

Supplementary Materials for **Hydraulic fracturing and infant health: New evidence from Pennsylvania**

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Table S1: Compare Mothers by Number of Births Observed in Sample

	One Birth (1)	2+ Births (2)
<i>Mother Characteristics</i>		
Married	0.57	0.62
Black	0.16	0.16
Hispanic	0.10	0.09
< High School	0.13	0.16
High School	0.27	0.26
Some College	0.29	0.25
College	0.20	0.21
Advanced	0.11	0.12
Less than 20	0.07	0.06
20-24	0.21	0.22
25-29	0.25	0.30
30-34	0.26	0.28
Over 35	0.20	0.14
<i>Infant Characteristics</i>		
1st born	0.53	0.31
2nd born	0.27	0.38
3rd born	0.13	0.18
4th and up	0.07	0.13
N	545,526	580,223

The data source is the universe of birth certificates in PA, 2004-2013, matched to the PA DEP Internal Operator Well Inventory, which is described in the notes to Figure 1. Each observation is a birth. Maternal demographics are recorded at the time of birth. Given the large sample sizes all of the means for one birth are statistically significantly different than the means for 2+ births.

Table S2: Effect of Fracturing on Infant Health, Including Both Inactive and Active Wells

<i>Dependent Variable</i>	(Near = 0-1 km) x After			(Near = 1-2 km) x After			(Near = 2-3 km) x After		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Low Birth Weight (mean = 0.065)	0.014** (0.006)	0.013** (0.006)	0.010 (0.014)	0.005 (0.003)	0.004 (0.003)	0.003 (0.007)	0.008*** (0.003)	0.007*** (0.003)	0.008 (0.005)
Birth Weight (mean = 3319.6)	-33.5** (14.5)	-32.9** (14.6)	-11.5 (28.8)	-3.8 (8.1)	-2.0 (8.1)	-7.0 (13.6)	-9.9 (6.2)	-8.5 (6.3)	-0.5 (10.2)
Health Index (mean = 0.000)	-0.043** (0.017)	-0.041** (0.018)	-0.003 (0.038)	-0.019+ (0.010)	-0.015 (0.010)	-0.013 (0.019)	-0.027*** (0.007)	-0.024*** (0.008)	-0.017 (0.014)
N	1,083,485	228,268	228,268	1,100,357	245,113	245,113	1,116,988	261,688	261,688
Mother FE	No	No	Yes	No	No	Yes	No	No	Yes
Under 15 km	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes

In this Table, we re-estimate the coefficients shown in Table 2, adding to our sample wells that are inactive (plugged) as of the date on which we downloaded the well spud data (November 2014).

Table S3: Effect of Fracturing on Infant Health, Treatment based on Birth Date

<i>Dependent Variable</i>	(Near = 0-1 km) x After			(Near = 1-2 km) x After			(Near = 2-3 km) x After		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Low Birth Weight (mean = 0.065)	0.015** (0.006)	0.014** (0.006)	0.010 (0.013)	0.002 (0.003)	0.002 (0.003)	-0.001 (0.006)	0.007** (0.003)	0.006** (0.003)	0.005 (0.005)
Birth Weight (mean = 3319.6)	-27.0+ (14.7)	-25.412+ (14.714)	5.7 (28.4)	-3.8 (7.9)	-1.844 (7.991)	-12.0 (13.5)	-6.1 (6.1)	-4.353 (6.189)	-1.7 (9.9)
Health Index (mean = 0.000)	-0.042** (0.017)	-0.040** (0.018)	0.025 (0.037)	-0.015 (0.009)	-0.012 (0.010)	-0.011 (0.018)	-0.023*** (0.007)	-0.020*** (0.008)	-0.013 (0.014)
N	1,086,917	231,578	231,578	1,102,424	247,085	247,085	1,117,919	262,580	262,580
Mother FE	No	No	Yes	No	No	Yes	No	No	Yes
Under 15 km	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes

In this Table, we re-estimate the coefficients shown in Table 2, re-defining exposure to mean the birth date, rather than the conception date, is after the well spud date.

Table S4: Effect of Fracturing on Infant Health, Controlling for Lat./Long. Grid*Year Controls

<i>Dependent Variabi</i>	(Near = 0-1 km) x After			(Near = 1-2 km) x After			(Near = 2-3 km) x After		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Low Birth Weight (mean = 0.065)	0.014+ (0.007)	0.013+ (0.007)	0.015 (0.015)	0.004 (0.004)	0.004 (0.004)	0.005 (0.007)	0.007** (0.003)	0.007** (0.003)	0.006 (0.006)
Birth Weight (mean = 3319.6)	-40.902** (16.171)	-39.466** (16.188)	-12.025 (31.967)	-7.493 (9.062)	-6.434 (9.102)	-8.367 (15.628)	-8.418 (7.017)	-7.232 (7.042)	10.583 (11.273)
Health Index (mean = 0.000)	-0.043** (0.019)	-0.044** (0.020)	-0.010 (0.042)	-0.012 (0.011)	-0.012 (0.011)	-0.014 (0.021)	-0.020** (0.008)	-0.020** (0.009)	-0.007 (0.015)
N	1,086,917	231,578	231,578	1,102,424	247,085	247,085	1,117,919	262,580	262,580
Mother FE	No	No	Yes	No	No	Yes	No	No	Yes
Under 15 km	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes

In this Table, we re-estimate the coefficients shown in Table 2, replacing the county and Region*Year fixed effect controls with 0.5 by 0.5 latitude/longitude square and square*year fixed effect controls. To create these new controls, we first assign each birth a code corresponding to the 0.5 wide bin its latitude belongs to and the 0.5 bin its longitude belongs to. Births with missing latitude or longitude are included and given separate codes for either case. We then replace the county fixed effects in our main specification with fixed effects for these latitude/longitude squares and we replace region*year FE with square*year FE. There are 77 lat/lon square fixed effects and 637 year*square interaction fixed effects (note that an interaction may not exist if there are no births within that year and square).

Table S5: Mothers with <2 well sites spudded within 1km vs. mothers with 2+ well sites spudded within 1km.

<i>Dependent Variable:</i>	LBW			BW			Health Index		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Conceived after at least 1 well spudded in 1km	0.021** (0.008)	0.027*** (0.010)	0.009 (0.023)	-49.777*** (18.462)	-56.334** (23.439)	5.921 (52.735)	-0.068*** (0.023)	-0.079*** (0.029)	0.055 (0.071)
Conceived after >2 wells spudded in 1km	-0.015 (0.013)	0.016 (0.026)	0.013 (0.053)	36.749 (31.588)	24.382 (61.795)	-66.848 (120.111)	0.043 (0.036)	-0.023 (0.070)	-0.130 (0.123)
1 or 2 well sites in 1 km	-0.006 (0.005)	-0.014*** (0.005)	-0.026 (0.022)	16.690 (11.804)	33.807** (13.779)	-40.427 (44.838)	0.015 (0.013)	0.045*** (0.015)	-0.003 (0.060)
>2 well sites in 1 km	0.006 (0.006)	-0.001 (0.010)	0.053+ (0.031)	-4.843 (15.522)	14.534 (24.310)	45.718 (84.293)	-0.013 (0.018)	0.005 (0.028)	-0.035 (0.102)
N	1086917	146,266	146,266	1086917	146,266	146,266	1086917	146,266	146,266
Mother FE	No	No	Yes	No	No	Yes	No	No	Yes
Under 15 km	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes

Notes: This table shows estimates for mothers who live <1km from a well site vs. mothers who live >3 and <15 km from a well site. Mothers may have 0, 1-2, or >2 wells spudded within 1km, so the omitted category is 0 wells spudded (no fracting).

Table S6: Effect of Fracturing on Infant Health, Logits for Low Birth Weight

	(Near = 0-1 km) x After (1)	(Near = 1-2 km) x After (2)	(Near = 2-3 km) x After (3)
Low Birth Weight (mean = 0.065)	0.283** (0.121)	0.088 (0.070)	0.145** (0.052)
Marginal Effect	0.016	0.005	0.008
N	231,578	247,085	262,580
Mother FE	No	No	No
Under 15 km	Yes	Yes	Yes