# **Selection in infant mortality**

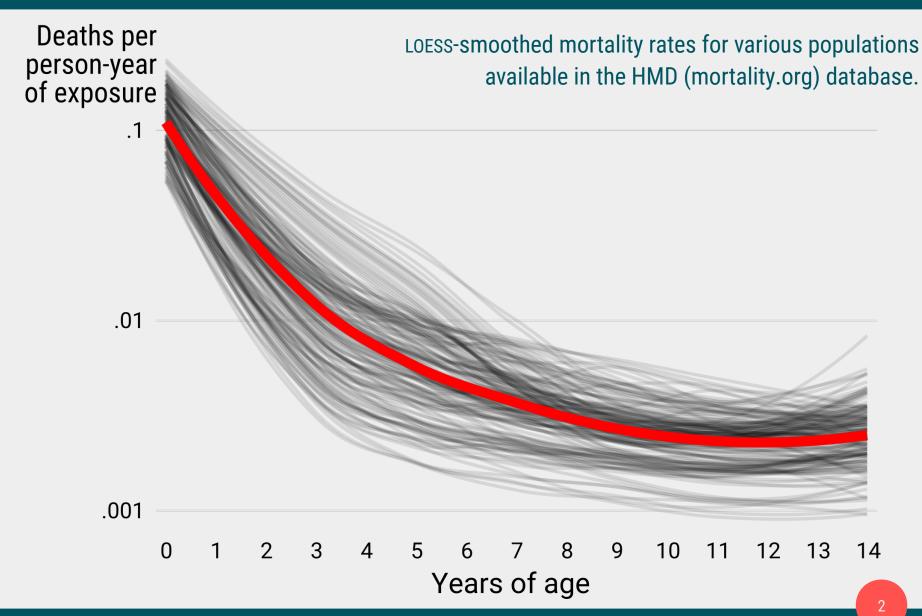
Jonas Schöley

jschoeley@health.sdu.dk

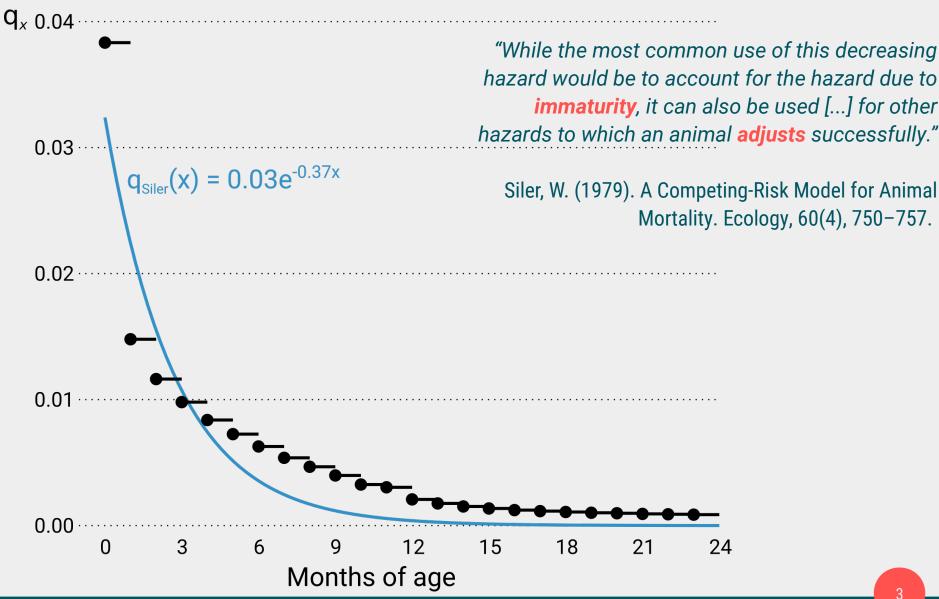




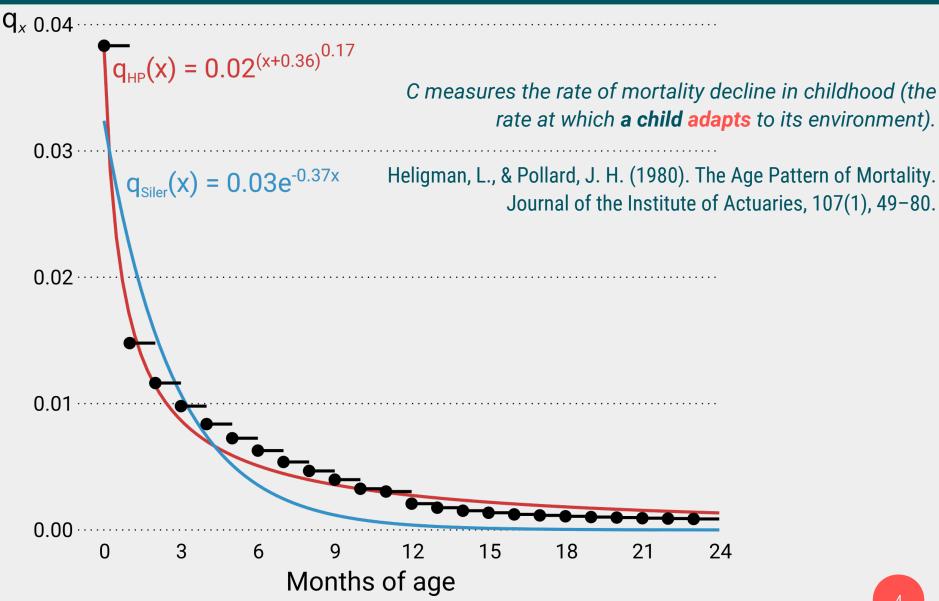
#### The age pattern of early life mortality

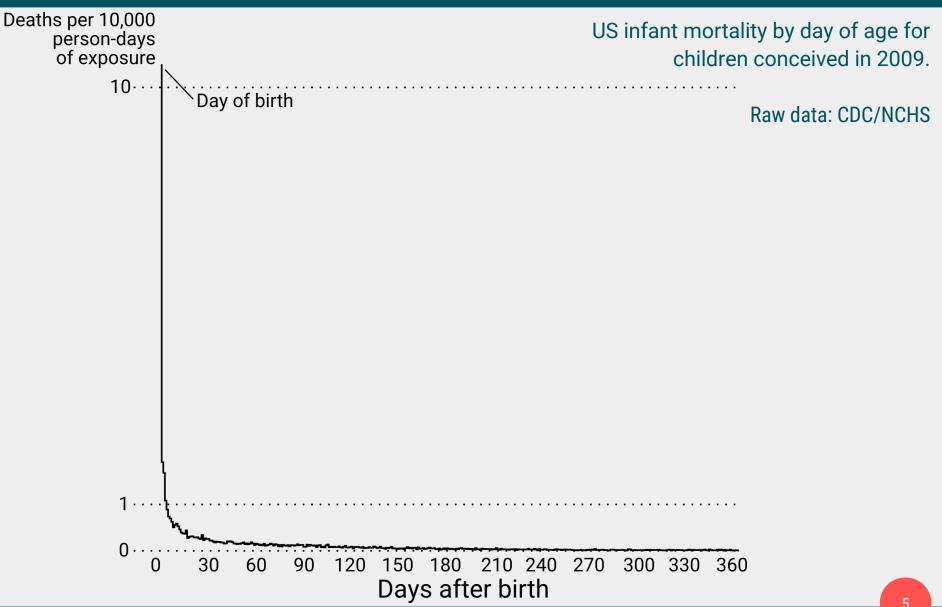


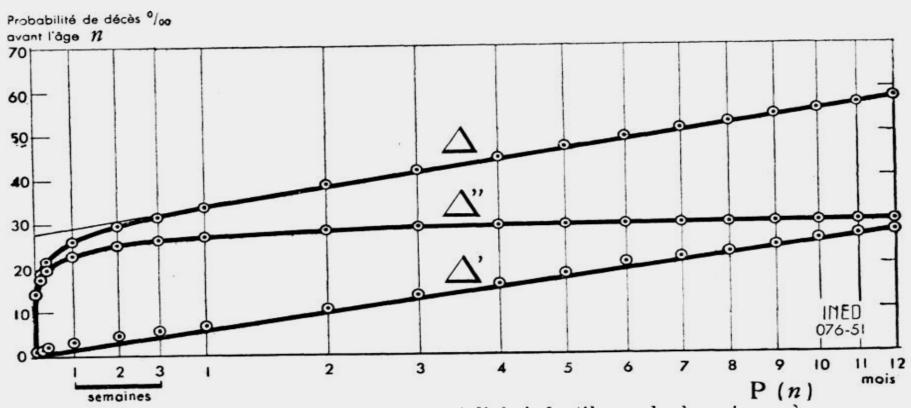
#### Mortality decline as growth and adaptation



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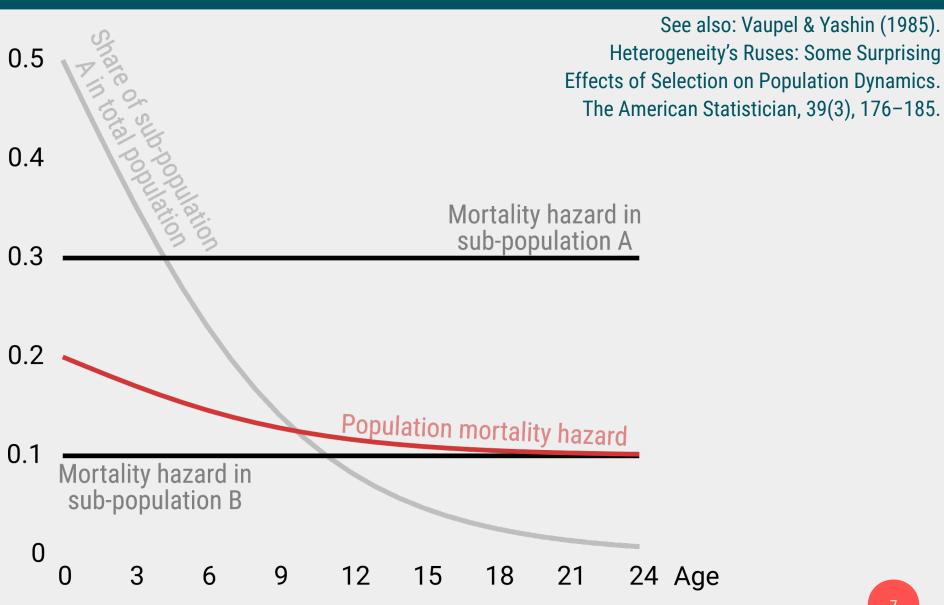


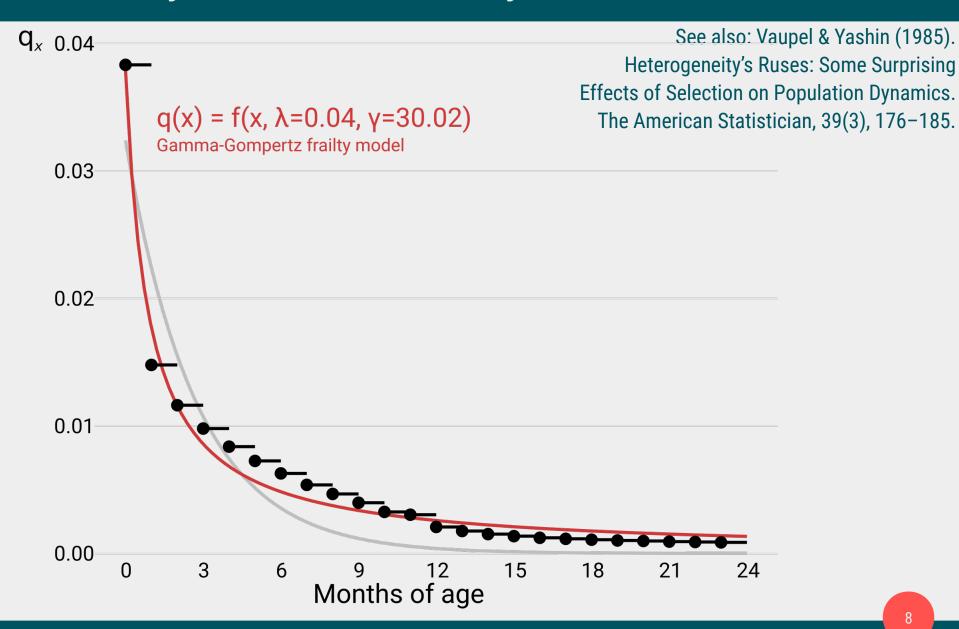




Graphique nº 8. — Séparation des mortalités infantiles endogène et exogène. (schéma observé aux Etats-Unis en 1932).

Bourgeois-Pichat, J. (1951). La mesure de la mortalité infantile. II. Les causes de décès. Population, 6(3), 459–480.





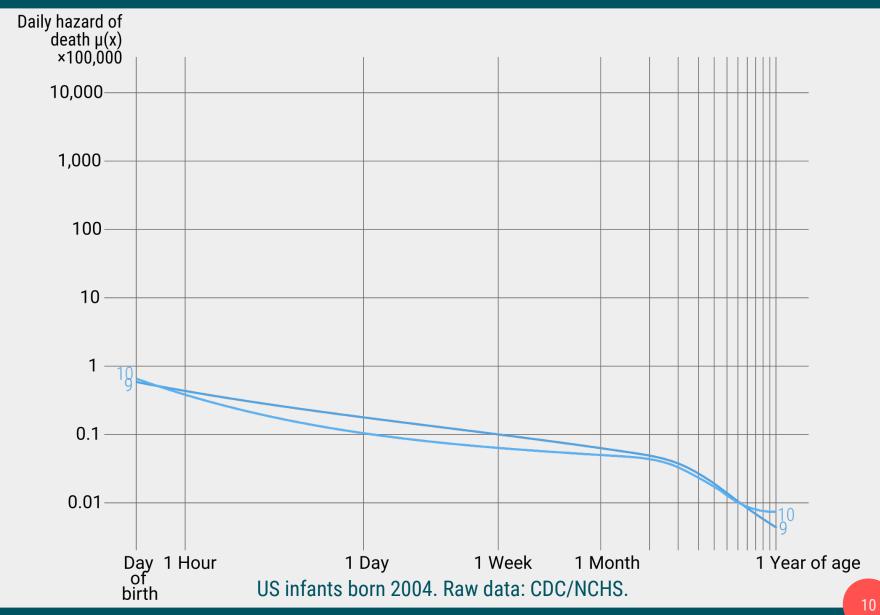
#### Overcoming guesswork by using individual level data

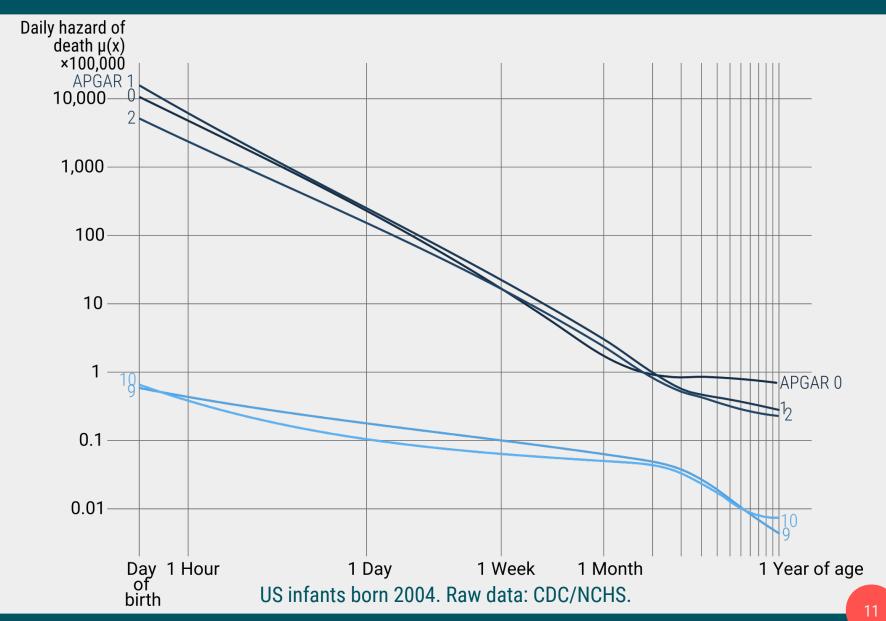
#### VITAL STATISTICS OF THE UNITED STATES: MORTALITY, 1994 TECHNICAL APPENDIX

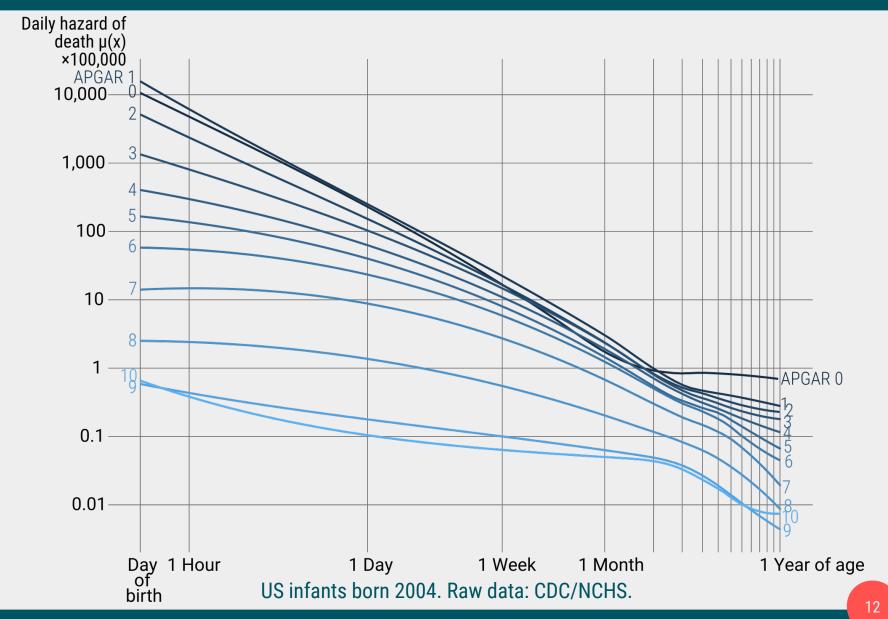
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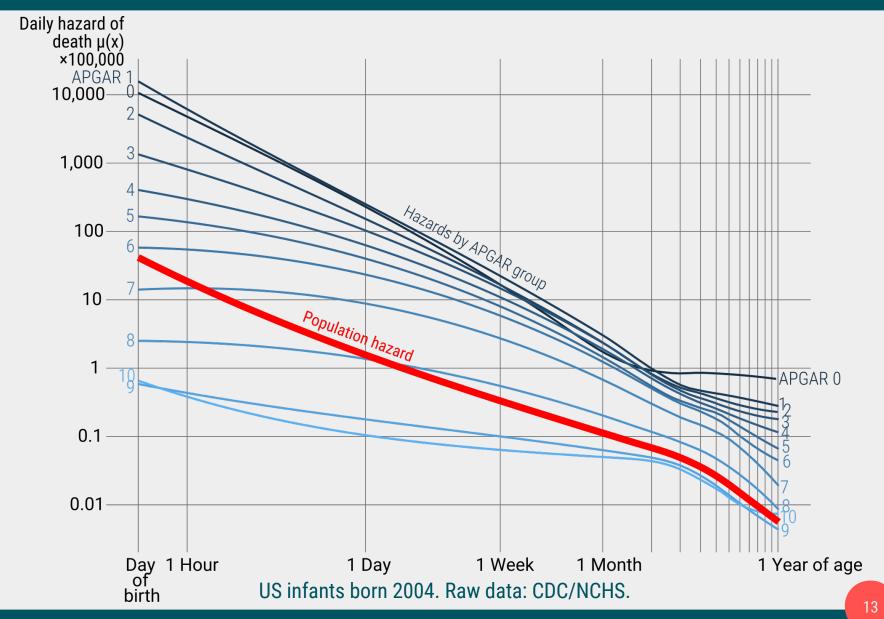
#### The NCHS provides:

- birth certificates on ~70 million US
   births over period 1995–2010
- death certificates on the 439,215 infant deaths during that time









#### **Decomposition methods**

$$Y(A)|X_A - Y(B)|X_B = (A-B) + (X_A-X_B)$$

Total difference in outcome between groups A and B

Difference due to group effect group composition

#### **Decomposition methods**

Vaupel, J. W., & Zhang, Z. (2010). **Attrition in heterogeneous cohorts**. Demographic Research, 23(26), 737–748.

Oaxaca, R. (1973). "Male-Female Wage Differentials in Urban Labor Markets". International Economic Review. 14 (3): 693–709.

Price, G. R. (1970). **Selection and covariance**. Nature, 227(5257), 520-1.

$$Y(A)|X_A - Y(B)|X_B = (A-B) + (X_A-X_B)$$

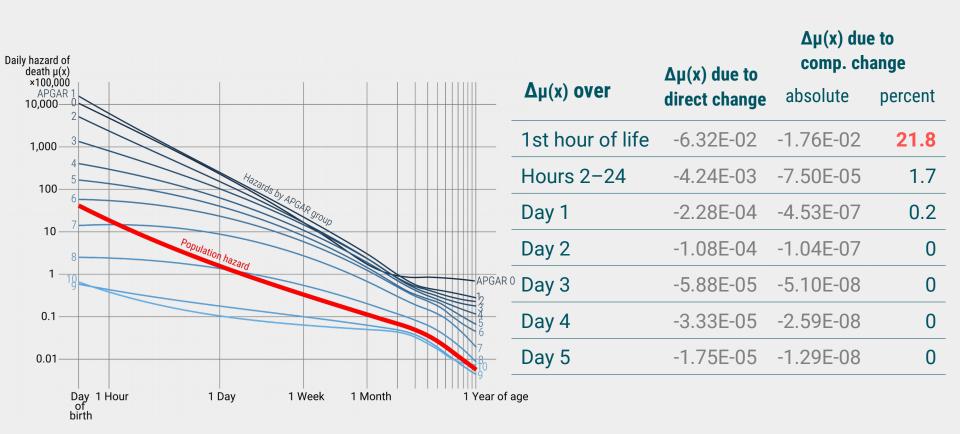
Total difference in outcome between groups A and B

Difference due to group effect group composition

Powers, D. A., Yoshioka, H., & Yun, M.-S. (2011). **mvdcmp: Multivariate decomposition for nonlinear response models.** The Stata Journal, 11(4), 556–576.

Preston, S.H., Himes, C.L., and Eggers, M. (1989). **Demographic conditions responsible for population aging**. Demography 26(4): 691–704.

Vaupel, J.W. and Canudas-Romo, V. (2002). **Decomposing demographic change into direct vs. compositional components**. Demographic Research 7(1): 1–14.



**Method:** Vaupel, J.W. and Canudas-Romo, V. (2002). Decomposing demographic change into direct vs. compositional components. Demographic Research 7(1): 1–14.

Data: US infants born 2005-10. CDC/NCHS,

% Δμ(x) due to									
$\Delta\mu(x)$ over	total Δμ(x)	direct change	compos. change						
hour 0 to 24	2.86E-03	39.4	60.6						

**Method:** Poisson regression on infant death counts decomposed using Powers, D. A., Yoshioka, H., & Yun, M.-S. (2011). mvdcmp: Multivariate decomposition for nonlinear response models. The Stata Journal, 11(4), 556–576.

Data: US infants born 2004. CDC/NCHS,

		% Δµ(x)	due to	sh	share on compositional change					
$\Delta\mu(x)$ over	total Δμ(x)	direct change	compos. change	sex	birth- weigh	birth defect	5 min APGAR	Mother		
hour 0 to 24	2.86E-03	39.4	60.6	0.00	<b>0.16</b>	0.04	0.80	0.00		

**Method:** Poisson regression on infant death counts decomposed using Powers, D. A., Yoshioka, H., & Yun, M.-S. (2011). mvdcmp: Multivariate decomposition for nonlinear response models. The Stata Journal, 11(4), 556–576.

Data: US infants born 2004. CDC/NCHS,

		% <b>Δ</b> μ(x)	due to	share on compositional change						
Δµ(x) over	total Δμ(x)	direct change	compos. change	sex	birth- weigh	birth defect	5 min APGAR	Mother		
hour 0 to 24	2.86E-03	39.4	60.6	0.00	b.16	0.04	0.80	0.00		
Day 2 to 7	7.84E-06	85.5	14.5	0.00	0.27	0.13	0.59	0.01		
Week 2 to 4	1.72E-06	91.7	8.3	0.00	0.25	0.24	0.49	0.02		
Month 2 to 12	1.69E-06	93.7	6.3	0.00	0.52	0.20	0.28	0.00		

**Method:** Poisson regression on infant death counts decomposed using Powers, D. A., Yoshioka, H., & Yun, M.-S. (2011). mvdcmp: Multivariate decomposition for nonlinear response models. The Stata Journal, 11(4), 556–576.

Data: US infants born 2004. CDC/NCHS,

#### Conclusion

Mortality selection drives the mortality decline immediately after birth

Still, most of the infant mortality decline over age is due to individual level effects.

#### More on this project

github.com/jschoeley/imort\_select

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