

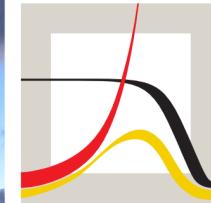




MAX PLANCK INSTITUTE
FOR DEMOGRAPHIC
RESEARCH

Decomposition perspectives on distributions of episode duration

Tim Riffe | HT C. Dudel & D. Schneider



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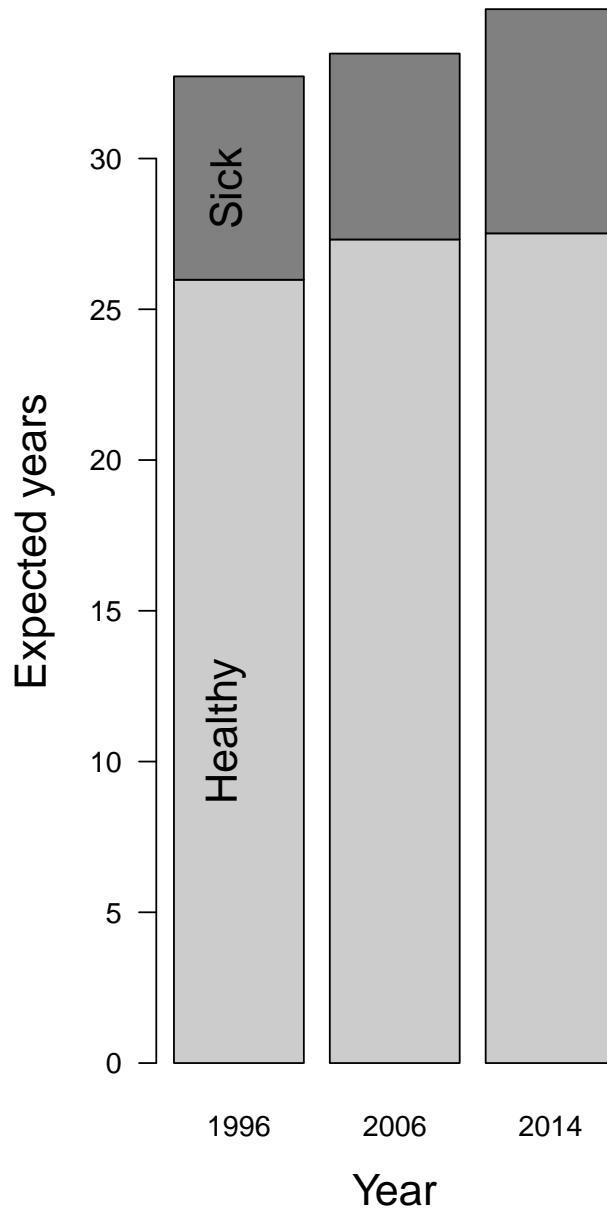
Some motivating observations:

1. Health *inequality* is multidimensional: episode duration important?
2. Dudel's expression for average episode count & duration

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A common sight:



Motivating questions:

1. How do state expectancies break down by episode duration?
2. What is the age pattern of episode duration?
3. Extra 1: how much of a state expectancy is from terminal episodes?
4. Extra 2: how do transition probabilities determine episode distributions?

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Probability of a new episode ϵ in state s starting at age x :

$$\epsilon^{s,new}(x) = \pi^{-s}(x) \cdot p^{\rightarrow s}(x) \quad (1)$$

- $\epsilon^{s,new}$ new episode of s
- π^{-s} prevalence of not being in s
- $p^{\rightarrow s}$ probability of transition to s

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- Let \mathbf{U}^s be a matrix with $p^{s \rightarrow s}$ in the subdiagonal
- Let $\mathbf{N}^s = (\mathbf{I} - \mathbf{U}^s)^{-1}$
- Then the conditional elapsed time spent in s :

$$\mathcal{E}^s = \mathbf{N}^s \mathbf{E}^s$$
- $\mathbb{E}(s, x) = \mathbf{e}' \mathcal{E}^s \mathbf{e} + p^s(x) \sum_{t=x}^{\omega} \prod_{i=t}^{\omega} p^{s \rightarrow s}(i)$
- The matrix \mathcal{E}^s is a decomposition of $\mathbb{E}(s)$ by age and duration

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An illustration

- Recycle transition probabilities from Riffe, Mehta, Schneider & Myrskylä (in progress) (HRS data).
- 3 states: 0 ADLs, 1+ ADLs, dead.
- ages 50+, 2-year age groups

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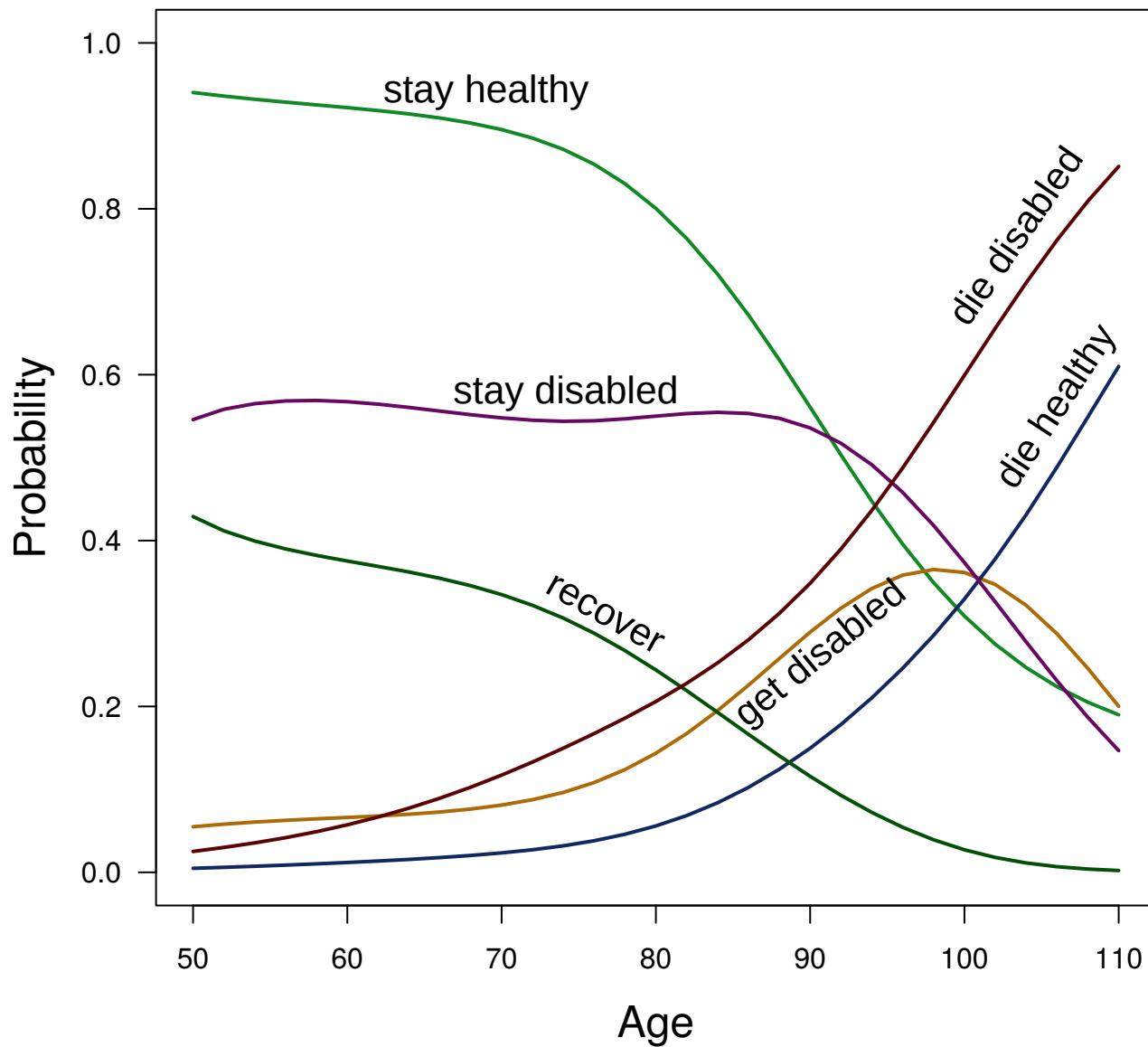
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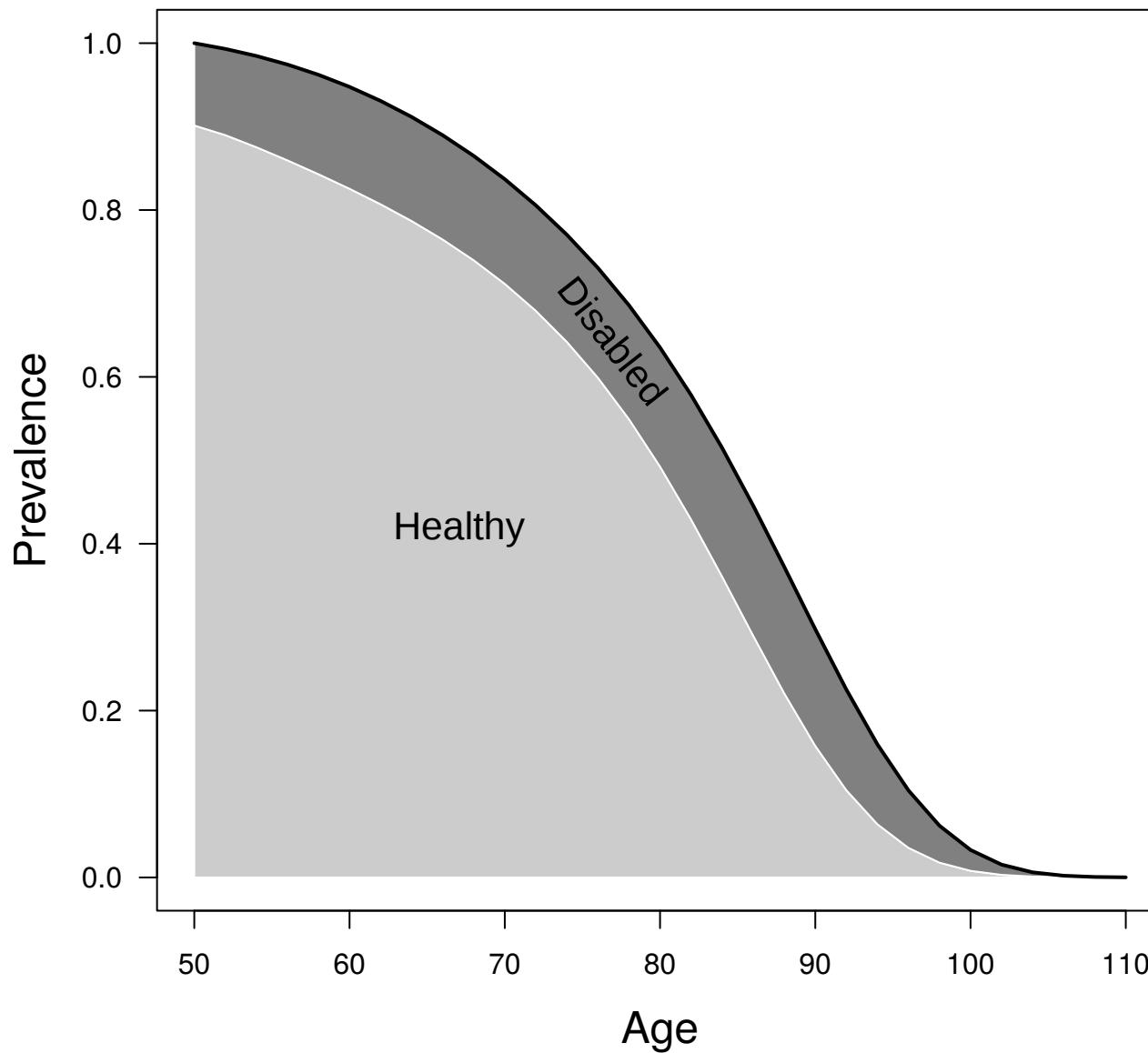
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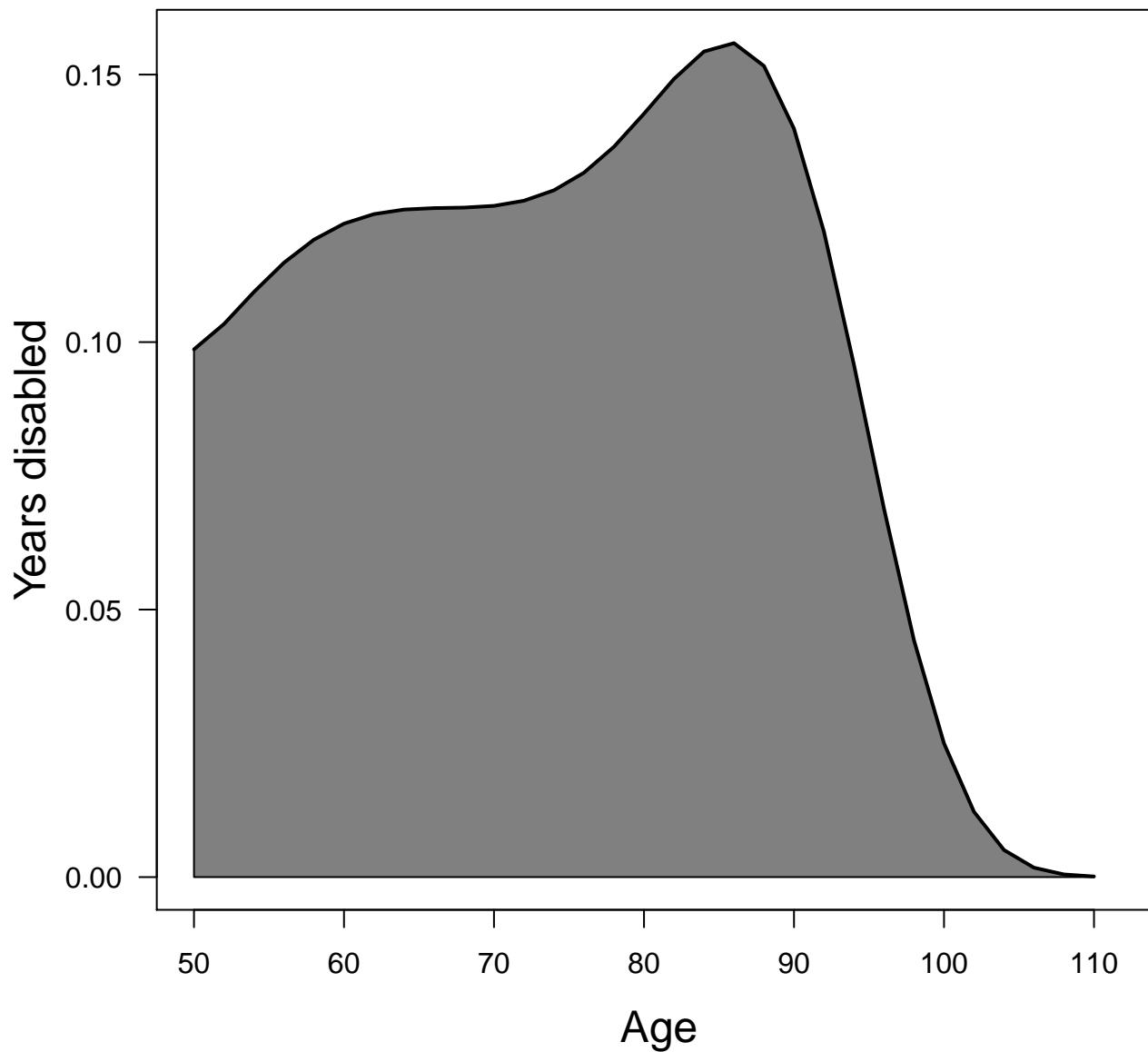
Transitions for 2006 females (all edu):



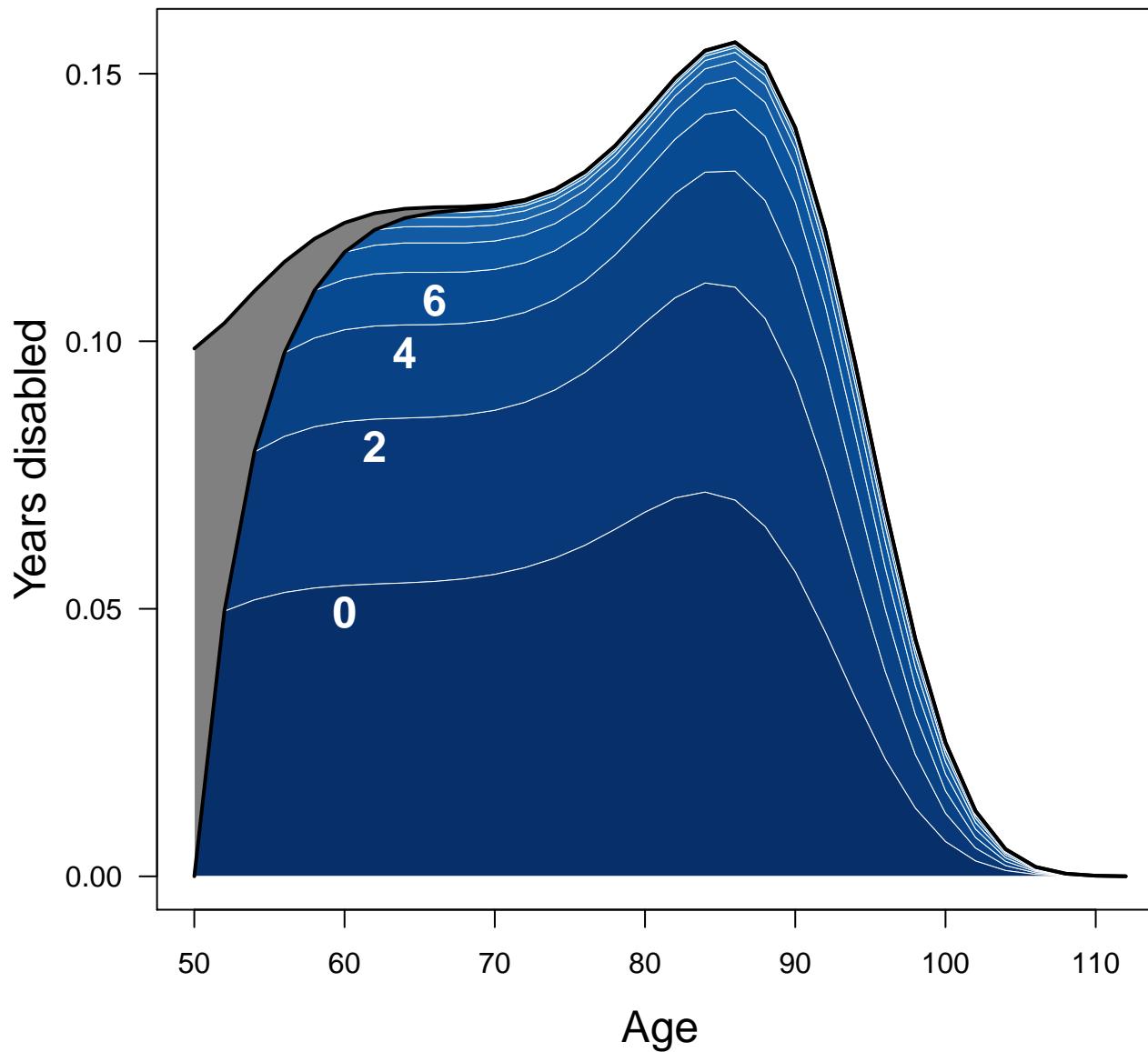
Prevalence for 2006 females (all edu):



Prevalence disabled 2006 females (all edu):



Disability decomposed 2006 females (all edu):



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