

Online Appendix

In-utero Exposure to Violence and Child Health in Iraq

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Table A.1: **Violent incident characteristics by perpetrator**

Perpetrator	casualties	suicide	bombs	airstrikes/missiles	gunfire	executions/torture
Coalition forces (N=1179)						
mean	5.621	0	0.049	0.2408	0.628	0.007
sd	32.74	0	0.216	0.427	0.483	0.087
Insurgent agents (N=2826)						
mean	3.207	0.182	0.669	0.071	0.264	0.009
sd	5.287	0.386	0.470	0.258	0.441	0.097
Sectarian agents (N=12874)						
mean	2.965	0.026	0.179	0.067	0.699	0.315
sd	11.692	0.161	0.383	0.251	0.458	0.464
Total (N=16879)						
mean	3.191	0.050	0.252	0.080	0.621	0.243
sd	13.573	0.219	0.434	0.272	0.484	0.428

Own classification of type of violence according to descriptions in "Cause of Death" column of the ESOC data (Iraq Body Count Project and Condra & Shapiro (2012) data set), based on keyword search. Multiple classifications for a single violent incidence are possible (e.g. suicide bombings + explosions). Summary stats are provided for incidences with one unique and identified perpetrator; events with unknown perpetrator (N=981) or multiple perpetrators (N=602) are not reported.

Table A.2: **Summary statistics MICS 2011 for non-exposed children and children without an exact birthday**

	(1)				(2)			
	No violence sample				No exact birthday sample			
	mean	sd	min	max	mean	sd	min	max
Female	0.49	0.50	0	1	0.50	0.50	0	1
Age	1.58	0.60	1	6	3.97	1.52	1	6
HAZ	-0.32	2.11	-10	10	-0.60	2.48	-7	10
WAZ	-0.04	1.81	-5	10	-0.21	2.14	-5	10
Wealth index score	0.20	0.93	-6	2	-0.07	0.91	-5	2
Age of mother	27.35	6.60	15	49	29.53	6.74	15	49
Age of husband/partner	31.83	7.77	15	89	33.62	7.79	14	76
Education of household head	2.26	0.75	1	3	2.22	0.76	1	3
Observations	7540				1647			

This Table reports summary statistics from the 2011 Iraq Multiple Indicator Cluster Survey on the child level. I report the summary statistics for the sample of children that did not experience any violent incident in-utero and those children that have no exact birthday and are therefore dropped in the main analysis.

Table A.3: Severity of Violence by Perpetrator

	mean	min	max	N
Coalition Forces				
Duration (days)	1.48	1	31	1179
Casualties	6.48	1	670	1179
Insurgent Agents				
Duration (days)	1.04	1	16	2826
Casualties	3.58	1	80	2826
Sectarian Agents				
Duration (days)	1.29	1	1077	12874
Casualties	3.11	1	1005	12874
Total				
Duration (days)	1.26	1	1077	16879
Casualties	3.42	1	1005	16879

Based on ESOC data (Iraq Body Count Project and Condra & Shapiro (2012) data set). Summary stats are provided for incidences with one unique and identified perpetrator; events with unknown perpetrator (N=981) or multiple perpetrators (N=602) are not reported.

Table A.4: Probability of treatment: in sibling sample

	number of mothers	share of mothers
No sibling treated	4,246	0.418
Some siblings treated	3,983	0.393
All siblings treated	1,921	0.189
Total	10,150	1

Number of households that have multiple children under the age of 5, of which none were exposed to violence during pregnancy (first row), of which some were exposed to violence (second row), of which all were exposed to violence (third row).

Table A.5: **Placebo treatment: all children within household assigned treatment status**

sample:	Height for Age Z-Score		Weight for Age Z-Score	
	all children (1)	control children only (2)	all children (3)	control children only (4)
Placebo violence	-0.058 (0.044)	-0.012 (0.055)	-0.043 (0.034)	-0.009 (0.041)
Observations	22640	13877	22640	13877
Districts	118	118	118	118
Adj. R-squared	0.133	0.124	0.084	0.087
Controls	Yes	Yes	Yes	Yes
YoB $\times$ district FE	Yes	Yes	Yes	Yes
Mother FE	No	No	No	No

The dependent variable is the height for age Z-score in columns 1 to 2, and the weight for age Z-score in columns 3 to 4. The sample of violent incidents is restricted to those with only one casualty. Placebo violence is assigning treatment status to all children of a mother, where at least one child has been exposed to violence in utero. Columns 1 and 3 include truly and placebo treated children in the sample. Columns 2 and 4 only include control children in the sample, i.e. comparing only placebo treated with control children. Control variables at the child level include gender, child birth order and a dummy variable for twins. Standard errors are clustered at the district level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.6: **Mother-level outcomes: cumulative exposure to violence 2003 - 2009 and likelihood of child death, miscarriage, and pre-natal care**

	children died		any miscarriage		any prenatal care	
	(1)	(2)	(3)	(4)	(5)	(6)
Log (1 + number of violent incidents)	-0.004 (0.003)		0.000 (0.005)		0.008 (0.012)	
Log (1 + number of casualties)		-0.002 (0.002)		-0.003 (0.005)		-0.002 (0.010)
Observations	10268	10268	10256	10256	4669	4669
Governorates	18	18	18	18	18	18
Adj. R-squared	0.005	0.005	0.008	0.008	0.034	0.033
Governorate FE	Yes	Yes	Yes	Yes	Yes	Yes
District controls	Yes	Yes	Yes	Yes	Yes	Yes
Household controls	Yes	Yes	Yes	Yes	Yes	Yes
Mother controls	Yes	Yes	Yes	Yes	Yes	Yes

OLS estimates on the number of children that have died (col 1 and 2), the likelihood of having experienced a miscarriage before 24 weeks of pregnancy (col 3 and 4), the likelihood of having sought any prenatal care in the past (col 5 and 6). The sample of violent incidents covers all violent incidents of any type in the whole ESOC observation period between 2003 and 2009. The treatment is measured the log of one plus the cumulative number of violent incidents (col 1, 3, 5) and the log of one plus the cumulative number of casualties (col 2, 4, 6) in the observation period. Control variables at the district level include: district population in 2003 from the World Food Program (WFP), share of urban population (WFP 2003), Shia, Sunni, Kurdish, Christian and Turkmen population in 2003, average distance to police department and average distance to public services (CIA, 2003). Household controls include: household size, number of women in household, number of children under age 5 in household, household owns animals, children aged 2 to 14, sex of household head, education of household head, dummy for rural household, any household member owns land, hectares of land household owns, wealth index score. Mother controls include: her and her husband's education level, her and her husband's birth order, her and her husband's age, her employment status, whether the husband is a relative and whether the husband has other wives. Regression includes governorate fixed effects. Standard errors are clustered at the governorate level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.7: Iraq Household Socio-Economic Survey: Reasons for Migration

Reason	N	share of subsample (%)	Share of full sample (%)
Work	230	14.51	0.131
Study or complete study	42	2.65	0.024
Marriage, divorce or becoming widow	278	17.54	0.158
Accompany household	733	46.25	0.419
Forced displacement or migration	51	3.22	0.029
Back from forced displacement or migration	83	5.24	0.047
Displacement for security reason	6	0.38	0.003
Conventional armed conflict	23	1.45	0.013
Civil conflict	14	0.88	0.008
Other	124	7.82	0.071
Observations	1,584		

Table A.7 uses a different data source, namely the Iraq household socio-economic survey of 2012 that asks the question "Did you stay for 6 months continuously in another place?" If yes, "What is the main reason for changing the place of residence?". The answers to the latter question are presented in this table. The full sample consists of more than 175,000 respondents, the relevant sample of migrants within the 2006 to 2009 observation period is 1,584.

Table A.8: Successively introducing controls and fixed effects: Violent incident during pregnancy deteriorates child health

	Height for Age Z-Score				Weight for Age Z-Score			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Violence _{all}	-0.183*** (0.060)	-0.190*** (0.060)	-0.118** (0.052)	-0.135** (0.059)	-0.0505 (0.054)	-0.0551 (0.054)	-0.116*** (0.042)	-0.143*** (0.051)
Observations	22,640	22,640	22,640	22,640	22,640	22,640	22,640	22,640
Mothers	10,150	10,150	10,150	10,150	10,150	10,150	10,150	10,150
Districts	118	118	118	118	118	118	118	118
Adj. R-squared	0.002	0.004	0.261	0.277	0.000	0.002	0.298	0.313
Controls		Yes	Yes	Yes		Yes	Yes	Yes
Mother FE			Yes	Yes			Yes	Yes
YoB × district FE				Yes				Yes
	mean (cm)		sd		mean(kg)		sd	
Age 0	64.22		15.87		6.98		3.39	
Age 1	78.65		24.53		10.44		2.87	
Age 2	87.18		14.98		12.66		3.45	
Age 3	95.26		20.12		14.62		3.36	
Age 4	102.26		20.08		16.41		3.34	

The dependent variable is the height for age Z-score in columns 1 to 4, and the weight for age Z-score in columns 5 to 8. Average height and weight by age as well as standard deviations are reported at the bottom of the table. The sample of violent incidents is restricted to those with only one casualty. The treatment is measured as a dummy variable for any violent incident during all of pregnancy. Control variables at the child level include gender, line number and a dummy variable for twins. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.9: MICS questions on illness, cognitive, motor and behavioral skills

Code	Category	Question	Scale	Coverage
CA1		Child had diarrhoea in last 2 weeks	0-1	full sample
CA7		Child ill with cough in last 2 weeks	0-1	full sample
EC8	cognitive	Child identifies at least ten letters of the alphabet	0-1	random sample
EC9	cognitive	Child reads at least four simple, popular words	0-1	random sample
EC10	cognitive	Child knows name and recognizes symbol of all numbers from 1-10	0-1	random sample
EC11	cognitive	Child able to pick up small object with 2 fingers	0-1	random sample
EC12	beahvior	Child sometimes too sick to play	0-1	random sample
EC13	beahvior	Child follows simple directions	0-1	random sample
EC14	beahvior	Child able to do something independently	0-1	random sample
EC15	beahvior	Child gets along well with other children	0-1	random sample
EC16	beahvior	Child kicks, bites or hits other children or adults	0-1	random sample
EC17	beahvior	Child gets distracted easily	0-1	random sample

Table A.10: Correlation among outcomes

		Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11
1	HAZ	-0.57	2.08											
2	WAZ	-0.26	1.84	0.74										
				(0.00)										
3	letters	0.29	0.45	0.03	0.05									
				(0.00)	(0.00)									
4	words	0.12	0.32	0.02	0.05	0.39								
				(0.01)	(0.00)	(0.00)								
5	numbers	0.21	0.41	0.05	0.06	0.31	0.34							
				(0.00)	(0.00)	(0.00)	(0.00)							
6	objects	0.90	0.30	0.01	-0.00	0.06	0.07	0.10						
				(0.14)	(0.87)	(0.00)	(0.00)	(0.00)						
7	sick	0.54	0.50	0.01	0.01	0.03	0.01	-0.05	0.08					
				(0.42)	(0.30)	(0.00)	(0.25)	(0.00)	(0.00)					
8	directions	0.82	0.39	0.00	0.01	0.12	0.07	0.11	0.17	0.05				
				(0.74)	(0.54)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)				
9	indep	0.74	0.44	0.01	-0.01	0.11	0.07	0.11	0.17	0.01	0.43			
				(0.56)	(0.46)	(0.00)	(0.00)	(0.00)	(0.00)	(0.52)	(0.00)			
10	children	0.84	0.37	0.01	0.02	0.06	0.03	0.07	0.10	-0.00	0.17	0.13		
				(0.47)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.60)	(0.00)	(0.00)		
11	kicks	0.26	0.44	-0.02	-0.02	-0.05	0.00	-0.04	-0.03	0.07	-0.10	-0.07	-0.43	
				(0.01)	(0.01)	(0.00)	(0.59)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	
12	distract	0.44	0.50	0.00	-0.01	0.01	0.02	-0.04	-0.04	0.14	-0.03	-0.04	-0.06	0.12
				(0.96)	(0.23)	(0.10)	(0.07)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)

Significance levels in brackets. HAZ = Height for age z-score NCHS; WAZ = Weight for age z-score NCHS; letters = Child identifies at least ten letters of the alphabet; words = Child reads at least four simple, popular words; numbers = Child knows name and recognizes symbol of all numbers from 1-10; objects = Child able to pick up small object with 2 fingers; sick = Child sometimes too sick to play; directions = Child follows simple directions; indep = Child able to do something independently; children = Child gets along well with other children; kicks = Child kicks, bites or hits other children or adults; distract = Child gets distracted easily

Table A.11: Severity of Violence during pregnancy and cognitive skills and behavior

	1st PC cognitive skills (1)	1st PC behavior (2)	1st PC cognitive skills (3)	1st PC behavior (4)
Log(1 + number of violent incidents)	-0.177* (0.092)	-0.061 (0.105)		
Violence (including large scale)			-0.025 (0.101)	-0.094 (0.144)
Observations	2256	2147	2256	2147
Districts	117	117	117	117
Adj. R-squared	0.590	0.463	0.589	0.463
Observations	22,588	22,584	2,256	2,147
Mothers	10,129	10,124	1,116	1,063
Districts	118	118	117	117
Adj. R-squared	0.382	0.210	0.589	0.463
Controls	Yes	Yes	Yes	Yes
YoB $\times$ district FE	Yes	Yes	Yes	Yes
Mother FE	Yes	Yes	Yes	Yes

The dependent variables in columns 1 and 3, are the first principle component of all cognitive and motor skills (questions EC8-EC11 of Appendix Table A.9) and in columns 2 and 4 the first principle component of behavioral outcomes (questions EC12-EC17 of Appendix Table A.9). These are only available for a random sub-sample of households. The treatment in columns 1 and 2 is the log of one plus the number of violent incidents during pregnancy. In columns 3 and 4, the treatment is measured as any violent incident during pregnancy and also includes large scale events (those with more than one casualty). Control variables at the child level include gender, child birth order and a dummy variable for twins. Standard errors are clustered at the district level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.12: Correlation between Perpetrator and Severity of Attack

	Coalition	Insurgent	Sectarian
Duration (Days)	0.009 0.221	-0.011 0.135	0.005 0.462
Casualties	0.061*** 0.000	0.004 0.560	-0.028*** 0.000

Table A.12 shows pairwise correlation between perpetrator and severity of incident, measured as the duration in days and the number of casualties. P-values are reported under the correlation coefficients.

Table A.13: **Stress mechanism: perpetrator of violence (restricted to one day one casualty incidents)**

Perpetrator of violence:	Height for Age Z-Score			Weight for Age Z-Score		
	sectarian (1)	insurgent (2)	coalition (3)	sectarian (4)	insurgent (5)	coalition (6)
Violence _{trim1}	-0.170** (0.068)	-0.152** (0.076)	-0.0359 (0.127)	-0.179*** (0.053)	-0.119** (0.058)	-0.018 (0.106)
Violence _{trim2}	-0.100* (0.060)	-0.062 (0.092)	-0.067 (0.104)	-0.095* (0.048)	-0.062 (0.072)	0.047 (0.094)
Violence _{trim3}	0.123* (0.069)	0.101 (0.090)	-0.121 (0.121)	0.065 (0.050)	-0.027 (0.057)	-0.068 (0.108)
Observations	20527	14158	12713	20527	14158	12713
Districts	118	117	117	118	117	117
Adj. R-squared	0.282	0.258	0.250	0.314	0.280	0.277
Controls	Yes	Yes	Yes	Yes	Yes	Yes
YoB × district FE	Yes	Yes	Yes	Yes	Yes	Yes
Mother FE	Yes	Yes	Yes	Yes	Yes	Yes

The dependent variable is the height for age Z-score in columns 1 to 3, and the weight for age Z-score in columns 4 to 6. The sample of violent incidents is restricted to those with only one casualty and lasted only one day. The treatment is measured as a dummy variable for any violent during each trimester, distinguishing between sectarian (columns 1 and 4), insurgent (columns 2 and 5) and coalition violence (columns 3 and 6). Separate regressions for each perpetrator of violence, dropping from the sample mothers treated by any other perpetrator of violence. Control variables at the child level include gender, birth order and a dummy variable for twins. Standard errors are clustered at the district level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.14: **Alternative definitions of violence: large scale events, frequency of events, and one day one casualty events**

	Height for Age Z-Score				Weight for Age Z-Score			
	including large scale events			low casualty	including large scale events			low casualty
	any event (1)	event frequency (2)	gunfire (3)	one day (4)	any event (5)	event frequency (6)	gunfire (7)	one day (8)
Violence _{all}		-0.192*** (0.053)				-0.224*** (0.045)		
Violence _{trim1}	-0.197*** (0.052)		-0.190*** (0.067)	-0.226*** (0.058)	-0.184*** (0.043)		-0.160*** (0.056)	-0.189*** (0.045)
Violence _{trim2}	-0.048 (0.047)		-0.014 (0.060)	-0.032 (0.058)	-0.084** (0.040)		-0.071 (0.055)	-0.041 (0.042)
Violence _{trim3}	0.072 (0.053)		0.069 (0.067)	0.110* (0.059)	0.044 (0.046)		0.018 (0.062)	0.030 (0.048)
Intens _{trim1}		0.001 (0.002)				0.001 (0.001)		
Intens _{trim2}		0.001 (0.003)				-0.001 (0.002)		
Intens _{trim3}		-0.002 (0.002)				-0.001 (0.001)		
Observations	22640	22640	19640	22253	22640	22640	19640	22253
Districts	118	118	118	118	118	118	118	118
Adj. R-squared	0.278	0.278	0.274	0.280	0.313	0.313	0.305	0.314
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
YoB $\times$ district FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mother FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

The dependent variable is the height for age Z-score in columns 1 to 3, and the weight for age Z-score in columns 4 to 6. The sample of violent incidents is expanded to *all* violent incidents, including large scale violent events. In columns 1 and 4, I include a dummy variable for any violent incident occurring in each trimester of the pregnancy. The top row of columns 2 and 5 is a dummy variable for any violent incident during all of pregnancy and includes the number of violent incidents in each trimester separately. Columns 3 and 6 restrict attention to violent incidents with one casualty that only lasted one day. Control variables at the child level include gender, line number and a dummy variable for twins. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.15: Alternative measures for height and weight

	Height for Age percent of median (1)	Weight for Age percent of median (2)	Height for Age Z-Score WHO (3)	Weight for Age Z-Score WHO (4)
Violence _{trim1}	-4.035* (2.365)	-4.681** (2.160)	-0.265*** (0.053)	0.0282 (0.032)
Violence _{trim2}	-0.338 (2.195)	-0.679 (1.965)	-0.116** (0.050)	0.014 (0.030)
Violence _{trim3}	1.104 (2.443)	1.123 (2.531)	0.028 (0.056)	-0.007 (0.040)
Observations	22,640	22,640	22,640	22,640
Mothers	10,150	10,150	10,150	10,150
Districts	118	118	118	118
Adj. R-squared	0.296	0.315	0.252	0.299
Controls	Yes	Yes	Yes	Yes
YoB $\times$ district FE	Yes	Yes	Yes	Yes
Mother FE	Yes	Yes	Yes	Yes

The dependent variables are alternative measures for the height and weight of children. In columns 1 and 2, they are expressed as percentages of the median, in columns 3 and 4 they are measured in Z-scores according to the WHO, rather than NHCS in the main specification. The sample of violent incidents is restricted to those with only one casualty. The treatment is measured as a dummy variable for any violent incident during all of pregnancy. Control variables at the child level include gender, line number and a dummy variable for twins. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.16: **Sample composition: excluding high and low violence districts and mothers with all children treated**

	Height for Age Z-Score				Weight for Age Z-Score			
	excl. Baghdad (1)	excl. Kurdistan (2)	excl. 90th prctl violence (3)	contr. group none treated (4)	excl. Baghdad (5)	excl. Kurdistan (6)	excl. 90th prctl violence (7)	contr. group none treated (8)
Violencetrim1	-0.210*** (0.055)	-0.210*** (0.057)	-0.233*** (0.057)	-0.184*** (0.061)	-0.175*** (0.042)	-0.179*** (0.044)	-0.181*** (0.042)	-0.117** (0.045)
Violencetrim2	-0.042 (0.058)	-0.045 (0.056)	-0.051 (0.057)	0.001 (0.074)	-0.046 (0.043)	-0.056 (0.039)	-0.056 (0.042)	-0.030 (0.054)
Violencetrim3	0.139** (0.058)	0.134** (0.063)	0.118** (0.060)	0.099 (0.074)	0.048 (0.049)	0.069 (0.048)	0.040 (0.049)	0.044 (0.052)
Observations	21269	18808	21381	18593	21269	18808	21381	18593
Districts	108	85	109	118	108	85	109	118
Adj. R-squared	0.257	0.286	0.277	0.252	0.299	0.320	0.314	0.286
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
YoB $\times$ district FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mother FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

The dependent variable is the height for age Z-score in columns 1 to 4, and the weight for age Z-score in columns 5 to 8. Columns 1 and 5 exclude the whole of Baghdad, columns 2 and 6 exclude the Kurdish autonomous region and columns 3 and 7 exclude districts in the 90th percentile of violent incidents in the observation period between 2006 and 2009. Columns 4 and 8 only include as a control group mothers where no child has been exposed to violence in-utero. Control variables at the child level include gender, line number and a dummy variable for twins. Standard errors are clustered at the district level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.