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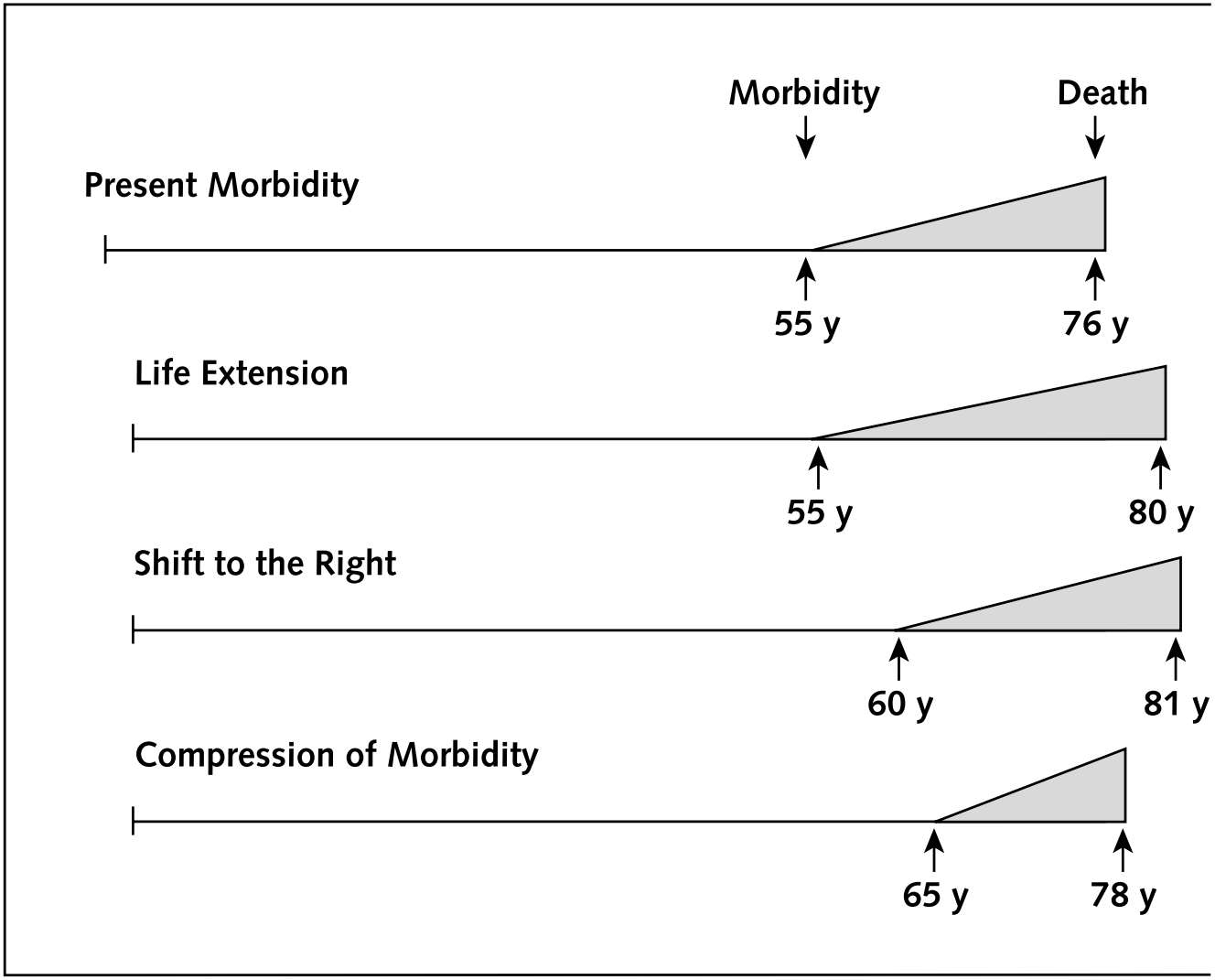
# Morbidity concentration and dispersion

**Tim Riffe, Aïda Solé Auro, Maarten J. Bijlsma**

# Fries' diagrams are a nice prop

***Figure 1.*** **Possible scenarios for future morbidity and longevity.**



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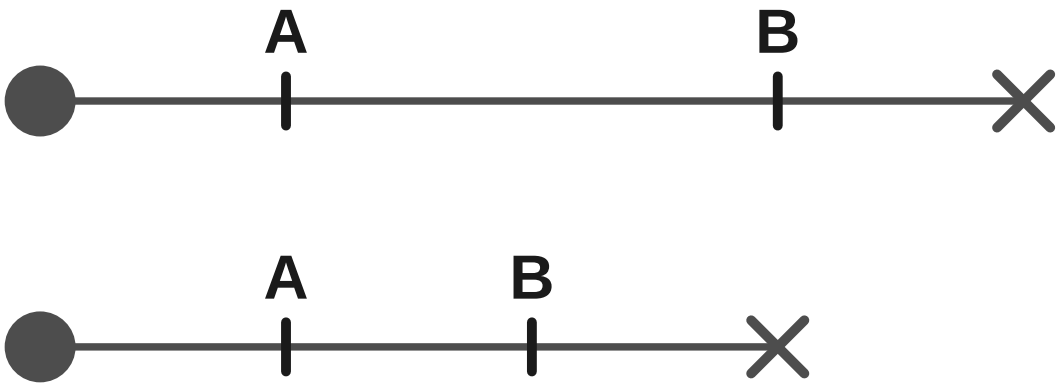

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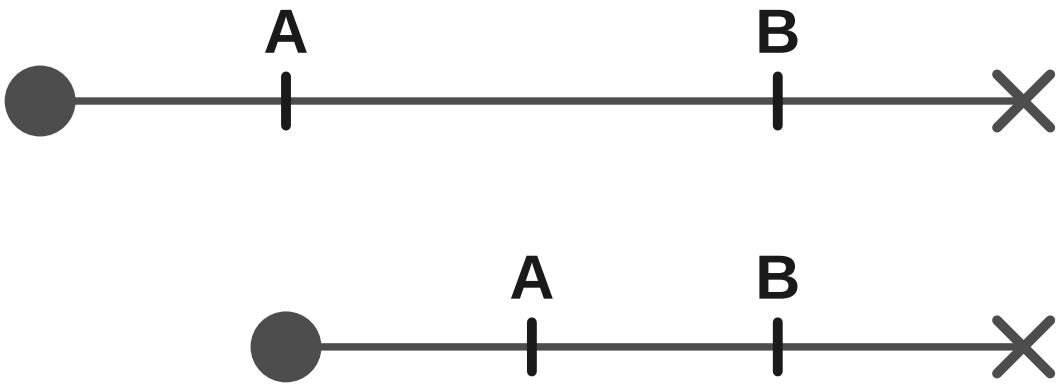

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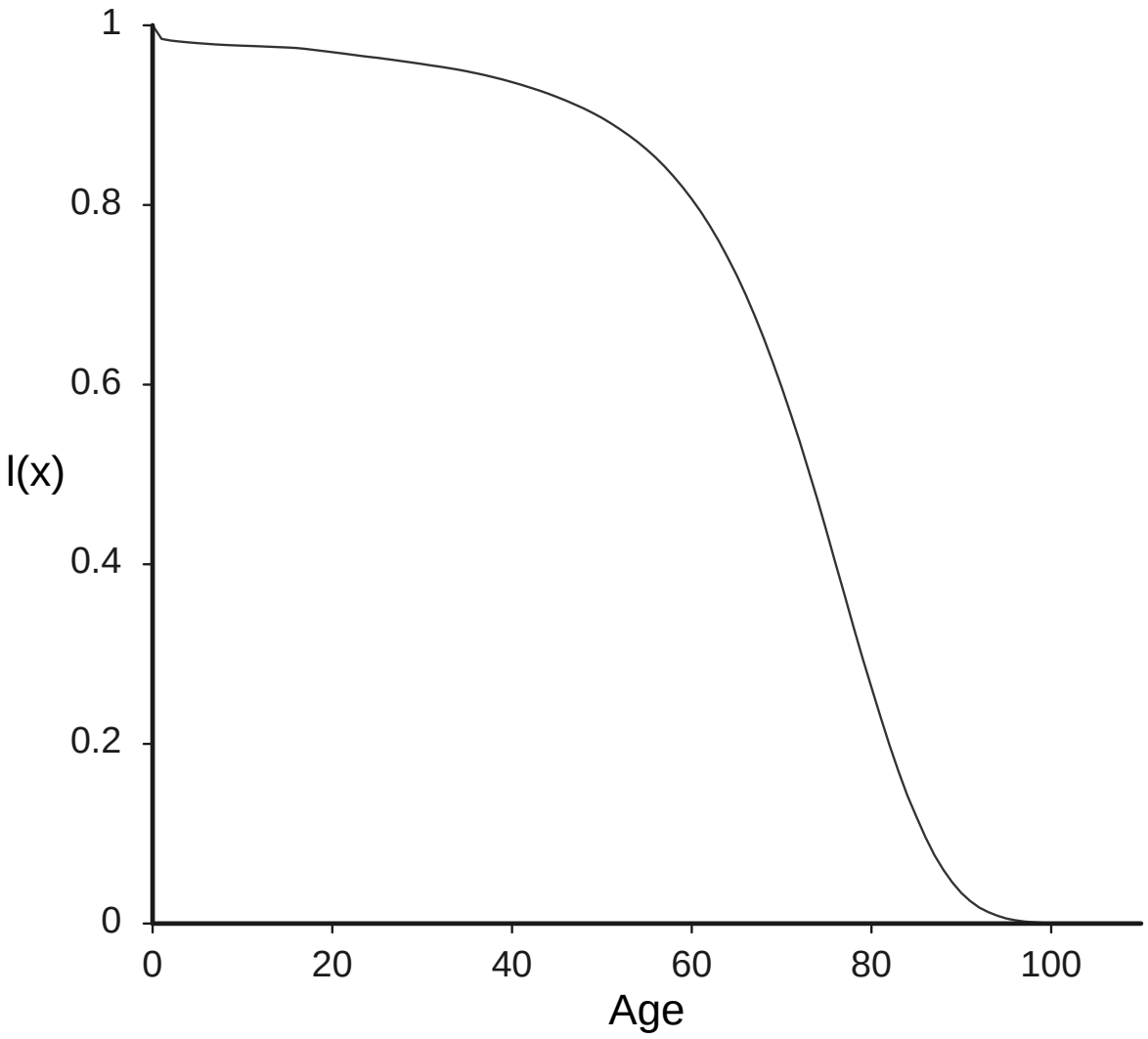

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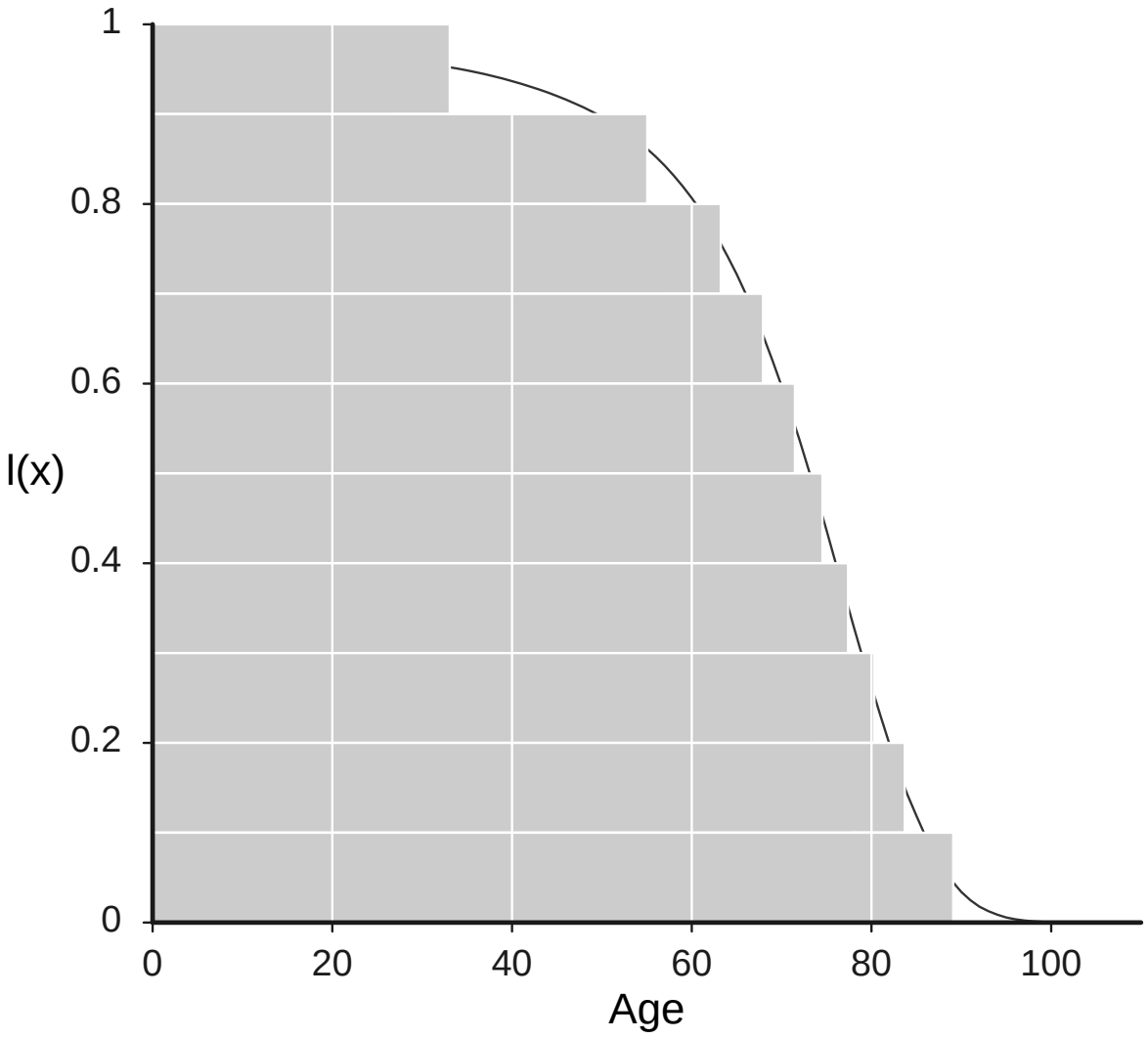

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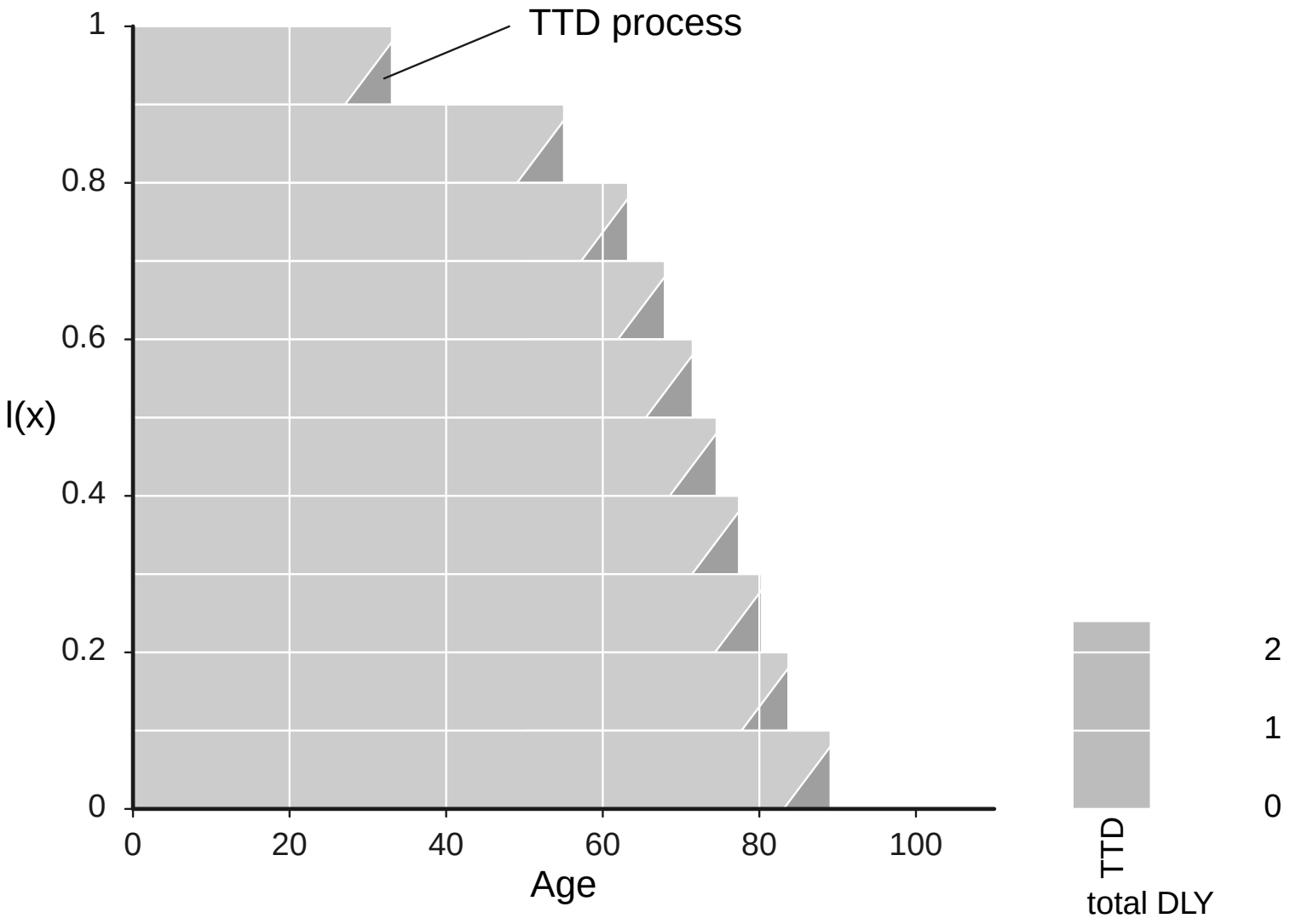

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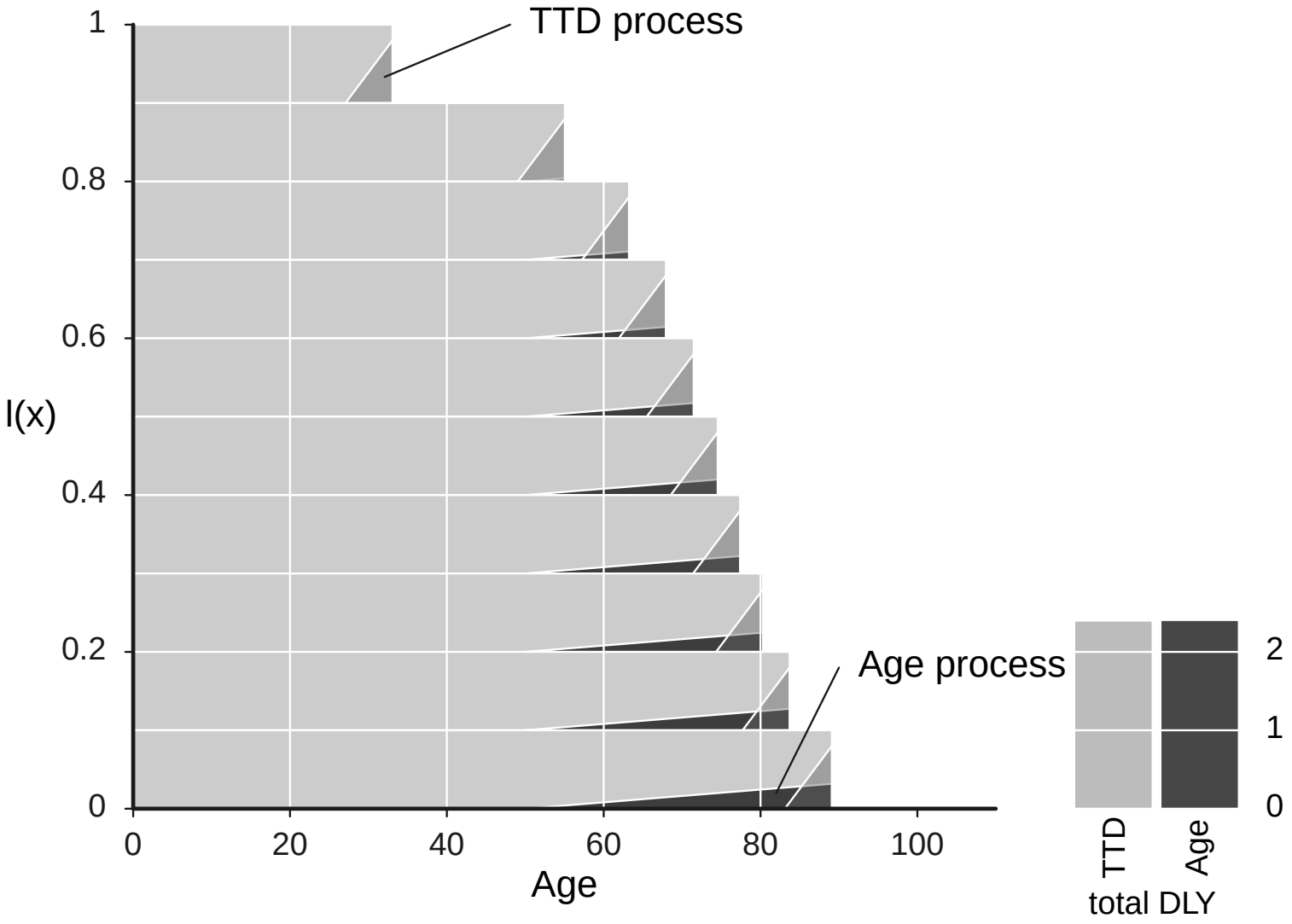

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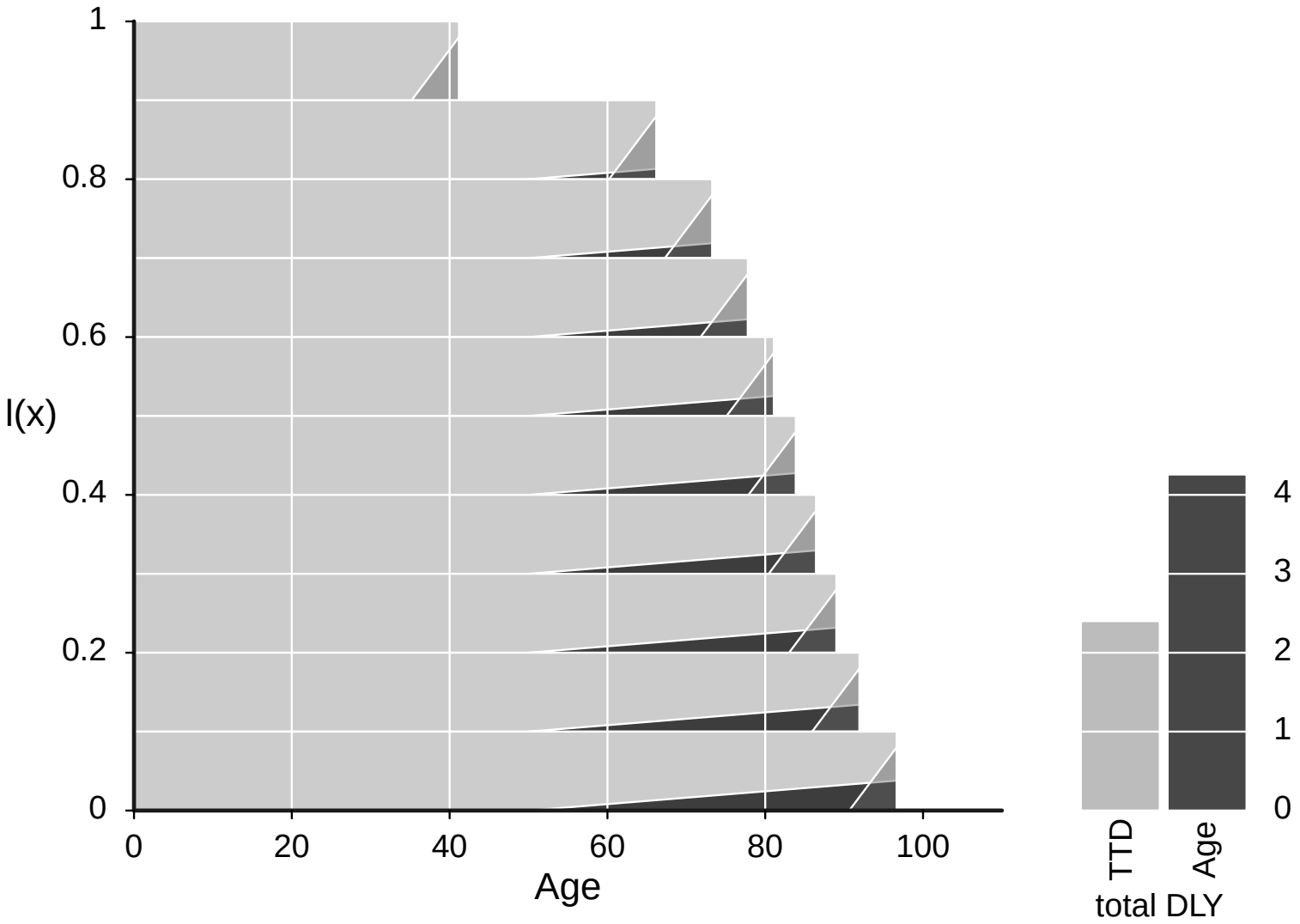

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## Compression definition

The level of morbidity compression is the average proportion of life in good health, $\mathbb{C} = \frac{HLE}{LE}$.

## Objective:

Separate morbidity levels and morbidity dispersion.

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Morbidity dispersion, $\mathbb{D}$, is the average time-to-death of late-life morbidity prevalence.

## Formal definition

$$\mathbb{D} = \frac{\int_0^\omega y\pi^\star(y)\,\mathrm{d}y}{\int_0^\omega \pi^\star(y)\,\mathrm{d}y} \tag{1}$$

where $a$ is age, $y$ is time until death, and $\pi^\star(y)$ is morbidity prevalance by time to death.

Or one might rather weight a lifespan-varying $\pi(y, l)$, by the length-of-life distribution.

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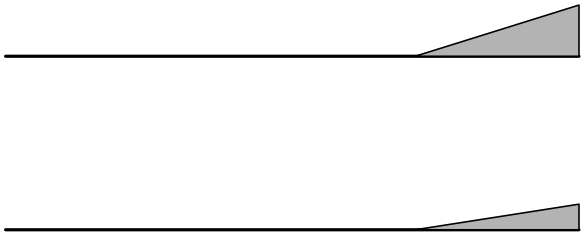
|  | $\downarrow$ | $\uparrow$ | $=$ | $\uparrow$ | $=$ |

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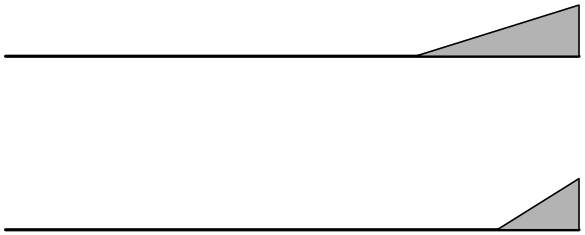
|  | $\downarrow$ | $\uparrow$ | $=$ | $\uparrow$ | $\downarrow$ |

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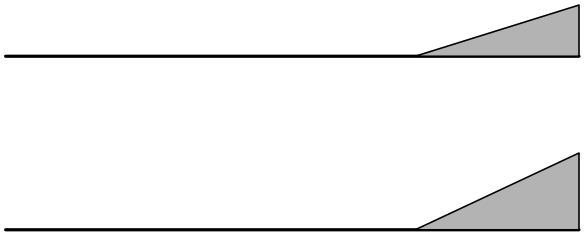
|  | $\uparrow$ | $\downarrow$ | $=$ | $\downarrow$ | $=$ |

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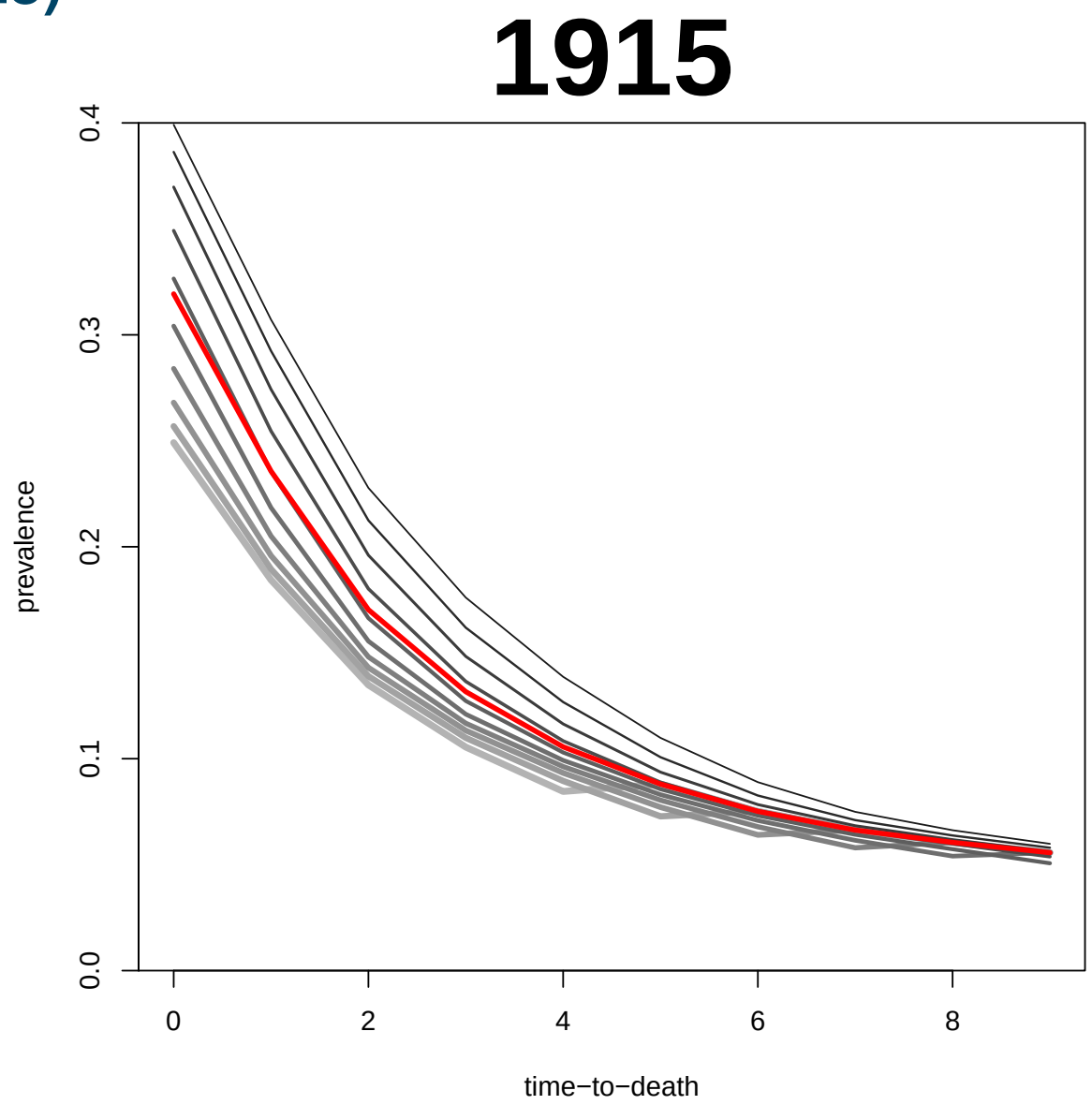
# Observed time-to-death patterns (HRS, ADL3)



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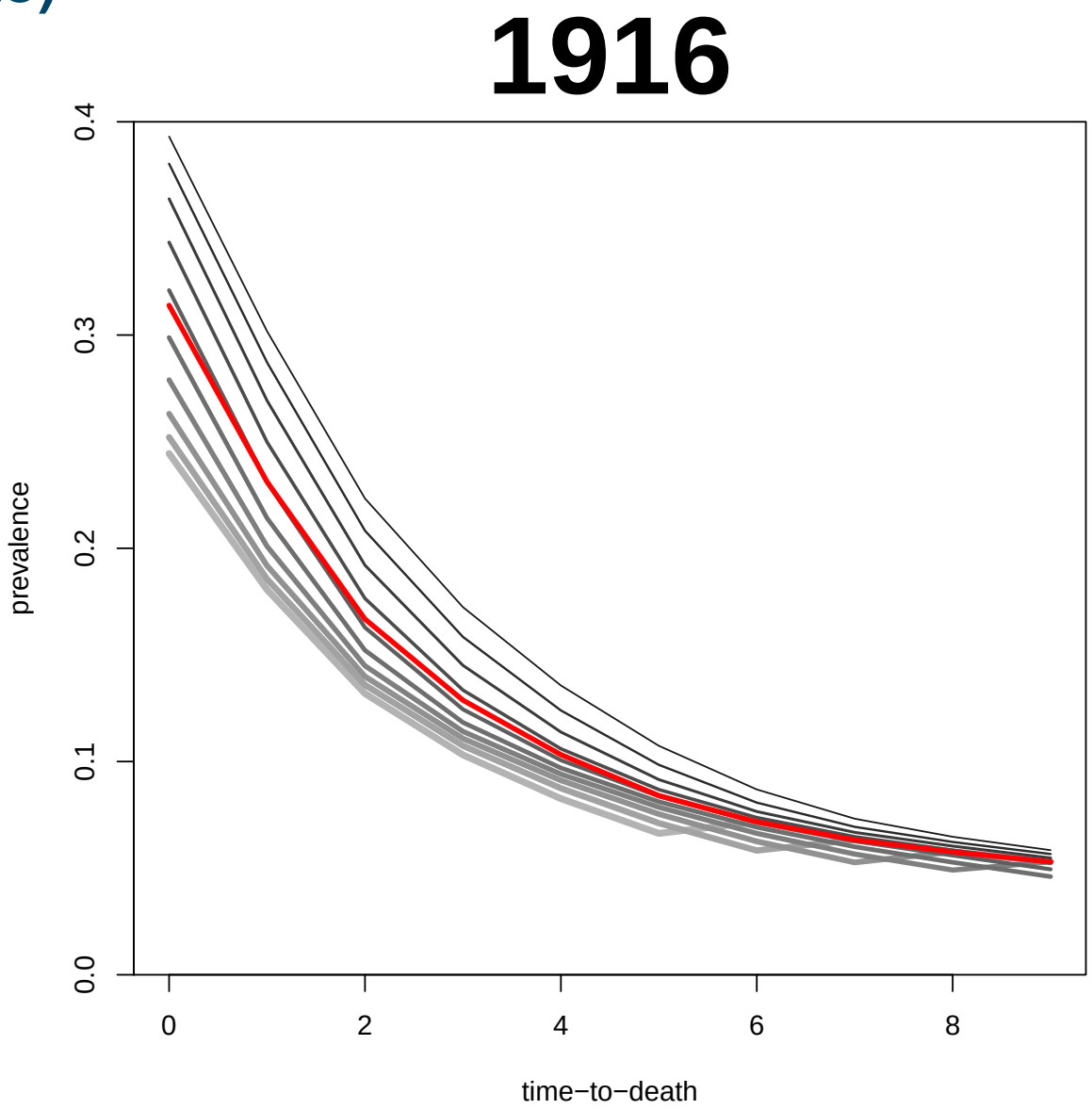

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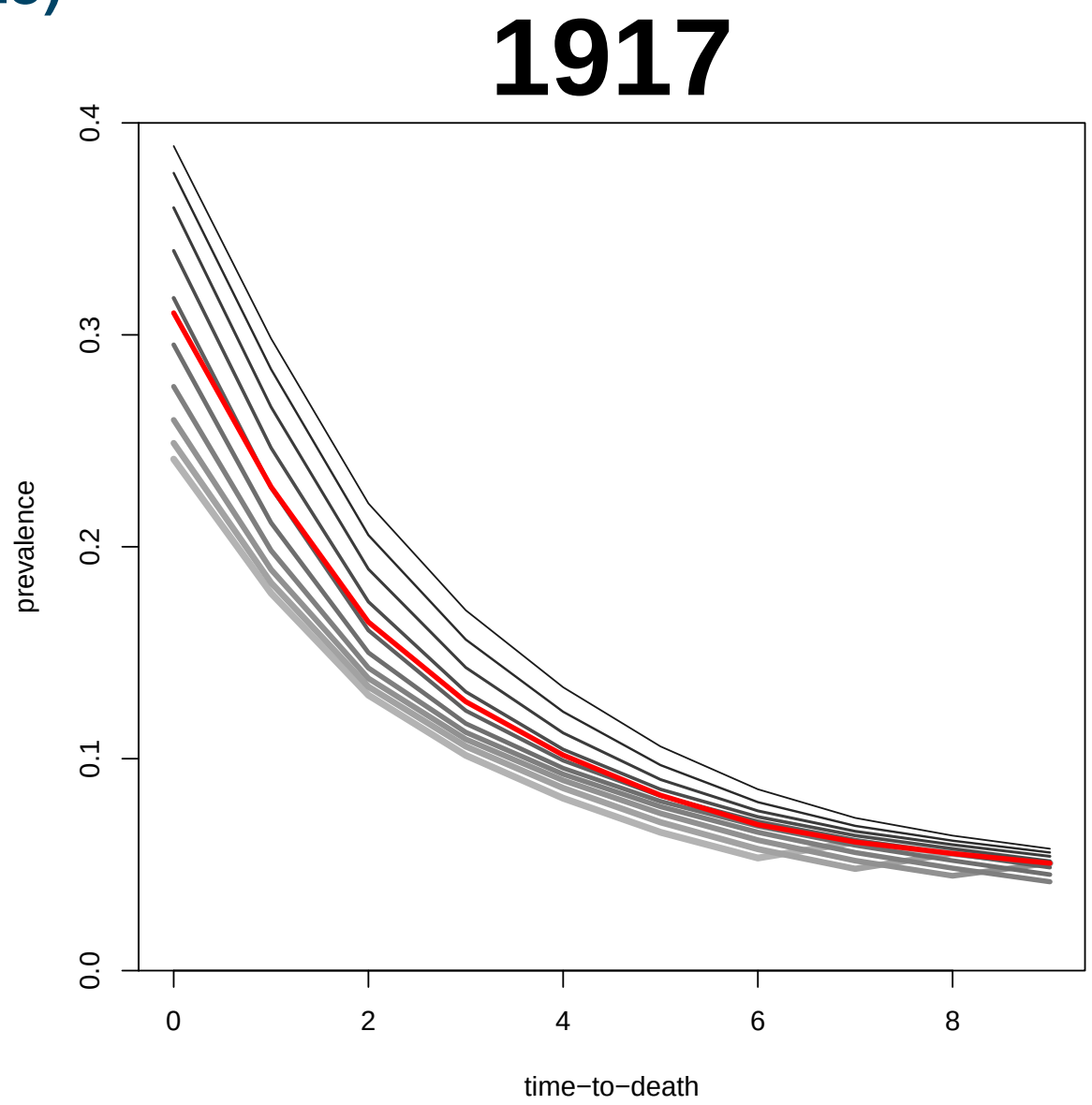

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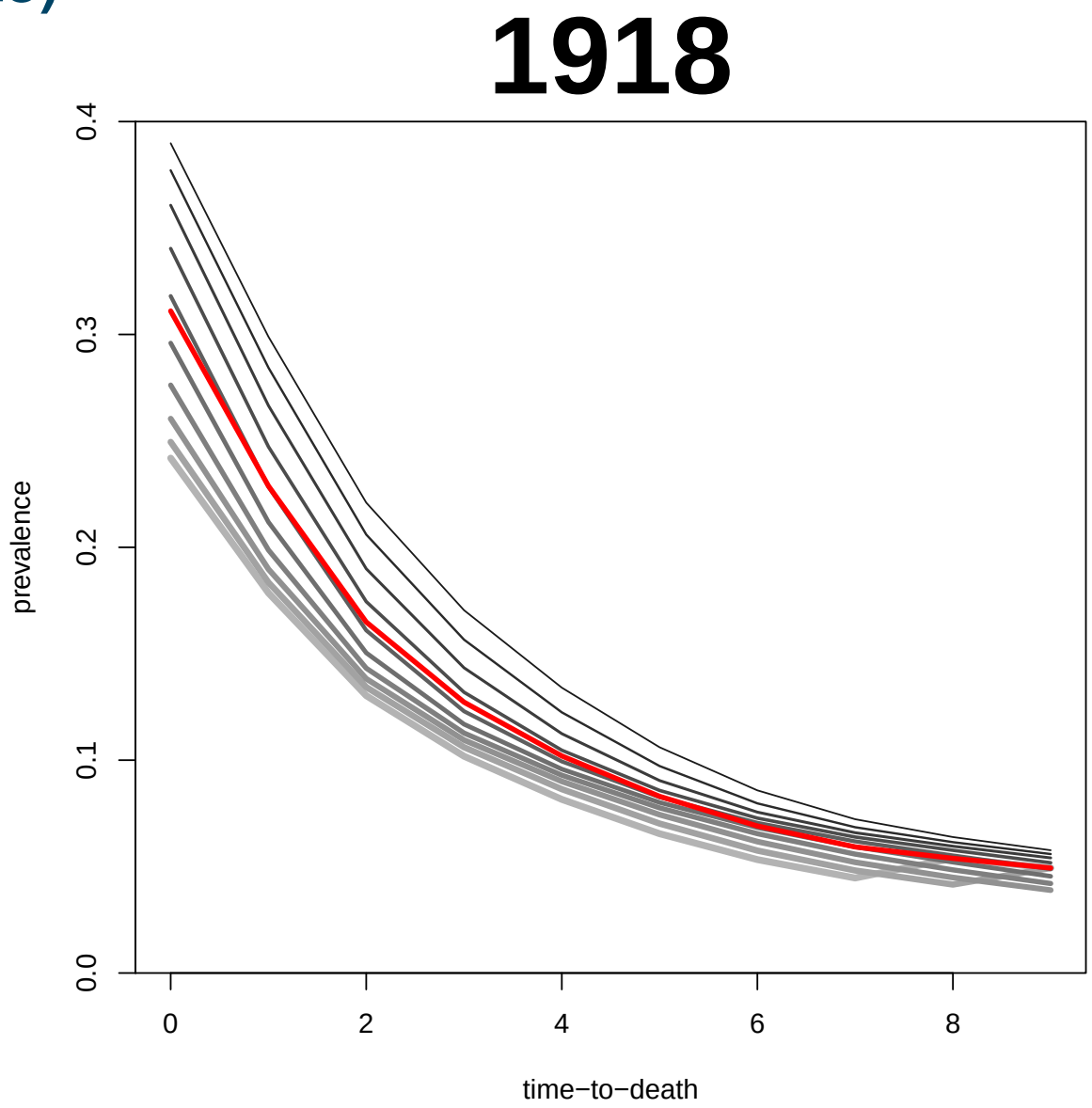

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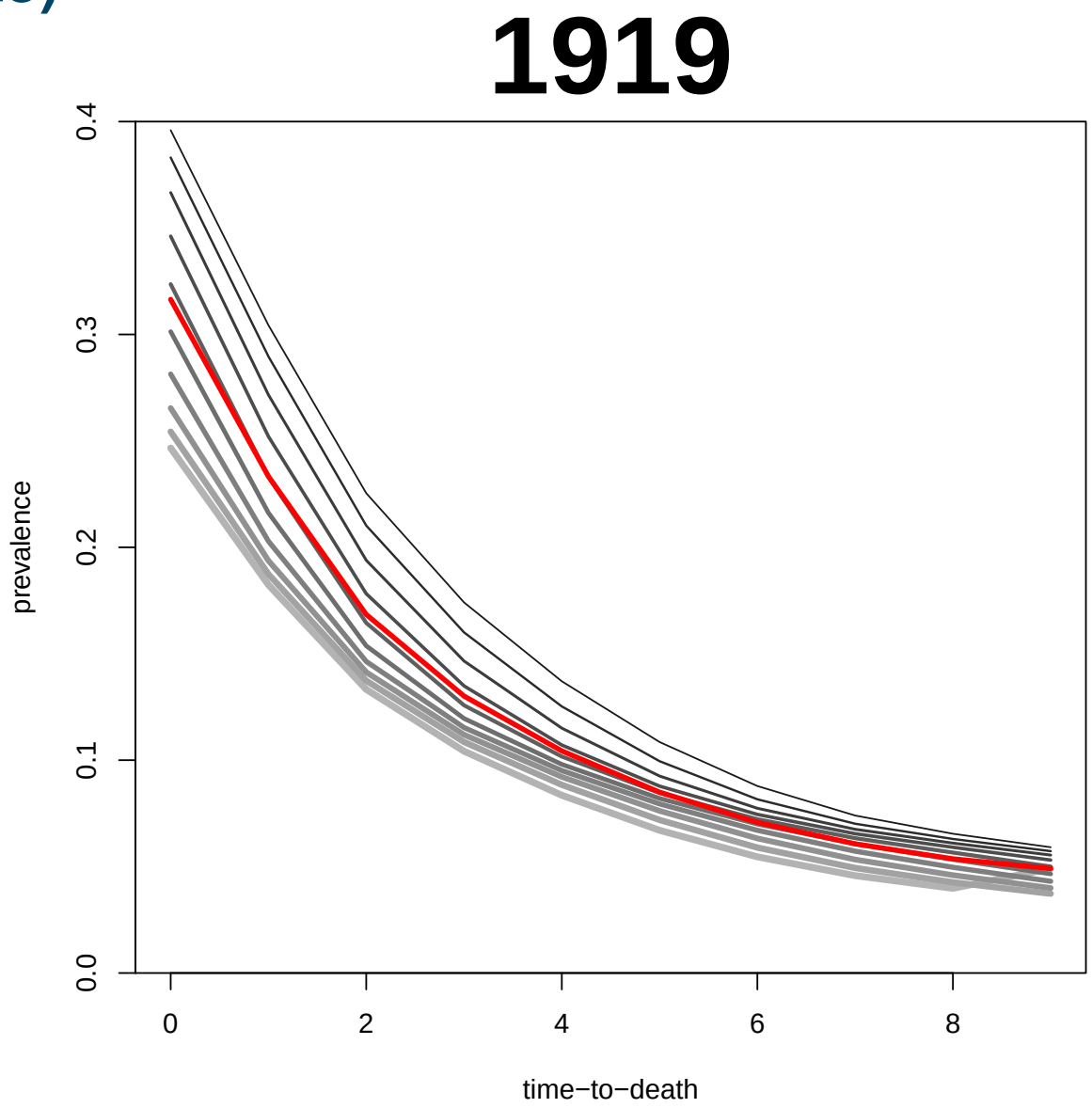

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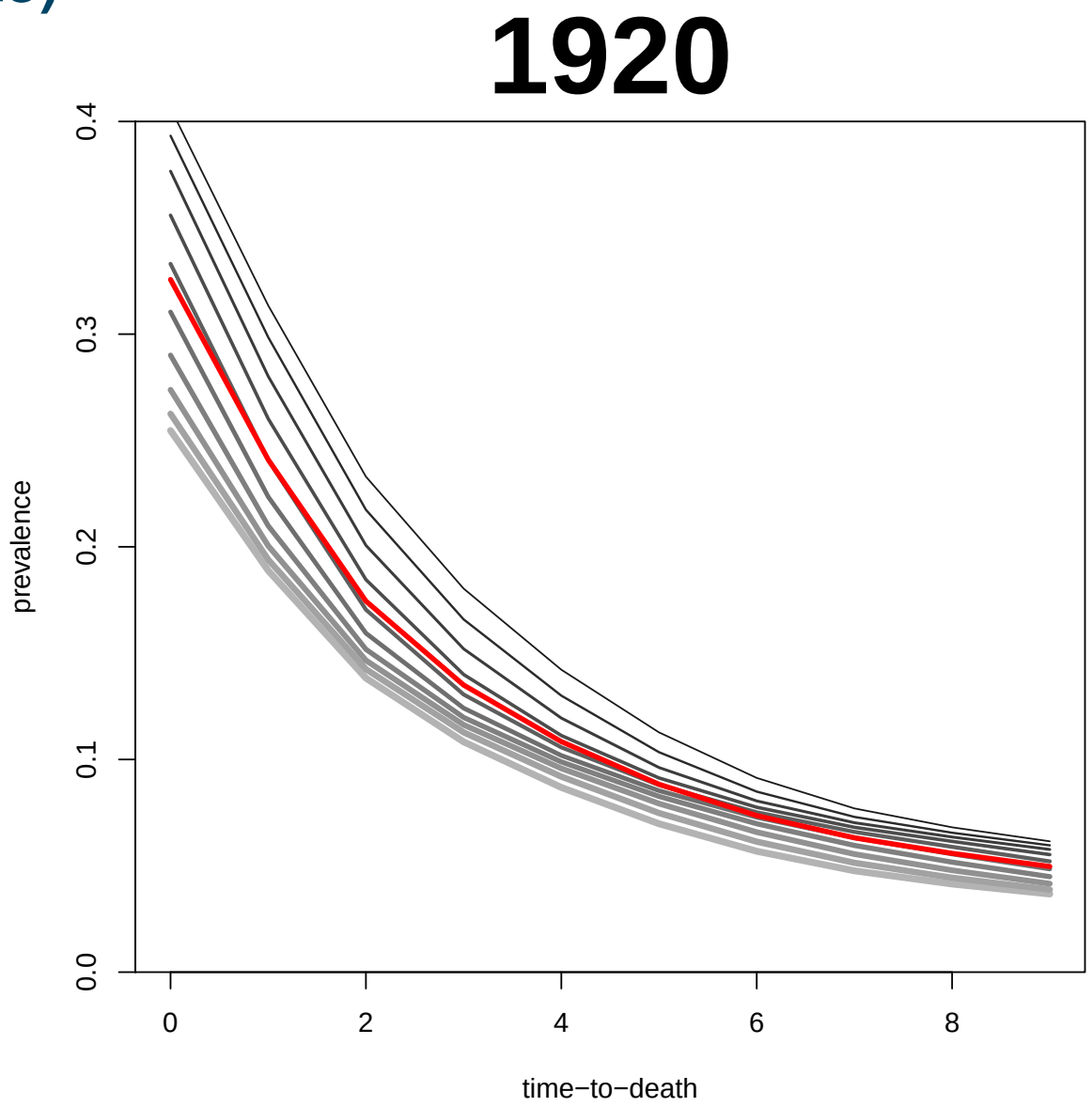

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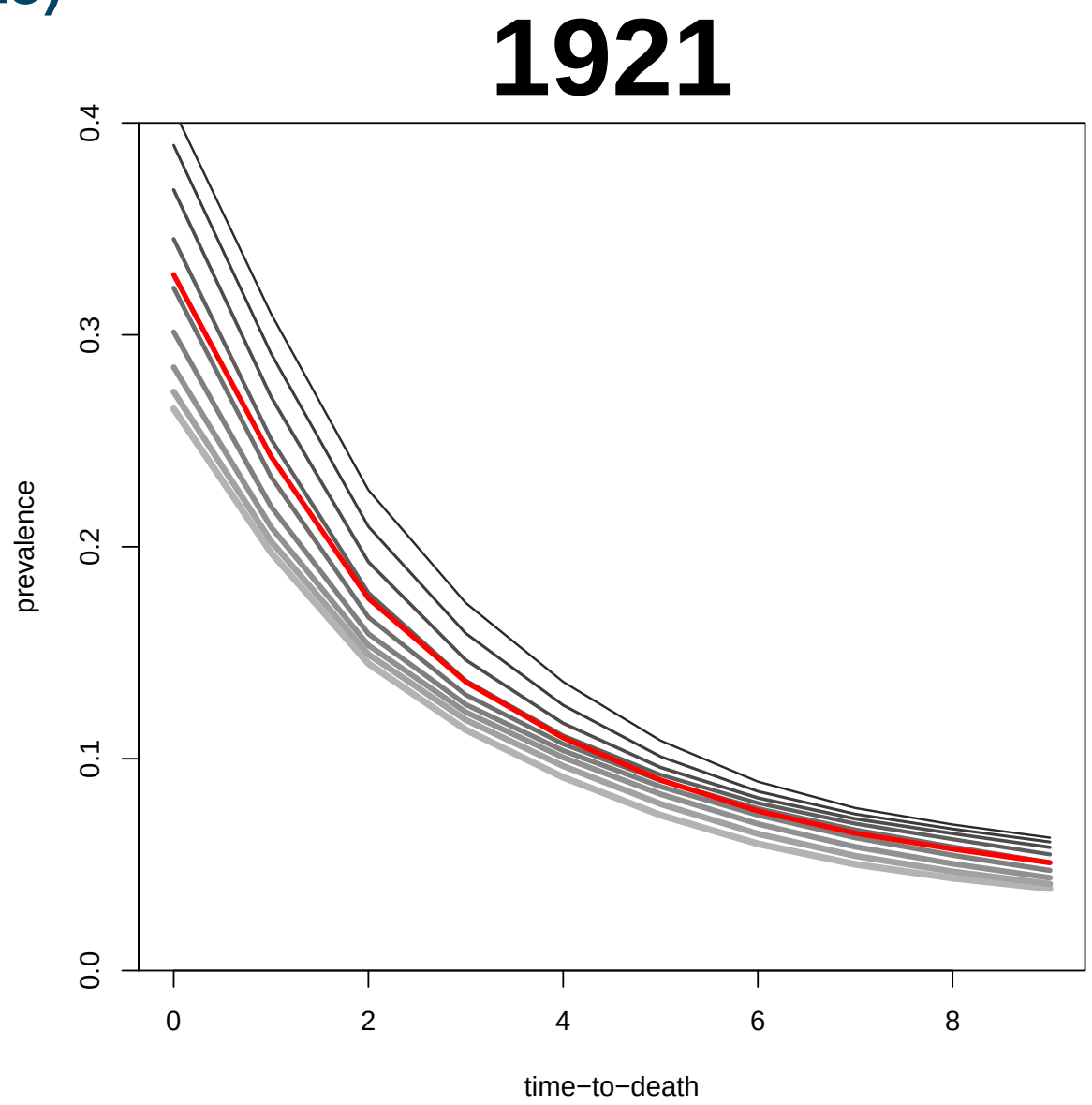

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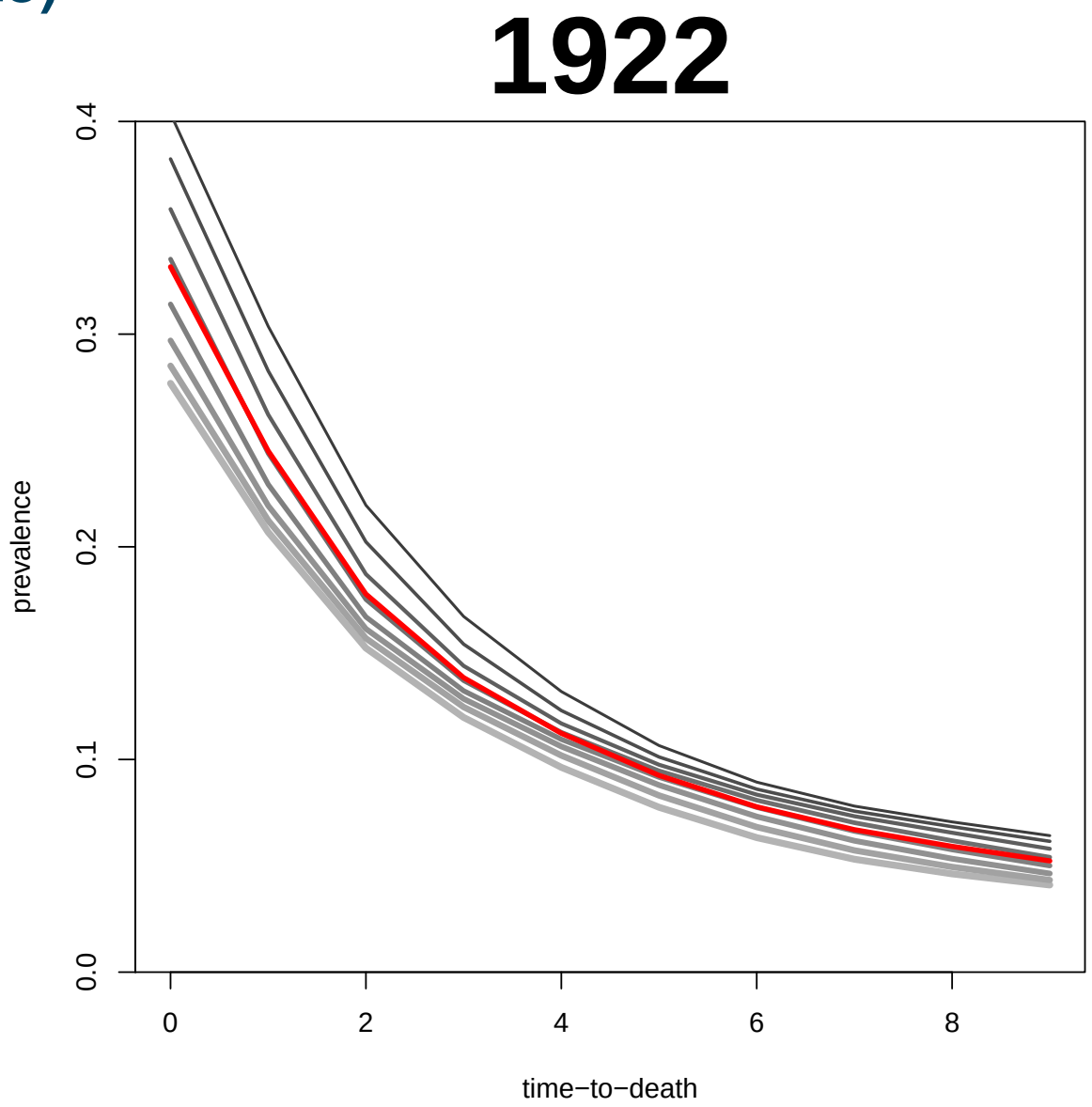

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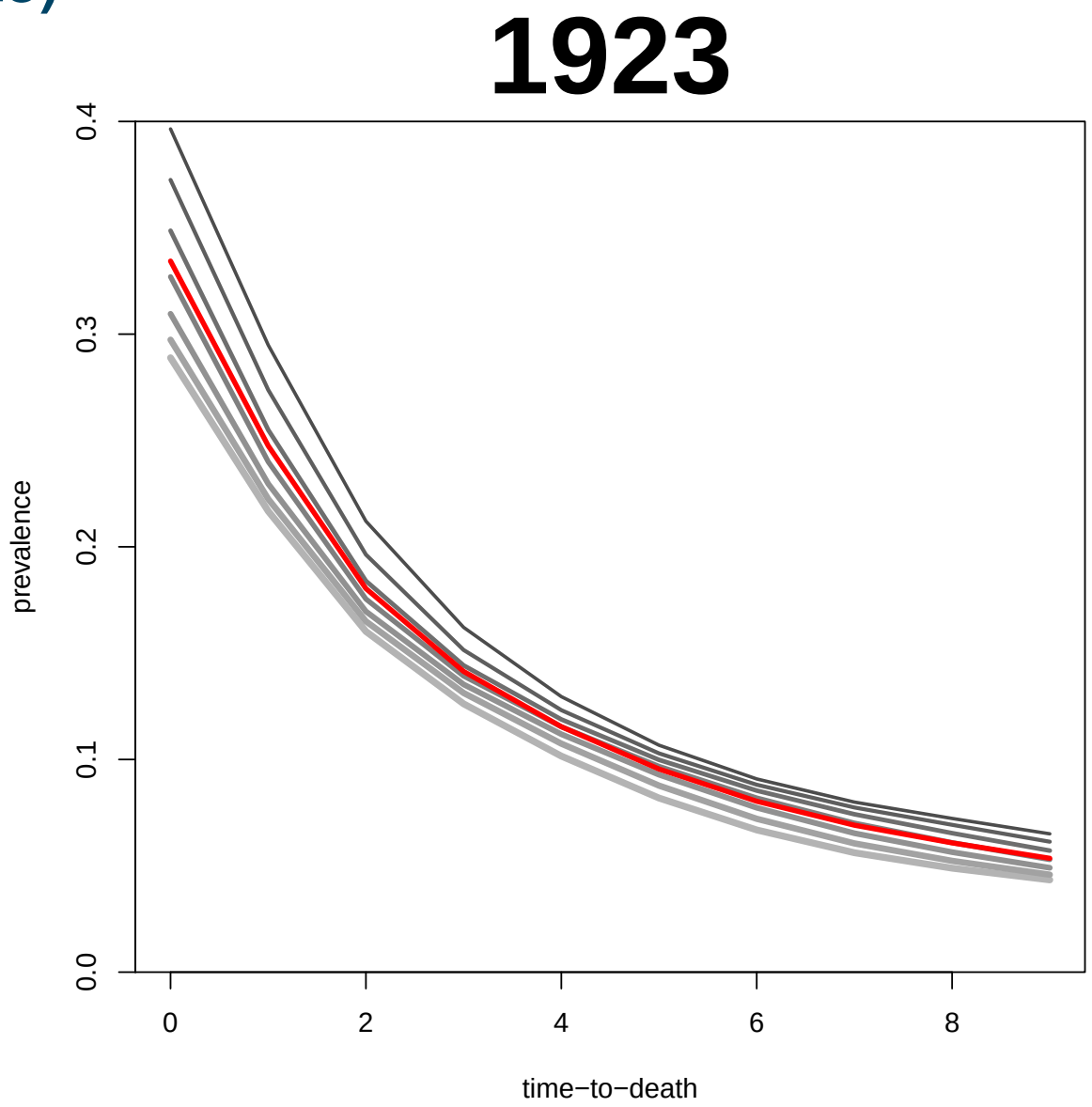

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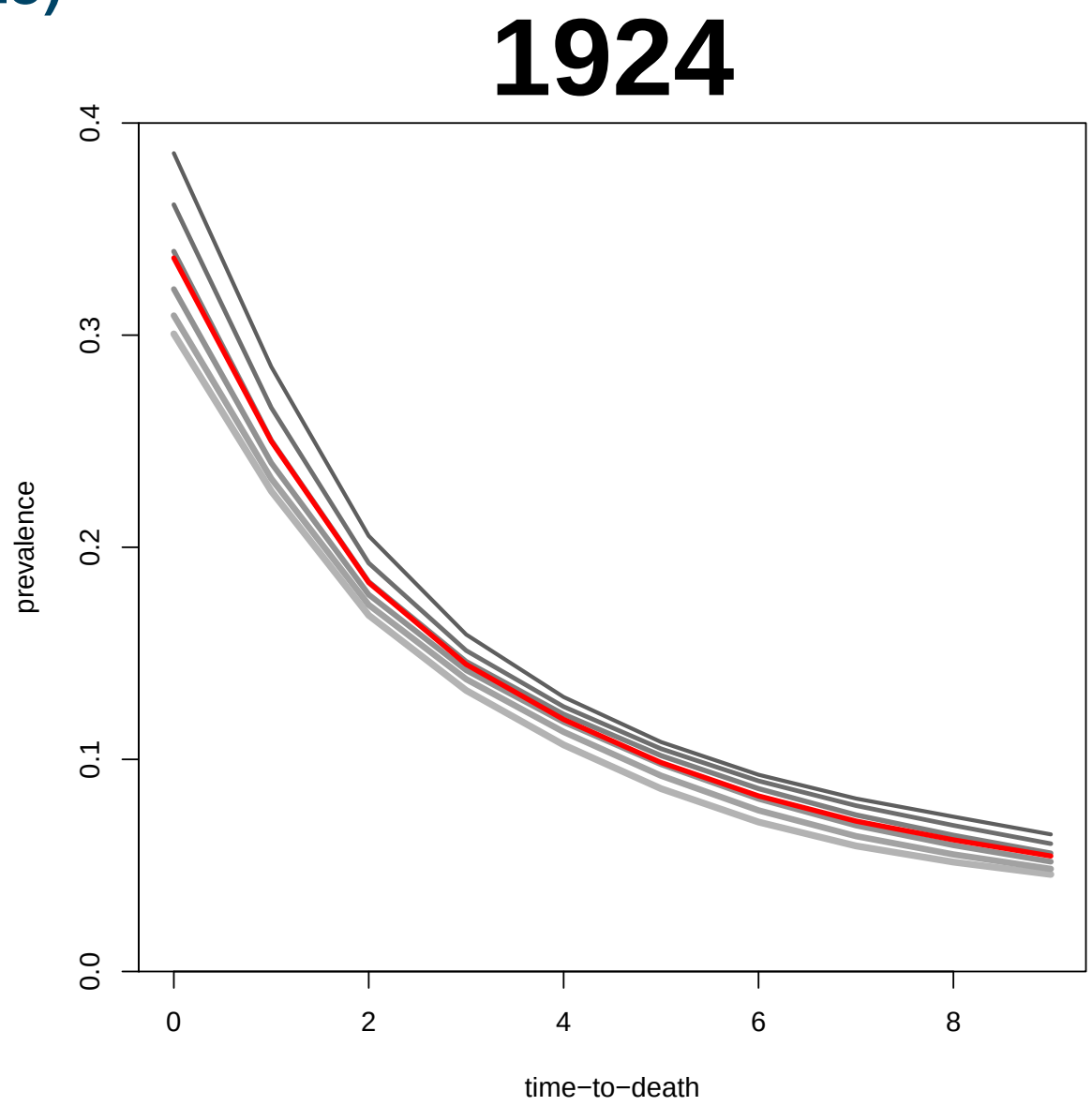

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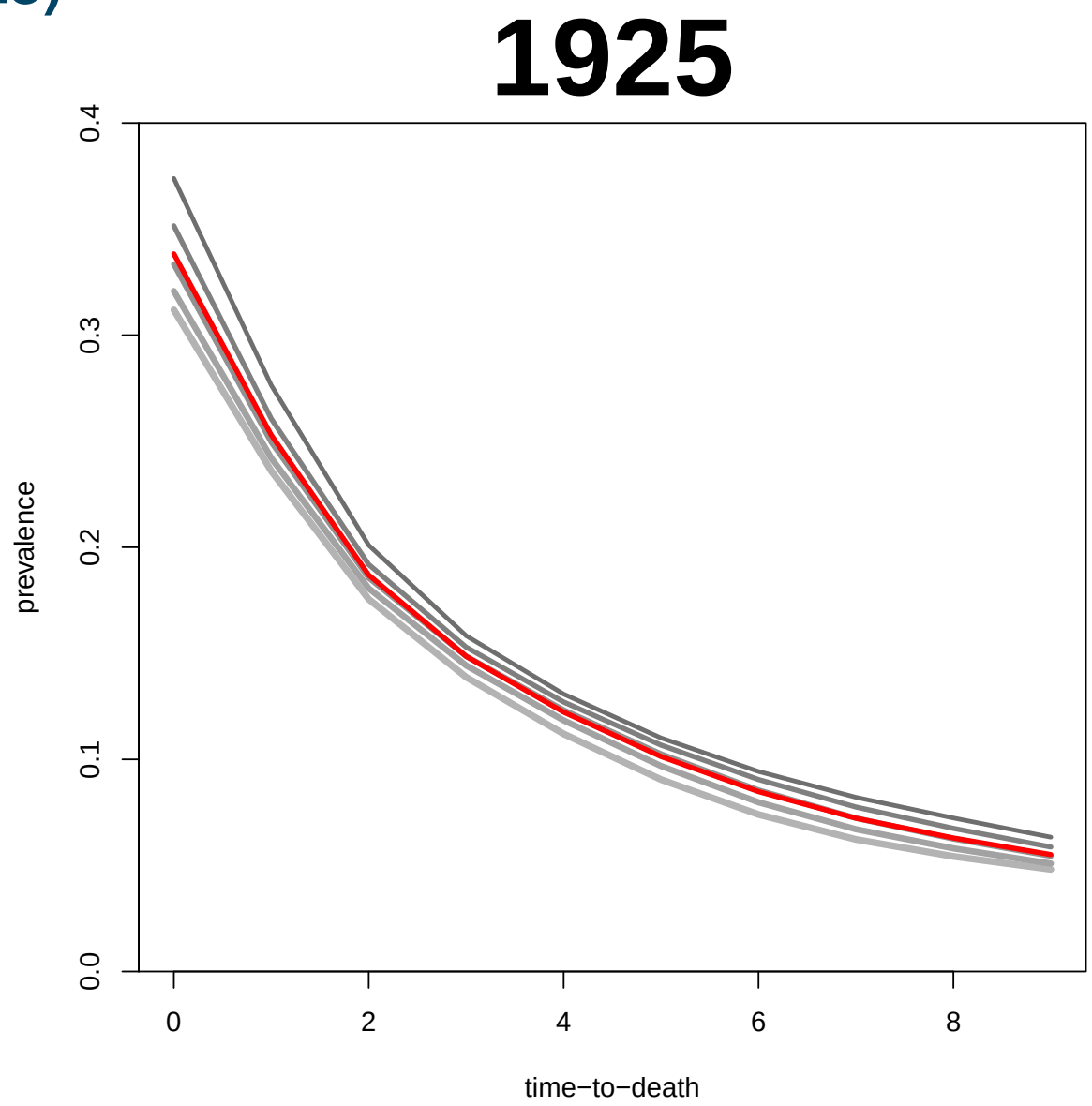
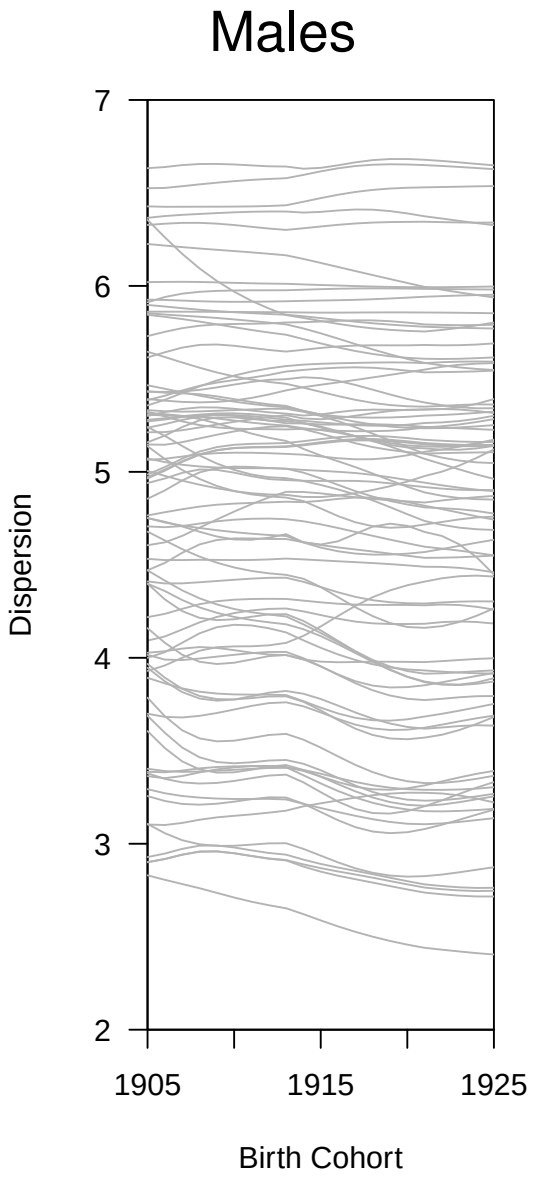
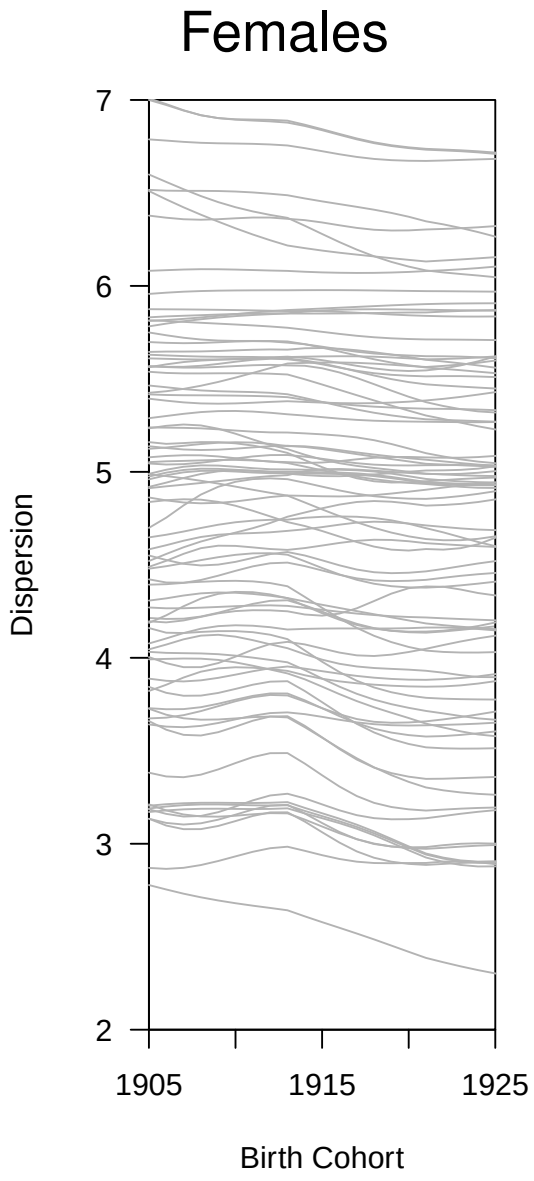


# Results from HRS (RAND, vP), 82 measures



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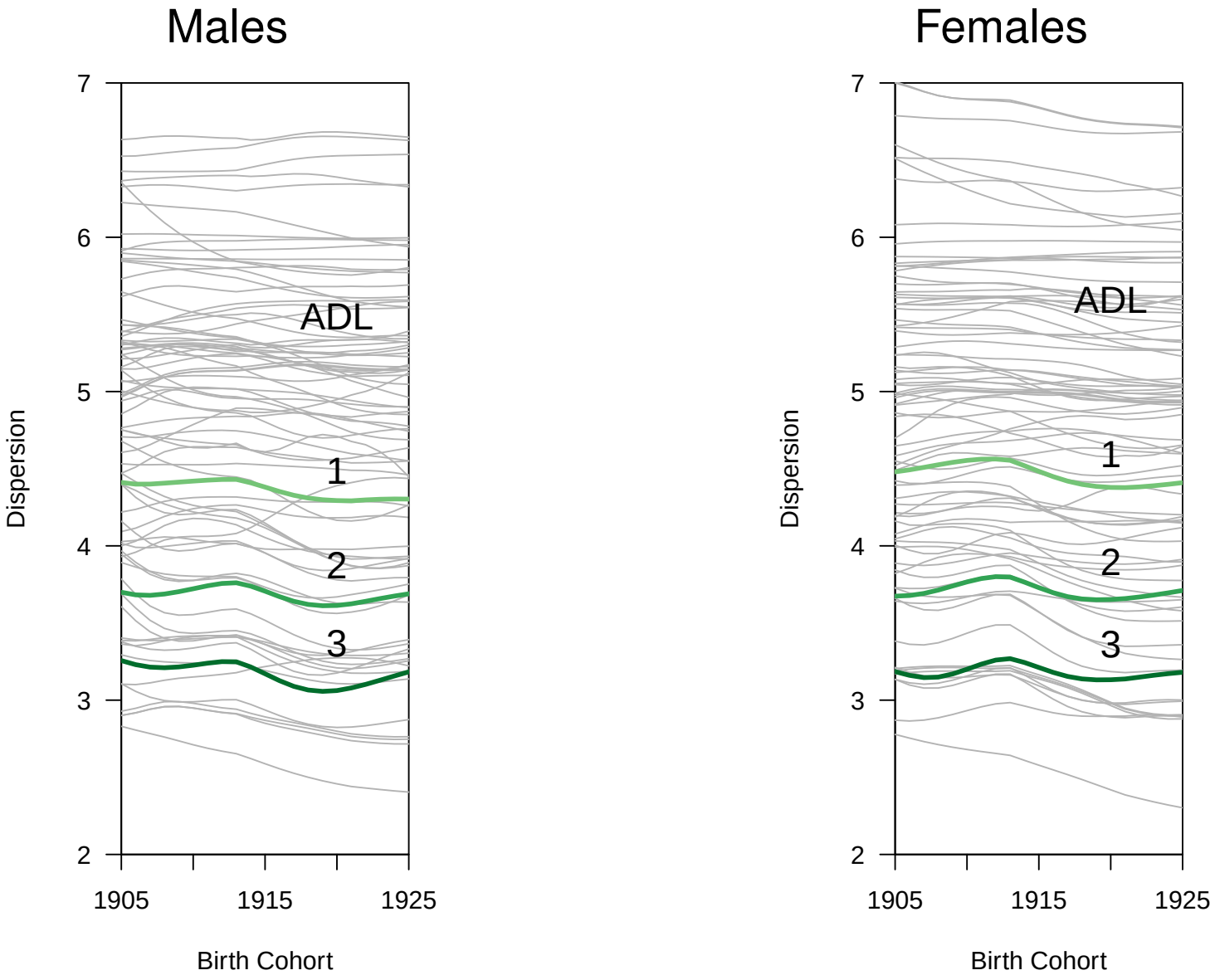

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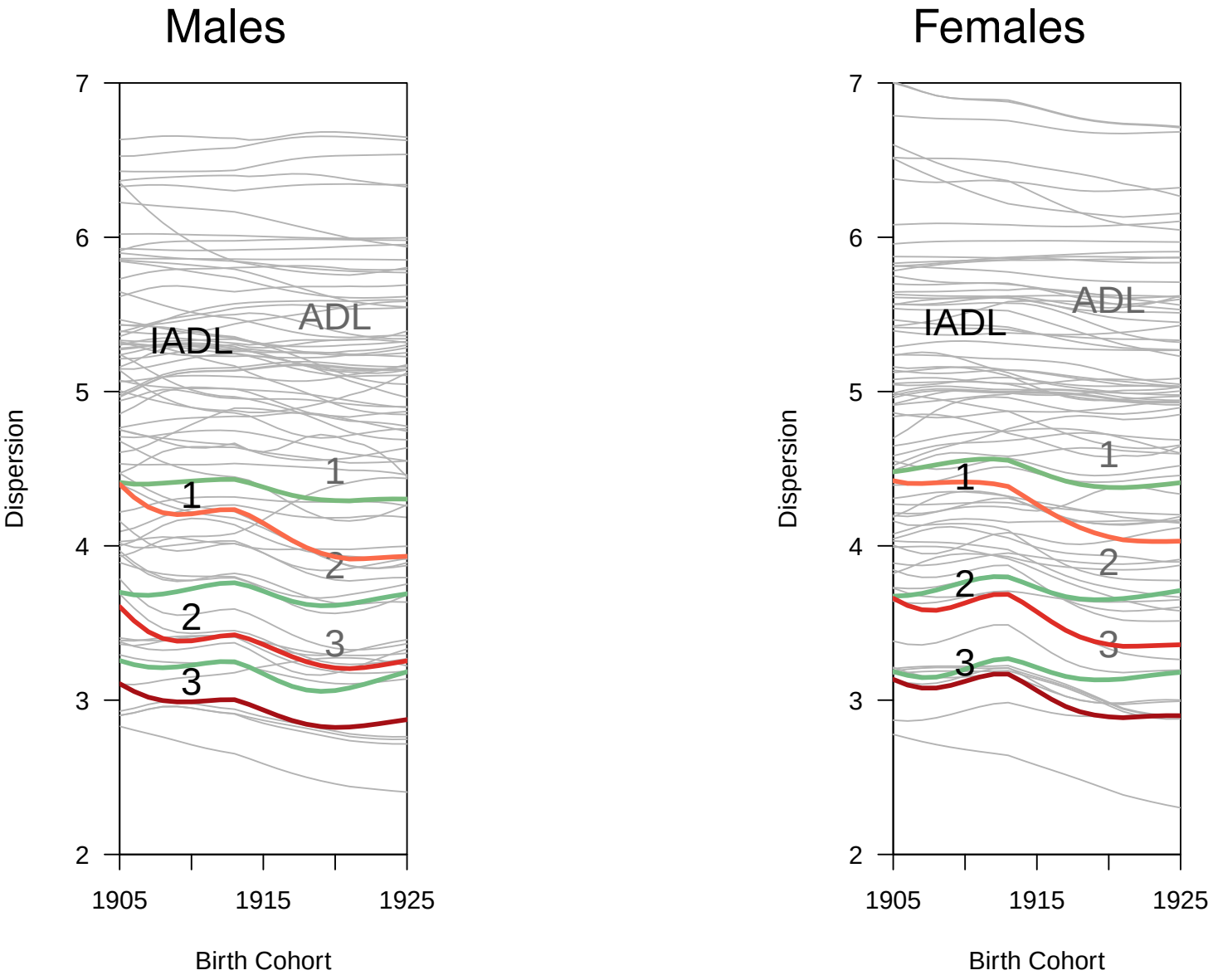

# Summary

## Measures

Dispersion measures an aspect of the shape of morbidity prevalance, and it is a complementary index to compression.

## Trends

Dispersion of most morbidities changed less than 10% between the 1905 and 1925 cohorts, mostly in the direction of increased concetration of poor health conditions at the end of life.

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