

# Vaccination and All Cause Child Mortality 1985-2011: Global Evidence from the Demographic and Health Surveys

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## Web Appendix

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**Web Table 1:** Demographic and Health Surveys Included in the Analysis

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DHS Survey: Year	DHS Survey: Year
Albania Year: 2008-2009	Central African Republic Year: 1994-1995
Bangladesh Year: 1993-1994	Chad Year: 1996-1997
Bangladesh Year: 1996-1997	Chad Year: 2004
Bangladesh Year: 1999-2000	Colombia Year: 1990
Bangladesh Year: 2004	Colombia Year: 1995
Bangladesh Year: 2007	Colombia Year: 2000
Benin Year: 1996	Colombia Year: 2005
Benin Year: 2001	Colombia Year: 2010
Benin Year: 2006	Comoros Year: 1996
Bolivia Year: 1994	Congo Democratic Republic Year: 2007
Bolivia Year: 1998	Congo (Brazzaville) Year: 2005
Bolivia Year: 2003	Cote d'Ivoire Year: 1994
Bolivia Year: 2008	Cote d'Ivoire Year: 1998-1999
Brazil Year: 1996	Dominican Republic Year: 1996
Burkina Faso Year: 1993	Dominican Republic Year: 1999
Burkina Faso Year: 1998-1999	Dominican Republic Year: 2002
Burkina Faso Year: 2003	Dominican Republic Year: 2007
Burkina Faso Year: 2010	Egypt Year: 1995
Burundi Year: 2010	Egypt Year: 2000
Cambodia Year: 2000	Egypt Year: 2005
Cambodia Year: 2005	Egypt Year: 2008
Cambodia Year: 2010	Ethiopia Year: 2000
Cameroon Year: 1991	Ethiopia Year: 2005
Cameroon Year: 1998	Ethiopia Year: 2011
Cameroon Year: 2004	Gabon Year: 2000
Cameroon Year: 2011	Ghana Year: 1993
Ghana Year: 1998	Lesotho Year: 2009
Ghana Year: 2003	Liberia Year: 2007
Ghana Year: 2008	Madagascar Year: 1997
Guatemala Year: 1995	Madagascar Year: 2003-2004
Guinea Year: 1999	Madagascar Year: 2008-2009
Guinea Year: 2005	Malawi Year: 1992
Guyana Year: 2009	Malawi Year: 2000
Haiti Year: 1994	Malawi Year: 2004
Haiti Year: 2000	Malawi Year: 2010
Haiti Year: 2005-2006	Maldives Year: 2009
Honduras Year: 2005-2006	Mali Year: 2001
India Year: 1992-1993	Mali Year: 2006
India Year: 1998-1999	Moldova Year: 2005

**Table 1 – Continued on the Next Page**

DHS Survey: Year	DHS Survey: Year
India Year: 2005-2006	Morocco Year: 1992
Indonesia Year: 1997	Morocco Year: 2003-2004
Indonesia Year: 2002-2003	Mozambique Year: 1997
Indonesia Year: 2007	Mozambique Year: 2003
Jordan Year: 1990	Namibia Year: 1992
Jordan Year: 1997	Namibia Year: 2006-2007
Jordan Year: 2002	Nepal Year: 1996
Jordan Year: 2007	Nepal Year: 2001
Kenya Year: 1993	Nepal Year: 2006
Kenya Year: 1998	Nepal Year: 2011
Kenya Year: 2003	Nicaragua Year: 1998
Kenya Year: 2008-2009	Nicaragua Year: 2001
Lesotho Year: 2004	Niger Year: 1998
Niger Year: 2006	Tanzania Year: 2004-2005
Nigeria Year: 1990	Tanzania Year: 2010
Nigeria Year: 2003	Timor Leste Year: 2009-2010
Nigeria Year: 2008	Togo Year: 1998
Pakistan Year: 1990	Turkey Year: 1993
Pakistan Year: 2006-2007	Turkey Year: 1998
Paraguay Year: 1990	Uganda Year: 1995
Peru Year: 1991-1992	Uganda Year: 2000-2001
Peru Year: 1996	Uganda Year: 2006
Peru Year: 2000	Uganda Year: 2011
Philippines Year: 1993	Vietnam Year: 1997
Philippines Year: 1998	Vietnam Year: 2002
Philippines Year: 2003	Zambia Year: 1996
Philippines Year: 2008	Zambia Year: 2001-2002
Rwanda Year: 1992	Zambia Year: 2007
Rwanda Year: 2000	Zimbabwe Year: 1994
Rwanda Year: 2005	Zimbabwe Year: 1999
Rwanda Year: 2010	Zimbabwe Year: 2005-2006
Sao Tome and Principe Year: 2008-2009	Zimbabwe Year: 2010-2011
Senegal Year: 2005	
Senegal Year: 2010-2011	
Sierra Leone Year: 2008	
South Africa Year: 1998	
Swaziland Year: 2006-2007	
Tanzania Year: 1996	
Tanzania Year: 1999	

Note: Demographic and Health Survey data are available from [www.dhsprogram.com](http://www.dhsprogram.com).

## Web Appendix 1

We excluded data from the first round of the Demographic and Health Surveys (DHS), as in the first wave vaccination status was typically recorded from vaccination cards alone, resulting in a high proportion of missing values, whereas later surveys include the mother’s report of their children’s vaccination status. Overall, 13% of children in the sample are reported as not having a card, while a further 30% do not have their card presented to the interviewer. If the vaccination card is not available, mothers are asked to report vaccination status. Langsten and Hill show that maternal reporting of Bacille Calmette-Guérin (BCG) status in Egypt is 98% accurate, compared to 83% for DPT3 (1). More recently, Murray and colleagues do not find any evidence that maternal recall bias affects coverage estimates in the DHS (2). However, the mother-reported information is an important limitation of the data (3).

World Health Organization (WHO) recommendations for vaccination have changed over time, in part reflecting updated evidence on the effectiveness of vaccines, and changing priorities from variation in coverage rates. For example, initially the Expanded Program on Immunization (EPI) recommended one dose of measles containing vaccine (MCV1), however two doses are now standard in many countries as vaccination failure typically occurs in 10-15% of infants receiving the first dose at 9 months (4). Failure rates are likely to be even higher if immunization occurs before 9 months due to immaturity of the immune system. The WHO recommends prioritizing the first measles dose until 80% coverage of MCV1 for three consecutive years has been achieved (4). Regarding Polio, in high risk countries an Oral Polio Vaccine (OPV) birth dose (Polio 0) followed by a primary series of three OPV doses and at least one Inactivated Poliovirus Vaccine (IPV) dose is now recommended (5). As relatively few DHS surveys include information on Polio 0 or a second measles containing vaccination (MCV2), we are restricted to the five types (BCG, DPT 1-3, Polio 1-3, MCV1, and maternal tetanus) if we wish to use all available datasets. Our data does not distinguish between a monovalent measles vaccine and the combined measles, mumps, and rubella (MMR) vaccine, or between IPV and OPV.

**Web Table 2:** Corrected Cluster Vaccination Coverage Rates

Cluster Vaccination Coverage	Median	Mean	SD	N
Measles				
Base	88.89%	79.77%	25.65%	68,490
Iteration 1	88.83%	79.64%	25.75%	68,490
Iteration 2	88.83%	79.64%	25.75%	68,490
Iteration 3	88.83%	79.64%	25.75%	68,490
Iteration 4	88.83%	79.64%	25.75%	68,490
Iteration 5	88.83%	79.64%	25.75%	68,490
Iteration 6	88.83%	79.64%	25.75%	68,490
Iteration 7	88.83%	79.64%	25.75%	68,490
Iteration 8	88.83%	79.64%	25.75%	68,490
Iteration 9	88.83%	79.64%	25.75%	68,490
Iteration 10	88.83%	79.64%	25.75%	68,490
DPT Polio				
Base	88.89%	81.92%	21.22%	68,490
Iteration 1	88.89%	81.91%	21.23%	68,490
Iteration 2	88.89%	81.91%	21.23%	68,490
Iteration 3	88.89%	81.91%	21.23%	68,490
Iteration 4	88.89%	81.91%	21.23%	68,490
Iteration 5	88.89%	81.91%	21.23%	68,490
Iteration 6	88.89%	81.91%	21.23%	68,490
Iteration 7	88.89%	81.91%	21.23%	68,490
Iteration 8	88.89%	81.91%	21.23%	68,490
Iteration 9	88.89%	81.91%	21.23%	68,490
Iteration 10	88.89%	81.91%	21.23%	68,490

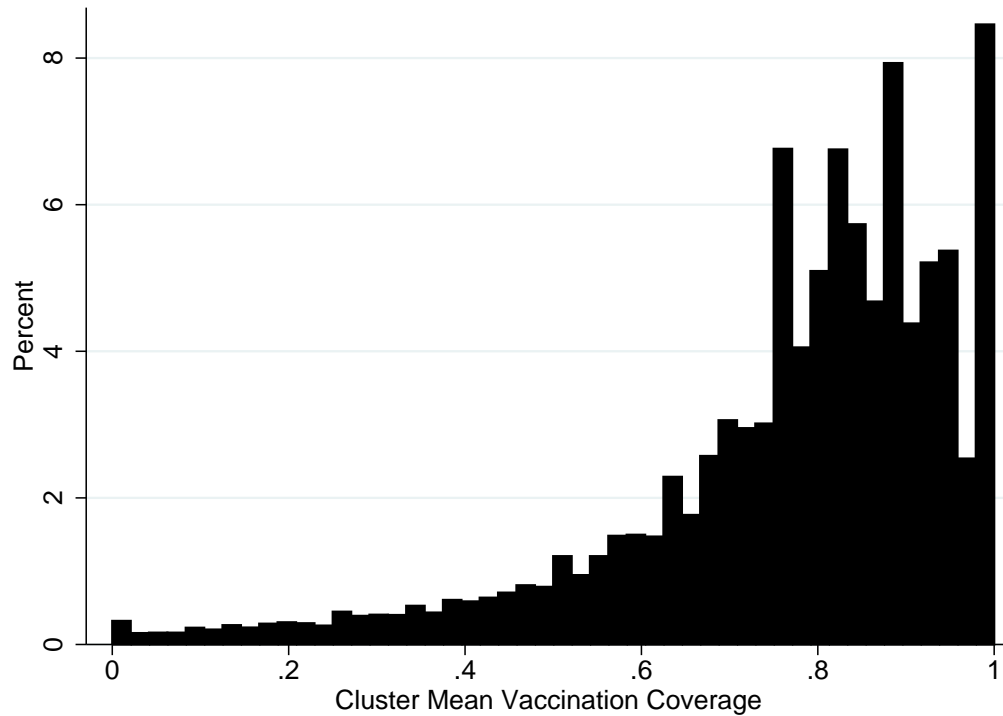
Table 2 – Continued on the Next Page

Cluster Vaccination Coverage	Median	Mean	SD	N
BCG				
Base	100.00%	87.28%	22.22%	68,490
Iteration 1	100.00%	87.30%	22.20%	68,490
Iteration 2	100.00%	87.29%	22.21%	68,490
Iteration 3	100.00%	87.29%	22.21%	68,490
Iteration 4	100.00%	87.29%	22.21%	68,490
Iteration 5	100.00%	87.29%	22.21%	68,490
Iteration 6	100.00%	87.29%	22.21%	68,490
Iteration 7	100.00%	87.29%	22.21%	68,490
Iteration 8	100.00%	87.29%	22.21%	68,490
Iteration 9	100.00%	87.29%	22.21%	68,490
Iteration 10	100.00%	87.29%	22.21%	68,490

Mean Vaccination				
Base	81.30%	76.80%	19.34%	68,490
Iteration 1	81.25%	76.64%	19.45%	68,490
Iteration 2	81.25%	76.62%	19.46%	68,490
Iteration 3	81.25%	76.61%	19.46%	68,490
Iteration 4	81.25%	76.61%	19.46%	68,490
Iteration 5	81.25%	76.61%	19.46%	68,490
Iteration 6	81.25%	76.61%	19.46%	68,490
Iteration 7	81.25%	76.61%	19.46%	68,490
Iteration 8	81.25%	76.61%	19.46%	68,490
Iteration 9	81.25%	76.61%	19.46%	68,490
Iteration 10	81.25%	76.61%	19.46%	68,490

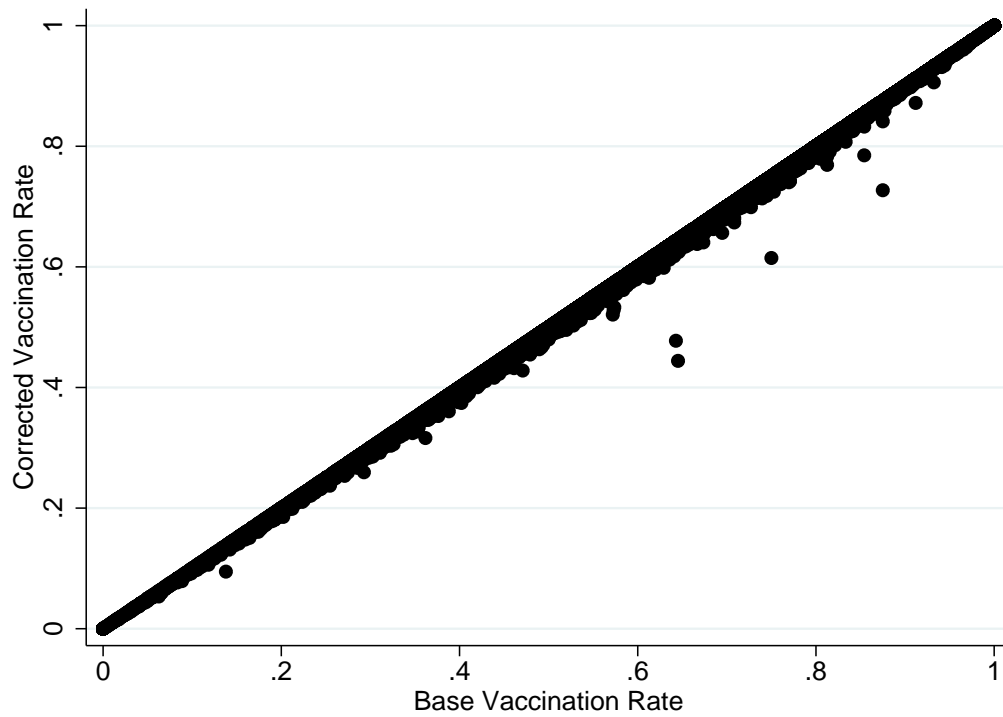
The base vaccination coverage rate is the raw cluster vaccination rate in the data which excludes children who have died. The vaccination coverage rate in iterations 1-10 corrects for this missing data using the procedure described in the main text.

**Web Figure 1: Histogram of Mean Vaccination Coverage**



Source: Demographic and Health Surveys. For BCG, measles, and maternal tetanus, we construct a binary indicator variable for each child indicating whether they received the relevant vaccine dose. We combine DPT and Polio into a single variable where each dose counts for 1/6. Therefore, receiving a full schedule of DPT and Polio results in a score of 1. Mean vaccination coverage is defined as the average of the BCG, DPT/Polio, measles, and maternal tetanus vaccination rates in the cluster. The data include 68,490 DHS primary sampling unit clusters, based on 149 surveys in 62 countries, and 960,271 children born between 1985 and 2011.

**Web Figure 2:** Scatterplot of Raw Mean Vaccination Coverage and Mortality-Corrected Mean Vaccination Coverage



Source: Demographic and Health Surveys. The data include 68,490 DHS primary sampling unit clusters, based on 149 surveys in 62 countries, and 960,271 children born between 1985 and 2011. The corrected vaccination rate adjusts for missing immunization information on children who have died using the procedure described in the main text.



**Web Table 3:** Poisson Model Results for Cluster Vaccination Coverage and Cluster Under Five Mortality in the Demographic and Health Surveys 1985-2011 (Unadjusted for Covariates other than Country Fixed Effects and Time Trends)

Variables	Relative Risk Cluster Level Under 5 Mortality (95% CI)	Relative Risk Cluster Level Under 5 Mortality (95% CI)	Relative Risk Cluster Level Under 5 Mortality (95% CI)	Relative Risk Cluster Level Under 5 Mortality (95% CI)
Cluster Vaccination Average Coverage	0.38 (0.36 - 0.40)	0.37 (0.35 - 0.38)		
Cluster BCG Coverage			1.06 (0.98 - 1.14)	1.06 (0.98 - 1.15)
Cluster DPT Polio Coverage			0.85 (0.77 - 0.93)	0.86 (0.79 - 0.94)
Cluster Measles Coverage			0.71 (0.66 - 0.77)	0.70 (0.65 - 0.75)
Cluster Maternal Tetanus Coverage			0.57 (0.53 - 0.58)	0.56 (0.53 - 0.58)
Corrected for Missing Data on Children who Died	No	Yes	No	Yes
Country Fixed Effects and Country Time Trends	Yes	Yes	Yes	Yes
Full Set of Control Variables	No	No	No	No
Observations	68,490	68,490	68,490	68,490

Note: Demographic and Health Survey data are available from [www.dhsprogram.com](http://www.dhsprogram.com). All variables are averages at the level of the DHS primary sampling unit cluster, based on 149 surveys in 62 countries, and 960,271 children born between 1985 and 2011. Coefficients illustrate the relative risk of moving from 0% vaccination coverage to 100% coverage (on the mortality of children born in the 5 years prior to interview). Columns 1 and 3 are based on the raw vaccination coverage in a cluster (defined as the proportion of children one year or older who have received the relevant doses), while columns 2 and 4 adjust the vaccination data for the selection effect due to non-reporting of vaccination status of children who have died. Models control for country fixed effects and country time trends.

**Web Table 4: Poisson Model Results for Cluster Vaccination Coverage and Cluster Under Five Mortality in the Demographic and Health Surveys 1985-2011 (Full Results Showing All Covariates)**

Variables	Relative Risk	Relative Risk	Relative Risk	Relative Risk
	Cluster Level Under 5 Mortality (95% CI)	Cluster Level Under 5 Mortality (95% CI)	Cluster Level Under 5 Mortality (95% CI)	Cluster Level Under 5 Mortality (95% CI)
Cluster Vaccination Average Coverage	0.76 (0.71 - 0.81)	0.73 (0.68 - 0.77)		
Cluster BCG Coverage			1.04 (0.96 - 1.12)	1.03 (0.96 - 1.11)
Cluster DPT Polio Coverage			0.97 (0.89 - 1.06)	0.97 (0.89 - 1.06)
Cluster Measles Coverage			0.83 (0.77 - 0.89)	0.83 (0.78 - 0.89)
Cluster Maternal Tetanus Coverage			0.92 (0.86 - 0.97)	0.92 (0.86 - 0.97)
<b>Wealth Index: Omitted=Highest</b>				
Cluster Mean Lowest Quintile	1.12 (1.05 - 1.19)	1.11 (1.04 - 1.19)	1.12 (1.05 - 1.19)	1.12 (1.05 - 1.19)
Cluster Mean Second Quintile	1.12 (1.06 - 1.20)	1.12 (1.05 - 1.19)	1.12 (1.06 - 1.20)	1.12 (1.06 - 1.20)
Cluster Mean Third Quintile	1.06 (1.00 - 1.13)	1.06 (1.00 - 1.12)	1.06 (1.00 - 1.13)	1.06 (1.00 - 1.13)
Cluster Mean Fourth Quintile	1.08 (1.02 - 1.15)	1.08 (1.02 - 1.14)	1.08 (1.02 - 1.14)	1.08 (1.02 - 1.14)
Cluster Mean Year of Birth	0.14 (0.13 - 0.16)	0.14 (0.13 - 0.16)	0.14 (0.13 - 0.16)	0.14 (0.13 - 0.16)
Cluster Mean Sex of Child – Female	0.93 (0.90 - 0.95)	0.93 (0.90 - 0.95)	0.92 (0.90 - 0.95)	0.92 (0.90 - 0.95)
Cluster Mean Was not Multiple Birth	0.90 (0.85 - 0.96)	0.90 (0.85 - 0.96)	0.90 (0.85 - 0.96)	0.90 (0.85 - 0.96)
<b>Place of Birth: Omitted= Own Home</b>				
Cluster Mean Other Home	1.01 (0.93 - 1.11)	1.01 (0.93 - 1.11)	1.01 (0.92 - 1.11)	1.01 (0.92 - 1.11)
Cluster Mean Government Hospital	0.82 (0.78 - 0.87)	0.83 (0.78 - 0.87)	0.83 (0.78 - 0.88)	0.83 (0.78 - 0.88)
Cluster Mean Government Health Center	0.87 (0.82 - 0.91)	0.87 (0.83 - 0.92)	0.87 (0.82 - 0.92)	0.87 (0.82 - 0.92)
Cluster Mean Private Hospital or Clinic	0.80 (0.75 - 0.86)	0.80 (0.75 - 0.86)	0.80 (0.74 - 0.86)	0.80 (0.74 - 0.86)
Cluster Mean Other and Unknown	1.97 (1.68 - 2.31)	1.96 (1.67 - 2.30)	1.99 (1.69 - 2.33)	1.98 (1.69 - 2.32)
<b>Birth Interval: Omitted=12-17 Months</b>				
Cluster Mean Birth Interval First Birth	0.14 (0.12 - 0.17)	0.14 (0.12 - 0.17)	0.14 (0.12 - 0.17)	0.14 (0.12 - 0.17)
Cluster Mean Birth Interval 1-11	5.15 (3.79 - 7.00)	5.09 (3.75 - 6.92)	5.15 (3.79 - 7.00)	5.15 (3.79 - 7.00)
Cluster Mean Birth Interval 18-23	0.22 (0.19 - 0.26)	0.22 (0.19 - 0.26)	0.22 (0.19 - 0.26)	0.22 (0.19 - 0.26)
Cluster Mean Birth Interval 24+	0.12 (0.11 - 0.14)	0.12 (0.11 - 0.14)	0.12 (0.11 - 0.14)	0.12 (0.11 - 0.14)
Cluster Mean Number of Siblings	1.07 (1.06 - 1.09)	1.07 (1.05 - 1.09)	1.07 (1.05 - 1.09)	1.07 (1.05 - 1.09)
<b>Mother's Age: Omitted=15-19</b>				
Cluster Mean Mother's Age 20-24	0.77 (0.68 - 0.86)	0.77 (0.68 - 0.86)	0.77 (0.69 - 0.87)	0.77 (0.69 - 0.87)
Cluster Mean Mother's Age 25-29	0.63 (0.56 - 0.71)	0.63 (0.56 - 0.72)	0.64 (0.56 - 0.72)	0.63 (0.56 - 0.72)
Cluster Mean Mother's Age 30-34	0.59 (0.52 - 0.67)	0.59 (0.52 - 0.67)	0.59 (0.52 - 0.68)	0.59 (0.52 - 0.68)
Cluster Mean Mother's Age 35-39	0.59 (0.51 - 0.68)	0.59 (0.51 - 0.68)	0.59 (0.51 - 0.68)	0.59 (0.51 - 0.68)
Cluster Mean Mother's Age 40-44	0.61 (0.52 - 0.72)	0.61 (0.52 - 0.73)	0.62 (0.52 - 0.73)	0.62 (0.52 - 0.73)
Cluster Mean Mother's Age 45-49	0.70 (0.55 - 0.89)	0.70 (0.55 - 0.89)	0.70 (0.55 - 0.89)	0.70 (0.55 - 0.89)
Cluster Mean Rural Place of Residence	0.95 (0.93 - 0.98)	0.95 (0.93 - 0.98)	0.95 (0.93 - 0.98)	0.95 (0.93 - 0.98)
<b>Mother's Highest Education: Omitted=None</b>				
Cluster Mean Primary	0.97 (0.92 - 1.03)	0.97 (0.92 - 1.03)	0.97 (0.92 - 1.03)	0.97 (0.92 - 1.03)
Cluster Mean Secondary	0.84 (0.78 - 0.90)	0.84 (0.78 - 0.90)	0.84 (0.78 - 0.90)	0.84 (0.78 - 0.90)
Cluster Mean Higher Education	0.71 (0.60 - 0.82)	0.71 (0.61 - 0.82)	0.71 (0.60 - 0.82)	0.71 (0.60 - 0.82)

**Table 4 – Continued on the Next Page**

Variables	Relative Risk	Relative Risk	Relative Risk	Relative Risk
	Cluster Level	Cluster Level	Cluster Level	Cluster Level
	Under 5 Mortality	Under 5 Mortality	Under 5 Mortality	Under 5 Mortality
	(95% CI)	(95% CI)	(95% CI)	(95% CI)
Cluster Mean Missing	0.49 (0.11 - 2.06)	0.48 (0.11 - 2.05)	0.48 (0.11 - 2.05)	0.49 (0.11 - 2.06)
Cluster Mean Flush Toilet Access	0.90 (0.86 - 0.95)	0.90 (0.86 - 0.95)	0.90 (0.86 - 0.95)	0.90 (0.86 - 0.95)
Cluster Mean Piped Water in House	0.98 (0.95 - 1.01)	0.98 (0.95 - 1.01)	0.98 (0.95 - 1.01)	0.98 (0.95 - 1.01)
<b>Partner Education: Omitted=None</b>				
Cluster Mean Primary	1.10 (1.03 - 1.17)	1.10 (1.03 - 1.17)	1.09 (1.03 - 1.16)	1.09 (1.03 - 1.16)
Cluster Mean Secondary	0.99 (0.92 - 1.06)	0.99 (0.92 - 1.06)	0.98 (0.92 - 1.05)	0.98 (0.92 - 1.05)
Cluster Mean Higher Education	0.91 (0.80 - 1.02)	0.91 (0.80 - 1.02)	0.91 (0.80 - 1.02)	0.91 (0.80 - 1.02)
Cluster Mean Missing	1.12 (1.00 - 1.25)	1.12 (1.00 - 1.25)	1.12 (1.00 - 1.25)	1.11 (1.00 - 1.24)
<b>Marital Status: Omitted=Married</b>				
Cluster Mean Never Married	1.11 (0.93 - 1.31)	1.11 (0.93 - 1.31)	1.11 (0.94 - 1.31)	1.11 (0.94 - 1.32)
Cluster Mean Living Together	1.11 (1.04 - 1.17)	1.11 (1.04 - 1.17)	1.10 (1.04 - 1.17)	1.10 (1.04 - 1.17)
Cluster Mean Widowed	1.80 (1.44 - 2.24)	1.79 (1.44 - 2.23)	1.79 (1.43 - 2.23)	1.79 (1.43 - 2.23)
Cluster Mean Divorced	1.90 (1.57 - 2.31)	1.90 (1.57 - 2.31)	1.90 (1.56 - 2.30)	1.90 (1.56 - 2.30)
Cluster Mean Not Living Together	1.67 (1.47 - 1.90)	1.67 (1.47 - 1.90)	1.67 (1.47 - 1.90)	1.67 (1.47 - 1.90)
<b>Religion: Omitted=Christian</b>				
Cluster Mean Religion Muslim	1.01 (0.97 - 1.05)	1.01 (0.97 - 1.05)	1.01 (0.97 - 1.05)	1.01 (0.97 - 1.05)
Cluster Mean Religion Jewish	0.85 (0.64 - 1.15)	0.86 (0.64 - 1.15)	0.85 (0.64 - 1.15)	0.85 (0.64 - 1.15)
Cluster Mean Religion Buddhist	0.86 (0.73 - 1.01)	0.86 (0.73 - 1.01)	0.86 (0.73 - 1.00)	0.86 (0.73 - 1.00)
Cluster Mean Religion Hindu	1.40 (1.30 - 1.51)	1.40 (1.30 - 1.51)	1.40 (1.30 - 1.51)	1.40 (1.30 - 1.51)
Cluster Mean Religion Sikh	1.13 (0.86 - 1.50)	1.14 (0.86 - 1.51)	1.15 (0.87 - 1.52)	1.15 (0.87 - 1.52)
Cluster Mean Religion Traditional	1.05 (0.95 - 1.16)	1.04 (0.95 - 1.15)	1.04 (0.95 - 1.15)	1.04 (0.95 - 1.15)
Cluster Mean Religion Other	1.07 (0.98 - 1.18)	1.07 (0.98 - 1.17)	1.08 (0.98 - 1.18)	1.08 (0.98 - 1.18)
Cluster Mean Religion None	0.87 (0.78 - 0.97)	0.87 (0.78 - 0.96)	0.86 (0.78 - 0.96)	0.87 (0.78 - 0.96)
Cluster Mean Unknown/Missing	1.07 (1.02 - 1.14)	1.08 (1.02 - 1.14)	1.07 (1.01 - 1.13)	1.07 (1.01 - 1.13)
Cluster Mean Months Since Birth	0.99 (0.99 - 0.99)	0.99 (0.99 - 0.99)	0.99 (0.99 - 0.99)	0.99 (0.99 - 0.99)
<b>Had Ante-Natal Visit: Omitted=No Visit</b>				
Cluster Mean Had Ante-Natal Visit	0.86 (0.81 - 0.91)	0.87 (0.82 - 0.93)	0.85 (0.80 - 0.91)	0.85 (0.80 - 0.91)
Cluster Mean Ante-Natal Visit Missing	1.32 (1.21 - 1.45)	1.32 (1.21 - 1.45)	1.29 (1.18 - 1.42)	1.29 (1.18 - 1.42)
Corrected for Missing Data on Children who Died	No	Yes	No	Yes
Country Fixed Effects and Country Time Trends	Yes	Yes	Yes	Yes
Number of clusters	68,490	68,490	68,490	68,490

Note: Demographic and Health Survey data are available from [www.dhsprogram.com](http://www.dhsprogram.com). All variables are averages at the level of the DHS primary sampling unit cluster, based on 149 surveys in 62 countries, and 960,271 children born between 1985 and 2011. Coefficients illustrate the relative risk of moving from 0% vaccination coverage to 100% coverage (on the mortality of children born in the 5 years prior to interview). Columns 1 and 3 are based on the raw vaccination coverage in a cluster (defined as the proportion of children one year or older who have received the relevant doses), while columns 2 and 4 adjust the vaccination data for the selection effect due to non-reporting of vaccination status of children who have died.

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