SUPPLEMENTAL TABLES

Table S1. Characteristics of the study population by preterm birth, 1991–2015.

Characteristic	Preterm (*n*=51,747)	Full term (*n*=957,442)
Nitrate pregnancy category, *n* (%)		
≤2 mg/L	26,616 (51)	502,556 (52)
>2–5 mg/L	16,547 (32)	301,588 (32)
>5–25 mg/L	6,579 (13)	118,023 (12)
>25 mg/L)	2,005 (4)	35,275 (4)
Sex, *n* (%)		
Female	22,959 (44)	469,155 (49)
Male	28,788 (56)	488,287 (51)
Birth order, *n* (%)		
1	28,874 (56)	411,932 (43)
2	15,022 (29)	379,630 (40)
≥3	7,851 (15)	165,880 (17)
Short interpregnancy interval, *n* (%)		
No	432 (1)	1,832 (0)
Yes	22,441 (43)	543,678 (57)
Missing (*i.e.,* only child)	28,874 (56)	411,932 (43)
Region, *n* (%)		
Capital	14,880 (29)	293,581 (31)
North Jutland	5,758 (11)	98,482 (10)
Mid Jutland	12,370 (24)	231,705 (24)
Southern Denmark	11,271 (22)	201,784 (21)
Zealand	7,468 (14)	131,890 (14)
Urbanicity, *n* (%)		
Capital	16,999 (33)	304,528 (32)
Suburb of the capital	15,326 (30)	273,251 (29)
Provincial city[b]	6,831 (13)	136,795 (14)
Provincial town[c]	6,156 (12)	121,590 (13)
Rural areas[d]	6,435 (12)	121,278 (13)
Year of birth, *n* (%)		
Q1 (1991–1996)	12,211 (24)	239,254 (25)
Q2 (1997–2002)	12,583 (24)	231,200 (24)
Q3 (2003–2008)	13,644 (26)	235,145 (25)
Q4 (2009–2015)	13,309 (26)	251,843 (26)
Season of birth, *n* (%)		
January–March	12,537 (24)	231,861 (24)
April–June	13,128 (25)	242,135 (25)
July–September	13,328 (26)	257,333 (27)
October–December	12,754 (25)	226,113 (24)
Maternal age (years), *n* (%)		
<25	8,324 (16)	126,998 (13)
25–29	18,808 (36)	347,758 (36)
30–34	16,210 (31)	333,614 (35)

≥35	8,405 (16)	149,072 (16)
Maternal smoking[e], *n* (%)		
No	37,748 (73)	758,681 (79)
Yes	13,999 (27)	198,761 (21)
Maternal BMI, *n* (%)		
<18.5	1,246 (2)	17,098 (2)
18.5–24.9	14,034 (27)	269,761 (28)
25–29.9	4,907 (9)	89,506 (9)
≥30	3,298 (6)	53,713 (6)
Missing[f]	28,262 (55)	527,364 (55)
Maternal education[g], *n* (%)		
Primary school	14,892 (29)	214,286 (22)
High school	23,543 (46)	444,333 (46)
Higher education	13,312 (26)	298,823 (31)
Maternal employment status[g], *n* (%)		
Employed	40,631 (79)	777,392 (81)
Unemployed	3,343 (6)	56,683 (6)
Not seeking work	7,773 (15)	123,367 (13)
Maternal income[h], *n* (%)		
Q1	14,243 (28)	233,500 (24)
Q2	12,950 (25)	238,764 (25)
Q3	12,320 (24)	240,982 (25)
Q4	12,234 (24)	244,196 (26)
Paternal age (years), *n* (%)		
<25	4,255 (8)	63,583 (7)
25–29	15,110 (29)	259,702 (27)
30–34	17,703 (34)	353,870 (37)
≥35	14,679 (28)	280,287 (29)
Paternal education[g], *n* (%)		
Primary school	13,495 (26)	203,904 (21)
High school	26,233 (51)	490,111 (51)
Higher education	11,298 (22)	253,229 (26)
Missing	721 (1)	10,198 (1)
Paternal employment status[g], *n* (%)		
Employed	45,456 (88)	859,349 (90)
Unemployed	2,586 (5)	37,014 (4)
Not seeking work	3,758 (7)	58,032 (6)
Missing	175 (0)	3,047 (0)
Paternal income[h], *n* (%)		
Q1	14,280 (28)	233,849 (24)
Q2	13,182 (25)	237,891 (25)
Q3	12,682 (25)	241,109 (25)
Q4	11,565 (22)	244,096 (25)
Missing	38 (0)	497 (0)

4 Note: BMI = body mass index. All X^2 tests for difference between strata were significant at $P \leq 0.001$.

a. The study population: full-term singleton live births in Denmark from January 1, 1991 to December 31, 2015 to Danish-born parents who had a nitrate estimate for each day of pregnancy, and with non-missing covariates in the base model
b. Municipalities having a town with > 100,000 inhabitants
c. Municipalities having a town with between 10,000 and 100,000 inhabitants
d. Municipalities in Denmark where the largest town has < 10,000 inhabitants
e. For children born in the period before 1997 smoking was recorded at the first visit with the midwife with no specifications as to the timing. For children born from 1997 onward smoking is during pregnancy
f. Available from 2003 onward only
g. As reported two years prior to birth
h. As reported two years before birth and standardized to 2013 values

Table S2. Comparison of the effect estimates of the associations between nitrate and preterm birth among those with two or more birth to liveborn singletons within the study period without and after additional adjustment for a short interpregnancy interval (<1 year between births).

			Without short interpregnancy interval		With short interpregnancy interval	
Nitrate (mg/L)	Total (*n*)	Cases (*n*)	OR (95% CI)	*P* value	OR (95% CI)	*P* value
≤2	301,822	11,678	Ref (1)		Ref (1)	
>2–5	171,805	7,133	1.06 (1.03, 1.09)	<0.001	1.06 (1.03, 1.09)	<0.001
>5–25	73,542	3,172	1.07 (1.03, 1.12)	0.001	1.07 (1.03, 1.12)	0.001
>25	21,214	890	1.06 (0.99, 1.14)	0.10	1.06 (0.99, 1.14)	0.09
Trend	568,383	22,873		<0.001		<0.001
Continuous (per 10 mg/L)	568,383		1.02 (1.00, 1.04)	0.04	1.02 (1.00, 1.04)	0.04

Note: OR = odds ratio; CI = confidence interval. Models were fitted using logistic regression with generalized estimating equations to control for the non-independence of births from the same mother and were controlled for calendar year, sex, gravidity, urbanicity, and maternal age, smoking, education, income, and employment status.

Table S3. Comparison of odds of preterm birth restricted to those with a BMI value unadjusted and adjusted for pre-pregnancy BMI.

			Without adjustment for BMI		With adjustment for BMI	
Nitrate (mg/L)	Total (*n*)	Cases (*n*)	OR (95% CI)	*P* value	OR (95% CI)	*P* value
≤2	252,424	12,767	Ref (1)		Ref (1)	
>2–5	144,045	7,580	1.06 (1.02, 1.09)	0.001	1.06 (1.02, 1.09)	0.001
>5–25	41,739	2,254	1.03 (0.99, 1.09)	0.16	1.03 (0.99, 1.08)	0.17
>25	15,355	884	1.09 (1.01, 1.17)	0.03	1.09 (1.01, 1.17)	0.03
Trend	453,563	23,485		0.001		0.001
Continuous (per 10 mg/L)	453,563	23,485	1.02 (1.00, 1.04)	0.05	1.02 (1.00, 1.04)	0.05

Note: BMI = body mass index; OR = odds ratio; CI = confidence interval.

Models were fitted using logistic regression with generalized estimating equations in order to control for the non-independence of births from the same mother and were controlled for calendar year, sex, gravidity, urbanicity, and maternal age, smoking, education, income, and employment status.

Table S4. Odds of preterm birth adding additional adjustment for covariates not included *a priori* to the main model.

			Season of birth		Paternal age				Paternal SES indicators[b]	
Nitrate (mg/L)	Total (*n*)	Cases (*n*)	OR (95% CI)	*P* value	OR (95% CI)	*P* value	Total (*n*)	Cases (*n*)	OR (95% CI)	*P* value
≤2	529,172	26,616	Ref (1)		Ref (1)		523,310	26,260	Ref (1)	
>2–5	318,135	16,547	1.03 (1.01, 1.06)	0.002	1.03 (1.01, 1.06)	0.002	313,653	16,250	1.03 (1.01, 1.05)	0.01
>5–25	124,602	6,579	1.04 (1.01, 1.07)	0.01	1.04 (1.01, 1.07)	0.01	123,029	6,485	1.04 (1.01, 1.07)	0.01
>25	37,280	2,005	1.05 (1.00, 1.10)	0.06	1.05 (1.00, 1.10)	0.06	36,929	1,968	1.04 (0.99, 1.09)	0.14
Trend	1,009,189	51,747		<0.001		<0.001	996,921	50,963		0.001
Continuous (per 10 mg/L)	1,009,189	51,747	1.01 (1.00, 1.03)	0.04	1.01 (1.00, 1.03)	0.04	996,921	50,963	1.01 (1.00, 1.02)	0.08

Note: OR = odds ratio; CI = confidence interval; SES = socioeconomic status.

Models were fitted using logistic regression with generalized estimating equations in order to control for the non-independence of births from the same mother.

a. Main model: controlled for calendar year, sex, gravidity, urbanicity, and maternal age, smoking, education, income, and employment status.

b. Paternal SES indicators: education, income and employment status

Table S5. Adjusted odds of preterm birth and preterm birth sub-categories given pregnancy concentrations of nitrate in drinking water including *n*=74,067 post-term births through 44 weeks in the referent category.

		Mean pregnancy nitrate exposure (mg/L)					
Category of birth		≤2	>2–5	>5–25	>25	Trend	Continuous (per 10 mg/L)
All preterm	Total (*n*)	566,853	341,607	134,729	40,067	1,083,256	1,083,256
(140–258 days)	Cases (*n*)	26,616	16,547	6,579	2,005	51,747	51,747
	OR (95% CI)	Ref (1)	1.03 (1.01, 1.05)	1.04 (1.01, 1.07)	1.05 (1.00, 1.10)		1.01 (1.00, 1.03)
	P value		0.005	0.01	0.05	<0.001	0.04
Extremely preterm	Total (*n*)	566,853	341,607	134,729	40,067	1,083,256	
(140–195 days)	Cases (*n*)	1,094	690	263	70	2,117	2,117
	OR (95% CI)	Ref (1)	1.03 (0.93, 1.14)	1.06 (0.92, 1.21)	0.93 (0.72, 1.20)		1.01 (0.94, 1.07)
	P value		0.54	0.41	0.56	0.72	0.86
Very preterm	Total (*n*)	565,759	340,917	134,466	39,997	1,081,139	1,081,139
(196–223 days)	Cases (*n*)	2,642	1,581	670	201	5,094	5,094
	OR (95% CI)	Ref (1)	1.00 (0.94, 1.07)	1.05 (0.96, 1.15)	1.03 (0.89, 1.19)		1.01 (0.97, 1.05)
	P value		0.90	0.28	0.71	0.36	0.72
Moderate preterm	Total (*n*)	563,117	339,336	133,796	39,796	1,076,045	1,076,045
(224–258 days)	Cases (*n*)	22,880	14,276	5,646	1,734	44,536	44,536
	OR (95% CI)	Ref (1)	1.03 (1.01, 1.06)	1.04 (1.01, 1.07)	1.06 (1.01, 1.12)		1.02 (1.00, 1.03)
	P value		0.003	0.01	0.03	<0.001	0.03

Note: OR = odds ratio; CI = confidence interval. Models were fitted using logistic regression with generalized estimating equations in order to control for the non-independence of births from the same mother and were controlled for calendar year, sex, gravidity, urbanicity, and maternal age, smoking, education, income, and employment status.

Table S6. Comparison of results for preterm birth with and without restricting analyses to children whose mothers pregnancy average nitrate exposure was ≤ 50 mg/L.

	Full Cohort				Restricted Cohort ≤ 50 mg/L			
Nitrate (mg/L)	Total (*n*)	Cases (*n*)	OR (95% CI)	*P* value	Total (*n*)	Cases (n)	OR (95% CI)	*P* value
≤2	529,172	26,616	Ref (1)		502,556	26,616	Ref (1)	
>2–5	318,135	16,547	1.03 (1.01, 1.06)	0.002	301,588	16,547	1.03(1.01,1.06)	0.002
>5–25	124,602	6,579	1.04 (1.01, 1.07)	0.01	118,023	6,579	1.04(1.01,1.07)	0.006
>25	37,280	2,005	1.05 (1.00, 1.10)	0.06	35,275	2,005	1.06(1.01,1.11)	0.03
Trend	1,009,189	51,747		0.001	957,422	51,747		0.001
Continuous (per 10 mg/L)	1,009,189	51,747	1.01 (1.00, 1.03)	0.04	957,422	51,747	1.02(1.01,1.04)	0.009

Note:; OR = odds ratio; CI = confidence interval.

Models were fitted using logistic regression with generalized estimating equations in order to control for the non-independence of births from the same mother and were controlled for calendar year, sex, gravidity, urbanicity, and maternal age, smoking, education, income, and employment status.