

Appendix: 1: Description of study participants

	Peri-urban	Rural	All areas
No of subjects	15791	27252	43043
No of deaths	361	1376	1737
Age in years at entry (median)	0.4	0.1	0.2
Age in years at exit (median)	4.7	5.0	5.0
Total time under observation (in person-years)	40180	76206	116385

Appendix 2: Distribution of the population on the last day of February each year

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
	N=11190	N=11322	N=11587	N=11546	N=11407	N=12203	N=12505	N=12812	N=13134	N=12335
Rural	7506 (67%)	7623 (67%)	7774 (67%)	7673 (66%)	7580 (66%)	7908 (65%)	8011 (64%)	8081 (63%)	8141 (62%)	7644 (62%)
Peri-urban	3684 (33%)	3699 (33%)	3813 (33%)	3873 (34%)	3827 (34%)	4295 (35%)	4494 (36%)	4731 (37%)	4993 (38%)	4691 (38%)
28-365 days	1944 (17%)	2049 (18%)	2056 (18%)	2079 (18%)	2048 (18%)	2247 (18%)	2258 (18%)	2263 (18%)	2118 (16%)	1713 (14%)
1-2 years	2461 (22%)	2163 (19%)	2406 (21%)	2352 (20%)	2336 (20%)	2480 (20%)	2533 (20%)	2644 (21%)	2631 (20%)	2346 (19%)
2-3 years	2400 (21%)	2419 (21%)	2205 (19%)	2447 (21%)	2410 (21%)	2468 (20%)	2620 (21%)	2590 (20%)	2804 (21%)	2673 (22%)
3-4 years	2323 (21%)	2424 (21%)	2479 (21%)	2243 (19%)	2452 (21%)	2519 (21%)	2570 (21%)	2708 (21%)	2772 (21%)	2853 (23%)
4-5 years	2062 (18%)	2267 (20%)	2441 (21%)	2425 (19%)	2161 (19%)	2489 (20%)	2524 (20%)	2607 (20%)	2809 (21%)	2750 (22%)
Poorest	2408 (22%)	2370 (21%)	2316 (20%)	2228 (19%)	2110 (18%)	2177 (18%)	2189 (18%)	2255 (18%)	2346 (18%)	2252 (18%)
Very poor	2363 (21%)	2345 (21%)	2250 (19%)	2130 (18%)	2037 (18%)	2127 (17%)	2184 (17%)	2313 (18%)	2424 (18%)	2361 (19%)
Poor	2963 (26%)	3166 (28%)	3454 (30%)	3600 (31%)	3711 (33%)	3798 (31%)	3809 (30%)	3810 (30%)	3796 (29%)	3517 (29%)
Less poor	1954 (17%)	1931 (17%)	1995 (17%)	1987 (17%)	1968 (17%)	2179 (18%)	2275 (18%)	2302 (18%)	2348 (18%)	2224 (18%)
Least poor	1502 (13%)	1510 (13%)	1572 (14%)	1601 (14%)	1581 (14%)	1922 (16%)	2048 (16%)	2132 (17%)	2220 (17%)	1981 (16%)

Appendix 3: Yearly mortality rates per 1000 person-years by key variables, Eastern Uganda (2006 to 2015)

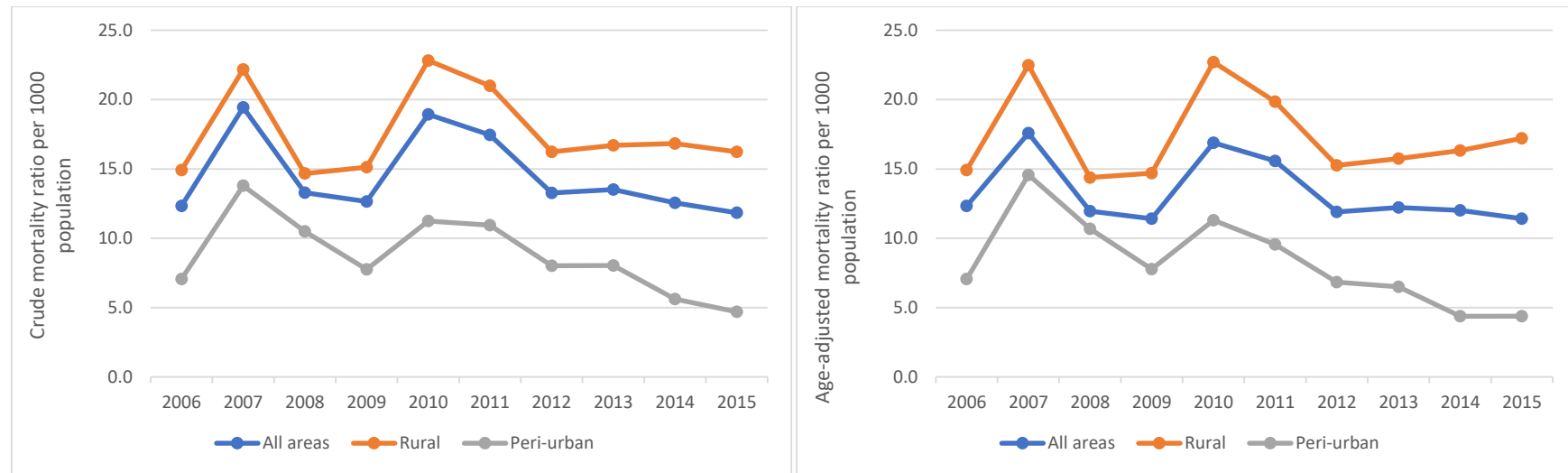
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
All areas	16.8 [14.2, 19.9]	19.5 [17.1, 22.2]	13.5 [11.5, 15.8]	12.7 [10.8, 14.9]	18.8 [16.4, 21.4]	18.1 [15.9, 20.7]	13.5 [11.6, 15.7]	13.7 [11.8, 15.9]	12.8 [10.9, 14.9]	11.4 [9.7, 13.4]
Rural	19.0 [15.8, 22.8]	22.3 [19.2, 25.9]	14.8 [12.4, 17.8]	15.1 [12.6, 18.1]	22.6 [19.5, 26.2]	21.5 [18.5, 25.0]	16.4 [13.8, 19.4]	16.9 [14.3, 20.0]	16.9 [14.3, 20.0]	15.5 [13.0, 18.6]
Peri-urban	11.3 [7.7, 16.6]	13.7 [10.4, 18.1]	10.7 [7.9, 14.6]	7.8 [5.5, 11.2]	11.1 [8.3, 15.0]	11.7 [8.8, 15.5]	8.2 [5.9, 11.4]	8.2 [6.0, 11.3]	5.8 [4.0, 8.4]	4.5 [3.0, 6.9]
<1year	32.3 [24.7, 42.3]	40.0 [32.1, 49.7]	27.9 [21.6, 36.2]	32.3 [25.4, 41.0]	40.5 [32.7, 50.0]	42.4 [34.5, 52.0]	29.4 [23.2, 37.4]	33.0 [26.4, 41.4]	37.6 [30.3, 46.6]	23.5 [17.5, 31.4]
1-2 years	25.3 [19.0, 33.7]	34.9 [28.1, 43.4]	25.5 [19.7, 33.0]	20.7 [15.6, 27.4]	32.5 [26.0, 40.7]	26.9 [21.1, 34.3]	24.2 [18.9, 31.1]	18.9 [14.3, 25.0]	13.0 [9.3, 18.2]	16.5 [12.1, 22.3]
2-3 years	11.2 [7.2, 17.3]	13.9 [9.9, 19.5]	10.2 [6.8, 15.2]	7.3 [4.5, 11.7]	12.2 [8.5, 17.5]	12.1 [8.4, 17.4]	7.4 [4.7, 11.6]	12.6 [9.0, 17.8]	9.7 [6.6, 14.2]	12.5 [8.9, 17.5]
3-4 years	5.8 [3.1, 10.8]	6.8 [4.1, 11.0]	4.6 [2.5, 8.2]	3.8 [2.0, 7.3]	7.2 [4.5, 11.6]	8.2 [5.3, 12.7]	5.2 [3.0, 9.0]	5.3 [3.1, 8.9]	5.2 [3.1, 8.7]	6.4 [4.0, 10.1]
4-5 years	6.7 [3.3, 13.3]	4.1 [2.1, 7.9]	1.7 [0.6, 4.6]	2.1 [0.9, 5.0]	3.9 [2.0, 7.4]	3.4 [1.7, 6.8]	2.4 [1.1, 5.3]	1.2 [0.4, 3.7]	2.9 [1.5, 5.9]	2.5 [1.2, 5.2]
Poorest	14.5 [10.0, 21.0]	19.1 [14.3, 25.5]	17.5 [12.9, 23.7]	12.8 [8.9, 18.4]	21.8 [16.5, 29.0]	21.2 [15.9, 28.3]	17.7 [12.9, 24.2]	17.5 [12.8, 23.9]	24.2 [18.6, 31.5]	17.8 [13.1, 24.1]
Very poor	20.4 [14.9, 28.1]	25.0 [20.2, 33.2]	13.3 [9.4, 18.9]	13.1 [9.1, 18.8]	27.9 [21.6, 36.0]	24.8 [18.9, 32.6]	14.4 [10.1, 20.5]	18.6 [13.8, 25.2]	15.2 [11.0, 21.1]	21.2 [16.2, 28.0]
Poor	17.0 [12.3, 23.6]	19.8 [15.3, 25.6]	14.9 [11.2, 19.8]	16.8 [12.9, 21.7]	17.1 [13.3, 21.9]	19.8 [15.7, 24.9]	15.1 [11.6, 19.7]	11.2 [8.3, 15.1]	11.0 [8.1, 14.9]	9.0 [6.4, 12.7]
Less poor	19.6 [13.3, 28.8]	20.2 [14.8, 27.5]	11.7 [7.8, 17.6]	11.4 [7.6, 17.2]	17.8 [12.9, 24.7]	12.6 [8.6, 18.6]	12.0 [8.2, 17.5]	16.5 [12.0, 22.7]	10.3 [6.9, 15.4]	5.2 [3.0, 9.2]
Least poor	10.3 [5.5, 19.1]	8.9 [5.3, 15.0]	7.1 [3.9, 12.7]	4.9 [2.5, 9.9]	7.5 [4.2, 13.2]	9.2 [5.6, 15.0]	6.4 [3.7, 11.0]	6.1 [3.6, 10.6]	3.6 [1.8, 7.3]	3.8 [1.9, 7.6]

Appendix 4: Number of deaths, crude and age-adjusted mortality rates per 1000 postnatal children per year, Eastern Uganda

Year	Number of deaths			Crude mortality rate ^a per 1000 postneonatal children			Age-adjusted mortality rate ^b per 1000 postneonatal children		
	All areas	Peri-urban	Rural	All areas	Peri-urban	Rural	All areas	Peri-urban	Rural
2005-2006	138	26	112	12.3	7.1	14.9	12.3	7.1	14.9
2006-2007	220	51	169	19.4	13.8	22.2	17.6	14.6	22.5
2007-2008	154	40	114	13.3	10.5	14.7	12.0	10.7	14.4
2008-2009	146	30	116	12.6	7.7	15.1	11.4	7.8	14.4
2009-2010	216	43	173	18.9	11.2	22.8	16.9	11.3	22.7
2010-2011	213	47	166	17.5	10.9	21.0	15.6	9.6	19.8
2011-2012	166	36	130	13.3	8.0	16.2	11.9	6.8	15.3
2012-2013	173	38	135	13.5	8.0	16.7	12.2	6.5	15.7
2013-2014	165	28	137	12.6	5.6	16.8	12.0	4.4	16.3
2014-2015	146	22	124	11.4	4.7	16.2	11.5	4.4	17.2

- a) The crude mortality rate is the number of deaths divided by the number of eligible study subjects on the last day of February for each year.
- b) The age-adjusted mortality rate was estimated for each year using the age structure on the last day of the baseline year (28th day of February 2006) as the reference population. It is a summary measure obtained by multiplying the age-specific mortality rates by age-specific weights, which are the proportion of the reference population within each age group.

Appendix 5: Crude (1a) and age-adjusted (1b) mortality rates per 1000 postneonatal children per year, by areas of residence, Eastern Uganda



Appendix 6a: Additional results of multi-level poisson regression model for postneonatal under-5 (1-59 months) mortality, peri-urban, Eastern Uganda (2005-2015)

Individual level determinants				
Poorest	1.00	1.00	1.00	1.00
Very poor	1.37 [0.60, 3.11]	1.38 [0.61, 3.13]	1.38 [0.61, 3.13]	1.39 [0.61, 3.15]
Poor	0.74 [0.36, 1.54]	0.74 [0.36, 1.55]	0.75 [0.36, 1.57]	0.73 [0.35, 1.52]
Less poor	1.05 [0.51, 2.16]	1.06 [0.52, 2.18]	1.07 [0.50, 2.21]	1.04 [0.51, 2.15]
Least poor	0.58 [0.28, 1.21]	0.59 [0.28, 1.25]	0.60 [0.28, 1.25]	0.57 [0.27, 1.21]
BCG	0.45 [0.30, 0.67]	0.45 [0.30, 0.67]	0.45 [0.31, 0.67]	0.45 [0.30, 0.67]
No BCG	1.00	1.00	1.00	1.00
Postneonatal (<1 year)	1.00	1.00	1.00	1.00
1-2 years old	0.49 [0.38, 0.63]	0.49 [0.38, 0.62]	0.49 [0.38, 0.63]	0.49 [0.38, 0.62]
2-3 years old	0.24 [0.17, 0.33]	0.24 [0.17, 0.33]	0.24 [0.17, 0.33]	0.24 [0.17, 0.33]
3-4 years old	0.17 [0.12, 0.24]	0.17 [0.12, 0.24]	0.17 [0.12, 0.24]	0.17 [0.12, 0.24]
4-5 years old	0.04 [0.03, 0.07]	0.04 [0.03, 0.07]	0.04 [0.03, 0.07]	0.04 [0.03, 0.07]
2005-2006	1.00	1.00	1.00	1.00
2006-2007	1.69 [1.05, 2.71]	1.68 [1.05, 2.70]	1.68 [1.05, 2.70]	1.68 [1.05, 2.70]
2007-2008	1.87 [1.03, 3.39]	1.47 [0.86, 2.48]	1.39 [0.84, 2.29]	1.46 [0.89, 2.39]
2008-2009	1.32 [0.71, 2.46]	1.04 [0.60, 1.81]	0.99 [0.58, 1.67]	1.03 [0.61, 1.75]
2009-2010	1.90 [1.05, 3.41]	1.49 [0.89, 2.51]	1.41 [0.86, 2.32]	1.48 [0.91, 2.42]
2010-2011	1.80 [1.06, 3.07]	1.55 [0.93, 2.58]	1.51 [0.93, 2.44]	1.53 [0.95, 2.49]
2011-2012	1.27 [0.73, 2.21]	1.09 [0.64, 1.86]	1.06 [0.64, 1.76]	1.08 [0.65, 1.80]
2012-2013	1.29 [0.74, 2.24]	1.10 [0.65, 1.88]	1.08 [0.65, 1.78]	1.10 [0.66, 1.82]
2013-2014	0.87 [0.50, 1.51]	0.80 [0.45, 1.43]	0.78 [0.45, 1.33]	0.88 [0.46, 1.36]
2014-2015	0.76 [0.42, 1.36]	0.70 [0.38, 1.28]	0.68 [0.38, 1.20]	0.69 [0.39, 1.23]
Mosquito net ownership	1.11 [0.97, 1.27]			
Overcrowded household		1.02 [0.87, 1.20]		
Household with improved sanitation			1.10 [0.92, 1.32]	
Household with improved water				0.91 [0.75, 1.10]

Appendix 6b: Additional results of multi-level poisson regression model for postneonatal under-5 (1-59 months) mortality, rural, Eastern Uganda (2005-2015)

Individual level determinants				
Poorest	1.00	1.00	1.00	1.00
Very poor	1.05 [0.92, 1.21]	1.04 [0.90, 1.20]	1.05 [0.91, 1.20]	1.05 [0.91, 1.20]
Poor	1.00 [0.87, 1.14]	0.98 [0.86, 1.13]	0.99 [0.86, 1.13]	0.99 [0.86, 1.13]
Less poor	0.85 [0.70, 1.04]	0.84 [0.69, 1.03]	0.84 [0.69, 1.03]	0.84 [0.69, 1.03]
Least poor	0.45 [0.25, 0.83]	0.45 [0.24, 0.82]	0.45 [0.24, 0.82]	0.45 [0.24, 0.82]
BCG	0.56 [0.41, 0.76]	0.56 [0.41, 0.76]	0.56 [0.41, 0.76]	0.56 [0.41, 0.76]
No BCG				
Postneonatal (<1 year)	1.00	1.00	1.00	1.00
1-2 years old	0.68 [0.60, 0.77]	0.68 [0.60, 0.77]	0.68 [0.60, 0.77]	0.68 [0.60, 0.77]
2-3 years old	0.31 [0.26, 0.36]	0.31 [0.26, 0.36]	0.31 [0.26, 0.36]	0.31 [0.26, 0.36]
3-4 years old	0.15 [0.12, 0.18]	0.15 [0.12, 0.18]	0.15 [0.12, 0.18]	0.15 [0.12, 0.18]
4-5 years old	0.04 [0.03, 0.05]	0.04 [0.03, 0.05]	0.04 [0.03, 0.05]	0.04 [0.03, 0.05]
2005-2006	1.00	1.00	1.00	1.00
2006-2007	1.40 [1.10, 1.78]	1.40 [1.10, 1.78]	1.40 [1.10, 1.78]	1.40 [1.10, 1.78]
2007-2008	0.94 [0.72, 1.22]	0.95 [0.73, 1.23]	0.95 [0.73, 1.23]	0.95 [0.73, 1.23]
2008-2009	0.97 [0.74, 1.26]	0.98 [0.75, 1.27]	0.98 [0.75, 1.27]	0.97 [0.75, 1.27]
2009-2010	1.44 [1.13, 1.83]	1.45 [1.14, 1.85]	1.45 [1.14, 1.85]	1.45 [1.14, 1.85]
2010-2011	1.38 [1.08, 1.76]	1.39 [1.09, 1.77]	1.39 [1.09, 1.77]	1.39 [1.09, 1.77]
2011-2012	1.06 [0.82, 1.37]	1.07 [0.82, 1.38]	1.07 [0.82, 1.38]	1.07 [0.82, 1.38]
2012-2013	1.09 [0.84, 1.41]	1.10 [0.85, 1.42]	1.10 [0.85, 1.42]	1.10 [0.85, 1.42]
2013-2014	1.16 [0.90, 1.49]	1.14 [0.88, 1.48]	1.14 [0.88, 1.48]	1.14 [0.88, 1.48]
2014-2015	1.14 [0.88, 1.48]	1.13 [0.86, 1.47]	1.13 [0.86, 1.47]	1.13 [0.86, 1.47]
Mosquito net ownership	0.96 [0.88, 1.06]			
Overcrowded household		0.98 [0.90, 1.07]		
Household with improved sanitation			0.98 [0.91, 1.05]	
Household with improved water				1.02 [0.96, 1.08]

Appendix 7: Incidence rate and cumulative incidence of postneonatal under-five mortality in IMHDSS and East Central/Busoga region, Uganda

Years covered by the DHS survey (unless noted below)	1996-2006 ^[1]	2001-2011 ^[2]	2006-2016 [3]
Years covered by HDSS data (stsplit at Feb 2007)	n/a	2005-2007	2007-2015
Mid-point of the period covered	2001	2006	2011
Incidence rate of postneonatal under-five mortality [95%CI] per 1000 person-years			
HDSS overall	n/a	18.4 [16.6, 20.4]	14.2 [13.5, 15.0]
HDSS peri-urban	n/a	12.8 [10.2, 16.0]	8.3 [7.4, 9.3]
HDSS rural	n/a	20.8 [18.5, 23.4]	17.5 [16.5, 18.5]
DHS national estimate (last 0-4 years)	23.8 [22.4, 25.2]	13.6 [12.6, 14.5]	8.0 [7.5, 8.4]
DHS urban estimate	18.9 [15.7, 22.3]	10.0 [8.4, 11.6]	7.0 [6.2, 7.8]
DHS rural estimate	26.9 [14.2, 28.3]	17.5 [9.2, 18.6]	10.5 [10.1, 11.0]
DHS eastern central/Busoga estimate	22.8 [20.3, 25.5]	18.0 [15.9, 20.3]	12.1 [11.0, 13.1]
Cumulative incidence of postneonatal under-five mortality [95%CI] per 1000 children			
HDSS overall	n/a	86.4 [78.5, 95.6]	67.5 [64.3, 71.2]
HDSS peri-urban	n/a	61.1 [49.0, 75.7]	40.0 [35.8, 44.8]
HDSS rural	n/a	97.5 [87.1, 108.8]	82.6 [78.0, 87.1]
DHS national estimate (last 0-4 years)	110.7 [104.6, 116.8]	64.6 [60.2, 69.0]	38.6 [36.5, 40.7]
DHS urban estimate	89.1 [74.4, 104.0]	47.9 [40.5, 55.5]	34.0 [30.2, 37.9]
DHS rural estimate	124.2 [118.3, 130.1]	82.6 [77.9, 87.4]	50.5 [48.3, 52.8]
DHS eastern central/Busoga estimate	106.3 [94.9, 117.9]	85.0 [75.2, 95.0]	57.7 [52.9, 62.6]

*Published DHS data were converted to incidence rate using the equation $CI = 1 - e^{-IR \times time}$ where CI is cumulative incidence and IR is incidence rate.

1. Uganda Bureau of Statistics and Macro International Inc., *Uganda Demographic and Health Survey, 2006*. 2007, Calverton, Maryland, USA: UBOS and Macro International Inc. .
2. Uganda Bureau of Statistics and ICF International, *Uganda demographic and health survey 2011*. 2012, UBOS and ICF International Inc: Kampala, Uganda and Claverton, Maryland.
3. Uganda Bureau of Statistics and ICF International, *Uganda Demographic and Health Survey 2016*. 2018, UBOS and ICF: Kampala, Uganda and Rockville, Maryland, USA.