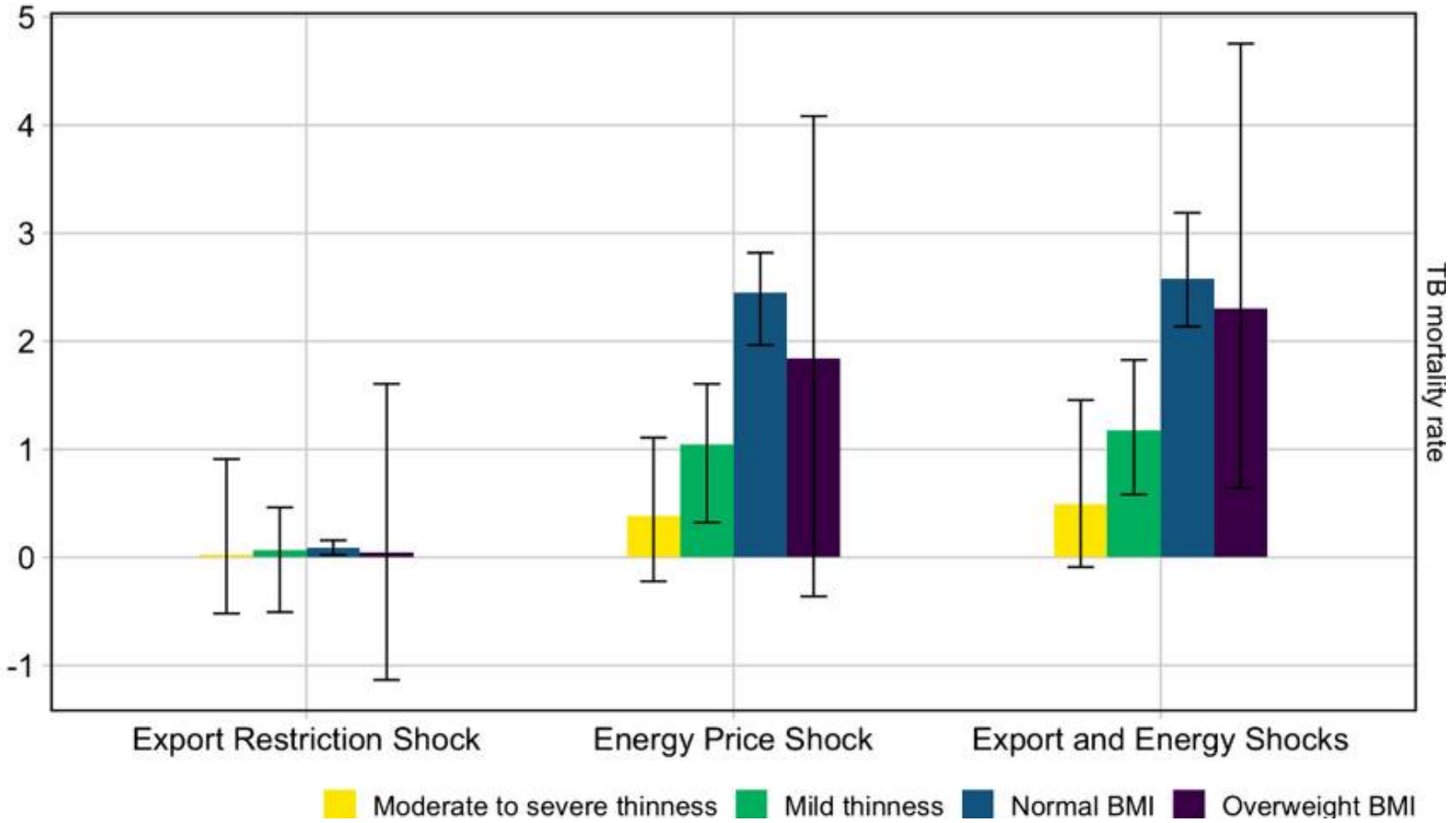
COMING SOON





Here is how we could fill one gap



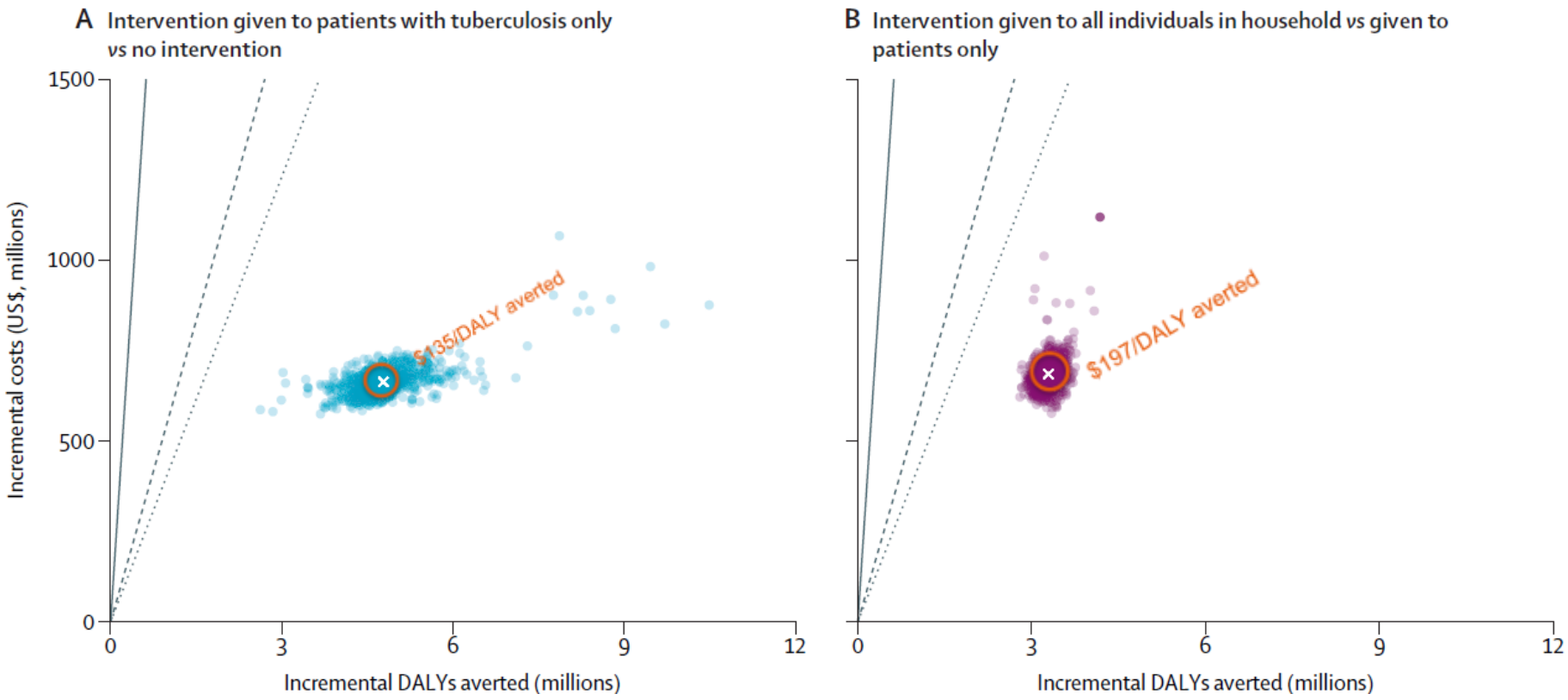


Clark et al (2025) BMC GPH

Here is how we could fill one gap

50% coverage for 12 years = 360,000 deaths averted





McQuaid et al (2025) Lancet GH

In one word: what does climate change mean for TB?

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Here are some other key examples: disruptions





Event type

- Storm
- Drought
- Flooding
- Dust storm
- Wildfire

Linde et al (2026) ssrn

Here are some other key examples: displacement

Table 1 Estimate of the potential global burden of tuberculosis among internally displaced people

Scenario	TB incidence	TB deaths	% of global TB incidence	% of global TB deaths	% of IDP deaths
Baseline, 2022	87 700 (77 400 to 98000)	14 100 (12 200 to 16000)	0.80 (0.70 to 0.90)	1.1 (0.90 to 1.3)	1.0 (0.90 to 1.1)
2 x incidence, 2022	175 000 (155 000 to 196 000)	28 200 (24 500 to 32000)	1.7 (1.4 to 1.9)	2.2 (1.9 to 2.6)	2.0 (1.7 to 2.2)
2 x incidence, 2 x OR death, 2022	175 000 (155 000 to 196 000)	49 600 (42 100 to 57100)	1.7 (1.4 to 1.9)	3.9 (3.2 to 4.6)	3.5 (3.0 to 4.0)
2 x incidence, 2 x OR death, 2035	280 000 (193 000 to 366 000)	79 100 (53 500 to 105 000)	2.8 (1.9 to 3.6)	11.0 (7.1 to 14.0)	1.4 (1.2 to 1.6)

Based on merging United Nations High Commissioner for Refugees data on Internally Displaced People for 2022 (excluding Gaza)[1] with the WHO tuberculosis estimates across 177 countries[8]; deaths in Internally Displaced People estimated using United Nations World Population Prospects[14] crude death rates with factor of 2.5 applied.[15] Projections model linear growth in Internally Displaced People based on data from 2018 giving predicted increase of 1.2 (95% prediction interval 1.0–1.4) for 2025 compared with 2022; projections in global population and per capita tuberculosis incidence use a log-linear model, which predicted factor changes of 1.0 (0.95–1.18) in 2025 relative to 2022. We assume no change in case fatality rate of tuberculosis over time in this population. The decline in the percentage of IDP deaths over time is due to global declining per capita TB.
Data and analysis code available on GitHub at https://github.com/petedodd/IDPTB.
IDP, internally displaced people; TB, tuberculosis.

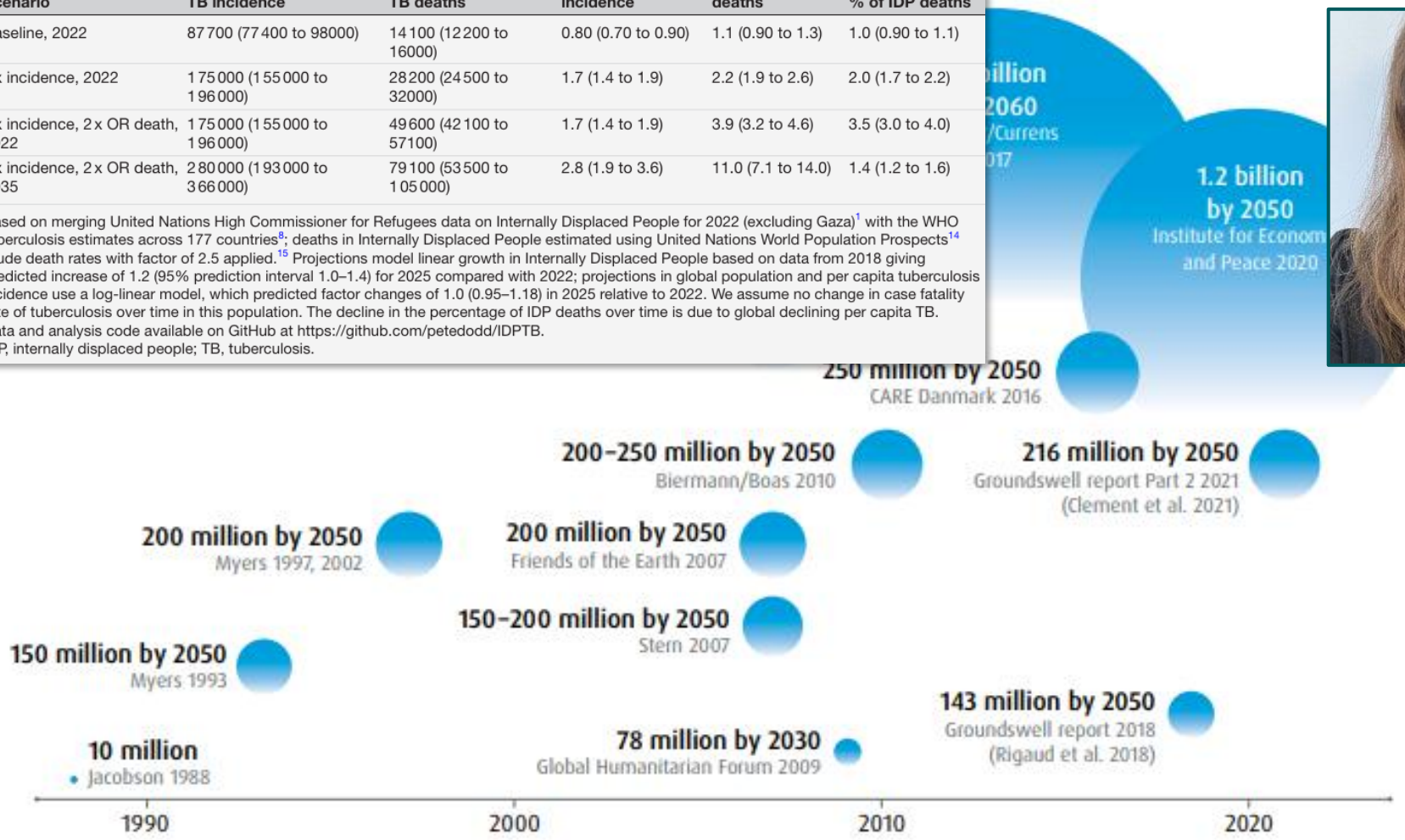


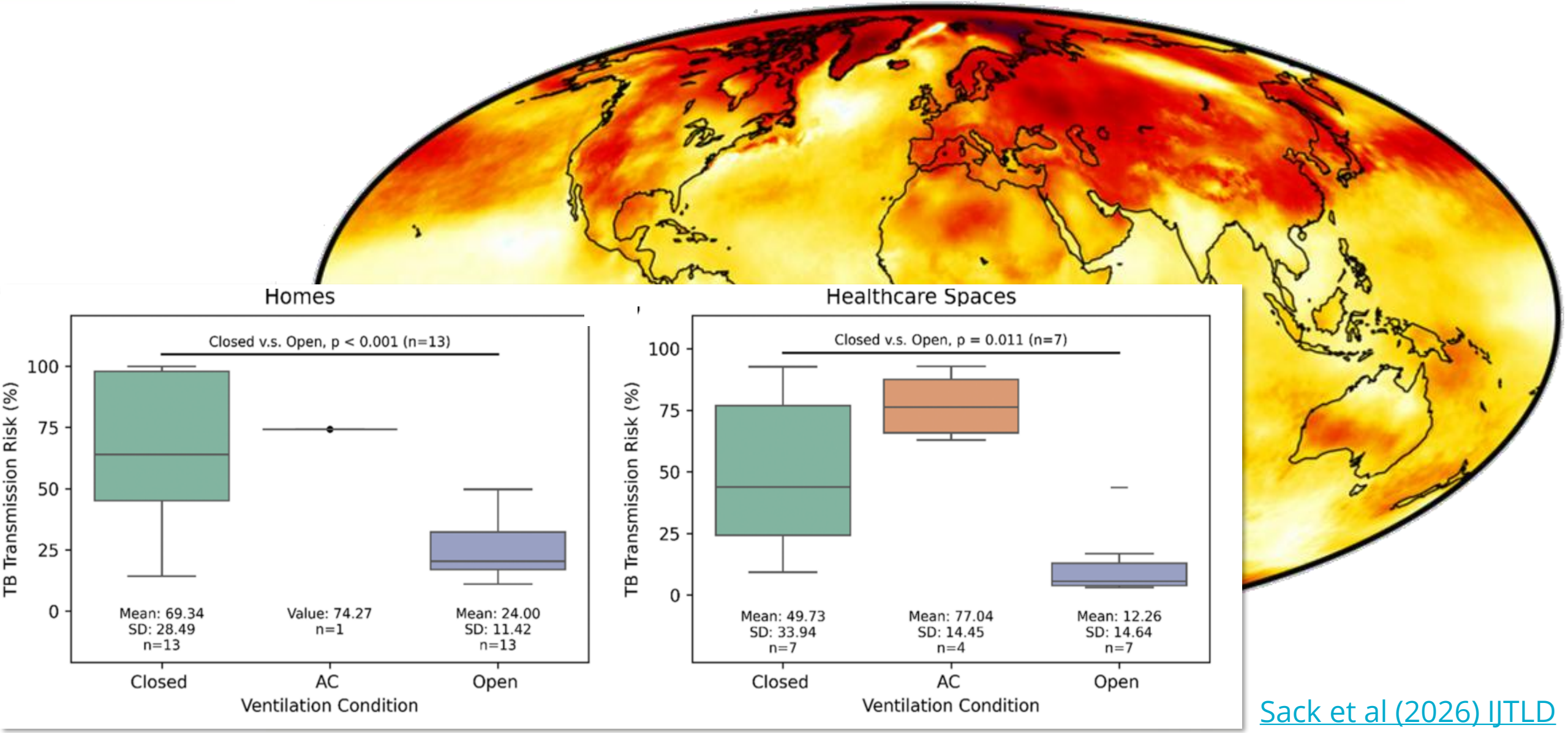
Illustration: SVR/Deniz Keskin





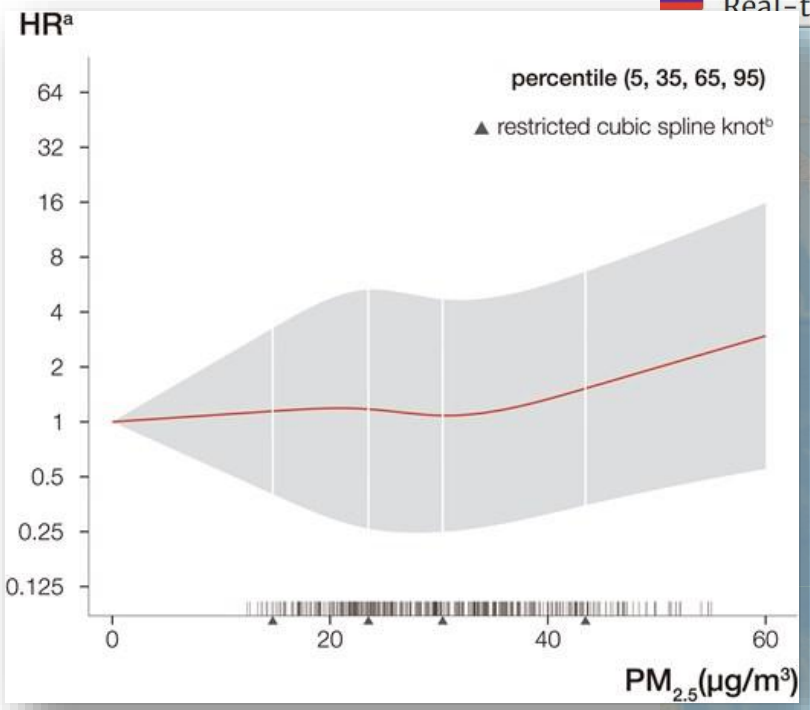
[Dodd et al (2025) BMJ GH]

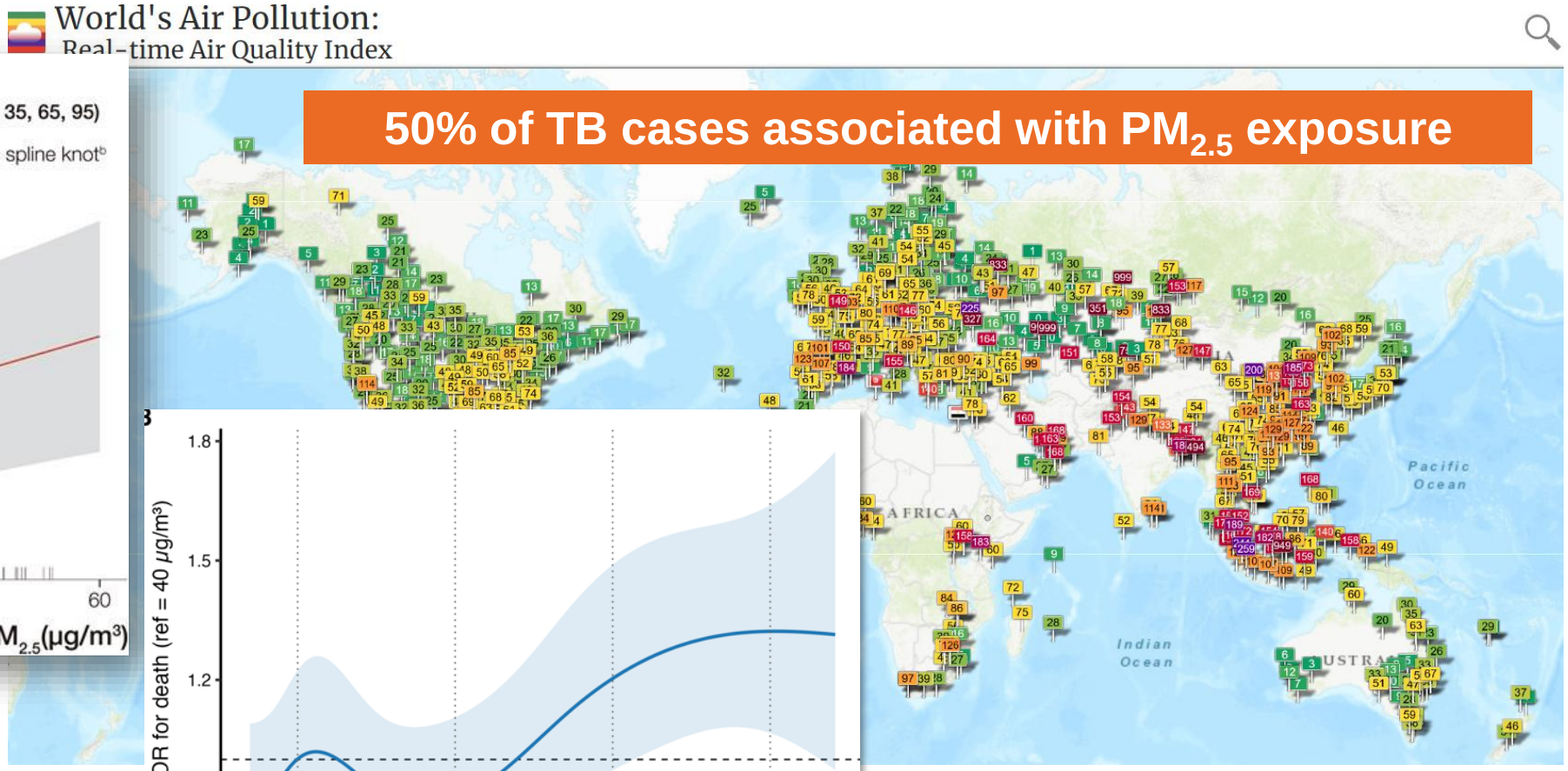
Here are some other key examples: heatwaves



Sack et al (2026) IJTLD

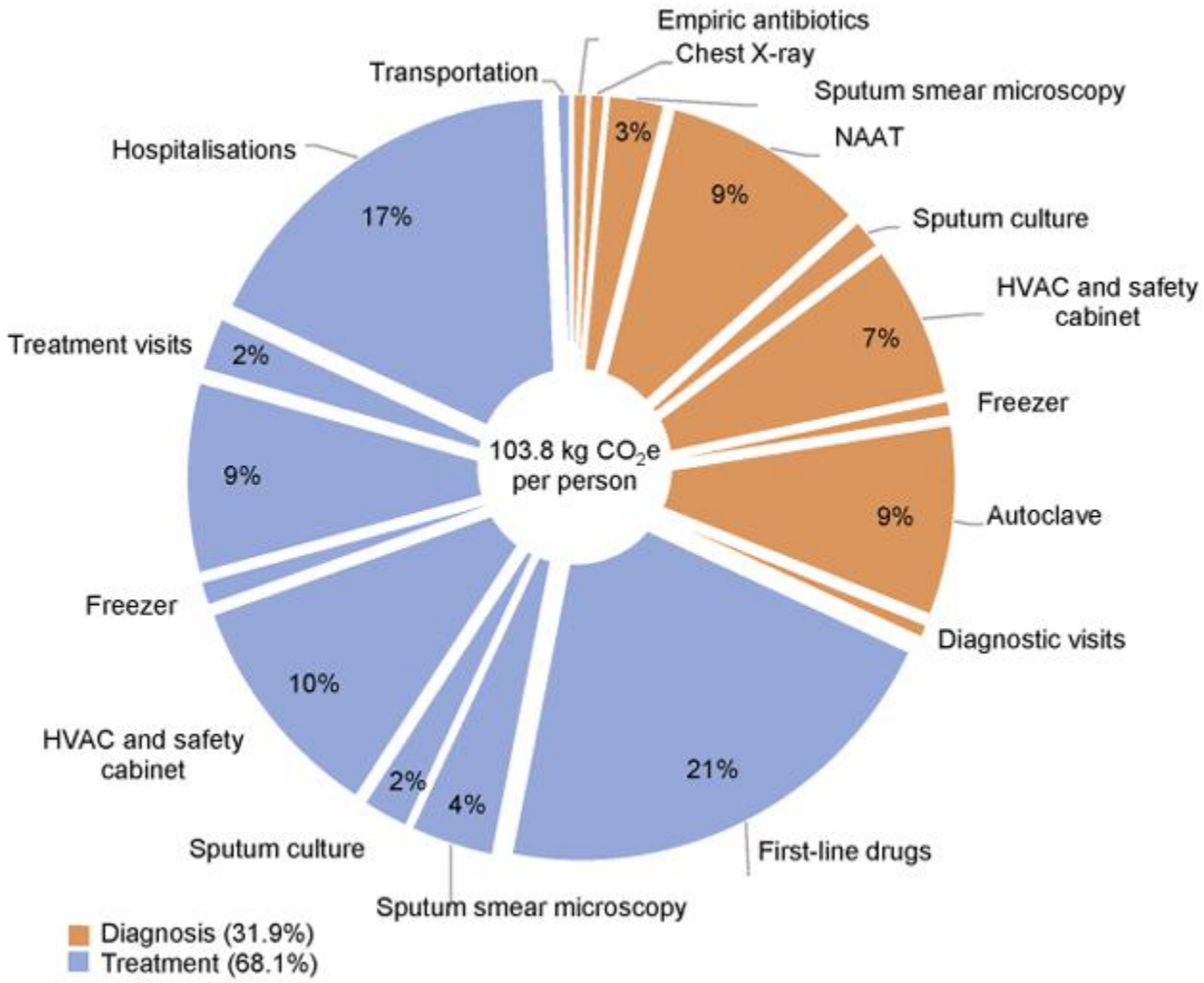
Here are some other key examples: pollution





[Zeng et al (2026) IJE]
[Sinha et al (2026) CID]
[Carroll et al (2026) AATS]

And what about the carbon impact of TB?



Martins et al (2024) IJTLD

What are the major challenges?

- Lack of data
  - Difficulty in measurement
  - Overlap of pathways
  - Translation of evidence



What should we do next?



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How likely are you to consider climate change in your TB-related work going forward?

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Unlikely

Very likely

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Acknowledgements

Matt Saunders · Lauden Linde · Rebecca Clark · Lara Goscè · Antonio Gasparrini · Julia Pescarini · Pally Khan · Delia Boccia · Bart Arendarczyk · Nick Menzies · Maria Calderon · Pranay Sinha · Peter Cegielski · Roel Bakker · Richard White · Rein Houben · Elena Venero Garcia · Salome Charalambous · Lelisa Fekadu · Leo Martinez · Peter Alexander · Roslyn Henry · James Seddon · Pete Dodd · Kaia Waxenberg · Norbert Ndjeka · Gopalan Narendran · Fernanda Dockhorn · Irina Vasilyeva · Tao Li · Nebiat Gebreselassie · Matteo Zignol

