

The Overall Effects of the Ebola Outbreak on Birthweight

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Zaire ebolavirus

- 70% culling rate for people in West Africa
 - 57–59% if hospitalized
- Disease kills within 6–16 days of contraction
- Spreads through bodily fluids of humans or animals
- Kills 74–100% of pregnant women (not conditional on West Africa)
- Kills 100% of all babies (not conditional on West Africa)

Data and Regressions

- Looking for the effect of Ebola on birthweight
- Data is from the Multiple Indicator Cluster Survey by the United Nations International Children's Emergency Fund (UNICEF)
- Compared birthweight of children born before and after Ebola crisis
- Birthweight is the current best signal for latent health effects

Data and Regressions

$$\text{Birthweight}_i = \beta_0 + \beta_1 \text{Ebola}_i + \varepsilon_i$$

$$\begin{aligned} \text{Birthweight}_i = & \beta_0 + \beta_1 \text{Ebola}_i + \beta_2 \text{Mende}_i + \beta_3 \text{Temne}_i + \beta_4 \text{Age}_i + \beta_5 \text{HighestGrade}_i \\ & + \beta_6 \text{Urban}_i + \beta_7 \text{MarriedOrLivedWithMan}_i + \beta_8 \text{FirstSex}_i + \beta_9 \text{Male}_i + \varepsilon_i \end{aligned}$$

$$\text{Birthweight}_i = \beta_0 + \beta_1 \text{Ebola}_i + \gamma(\text{Ebola} \times \text{Urban})_i + \beta_6 \text{Urban}_i + \varepsilon_i$$

$$\begin{aligned} \text{Birthweight}_i = & \beta_0 + \beta_1 \text{Ebola}_i + \gamma(\text{Ebola} \times \text{Urban})_i + \beta_2 \text{Mende}_i + \beta_3 \text{Temne}_i + \beta_4 \text{Age}_i + \\ & \beta_5 \text{HighestGrade}_i + \beta_6 \text{Urban}_i + \beta_7 \text{MarriedOrLivedWithMan}_i + \beta_8 \text{FirstSex}_i + \\ & \beta_9 \text{Male}_i + \varepsilon_i \end{aligned}$$

Table 1: Summary Statistics and Baseline Balance

	All	Treatment	Control	Difference
	(1)	(2)	(3)	(4)
Ethnicity: Mende	0.457 (0.498)	0.469 (0.499)	0.443 (0.497)	0.025*
Ethnicity: Temne	0.232 (0.422)	0.221 (0.415)	0.244 (0.429)	-0.023*
Age of Mother	29.358 (6.671)	28.605 (6.914)	30.206 (6.280)	-1.601***
Highest grade	2.913 (4.276)	3.318 (4.456)	2.457 (4.017)	0.861***
Lives in Urban Area	0.280 (0.449)	0.302 (0.459)	0.255 (0.436)	0.047***
Ever Married or Lived with a Man	0.860 (0.347)	0.833 (0.373)	0.890 (0.313)	-0.058***
Age at First Sex	15.983 (2.080)	15.995 (2.079)	15.970 (2.081)	0.025
Is the Newborn Male	0.507 (0.500)	0.509 (0.500)	0.505 (0.500)	0.004
N	4,185	2,216	1,969	

Notes: Columns 1–3 present the averages and standard deviations. Column 4 presents the difference between Column 2 and Column 3.

A dummy variable denoting if the woman had health insurance was omitted because almost no one has health insurance in Sierra Leone (2.05% of the sample). There are 14+ ethnicities in Sierra Leone, the ones presented are the largest ones (Mende at 45.69% of the sample, Temne at 23.18%). There are no 0 values for “Age at First Sex”. “Highest Grade” denotes the last grade the woman had finished, within grades 1–13, and 14 being recorded for the few (2.15% of the sample) who went to higher education or vocational school.

* denotes significance at 10%, ** significance at 5%, and *** significance at 1%.

Table 2: Effect of Ebola Crisis on Birthweight

	Birthweight	
	(1)	(2)
Ebola	-0.042**	-0.042**
	[0.017]	[0.017]
Ethnicity: Mende		0.037*
		[0.019]
Ethnicity: Temne		0.042*
		[0.023]
Age of Mother		0.002*
		[0.001]
Highest Grade		0.009***
		[0.002]
Lives in Urban Area		0.038*
		[0.020]
Ever Married or Lived with a Man		0.095***
		[0.024]
Age of First Sex		-0.004
		[0.004]
Is the Newborn Male		0.056***
		[0.016]
Constant	3.223***	3.045***
	[0.012]	[0.078]
Observations	4,185	4,185
R-squared	0.002	0.014
Mean of Birthweight in the Control Group	3.223	3.223
Standard Deviation of Birthweight in the Control Group	0.522	0.522

1.300% drop

Notes: Standard errors in brackets. This table presents ordinary least squares linear regressions for the treatment's effect on birthweight. The construction of the treatment is as described in earlier in this paper.

* denotes significance at 10%, ** significance at 5%, and *** significance at 1%

Table 3: Differential Effect of Urban/Rural Household

	Birthweight	
	(1)	(2)
Ebola	-0.036*	-0.034*
	[0.019]	[0.019]
Ebola × Urban	-0.029	-0.029
	[0.037]	[0.037]
Ethnicity: Mende		0.037*
		[0.019]
Ethnicity: Temne		0.042*
		[0.023]
Age of Mother		0.002*
		[0.001]
Highest Grade		0.009***
		[0.002]
Lives in Urban Area	0.065**	0.053*
	[0.028]	[0.028]
Ever Married or Lived with a Man		0.095***
		[0.024]
Age at First Sex		-0.004
		[0.004]
Is the Newborn Male		0.056***
		[0.016]
Constant	3.206***	3.041***
	[0.014]	[0.078]
Observations	4,185	4,185
R-squared	0.003	0.014
Mean of Birthweight in the Control Group	3.223	3.223
Standard Deviation of Birthweight in the Control Group	0.522	0.522

1.053% drop

Notes: Standard errors in brackets. This table presents ordinary least squares linear regressions for the treatment's effect on birthweight. Ebola × Urban measures the difference-in-difference between the treatment effect and the urban/rural status. The construction of the treatment is as described in earlier in this paper.

* denotes significance at 10%, ** significance at 5%, and *** significance at 1%

Validity and Potential Threats

- Other academic papers show that maternal stress effects birthweight
- These results can be applied to Guinea and Liberia
 - Similar culture and environment
 - Disease spread through the same vectors
- High culling rate means that the most effected are not in the dataset
- GDP per capita was higher in the treatment period vs control
- All questionnaires have compliance rates of above 99%