



## Are tuition-free primary education policies associated with lower infant and neonatal mortality in low- and middle-income countries?

### Background

Reducing child mortality is a global health priority, and research has shown that increasing mothers' level of education may be central to this effort. Studies from high- and low-income countries alike show that maternal education is associated with increased birth weight, improved child nutrition, and increased likelihood of breastfeeding, which are in turn associated with lower child mortality and improved child health.

Girls in low- and middle-income countries (LMICs) face a range of barriers to education, including financial barriers. Some countries charge fees for tuition, uniforms, books and other materials.

This study is the first to bridge the evidence of the importance of maternal education to child health outcomes and the problem of financial barriers to school, by examining whether policies establishing tuition-free primary school have an effect on infant and neonatal mortality in LMICs.

### Methods

Data from the Demographic Health Surveys (DHS) were used to construct a representative sample of live births occurring in 37 LMICs to young mothers aged 15-21 years in survey years 2003 to 2011. DHS data contain information on:

- infant and neonatal mortality, including the age of death of any children who have died, based on the birth histories collected for each woman; and
- factors that might impact infant and neonatal mortality, including gender of the infant, gender of the household head, education of the household head, urban/ rural residence, and household socioeconomic status (SES).



DHS data were merged with data collected on tuition-free education policy in the country at the time during which each mother would have been in primary school.

Because education policies are not randomly assigned to countries, but rather are often related to other country characteristics, this study used propensity score matching techniques to identify comparable groups of mothers, based on the distributions of measured characteristics hypothesized to be associated with tuition-free policies.

Propensity scores were obtained using logistic regression models. After matching on the propensity score, the samples used in the analyses of infant and neonatal mortality comprised 24,396 and 36,030 births, respectively, from 23 LMICs.

Multilevel logistic regression models, fitted using generalized estimating equations, were used to estimate the effect of exposure to tuition-free primary education policies on the risk of infant and neonatal mortality. This study controlled for GDP per capita, percentage of the population living in urban centers, and health expenditures per capita. Quamruzzaman et al. also tested whether this effect was modified by household SES.

## Findings

Young mothers' exposure to a tuition-free primary education policy was associated with 15 fewer infant deaths and 5 fewer neonatal deaths per 1,000 live births, adjusting for household SES. These reductions represent a decrease of approximately 19% and 13% relative to the sample means, respectively.

The impact of tuition-free policies did not vary significantly across SES groups, though these policies were most strongly associated with reductions in infant mortality for births to mothers in the middle of the socioeconomic gradient. For those in the third quintile of household SES, exposure to a tuition-free policy was associated with 23 fewer infant and 12 fewer neonatal deaths per 1,000 live births.

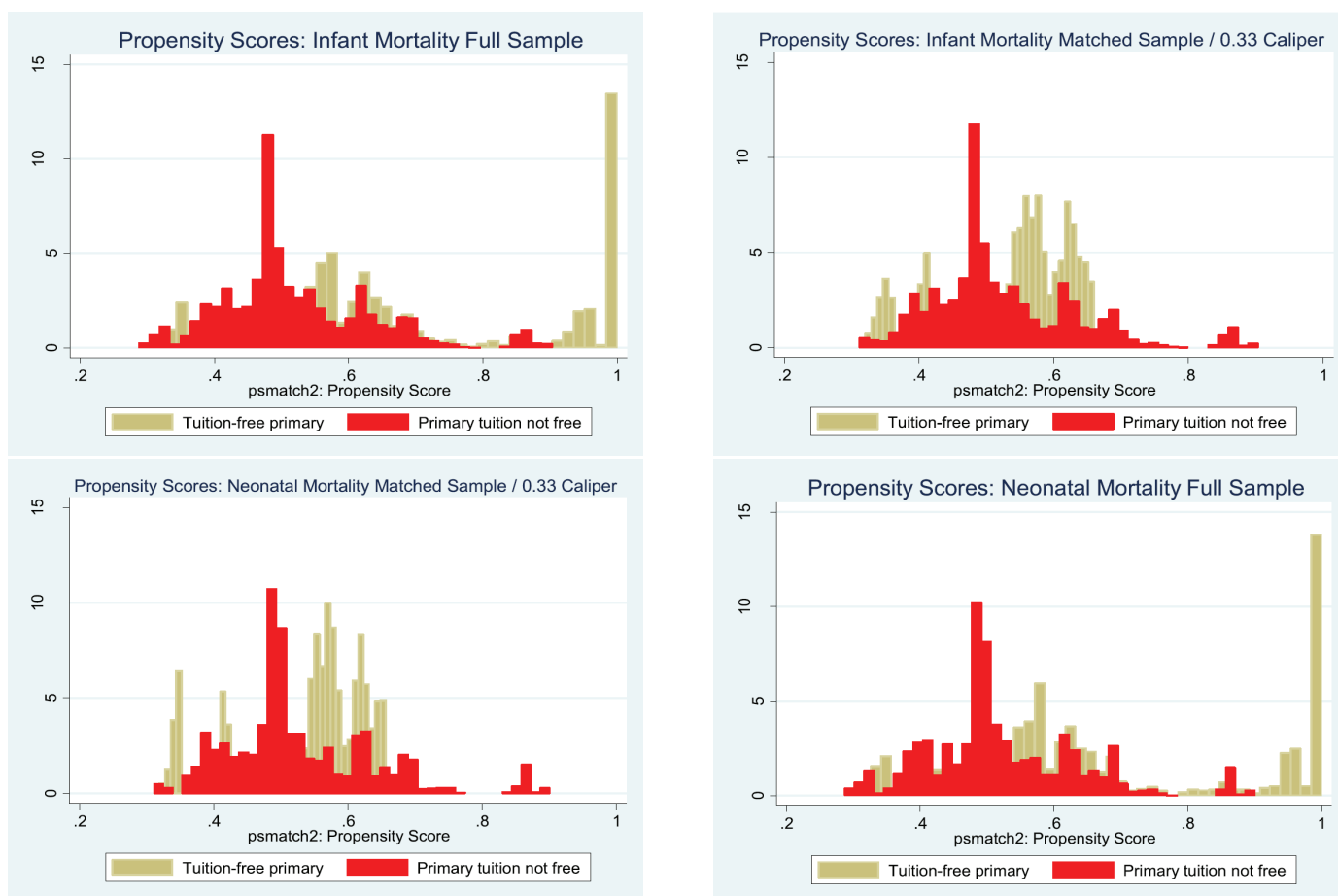
## Discussion

Although differences across SES groups were not statistically significant, other barriers or advantages might explain the somewhat lower association between tuition-free policies and infant mortality for

the poorest and wealthiest mothers:

- Among those in the bottom quintile, pervasive poverty creates a range of obstacles to school beyond tuition fees, including the inability to pay for uniform and textbook costs and expectations that girls perform household work and care for younger siblings.
- Conversely, the wealthiest households face lower opportunity costs by sending their children to school, and likely have greater means to pay for education in countries where primary school is not tuition-free.

*This research brief presents key findings from the following article: Quamruzzaman A, Mendoza JM, Heymann SJ, Kaufman JS, and Nandi A. Are Tuition-Free Primary Education Policies Associated with Lower Infant and Neonatal Mortality in Low- and Middle-Income Countries? Social Science & Medicine. 2014; 120: 153-159. To access this and other WORLD publications, please visit: <http://worldpolicycenter.org/publications>*



**Figure 1.** Histograms showing the distributions of the estimated propensity scores for the infant (top) and neonatal (bottom) mortality samples for exposed and unexposed respondents before (left) and after (right) matching.

