



Workshop «Indirect International Impacts of Climate Change on Switzerland»

Zürich, 26. September 2017

Climate change and health: thinking out of the box to explore indirect impacts for Switzerland

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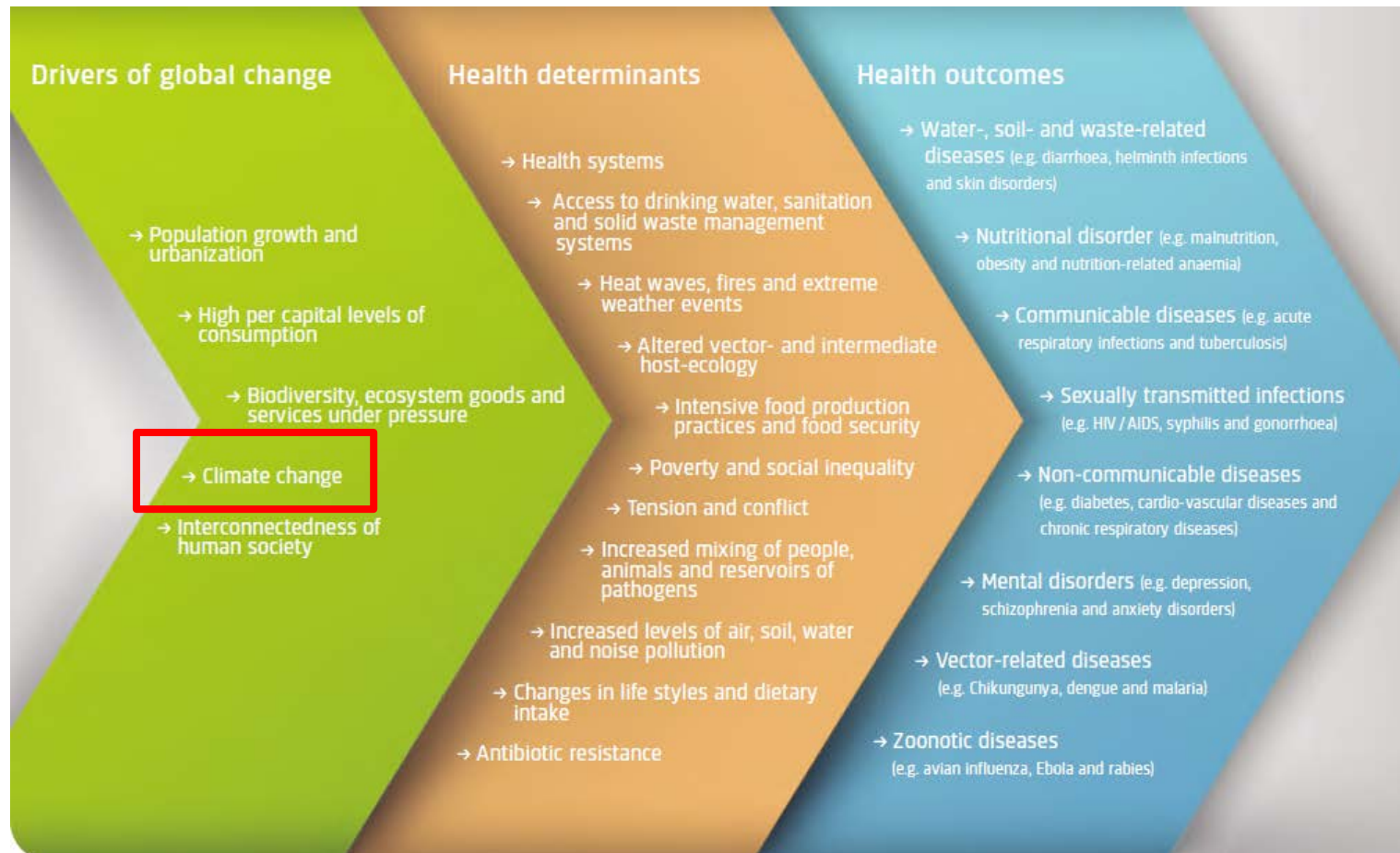




Content

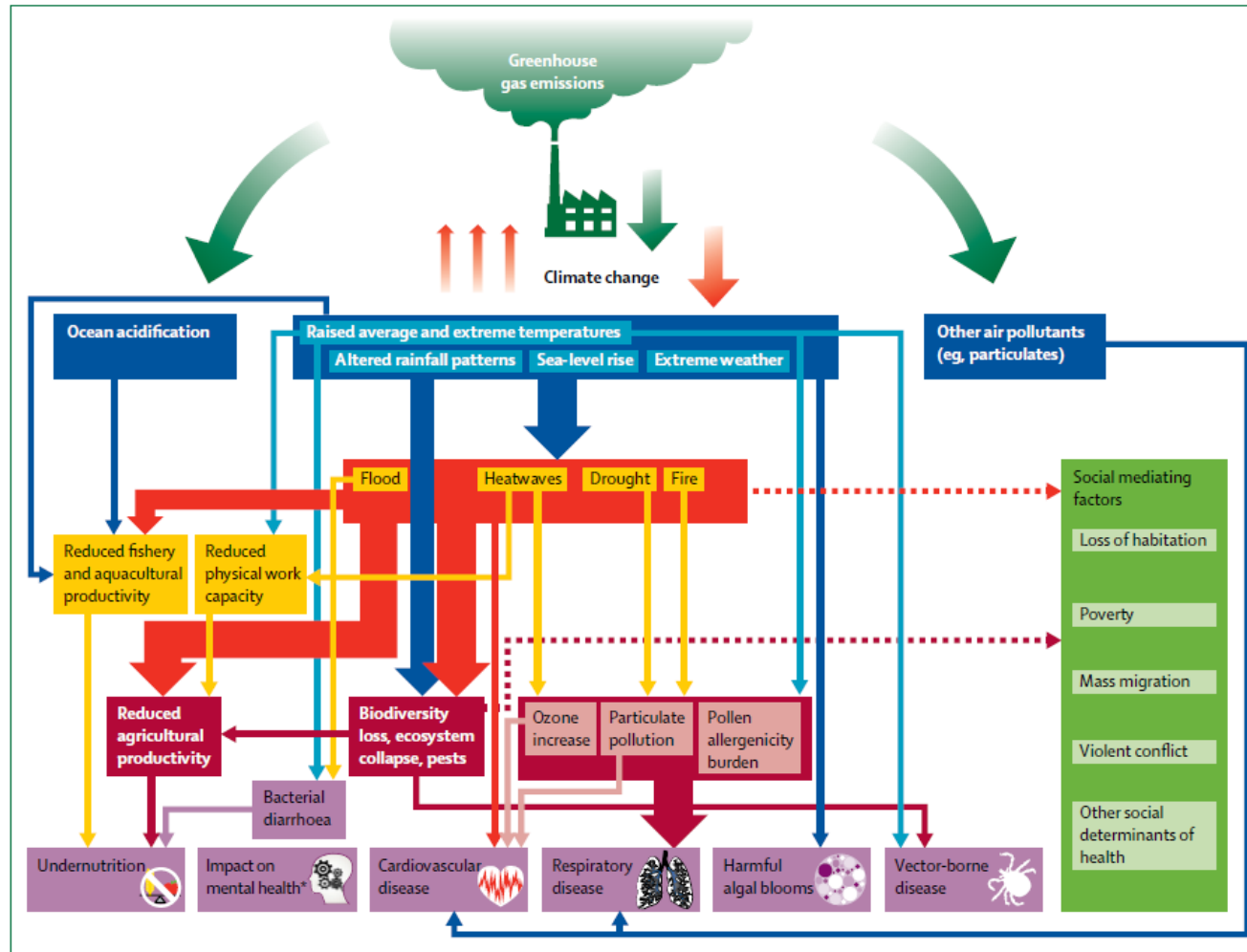
1. How does climate change affect health?
2. What methods/approaches to assess the impact of climate change on health?
3. What are the impacts of climate change related events challenges abroad on health in Switzerland (or other European countries)?
4. What are the impacts of climate induced health challenges abroad on Switzerland (or other European countries)?

1. Health and global change in an interconnected world



Winkler et al. Health and global change in an interconnected world, *A+ Factsheet*, 2015

1. The Health Impacts of Climate Change

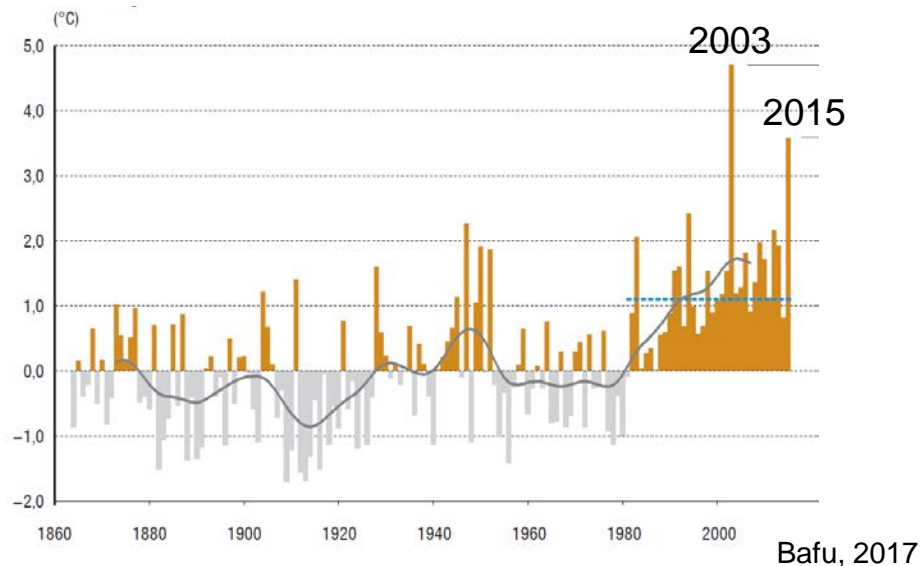


Watts et al.
Lancet, 2017

2. What methods/approaches to assess the impact of climate change on health?

- Case study: summer 2015 (Vicedo-Cabrera A. et al. Excess mortality during the warm summer 2015 in Switzerland, *Swiss Medical Weekly*, 2016, 146: w14381)

Deviation of mean temperature in summer

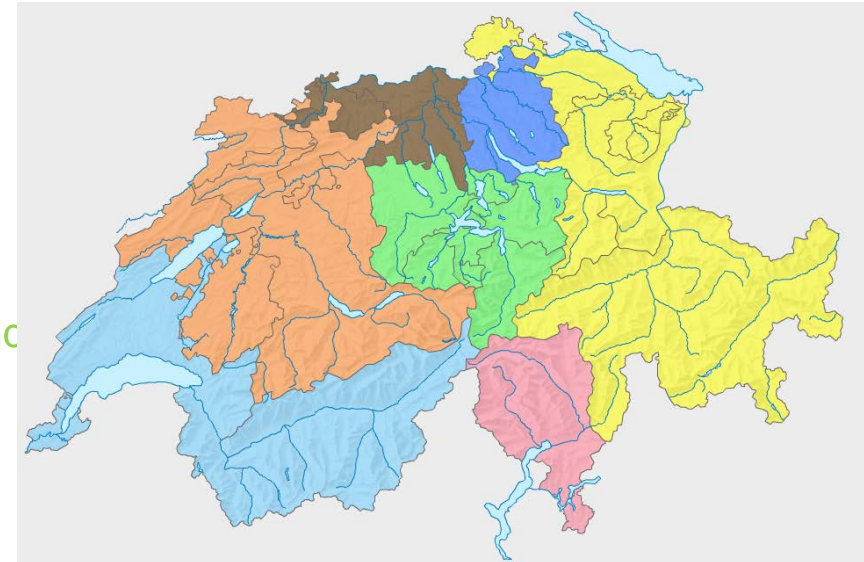


2. Observed-expected

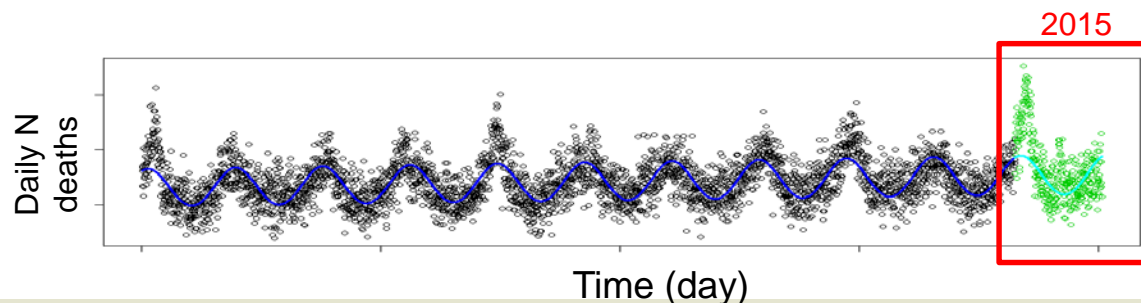
Expected: Statistical model per

- Gender
- age category (<20, 20-39, 40-64, 65-74, 75-84 and ≥85 years)
- geographical region (Northwestern Switzerland, Espace Mittelland, Lake Geneva, Zurich, Ticino, Central Switzerland and Eastern Switzerland)

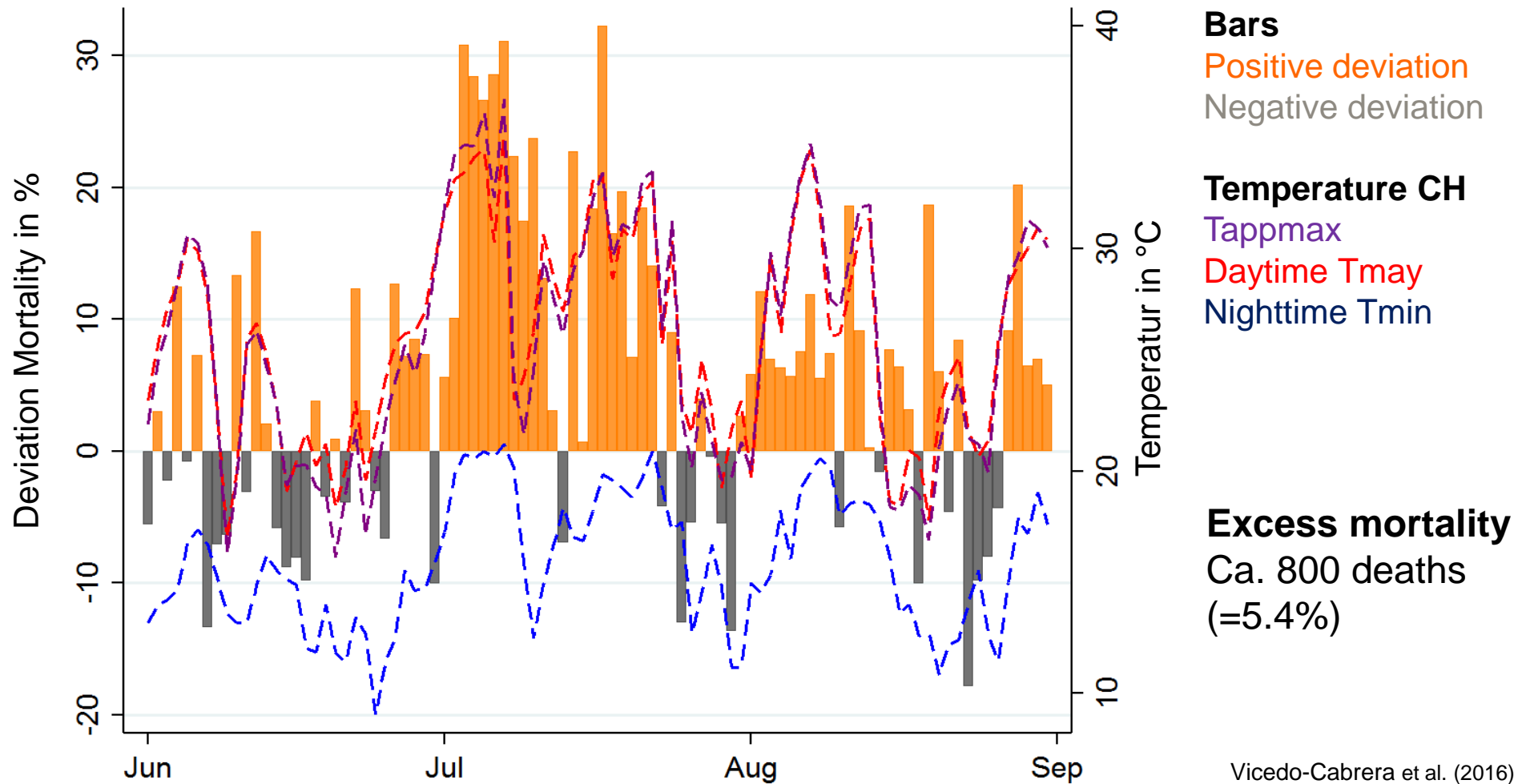
adjusted by long term and seasonal trends (sine-cosine function of time), and population size.



$$Excess\ Deaths_{i(2015),j,k,l} = Observed\ Deaths_{i(2015),j,k,l} - Expected\ Deaths_{i(2015),j,k,l}$$

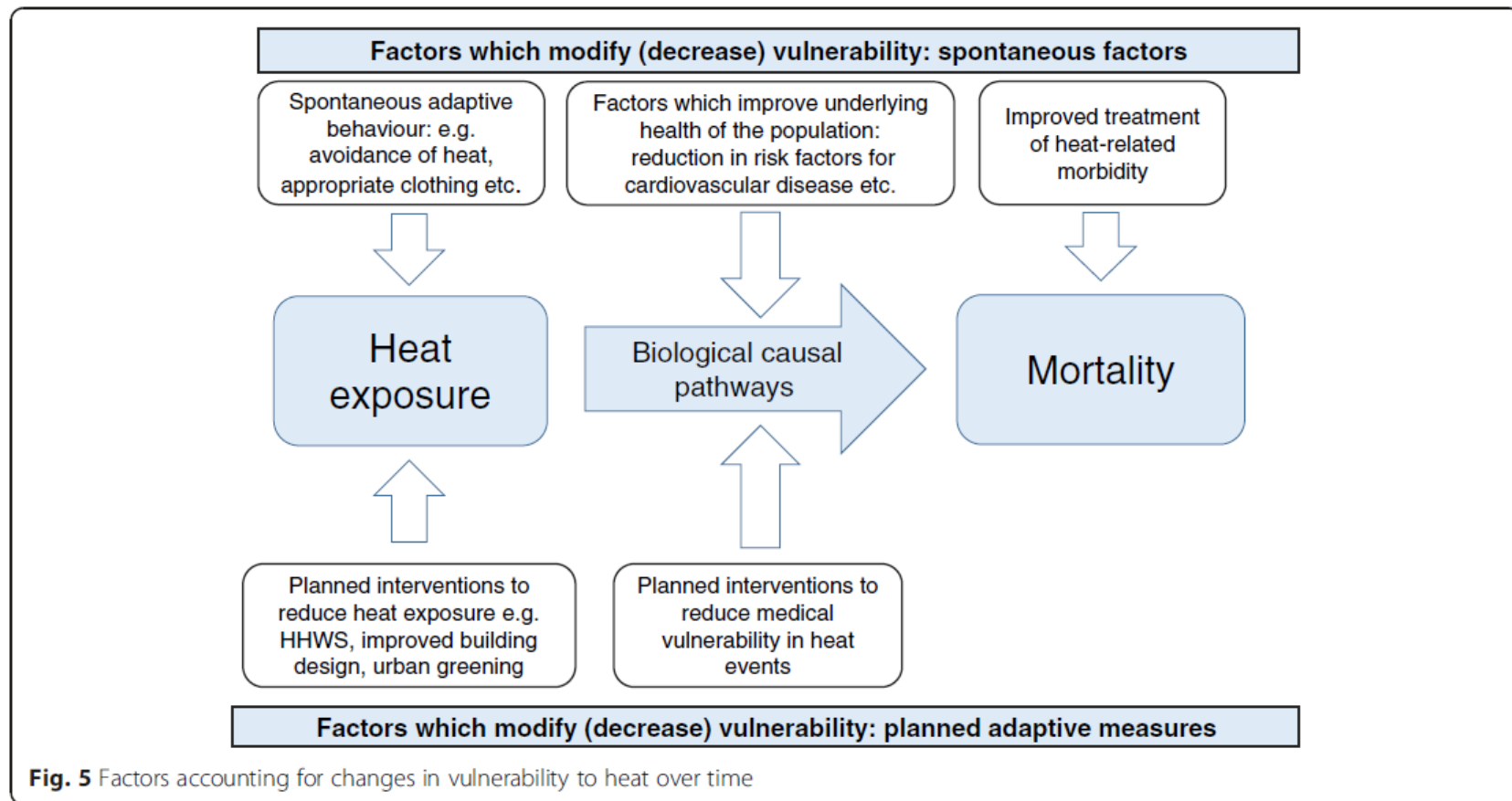


Summer 2015 excess mortality

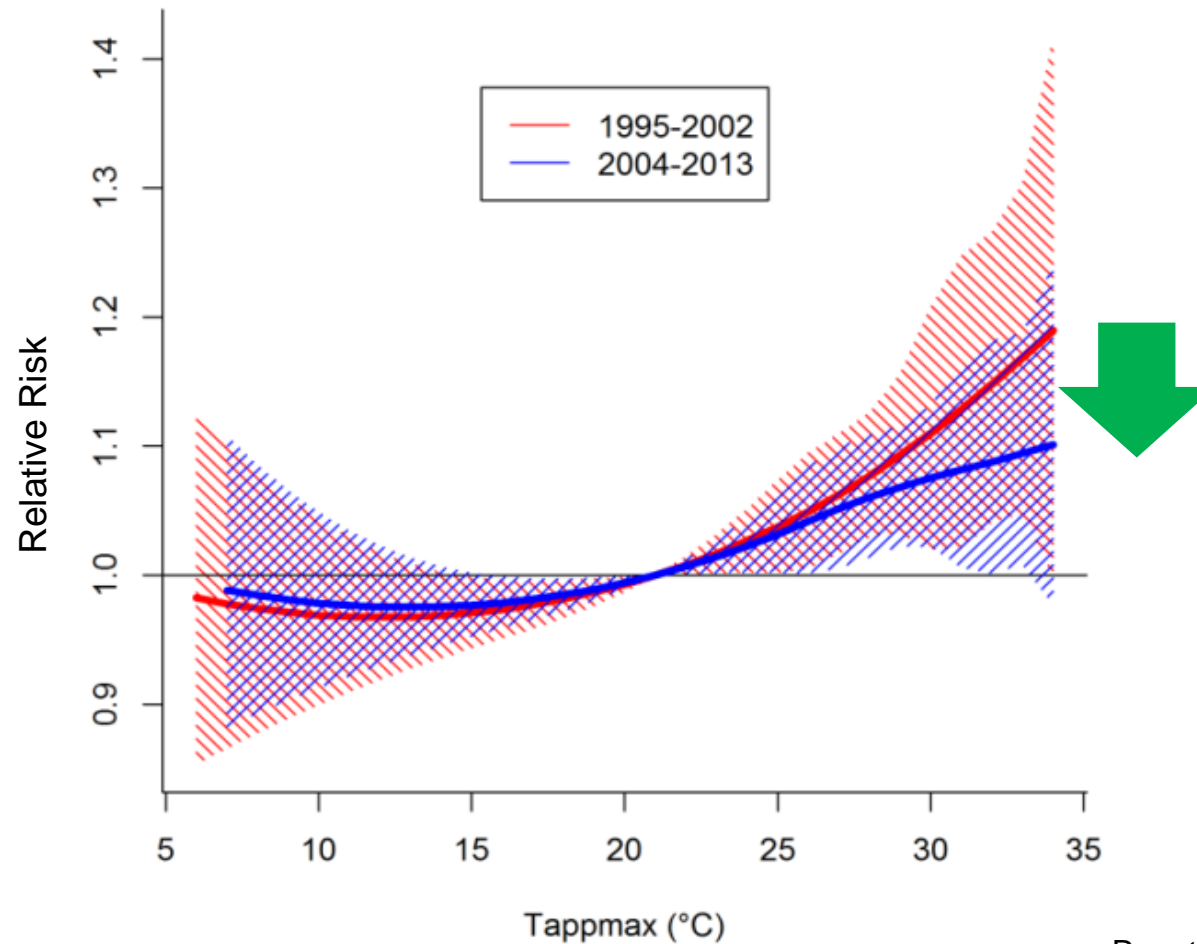


Vicedo-Cabrera et al. (2016)

Factors related to heat related mortality over time



Relationship temperature-mortality in 8 main Swiss cities



Ragetti et al. *Env Res* 2017

Predictions based on attributable fractions

1. Relationship between risk factor and health outcome
2. Calculating disability-adjusted life years
3. Calculating attributable fraction based on climate predictions

Predictions (DALYs) for South Korea:

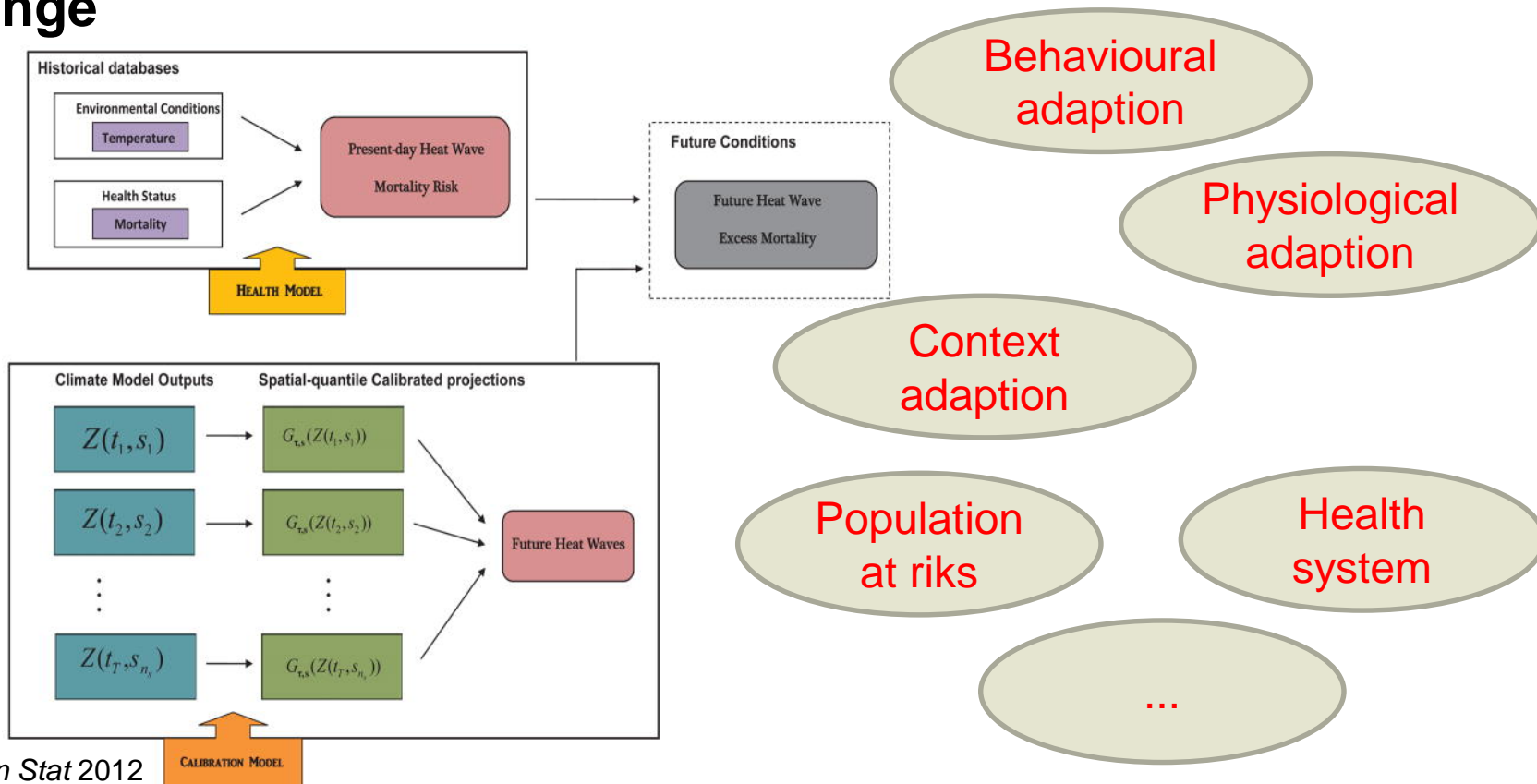
Table 7 – Predicted burden of disease by climate change scenario in disability-adjusted life years/1000 population.

	2008	2020	2030	2040	2050	2060	2070	2080	2090	2100
Heatwave	5.19	5.19	6.29	6.29	7.27	7.27	8.35	8.35	9.53	9.53
Temperature	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.09	0.09	0.09
Ozone density	1.59	1.59	1.59	1.59	1.59	1.59	1.59	1.80	1.80	1.80
Disaster	0.03	0.03	0.04	0.04	0.04	0.05	0.05	0.06	0.06	0.07

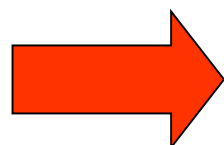
Here no differentiation between natural and climate change induced effects

Yoon et al. *Public Health* 2014

Example: estimating the Heat Related Health Impact of Climate Change



Zhou et al. *J Agric Biol Environ Stat* 2012



Estimation of climate change related health effects is based on assumption and not necessarily a forecast what will happen

Combining heat extremes and population ageing

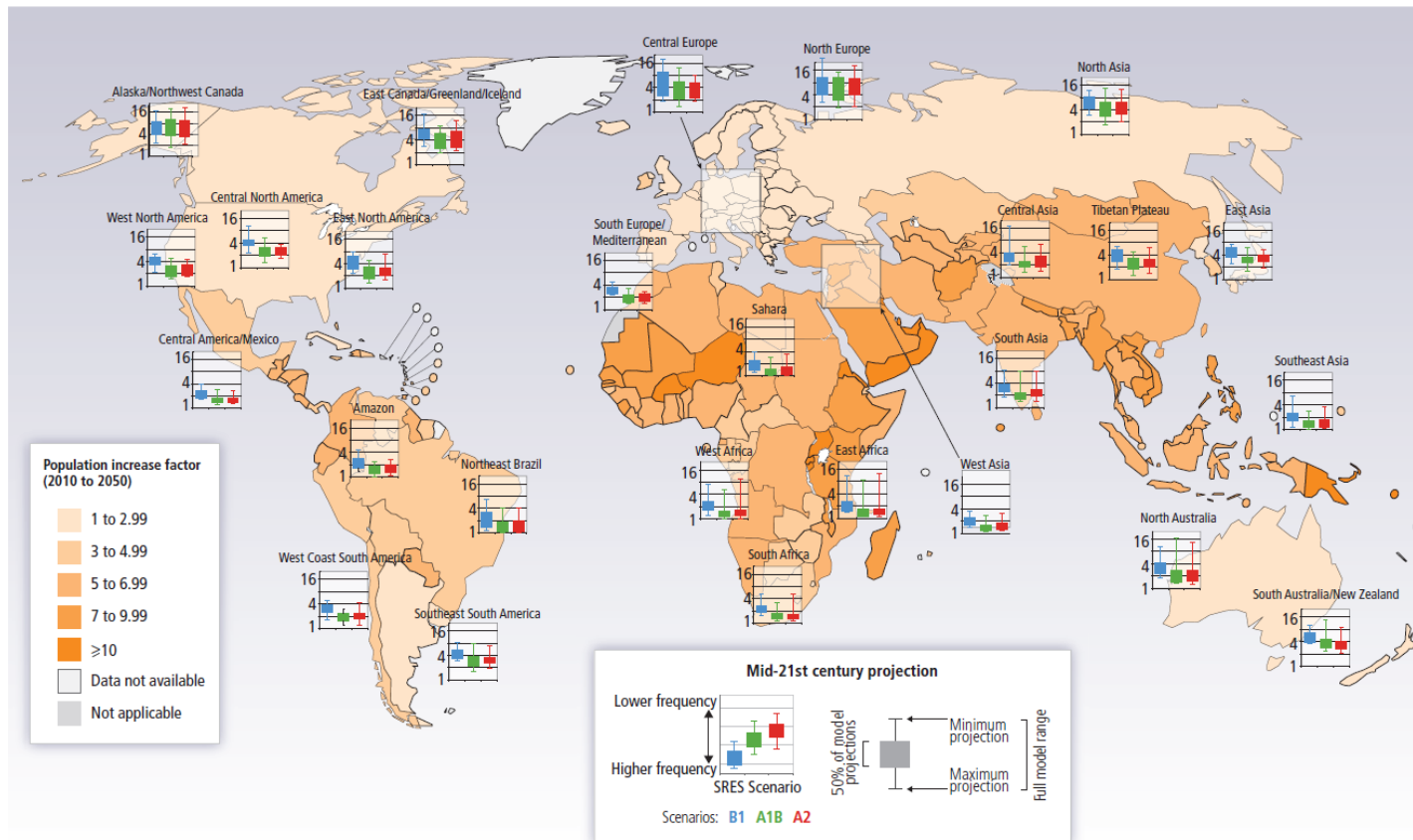
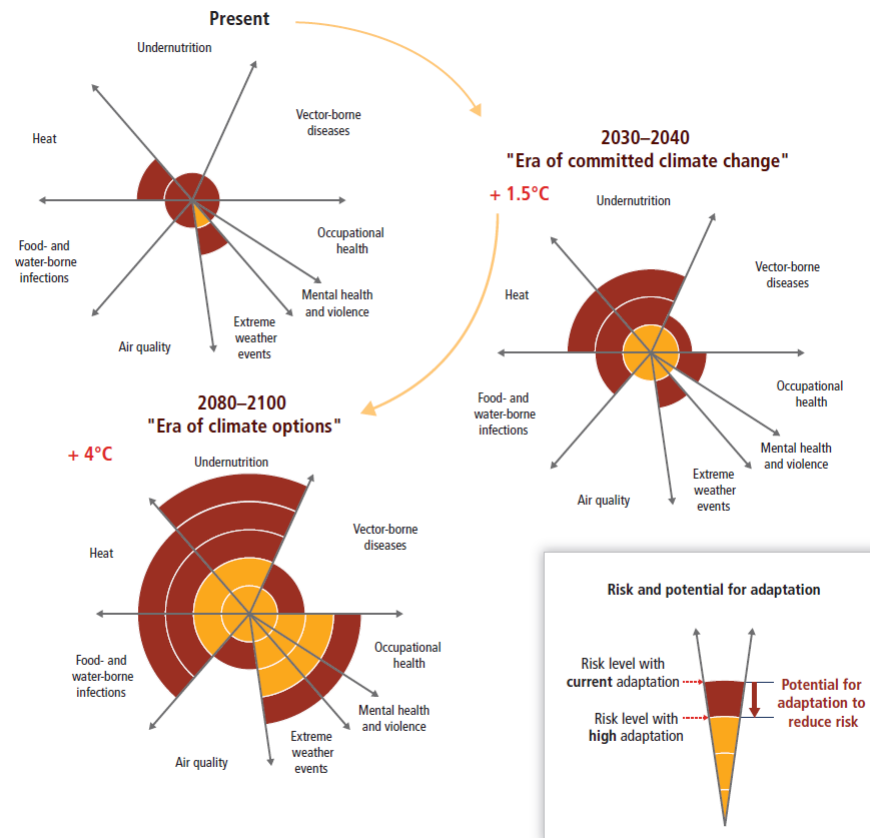


Figure 11-2 | Increasingly frequent heat extremes will combine with rapidly growing numbers of older people living in cities—who are particularly vulnerable to extreme heat. Countries are shaded according to the expected proportional increase in urban populations aged over 65 by the year 2050. Bar graphs show how frequently the maximum daily temperature that would have occurred only once in 20 years in the late 20th century is expected to occur in the mid-21st century, with lower numbers indicating more frequent events. Results are shown for three different Special Report on Emission Scenarios (SRES) scenarios (blue = B1; green = A1B, red = A2), as described in the IPCC Special Report on Emissions Scenarios, and based on 12 global climate models participating in the third phase of the Coupled Model Intercomparison Project (CMIP3). Colored boxes show the range in which 50% of the model projections are contained, and whiskers show the maximum and minimum projections from all models (WHO and WMO, 2012).

Smith et al.,
2014

Conceptual presentation of the health impacts from climate change and the potential for impact reduction through adaptation

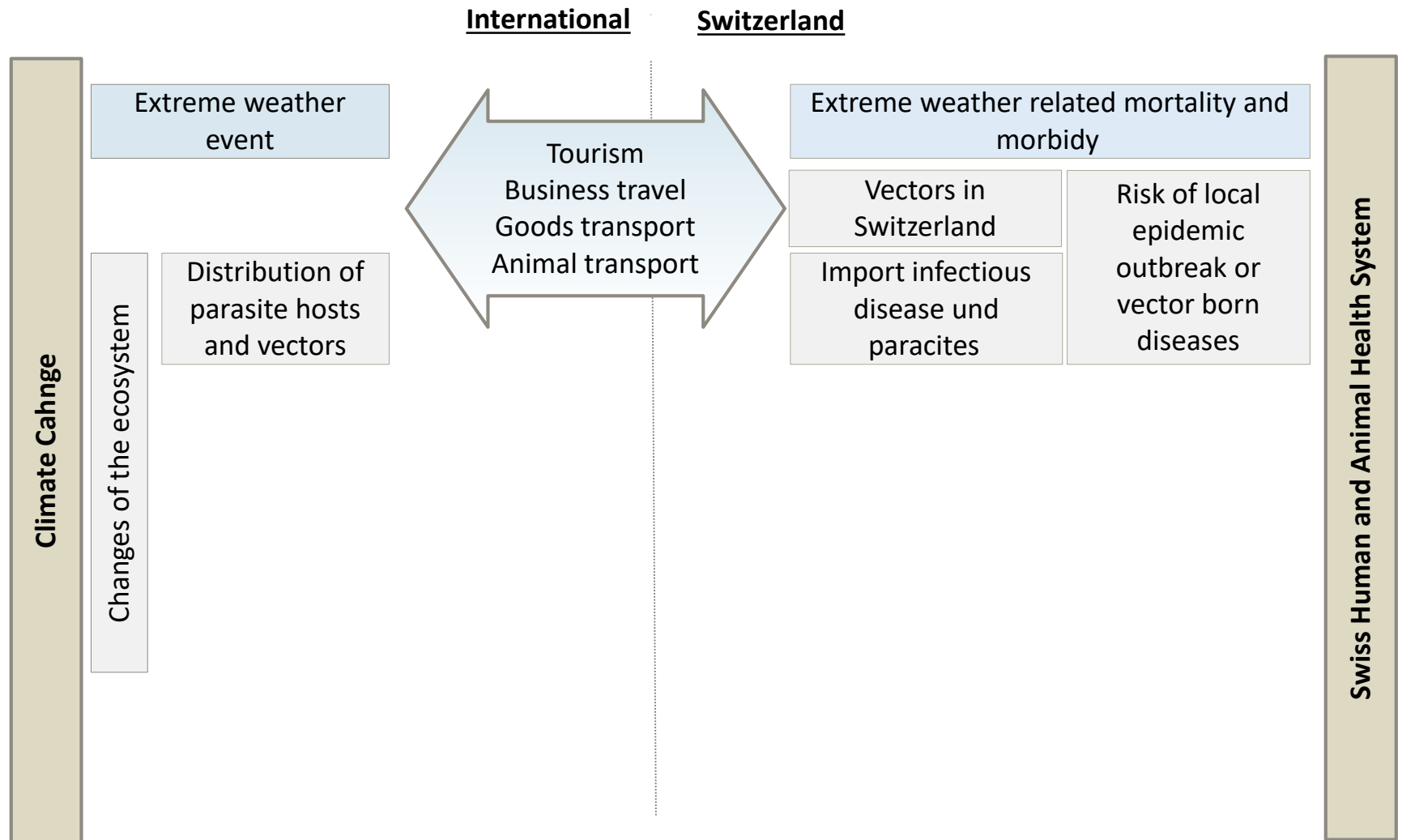


Smith et al.,
2014

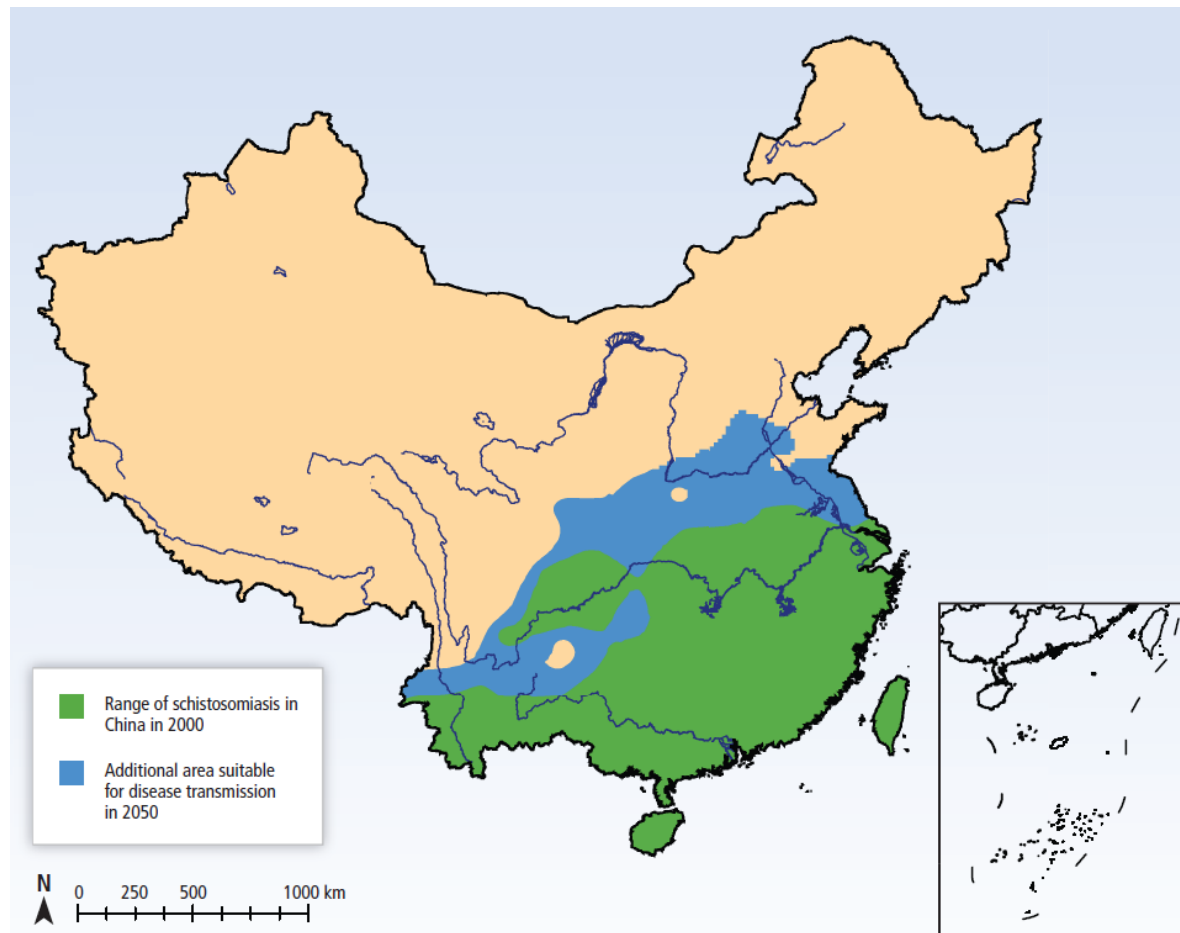
3. What are the impacts of climate change related events challenges abroad on health in Switzerland (or other European countries)?



CC abroad -> health Switzerland



Example: effect of rising temperatures and potential area of transmission of *Schistosomiasis japonica*



Autochthonous Case of Eosinophilic Meningitis Caused by *Angiostrongylus cantonensis*, France, 2016

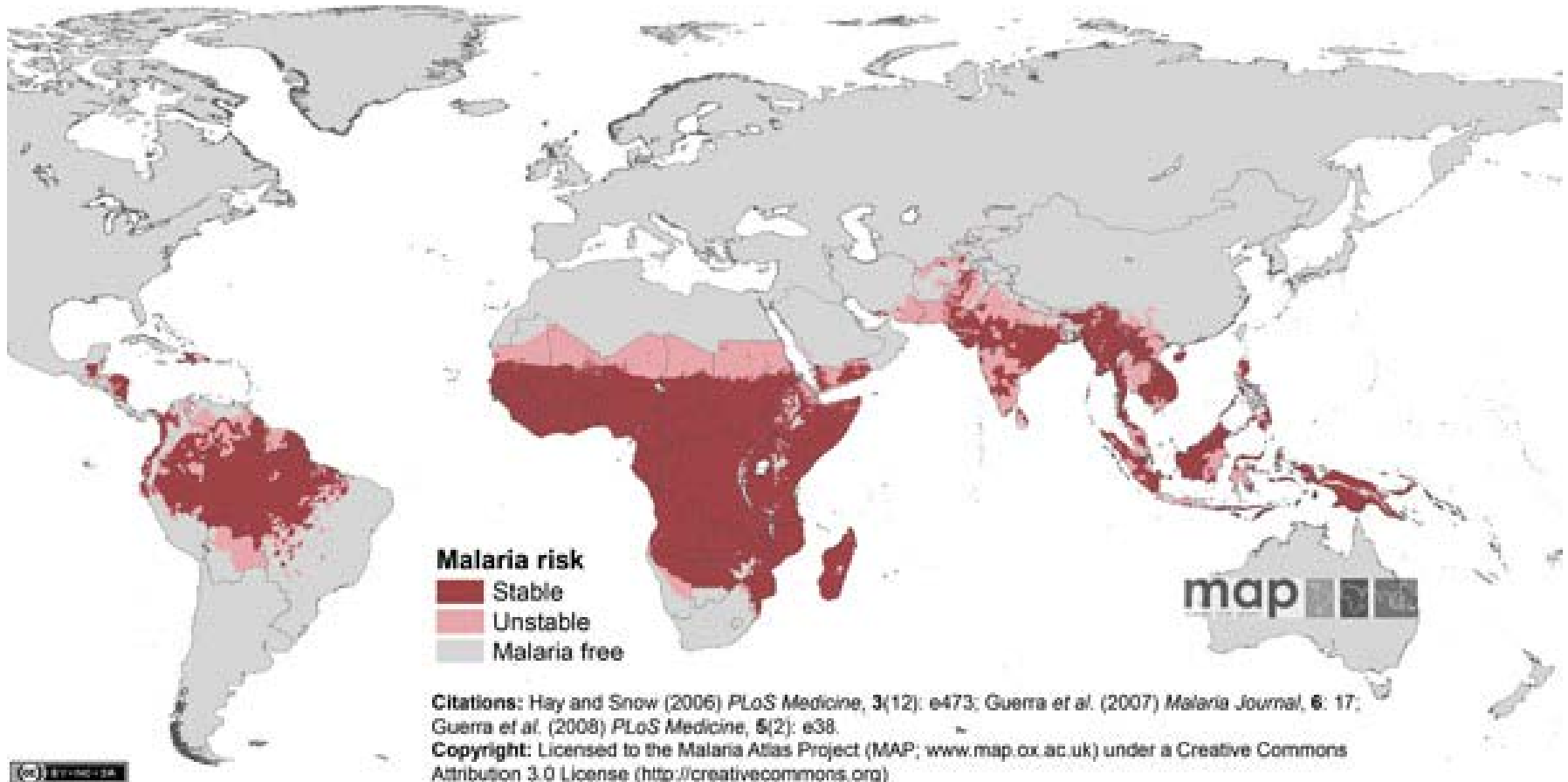
Yann Nguyen, Benjamin Rossi, Nicolas Argy, Catherine Baker, Beatrice Nickel, Hanspeter Marti, Virginie Zarrouk, Sandrine Houzé, Bruno Fantin, Agnès Lefort

Author affiliations: Hôpital Beaujon, Clichy, France (Y. Nguyen, B. Rossi, C. Baker, V. Zarrouk, B. Fantin, A. Lefort); Hôpital Bichat, Paris, France (N. Argy, S. Houzé); Swiss Tropical and Public Health Institute, Basel, Switzerland (B. Nickel, H. Marti); University of Basel, Basel (B. Nickel, H. Marti)

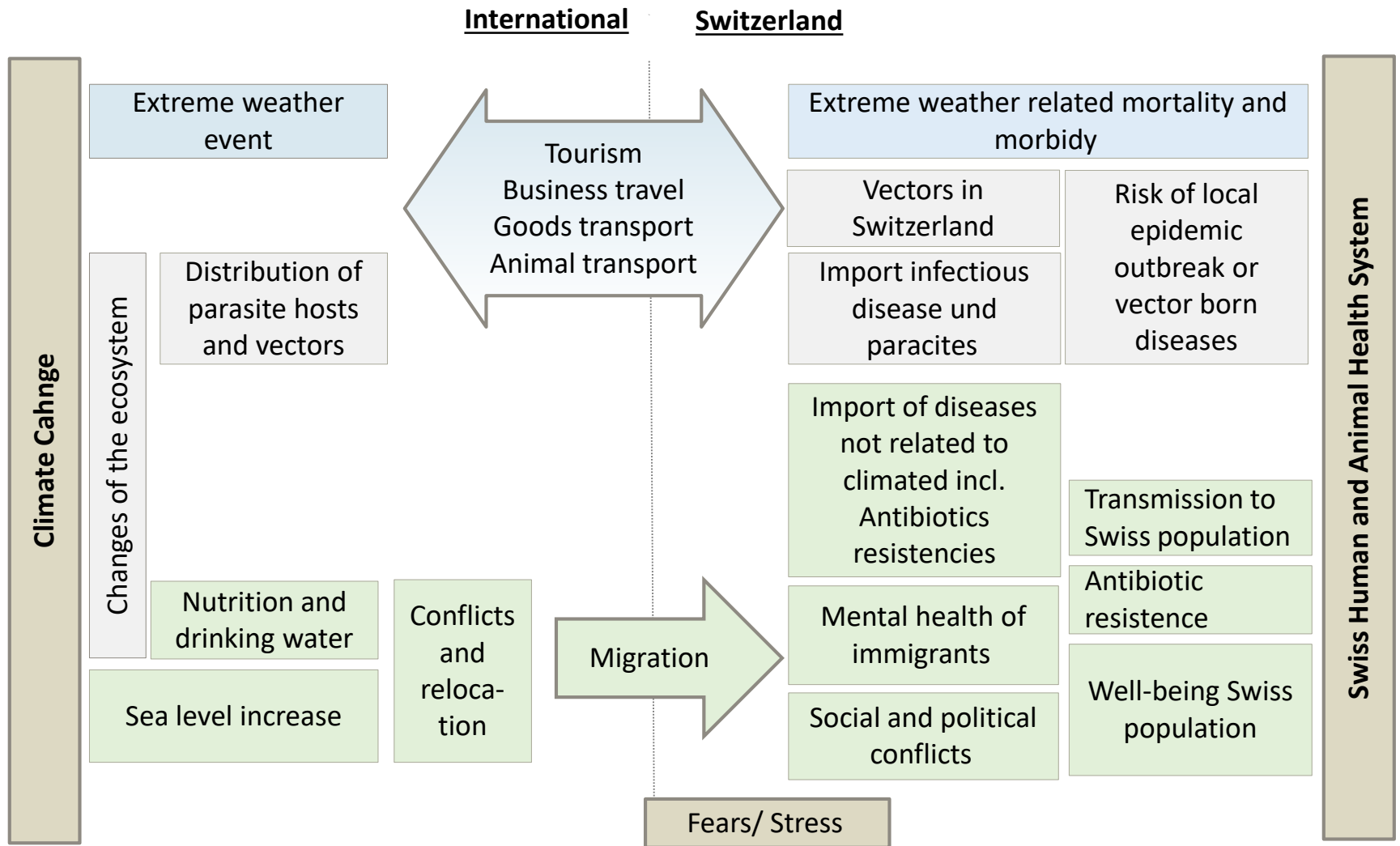
DOI: <https://dx.doi.org/10.3201/eid2306.161999>

We report a case of a 54-year-old Moroccan woman living in France diagnosed with eosinophilic meningitis caused by *Angiostrongylus cantonensis*. Diagnosis was based on clinical symptoms and confirmed by testing of serum and cerebrospinal fluid samples. Physicians should consider the risk for *A. cantonensis* infection outside of endemic areas.

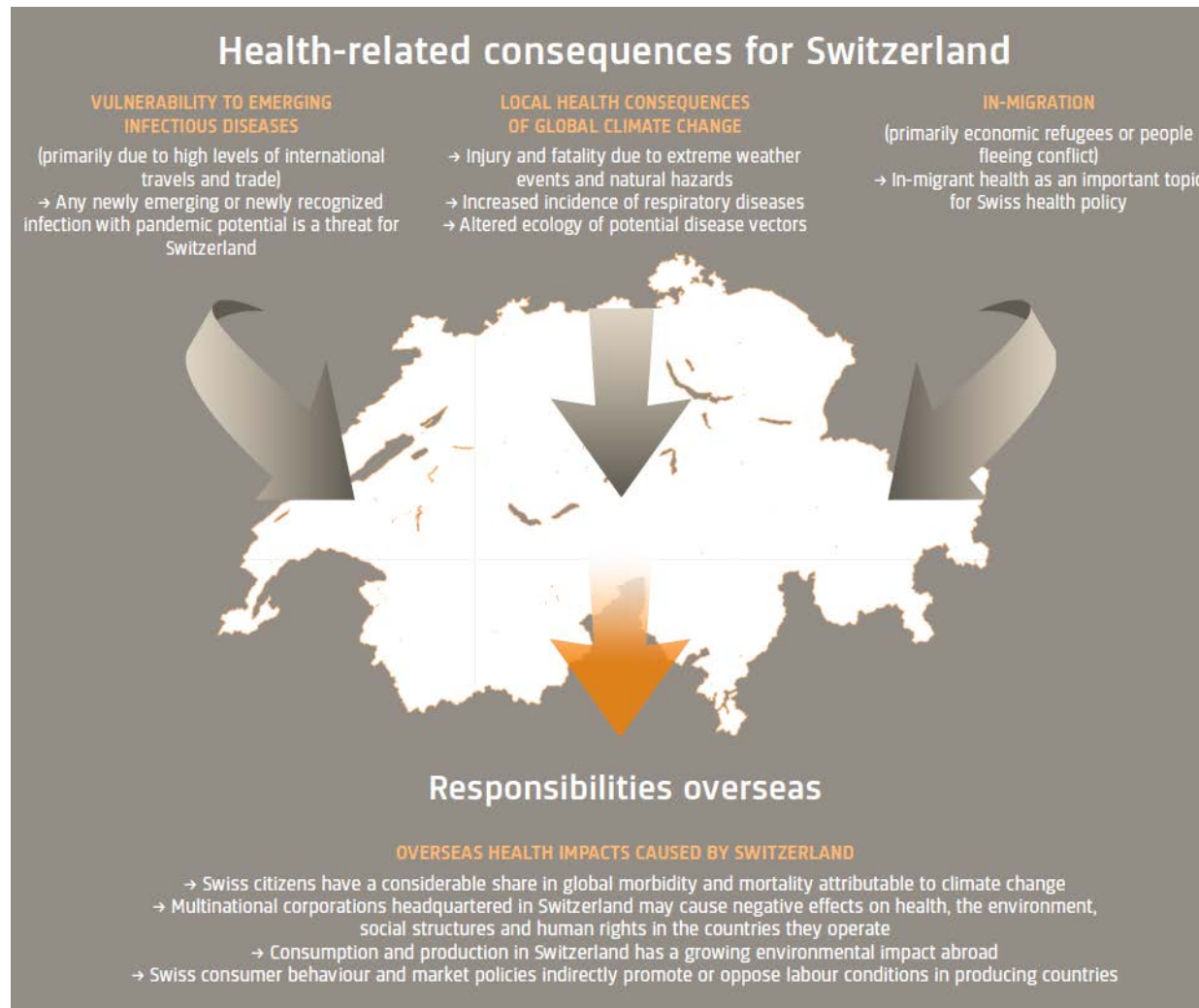
Travel advices



CC abroad -> Health Switzerland



1. Concerns and responsibilities for Switzerland



Winkler et al.
A+ Factsheet, 2015,

Summary: CC abroad ->health in Switzerland

- More health problems due to disease transmission and illness from travel
- Higher risk of local epidemic outbreaks in Switzerland due to infected travellers and migrants (also in combination with spread of vectors in Switzerland)
- Burden to Swiss health system from migrants
- Import of nutrition related infections and zoonose
- Climate change discussion as stressor: -> Mental health in Swiss residents

CC effects on health abroad -> Impact Switzerland

- Need of first aid from Switzerland due to disasters abroad
- Swiss health expertise needed abroad
- Epidemics abroad affect business in Switzerland (e.g. large fairs)
- Swiss insurances due to major health events abroad (epidemics, disasters)

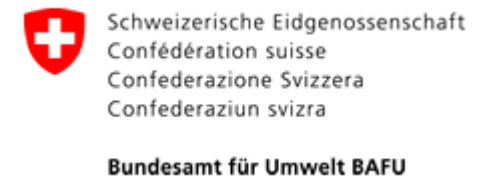


Conclusions

- Climate change is one of numerous factors affecting population's health
- To estimate health impact of climate change is a challenge
- In a globally connected world Switzerland will be affected with climate change induced (health) effects abroad
- Due to complexity: we need to think outside the box

Acknowledgements

Dr. Martina Ragetti



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<https://www.swisstph.ch/de/ueber-uns/eph/environmental-exposures-and-health/evaluation-of-heat-wave-related-mortality-and-adaptation-measures-in-switzerland>