

Online bijlage

Een kansrijke start voor alle kinderen: een populatie-perspectief

Ongelijkheid in geboorte-uitkomsten in Nederland op basis van landelijke registratiedata

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Dutch educational levels

Educational level is categorized by Statistics Netherlands into 18 ordinal levels according to the Dutch Standard Classification of Education (SOI). For years 2016 to 2018, this is according to the SOI 2016; for year 2019, this is according to SOI 2021. From lowest educational level to highest, these are (using original Dutch terms and abbreviations): [1] “Basisonderwijs groep 1-2”, [2] “Basisonderwijs groep 3-8”, [3] “Praktijkonderwijs”, [4] “Vmbo-b/k”, [5] “Mbo1”, [6] “Vmbo-g/t”, [7] “Havo-, vwo-onderbouw”, [8] “Mbo2”, [9] “Mbo3”, [10] “Mbo4”, [11] “Havo-bovenbouw”, [12] “Vwo-bovenbouw”, [13] “Hbo-associate degree”, [14] “Hbo-bachelor”, [15] “Wo-bachelor”, [16] “Hbo-master”, [17] “Wo-master”, [18] “Doctor”. The aggregation of these 18 levels into the 5 levels used for this study was performed in the following manner (with the International Standard Classification of Education (ISCED) 2011 levels given in brackets):

1. “Basisonderwijs” (primary education) = SOI levels 1-2 (ISCED 2011 levels 0-1),
2. “Vmbo, havo-, vwo-onderbouw, mbo1” (lower secondary education) = SOI levels 3-7 (ISCED Lower secondary education),
3. “Havo, vwo, mbo” (higher secondary education) = SOI levels 8-12 (ISCED levels 3-4),
4. “Hbo-, wo-bachelor” (bachelor’s degree) = SOI levels 13-15 (ISCED levels 5-6),
5. “Hbo-, wo-master, doctor” (master’s degree or higher) = SOI levels 16-18 (ISCED levels 7-8).

More detailed information is described here

<https://www.cbs.nl/nl-nl/onze-diensten/methoden/begrippen/onderwijsniveau-soi-2016> and here

<https://www.cbs.nl/nl-nl/onze-diensten/methoden/begrippen/onderwijsniveau-soi-2021>.

Handling missing data

Missing information on maternal education was imputed using covariables from Statistics Netherlands that have previously been demonstrated to be predictive of educational level (59). In addition to the adverse birth outcomes, the following covariables with respect to the mother were used: age (<24 years, 24-30 years, >30 years), parity (0, 1, >1), year (2016, 2017, 2018, 2019), Dutch province (Drenthe, Gelderland, Groningen, Flevoland, Friesland, Limburg, Noord-Brabant, Noord-Holland, Overijssel, Utrecht, Zeeland, Zuid-Holland), country of birth (Netherlands, other Europe, Turkey, Morocco, Suriname, Dutch Caribbean, Indonesia, other Africa, other Asia, other America and Oceania), parental country of birth (both parents born in the Netherlands, one parent born in the Netherlands, neither parent born in the Netherlands), at least six months’ health insurance debt in current or prior year (yes, no), criminal suspect in current or prior year (yes, no), occupational status (employee, director/majority shareholder, independent entrepreneur, other independent worker, receiving unemployment benefits, receiving social assistance benefits, receiving other social service benefits, receiving sickness benefits, receiving pension, school/university student with income, school/university student without income, other without income, cooperating family member). In addition, we used household income percentile ($\leq 20\%$, 21%-40%, 41%-60%, 61%-80%, $\geq 81\%$, private household with unknown income, institutional household, private student household), partner’s educational level (1-5), and living in same household with partner (yes, no) – subsequently referred to as “same household.” Note that the term “father” represents the mother’s partner; this person may not be the biological parent and could be female.

List S1: Severe congenital anomalies included in the study

- Anencephaly
- Meningocele
- Hydranencephaly
- Congenital hydrocephalus
- Holoprosencephaly
- Gyration disorders/polymicrogyria
- Other lethal or life-threatening central nervous system abnormalities
- Transposition of the great vessels
- Tetralogy of Fallot (with and without pulmonary atresia)
- Tricuspid atresia
- Hypoplastic left heart syndrome
- Complex cor vitium
- Other lethal or life-threatening congenital heart defect
- Palatoschisis
- Colon or rectal atresia
- Anus imperforatus/anorectal malformation
- Omphalocele
- Gastroschisis
- Biliary atresia
- Small intestinal atresia
- Esophageal atresia (with or without fistula)
- Other lethal or life-threatening condition of the digestive tract
- Bilateral renal agenesis
- Bilateral polycystic, multicystic, or dysplastic kidneys
- Obstructive uropathy with congenital hydronephrosis
- Bladder exstrophy
- Other lethal or life-threatening disorder of the urogenital tract
- Trisomy 13
- Trisomy 18
- Trisomy 21
- Syndromic abnormalities (severe retrognathia, Treacher Collins, CHARGE, etc.)
- Other chromosomal abnormalities
- Skeletal dysplasia
- Congenital diaphragmatic hernia
- Hydrops fetalis
- Oligohydramnios sequence with the following features: (1) Oligohydramnios determined by ultrasound 5 or more days antepartum, (2) evidence of fetal movement restriction in postnatal physical
- Dystrophia myotonica
- conjoined twins
- Tracheal resia
- CCAML (Congenital cystic adenomatoid malformation of the lung)/CPAM (Congenital pulmonary airway malformations)
- Choaneatresia
- Other lethal or life-threatening respiratory illness
- Other lethal or life-threatening congenital anomalies

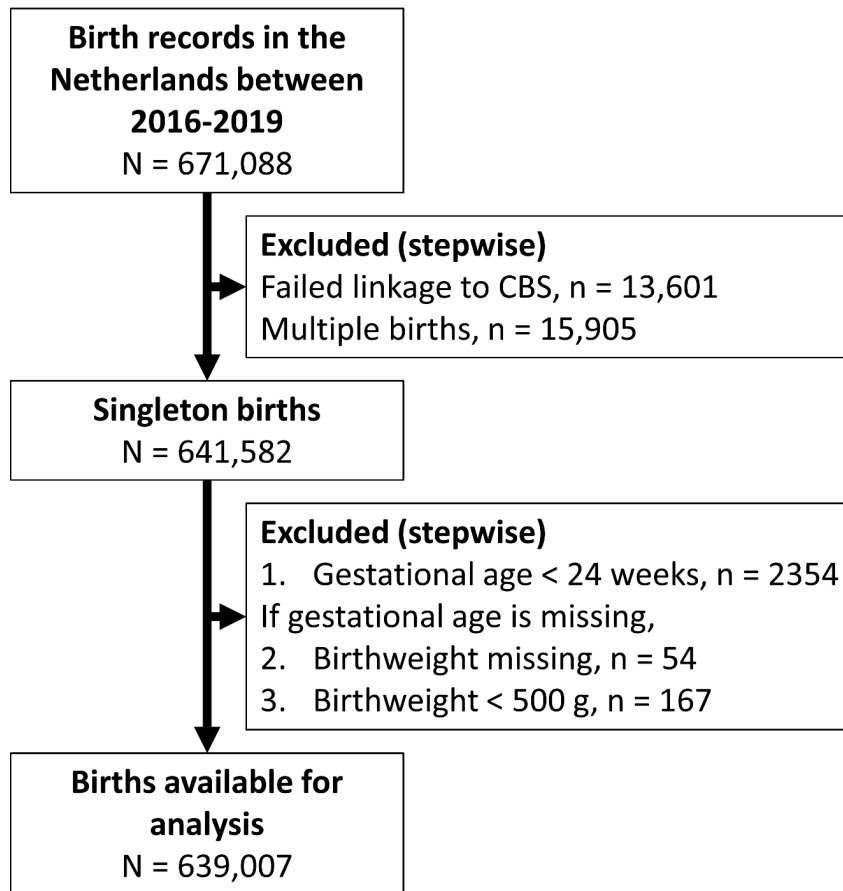


Figure S1. Participant inclusion flowchart

Table S1. Contingency table of multiple imputations accuracy for estimating maternal highest attained educational level in 10.9% of the known population

True attained education \ Estimated attained education	Primary education, n = 2639	Lower secondary education, n = 5723	Higher secondary education, n = 21369	Bachelor's degree, n = 17152	Master's degree or higher, n = 8613
Primary education, n = 2785	1422 (51.1)	559 (20.1)	555 (19.9)	172 (6.2)	77 (2.8)
Lower secondary education, n = 4884	389 (8)	2231 (45.7)	1587 (32.5)	515 (10.5)	162 (3.3)
Higher secondary education, n = 22810	586 (2.6)	2169 (9.5)	14641 (64.2)	4237 (18.6)	1177 (5.2)
Bachelor's degree, n = 15637	160 (1)	530 (3.4)	3322 (21.2)	9619 (61.5)	2006 (12.8)
Master's degree or higher, n = 9380	82 (0.9)	234 (2.5)	1264 (13.5)	2609 (27.8)	5191 (55.3)

The accuracy of multiple imputations for educational attainment – the variable with most missing values – was calculated by performing multiple imputations on a dataset of participants with known educational levels. This was done by assigning a percentage of the known educational levels as missing at random (equivalent to the actual proportion of missings) and reporting the proportion of correctly imputed values. In the table, the values given are the frequencies with column percentages given in brackets. The values in the left diagonal boxes were correctly estimated. The values in brackets are row percentages. Accuracy (correctly estimated values / total population) = 59.7%.

Table S2. Covariable demographic characteristics and outcomes for one imputed dataset stratified by maternal education

Variable	Total population, n = 639,007	Primary education, n = 35981 (5.6%), imputed = 11748 (32.7%)	Lower secondary education, n = 58298 (9.1%), imputed = 10365 (17.8%)	Higher secondary education, n = 250914 (39.3%), imputed = 21639 (8.6%)	Bachelor's degree, n = 177534 (27.8%), imputed = 15,321 (8.6%)	Master's or higher, n = 116280 (18.2%), imputed = 10719 (9.2%)
Year						
2016	163339 (25.6)	9543 (26.5)	15676 (26.9)	63748 (25.4)	44997 (25.3)	29375 (25.3)
2017	160405 (25.1)	9055 (25.2)	14932 (25.6)	63171 (25.2)	44469 (25.0)	28778 (24.7)
2018	156623 (24.5)	8960 (24.9)	14109 (24.2)	61268 (24.4)	43524 (24.5)	28762 (24.7)
2019	158640 (24.8)	8423 (23.4)	13581 (23.3)	62727 (25.0)	44544 (25.1)	29365 (25.3)
Age, missing = 135 (0.02%)						
≤24 years	38758 (6.1)	5727 (15.9)	11254 (19.3)	20021 (8.0)	1526 (0.9)	230 (0.2)
25-30 years	265624 (41.6)	12001 (33.4)	24264 (41.6)	132903 (53.0)	69050 (38.9)	27406 (23.6)
≥31 years	334625 (52.4)	18253 (50.7)	22780 (39.1)	97990 (39.1)	106958 (60.2)	88644 (76.2)
Parity, missing = 2848 (0.4%)						
0	280103 (43.8)	10841 (30.1)	22398 (38.4)	112095 (44.7)	80507 (45.3)	54262 (46.7)
1	231307 (36.2)	10126 (28.1)	19286 (33.1)	90430 (36.0)	67454 (38.0)	44011 (37.8)
≥2	127597 (20.0)	15014 (41.7)	16614 (28.5)	48389 (19.3)	29573 (16.7)	18007 (15.5)
Province, imputed = 28484 (4.5%)						
Drenthe	16387 (2.6)	766 (2.1)	1443 (2.5)	7607 (3.0)	4670 (2.6)	1901 (1.6)
Flevoland	18579 (2.9)	1131 (3.1)	2257 (3.9)	9032 (3.6)	4636 (2.6)	1523 (1.3)
Friesland	21244 (3.3)	913 (2.5)	1759 (3.0)	9798 (3.9)	6605 (3.7)	2169 (1.9)
Gelderland	76321 (11.9)	3405 (9.5)	6529 (11.2)	32896 (13.1)	21552 (12.1)	11939 (10.3)
Groningen	13586 (2.1)	782 (2.2)	1208 (2.1)	5159 (2.1)	3625 (2.0)	2812 (2.4)
Limburg	33715 (5.3)	2170 (6.0)	3575 (6.1)	13804 (5.5)	9174 (5.2)	4992 (4.3)

Table S2. Vervolg

Variable	Total population, n = 639,007	Primary education, n = 35981 (5.6%), imputed = 11748 (32.7%)	Lower secondary education, n = 58298 (9.1%), imputed = 10365 (17.8%)	Higher secondary education, n = 250914 (39.3%), imputed = 21639 (8.6%)	Bachelor's degree, n = 177534 (27.8%), imputed = 15,321 (8.6%)	Master's or higher, n = 116280 (18.2%), imputed = 10719 (9.2%)
Noord Brabant	83502 (13.1)	4925 (13.7)	7690 (13.2)	31903 (12.7)	24770 (14.0)	14214 (12.2)
Noord Holland	110913 (17.4)	6571 (18.3)	9417 (16.2)	37039 (14.8)	30406 (17.1)	27480 (23.6)
Overijssel	45221 (7.1)	1680 (4.7)	3463 (5.9)	19695 (7.8)	14241 (8.0)	6142 (5.3)
Utrecht	56470 (8.8)	2415 (6.7)	4088 (7.0)	17744 (7.1)	16013 (9.0)	16210 (13.9)
Zeeland	12552 (2.0)	651 (1.8)	1356 (2.3)	6290 (2.5)	3247 (1.8)	1008 (0.9)
Zuid Holland	150517 (23.6)	10572 (29.4)	15513 (26.6)	59947 (23.9)	38595 (21.7)	25890 (22.3)
Mother's migration background, imputed = 22 (<0.01%)						
Dutch with one foreign parent	124869 (19.5)	28618 (79.5)	18533 (31.8)	39760 (15.8)	20419 (11.5)	17539 (15.1)
Born in other country	79186 (12.4)	1795 (5.0)	8888 (15.2)	36834 (14.7)	19852 (11.2)	11817 (10.2)
Mother's parents' nationalities, imputed = 22 (<0.01%)						
One parent Dutch	36036 (5.6)	692 (1.9)	3578 (6.1)	13668 (5.4)	10058 (5.7)	8040 (6.9)
Neither parent Dutch	168019 (26.3)	29721 (82.6)	23843 (40.9)	62926 (25.1)	30213 (17.0)	21316 (18.3)
Mother's country of birth, imputed = 22 (<0.01%)						
Netherlands	508979 (79.7)	7297 (20.3)	39404 (67.6)	209405 (83.5)	155623 (87.7)	97250 (83.6)
Other European	41241 (6.5)	6542 (18.2)	5016 (8.6)	12132 (4.8)	8046 (4.5)	9505 (8.2)
Turkey	8672 (1.4)	2270 (6.3)	1585 (2.7)	3334 (1.3)	1029 (0.6)	454 (0.4)
Morocco	12556 (2.0)	3088 (8.6)	2394 (4.1)	4996 (2.0)	1621 (0.9)	457 (0.4)
Suriname	4690 (0.7)	227 (0.6)	735 (1.3)	2310 (0.9)	907 (0.5)	511 (0.4)
Dutch Caribbean	4764 (0.7)	235 (0.7)	923 (1.6)	2449 (1.0)	740 (0.4)	417 (0.4)
Indonesia	1684 (0.3)	162 (0.5)	174 (0.3)	537 (0.2)	454 (0.3)	357 (0.3)
Other African	16314 (2.6)	7117 (19.8)	2536 (4.4)	4266 (1.7)	1390 (0.8)	1005 (0.9)
Other Asian	32092 (5.0)	8436 (23.4)	4586 (7.9)	8937 (3.6)	5832 (3.3)	4301 (3.7)
American or Oceanian	8015 (1.3)	607 (1.7)	945 (1.6)	2548 (1.0)	1892 (1.1)	2023 (1.7)
Mother with insurance debt, yes, imputed = 22 (<0.01%)	18599 (2.9)	2197 (6.1)	6346 (10.9)	9084 (3.6)	798 (0.4)	174 (0.1)
Mother was a criminal suspect, yes, imputed = 22 (<0.01%)	6792 (1.1)	1129 (3.1)	2099 (3.6)	2958 (1.2)	461 (0.3)	145 (0.1)
Mother's social economic category, imputed = 1282 (0.2%)						
Employee	396294 (62.0)	4050 (11.3)	16403 (28.1)	148380 (59.1)	135538 (76.3)	91923 (79.1)
Director/majority shareholder	2024 (0.3)	24 (0.1)	109 (0.2)	498 (0.2)	675 (0.4)	718 (0.6)
Independent entrepreneur	23751 (3.7)	526 (1.5)	1170 (2.0)	7659 (3.1)	7319 (4.1)	7077 (6.1)
Other independent worker	4644 (0.7)	194 (0.5)	570 (1.0)	2333 (0.9)	1040 (0.6)	507 (0.4)
Receiving social assistance benefits	786 (0.1)	48 (0.1)	120 (0.2)	375 (0.1)	157 (0.1)	86 (0.1)
Receiving other social service benefits	35681 (5.6)	13133 (36.5)	9035 (15.5)	11447 (4.6)	1588 (0.9)	478 (0.4)

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Receiving unemployment benefits	27549 (4.3)	2777 (7.7)	5558 (9.5)	11326 (4.5)	5093 (2.9)	2795 (2.4)
Receiving sickness benefits	68489 (10.7)	3822 (10.6)	8668 (14.9)	35038 (14.0)	14489 (8.2)	6472 (5.6)
Receiving pension	185 (0.0)	32 (0.1)	27 (0.0)	79 (0.0)	36 (0.0)	11 (0.0)
Preschooler/student with income	8291 (1.3)	322 (0.9)	2474 (4.2)	4841 (1.9)	527 (0.3)	127 (0.1)
Preschooler/student without income	2563 (0.4)	432 (1.2)	508 (0.9)	1054 (0.4)	429 (0.2)	140 (0.1)
Other without income	66018 (10.3)	10457 (29.1)	13213 (22.7)	26363 (10.5)	10176 (5.7)	5809 (5.0)
Cooperating family member	2732 (0.4)	164 (0.5)	443 (0.8)	1521 (0.6)	467 (0.3)	137 (0.1)
Household income percentile, imputed = 10222 (1.6%)						
<21 st percentile	106031 (16.6)	22834 (63.5)	24564 (42.1)	44972 (17.9)	10040 (5.7)	3621 (3.1)
21 st -40 th percentile	76551 (12.0)	5140 (14.3)	11608 (19.9)	41796 (16.7)	13216 (7.4)	4791 (4.1)
41 st -60 th percentile	113826 (17.8)	3118 (8.7)	9591 (16.5)	60556 (24.1)	30212 (17.0)	10349 (8.9)
61 st -80 th percentile	156395 (24.5)	1796 (5.0)	6585 (11.3)	64163 (25.6)	57560 (32.4)	26291 (22.6)
>80 th percentile	177314 (27.7)	1058 (2.9)	3676 (6.3)	36184 (14.4)	65642 (37.0)	70754 (60.8)
Private household with unknown income	3388 (0.5)	634 (1.8)	716 (1.2)	1221 (0.5)	482 (0.3)	335 (0.3)
Institutional household	2803 (0.4)	1210 (3.4)	754 (1.3)	540 (0.2)	205 (0.1)	94 (0.1)
Private student household	2699 (0.4)	191 (0.5)	804 (1.4)	1482 (0.6)	177 (0.1)	45 (0.0)
Mother in same household as infant's father, yes, missing = 43845 (6.9%)*	526718 (88.5)	22729 (80.2)	36500 (74.6)	200839 (86.2)	160244 (93.1)	106406 (94.2)
Father's educational level, missing = 119651 (18.7%)*						
Primary education	25816 (5.0)	8709 (39.8)	5430 (12.9)	8839 (4.4)	2170 (1.4)	668 (0.7)
Lower secondary education	51063 (9.8)	4537 (20.7)	10150 (24.0)	26611 (13.2)	7583 (5.0)	2182 (2.1)
Higher secondary education	219194 (42.2)	6501 (29.7)	21421 (50.7)	117573 (58.3)	55437 (36.6)	18262 (17.9)
Bachelor's degree	136126 (26.2)	1438 (6.6)	3953 (9.4)	37559 (18.6)	59617 (39.3)	33559 (32.9)
Master's or higher	87157 (16.8)	724 (3.3)	1299 (3.1)	10935 (5.4)	26830 (17.7)	47369 (46.4)
Vital outcome, imputed = 27 (<0.01%)						
Antepartum stillbirths	1354 (0.21)	144 (0.40)	179 (0.31)	540 (0.22)	332 (0.19)	159 (0.14)
Intrapartum stillbirths	244 (0.04)	28 (0.08)	33 (0.06)	95 (0.04)	58 (0.03)	30 (0.03)
Early neonatal death	998 (0.16)	96 (0.27)	100 (0.17)	439 (0.18)	224 (0.13)	139 (0.12)
Late neonatal death	229 (0.04)	17 (0.05)	33 (0.06)	109 (0.04)	46 (0.03)	24 (0.02)
Gestational age, imputed = 3662 (0.6%)						
Extremely preterm	1792 (0.28)	130 (0.36)	229 (0.39)	802 (0.32)	396 (0.22)	235 (0.20)
Very preterm	3475 (0.55)	239 (0.67)	409 (0.70)	1530 (0.61)	838 (0.47)	459 (0.40)
Moderate/late preterm	28166 (4.42)	1709 (4.77)	3224 (5.55)	11772 (4.70)	7175 (4.05)	4286 (3.69)
Postterm	8699 (1.36)	586 (1.64)	542 (0.93)	2727 (1.09)	2686 (1.52)	2158 (1.86)

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Hoftiezer percentile, imputed = 9014 (1.4%)						
0-10% (small-for-gestational-age)	62329 (9.8)	5243 (14.6)	7809 (13.4)	25381 (10.1)	14362 (8.1)	9534 (8.2)
90-100% (large-for-gestational-age)	64961 (10.2)	2637 (7.4)	4981 (8.6)	25858 (10.3)	19663 (11.1)	11822 (10.2)
5-minute Apgar score, imputed = 1074 (0.2%)						
0-3	3334 (0.52)	308 (0.86)	381 (0.66)	1346 (0.54)	830 (0.47)	469 (0.40)
4-6	8640 (1.36)	658 (1.84)	906 (1.56)	3531 (1.41)	2228 (1.26)	1317 (1.13)
NICU admission, imputed = 3662 (0.6%)						
Gestational age <32 weeks	4153 (0.65)	275 (0.77)	507 (0.87)	1855 (0.74)	970 (0.55)	546 (0.47)
Gestational age ≥32 weeks	8602 (1.35)	610 (1.70)	910 (1.57)	3457 (1.38)	2201 (1.24)	1424 (1.23)
Severe congenital anomaly	2978 (0.47)	256 (0.71)	289 (0.50)	1196 (0.48)	771 (0.44)	466 (0.40)

All variables are reported as frequencies with percentages in brackets. The frequencies of imputed values are given below each variable name.

*Variable was not imputed, so the percentages are out of the cases which were not missing.

Table S3. Composite outcome and vital outcome rates stratified by future maternal education (2016-2017)

Outcome	Composite outcomes			Vital outcomes					
Outcome (sub)group	Any adverse outcome, % births	Any adverse outcome, % live births	Big 4 outcome, % live births	Stillbirths, /1000 births	Antepartum stillbirths, /1000 births	Intrapartum stillbirths, /1000 births	Total neonatal deaths, /1000 live births	Early neonatal deaths, /1000 live births	Late neonatal deaths, /1000 live births
Total population rate	15.78 (15.65 to 15.91)	15.57 (15.44 to 15.70)	15.09 (14.96 to 15.22)	2.46 (2.29 to 2.63)	2.09 (1.93 to 2.25)	0.36 (0.29 to 0.43)	1.89 (1.74 to 2.04)	1.53 (1.39 to 1.67)	0.36 (0.29 to 0.43)
Maternal education									
Primary education, rate	21.39 (20.80 to 21.98)	20.93 (20.35 to 21.51)	20.39 (19.81 to 20.97)	5.84 (4.74 to 6.94)	4.71 (3.73 to 5.69)	1.13 (0.65 to 1.61)	2.94 (2.16 to 3.72)	2.40 (1.70 to 3.10)	0.53 (0.20 to 0.86)
Lower secondary, rate	20.63 (20.01 to 21.25)	20.39 (19.78 to 21.00)	19.83 (19.22 to 20.44)	2.97 (2.14 to 3.80)	2.63 (1.85 to 3.41)	0.34 (0.06 to 0.62)	2.15 (1.44 to 2.86)	1.58 (0.97 to 2.19)	0.56 (0.20 to 0.92)
Higher secondary, rate	16.67 (16.46 to 16.88)	16.45 (16.25 to 16.65)	15.99 (15.79 to 16.19)	2.61 (2.33 to 2.89)	2.22 (1.96 to 2.48)	0.39 (0.28 to 0.50)	2.12 (1.87 to 2.37)	1.71 (1.48 to 1.94)	0.41 (0.30 to 0.52)
Bachelor's, rate	13.89 (13.66 to 14.12)	13.71 (13.48 to 13.94)	13.23 (13.01 to 13.45)	2.12 (1.82 to 2.42)	1.76 (1.49 to 2.03)	0.36 (0.24 to 0.48)	1.58 (1.32 to 1.84)	1.31 (1.07 to 1.55)	0.27 (0.16 to 0.38)
Master's or higher, rate (ref.)	13.42 (13.14 to 13.70)	13.28 (13.00 to 13.56)	12.79 (12.52 to 13.06)	1.63 (1.30 to 1.96)	1.47 (1.16 to 1.78)	0.16 (0.06 to 0.26)	1.51 (1.19 to 1.83)	1.25 (0.96 to 1.54)	0.25 (0.12 to 0.38)
Rate difference	7.97 (7.32 to 8.62)	7.65 (7.00 to 8.30)	7.60 (6.96 to 8.24)	4.21 (3.07 to 5.35)	3.24 (2.21 to 4.27)	0.97 (0.48 to 1.46)	1.43 (0.59 to 2.27)	1.15 (0.39 to 1.91)	0.28 (-0.07 to 0.63)
Rate ratio	1.59 (1.54 to 1.64)	1.58 (1.53 to 1.63)	1.59 (1.53 to 1.65)	3.59 (2.60 to 4.58)	3.20 (2.25 to 4.15)	7.20 (1.64 to 12.76)	1.95 (1.29 to 2.61)	1.91 (1.20 to 2.62)	2.13 (0.41 to 3.85)
Crude results									
PAR	2.36 (2.05 to 2.67)	2.29 (1.99 to 2.59)	2.30 (2.00 to 2.60)	0.83 (0.46 to 1.20)	0.62 (0.27 to 0.97)	0.21 (0.09 to 0.33)	0.38 (0.03 to 0.73)	0.28 (-0.04 to 0.60)	0.11 (-0.03 to 0.25)
PAF, %	14.9 (13.0 to 16.9)	14.7 (12.8 to 16.7)	15.2 (13.3 to 17.2)	33.7 (18.4 to 49.0)	29.6 (12.7 to 46.5)	57.0 (22.1 to 92.0)	20.2 (1.5 to 38.9)	18.0 (-2.5 to 38.5)	29.6 (-9.7 to 68.8)
Annual attributable cases	3817 (3321 to 4313)	3701 (3208 to 4194)	3713 (3228 to 4198)	134 (73 to 195)	100 (42 to 158)	34 (12 to 56)	61 (4 to 118)	44 (-6 to 94)	17 (-6 to 40)
Adjusted results									
PAR	2.96 (2.65 to 3.27)	2.90 (2.60 to 3.20)	2.88 (2.58 to 3.18)	0.87 (0.50 to 1.24)	0.65 (0.30 to 1.00)	0.22 (0.10 to 0.34)	0.37 (0.02 to 0.72)	0.26 (-0.06 to 0.58)	0.11 (-0.03 to 0.25)
PAF, %	18.8 (16.8 to 20.7)	18.6 (16.6 to 20.6)	19.1 (17.1 to 21.1)	35.3 (20.0 to 50.6)	31.2 (14.2 to 48.1)	59.1 (24.4 to 93.8)	19.5 (1.0 to 38.1)	16.9 (-3.9 to 37.7)	30.9 (-10.2 to 71.9)
Annual attributable cases	4799 (4301 to 5297)	4677 (4184 to 5171)	4654 (4167 to 5141)	140 (79 to 201)	105 (47 to 163)	35 (13 to 57)	59 (3 to 115)	42 (-10 to 94)	18 (-6 to 42)

The values provided are pooled means across all imputed datasets, with the pooled 95% confidence intervals given in brackets. Rate difference: rate in lowest education group minus rate in highest education group. Rate ratio: rate in lowest education group divided by rate in highest education group. Adjusted results are adjusted for age and parity. The Big 4 outcomes are preterm birth, small-for-gestational-age, Apgar <7, and severe congenital anomaly. PAF = population attributable fraction; PAR = population attributable risk.

Table S4. Preterm birth and small-for-gestational-age rates stratified by future maternal education (2016-2017)

Outcome	Preterm births				Small-for-gestational age
Outcome (sub)group	Total PTBs (<37 weeks), %	Extremely PTBs (<28 weeks), %	Very PTBs (28-32 weeks), %	Moderate/late PTBs (33-36 weeks), %	Hoftiezer percentile <10, %
Total population rate	5.15 (5.07 to 5.23)	0.22 (0.20 to 0.24)	0.52 (0.49 to 0.55)	4.42 (4.35 to 4.49)	9.70 (9.60 to 9.80)
<i>Maternal education</i>					
Primary education, rate	5.85 (5.51 to 6.19)	0.29 (0.21 to 0.37)	0.57 (0.46 to 0.68)	4.98 (4.67 to 5.29)	14.43 (13.92 to 14.94)
Lower secondary, rate	6.47 (6.09 to 6.85)	0.27 (0.19 to 0.35)	0.72 (0.59 to 0.85)	5.48 (5.13 to 5.83)	13.64 (13.12 to 14.16)
Higher secondary, rate	5.55 (5.42 to 5.68)	0.26 (0.23 to 0.29)	0.58 (0.54 to 0.62)	4.71 (4.59 to 4.83)	10.29 (10.12 to 10.46)
Bachelor's, rate	4.70 (4.56 to 4.84)	0.17 (0.14 to 0.20)	0.44 (0.40 to 0.48)	4.09 (3.96 to 4.22)	8.12 (7.94 to 8.30)
Master's, rate (ref.)	4.31 (4.14 to 4.48)	0.15 (0.12 to 0.18)	0.41 (0.36 to 0.46)	3.75 (3.60 to 3.90)	8.08 (7.86 to 8.30)
Rate difference	1.54 (1.16 to 1.92)	0.14 (0.06 to 0.22)	0.17 (0.05 to 0.29)	1.24 (0.89 to 1.59)	6.34 (5.79 to 6.89)
Rate ratio	1.36 (1.27 to 1.45)	1.89 (1.25 to 2.53)	1.41 (1.09 to 1.73)	1.33 (1.23 to 1.43)	1.78 (1.70 to 1.86)
<i>Crude results</i>					
PAR	0.85 (0.67 to 1.03)	0.06 (0.02 to 0.10)	0.11 (0.05 to 0.17)	0.67 (0.50 to 0.84)	1.62 (1.38 to 1.86)
PAF, %	16.4 (12.9 to 20.0)	29.8 (12.0 to 47.6)	21.7 (10.3 to 33.2)	15.2 (11.3 to 19.0)	16.7 (14.2 to 19.2)
Annual attributable cases	1367 (1072 to 1662)	105 (42 to 168)	182 (86 to 278)	1080 (804 to 1356)	2615 (2218 to 3012)
<i>Adjusted results</i>					
PAR	0.99 (0.81 to 1.17)	0.06 (0.02 to 0.10)	0.14 (0.08 to 0.20)	0.79 (0.62 to 0.96)	2.03 (1.79 to 2.27)
PAF, %	19.2 (15.7 to 22.8)	29.8 (12.0 to 47.6)	26.8 (15.6 to 37.9)	17.8 (14.0 to 21.7)	21.0 (18.4 to 23.5)
Annual attributable cases	1599 (1302 to 1896)	104 (41 to 167)	224 (130 to 318)	1271 (995 to 1547)	3284 (2885 to 3683)

The values provided are pooled means across all imputed datasets, with the pooled 95% confidence intervals given in brackets. Rate difference: rate in lowest education group minus rate in highest education group. Rate ratio: rate in lowest education group divided by rate in highest education group. All rates are reported as the proportion of live births. Adjusted results are adjusted for age and parity. PAF = population attributable fraction; PAR = population attributable risk; PTB = preterm birth.

Table S5. Apgar score <7, NICU admission, and severe congenital disease rates stratified by future maternal education (2016-2017)

Outcome	5-minute Apgar score			NICU admissions		Severe congenital diseases	
Outcome (sub)group	Total Apgar scores <7, %	Apgar scores 0-3, %	Apgar scores 4-6, %	Total NICU admissions, %	<32 weeks NICU admissions, %	≥32 weeks NICU admission, %	Severe congenital diseases, /1000
Total population rate	1.58 (1.54 to 1.62)	0.28 (0.26 to 0.30)	1.30 (1.26 to 1.34)	1.98 (1.93 to 2.03)	0.64 (0.61 to 0.67)	1.34 (1.30 to 1.38)	3.62 (3.41 to 3.83)
<i>Maternal education</i>							
Primary education, rate	2.32 (2.10 to 2.54)	0.43 (0.34 to 0.52)	1.88 (1.68 to 2.08)	2.44 (2.22 to 2.66)	0.75 (0.63 to 0.87)	1.68 (1.50 to 1.86)	5.34 (4.29 to 6.39)
Lower secondary, rate	1.84 (1.63 to 2.05)	0.31 (0.23 to 0.39)	1.53 (1.34 to 1.72)	2.57 (2.33 to 2.81)	0.87 (0.73 to 1.01)	1.70 (1.50 to 1.90)	4.10 (3.12 to 5.08)
Higher secondary, rate	1.64 (1.57 to 1.71)	0.29 (0.26 to 0.32)	1.36 (1.30 to 1.42)	2.08 (2.00 to 2.16)	0.75 (0.70 to 0.80)	1.34 (1.28 to 1.40)	3.73 (3.39 to 4.07)
Bachelor's, rate	1.47 (1.39 to 1.55)	0.24 (0.21 to 0.27)	1.23 (1.16 to 1.30)	1.79 (1.70 to 1.88)	0.53 (0.48 to 0.58)	1.26 (1.19 to 1.33)	3.45 (3.07 to 3.83)
Master's or higher, rate (ref.)	1.32 (1.23 to 1.41)	0.26 (0.22 to 0.30)	1.06 (0.98 to 1.14)	1.72 (1.61 to 1.83)	0.48 (0.42 to 0.54)	1.24 (1.15 to 1.33)	3.03 (2.58 to 3.48)
Rate difference	0.99 (0.75 to 1.23)	0.17 (0.07 to 0.27)	0.82 (0.61 to 1.03)	0.72 (0.47 to 0.97)	0.28 (0.14 to 0.42)	0.44 (0.23 to 0.65)	2.31 (1.17 to 3.45)
Rate ratio	1.75 (1.55 to 1.95)	1.67 (1.22 to 2.12)	1.77 (1.54 to 2.00)	1.42 (1.26 to 1.58)	1.58 (1.26 to 1.90)	1.35 (1.17 to 1.53)	1.76 (1.33 to 2.19)
<i>Crude results</i>							
PAR	0.26 (0.16 to 0.36)	0.02 (-0.03 to 0.07)	0.24 (0.15 to 0.33)	0.27 (0.15 to 0.39)	0.16 (0.10 to 0.22)	0.10 (0.00 to 0.20)	0.59 (0.10 to 1.08)
PAF, %	16.2 (9.8 to 22.7)	6.2 (-7.9 to 20.2)	18.4 (11.3 to 25.5)	13.4 (7.6 to 19.1)	25.7 (15.6 to 35.9)	7.5 (0.1 to 14.8)	16.3 (2.6 to 30.0)
Annual attributable cases	415 (250 to 580)	28 (-36 to 92)	387 (237 to 537)	428 (243 to 613)	266 (160 to 372)	162 (2 to 322)	95 (15 to 175)
<i>Adjusted results</i>							
PAR	0.35 (0.25 to 0.45)	0.03 (-0.02 to 0.08)	0.31 (0.22 to 0.40)	0.38 (0.26 to 0.50)	0.19 (0.13 to 0.25)	0.19 (0.09 to 0.29)	0.83 (0.34 to 1.32)
PAF, %	21.9 (15.5 to 28.4)	11.5 (-5.9 to 29.0)	24.1 (16.9 to 31.4)	19.0 (13.1 to 24.8)	29.4 (19.6 to 39.2)	14.0 (6.7 to 21.3)	22.9 (9.2 to 36.6)
Annual attributable cases	560 (394 to 726)	52 (-27 to 131)	508 (355 to 661)	608 (420 to 796)	304 (202 to 406)	303 (145 to 461)	134 (53 to 215)

The values provided are pooled means across all imputed datasets, with the pooled 95% confidence intervals given in brackets. Rate difference: rate in lowest education group minus rate in highest education group. Rate ratio: rate in lowest education group divided by rate in highest education group. All rates are reported as the proportion of live births. Adjusted results are adjusted for age and parity. NICU = neonatal intensive care unit; PAF = population attributable fraction; PAR = population attributable risk.

Table S6. Composite outcome and vital outcome rates stratified by maternal education in the unimputed dataset

Outcome	Composite outcomes			Vital outcomes			Intrapartum stillbirths, /1000 births	Total neonatal deaths, /1000 live births	Early neonatal deaths, /1000 live births	Late neonatal deaths, /1000 live births
Outcome (sub)group	Any adverse outcome, % births	Any adverse outcome, % live births	Big 4 outcome, % live births	Stillbirths, /1000 births	Antepartum stillbirths, /1000 births	Stillbirths, /1000 births				
Total population rate										
Maternal education										
Primary education, rate	15.58 (15.49 to 15.67)	15.38 (15.29 to 15.47)	14.91 (14.82 to 15.00)	2.40 (2.27 to 2.53)	2.03 (1.91 to 2.15)	0.37 (0.32 to 0.42)	1.87 (1.76 to 1.98)	1.49 (1.39 to 1.59)	0.38 (0.33 to 0.43)	
Lower secondary, rate	21.04 (20.53 to 21.55)	20.65 (20.14 to 21.16)	20.08 (19.58 to 20.58)	4.81 (3.94 to 5.68)	3.94 (3.15 to 4.73)	0.87 (0.50 to 1.24)	3.46 (2.72 to 4.20)	2.75 (2.09 to 3.41)	0.71 (0.37 to 1.05)	
Higher secondary, rate	20.77 (20.41 to 21.13)	20.47 (20.11 to 20.83)	19.94 (19.58 to 20.30)	3.71 (3.17 to 4.25)	3.17 (2.67 to 3.67)	0.54 (0.33 to 0.75)	2.19 (1.77 to 2.61)	1.62 (1.26 to 1.98)	0.57 (0.36 to 0.78)	
Bachelor's, rate	16.39 (16.24 to 16.54)	16.18 (16.03 to 16.33)	15.71 (15.56 to 15.86)	2.43 (2.23 to 2.63)	2.08 (1.89 to 2.27)	0.35 (0.27 to 0.43)	2.15 (1.96 to 2.34)	1.70 (1.53 to 1.87)	0.45 (0.36 to 0.54)	
Master's or higher, rate (ref.)	13.62 (13.45 to 13.79)	13.44 (13.27 to 13.61)	13.00 (12.84 to 13.16)	2.12 (1.90 to 2.34)	1.80 (1.59 to 2.01)	0.32 (0.23 to 0.41)	1.46 (1.27 to 1.65)	1.20 (1.03 to 1.37)	0.26 (0.18 to 0.34)	
Rate difference	13.24 (13.04 to 13.44)	13.09 (12.89 to 13.29)	12.63 (12.43 to 12.83)	1.63 (1.39 to 1.87)	1.35 (1.13 to 1.57)	0.28 (0.18 to 0.38)	1.38 (1.16 to 1.60)	1.11 (0.91 to 1.31)	0.27 (0.17 to 0.37)	
Rate ratio	7.80 (7.25 to 8.35)	7.55 (7.00 to 8.10)	7.46 (6.92 to 8.00)	3.19 (2.29 to 4.09)	2.59 (1.77 to 3.41)	0.60 (0.22 to 0.98)	2.08 (1.31 to 2.85)	1.64 (0.95 to 2.33)	0.44 (0.09 to 0.79)	
Crude results										
PAR	1.59 (1.54 to 1.64)	1.58 (1.53 to 1.63)	1.59 (1.54 to 1.64)	2.96 (2.27 to 3.65)	2.92 (2.16 to 3.68)	3.16 (1.39 to 4.93)	2.50 (1.83 to 3.17)	2.47 (1.73 to 3.21)	2.66 (1.07 to 4.25)	
PAF, %	2.17 (1.94 to 2.40)	2.10 (1.88 to 2.32)	2.11 (1.89 to 2.33)	0.77 (0.50 to 1.04)	0.68 (0.43 to 0.93)	0.09 (-0.02 to 0.20)	0.49 (0.24 to 0.74)	0.37 (0.15 to 0.59)	0.12 (0.01 to 0.23)	
Annual attributable cases	13.9 (12.5 to 15.3)	13.7 (12.2 to 15.2)	14.1 (12.6 to 15.6)	32.3 (20.6 to 43.9)	33.6 (21.1 to 46.1)	24.8 (-6.4 to 56.1)	26.2 (12.7 to 39.6)	25.1 (9.8 to 40.3)	30.5 (1.9 to 59.1)	
Adjusted results										
PAR	3027 (2712 to 3342)	2935 (2621 to 3249)	2937 (2629 to 3245)	110 (70 to 150)	97 (60 to 134)	13 (-3 to 29)	69 (33 to 105)	53 (20 to 86)	17 (1 to 33)	
PAF, %	2.83 (2.60 to 3.06)	2.76 (2.54 to 2.98)	2.74 (2.52 to 2.96)	0.86 (0.59 to 1.13)	0.74 (0.49 to 0.99)	0.11 (0.00 to 0.22)	0.54 (0.29 to 0.79)	0.40 (0.18 to 0.62)	0.14 (0.03 to 0.25)	
Annual attributable cases	18.2 (16.7 to 19.6)	18.0 (16.5 to 19.4)	18.4 (16.9 to 19.8)	35.7 (24.1 to 47.2)	36.6 (24.0 to 49.1)	30.8 (-1.0 to 62.6)	28.7 (15.3 to 42.2)	26.6 (11.6 to 41.6)	37.1 (7.2 to 67.0)	
	3952 (3636 to 4268)	3848 (3534 to 4162)	3816 (3507 to 4125)	121 (81 to 161)	105 (68 to 142)	16 (-1 to 33)	76 (40 to 112)	56 (24 to 88)	20 (4 to 36)	

The results provided are from the unimputed dataset where rows where missing values were excluded in a case-wise manner. The values in brackets are the 95% confidence intervals. Rate difference: rate in lowest education group minus rate in highest education group. Rate ratio: rate in lowest education group divided by rate in highest education group. The Big 4 outcomes are preterm birth, small-for-gestational-age, Apgar <7, and severe congenital anomaly. PAF = population attributable fraction; PAR = population attributable risk.

Table S7. Preterm birth and small-for-gestational-age rates stratified by maternal education in the unimputed dataset

Outcome	Preterm births				Small-for-gestational age
Outcome (sub)group	Total PTBs (<37 weeks), %	Extremely PTBs (<28 weeks), %	Very PTBs (28-32 weeks), %	Moderate/late PTBs (33-36 weeks), %	Hofsteezer percentile <10, %
Total population rate	5.10 (5.04 to 5.16)	0.21 (0.20 to 0.22)	0.50 (0.48 to 0.52)	4.39 (4.34 to 4.44)	9.41 (9.33 to 9.49)
<i>Maternal education</i>					
Primary education, rate	5.74 (5.45 to 6.03)	0.30 (0.23 to 0.37)	0.63 (0.53 to 0.73)	4.80 (4.53 to 5.07)	14.12 (13.68 to 14.56)
Lower secondary, rate	6.67 (6.45 to 6.89)	0.31 (0.26 to 0.36)	0.69 (0.62 to 0.76)	5.67 (5.46 to 5.88)	13.43 (13.12 to 13.74)
Higher secondary, rate	5.48 (5.39 to 5.57)	0.25 (0.23 to 0.27)	0.56 (0.53 to 0.59)	4.68 (4.59 to 4.77)	9.91 (9.79 to 10.03)
Bachelor's, rate	4.62 (4.52 to 4.72)	0.17 (0.15 to 0.19)	0.44 (0.41 to 0.47)	4.01 (3.91 to 4.11)	7.81 (7.68 to 7.94)
Master's or higher, rate (ref.)	4.19 (4.07 to 4.31)	0.15 (0.13 to 0.17)	0.38 (0.34 to 0.42)	3.66 (3.55 to 3.77)	7.88 (7.72 to 8.04)
Rate difference	1.55 (1.23 to 1.87)	0.15 (0.08 to 0.22)	0.25 (0.14 to 0.36)	1.14 (0.85 to 1.43)	6.24 (5.77 to 6.71)
Rate ratio	1.37 (1.29 to 1.45)	2.04 (1.47 to 2.61)	1.67 (1.36 to 1.98)	1.31 (1.23 to 1.39)	1.79 (1.72 to 1.86)
<i>Crude results</i>					
PAR	0.90 (0.77 to 1.03)	0.06 (0.03 to 0.09)	0.12 (0.08 to 0.16)	0.71 (0.58 to 0.84)	1.42 (1.24 to 1.60)
PAF, %	17.6 (14.9 to 20.2)	29.9 (16.7 to 43.0)	24.7 (16.2 to 33.3)	16.1 (13.3 to 19.0)	15.1 (13.2 to 17.0)
Annual attributable cases	1260 (1072 to 1448)	89 (49 to 129)	175 (114 to 236)	996 (820 to 1172)	1980 (1729 to 2231)
<i>Adjusted results</i>					
PAR	1.04 (0.91 to 1.17)	0.06 (0.03 to 0.09)	0.14 (0.10 to 0.18)	0.83 (0.70 to 0.96)	1.88 (1.70 to 2.06)
PAF, %	20.4 (17.7 to 23.0)	29.8 (16.7 to 42.9)	28.6 (20.1 to 37.1)	18.9 (16.1 to 21.8)	20.0 (18.0 to 21.9)
Annual attributable cases	1460 (1271 to 1649)	89 (49 to 129)	203 (142 to 264)	1168 (991 to 1345)	2616 (2365 to 2867)

The results provided are from the unimputed dataset where rows where missing values were excluded in a case-wise manner. The values in brackets are the 95% confidence intervals. Rate difference: rate in lowest education group minus rate in highest education group. Rate ratio: rate in lowest education group divided by rate in highest education group. All rates are reported as the proportion of live births. Adjusted results are adjusted for age and parity. PAF = population attributable fraction; PAR = population attributable risk; PTB = preterm birth.

Table S8. Apgar score <7, NICU admission, and severe congenital disease rates stratified by maternal education in the unimputed dataset

Outcome	5-minute Apgar score		NICU admissions		Severe congenital diseases	
Outcome (sub)group	Total Apgar scores <7, %	Apgar scores 0-3, %	Apgar scores 4-6, %	Total NICU admissions, %	<32 weeks NICU admissions, %	Severe congenital diseases, /1000
Total population rate	1.59 (1.56 to 1.62)	0.26 (0.25 to 0.27)	1.32 (1.29 to 1.35)	1.96 (1.92 to 2.00)	0.64 (0.62 to 0.66)	1.32 (1.29 to 1.35)
<i>Maternal education</i>						
Primary education, rate	2.26 (2.07 to 2.45)	0.39 (0.31 to 0.47)	1.87 (1.70 to 2.04)	2.58 (2.38 to 2.78)	0.83 (0.72 to 0.94)	1.74 (1.58 to 1.90)
Lower secondary, rate	1.85 (1.73 to 1.97)	0.30 (0.25 to 0.35)	1.55 (1.44 to 1.66)	2.45 (2.31 to 2.59)	0.89 (0.81 to 0.97)	1.56 (1.45 to 1.67)
Higher secondary, rate	1.66 (1.61 to 1.71)	0.28 (0.26 to 0.30)	1.38 (1.33 to 1.43)	2.08 (2.02 to 2.14)	0.72 (0.69 to 0.75)	1.35 (1.30 to 1.40)
Bachelor's, rate	1.46 (1.40 to 1.52)	0.24 (0.22 to 0.26)	1.23 (1.18 to 1.28)	1.75 (1.69 to 1.81)	0.54 (0.50 to 0.58)	1.21 (1.16 to 1.26)
Master's or higher, rate (ref.)	1.34 (1.27 to 1.41)	0.23 (0.20 to 0.26)	1.11 (1.05 to 1.17)	1.66 (1.58 to 1.74)	0.46 (0.42 to 0.50)	1.20 (1.13 to 1.27)
Rate difference	0.92 (0.72 to 1.12)	0.16 (0.08 to 0.24)	0.76 (0.58 to 0.94)	0.92 (0.71 to 1.13)	0.37 (0.25 to 0.49)	0.55 (0.37 to 0.73)
Rate ratio	1.68 (1.52 to 1.84)	1.68 (1.28 to 2.08)	1.68 (1.50 to 1.86)	1.55 (1.41 to 1.69)	1.80 (1.51 to 2.09)	1.46 (1.30 to 1.62)
<i>Crude results</i>						
PAR	0.24 (0.16 to 0.32)	0.03 (0.00 to 0.06)	0.21 (0.14 to 0.28)	0.29 (0.20 to 0.38)	0.17 (0.12 to 0.22)	0.12 (0.05 to 0.19)
PAF, %	15.3 (10.4 to 20.2)	11.6 (-0.7 to 23.9)	16.0 (10.7 to 21.4)	14.8 (10.5 to 19.2)	27.3 (19.9 to 34.7)	8.8 (3.5 to 14.1)
Annual attributable cases	343 (233 to 453)	43 (-3 to 89)	300 (200 to 400)	408 (288 to 528)	246 (179 to 313)	163 (65 to 261)
<i>Adjusted results</i>						
PAR	0.34 (0.26 to 0.42)	0.05 (0.02 to 0.08)	0.29 (0.22 to 0.36)	0.39 (0.30 to 0.48)	0.19 (0.14 to 0.24)	0.20 (0.13 to 0.27)
PAF, %	21.4 (16.6 to 26.3)	17.9 (6.5 to 29.4)	22.1 (16.8 to 27.5)	20.1 (15.7 to 24.5)	29.9 (22.7 to 37.2)	15.4 (9.8 to 20.9)
Annual attributable cases	480 (371 to 589)	67 (24 to 110)	413 (313 to 513)	554 (432 to 676)	269 (203 to 335)	285 (182 to 388)
						123 (65 to 181)

The results provided are from the unimputed dataset where rows where missing values were excluded in a case-wise manner. The values in brackets are the 95% confidence intervals. Rate difference: rate in lowest education group minus rate in highest education group. Rate ratio: rate in lowest education group divided by rate in highest education group. All rates are reported as the proportion of live births. Adjusted results are adjusted for age and parity. NICU = neonatal intensive care unit; PAF = population attributable fraction; PAR = population attributable risk.

Outcome	Composite outcomes		Vital outcomes						
	Any adverse outcome, % births	Any adverse outcome, % live births	Big 4 outcome, % live births	Stillbirths, /1000 births	Antepartum stillbirths, /1000 births	Intrapartum stillbirths, /1000 births	Total neonatal deaths, /1000 live births	Early neonatal deaths, /1000 live births	Late neonatal deaths, /1000 live births
PAR	2.08 (1.86 to 2.30)	2.03 (1.81 to 2.25)	2.02 (1.81 to 2.23)	0.73 (0.47 to 0.99)	0.65 (0.41 to 0.89)	0.08 (-0.02 to 0.18)	0.30 (0.06 to 0.54)	0.18 (-0.04 to 0.40)	0.12 (0.02 to 0.22)
PAF, %	13.2 (11.8 to 14.6)	13.0 (11.6 to 14.4)	13.3 (11.9 to 14.8)	29.3 (18.6 to 39.9)	30.6 (19.1 to 42.0)	22.1 (-6.9 to 51.2)	15.8 (3.1 to 28.5)	11.8 (-2.8 to 26.3)	33.3 (6.4 to 60.1)
Annual attributable cases	3328 (2981 to 3675)	3234 (2890 to 3578)	3213 (2875 to 3551)	117 (74 to 160)	103 (64 to 142)	13 (-4 to 30)	48 (9 to 87)	29 (-7 to 65)	19 (3 to 35)

The values provided are pooled means across all imputed datasets, with the pooled 95% confidence intervals given in brackets. Results are adjusted for age, parity, province, mother's immigration background, mother's parents' nationalities, mother's country of birth, mother with insurance debt, mother was a criminal suspect, mother's occupational status, and household income percentile. The Big 4 outcomes are preterm birth, small-for-gestational-age, APGAR <7, and severe congenital anomaly. PAF = population attributable fraction; PAR = population attributable risk.

Table S10. Preterm birth and small-for-gestational-age: PAR, PAF, and annual attributable cases adjusted for all covariates

Outcome	Preterm births				Small-for-gestational age
Outcome (sub)group	Total PTBs (<37 weeks), %	Extremely PTBs (<28 weeks), %	Very PTBs (28-32 weeks), %	Moderate/late PTBs (33-36 weeks), %	Hoftiezer percentile <10, %
PAR	1.02 (0.89 to 1.15)	0.05 (0.02 to 0.08)	0.14 (0.10 to 0.18)	0.83 (0.71 to 0.95)	1.14 (0.97 to 1.31)
PAF, %	20.1 (17.5 to 22.6)	23.3 (11.3 to 35.4)	27.1 (19.4 to 34.8)	19.1 (16.3 to 21.8)	11.8 (10.0 to 13.6)
Annual attributable cases	1626 (1421 to 1831)	82 (39 to 125)	220 (157 to 283)	1323 (1132 to 1514)	1823 (1545 to 2101)

The values provided are pooled means across all imputed datasets, with the pooled 95% confidence intervals given in brackets. Rate difference: rate in lowest education group minus rate in highest education group. Rate ratio: rate in lowest education group divided by rate in highest education group. All rates are reported as the proportion of live births. Fully adjusted results are adjusted for age, parity, province, mother's migration background, mother's parents' nationalities, mother's country of birth, mother with insurance debt, mother was a criminal suspect, mother's occupational status, and household income percentile. PAF = population attributable fraction; PAR = population attributable risk; PTB = preterm birth.

Table S11. Apgar score <7, NICU admission, and severe congenital disease: PAR, PAF, and annual attributable cases adjusted for all covariates

Outcome	5-minute Apgar score			NICU admissions			Severe congenital diseases
Outcome (sub)group	Total Apgar scores <7, %	Apgar scores 0-3, %	Apgar scores 4-6, %	Total NICU admissions, %	<32 weeks NICU admissions, %	≥32 weeks NICU admission, %	Severe congenital diseases, /1000
PAR	0.26 (0.19 to 0.33)	0.03 (0.00 to 0.06)	0.23 (0.16 to 0.30)	0.36 (0.28 to 0.44)	0.18 (0.14 to 0.22)	0.18 (0.11 to 0.25)	0.50 (0.10 to 0.90)
PAF, %	15.7 (11.2 to 20.2)	10.3 (-0.3 to 21.0)	16.8 (11.9 to 21.7)	18.0 (13.9 to 22.1)	27.4 (20.6 to 34.1)	13.5 (8.3 to 18.7)	11.1 (2.3 to 19.9)
Annual attributable cases	407 (291 to 523)	45 (-1 to 91)	362 (256 to 468)	574 (442 to 706)	284 (213 to 355)	290 (178 to 402)	80 (17 to 143)

The values provided are pooled means across all imputed datasets, with the pooled 95% confidence intervals given in brackets. Rate difference: rate in lowest education group minus rate in highest education group. Rate ratio: rate in lowest education group divided by rate in highest education group. All rates are reported as the proportion of live births. Fully adjusted results are adjusted for age, parity, province, mother's migration background, mother's parents' nationalities, mother's country of birth, mother with insurance debt, mother was a criminal suspect, mother's occupational status, and household income percentile. NICU = neonatal intensive care unit; PAF = population attributable fraction; PAR = population attributable risk.