Table A1: Sample size and surveys across countries

	Phase (Year of survey)	No. obs. (% of total)
Albania	Phase 5 (2008/09)	1,152 (0.15)
Armenia	Phase 4 (2000), Phase 5 (2005), Phase 6 (2010)	2,778 (0.37)
Azerbaijan	Phase 5 (2006)	1,174 (0.16)
Bangladesh	Phase 3 (1993/94, 1996, 1997)*, Phase 4 (1999, 2000)*, Phase 5 (2004, 2007)*, Phase 6 (2011)	23,459 (3.12)
Benin	Phase 3 (1996), Phase 4 (2001)*, Phase 5 (2006), Phase 6 (2011/12)	16,274 (2.16)
Bolivia	Phase 3 (1993/94), Phase 4 (2003/04), Phase 5 (2008)	17,034 (2.26)
Brazil	Phase 2 (1991/92), Phase 3 (1996)	5,339 (0.71)
Burkina Faso	Phase 2 (1992/93), Phase 4 (1998/99, 2003)*, Phase 6 (2010)	15,095 (2.01)
Burundi	Phase 6 (2010/11)	3,224 (0.43)
Cambodia	Phase 4 (2000), Phase 5 (2005/06), Phase 6 (2010/11)	14,645 (1.95)
Cameroon	Phase 2 (1991), Phase 3 (1998), Phase 4 (2004), Phase 6 (2011)	10,344 (1.37)
Central Afr. Republic	Phase 3 (1994/95)	1,451 (0.19)
Chad	Phase 3 (1996/97), Phase 4 (2004)	5,821 (0.77)
Colombia	Phase 3 (1995), Phase 5 (2004, 2005)*, Phase 6 (2009/10)	24,944 (3.31)
Comoros	Phase 3 (1996)	595 (0.08)
Congo (DRC)	Phase 5 (2007)	3,297 (0.44)
Congo (Brazzaville)	Phase 5 (2005), Phase 6 (2011/12)	6,281 (0.83)
Dom. Republic	Phase 2 (1991), Phase 3 (1996), Phase 4 (2002), Phase 5 (2007)	17,845 (2.37)
Egypt	Phase 2 (1992/93), Phase 3 (1995/96), Phase 4 (2000, 2003)*, Phase 5 (2005, 2008)*	37,847 (5.03)
Ethiopia	Phase 4 (2000), Phase 5 (2005), Phase 6 (2011)	14,694 (1.95)
Gabon	Phase 4 (2000/01), Phase 6 (2012)	4,039 (0.54)
Ghana	Phase 3 (1993/94), Phase 4 (1998/99, 2003), Phase 5 (2008)	7,067 (0.94)
Guatemala	Phase 3 (1995), Phase 4 (1998/99)	8,340 (1.11)
Guinea	Phase 4 (1999), Phase 5 (2005), Phase 6 (2012)	8,518 (1.13)
Guyana	Phase 5 (2005, 2009)*	1,004 (0.13)
Haiti	Phase 3 (1994/95), Phase 4 (2000), Phase 5 (2005/06), Phase 6 (2012)	11,927 (1.58)
Honduras	Phase 5 (2005/06), Phase 6 (2011/12)	12,725 (1.69)
India	Phase 4 (1998/99/00), Phase 5 (2005/06)	46,435 (6.17)
Indonesia	Phase 2 (1991), Phase 3 (1994, 1997), Phase 4 (2002/03), Phase 5 (2007), Phase 6 (2012)	64,890 (8.62)
Ivory Coast	Phase 3 (1994), Phase 4 (1998/99), Phase 5 (2005), Phase 6 (2011/12)	8,020 (1.07)
Jordan	Phase 3 (1997), Phase 5 (2007), Phase 6 (2012)	13,205 (1.75)
Kazakhstan	Phase 3 (1995, 1999)*	1,454 (0.19)
Kenya	Phase 2 (1993), Phase 3 (1998), Phase 4 (2003), Phase 5 (2008/09)	9,250 (1.23)
Kyrgyz Republic	Phase 3 (1997), Phase 6 (2012)	2,859 (0.38)
Lesotho	Phase 5 (2004/05), Phase 6 (2009/10)	4,522 (0.60)
Liberia	Phase 5 (2006/07)	2,229 (0.30)
Madagascar	Phase 2 (1992), Phase 3 (1997), Phase 4 (2003/04), Phase 5 (2008/09)	13,746 (1.83)
Malawi	Phase 4 (2000), Phase 5 (2004/05), Phase 6 (2010)	20,486 (2.72)
Maldives	Phase 6 (2009)	2,041 (0.27)

Mali	Phase 3 (1995/96), Phase 4 (2001), Phase 5 (2006)	12,855 (1.71)
Moldova	Phase 5 (2005)	1,153 (0.15)
Morocco	Phase 2 (1992), Phase 5 (2003/04)	6,520 (0.87)
Mozambique	Phase 3 (1997), Phase 4 (2003/04), Phase 6 (2011)	12,008 (1.60)
Namibia	Phase 2 (1992), Phase 4 (2000), Phase 5 (2006/07)	5,961 (0.79)
Nepal	Phase 3 (1996), Phase 4 (2001), Phase 5 (2006), Phase 6 (2011)	11,688 (1.55)
Nicaragua	Phase 3 (1997/98), Phase 4 (2001)	8,658 (1.15)
Nigeria	Phase 2 (1990), Phase 4 (1999, 2003), Phase 5 (2008)	17,896 (2.38)
Niger	Phase 2 (1992), Phase 3 (1998), Phase 5 (2006), Phase 6 (2012)	13,275 (1.76)
Pakistan	Phase 2 (1990/91), Phase 5 (2006/07), Phase 6 (2012/13)	11,236 (1.49)
Paraguay	Phase 2 (1990)	2,421 (0.32)
Peru	Phase 2 (1991/92), Phase 3 (1996), Phase 4 (2000), Phase 5 (2005/06, 2007/08, 2009), Phase 6 (2010/11/12)	57,103 (7.59)
Philippines	Phase 3 (1993, 1998)*, Phase 4 (2003), Phase 5 (2008)	17,568 (2.33)
Rwanda	Phase 2 (1992), Phase 4 (2000), Phase 5 (2005), Phase 6 (2010/11)	15,041 (2.00)
Sao Tome and Principe	Phase 5 (2008/09)	1,072 (0.14)
Senegal	Phase 2 (1992/93), Phase 3 (1997), Phase 4 (2005), Phase 6 (2010/11, 2012/13)*	13,834 (1.84)
Sierra Leone	Phase 5 (2008)	2,202 (0.29)
South Africa	Phase 4 (1998)	3,075 (0.41)
Swaziland	Phase 5 (2006/07)	1,396 (0.19)
Tanzania	Phase 2 (1991/2), Phase 3 (1996), Phase 4 (1999), Phase 5 (2004/5, 2007/8)*, Phase 6 (2009/10)	16,392 (2.18)
Timor-Leste	Phase 6 (2009/10)	3,612 (0.48)
Togo	Phase 4 (1998)	2,196 (0.29)
Turkey	Phase 2 (1993), Phase 4 (1998), Phase 5 (2003/04)	7,980 (1.06)
Uganda	Phase 3 (1995), Phase 4 (2000/01), Phase 5 (2006), Phase 6 (2011)	11,743 (1.56)
Ukraine	Phase 5 (2007)	800 (0.11)
Uzbekistan	Phase 3 (1996)	768 (0.10)
Vietnam	Phase 4 (1997 / 2002)*	2,437 (0.32)
Yemen	Phase 2 (1991/2)	3,369 (0.45)
Zambia	Phase 2 (1992) Phase 3 (1996/97), Phase 4 (2001/02), Phase 5 (2007)	12,572 (1.67)
Zimbabwe	Phase 3 (1994), Phase 4 (1999), Phase 5 (2005/06), Phase 6 (2010/11)	9,754 (1.30)
TOTAL		752,635 (100)

Total numbers and frequencies are based on the neonatal mortality sample. * indicates that more than one survey was conducted within the phase

Table A2: Covariates across exposure category

Covariate	Mother attended at least 1 ANC visit; % (n=616347)	Mother did not attend ANC visit, % (n=136288)
Maternal education		
None	45.41	82.92*
Primary or incompl. Secondary	33.89	13.38*
Secondary or higher	20.70	3.70*
Maternal age at birth		
≤ 17 years	3.51	4.89*
17 - 19 years	12.89	12.52*
20 - 24 years	28.13	25.31*
25 - 29 years	24.58	22.99*
30 years or older	30.88	34.29*
Mother is working	57.25	51.02*
Mother is HH Head	9.13	7.20*
Mother is married	72.24	85.77*
Child is female	48.65	48.88
Multiple birth	0.91	0.10*
Birth order		
First child	31.23	19.41*
Second child	21.60	16.16*
Third child	15.55	14.67*
Fourth child	10.43	12.53*
Fifth or later born child	21.19	37.23*
Birth spacing ≤ 18 mths	3.56	5.58*
Wealth quintiles		
First quintile	15.17	32.49*
Second quintile	17.50	26.81*
Third quintile	19.88	20.39
Fourth quintile	22.30	13.91*
Fifth quintile	25.14	6.40*
N values denote the number of observations in the neonatal mortality sample. Values were population weighted. * Proportions in the two groups were significantly different from each other, $p \leq 0.05$ (t test).		

Table A3: Associations between mortality outcomes and mediator variables

	Neonatal Mortality		**Infant Mortality**	
	(1)	**(2)**	**(1)**	**(2)**
at least 1 ANC visit	-0.00520*** [0.001]	-0.00288*** [0.001]	-0.00562*** [0.001]	-0.00416*** [0.001]
at least 4 ANC visits & skilled ANC provider		-0.00556*** [0.001]		-0.00342*** [0.001]
facility delivery	0.00211*** [0.001]	0.00273*** [0.001]	-0.00137* [0.001]	-0.000999 [0.001]
mother had TT injection	-0.00856*** [0.001]	-0.00814*** [0.001]	-0.00619*** [0.001]	-0.00594*** [0.001]
delivery by C-section	0.0101*** [0.001]	0.0103*** [0.001]	0.00106 [0.001]	0.00117 [0.001]
child was breastfed			-0.0501*** [0.002]	-0.0501*** [0.002]
N	689319	689319	522970	522970
Adjusted for confounding	**yes**	**yes**	**yes**	**yes**

All regressions include PSU fixed effects. ***, ** and * denote significance at the 1%, 5%, and 10% levels, respectively. Std. Errors in square brackets and are clustered at PSU level. Control variables include: Mother's age, marital status and educational achievement, whether she heads the HH, child's sex and birth order and spacing, month of birth, whether it was a multiple birth and HH wealth quintile.

Table A4: Associations between nutritional outcomes and mediator variables

	Low Birthweight		**Stunting**		**Underweight**	
	(1)	**(2)**	**(1)**	**(2)**	**(1)**	**(2)**
at least 1 ANC visit	-0.0349*** [0.004]	-0.0168*** [0.004]	-0.0458*** [0.003]	-0.0388*** [0.003]	-0.0308*** [0.002]	-0.0225*** [0.003]
at least 4 ANC visits & skilled ANC provider		-0.0274*** [0.002]		-0.0159*** [0.002]		-0.0190*** [0.002]
mother had TT injection	-0.00721*** [0.002]	-0.00532*** [0.002]	0.0000754 [0.002]	0.000984 [0.002]	-0.00566*** [0.002]	-0.00458*** [0.002]
child was breastfed			-0.0264*** [0.005]	-0.0264*** [0.005]	-0.0154*** [0.004]	-0.0153*** [0.004]
child ever got vaccine			0.0539*** [0.004]	0.0546*** [0.004]	-0.00196 [0.003]	-0.00107 [0.003]
N	380570	380570	475936	475936	486040	486040
Adjusted for confounding	**yes**	**yes**	**yes**	**yes**	**yes**	**yes**

All regressions include PSU fixed effects. ***, ** and * denote significance at the 1%, 5%, and 10% levels, respectively. Std. Errors in square brackets and are clustered at PSU level. Control variables include: Mother's age, marital status and educational achievement, whether she heads the HH, child's sex and birth order and spacing, month of birth, whether it was a multiple birth and HH wealth quintile.

Table A5: Associations between the exposure variables and full set of control variables

	Neonatal Mortality	**Infant Mortality**	**Low Birthweight**	**Stunting**	**Underweight**
Maternal education *[reference: no education]*					
Primary or incompl. Secondary	-0.00247*** [0.001]	-0.00539*** [0.001]	-0.0191*** [0.002]	-0.0447*** [0.002]	-0.0356*** [0.002]
Secondary or higher	-0.00566*** [0.001]	-0.00890*** [0.001]	-0.0350*** [0.002]	-0.0785*** [0.003]	-0.0460*** [0.002]
Maternal age at birth *[reference: ≤ 17yrs]*					
17 - 19 years	-0.00474*** [0.001]	-0.00682*** [0.002]	-0.00926** [0.004]	-0.0477*** [0.005]	-0.0340*** [0.004]
20 - 24 years	-0.00735*** [0.001]	-0.0105*** [0.002]	-0.0205*** [0.004]	-0.0714*** [0.004]	-0.0477*** [0.004]
25 - 29 years	-0.00645*** [0.001]	-0.00963*** [0.002]	-0.0218*** [0.004]	-0.0970*** [0.005]	-0.0545*** [0.004]
30 years or older	-0.000352 [0.001]	-0.00881*** [0.002]	-0.00879** [0.004]	-0.114*** [0.005]	-0.0567*** [0.004]
Mother is working	0.00299*** [0.000]	0.000925 [0.001]	-0.000101 [0.001]	0.0155*** [0.002]	0.00591*** [0.001]
Mother is HH Head	-0.000972 [0.001]	-0.0000246 [0.001]	-0.00123 [0.002]	0.00701** [0.003]	-0.00259 [0.002]
Mother is married	-0.00134** [0.001]	-0.00610*** [0.001]	-0.00988*** [0.002]	-0.00849*** [0.002]	-0.0106*** [0.002]
Child is female	-0.00451*** [0.000]	-0.00217*** [0.001]	0.0208*** [0.001]	-0.0399*** [0.001]	-0.0220*** [0.001]
Multiple birth	0.0970*** [0.004]	0.0607*** [0.005]	0.391*** [0.010]	0.155*** [0.009]	0.148*** [0.008]
Birth order *[reference: First born child]*					
Second child	-0.00904*** [0.001]	-0.00495*** [0.001]	-0.0265*** [0.002]	0.0290*** [0.002]	0.00545*** [0.002]
Third child	-0.0108*** [0.001]	-0.00429*** [0.001]	-0.0342*** [0.002]	0.0456*** [0.003]	0.0137*** [0.002]
Fourth child	-0.0118*** [0.001]	-0.00484*** [0.001]	-0.0350*** [0.003]	0.0574*** [0.003]	0.0194*** [0.003]
Fifth or later born child	-0.0115*** [0.001]	-0.00392*** [0.001]	-0.0417*** [0.003]	0.0835*** [0.003]	0.0276*** [0.003]
Birth spacing ≤ 18 months	0.0218*** [0.001]	0.0234*** [0.002]	0.0240*** [0.004]	0.0462*** [0.004]	0.0333*** [0.003]
Wealth quintiles *[reference: poorest 20%]*					
Second quintile	0.00102 [0.001]	-0.00174* [0.001]	-0.00848*** [0.002]	-0.0172*** [0.003]	-0.0120*** [0.002]
Third quintile	0.000917 [0.001]	-0.00246** [0.001]	-0.0121*** [0.003]	-0.0371*** [0.003]	-0.0302*** [0.002]

Fourth quintile	0.000564 [0.001]	-0.00496*** [0.001]	-0.0170*** [0.003]	-0.0602*** [0.003]	-0.0511*** [0.003]
Fifth quintile	0.0000414 [0.001]	-0.00619*** [0.001]	-0.0206*** [0.003]	-0.0977*** [0.003]	-0.0790*** [0.003]
Month of birth	0.0000126 [0.000]	-0.0000336 [0.000]	-0.000283* [0.000]	-0.00372*** [0.000]	-0.00290*** [0.000]
N	**752635**	**574675**	**400426**	**501484**	**512424**
Results are from the main results regressions of table 2 & 3 (model 3) and are adjusted for the full set of control variables and include PSU fixed effects. ***, ** and * denote significance at the 1%, 5%, and 10% levels, respectively. Std. Errors in square brackets and are clustered at PSU level.					

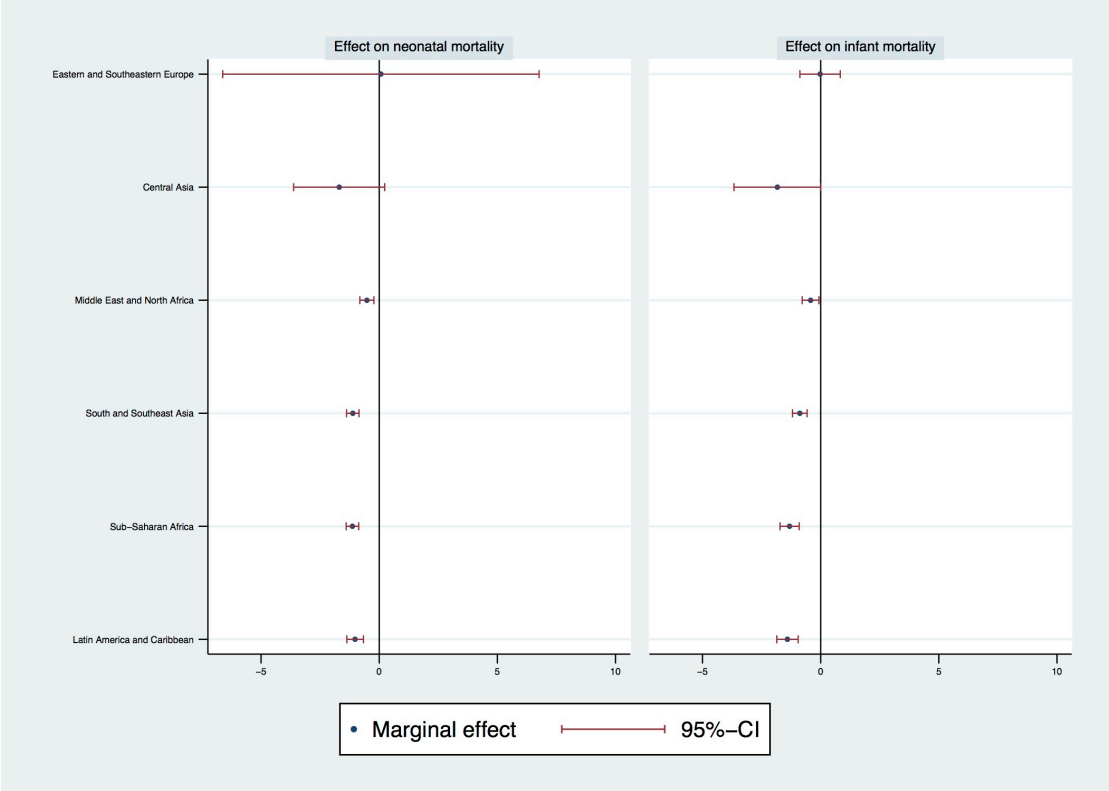
Table A6: Associations between the exposure variables before and after the introduction of the WHO recommendation (Year 2002)

Neonatal Mortality	**Before 2002 (1990-2002)**			**After 2002 (2003-2013)**		
	(1)	**(2)**	**(3)**	**(1)**	**(2)**	**(3)**
at least 1 ANC visit	-0.0130*** [0.001]	-0.0129*** [0.001]	-0.00983*** [0.001]	-0.00798*** [0.001]	-0.00755*** [0.001]	-0.00534*** [0.001]
at least 4 ANC visits & skilled ANC provider			-0.00702*** [0.001]			-0.00453*** [0.001]
N	320338	320338	320338	432297	432297	432297
Infant Mortality	**Before 2002 (1990-2002)**			**After 2002 (2003-2013)**		
at least 1 ANC visit	-0.0152*** [0.001]	-0.0126*** [0.001]	-0.00936*** [0.002]	-0.00987*** [0.001]	-0.00827*** [0.001]	-0.00733*** [0.001]
at least 4 ANC visits & skilled ANC provider			-0.00730*** [0.001]			-0.00189** [0.001]
N	244729	244729	244729	329946	329946	329946
Low Birthweight	**Before 2002 (1990-2002)**			**After 2002 (2003-2013)**		
at least 1 ANC visit	-0.0404*** [0.005]	-0.0352*** [0.005]	-0.0181*** [0.006]	-0.0455*** [0.006]	-0.0416*** [0.006]	-0.0202*** [0.006]
at least 4 ANC visits & skilled ANC provider			-0.0259*** [0.003]			-0.0299*** [0.002]
N	145426	145426	145426	255000	255000	255000
Stunting	**Before 2002 (1990-2002)**			**After 2002 (2003-2013)**		
at least 1 ANC visit	-0.0753*** [0.004]	-0.0416*** [0.004]	-0.0333*** [0.004]	-0.0586*** [0.004]	-0.0383*** [0.004]	-0.0335*** [0.004]
at least 4 ANC visits & skilled ANC provider			-0.0187*** [0.003]			-0.00964*** [0.003]
N	217791	217791	217791	283693	283693	283693
Underweight	**Before 2002 (1990-2002)**			**After 2002 (2003-2013)**		
at least 1 ANC visit	-0.0534*** [0.003]	-0.0299*** [0.003]	-0.0204*** [0.003]	-0.0463*** [0.003]	-0.0338*** [0.003]	-0.0257*** [0.004]
at least 4 ANC visits & skilled ANC provider			-0.0214*** [0.003]			-0.0163*** [0.002]
N	223491	223491	223491	288933	288933	288933

Adjusted for confounding	no	yes	yes	no	yes	yes

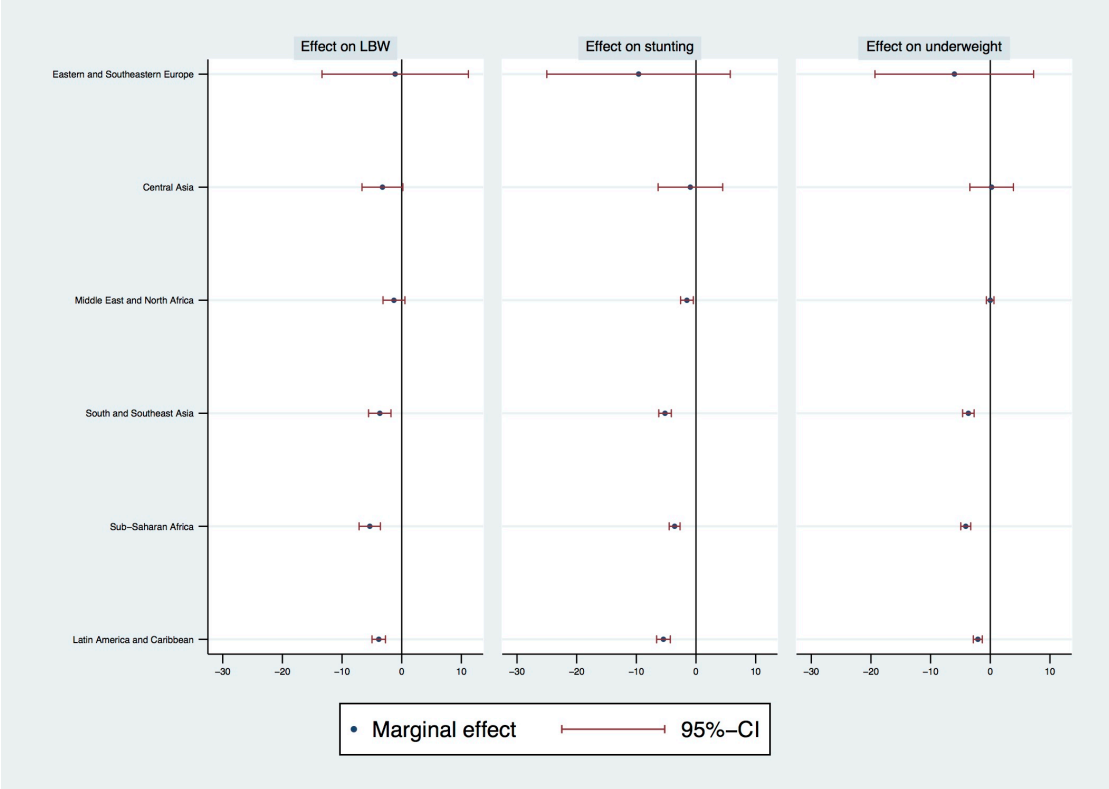
All regressions include PSU fixed effects. ***, ** and * denote significance at the 1%, 5%, and 10% levels, respectively. Std. Errors in square brackets and are clustered at PSU level. Control variables include: Mother's age, marital status and educational achievement, whether she heads the HH, child's sex and birth order and spacing, month of birth, whether it was a multiple birth and HH wealth quintile.

Figure A1: Associations between mortality outcomes and ANC attendance by world region



Figures show marginal effects and 95% confidence intervals for binary indicator that the mother attended at least one ANC visit (region-wise regressions). The estimated model corresponds to the specification (2) from table 2 & 3. All regressions include PSU fixed effects and the full set of covariates.

Figure A2: Associations between nutritional outcomes and ANC attendance by world region



Figures show marginal effects and 95% confidence intervals for binary indicator that the mother attended at least one ANC visit (region-wise regressions). The estimated model corresponds to the specification (2) from table 2 & 3. All regressions include PSU fixed effects and the full set of covariates.