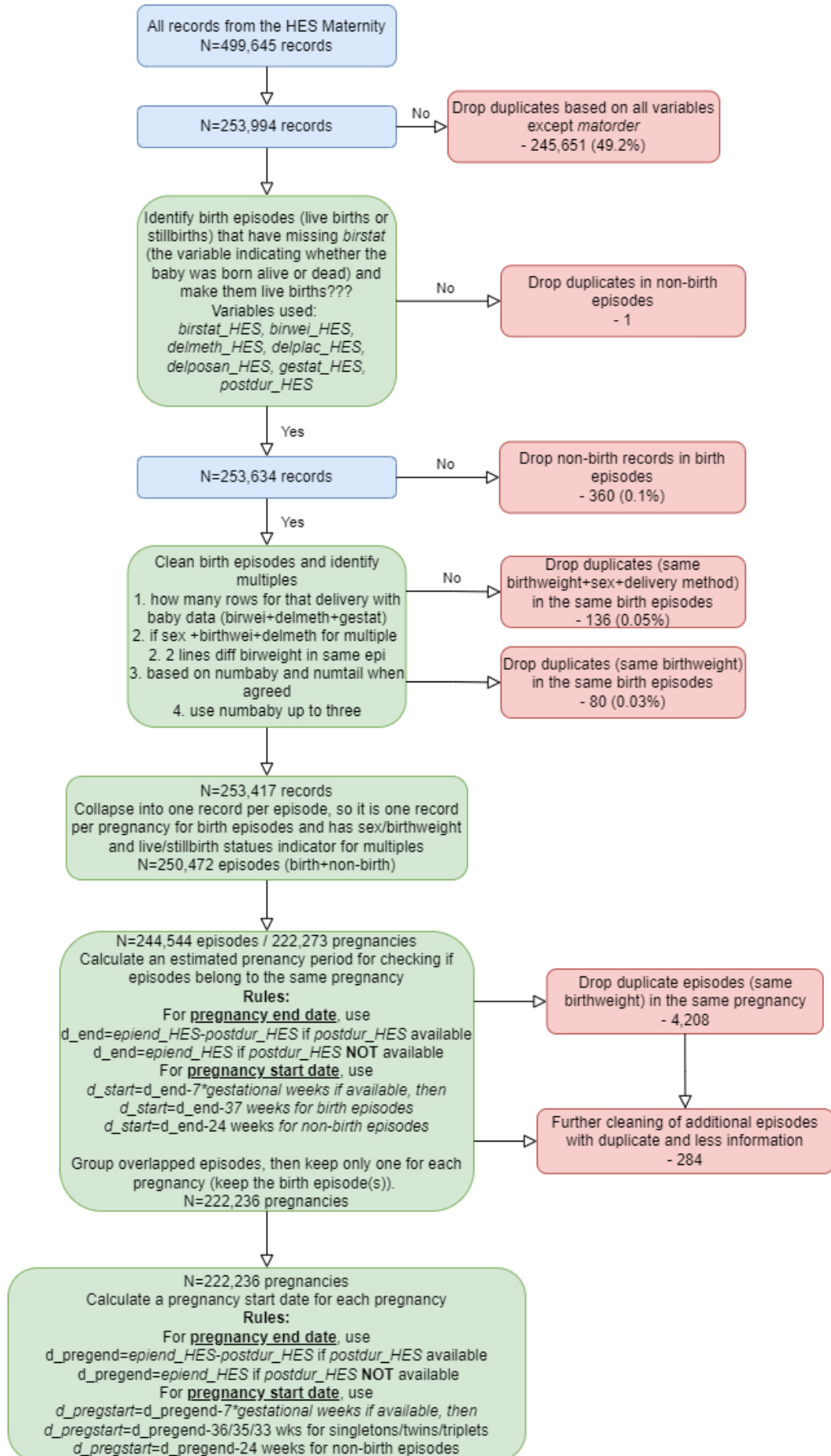


Supplementary Appendix 1: Cleaning Hospital Episode Statistics Maternity data



Supplementary Appendix 2: Priority setting and overarching rules were developed based on the nature of the data sources to ensure priority was given to more reliable sources of data in identifying 'true' pregnancies and eliminating duplicates

1. To ensure pregnancies duplicated across data sources were only counted once, all data sources were considered at the same time.
2. The Pregnancy Register uses an algorithm to estimate pregnancy dates, and birth dates ('pregend') may be adjusted when records conflict with estimated dates or fall outside plausible periods. As a result, the estimated birth date may not be the actual birth date. The variable 'deldate' in CPRD Mother Baby Link (MBL) is an estimated date based on record of a birth in the mother's file. Hospital Episode Statistics (HES) data does not include a 'pregend' or a 'deldate' variable, so we used the end date of the birth episode. As a result, dates were not expected to match exactly.
3. Live births are always given precedence over other outcomes.
4. Linkage to a child in the MBL (evidenced by presence of a baby patient id number) was considered strong evidence of a birth.
5. A HES record of a birth or stillbirth was given precedence over the PR records.
6. When other information was the same, the record with the earliest antenatal record date, pregnancy end date, and then pregnancy start date, subsequently, was chosen to avoid pregnancy care being misclassified to pre-pregnancy care.

Supplementary Appendix 3: Proportion of pregnancies added from Mother Baby Link (MBL) and Hospital Episode Statistics (HES, 1997 onwards)

**Source of data by pregnancy**

Year when pregnancy started	Total number	PR (with or w/o evidence from MBL/HES)	MBL only	HES only	MBL+HES
1997	10,260	71.7	0.0	28.1	0.1
1998	10,512	79.0	0.0	20.8	0.1
1999	10,500	85.5	0.1	14.3	0.2
2000	10,761	86.3	0.0	13.4	0.2
2001	11,869	88.8	0.0	11.0	0.2
2002	12,642	90.0	0.0	9.7	0.3
2003	13,759	90.7	0.0	8.9	0.3
2004	14,779	91.5	0.0	8.1	0.4
2005	15,262	91.7	0.1	7.9	0.4
2006	16,402	93.2	0.1	6.4	0.3
2007	17,629	93.2	0.3	6.4	0.2
2008	17,429	94.0	0.2	5.5	0.4
2009	18,088	94.3	0.0	5.1	0.5
2010	18,505	94.2	0.0	5.2	0.6
2011	18,329	95.2	0.1	4.3	0.4
2012	17,773	95.8	0.0	3.7	0.5
2013	17,249	96.7	0.1	2.7	0.5
2014	16,677	97.4	0.1	2.0	0.5
2015	16,132	98.3	0.1	1.1	0.6
2016	13,923	98.2	0.1	1.3	0.5
2017	10,528	98.0	0.1	1.4	0.5
2018	7,311	97.1	0.1	2.2	0.6
2019	5,116	96.5	0.2	2.9	0.4
2020	2,440	98.2	0.5	1.2	0.0
2021	355	100.0	0.0	0.0	0.0
<b>Total</b>	<b>324,230</b>	<b>92.7</b>	<b>0.1</b>	<b>6.9</b>	<b>0.4</b>

PR Pregnancy Register.  
 MBL Mother Baby Link.  
 HES Hospital Episode Statistics.

Supplementary Appendix 4: Extent of bias introduced by the 'as provided' Pregnancy Register data (based on all pregnancies)

	'As provided'	'Derived'	'Strictly derived'	'As provided'		'Derived'		'Strictly derived'	
	N = 381,811	N = 363,599	N = 181,381	Unadjusted OR	Adjusted OR <sup>a</sup>	Unadjusted OR	Adjusted OR <sup>a</sup>	Unadjusted OR	Adjusted OR <sup>a</sup>
<b>Exposure 1, Asthma</b>	<b>Number of cases (row%)</b>	<b>Number of cases (row%)</b>	<b>Number of cases (row%)</b>						
<b>Outcome 1, gestational diabetes (GDM)</b>									
No exposure	3,734 (1.1)	3,527 (1.1)	2,488 (1.6)	Reference	Reference	Reference	Reference	Reference	Reference
Exposure	673 (1.3)	635 (1.3)	504 (1.7)	1.14 (1.03-1.25)	1.07 (0.97-1.18)	1.19 (1.09-1.31)	1.09 (0.99-1.20)	1.07 (0.96-1.19)	1.10 (0.99-1.23)
Total	4,407 (1.2)	4,162 (1.1)	2,992 (1.7)						
<b>Outcome 2, preterm birth (PTB)</b>									
No exposure	13,068 (6.7)	15,087 (7.2)	8,563 (8.5)	Reference	Reference	Reference	Reference	Reference	Reference
Exposure	2,236 (7.4)	2,446 (7.8)	1,658 (8.8)	1.10 (1.05-1.16)	1.05 (1.00-1.11)	1.08 (1.03-1.14)	1.03 (0.99-1.09)	1.04 (0.98-1.10)	1.05 (0.99-1.11)
Total	15,304 (6.8)	17,533 (7.3)	10,221 (8.5)						
<b>Exposure 2, Actively managed asthma</b>	<b>Number of cases (row%)</b>	<b>Number of cases (row%)</b>	<b>Number of cases (row%)</b>						
<b>Outcome 1, gestational diabetes (GDM)</b>									
No exposure	4,130 (1.1)	3,904 (1.1)	2,760 (1.6)	Reference	Reference	Reference	Reference	Reference	Reference
Exposure	277 (1.6)	258 (1.8)	232 (2.0)	1.45 (1.26-1.67)	1.20 (1.05-1.38)	1.59 (1.38-1.83)	1.25 (1.09-1.44)	1.25 (1.08-1.44)	1.26 (1.08-1.45)
Total	4,407 (1.2)	4,162 (1.1)	2,992 (1.7)						
<b>Outcome 2, preterm birth (PTB)</b>									
No exposure	14,373 (6.7)	16,609 (7.2)	9,491 (8.5)	Reference	Reference	Reference	Reference	Reference	Reference
Exposure	931 (9.7)	924 (9.6)	730 (9.7)	1.50 (1.39-1.62)	1.39 (1.29-1.49)	1.36 (1.27-1.47)	1.28 (1.19-1.37)	1.16 (1.06-1.26)	1.16 (1.06-1.26)
Total	15,304 (6.8)	17,533 (7.3)	10,221 (8.5)						

