

**Appendix.**

Here we provide additional details about the statistical models used in estimation. We used multilevel linear regression to model the variation in the intervals of time preceding the birth of child  $i$  born to woman  $j$  in village  $k$  in country  $l$ . Specifically, we estimated the following model:

$$y_{ijkl} = \beta_0 + BX_{ijkl} + CY_{jkl} + DZ_{kl} + (w_{0l} + v_{0kl} + u_{0jkl} + e_{0ijkl})$$

where  $\beta_0$  represents the mean birth interval for the reference groups (e.g., women who lived in rural areas, who had only achieved primary schooling, etc.) across all countries;  $X_{ijkl}$  represents explanatory variables measured at the level of child  $i$  born to woman  $j$ ;  $Y_{jkl}$  represents explanatory variables measured at the level of woman  $j$ , including personal history of IPV;  $Z_{kl}$  represents explanatory variables measured at the level of village  $k$ , including community prevalence of IPV; and the terms in the brackets represent random effects associated with country  $l$  ( $w_{0l}$ ), village  $k$  ( $v_{0kl}$ ), woman  $j$  ( $u_{0jkl}$ ), and a residual term for each birth  $i$  ( $e_{0ijkl}$ ).

Assuming the errors were independently and identically distributed, we estimated a variance at level 1 ( $\sigma^2_{e0}$ ; between-birth), level 2 ( $\sigma^2_{u0}$ ; between-individual), level 3 ( $\sigma^2_{v0}$ ; between-village), and level 4 ( $\sigma^2_{w0}$ ; between-country).

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**Table 1. Characteristics of the 11 Demographic and Health Surveys Included in the Analysis**

<b>Country</b>	<b>Year</b>	<b>Sampling Plan</b>	<b>Response Rate (%)</b>	<b>No. of Women Surveyed</b>	<b>No. of Women Included in Analysis</b>
Cameroon	2004	Two-stage cluster, self-weighting within strata, 1 selected village not covered due to remoteness	92.0	10,656	1,998
Democratic Republic of the Congo	2007	Two -stage urban, 3-stage rural cluster	96.0	9,995	2,281
Ghana	2008	Two-stage cluster	95.1	4,916	1,446
Kenya	2008	Two-stage cluster, not self-weighting	96.3	8,444	4,099
Liberia	2007	Two-stage cluster, not self-weighting	92.5	7,092	3,503
Malawi	2004	Two-stage cluster, not self-weighting	93.6	11,698	6,772
Nigeria	2008	Two-stage cluster	96.5	33,385	15,368
Rwanda	2005	Two-stage cluster, not self-weighting	97.9	11,321	2,428
Uganda	2006	Two-stage cluster, not self-weighting	92.3	8,531	1,525
Zambia	2007	Two-stage cluster	94.4	7,146	3,570
Zimbabwe	2005-06	Two-stage cluster, not self-weighting	85.6	8,907	3,707
<b>Totals</b>				122,091	46,697

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**Table 2. Distribution of Violence Against Women at the Village Level, by Country**

Country	No. of Villages	No. of Women Surveyed per Village, Median (IQR)	Community Prevalence of Less Severe Physical Violence, Median (IQR)	Community Prevalence of More Severe Physical Violence, Median (IQR)	Community Prevalence of Any Physical Violence, Median (IQR)	Community Prevalence of Sexual Violence, Median (IQR)
Cameroon	466	60 (41-90)	31.0 (12.9-50.4)	16.5 (0-37.3)	33.3 (15.2-57.7)	2.3 (0-22.9)
Democratic Republic of the Congo	300	88 (71-103)	45.5 (29.0-59.0)	22.5 (9.1-33.3)	48.5 (30.8-62.5)	23.3 (7.7-40.5)
Ghana	411	25 (18-33)	7.7 (0-25.0)	0 (0-12.5)	9.1 (0-27.3)	0 (0-0)
Kenya	398	47 (32-67)	22.0 (10.0-37.2)	9.5 (0-22.4)	23.0 (10.6-40.0)	7.9 (0-16.1)
Liberia	298	63 (44-80)	25.0 (12.7-40.9)	10.2 (1.6-22.4)	26.5 (12.9-41.4)	1.5 (0-10.9)
Malawi	521	58 (39-76)	13.1 (5.6-23.7)	7.4 (0-14.3)	16.0 (7.8-26.9)	8.0 (0-19.4)
Nigeria	886	96 (70-137)	11.4 (2.9-22.2)	2.8 (0-10.7)	12.3 (3.3-23.4)	0 (0-5.0)
Rwanda	462	61 (49-72)	23.5 (5.9-36.1)	10.0 (0-22.2)	23.8 (7.7-39.5)	4.2 (0-17.5)
Uganda	368	73 (57-90)	22.4 (5.3-39.1)	7.0 (0-39.1)	25.2 (6.3-47.6)	20.6 (0-50.0)
Zambia	319	57 (40-74)	31.2 (16.7-43.7)	13.0 (4.5-23.4)	32.6 (18.1-46.5)	10.4 (3.4-22.2)
Zimbabwe	398	42 (31-54)	17.4 (7.3-30.0)	8.7 (0-18.9)	20.0 (9.1-31.8)	7.1 (0-16.7)
All countries	4,829	61 (40-85)	17.9 (6.2-33.3)	7.2 (0-18.8)	19.7 (7.4-34.7)	3.8 (0-14.9)

IQR, interquartile range.

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**Table 3. Estimated Associations Between Shortened Birth Intervals (Using Varying Cutoffs) and Violence Against Women, Pooled Across Countries**

	Estimated Adjusted Odds Ratio (95% Confidence Interval)					
	Birth Interval Less Than 18 Months		Birth Interval Less Than 24 Months		Birth Interval Less Than 36 Months	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Personal history of physical violence	0.98 (0.92-1.03)		1.04 (1.01-1.08) *		1.05 (1.02-1.09)†	
Community prevalence of physical violence	1.47 (1.25-1.73)‡		1.24 (1.10-1.38)‡		1.11 (0.99-1.24)	
Personal history of sexual violence		1.02 (0.93-1.10)		1.08 (1.02-1.14) †		1.08 (1.03-1.15)‡
Community prevalence of sexual violence		1.28 (1.01-1.62)*		1.15 (0.98-1.36)		1.21 (1.03-1.42)*
Age (per five years)	0.99 (0.97-1.00)	0.99 (0.97-1.00)	1.00 (0.99-1.01)	1.00 (0.99-1.01)	0.97 (0.96-0.98)‡	0.97 (0.96-.98)‡
Urban residence	1.00 (0.93-1.08)	1.00 (0.93-1.08)	0.99 (0.94-1.04)	0.99 (0.94-1.04)	0.96 (0.91-1.01)	0.96 (0.91-1.01)
In a domestic partnership	1.01 (0.93-1.10)	1.01 (0.93-1.10)	1.05 (0.99-1.11)	1.05 (0.99-1.10)	1.09 (1.04-1.15)‡	1.09 (1.04-1.15)‡
Religion						
Other	Ref	Ref	Ref	Ref	Ref	Ref
Christian	0.97 (0.90-1.05)	0.99 (0.92-1.06)	0.93 (0.89-0.98)†	0.95 (0.90-0.99)*	0.96 (0.91-1.01)	0.96 (0.92-1.01)
Muslim	0.93 (0.87-	0.93 (0.87-	1.00 (0.95-	1.00 (0.95-	0.99 (0.94-	0.99 (0.94-

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	0.99)*	0.99)*	1.04)	1.04)	1.03)	1.03)
Household headship	0.97	0.97	0.98	0.98	0.90	0.90
	(0.90-	(0.90-	(0.94-	(0.94-	(0.86-	(0.86-
	1.03)	1.03)	1.03)	1.03)	0.94)‡	0.94)‡
Professional-class	0.92	0.92	0.96	0.96	0.97	0.97
occupation	(0.86-	(0.86-	(0.92-	(0.92-	(0.92-	(0.92-
	0.99)*	0.99)*	1.01)	1.01)	1.01)	1.01)
Educational attainment						
None	1.19	1.19	1.17	1.17	1.12	1.12
	(1.12-	(1.12-	(1.13-	(1.13-	(1.08-	(1.08-
	1.26)‡	1.25)‡	1.21)‡	1.21)‡	1.16)‡	1.16)‡
Primary	Ref	Ref	Ref	Ref	Ref	Ref
Secondary	0.88	0.88	0.87	0.87	0.81	0.81
	(0.82-	(0.82-	(0.83-	(0.83-	(0.78-	(0.78-
	0.95)‡	0.95)‡	0.91)‡	0.91)‡	0.85)‡	0.85)‡
Greater than	0.86	0.86	0.89	0.88	0.85	0.85
secondary education	(0.73-	(0.72-	(0.79-	(0.79-	(0.77-	(0.77-
	1.02)	1.01)	0.99)*	0.98)*	0.94)‡	0.93)‡
Household asset wealth						
Most poor	1.00	1.01	1.04	1.04	1.06	1.07
	(0.94-	(0.94-	(0.99-	(0.99-	(1.02-	(1.02-
	1.07)	1.08)	1.09)	1.09)	1.11)†	1.11)†
Very poor	0.98	0.98	1.02	1.02	1.05	1.05
	(0.92-	(0.92-	(0.98-	(0.98-	(1.00-	(1.00-
	1.05)	1.05)	1.07)	1.06)	1.09)*	1.09)*
Poor	Ref	Ref	Ref	Ref	Ref	Ref
Less poor	0.95	0.95	0.96	0.96	0.94	0.94
	(0.88-	(0.88-	(0.91-	(0.91-	(0.89-	(0.89-
	1.02)	1.02)	1.01)	1.01)	0.98)†	0.98)†
Least poor	0.97	0.96	0.98	0.98	0.87	0.87
	(0.88-	(0.88-	(0.92-	(0.92-	(0.82-	(0.82-
	1.07)	1.06)	1.04)	1.04)	0.92)‡	0.92)‡
Contraceptive use						
Using modern	0.91	0.91	0.98	0.98	1.01	1.01
method	(0.86-	(0.86-	(0.94-	(0.94-	(0.97-	(0.97-

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	0.97)†	0.97)†	1.02)	1.02)	1.05)	1.05)
Using traditional	0.99	0.99	0.96	0.95	1.03	1.03
method	(0.90-	(0.90-	(0.89-	(0.89-	(0.97-	(0.96-
	1.11)	1.10)	1.02)	1.02)	1.10)	1.10)
None	Ref	Ref	Ref	Ref	Ref	Ref
Child's birth order	1.02	1.02	0.98	0.99	0.97	0.97
	(1.01-	(1.01-	(0.97-	(0.98-	(0.96-	(0.96-
	1.04)†	1.04)†	0.99)*	1.00)	0.98)‡	0.98)‡
Cumulative number of	1.01	1.01	1.00	1.00	0.99	0.99
boys	(0.98-	(0.98-	(0.99-	(0.99-	(0.98-	(0.98-
	1.03)	1.03)	1.02)	1.02)	1.01)	1.01)
Previous sibling died	0.56	0.56	1.14	1.14	1.28	1.28
	(0.52-	(0.52-	(1.10-	(1.10-	(1.23-	(1.23-
	0.60)‡	0.60)‡	1.19)‡	1.19)‡	1.33)‡	1.33)‡

\*Statistical significance at the level of  $P < .05$ .

†Statistical significance at the level of  $P < .01$ .

‡Statistical significance at the level of  $P < .001$ .

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**Table 4. Estimated Associations Between Birth Intervals and Physical Violence Against Women, Disaggregated Into Severe Acts of Physical Violence\* Compared With More Severe Acts<sup>†</sup>, Pooled Across Countries**

	Estimated Regression Coefficient (95% Confidence Interval)	
	Model 1	Model 2
Personal history of severe acts of physical violence	-0.59 (-0.91 to -0.27) <sup>‡</sup>	
Community prevalence of severe acts of physical violence	-1.36 (-2.40 to -0.32) <sup>§</sup>	
Personal history of more severe acts of physical violence		-0.94 (-1.35 to -0.53) <sup>‡</sup>
Community prevalence of more severe acts of physical violence		-1.49 (-2.83 to -0.15) <sup>  </sup>
Age (per five years)	1.06 (0.98-1.15) <sup>‡</sup>	1.06 (0.98-1.15) <sup>‡</sup>
Urban residence	0.86 (0.41-1.31) <sup>‡</sup>	0.85 (0.40-1.30) <sup>‡</sup>
In a domestic partnership	-1.00 (-1.45 to -0.56) <sup>‡</sup>	-1.04 (-1.49 to -0.60) <sup>‡</sup>
Religion		
Other	Ref	Ref
Christian	0.11 (-0.31 to 0.54)	0.12 (-0.30 to 0.54)
Muslim	0.23 (-0.17 to 0.63)	0.22 (-0.19 to 0.62)
Household headship	0.99 (0.62-1.36) <sup>‡</sup>	1.00 (0.63-1.37) <sup>‡</sup>
Professional-class occupation	0.79 (0.40-1.19) <sup>‡</sup>	0.79 (0.40-1.18) <sup>‡</sup>
Educational attainment		
None	-0.81 (-1.13 to -0.49) <sup>‡</sup>	-0.81 (-1.13 to -0.49) <sup>‡</sup>
Primary	Ref	Ref
Secondary	2.17 (1.77-2.56) <sup>‡</sup>	2.17 (1.78-2.56) <sup>‡</sup>
Greater than secondary education	2.38 (1.49-3.27) <sup>‡</sup>	2.40 (1.51-3.29) <sup>‡</sup>
Household asset wealth		
Most poor	-0.68 (-1.07 to -0.28) <sup>‡</sup>	-0.67 (-1.06 to -0.27) <sup>‡</sup>
Very poor	-0.52 (-0.89 to -	-0.51 (-0.89 to -

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	0.15)§	0.14)§
Poor	Ref	Ref
Less poor	0.63 (0.21-1.04)§	0.63 (0.21-1.04)§
Least poor	1.45 (0.91-1.99)‡	1.47 (0.93-2.01)‡
Contraceptive use		
Using modern method	-0.52 (-0.86 to -0.19)§	-0.52 (-0.85 to -0.18)§
Using traditional method	-0.93 (-1.51 to -0.36)§	-0.92 (-1.50 to -0.34)§
None	Ref	Ref
Child's birth order	-0.04 (-0.13 to 0.05)	-0.04 (-0.13 to 0.04)
Cumulative number of boys	0.02 (-0.11 to 0.15)	0.02 (-0.11 to 0.15)
Previous sibling died	-0.89 (-1.25 to -0.54)‡	-0.89 (-1.25 to -0.54)‡

\*Severe acts of physical violence included being pushed or slapped.

†More severe acts of physical violence included being punched, kicked, choked, burned, attacked with a weapon, or threatened with a weapon.

‡Statistical significance at the level of  $P < .001$ .

§Statistical significance at the level of  $P < .01$ .

||Statistical significance at the level of  $P < .05$ .

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