

Supplementary information

Contents

Supplementary methods	2
S1. Study population and setting	2
S1a. Data linkage.....	2
S1b. High risk children.....	2
S2. Outcomes	3
S2b. CTV3 Read code list.....	3
S2c. Antibiotic prescriptions	3
S3. Characteristics of key variables.....	4
S4. Directed acyclic graph (DAG)	9
S5. Sensitivity analyses - methods	9
S5a. Western BMI cut offs for Asian women	9
S5b. Adjusting gestational cut offs for maternal weight measured	9
S5c. Excluding high-risk pregnancies	10
S5d. Adjusting for maternal health seeking behaviour	10
S5e. Fully vaccinated children only	10
S5f. Adjusting for potential mediators.....	11
S5g. Exploring variations in clinical coding strategies.....	11
Supplementary results	12
S6. Missing data	12
S6b. Proportions of observed and imputed data by participant characteristics	14
S7. Crude rates of infection – complete table	15
S8. Sensitivity analyses - results.....	16
S8a. Western BMI cut offs for Asian women	16
S8b. Adjusting gestational cut offs for maternal weight	16
S8c. Adjusting for maternal health-seeking behaviour.....	18
S8d. Excluding high-risk pregnancies	18
S8e. Restricting analysis to fully vaccinated children only	18
S8f. Adjusting for potential mediators.....	19
S8g. Exploring variations in clinical coding strategies.....	20
S9. Complete case analysis	23

Supplementary methods

S1. Study population and setting

S1a. Data linkage

Born in Bradford (BiB) has been extensively linked to external data sources. This study specifically analysed cohort data linked to maternity health records and mothers' and children's primary care and hospital admission records.

Members of the BiB study team manually extracted data from the mother's maternity notes and performed quality assurance procedures.¹ Participants were deterministically linked to primary care data from SystmOne using NHS number, surname, date of birth and gender. SystmOne is a primary care electronic health record system which has full coverage across all GP practices in Bradford, which meant approximately 99% of mothers and children had their BiB data successfully linked to their healthcare records. Participants survey data was deterministically linked to hospital admission data from the Bradford Royal Infirmary using NHS number. Because linkage only occurred with one hospital, the denominator is unknown and a linkage rate cannot be calculated for secondary care data. However, 90% of children have at least one event recorded within hospital records.¹

S1b. High risk children

Children were flagged as being high risk for infections if they had any of the following conditions, identified using either CTV3 Read codes (in primary care data) or ICD10 codes (in hospital admission data): Immunodeficiency; cystic fibrosis; chronic kidney disease; malignant neoplasm; sickle cell disease; or beta-thalassemia. Lists of full ICD10 and CTV3 Read codes, with descriptions, can be found in Supplementary information B.

Table S1. CTV3 Read and ICD10 clinical codes used to identify conditions related to high rates of infections

	ICD10	CTV3 Read code
Immunodeficiency	D80, D81, D84, D89	C3920, X20Gc, X20Ge, X20HJ, XE11v, X20Gd, C3908, C3900, X20Gy, X20Gz, C3901, X20Gx, X20Gu, C3902, X20Gn, C390B, X20Gp, Cyu00, X20Go, X20Gp, X20H0, X20H1, X20Hz, X20H3, X20H9, X20HA, X20HB, X20HC, X20HD, C390A, C392, X20HI, X20HJ, C3920, C3913, X20HP, C3923, C3924, C3925, C3928, C3929, C392z, C392, X40Ua, X40Uc, X20HH, X20Ga, Cyu01, C39y0, X20Hc, C3760, M15y3, X20Hs, X20Ht, X20Hu, X20Hv, X20Hw, X20Hx, X20Hy, X20Hz, X20I0, X20I1, X20I2, X20I3, X20I4, X20I5, X20I6, X20I7, X20I8, X20I9, X20IB, X20IC, X20ID, X20IE, X20IF, X20IG, X20IH, X20II, X20IJ, X20IK, X20IS, X20IT, X20IU, X70wB, X70wH, C330, C330z, C3301, C3320, XaYgn
Cystic fibrosis	E84	C370, XaREZ, C370z, XaBDb
Chronic kidney disease	N18	
Malignant neoplasm	C	
Sickle cell disease	D57	D106, X20Cx, D1060, D1061, D1062, D106z, Dyu12

Beta-thalassemia	D56.1	X20Cn, D1046, D1047, X20Co, X20Cp, X20Cq
------------------	-------	--

S2. Outcomes

Due to the variability in coding for infections in primary care,ⁱⁱ both CTV3 Read codes and antibiotic prescriptions were used to identify cases of infection. In order to develop the list of CTV3 Read codes and prescriptions, the following steps were undertaken:

- 1) The primary researcher (VC) initially developed a comprehensive list of CTV3 Read codes by searching clinical code repositories^{iii,iv} and through manually searching and extracting codes using the Clinical Terminology Browser^v. The threshold for inclusion was low to ensure that all possible infections codes were included during this first step.
- 2) An appropriate framework for categorising infections was then identified from existing literature on childhood infections.
- 3) VC and an academic general practitioner (GP) with primary care, hospital paediatrics and clinical coding experience (HFA) then reviewed and categorised infections codes by type of infection.
- 4) Steps one and three were repeated when new codes were added after further searches.
- 5) VC identified relevant antibiotics using the British National Formulary (BNF) and by searching existing literature published in the area.
- 6) HA reviewed the initial list and excluded any that were not relevant, and where possible, categorised by infection type. When the antibiotic had more than one use, the drug was not assigned a category and just counted in the overall infection category.

After searching primary care records for CTV3 Read codes and relevant prescriptions, a number of steps were undertaken to avoid double counting the same infections. The following cases were counted once:

- 1) Records that exactly matched by child id, age in days, event id, prescription and/or diagnosis code
- 2) Records that matched on child id, event id, age in days with CTV3 Read codes within the same infection category (i.e. bronchiolitis and lower respiratory tract infections are likely to refer to the same infection)
- 3) Records that exactly matched on child id and CTV3 Read code and occurred within seven days of each other.
- 4) Records that exactly matched on child id and antibiotic prescription, and occurred within seven days.
- 5) Records that exactly matched on child id with an infection related CTV3 Read code and antibiotic prescription within seven days for the same infection category (e.g. upper respiratory tract infection diagnosis with a prescription for Amoxicillin a few days later, with no new diagnosis code).

S2b. CTV3 Read code list

*see [Supplementary information B](#)

S2c. Antibiotic prescriptions

*See [Supplementary information C](#)

S3. Characteristics of key variables

Table S2. Characteristics of key variables

Variable	Source	Details/cleaning	Categories/units
Maternal BMI (5 category)	<p>Maternal weight measured at three time points:</p> <ol style="list-style-type: none"> At booking (~10 weeks' gestation) At recruitment (~26 weeks' gestation) During the third trimester <p>Weight at booking and during the third trimester were usually taken by midwives and available in maternity health records. Weight and height at recruitment was recorded by a research nurse as part of BiB and available in the baseline survey data.</p> <p>Weight/BMI was also recorded in Maternal primary care records. Mother's primary care records were searched for weight or BMI measures within one year prior to pregnancy up to 14 weeks' gestation.</p>	<p>Maternal weight from booking appointment was preferred measure. Maternal BMI was calculated by dividing weight (kg) by height squared (m²). Weights were set to missing if gestation at measure was missing. Where more than one measure of weight was available, the difference between the two weights was calculated and if the difference was +/- 4 standard deviations (SD) from the mean based on week of gestation^{vi} at second measurement, then this was deemed an implausible weight change and either booking or second weight measurement was deemed incorrect. Because it was not possible to determine whether the booking or second measurement was incorrect, both were excluded.</p> <p>Main analysis cohort: Weight measures recorded beyond the first trimester (≥14 weeks gestation) were excluded.</p> <p>Sensitivity analysis cohort 1: Weight measures recorded beyond the first trimester (≥14 weeks gestation) were excluded and 'Western' definitions of BMI categories used for all women.</p> <p>Sensitivity analysis 2 cohort: Weight measures recorded beyond 16 weeks gestation were excluded.</p> <p>Sensitivity analysis 3 cohort: All weight measures were included, but those measured beyond the first trimester were adjusted for expected weight gain from the end of the first trimester based on gestation at measurement.^{vii} Expected weight gain per week of gestation was calculated based on values from a previous study.^{viii} Because values were specific to pre-pregnancy BMI category, an average was taken of all categories of BMI and weighted by expected proportions. The difference was then subtracted and an estimated weight was generated for week 12 of pregnancy. A starting weight or pre-pregnancy weight was not estimated, due to the majority of booking weights were measured at ~10-12 weeks gestation. BMI was then calculated by dividing by height squared (m²).</p>	<p>BMI was categorised as ('Western'):</p> <p>Underweight (<18.5) Healthy weight (18.5-24.9) Overweight (25-29.9) Obese grade 1 (30-34.9) Obese grade 2 & grade 3 (≥35)</p> <p>For Pakistani women:</p> <p>Underweight (<18.5) Healthy weight (18.5-22.9) Overweight (23-24.9) Obese grade 1 (25-29.9) Obese grade 2 & grade 3 (≥30)</p>

Maternal BMI (4 category)	See above	See above	BMI was categorised as ('Western'): Underweight (<18.5) <u>Healthy weight (18.5-24.9)</u> Overweight (25-29.9) Obese (≥30)
Gestation at booking	Maternity health records	Two variables were available: 'drvgesbook' and 'prmbgestagewpregbk'. Both were number of completed weeks gestation at booking appointment. 'prmbgestagewpregbk' was preferred variable due to more extensive cleaning performed by BiB team. If 'prmbgestagewpregbk' was missing, 'drvgesbook' was used. Values were recoded as missing if gestation at booking was <5 weeks or was > than gestation at recruitment (As recruitment occurred during oral glucose tolerance test (OGTT), therefore, women would have already had their booking appointment in order to qualify for the OGTT).	Recorded as completed gestational weeks.
Childhood infection	Child primary care records + child primary care prescriptions	See section S2 for more details about identifying infections and removing duplicate records. For a full list of codes and prescriptions, see supplementary information B and C. Infections were grouped using categories from existing literature ^{ix} , however, invasive bacterial infections were not explored as a category due to low numbers of infections.	Infections explored as total infections and also as specific infections. Categories of infection types, as follows: 1. Upper respiratory tract infection (URTI) 2. Lower respiratory tract infection (LRTI) 3. Skin and soft tissue infection (SST) 4. Genitourinary infection (GU) 5. Gastrointestinal infection (GI) 6. Multi-system viral (VIR)
Maternal age at birth	Baseline questionnaire	Self-reported at recruitment	<20, 20-24, <u>25-29</u> , 30-34, 35+
Child sex	Maternity health records		<u>Male</u> , Female
Maternal ethnicity	Baseline questionnaire + GP records	Variable derived by other BiB researchers: If baseline questionnaire values missing, ethnicity as recorded in GP records was included.	<u>White</u> , Pakistani, Other
Index of Multiple Deprivation (IMD) score	Baseline questionnaire	Variable derived by BiB researchers: Postcode used to identify Lower Super Output Area (LSOA) and identify relevant IMD code.	Quintiles: <u>Q1</u> – Q5

Socio-economic position	Baseline questionnaire	Variable derived by other BiB researchers: by Fairley et al. (2014) using latent class analysis with 19 objective and subjective indicators of SES and financial security. Full details published elsewhere ^x .	Least deprived and most educated Employed not materially deprived Employed with no access to money Benefits but coping Most deprived
Maternal education	Baseline questionnaire	UK National Recognition Information Centre had been previously used to equivalise educational awards, based on level and country. Initial categories: included <5 GCSE, 5 GCSE, A-Level, >A-level, Other, Don't know, Foreign unknown. 'Foreign unknown' and 'Don't know' were recoded as missing and 5 GCSE and A-level were collapsed into one category for analysis.	<5 GCSE 5 GCSE-A-level >A-level Other
Child BMI (4-5 years)	National Child Measurement Programme (NCMP) + child primary care records	Child BMI standardised for age and sex was previously derived by BiB team. BMI was generated using UK90 growth charts. Age at measurement was used to identify those taken at 4-5 years of age. If more than one measurement existed, the source of the measurement was identified and preference was given to the measurement taken as part of the NCMP as the method of measurement was standardised. If this was missing, then preference was given to measurements from child primary care records. If multiple NCMP measures were taken at 4-5 years of age, the first measurement was used. Centiles were generated and measures were grouped into BMI categories.	Underweight (<5 th centile) Healthy weight (5th - <85th centile) Overweight (85 th - 95 th centile) Obese (>95 th centile)
Gestational age	Maternity health records	Gestational age at birth to last recorded week obtained from electronic health records. Weeks' collapsed into four categories for analysis.	<34, 34-36, 37-38, 39+
Parity	Maternity health records	Registerable parity taken from electronic health records of mother and collapsed into binary variable for analysis. Cross checked against subsequent birth records, identified using mother id and maternal age at birth.	0 , 1+
High risk condition (child)	Child primary care and hospital admission records	Variable derived using children's primary and secondary care records. See section S1b for further details, including codes and sources searched. A high risk child was defined as a child with evidence of at least one of the high risk conditions stated in S1b.	Yes, No

High-risk pregnancy	Maternity health records	High risk pregnancy defined as a woman with gestational diabetes, pre-existing diabetes [type 1 or 2], gestational hypertension, pre-eclampsia, pre-existing heart condition. Details of each condition were recorded in the woman's maternity health records. A high risk pregnancy was defined as evidence of at least one of these conditions.	Yes, No
Vaccination status	Child primary care records	Full vaccination status defined as evidence of child having complete vaccinations from minimum vaccination programme up to 1 year of age at time. Partial defined as some, but not all, and none defined as no record of any childhood vaccinations from minimum vaccination program during the first year of life. If a child has 'mumps vaccine' recorded within GP records, this is assumed to be MMR vaccine. See Table S3 for further details.	Full , partial, none
Breastfeeding	Follow up BiB questionnaires (ALL IN study @ 12 and 24 months; BiB1000 study @ 6, 12, 18, 24 and 36 months; MEDALL study @ 4 years) + child health visitor records + child primary care records + mother primary care records	<p>BiB follow up questionnaires only include subsamples of BiB cohort. Therefore, the breastfeeding variable was derived using multiple sources of data.</p> <p>Breastfeeding duration defined as either: reported duration in questionnaire responses; duration-related diagnosis code (CTV3 Read code) [i.e. breastfeeding at 6 weeks]; or a breastfeeding-related diagnosis code + age of child in child health visitor or primary care records.</p> <p>Never breastfed defined as a negative questionnaire response (e.g. child never breastfed) or relevant diagnosis code in child health visitor or primary care records.</p> <p>Questionnaire responses were considered more reliable than routine data, therefore, routine data was only used when questionnaire responses were missing. If there was more than one questionnaire response, the longest duration was identified as the most relevant response.</p> <p>See Supplementary Information B for full list of feeding codes searched in child health visitor and primary care records.</p>	Never, <6 weeks, ≥6 weeks

Mode of birth	Maternity health records	Mode of birth crossed checked against labour induction. In cases where data did not match (e.g. there were a small number of cases that had 'no labour, c-section' listed as labour induction and 'vaginal' reported as mode of birth) cases were recoded as missing. Categories of mode of birth collapsed into two category variable.	<u>Vaginal</u> , C-section
Maternal health seeking behaviour	Mother's primary care records (from 2 years prior to birth to 5 years post birth)	The total number of primary care events (for any cause) were divided by the total follow up time to generate an average yearly rate of events for each mother. See section S5d for more detail.	<u>Rate/ year</u>

*Maternity health records were the 'Eclipse' system which includes maternity records from both primary and secondary care
Baseline questionnaire: Completed at approximately 26-28 weeks' gestation
Reference categories in bold and underlined.*

S4. Directed acyclic graph (DAG)

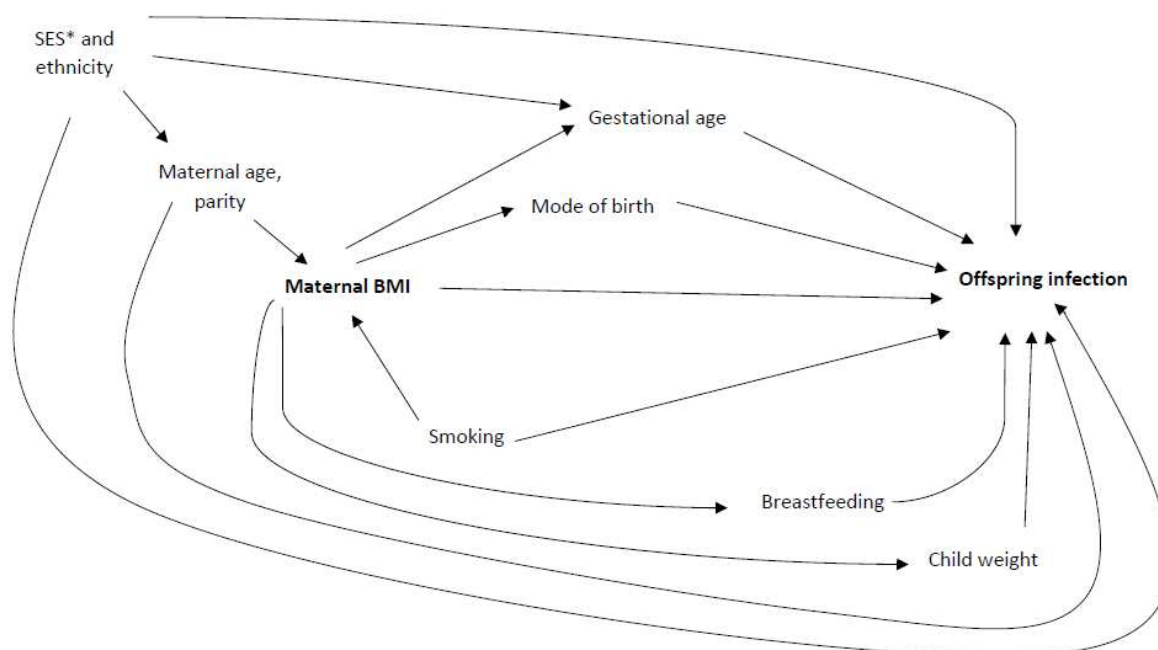


Figure S1. Directed acyclic graph of maternal body mass index and offspring infection.

*Please note SES refers to three variables in this DAG: (1) an individual level marker = 'socio-economic position'; and (2) an area level marker = Index of multiple deprivation; and (3) highest level of maternal education

S5. Sensitivity analyses - methods

S5a. Western BMI cut offs for Asian women

Asian-specific BMI cut offs are based on the increased risk of metabolic disease observed at lower body weights within populations of Asian people.⁹ However, it is not clear if these are appropriate for use when examining BMI in relation to other disease types, such as infectious disease, especially within the offspring. Therefore, the main analysis was repeated using 'Western' BMI cut offs for all women (Underweight = <18.5; Healthy weight = 18.5 to <25; Overweight = 25 to <30; Obese grade 1 = 30 to <35; Obese grade 2 & 3 = 35+).

S5b. Adjusting gestational cut offs for maternal weight measured

Approximately 23% of women had their booking appointment beyond the first trimester. Predictors of booking late include younger age, high parity, lower socio-economic status and ethnic minority origin.¹⁰ Therefore, to explore whether results differed due to excluding 'late bookers', two sensitivity analyses were performed:

1. The first involved altering the booking weight cut off to within the first 16 weeks of pregnancy (16[+6] weeks' gestation). This cut off increased the sample size to 10,510.

2. The second involved adjusting maternal weight by the expected weight gain based on gestational age at booking. A woman's weight beyond 13+6 weeks' gestation was adjusted using gestational weight gain charts derived from a study by Santos et al. (2018). The study included data from multiple cohorts of pregnant women (N = >200k) from the US, Europe and Australia¹⁶. Gestational weight gain charts were derived for each BMI category, based on weight recorded in early pregnancy. However, because it was not possible to classify a woman's BMI category based on weight recorded later in pregnancy, a mean value for all BMI categories was calculated (a weighted mean based on expected proportions of BMI category). The estimated weight gain, based on gestational age at booking, was then deducted from the actual weight recorded at booking to provide an estimated 1st trimester weight. This method has been described in detail elsewhere.¹¹ By including all women with late booking weights, the sample size increased to 11,176.

Descriptive characteristics of women and children were compared across the different samples.

S5c. Excluding high-risk pregnancies

To explore what the impact of having a pre-existing condition that impacts pregnancy has on the stability of estimates, women with a high-risk pregnancy were excluded from the sample. A high risk pregnancy was defined as the presence of gestational diabetes, pre-existing diabetes (type 1 or 2), a pre-existing heart condition, gestational hypertension or pre-eclampsia. Conditions were identified via the mother's maternity health records (which includes both secondary and primary care).

S5d. Adjusting for maternal health seeking behaviour

Informed presence is the notion that individuals who have more contact with healthcare providers have more opportunities for diagnoses (i.e. a person with a lower threshold for contacting their GP may have more infection-related diagnosis codes within their electronic healthcare records (EHC) compared to someone who prefers to delay seeing their GP until they are certain the infection will not clear without medical intervention). To explore the impact of informed presence bias on results, we adjusted for the annual rate at which mother's attended their GP during two years prior to birth until five years of age.

Maternal rate of health seeking behaviour was calculated by totalling the number of primary care events, from 2 years before birth up until the child's 5th birthday, divided by the amount of follow up time, multiplied by 364.25. This provided an average rate of primary care events per year.

S5e. Fully vaccinated children only

To explore how vaccination affected estimates, children who were not fully vaccinated by one year were excluded from the analysis. Full vaccination was defined as completion of the national immunisation programme (available during the study period of 2007-2011) by age one. The national immunisation programme in place during the study period can be seen in table Sx.

Table S3. UK National immunisation programme during study period (2007-2011)

Vaccination	Infection type	Age	Dose
BCG	TB	1m	1
dTaP/IPV/Hib	Diphtheria, Tetanus, Pertussis, Polio and Haemophilus B	2m	1
dTaP/IPV/Hib	Diphtheria, Tetanus, Pertussis, Polio and Haemophilus B	3m	2
dTaP/IPV/Hib	Diphtheria, Tetanus, Pertussis, Polio and Haemophilus B	4m	3
dTaP/IPV	Diphtheria, Tetanus, Pertussis and Polio	3y 4m - 5y	Booster
Td/IPV	Diphtheria, Tetanus, Polio	13-18y	Booster
PCV	Pneumococcal disease	2m	1
PCV	Pneumococcal disease	4m	2
PCV	Pneumococcal disease	13m	Booster
Men C	Meningitis C	3m	1
Men C	Meningitis C	4m	2
Hib/Men C	Haemophilus B and Meningitis C	12m	Booster
MMR	Measles, Mumps and Rubella	13m	1
MMR	Measles, Mumps and Rubella	3y 4m - 5y	2

S5f. Adjusting for potential mediators

To explore how adjustment for potential mediators affects estimates, we conducted a sensitivity analysis whereby we further adjusted the main model for mode of birth (C-section vs. vaginal), breastfeeding (none, <6 weeks and 6+ weeks), gestational age at birth (<34, 34-36, 37-38 and 39+ weeks) and child BMI at 4-5 years (. The model was repeated with each mediator initially and then a final model was run with all mediators together.

S5g. Exploring variations in clinical coding strategies

Because many antibiotics are broad spectrum, this meant we were unable to categorise most antibiotics into specific infection categories. Antibiotics for skin and soft tissue, and genitourinary infections were the most commonly categorised. This therefore led to high variability in how certain types of infections were identified; potentially meaning some types of infection would be underestimated due to broad spectrum antibiotics (See supplementary information B for all antibiotic prescriptions).

Table S4. Proportions of diagnosis codes and antibiotic prescriptions by infection type

Infection type	Diagnosis code + prescription	Diagnosis code only	Prescription only
Upper respiratory tract	23%	62%	15%
Lower respiratory tract	78%	22%	0%
Skin and soft tissue	20%	6%	74%
Genitourinary	20%	10%	71%

Gastrointestinal	4%	96%	0%
Multi-system viral	8%	92%	0%

Therefore, we conducted two sensitivity analyses to explore how coding practices impacts results. The first involved restricting the main analysis to infections with diagnosis codes only and completely disregarding prescription data. The second involved coding all prescriptions of Amoxicillin as URTIs and LRTIs.

Amoxicillin is one of the most commonly prescribed antibiotics in children and is primarily used to treat respiratory tract infections.^{xi} Because it is used for both URTI and LRTI, cases where Amoxicillin was prescribed without a diagnosis code, meant they were not categorised into infection types. This suggested that rates for both types of respiratory tract infections were likely to be underestimated in this study. Therefore, a sensitivity analysis was performed whereby all Amoxicillin prescriptions were allocated to both URTIs and LRTIs (as it was not possible to distinguish which were which, both were allocated). Whilst this is likely to overestimate rates of respiratory infections, it provides an absolute maximum, and the true rates within this study are likely to be somewhere in-between.

Supplementary results

S6. Missing data

Approximately 15% of participants were excluded from the complete case analysis (CCA) due to missing data (Table S5).

See table S5 on next page

Table S5. Frequencies and proportions of missing data by participant characteristics in total, excluded and complete case analysis (CCA) cohorts (*p-value from chi-squared tests)

	Total (N=9,540)	CCA (N=8,137)	Excluded (N=1,403)	p-value*
Maternal BMI (1st trimester)				
<i>Underweight</i>	489 (5.1)	403 (5.0)	86 (6.1)	<0.0001
<i>Healthy weight</i>	3687 (38.7)	3072 (37.8)	615 (43.8)	
<i>Overweight</i>	2886 (30.3)	2479 (30.5)	407 (29.0)	
<i>Obese gr1</i>	1520 (15.9)	1339 (16.5)	181 (12.9)	
<i>Obese gr2 & 3</i>	958 (10.0)	844 (10.4)	114 (8.1)	
Mother's age				
<25	3037 (31.8)	2576 (31.7)	461 (32.9)	0.444
25-29	3108 (32.6)	2668 (32.8)	440 (31.4)	
30-34	2208 (23.1)	1870 (23.0)	338 (24.1)	
35+	1187 (12.4)	1023 (12.6)	164 (11.7)	
Missing	0	0	0	
Child sex				
<i>Male</i>	4828 (50.6)	4139 (50.9)	689 (49.1)	<0.0001
<i>Female</i>	4615 (48.4)	3998 (49.1)	617 (44.0)	
Missing	97 (1.0)	0	97 (6.9)	
Parity				
<i>Nulliparous</i>	3773 (39.6)	3420 (42.0)	353 (25.2)	<0.0001
<i>Parous</i>	5306 (55.6)	4717 (58.0)	589 (42.0)	
Missing	461 (4.8)	0	461 (32.9)	
Socio-economic position				
<i>Least deprived and most educated</i>	1760 (18.5)	1673 (20.6)	87 (6.2)	<0.0001
<i>Employed, not materially deprived</i>	1802 (18.9)	1690 (20.8)	112 (8.0)	
<i>Employed, no access to money</i>	1317 (13.8)	1242 (15.3)	75 (5.4)	
<i>Benefits but coping</i>	2455 (25.7)	2294 (28.2)	161 (11.5)	
<i>Most deprived</i>	1346 (14.1)	1238 (15.2)	108 (7.7)	
Missing	860 (61.3)	0	860 (61.3)	
Maternal education				
<GCSE	1793 (18.8)	1678 (20.6)	115 (8.2)	<0.0001
GCSE-A-level	3982 (41.7)	3784 (46.5)	198 (14.1)	
>A-level	2279 (23.9)	2155 (26.5)	124 (8.8)	
Other	553 (5.8)	520 (6.4)	33 (2.4)	
Missing	933 (9.8)	0	933 (66.5)	
Ethnicity				
<i>White, British</i>	3742 (39.2)	3369 (41.4)	373 (26.6)	<0.0001
<i>Pakistani</i>	4196 (44.0)	3603 (44.3)	593 (42.3)	
<i>Other</i>	1463 (15.3)	1165 (14.3)	298 (21.2)	
Missing	139 (1.5)	0	139 (9.9)	
Smoked during pregnancy				
Yes	1439 (15.1)	1351 (16.6)	491 (35.0)	<0.0001
No	7277 (76.3)	6786 (83.4)	88 (6.3)	
Missing	824 (8.6)	0	824 (58.7)	
Gestational age				
<34 weeks	131 (1.4)	113 (1.4)	18 (1.3)	<0.0001
34-36 weeks	368 (3.9)	311 (3.8)	57 (4.1)	
37-38 weeks	1995 (20.9)	1708 (21.0)	287 (20.5)	
39+ weeks	6949 (72.8)	6005 (73.8)	944 (67.3)	
Missing	97 (1.0)	0	97 (6.9)	
Mode of birth				
<i>Vaginal</i>	7280 (76.3)	6294 (77.4)	986 (70.3)	<0.0001
<i>C-section</i>	2163 (22.7)	1843 (22.7)	320 (22.8)	
Missing	97 (1.0)	0	97 (6.9)	
Breastfeeding				
<i>Never</i>	702 (7.4)	670 (8.2)	32 (2.3)	<0.0001
<6 weeks	1874 (19.4)	1,588 (19.5)	259 (18.5)	
≥6 weeks	3971 (41.6)	3,440 (42.3)	531 (37.9)	
Missing	3,020 (31.7)	2,439 (30.0)	581 (41.4)	
Vaccination status at 1 year				
<i>Fully vaccinated</i>	8328 (87.3)	7099 (87.2)	1229 (87.6)	<0.0001
<i>Partially vaccinated</i>	470 (4.9)	384 (4.7)	86 (6.1)	
<i>Not vaccinated</i>	535 (5.6)	485 (6.0)	50 (3.6)	
Missing	207 (2.2)	169 (2.1)	38 (2.7)	

S6b. Proportions of observed and imputed data by participant characteristics

Table S6. Proportions of missing, observed and total data (after imputation)

	Observed* data	Total after imputation (observed + imputed data)
Child sex		
<i>Male</i>	50	51
<i>Female</i>	50	49
<i>Missing</i>	1	0
Parity		
<i>Nulliparous</i>	40	41
<i>Parous</i>	60	59
<i>Missing</i>	5	0
IMD score		
<i>Q1</i>	38	37
<i>Q2</i>	26	27
<i>Q3</i>	19	19
<i>Q4</i>	13	13
<i>Q5</i>	4	4
<i>Missing</i>	9	0
Socio-economic position		
<i>Least deprived and most educated</i>	22	20
<i>Employed, not materially deprived</i>	21	21
<i>Employed, no access to money</i>	15	15
<i>Benefits but coping</i>	29	28
<i>Most deprived</i>	13	16
<i>Missing</i>	9	0
Maternal education		
<i><GCSE</i>	19	21
<i>GCSE-A-level</i>	45	47
<i>>A-level</i>	30	26
<i>Other</i>	6	6
<i>Missing</i>	10	0
Ethnicity		
<i>White, British</i>	35	40
<i>Pakistani</i>	50	45
<i>Other</i>	15	15
<i>Missing</i>	2	0
Smoked during pregnancy		
<i>No</i>	88	84
<i>Yes</i>	12	16
<i>Missing</i>	9	0
Gestational age		
<i><34 weeks</i>	1	1
<i>34-36 weeks</i>	3	4
<i>37-38 weeks</i>	22	21
<i>39+ weeks</i>	74	74
<i>Missing</i>	1	0
Mode of birth		
<i>Vaginal</i>	78	77
<i>C-section</i>	22	23
<i>Missing</i>	1	0
Breastfeeding		
<i>Never</i>	13	12
<i><6 weeks</i>	28	30
<i>≥6 weeks</i>	59	58
<i>Missing</i>	32	0
Child BMI (4/5 years)		
<i>Underweight</i>	5	5
<i>Healthy weight</i>	81	80
<i>Overweight</i>	9	10
<i>Obese</i>	4	5
<i>Missing</i>	31	0
Vaccination status at 1 year		
<i>Fully vaccinated</i>	90	89
<i>Partially vaccinated</i>	4	5
<i>Not vaccinated</i>	6	6
<i>Missing</i>	2	0

*Please note that proportions of observed do not add up to 100% when levels of missing data also accounted for, as the purpose of the table is to present the distribution of the observed data only

S7. Crude rates of infection – complete table**Table S7.** Crude rates of infections stratified by age group and maternal body mass index

	Total				<1 year				1-<2 years				2-<5 years				5-<15 years				
	N	PYR	Rate	RD	N	PYR	Rate	RD	N	PYR	Rate	RD	N	PYR	Rate	RD	N	PYR	Rate	RD	
Total infection																					
Underweight	6,969	6,136	113.6	8	1,397	468	298.5	20.4	1,079	465	232	-1.4	2,255	1,388	162.5	10.8	2,238	3,815	58.7	6.7	
Healthy weight	48,462	45,887	105.6	-	9,759	3,509	278.1	-	8,128	3,482	233.4	-	15,74	10,38	151.7	-	14,82	28,51	52	-	
Overweight	40,941	36,321	112.7	7.1	8,002	2,766	289.3	11.2	6,863	2,748	249.7	16.3	13,00	8,212	158.3	6.7	13,07	22,59	57.9	5.9	
Obese grade 1	23,798	19,102	124.6	19	4,487	1,461	307.1	29	3,905	1,454	268.6	35.1	7,796	4,329	180.1	28.4	7,610	11,85	64.2	12.2	
Obese grade 2 & 3	15,412	12,022	128.2	22.6	2,972	920	323	44.9	2,394	914	261.9	28.5	4,861	2,730	178.1	26.4	5,185	7,458	69.5	17.5	
Total	135,58	119,46	113.5	-	26,61	9,124	291.7	-	22,36	9,063	246.8	-	43,66	27,04	161.5	-	42,93	74,23	57.8	-	
URTI																					
Underweight	2,800	6,136	45.6	5.1	522	468	111.5	12.4	457	465	98.3	8.6	988	1,388	71.2	8.8	833	3,815	21.8	2.4	
Healthy weight	18,616	45,887	40.6	-	3,478	3,509	99.1	-	3,124	3,482	89.7	-	6,473	10,38	62.3	-	5,541	28,51	19.4	-	
Overweight	15,679	36,321	43.2	2.6	2,925	2,766	105.7	6.6	2,683	2,748	97.6	7.9	5,361	8,212	65.3	2.9	4,710	22,59	20.8	1.4	
Obese	14,823	31,124	47.6	7.1	2,652	2,381	111.4	12.3	2,373	2,368	100.2	10.5	5,073	7,059	71.9	9.5	4,725	19,31	24.5	5	
Total	51,918	119,46	43.5	-	9,577	9,124	105	-	8,637	9,063	95.3	-	17,89	27,04	66.2	-	15,80	74,23	21.3	-	
LRTI																					
Underweight	391	6,136	6.4	0.6	73	4.68	15.6	-1.6	65	465	14	-2.1	150	1,388	10.8	1.6	103	3,815	2.7	0.9	
Healthy weight	2,647	45,887	5.8	-	604	3,509	17.2	-	561	3,482	16.1	-	956	10,38	9.2	-	526	28,51	1.8	-	
Overweight	2,278	36,321	6.3	0.5	476	2,766	17.2	0	458	2,748	16.7	0.6	773	8,212	9.4	0.2	571	22,59	2.5	0.7	
Obese	2,349	31,124	7.5	1.8	528	2,381	22.2	5	460	2,368	19.4	3.3	837	7,059	11.9	2.7	524	19,31	2.7	0.9	
Total	7,665	119,46	6.4	-	1,681	9,124	18.4	-	1,544	9,063	17	-	2,716	27,04	10	-	1,724	74,23	2.3	-	
SST																					
Underweight	1,822	6,136	29.7	3.7	466	468	99.6	12.9	249	465	53.5	6.1	432	1,388	31.1	2.1	675	3,815	17.7	2.9	
Healthy weight	11,925	45,887	26	-	3,040	3,509	86.6	-	1,651	3,482	47.4	-	3,010	10,38	29	-	4,224	28,51	14.8	-	
Overweight	9,918	36,321	27.3	1.3	2,396	2,766	86.6	0	1,365	2,748	49.7	2.3	2,528	8,212	30.8	1.8	3,629	22,59	16.1	1.2	
Obese	9,330	31,124	30	4	2,210	2,381	92.8	6.2	1,236	2,368	52.2	4.8	2,464	7,059	34.9	5.9	3,420	19,31	17.7	2.9	
Total	32,995	119,46	27.6	-	8,112	9,124	88.9	-	4,501	9,063	49.7	-	8,434	27,04	31.2	-	11,94	74,23	16.1	-	
GU																					
Underweight	173	6,136	2.8	-1	<10	4.68	1.3	-1.8	<10	465	0.6	-2.8	53	1,388	3.8	-1.8	111	3,815	2.9	-0.4	
Healthy weight	1,762	45,887	3.8	-	109	3,509	3.1	-	121	3,482	3.5	-	587	10,38	5.7	-	945	28,51	3.3	-	
Overweight	1,349	36,321	3.7	-0.1	83	2,766	3	-0.1	100	2,748	3.6	0.2	443	8,212	5.4	-0.3	723	22,59	3.2	-0.1	
Obese	1,295	31,124	4.2	0.3	93	2,381	3.9	0.9	84	2,368	3.5	0.1	400	7,059	5.7	0	718	19,31	3.7	0.4	
Total	4,579	119,46	3.8	-	291	9,124	3.2	-	308	9,063	3.4	-	1,483	27,04	5.5	-	2,497	74,23	3.4	-	
GI																					
Underweight	362	6,136	5.9	1.3	86	4.68	18.4	2.7	75	465	16.1	2.2	111	1,388	8	2.3	90	3,815	2.4	0.6	
Healthy weight	2,126	45,887	4.6	-	549	3,509	15.6	-	484	3,482	13.9	-	591	10,38	5.7	-	502	28,51	1.8	-	
Overweight	1,796	36,321	4.9	0.3	448	2,766	16.2	0.6	419	2,748	15.2	1.3	489	8,212	6	0.3	440	22,59	1.9	0.2	
Obese	1,639	31,124	5.3	0.6	387	2,381	16.3	0.6	383	2,368	16.2	2.3	465	7,059	6.6	0.9	404	19,31	2.1	0.3	
Total	5,923	119,46	5	-	1,470	9,124	16.1	-	1,361	9,063	15	-	1,656	27,04	6.1	-	1,436	74,23	1.9	-	
VIR																					
Underweight	323	6,136	5.3	0.4	43	4.68	9.2	0.6	42	465	9	-1.2	121	1,388	8.7	0.2	117	3,815	3.1	0.7	
Healthy weight	2,229	45,887	4.9	-	303	3,509	8.6	-	358	3,482	10.3	-	880	10,38	8.5	-	688	28,51	2.4	-	
Overweight	1,808	36,321	5	0.1	244	2,766	8.8	0.2	287	2,748	10.4	0.2	749	8,212	9.1	0.6	528	22,59	2.3	-0.1	
Obese	1,556	31,124	5	0.1	185	2,381	7.8	-0.9	250	2,368	10.6	0.3	594	7,059	8.4	-0.1	527	19,31	2.7	0.3	
Total	5,916	119,46	5	-	775	9,124	8.5	-	937	9,063	10.3	-	2,344	27,04	8.7	-	1,860	74,23	2.5	-	

N = number of infections in primary care records, PYR = person years at risk, Rate = rate/100 person years, RD=rate difference. (Low counts are reported as '<10' due to disclosure control)

S8. Sensitivity analyses - results

S8a. Western BMI cut offs for Asian women

Table S8. Sensitivity analysis 1: Adjusted[^] rate ratios and 95% confidence intervals when using western BMI cut offs for Asian women (N=9,540)

	Child age (years)			
	<1	1-<2	2-<5	5-<15
Maternal BMI	RR (95% CI)	RR (95% CI)	RR (95% CI)	RR (95% CI)
<i>Underweight</i>	1.00 (0.92, 1.09)	0.94 (0.85, 1.04)	1.00 (0.91, 1.10)	1.06 (0.94, 1.20)
<i>Healthy weight</i>	1.00	1.00	1.00	1.00
<i>Overweight</i>	1.03 (0.98, 1.07)	1.07 (1.01, 1.12)*	1.03 (0.98, 1.09)	1.09 (1.02, 1.17)*
<i>Obese gr. 1</i>	1.03 (0.96, 1.09)	1.06 (0.99, 1.14)	1.08 (1.01, 1.16)*	1.14 (1.05, 1.25)*
<i>Obese gr. 2 & 3</i>	1.15 (1.06, 1.23)*	1.13 (1.03, 1.23)*	1.19 (1.08, 1.30)*	1.36 (1.18, 1.57)*

RR = rate ratios, 95% CI = 95% confidence intervals

[^]Models adjusted for maternal age, parity, ethnicity, smoking during pregnancy, socio-economic position, IMD score and maternal education

*p<0.05

**p<0.01

***p<0.0001

S8b. Adjusting gestational cut offs for maternal weight

Table S9. Sensitivity analysis 2: Adjusted[^] rate ratios and 95% confidence intervals when cohort restricted to women with weight measure recorded \leq 16 weeks' gestation (N=10,510)

	Child age (years)			
	<1	1-<2	2-<5	5-<15
Maternal BMI	RR (95% CI)	RR (95% CI)	RR (95% CI)	RR (95% CI)
<i>Underweight</i>	0.98 (0.90, 1.07)	0.93 (0.85, 1.02)	1.02 (0.92, 1.12)	1.11 (0.97, 1.28)
<i>Healthy weight</i>	1.00	1.00	1.00	1.00
<i>Overweight</i>	1.01 (0.97, 1.06)	1.04 (0.99, 1.10)	1.02 (0.98, 1.08)	1.08 (1.01, 1.15)*
<i>Obese gr. 1</i>	1.03 (0.97, 1.09)	1.09 (1.02, 1.16)*	1.11 (1.04, 1.18)**	1.15 (1.06, 1.24)***
<i>Obese gr. 2 & 3</i>	1.10 (1.03, 1.18)*	1.08 (1.00, 1.16)*	1.13 (1.05, 1.23)**	1.28 (1.14, 1.44)***

RR = rate ratios, 95% CI = 95% confidence intervals

[^]Models adjusted for maternal age, parity, ethnicity, smoking during pregnancy, socio-economic position, IMD score and maternal education

*p<0.05

**p<0.01

***p<0.0001

Table S10. Sensitivity analysis 3: Adjusted[^] rate ratios and 95% confidence intervals when cohort included all women with at least one recorded weight (weight measure adjusted based on expected weight gain by gestation at measurement) (N=11,176)

	Child age (years)			
	<1	1-<2	2-<5	5-<15
Maternal BMI	RR (95% CI)	RR (95% CI)	RR (95% CI)	RR (95% CI)
<i>Underweight</i>	0.99 (0.91, 1.08)	0.94 (0.85, 1.03)	1.02 (0.93, 1.13)	1.10 (0.96, 1.26)
<i>Healthy weight</i>	1.00	1.00	1.00	1.00
<i>Overweight</i>	1.01 (0.97, 1.05)	1.05 (1.00, 1.10)	1.03 (0.98, 1.08)	1.08 (1.01, 1.15)*
<i>Obese gr. 1</i>	1.04 (0.99, 1.10)	1.09 (1.03, 1.15)**	1.11 (1.05, 1.18)**	1.15 (1.07, 1.25)***
<i>Obese gr. 2 & 3</i>	1.10 (1.03, 1.18)**	1.07 (0.99, 1.15)	1.13 (1.04, 1.22)**	1.26 (1.13, 1.42)***

RR = rate ratios, 95% CI = 95% confidence intervals

[^]Models adjusted for maternal age, parity, ethnicity, smoking during pregnancy, socio-economic position, IMD score and maternal education

*p<0.05

**p<0.01

***p<0.0001

Table S11. Descriptive statistics by different BMI cut offs

	≤13 weeks BMI ^a	≤16 weeks BMI ^b	Adjusted BMI ^c
Maternal BMI (1 st trimester)			
Underweight	489 (5.1)	541 (5.2)	567 (5.1)
Healthy weight	3687 (38.7)	4054 (38.6)	4308 (38.6)
Overweight	2886 (30.3)	3176 (30.2)	3396 (30.4)
Obese gr1	1520 (15.9)	1697 (16.2)	1809 (16.2)
Obese gr2 & 3	958 (10.0)	1042 (9.9)	1096 (9.8)
Mother's age			
<25	3037 (31.8)	3357 (31.9)	3633 (32.5)
25-29	3108 (32.6)	3415 (32.5)	3624 (32.4)
30-34	2208 (23.1)	2416 (23.0)	2530 (22.6)
35+	1187 (12.4)	1322 (12.6)	1389 (12.4)
Missing	0	0	0
Child sex			
Male	4828 (50.6)	5334 (50.8)	5395 (48.3)
Female	4615 (48.4)	5079 (48.3)	5684 (50.9)
Missing	97 (1.0)	97 (0.9)	97 (0.9)
Parity			
Nulliparous	3773 (39.6)	4106 (39.1)	4361 (39.0)
Parous	5306 (55.6)	5901 (56.2)	6291 (56.3)
Missing	461 (4.8)	503 (4.8)	524 (4.7)
Socio-economic position			
Least deprived and most educated	1760 (18.5)	1918 (18.3)	2017 (18.1)
Employed, not materially deprived	1802 (18.9)	1966 (18.7)	2042 (18.3)
Employed, no access to money	1317 (13.8)	1459 (13.9)	1565 (14.0)
Benefits but coping	2455 (25.7)	2780 (26.5)	3031 (27.1)
Most deprived	1346 (14.1)	1515 (14.4)	1645 (14.7)
Missing	860 (61.3)	872 (8.3)	876 (7.8)
Maternal education			
<GCSE	1793 (18.8)	2039 (19.4)	2236 (20.0)
GCSE-A-level	3982 (41.7)	4404 (41.9)	4682 (41.9)
>A-level	2279 (23.9)	2489 (23.7)	2628 (23.5)
Other	553 (5.8)	632 (6.0)	669 (6.0)
Missing	933 (9.8)	946 (9.0)	961 (8.6)
Ethnicity			
White, British	3742 (39.2)	4050 (38.5)	4241 (38.0)
Pakistani	4196 (44.0)	4680 (44.5)	5029 (45.0)
Other	1463 (15.3)	1641 (15.6)	1767 (15.8)
Missing	139 (1.5)	139 (1.3)	139 (1.2)
Smoked during pregnancy			
Yes	1439 (15.1)	1586 (15.1)	1703 (15.2)
No	7277 (76.3)	8097 (77.0)	8644 (77.3)
Missing	824 (8.6)	827 (7.9)	829 (7.4)
Gestational age			
<34 weeks	131 (1.4)	149 (1.4)	160 (1.4)
34-36 weeks	368 (3.9)	405 (3.9)	434 (3.9)
37-38 weeks	1995 (20.9)	2182 (20.8)	2328 (20.8)
39+ weeks	6949 (72.8)	7677 (73.0)	8157 (73.0)
Missing	97 (1.0)	97 (0.9)	97 (0.9)
Mode of birth			
Vaginal	7280 (76.3)	8052 (76.6)	8601 (77.0)
C-section	2163 (22.7)	2361 (22.5)	2478 (22.2)
Missing	97 (1.0)	97 (0.9)	97 (0.8)
Breastfeeding			
Never	3695 (38.7)	4037 (38.4)	4301 (38.5)
<6 weeks	1874 (19.6)	2084 (19.8)	2224 (19.9)
≥6 weeks	3971 (41.6)	4389 (41.8)	4651 (41.6)
Missing	0	0	0
Vaccination status at 1 year			
Fully vaccinated	8328 (87.3)	9167 (87.2)	9714 (86.9)
Partially vaccinated	470 (4.9)	516 (4.9)	568 (5.1)
Not vaccinated	535 (5.6)	592 (5.6)	640 (5.7)
Missing	207 (2.2)	235 (2.2)	254 (2.3)

^aCohort restricted to those with weight measured in the first trimester only

^bCohort restricted to those with weight measured during the first 16 weeks of pregnancy

^cCohort includes all women with at least one weight measure and those measured beyond the first trimester were adjusted for expected weight gain based on gestation at measure. See Table S2 for more detail.

S8c. Adjusting for maternal health-seeking behaviour

Table S12. Sensitivity analysis 4: Adjusted[^] rate ratios and 95% confidence intervals when cohort also adjusted for maternal health-seeking behaviour

	Child age (years)			
	<1	1-<2	2-<5	5-<15
Maternal BMI	RR (95% CI)	RR (95% CI)	RR (95% CI)	RR (95% CI)
<i>Underweight</i>	1.00 (0.92, 1.10)	0.95 (0.86, 1.05)	1.01 (0.92, 1.12)	1.09 (0.96, 1.23)
<i>Healthy weight</i>	1.00	1.00	1.00	1.00
<i>Overweight</i>	1.02 (0.97, 1.06)	1.05 (1.00, 1.11)*	1.02 (0.97, 1.07)	1.09 (1.02, 1.17)*
<i>Obese gr. 1</i>	1.05 (0.99, 1.11)	1.09 (1.03, 1.16)*	1.12 (1.05, 1.19)*	1.17 (1.08, 1.27)*
<i>Obese gr. 2 & 3</i>	1.12 (1.04, 1.20)*	1.10 (1.02, 1.19)*	1.15 (1.06, 1.25)*	1.30 (1.15, 1.47)*

RR = rate ratios, 95% CI = 95% confidence intervals

[^]Models adjusted for maternal age, parity, ethnicity, smoking during pregnancy, socio-economic position, IMD score and maternal education

*p<0.05

**p<0.01

***p<0.0001

S8d. Excluding high-risk pregnancies

Table S13. Sensitivity analysis 5: Adjusted[^] rate ratios and 95% confidence intervals when high-risk pregnancies[§] excluded (N=7,852)

	Child age (years)			
	<1	1-<2	2-<5	5-<15
Maternal BMI	RR (95% CI)	RR (95% CI)	RR (95% CI)	RR (95% CI)
<i>Underweight</i>	1.02 (0.93, 1.12)	0.95 (0.86, 1.06)	1.03 (0.93, 1.14)	1.08 (0.95, 1.24)
<i>Healthy weight</i>	1.00	1.00	1.00	1.00
<i>Overweight</i>	1.04 (0.99, 1.09)	1.06 (1.01, 1.12)*	1.04 (0.98, 1.10)	1.09 (1.02, 1.17)*
<i>Obese gr. 1</i>	1.09 (1.02, 1.16)*	1.12 (1.04, 1.20)*	1.14 (1.06, 1.23)*	1.20 (1.09, 1.32)*
<i>Obese gr. 2 & 3</i>	1.18 (1.09, 1.28)*	1.09 (0.99, 1.20)	1.16 (1.04, 1.27)*	1.23 (1.07, 1.41)*

RR = rate ratios, 95% CI = 95% confidence intervals

[^]Models adjusted for maternal age, parity, ethnicity, smoking during pregnancy, socio-economic position, IMD score and maternal education

*p<0.05

**p<0.01

***p<0.0001

[§]See section S5c for definition

S8e. Restricting analysis to fully vaccinated children only

Table S14. Sensitivity analysis 6: Adjusted[^] rate ratios and 95% confidence intervals when cohort restricted to children fully vaccinated by one year (N=8,328)

	Child age (years)			
	<1	1-<2	2-<5	5-<15
Maternal BMI	RR (95% CI)	RR (95% CI)	RR (95% CI)	RR (95% CI)
<i>Underweight</i>	1.00 (0.92, 1.10)	0.94 (0.85, 1.04)	1.03 (0.93, 1.13)	1.05 (0.92, 1.19)
<i>Healthy weight</i>	1.00	1.00	1.00	1.00
<i>Overweight</i>	1.01 (0.96, 1.06)	1.04 (1.00, 1.10)	1.01 (0.96, 1.07)	1.08 (1.01, 1.15)*
<i>Obese gr. 1</i>	1.05 (0.98, 1.11)	1.10 (1.03, 1.18)*	1.11 (1.04, 1.18)*	1.17 (1.07, 1.27)*
<i>Obese gr. 2 & 3</i>	1.11 (1.04, 1.19)*	1.09 (1.01, 1.18)*	1.15 (1.06, 1.26)*	1.31 (1.15, 1.49)*

RR = rate ratios, 95% CI = 95% confidence intervals

[^]Models adjusted for maternal age, parity, ethnicity, smoking during pregnancy, socio-economic position, IMD score and maternal education

*p<0.05

**p<0.01

***p<0.0001

S8f. Adjusting for potential mediators

Table S15. Sensitivity analysis 7: Rate ratios and 95% confidence intervals for overall infections in primary care, when sequentially adjusting for potential mediators

Gestational age				
Maternal BMI	<1 RR (95% CI)	1-<2 RR (95% CI)	2-<5 RR (95% CI)	5-<15 RR (95% CI)
<i>Underweight</i>	1.00 (0.92, 1.09)	0.94 (0.85, 1.04)	1.00 (0.91, 1.10)	1.07 (0.94, 1.21)
<i>Healthy weight</i>	1	1	1	1
<i>Overweight</i>	1.02 (0.97, 1.06)	1.05 (1.00, 1.10)	1.01 (0.96, 1.07)	1.08 (1.02, 1.16)*
<i>Obese gr. 1</i>	1.05 (0.99, 1.11)	1.09 (1.03, 1.17)**	1.12 (1.05, 1.20)***	1.17 (1.08, 1.27)***
<i>Obese gr. 2 & 3</i>	1.12 (1.04, 1.19)**	1.09 (1.01, 1.18)*	1.14 (1.05, 1.24)**	1.30 (1.15, 1.47)***
Mode of birth				
<i>Underweight</i>	1.01 (0.92, 1.10)	0.95 (0.86, 1.05)	1.01 (0.92, 1.11)	1.08 (0.96, 1.23)
<i>Healthy weight</i>	1	1	1	1
<i>Overweight</i>	1.01 (0.97, 1.06)	1.05 (0.99, 1.10)	1.01 (0.96, 1.07)	1.08 (1.02, 1.16)*
<i>Obese gr. 1</i>	1.05 (0.99, 1.11)	1.09 (1.02, 1.16)**	1.12 (1.05, 1.20)**	1.17 (1.08, 1.28)***
<i>Obese gr. 2 & 3</i>	1.11 (1.04, 1.19)**	1.09 (1.01, 1.18)*	1.14 (1.05, 1.24)**	1.30 (1.15, 1.48)***
Breastfeeding				
<i>Underweight</i>	1.00 (0.92, 1.09)	0.95 (0.86, 1.04)	1.01 (0.91, 1.11)	1.08 (0.95, 1.22)
<i>Healthy weight</i>	1	1	1	1
<i>Overweight</i>	1.02 (0.97, 1.06)	1.05 (1.00, 1.10)	1.02 (0.97, 1.07)	1.09 (1.02, 1.16)*
<i>Obese gr. 1</i>	1.05 (0.99, 1.11)	1.10 (1.03, 1.17)**	1.13 (1.06, 1.20)***	1.18 (1.09, 1.28)***
<i>Obese gr. 2 & 3</i>	1.11 (1.03, 1.19)**	1.09 (1.01, 1.18)*	1.14 (1.05, 1.24)**	1.30 (1.15, 1.48)***
Child BMI (4-5 years)^				
<i>Underweight</i>	1.01 (0.93, 1.11)	0.95 (0.88, 1.05)	1.01 (0.92, 1.12)	1.07 (0.95, 1.22)
<i>Healthy weight</i>	1	1	1	1
<i>Overweight</i>	1.01 (0.97, 1.06)	1.04 (0.99, 1.10)	1.01 (0.96, 1.06)	1.08 (1.01, 1.15)*
<i>Obese gr. 1</i>	1.04 (0.98, 1.10)	1.08 (1.01, 1.15)*	1.11 (1.04, 1.18)**	1.16 (1.07, 1.27)***
<i>Obese gr. 2 & 3</i>	1.10 (1.02, 1.17)*	1.07 (0.99, 1.16)	1.12 (1.03, 1.22)**	1.27 (1.13, 1.44)***
All mediators				
<i>Underweight</i>	1.01 (0.92, 1.10)	0.94 (0.85, 1.04)	1.01 (0.91, 1.11)	1.07 (0.94, 1.21)
<i>Healthy weight</i>	1	1	1	1
<i>Overweight</i>	1.01 (0.96, 1.06)	1.04 (0.99, 1.09)	1.01 (0.96, 1.06)	1.07 (1.01, 1.15)*
<i>Obese gr. 1</i>	1.04 (0.98, 1.10)	1.07 (1.01, 1.14)*	1.10 (1.03, 1.18)**	1.15 (1.06, 1.25)**
<i>Obese gr. 2 & 3</i>	1.08 (1.01, 1.16)*	1.05 (0.97, 1.14)	1.10 (1.01, 1.19)*	1.24 (1.10, 1.41)**

Estimates already adjusted for maternal age, parity, ethnicity, smoking during pregnancy, socio-economic position, IMD score and maternal education

RR = rate ratios, 95% CI = 95% confidence intervals

^Child BMI at 4-5 years used as proxy for child BMI at other ages

* $p < 0.05$

** $p < 0.01$

*** $p < 0.0001$

S8g. Exploring variations in clinical coding strategies

Table S16. Sensitivity analysis 8: Crude rates by infection type and maternal BMI, stratified by child age (outcomes restricted to those with diagnosis code only)

	Total				<1 year				1-<2 years				2-<5 years				5-<15 years				
	N	PYR	Rate	RD	N	PYR	Rate	RD	N	PYR	Rate	RD	N	PYR	Rate	RD	N	PYR	Rate	RD	
Upper respiratory tract																					
Underweight	2,416	6,136	39.4	4.9	504	468	107.7	11.9	421	465	90.5	8.1	863	1,388	62.2	8.5	628	3,815	16.5	2.4	
Healthy weight	15,809	45,887	34.5	-	3,361	3,509	95.8	-	2,872	3,482	82.5	-	5,572	10,384	53.7	-	4,004	28,512	14.0	-	
Overweight	13,456	36,321	37.0	2.6	2,823	2,766	102.1	6.3	2,484	2,748	90.4	7.9	4,661	8,212	56.8	3.1	3,488	22,595	15.4	1.4	
Obese	12,500	31,124	40.2	5.7	2,566	2,381	106.9	11.1	2,204	2,368	91.8	9.4	4,362	7,059	61.4	7.8	3,368	19,316	17.5	3.4	
Total	44,181	119,468	37.0	-	9,254	9,124	101.7	-	7,981	9,063	88.1	-	15,458	27,043	57.3	-	11,488	74,238	15.5	-	
Lower respiratory tract																					
Underweight	391	6,136	6.4	0.6	73	468	15.6	-1.6	65	465	14.0	-2.1	150	1,388	10.8	1.6	103	3,815	2.7	0.9	
Healthy weight	2,647	45,887	5.8	-	604	3,509	17.2	-	561	3,482	16.1	-	956	10,384	9.2	-	526	28,512	1.8	-	
Overweight	2,278	36,321	6.3	0.5	476	2,766	17.2	0.0	458	2,748	16.7	0.6	773	8,212	9.4	0.2	571	22,595	2.5	0.7	
Obese	2,349	31,124	7.5	1.3	528	2,381	22.0	4.8	460	2,368	19.2	3.1	837	7,059	11.8	2.6	524	19,316	2.7	0.9	
Total	7,665	119,468	6.4	-	1,681	9,124	18.5	-	1,544	9,063	17.0	-	2,716	27,043	10.1	-	1,724	74,238	2.3	-	
Skin/soft tissue																					
Underweight	475	6,136	7.7	1.0	141	468	30.1	4.4	67	465	14.4	1.0	102	1,388	7.3	-0.1	165	3,815	4.3	1.0	
Healthy weight	3,094	45,887	6.7	-	904	3,509	25.8	-	467	3,482	13.4	-	770	10,384	7.4	-	953	28,512	3.3	-	
Overweight	2,457	36,321	6.8	0.0	723	2,766	26.1	0.4	380	2,748	13.8	0.4	626	8,212	7.6	0.2	728	22,595	3.2	-0.1	
Obese	2,387	31,124	7.7	0.9	663	2,381	27.6	1.9	336	2,368	14.0	0.6	610	7,059	8.6	1.2	778	19,316	4.0	0.7	
Total	8,413	119,468	7.0	-	2,431	9,124	26.7	-	1,250	9,063	13.8	-	2,108	27,043	7.8	-	2,624	74,238	3.5	-	
Genitourinary																					
Underweight	67	6,136	1.1	0	2	468	0.4	-0.3	1	465	0.2	-0.6	18	1,388	1.3	-0.2	46	3,815	1.2	0.2	
Healthy weight	502	45,887	1.1	-	27	3,509	0.8	-	30	3,482	0.9	-	159	10,384	1.5	-	286	28,512	1.0	-	
Overweight	381	36,321	1.0	-0.1	32	2,766	1.2	0.4	23	2,748	0.8	0.0	119	8,212	1.4	-0.1	207	22,595	0.9	-0.1	
Obese	377	31,124	1.2	0.1	21	2,381	0.9	0.1	19	2,368	0.8	-0.1	114	7,059	1.6	0.1	223	19,316	1.2	0.2	
Total	1,327	119,468	1.1	-	82	9,124	0.9	-	73	9,063	0.8	-	410	27,043	1.5	-	762	74,238	1.0	-	
Gastrointestinal																					
Underweight	362	6,136	5.9	1.3	86	468	18.4	2.7	75	465	16.1	2.2	111	1,388	8.0	2.3	90	3,815	2.4	0.6	
Healthy weight	2,126	45,887	4.6	-	549	3,509	15.6	-	484	3,482	13.9	-	591	10,384	5.7	-	502	28,512	1.8	-	
Overweight	1,796	36,321	4.9	0.3	448	2,766	16.2	0.6	419	2,748	15.2	1.3	489	8,212	6.0	0.3	440	22,595	1.9	0.1	
Obese	1,639	31,124	5.3	0.6	387	2,381	16.1	0.5	383	2,368	16.0	2.1	465	7,059	6.5	0.9	404	19,316	2.1	0.3	
Total	5,923	119,468	5.0	-	1,470	9,124	16.2	-	1,361	9,063	15.0	-	1,656	27,043	6.1	-	1,436	74,238	1.9	-	
Multi-system viral																					
Underweight	323	6,136	5.3	0.4	43	468	9.2	0.6	42	465	9.0	-1.2	121	1,388	8.7	0.2	117	3,815	3.1	0.7	
Healthy weight	2,229	45,887	4.9	-	303	3,509	8.6	-	358	3,482	10.3	-	880	10,384	8.5	-	688	28,512	2.4	-	
Overweight	1,808	36,321	5.0	0.1	244	2,766	8.8	0.2	287	2,748	10.4	0.2	749	8,212	9.1	0.6	528	22,595	2.3	-0.1	
Obese	1,556	31,124	5.0	0.1	185	2,381	7.7	-0.9	250	2,368	10.4	0.1	594	7,059	8.4	-0.1	527	19,316	2.7	0.3	
Total	5,916	119,468	5.0	-	775	9,124	8.5	-	937	9,063	10.3	-	2,344	27,043	8.7	-	1,860	74,238	2.5	-	

N = number of infections in primary care records, PYR = Person-years-at-risk, Rate = rate/100PYR, RD = Rate difference

Table S17. Sensitivity analysis 8: Adjusted[^] rate ratios and 95% confidence intervals for types of infection in primary care when restricting outcomes to infections identified using diagnosis codes only

Infection type	Age (years)			
	<1	1-<2	2-<5	5-<15
Upper respiratory tract	RR (95% CI)	RR (95% CI)	RR (95% CI)	RR (95% CI)
<i>Underweight</i>	1.03 (0.92, 1.15)	1.01 (0.89, 1.16)	1.09 (0.96, 1.23)	1.09 (0.95, 1.25)
<i>Healthy weight</i>	1.00	1.00	1.00	1.00
<i>Overweight</i>	1.03 (0.97, 1.10)	1.07 (1.00, 1.14)	1.04 (0.98, 1.11)	1.07 (0.99, 1.16)
<i>Obese</i>	1.07 (1.00, 1.104)*	1.08 (1.00, 1.16)*	1.13 (1.05, 1.21)**	1.17 (1.08, 1.27)***
Lower respiratory tract				
<i>Underweight</i>	0.89 (0.67, 1.17)	0.80 (0.60, 1.07)	1.02 (0.80, 1.31)	1.24 (0.89, 1.74)
<i>Healthy weight</i>	1.00	1.00	1.00	1.00
<i>Overweight</i>	0.98 (0.85, 1.13)	1.01 (0.87, 1.16)	0.97 (0.85, 1.11)	1.25 (1.06, 1.48)
<i>Obese</i>	1.19 (1.03, 1.37)*	1.11 (0.96, 1.28)	1.14 (0.99, 1.31)	1.39 (1.16, 1.67)***
Skin/soft tissue				
<i>Underweight</i>	0.97 (0.79, 1.20)	1.01 (0.77, 1.33)	0.93 (0.73, 1.17)	1.22 (0.99, 1.51)
<i>Healthy weight</i>	1.00	1.00	1.00	1.00
<i>Overweight</i>	1.01 (0.90, 1.13)	1.05 (0.91, 1.22)	1.04 (0.92, 1.18)	0.97 (0.86, 1.09)
<i>Obese</i>	1.07 (0.96, 1.21)	1.11 (0.95, 1.29)	1.12 (0.98, 1.28)	1.18 (1.03, 1.35)*
Genitourinary				
<i>Underweight</i>	0.45 (0.11, 1.90)	0.23 (0.03, 1.67)	0.71 (0.42, 1.20)	1.13 (0.77, 1.64)
<i>Healthy weight</i>	1.00	1.00	1.00	1.00
<i>Overweight</i>	1.56 (0.91, 2.69)	1.02 (0.58, 1.79)	0.97 (0.75, 1.24)	0.92 (0.73, 1.16)
<i>Obese</i>	1.16 (0.61, 2.22)	0.95 (0.52, 1.72)	1.01 (0.77, 1.33)	1.20 (0.93, 1.55)
Gastrointestinal				
<i>Underweight</i>	1.06 (0.82, 1.26)	1.01 (0.78, 1.31)	1.14 (0.91, 1.44)	1.07 (0.84, 1.35)
<i>Healthy weight</i>	1.00	1.00	1.00	1.00
<i>Overweight</i>	1.03 (0.91, 1.18)	1.10 (0.96, 1.26)	0.99 (0.86, 1.13)	1.02 (0.88, 1.19)
<i>Obese</i>	1.05 (0.91, 1.21)	1.17 (1.01, 1.34)*	1.09 (0.95, 1.25)	1.11 (0.95, 1.30)
Multi-system viral				
<i>Underweight</i>	1.12 (0.79, 1.59)	0.90 (0.63, 1.28)	0.98 (0.81, 1.19)	1.16 (0.94, 1.42)
<i>Healthy weight</i>	1.00	1.00	1.00	1.00
<i>Overweight</i>	1.05 (0.87, 1.26)	1.05 (0.89, 1.22)	1.08 (0.97, 1.20)	0.98 (0.86, 1.11)
<i>Obese</i>	0.90 (0.73, 1.11)	1.04 (0.87, 1.23)	0.99 (0.87, 1.12)	1.13 (0.99, 1.29)

RR = rate ratios, 95% CI = 95% confidence intervals

[^]Models adjusted for maternal age, parity, ethnicity, smoking during pregnancy, socio-economic position, IMD score and maternal education

*p<0.05

**p<0.01

***p<0.0001

Table S18. Crude infection rates when Amoxicillin is coded as respiratory infections

	Total				<1 year				1-<2 years				2-<5 years				5-<15 years			
	N	PYR	Rate	RD	N	PYR	Rate	RD	N	PYR	Rate	RD	N	PYR	Rate	RD	N	PYR	Rate	RD
Upper respiratory tract																				
Underweight	3,836	6,136	62.5	4.3	723	468	154.5	9.5	650	465	139.8	2.0	1,366	1,388	98.4	8.0	1,097	3,815	28.8	2.7
Healthy weight	26,700	45,887	58.2	-	5,086	3,509	144.9	-	4,797	3,482	137.8	-	9,392	10,384	90.4	-	7,425	28,512	26.0	-
Overweight	22,699	36,321	62.5	4.3	4,329	2,766	156.5	11.6	4,145	2,748	150.8	13.1	7,793	8,212	94.9	4.5	6,432	22,595	28.5	2.4
Obese	21,601	31,124	69.4	11.2	4,021	2,381	167.5	22.6	3,711	2,368	154.6	16.9	7,474	7,059	105.3	14.8	6,395	19,316	33.1	7.1
Total	74,836	119,468	62.6	-	14,159	9,124	155.6	-	13,303	9,063	146.8	-	26,025	27,043	96.4	-	21,349	74,238	28.8	-
Lower respiratory tract																				
Underweight	1,563	6,136	25.5	0.4	304	468	65.0	0.6	304	465	65.4	-3.4	565	1,388	40.7	0.8	390	3,815	10.2	0.8
Healthy weight	11,485	45,887	25.0	-	2,260	3,509	64.4	-	2,395	3,482	68.8	-	4,147	10,384	39.9	-	2,683	28,512	9.4	-
Overweight	10,016	36,321	27.6	2.5	1,990	2,766	71.9	7.5	2,080	2,748	75.7	6.9	3,501	8,212	42.6	2.7	2,445	22,595	10.8	1.4
Obese	9,677	31,124	31.1	6.1	1,954	2,381	81.4	17.0	1,924	2,368	80.2	11.4	3,438	7,059	48.4	8.5	2,361	19,316	12.2	2.8
Total	32,741	119,468	27.4	-	6,508	9,124	71.5	-	6,703	9,063	74.0	-	11,651	27,043	43.2	-	7,879	74,238	10.6	-

N = number of infections in primary care records, *PYR* = Person-years-at-risk, *Rate* = rate/100PYR, *RD* = Rate difference

Table S19. Sensitivity analysis 9: Adjusted[^] rate ratios and 95% confidence intervals for respiratory infections in primary care when coding Amoxicillin as respiratory infections

Upper respiratory tract infections				
	<1	1-<2	2-<5	5-<15
Maternal BMI	RR (95% CI)	RR (95% CI)	RR (95% CI)	RR (95% CI)
Underweight	0.99 (0.90, 1.10)	0.96 (0.86, 1.07)	1.02 (0.92, 1.13)	1.03 (0.92, 1.16)
Healthy weight	1.00	1.00	1.00	1.00
Overweight	1.04 (0.98, 1.10)	1.06 (1.01, 1.13)*	1.02 (0.96, 1.08)	1.07 (1.00, 1.14)*
Obese	1.09 (1.03, 1.15)*	1.09 (1.02, 1.5)*	1.12 (1.06, 1.19)*	1.22 (1.13, 1.32)*
Lower respiratory tract infections				
	<1	1-<2	2-<5	5-<15
Maternal BMI	RR (95% CI)	RR (95% CI)	RR (95% CI)	RR (95% CI)
Underweight	0.96 (0.82, 1.13)	0.91 (0.78, 1.06)	0.94 (0.81, 1.09)	0.99 (0.81, 1.22)
Healthy weight	1.00	1.00	1.00	1.00
Overweight	1.05 (0.97, 1.14)	1.04 (0.97, 1.13)	1.01 (0.94, 1.09)	1.10 (1.00, 1.22)*
Obese	1.15 (1.06, 1.25)*	1.10 (1.02, 1.19)*	1.14 (1.05, 1.23)*	1.23 (1.10, 1.38)*

RR = rate ratios, *95% CI* = 95% confidence intervals

[^]Models adjusted for maternal age, parity, ethnicity, smoking during pregnancy, socio-economic position, IMD score and maternal education

**p*<0.05

***p*<0.01

****p*<0.0001

S9. Complete case analysis

Table S20. Sequentially adjusted rate ratios and 95% confidence intervals for overall infections in primary care by categories of maternal BMI, stratified by age (complete case analysis)

Model 1: Unadjusted				
	<1	1-<2	2-<5	5-<15
Maternal BMI	RR (95% CI)	RR (95% CI)	RR (95% CI)	RR (95% CI)
<i>Underweight</i>	1.08 (0.99, 1.18)	0.99 (0.89, 1.09)	1.08 (0.98, 1.19)	1.17 (1.03, 1.33)*
<i>Healthy weight</i>	1.00	1.00	1.00	1.00
<i>Overweight</i>	1.04 (1.00, 1.09)	1.08 (1.02, 1.13)*	1.05 (1.00, 1.10)	1.12 (1.05, 1.20)*
<i>Obese gr. 1</i>	1.11 (1.05, 1.17)*	1.15 (1.04, 1.22)*	1.19 (1.12, 1.27)*	1.26 (1.15, 1.37)*
<i>Obese gr. 2 & 3</i>	1.17 (1.09, 1.26)*	1.13 (1.04, 1.22)*	1.18 (1.09, 1.29)*	1.37 (1.20, 1.55)*
Model 2: Model 1 + SES*				
	<1	1-<2	2-<5	5-<15
Maternal BMI	RR (95% CI)	RR (95% CI)	RR (95% CI)	RR (95% CI)
<i>Underweight</i>	0.99 (0.90, 1.09)	0.96 (0.86, 1.06)	1.02 (0.92, 1.14)	1.10 (0.96, 1.27)
<i>Healthy weight</i>	1.00	1.00	1.00	1.00
<i>Overweight</i>	1.02 (0.98, 1.07)	1.07 (1.02, 1.13)*	1.06 (1.01, 1.12)*	1.14 (1.06, 1.22)*
<i>Obese gr. 1</i>	1.07 (1.00, 1.13)*	1.13 (1.06, 1.21)*	1.17 (1.10, 1.25)*	1.26 (1.16, 1.38)*
<i>Obese gr. 2 & 3</i>	1.12 (1.04, 1.20)*	1.11 (1.02, 1.20)*	1.16 (1.07, 1.27)*	1.34 (1.17, 1.53)*
Model 3: Model 2 + ethnicity				
	<1	1-<2	2-<5	5-<15
Maternal BMI	RR (95% CI)	RR (95% CI)	RR (95% CI)	RR (95% CI)
<i>Underweight</i>	0.95 (0.87, 1.04)	0.93 (0.83, 1.03)	0.97 (0.88, 1.08)	1.06 (0.92, 1.22)
<i>Healthy weight</i>	1.00	1.00	1.00	1.00
<i>Overweight</i>	0.99 (0.95, 1.04)	1.04 (0.99, 1.10)	1.02 (0.97, 1.07)	1.09 (1.02, 1.16)*
<i>Obese gr. 1</i>	1.02 (0.96, 1.09)	1.08 (1.02, 1.16)*	1.12 (1.04, 1.19)*	1.19 (1.09, 1.30)*
<i>Obese gr. 2 & 3</i>	1.10 (1.02, 1.18)*	1.09 (1.01, 1.18)*	1.15 (1.05, 1.25)*	1.31 (1.15, 1.50)*
Model 4: fully adjusted[^]				
	<1	1-<2	2-<5	5-<15
Maternal BMI	RR (95% CI)	RR (95% CI)	RR (95% CI)	RR (95% CI)
<i>Underweight</i>	0.95 (0.87, 1.05)	0.92 (0.83, 1.03)	0.95 (0.85, 1.05)	1.02 (0.88, 1.18)
<i>Healthy weight</i>	1.00	1.00	1.00	1.00
<i>Overweight</i>	1.00 (0.95, 1.04)	1.05 (0.99, 1.10)	1.03 (0.97, 1.08)	1.10 (1.02, 1.17)*
<i>Obese gr. 1</i>	1.02 (0.96, 1.09)	1.09 (1.02, 1.16)*	1.13 (1.05, 1.21)*	1.21 (1.11, 1.32)*
<i>Obese gr. 2 & 3</i>	1.10 (1.02, 1.18)*	1.10 (1.01, 1.19)*	1.16 (1.06, 1.27)*	1.31 (1.15, 1.49)*

[§]SES = socio-economic position, IMD score and maternal education

RR = rate ratios, 95% CI = 95% confidence intervals

[^]Adjusted for socio-economic position, IMD score, maternal education, maternal age, parity, ethnicity and smoking during pregnancy

* $p < 0.05$

** $p < 0.01$

*** $p < 0.0001$

Table S21. Adjusted[^] rate ratios and 95% confidence intervals for types of infection by categories of maternal BMI, stratified by age (complete case analysis)

	Adjusted			
	<1	1-<2	2-<5	5-<15
Maternal BMI	RR (95% CI)	RR (95% CI)	RR (95% CI)	RR (95% CI)
URTI				
Underweight	1.04 (0.92, 1.18)	1.01 (0.88, 1.16)	1.02 (0.90, 1.15)	0.99 (0.86, 1.15)
Healthy weight	1.00	1.00	1.00	1.00
Overweight	1.02 (0.95, 1.09)	1.07 (1.00, 1.15)*	1.04 (0.97, 1.11)	1.05 (0.97, 1.14)
Obese	1.06 (0.99, 1.14)	1.08 (1.00, 1.17)*	1.13 (1.05, 1.22)*	1.23 (1.12, 1.34)*
LRTI				
Underweight	0.77 (0.57, 1.03)	0.70 (0.50, 0.97)*	1.02 (0.75, 1.39)	1.34 (0.85, 2.11)
Healthy weight	1.00	1.00	1.00	1.00
Overweight	0.98 (0.84, 1.15)	1.01 (0.86, 1.17)	0.96 (0.83, 1.12)	1.31 (1.09, 1.58)*
Obese	1.20 (1.03, 1.40)*	1.16 (0.99, 1.36)	1.24 (1.06, 1.44)*	1.43 (1.18, 1.74)*
SST				
Underweight	0.98 (0.84, 1.15)	1.04 (0.82, 1.32)	0.95 (0.76, 1.19)	1.05 (0.86, 1.28)
Healthy weight	1.00	1.00	1.00	1.00
Overweight	0.96 (0.89, 1.04)	1.01 (0.91, 1.11)	1.12 (1.02, 1.22)*	1.11 (1.01, 1.22)*
Obese	1.02 (0.94, 1.11)	1.06 (0.95, 1.18)	1.22 (1.10, 1.36)*	1.21 (1.09, 1.35)*
GU				
Underweight	0.31 (0.11, 0.85)*	0.33 (0.09, 1.19)	0.67 (0.44, 1.01)	1.02 (0.71, 1.46)
Healthy weight	1.00	1.00	1.00	1.00
Overweight	0.92 (0.53, 1.60)	0.99 (0.57, 1.71)	0.98 (0.76, 1.28)	0.98 (0.80, 1.20)
Obese	1.23 (0.70, 2.170)	1.00 (0.59, 1.72)	0.88 (0.67, 1.15)	1.13 (0.89, 1.44)
GI				
Underweight	1.01 (0.77, 1.33)	1.07 (0.81, 1.41)	1.02 (0.78, 1.33)	1.08 (0.84, 1.40)
Healthy weight	1.00	1.00	1.00	1.00
Overweight	1.01 (0.88, 1.17)	1.12 (0.97, 1.30)	1.00 (0.86, 1.15)	1.02 (0.87, 1.20)
Obese	1.01 (0.86, 1.17)	1.15 (0.99, 1.34)	1.14 (0.98, 1.32)	1.09 (0.92, 1.29)
Viral				
Underweight	1.00 (0.66, 1.50)	0.99 (0.69, 1.43)	0.88 (0.71, 1.10)	1.06 (0.83, 1.35)
Healthy weight	1.00	1.00	1.00	1.00
Overweight	1.04 (0.85, 1.27)	0.99 (0.84, 1.18)	1.08 (0.96, 1.21)	1.00 (0.87, 1.14)
Obese	0.88 (0.70, 1.11)	0.97 (0.81, 1.17)	0.98 (0.86, 1.11)	1.12 (0.97, 1.29)

[^]Adjusted for socio-economic position, IMD score, maternal education, maternal age, parity, ethnicity and smoking during pregnancy

RR = rate ratios, 95% CI = 95% confidence intervals

*p<0.05

**p<0.01

***p<0.0001

ⁱ https://borninbradford.nhs.uk/wp-content/uploads/BiB_Data_Summary_printable.pdf

ⁱⁱ Hay AD. Coding infections in primary care. Vol. 367, The BMJ. BMJ Publishing Group; 2019

ⁱⁱⁱ https://datacompass.lshtm.ac.uk/view/keywords/Code_list.html

^{iv} <https://clinicalcodes.rss.mhs.man.ac.uk/>

^v NHS Read code browser: <https://isd.digital.nhs.uk/trud/users/guest/filters/2/categories/9/items/8/releases>

^{vi} Johansson, K., Hutcheon, J. A., Bodnar, L. M., Cnattingius, S., & Stephansson, O. (2018). Pregnancy weight gain by gestational age and stillbirth: a population-based cohort study. *BJOG: An International Journal of Obstetrics and Gynaecology*, 125(8), 973–981.

<https://doi.org/10.1111/1471-0528.15034>

^{vii} Heslehurst, N., Rankin, J., Wilkinson, J. R., & Summerbell, C. D. (2010). A nationally representative study of maternal obesity in England, UK: Trends in incidence and demographic inequalities in 619 323 births, 1989–2007. *International Journal of Obesity*, 34(3), 420–428.

<https://doi.org/10.1038/ijo.2009.250>

^{viii} Santos, S., Eekhout, I., Voerman, E., Gaillard, R., Barros, H., Charles, M. A., Chatzi, L., Chevrier, C., Chrousos, G. P., Corpeleijn, E., Costet, N., Crozier, S., Doyon, M., Eggesbø, M., Fantini, M. P., Farchi, S., Forastiere, F., Gagliardi, L., Georgiu, V., ... Jaddoe, V. W. V. (2018).

Gestational weight gain charts for different body mass index groups for women in Europe, North America, and Oceania. *BMC Medicine*, 16(1), 1–15. <https://doi.org/10.1186/s12916-018-1189-1>

^{ix} Miller, J. E., Hammond, G. C., Strunk, T., Moore, H. C., Leonard, H., Carter, K. W., Bhutta, Z., Stanley, F., de Klerk, N., & Burgner, D. P. (2016). Association of gestational age and growth measures at birth with infection-related admissions to hospital throughout childhood: a population-based, data-linkage study from Western Australia. *The Lancet Infectious Diseases*, 16(8), 952–961. [https://doi.org/10.1016/S1473-3099\(16\)00150-X](https://doi.org/10.1016/S1473-3099(16)00150-X)

^x <https://bmcpublichealth.biomedcentral.com/articles/10.1186/1471-2458-14-835>

^{xi} Miller F, Zylbersztejn A, Favarato G, Adamestam I, Pembrey L, Shallcross L, Mason D, Wright J, Hardelid P. Factors predicting amoxicillin prescribing in primary care among children: a cohort study. *Br J Gen Pract*. 2022 Apr 4;72(722):e659–67. doi: 10.3399/BJGP.2021.0639. Epub ahead of print. PMID: 35817584; PMCID: PMC9282803. (<https://pubmed.ncbi.nlm.nih.gov/35817584/>)