Maternal age and child mortality in developing countries: an analysis of 228 DHS surveys

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• Childbearing at very young and advanced ages
  – pre-term birth
  – low birth weight
  – infant mortality

• Reproductive ageing

• Secular declines in infant and child mortality
Millenium Development Goal

• MDG Goal 4:
  – Reduce under-five mortality by two-thirds

• Between 1990-2013:
  – Global reduction by 49%

• Only 27 out of 138 developing countries on track
The Past 45 Years

Figure 2: Global under-5 mortality rate and rate of change, 1970–2013
Data

• Demographic and Health Surveys (DHS)
• Pool of 228 surveys, 1985-2014
• Fertility history from mothers
• Response rates:
  – Mean: 93.6%
  – Range: 77.0-99.4%
Outcomes

• Under-five mortality (0-60 months)
  – N= 6,800,524; Deaths=526,363
  – Fixed effects: N= 3,341,809; Deaths=514,311

• Infant mortality (0-12 months)
  – N=6,800,524; Deaths=305,587
  – Fixed effects: N=2,817,073; Deaths=298,295

• Child mortality (13-60 months)
  – N=6,270,225; Deaths=220,776
  – Fixed effects: N=1,584,578; Deaths=216,092
Our Study (77 countries)
Methods and Analysis

• Cox proportional hazards models
  – Stratified Cox analyses (country, mothers)

• Weighting

• Interactions by:
  – Sex of child
  – WHO region
  – Maternal education level
    • None, Primary, Secondary, Tertiary
Analysis Design

• Model 1 (Descriptive):
  – Country fixed effects
  – Adjusting for sex and birth year

• Model 2 (Net effect):
  – Mother fixed effects
  – Adjusting for sex, birth order, and birth year

• Model 3 (Total effect):
  – Mother fixed effects
  – Adjusting for sex and birth order
0-5 Mortality: Sex of Child
0-5 Mortality: Maternal Education

Net Effect of Maternal Age

Total Effect of Maternal Age

Relative Risk

Less than Primary
Primary
Secondary
Tertiary
0-5 Mortality: Region Interaction

Relative Risk

Net Effect of Maternal Age

Total Effect of Maternal Age

WHO Africa Region
WHO Americas Region
WHO Eastern Mediterranean Region
WHO European Region
WHO South-East Asia Region
Infant Mortality: Sex of Child

Relative Risk of Under-five Mortality

Net Effect of Maternal Age

Total Effect of Maternal Age
Child Mortality: Sex of Child

Relative Risk of Under-five Mortality

Net Effect of Maternal Age

Total Effect of Maternal Age
• All births at ages 40+
  – Under-five mortality 18% lower

• Maternal age distribution of Sweden in 2014
  – Under-five mortality 10% lower
Alterative Distribution

Maternal Age

Percent

Developing World

Sweden in 2014
Valid for the Future?

• Postponing would have made sense for the past 30 years, but what about the next?

• Can secular decline be maintained?
Figure 2: Global under-5 mortality rate and rate of change, 1970–2013
Nordic, UK, USA
Limitations

• Self-reported fertility history

• Not much country-specific nuance here...

• Weighting issue
  – Response rates are very good
  – Alternative approaches...
Thanks for listening!
Infant Mortality: Maternal Education

Relative Risk

Net Effect of Maternal Age

Total Effect of Maternal Age

No Education
Primary
Secondary
Tertiary
Infant Mortality: Region Interaction

Relative Risk

Net Effect of Maternal Age

Total Effect of Maternal Age

WHO Africa Region
WHO Americas Region
WHO Eastern Mediterranean Region
WHO European Region
WHO South-East Asia Region
Child Mortality: Maternal Education

Relative Risk

Net Effect of Maternal Age

Total Effect of Maternal Age

No Education
Primary
Secondary
Tertiary
Child Mortality: Region Interaction

Relative Risk

Net Effect of Maternal Age

Total Effect of Maternal Age

WHO Africa Region
WHO Americas Region
WHO Eastern Mediterranean Region
WHO European Region
WHO South-East Asia Region