Decomposition techniques in population health research

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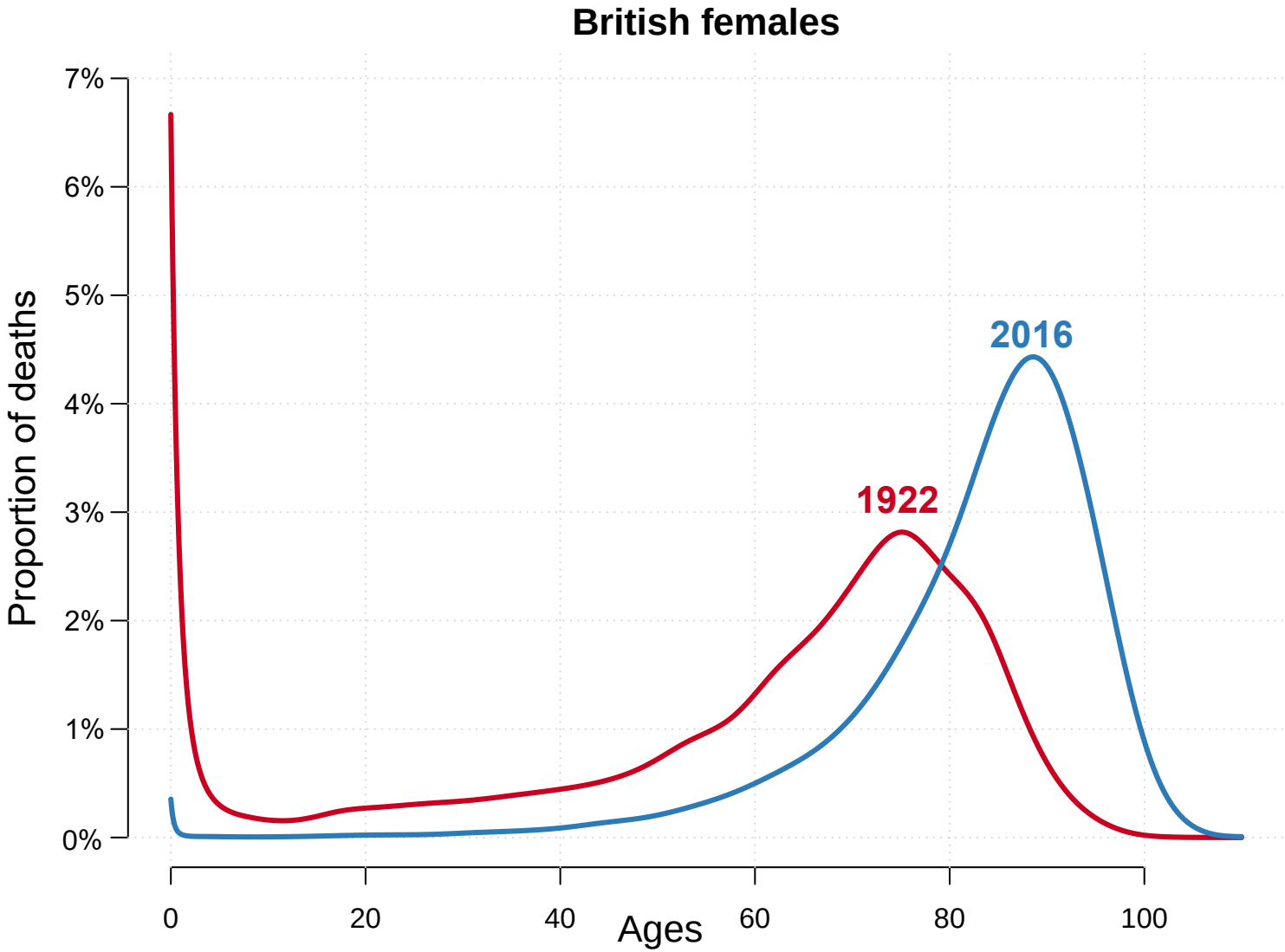
What is lifespan inequality?



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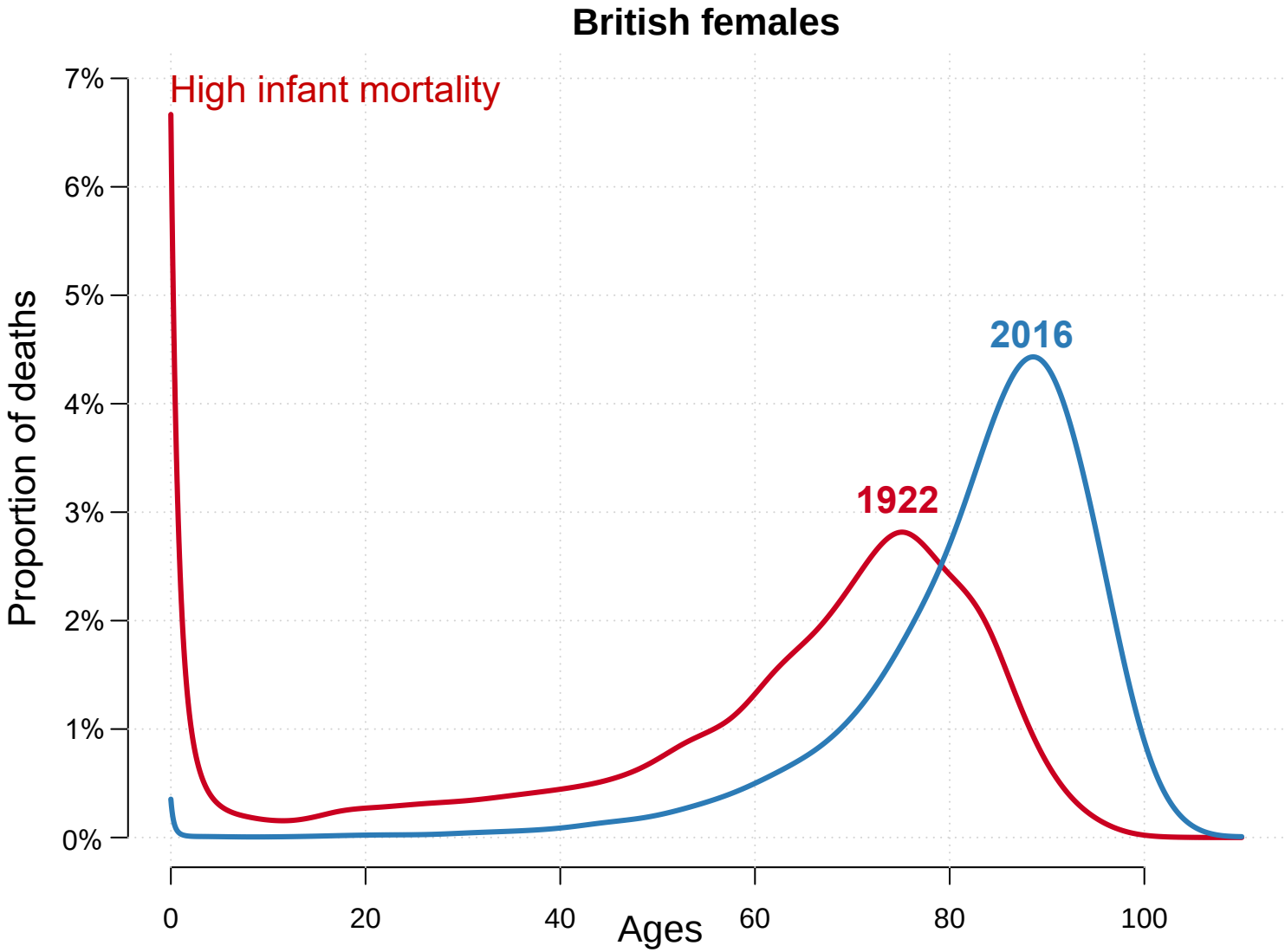

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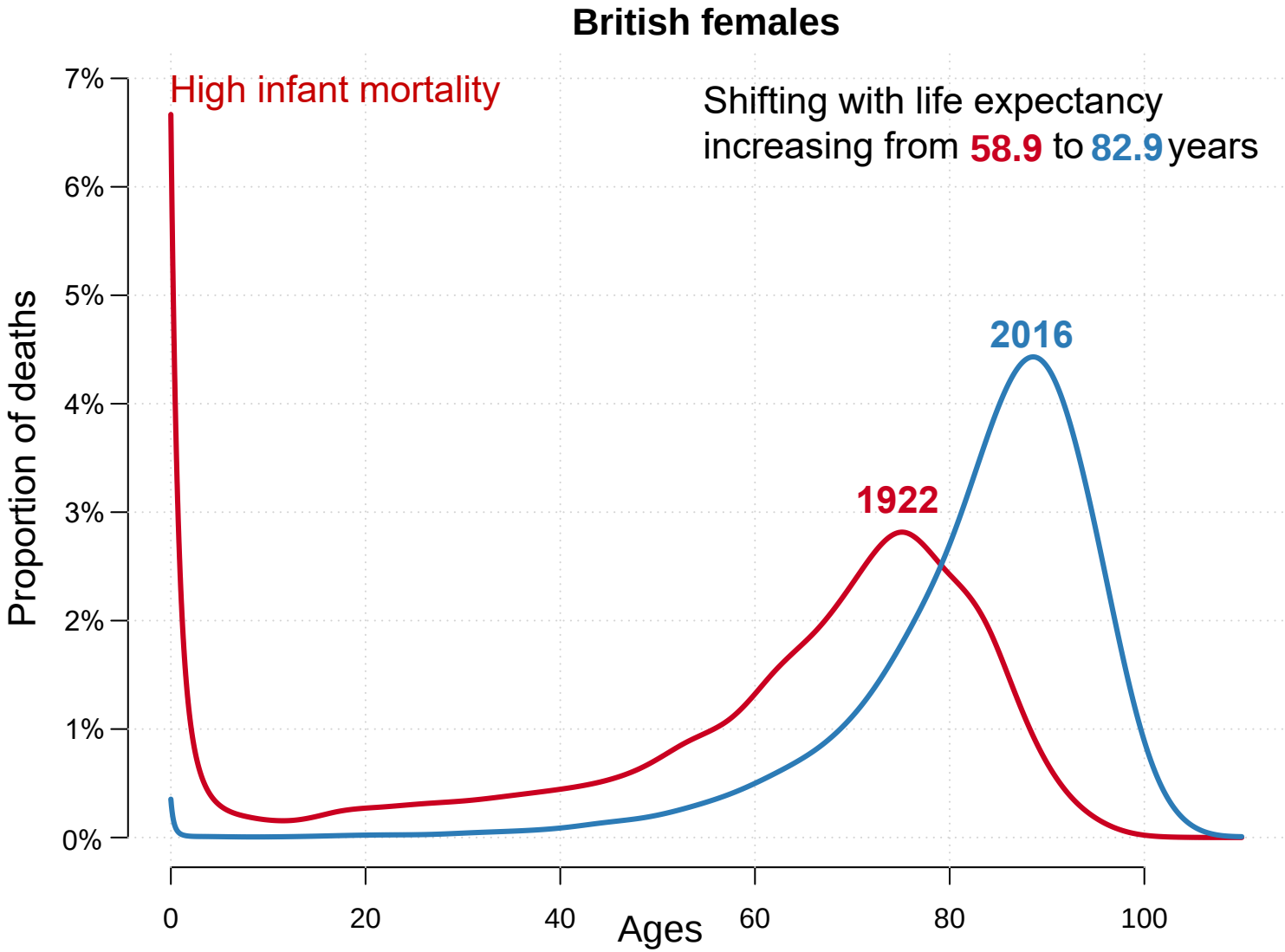

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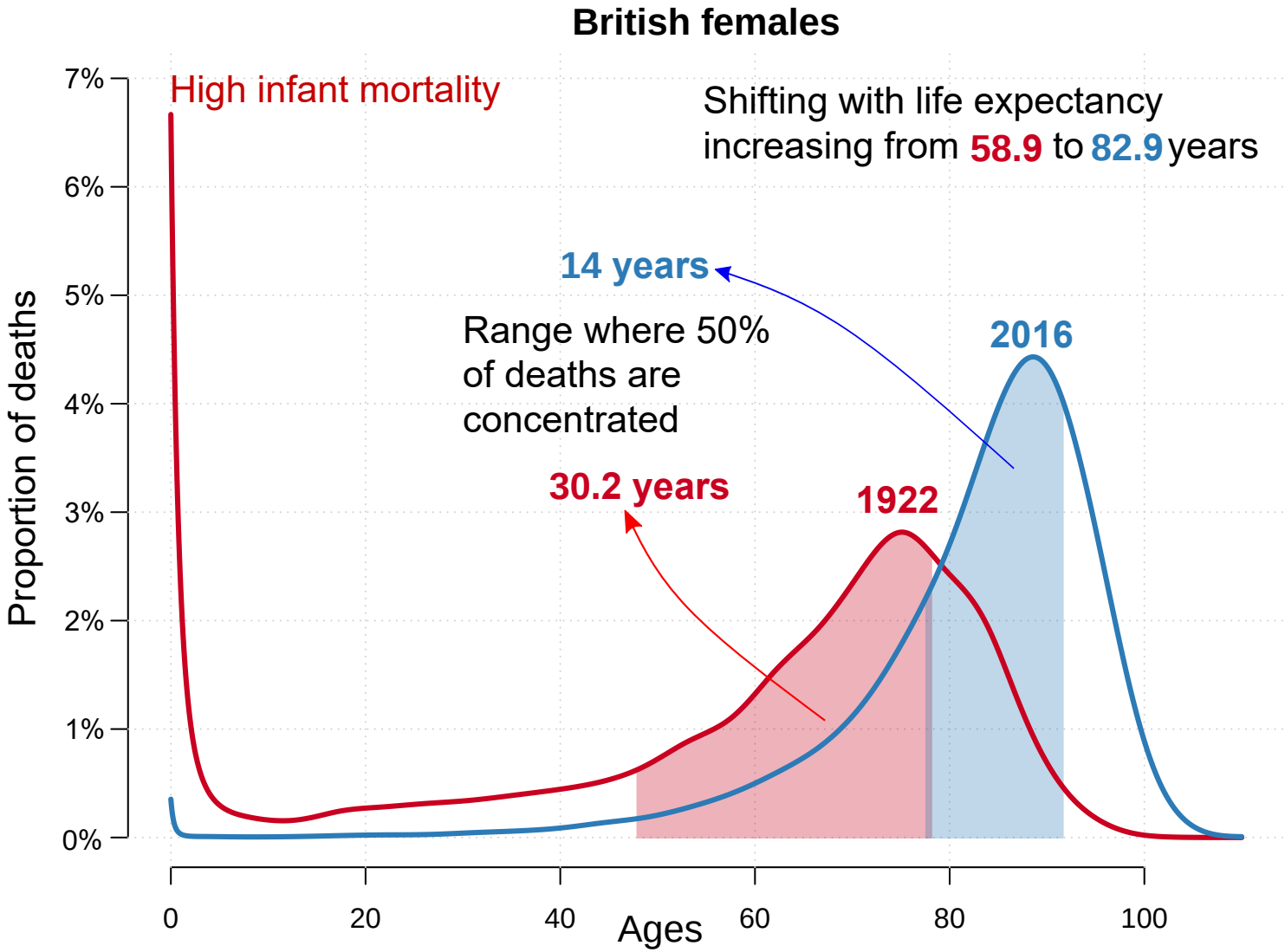

Why studying lifespan inequality?

- **Complements** life expectancy.

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- **Complements** life expectancy.
- Reflects **individual uncertainty** in the timing of death (micro).
- **Heterogeneity** in underlying population health (macro).

Spread-Allocation-Timing

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Latin American convergence and divergence towards the mortality profiles of developed countries

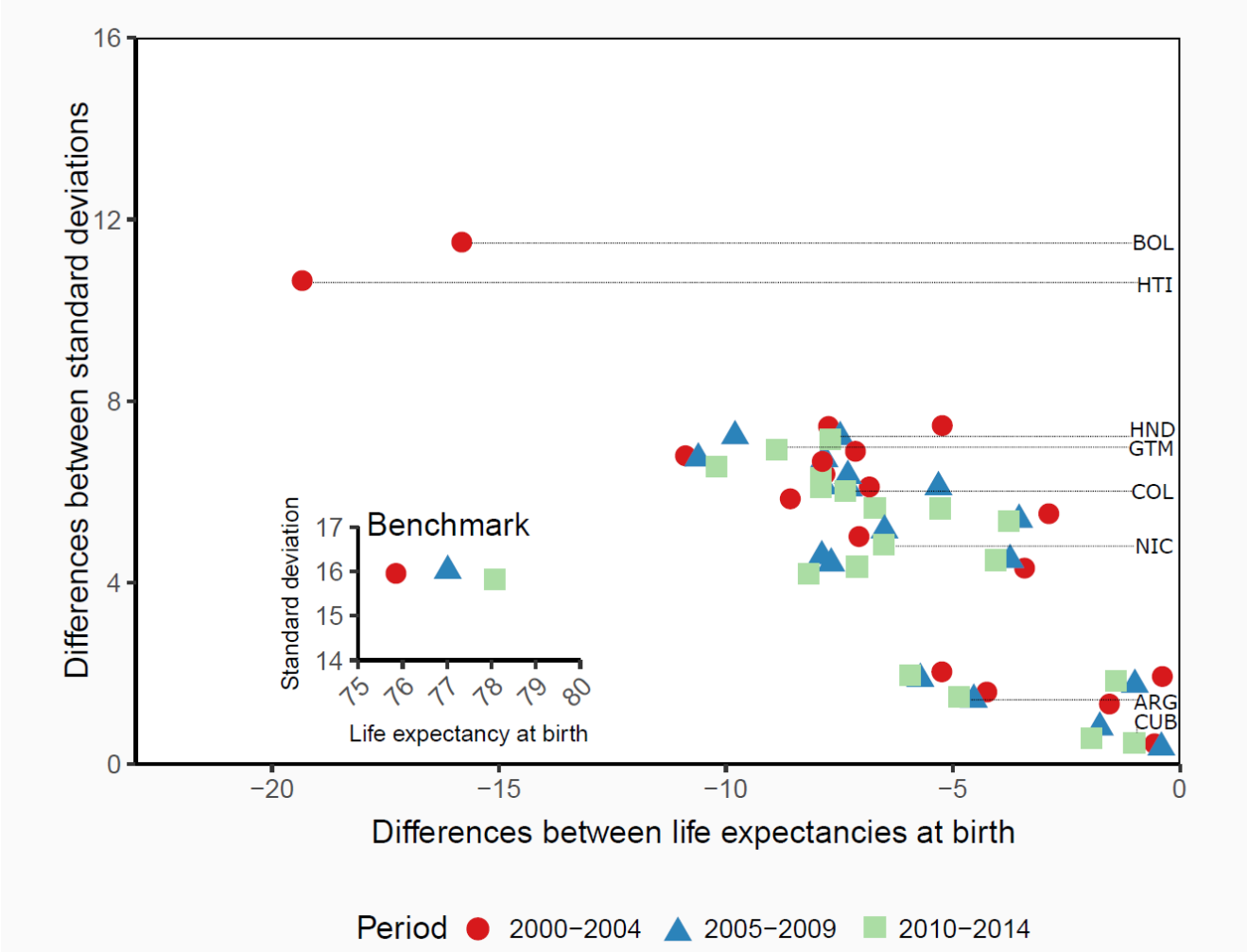
Jesús-Adrián Alvarez [1], José Manuel Aburto [1,2] and Vladimir Canudas-Romo [3]

[1]University of Southern Denmark, [2]Max Planck Institute for Demographic Research, [3]Australian National University

It is uncertain whether Latin America and Caribbean (LAC) countries are approaching a single mortality regime. Over the last three decades, LAC has experienced major public health interventions and the highest number of homicides in the world. However, these interventions and homicide rates are not evenly shared across countries. This study documents trends in life expectancy and lifespan variability for 20 LAC countries, 2000–14. By extending a previous method, we decompose differences in lifespan variability between LAC and a developed world benchmark into cause-specific effects. For both sexes, dispersion of amenable diseases through the age span makes the largest contribution to the gap between LAC and the benchmark. Additionally, for males, the concentration of homicides, accidents, and suicides in mid-life further impedes mortality convergence. Great disparity exists in the region: while some countries are rapidly approaching the developed regime, others remain far behind and suffer a clear disadvantage in population health.

Supplementary material for this article is available at: http://dx.doi.org/10.1080/00324728.2019.1614651

Standard deviation and life expectancy differences in for LAC countries and the benchmark trajectory, Males 2000-2014



Extension of SAT decomposition to SD

$$\sigma_l - \sigma_b = spread + allocation + timing + joint,$$

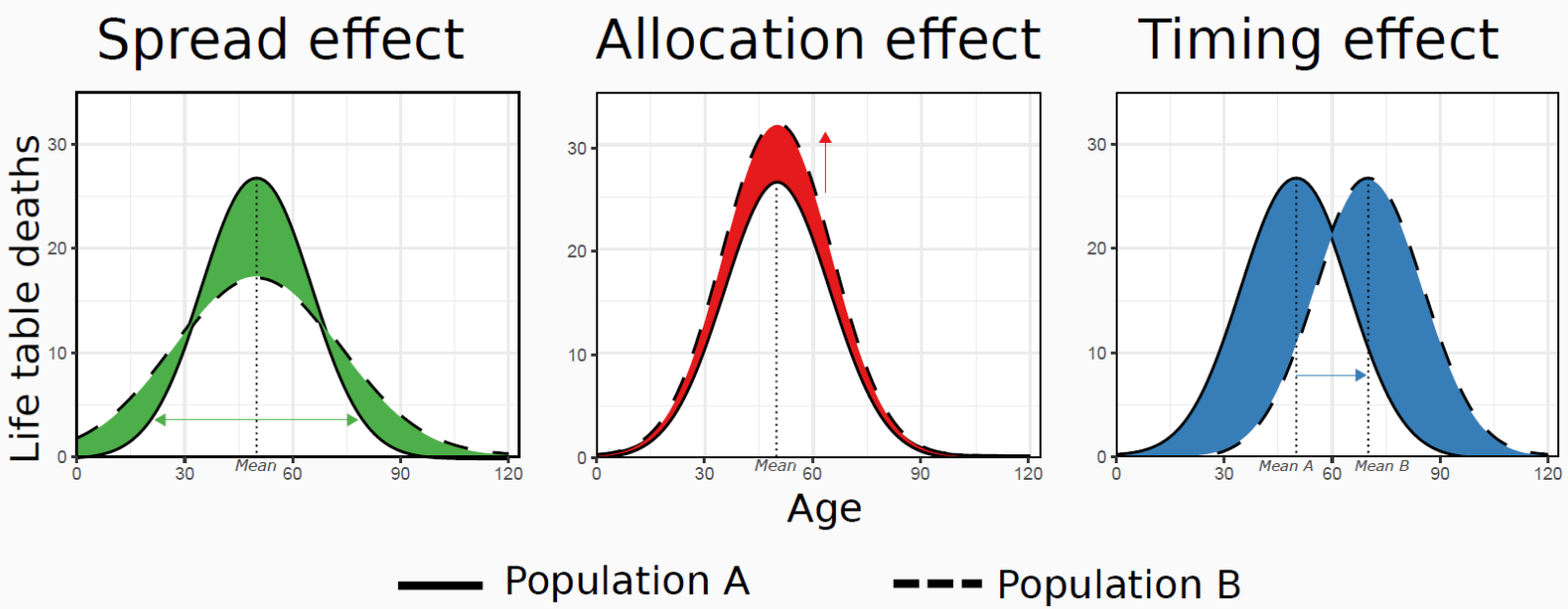
$$spread = K\sum_{c=1}^{C} p_{c,b}(\sigma_{c,l}^2 - \sigma_{c,b}^2)$$

$$allocation = K\sum_{c=1}^{C} (p_{c,l} - p_{c,b})(\sigma_{c,b}^2 - \bar{x}_{c,b}^2)$$

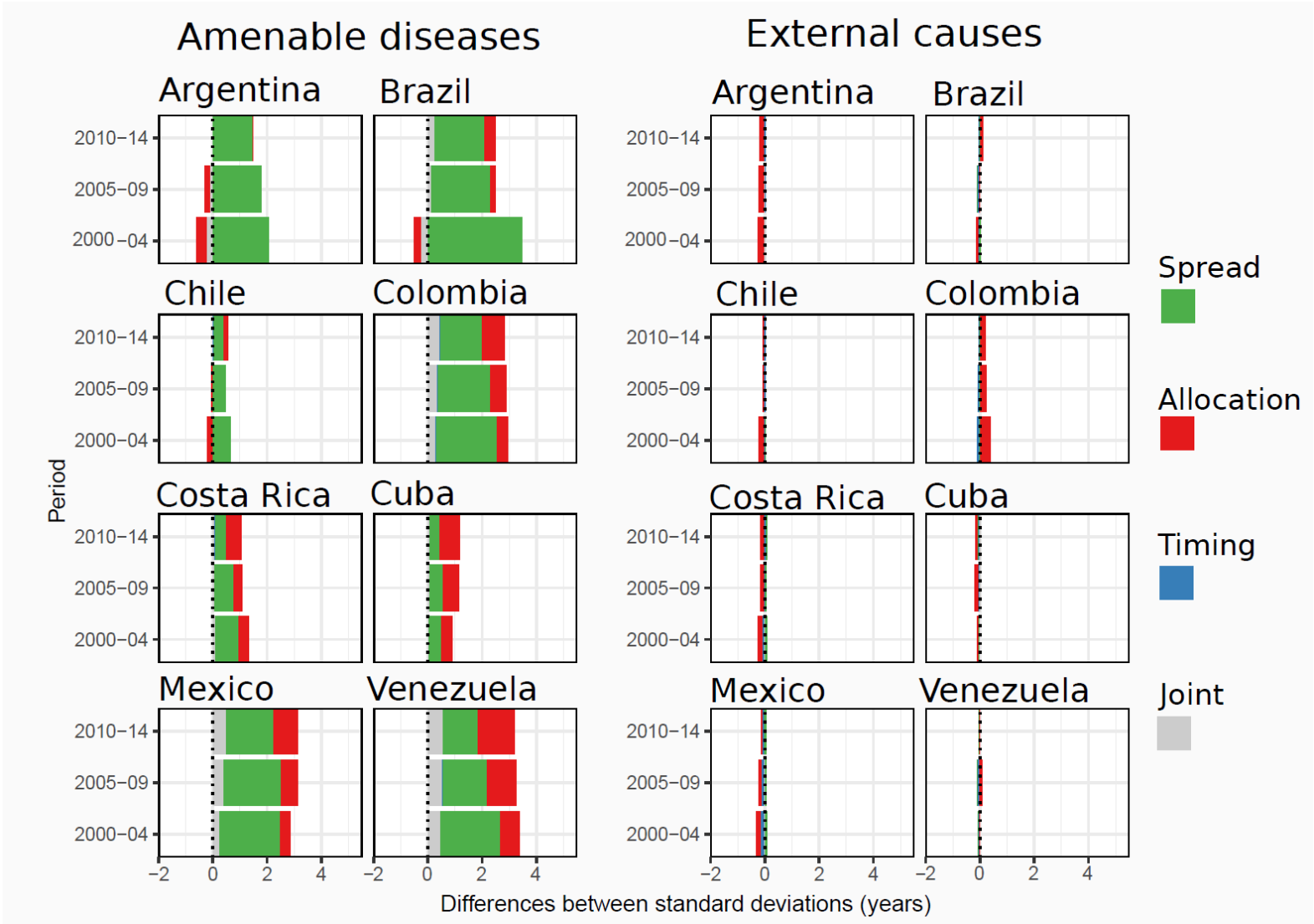
$$timing = K\sum_{c=1}^{C} p_{c,b}(\bar{x}_{c,l}^2 - \bar{x}_{c,b}^2)$$

$$joint = K\sum_{c=1}^{C} (p_{c,l} - p_{c,b})[(\sigma_{c,l}^2 - \sigma_{c,b}^2) - (\bar{x}_{c,l}^2 - \bar{x}_{c,b}^2)].$$

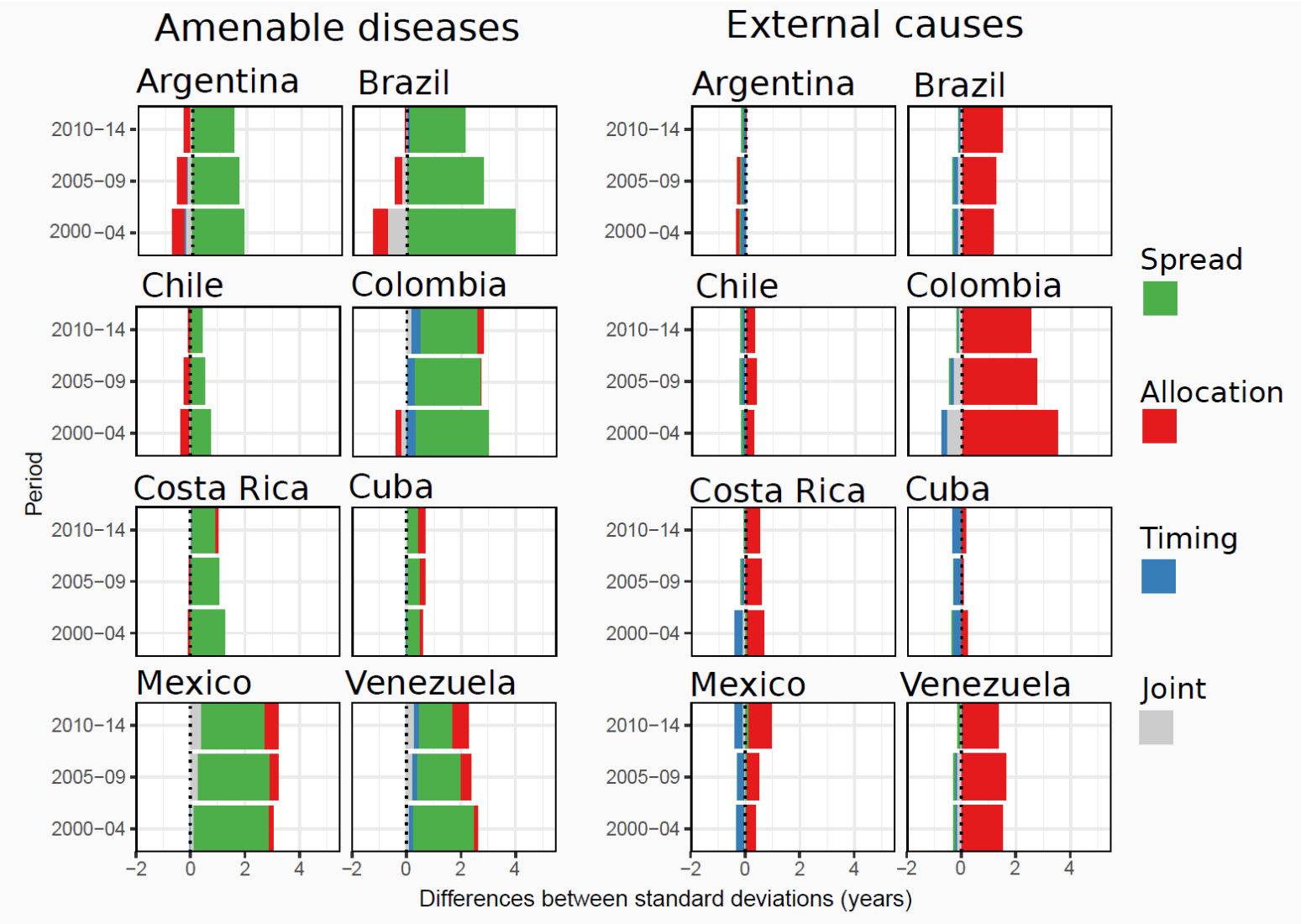
Extension of SAT decomposition to SD



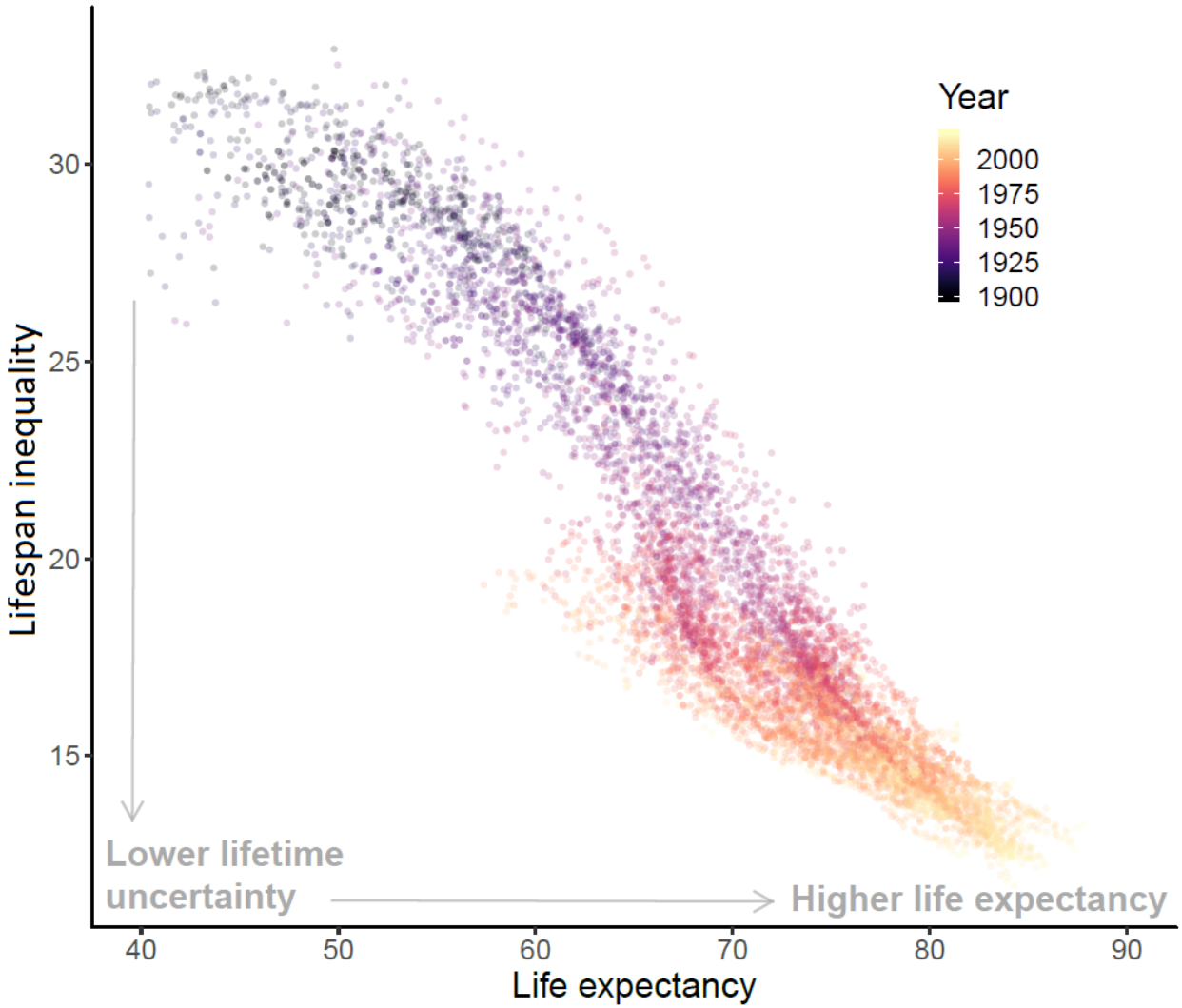
Decomposition differences for females



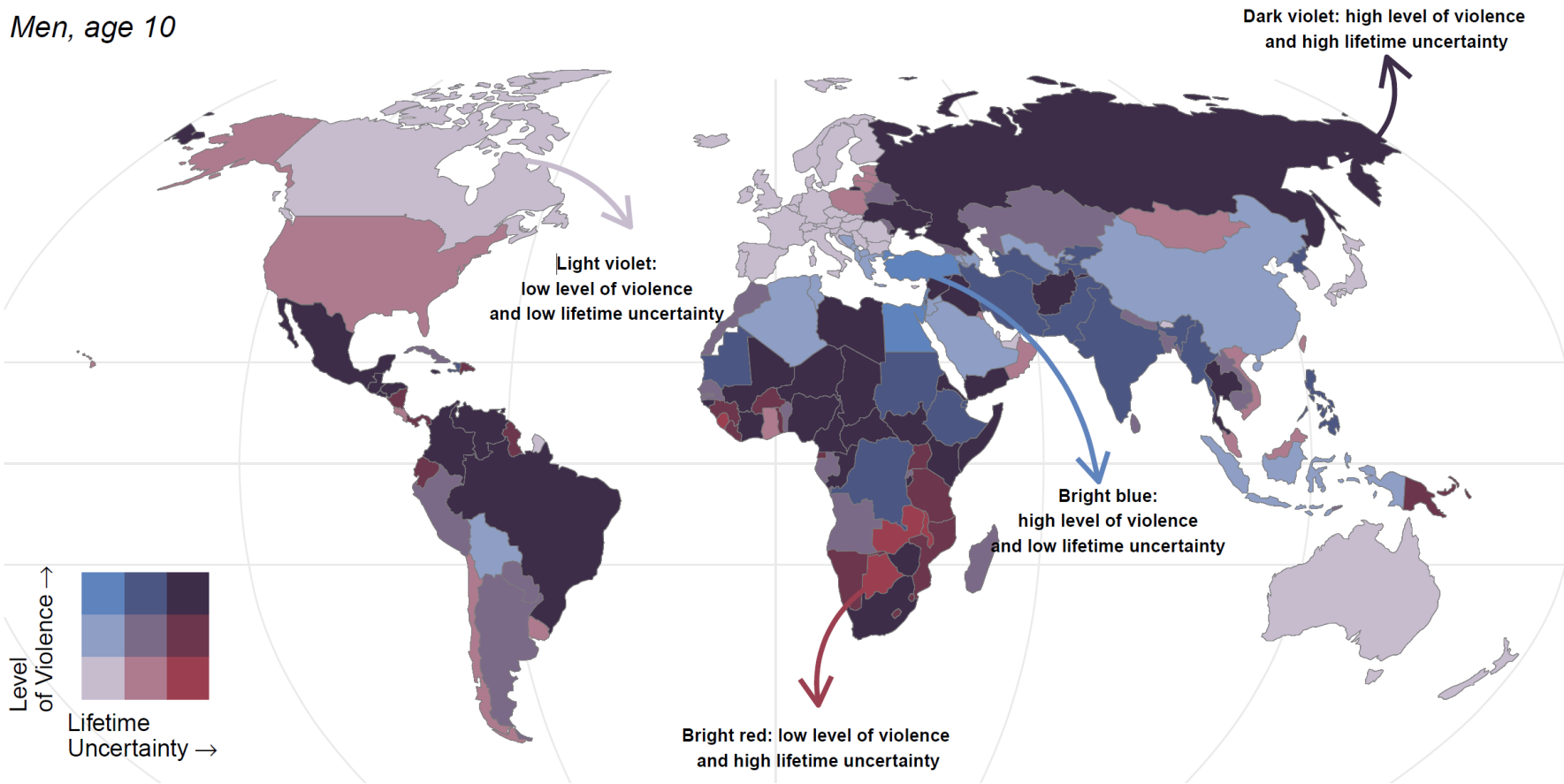
Decomposition differences for males



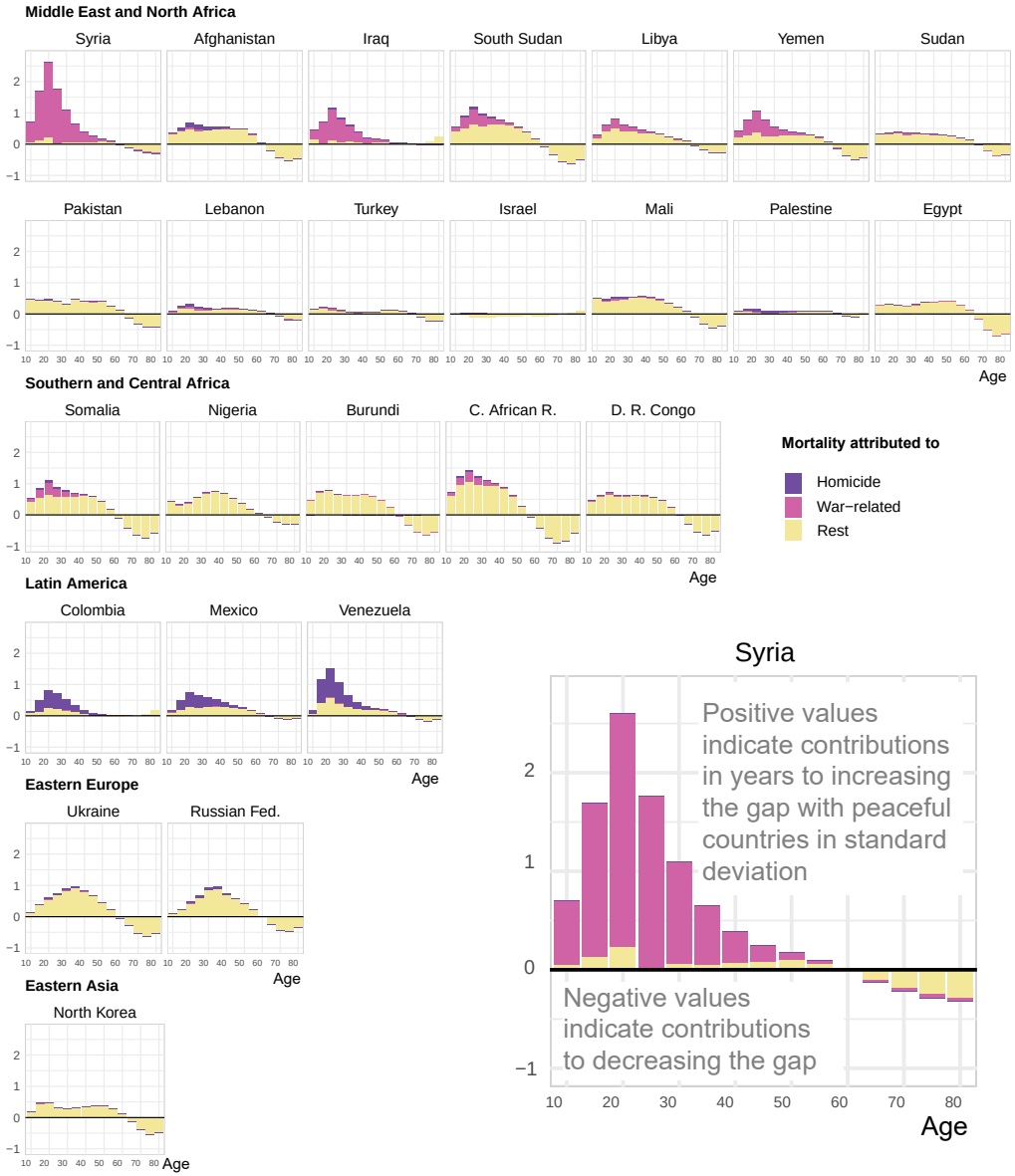
Life expectancy and lifespan inequality (σ)



Edwards and Tuljapurkar, PDR (2005); Smits & Monden, Soc. Sci. Med. (2009); Vaupel et al, BMJ Open (2011)



Aburto et al (Working progress)



Aburto et al (Working progress)

From Ronald Lee's *Demography abandons its core*: "A key staff memeber at NICHD recently said "Formal demography is in a coma. Perhaps we should just let it die a natural death"

Where is formal demography going 20 years later?

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