

## Impact of smoking on future rates of stillbirth, neonatal and infant mortality and poor birth outcomes in England

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### BACKGROUND

Smoking in pregnancy is a key modifiable risk factor for a range of maternal and infant health problems and increased mortality, both before and after birth. The risks of miscarriage and stillbirth are significantly increased, and babies born to smoking mothers are more likely to be born prematurely or too small, and to die in the first year of life.<sup>1</sup>

The most recent data show that around 11% of women in England smoke at the time of giving birth;<sup>2</sup> a figure that has declined over the last decade but stagnated in recent years. Rates vary significantly across the country, with 28.1% of women in Blackpool smoking in pregnancy compared to just 2.33% in Kensington and Chelsea, London. Rates also vary widely by age and socioeconomic status. Supporting women who smoke to quit after becoming pregnant is a key public health priority and has been the subject of national smoking reduction targets, most recently in the 2017 Tobacco Control Plan (TCP) for England, which aims for fewer than 6% of women to be smoking in pregnancy by the end of 2022.<sup>3</sup>

Improving outcomes in pregnancy and after birth is an increasingly important priority for the Department of Health and Social Care. There has been relatively little change in rates of stillbirth, neonatal and infant mortality, preterm birth and low birthweight in recent years, and there is wide variation across the country and between social and ethnic groups.<sup>4</sup> In 2015 a national ambition was announced as part of the Maternity Transformation Programme (MTP) to halve the rate of stillbirths and neonatal deaths by 2030, which was subsequently bought forward to 2025 in 2017, along with the additional target of reducing preterm birth from 8% to 6% of live births.<sup>5</sup>

Due to the contribution smoking makes to adverse fetal and infant outcomes, efforts to reduce rates of stillbirth, neonatal death and preterm birth must include supporting women to quit smoking, and indeed this is a core part of the Saving Babies' Lives care bundle to reduce stillbirth.<sup>6</sup> This paper aims to explore the link between predicted future rates of smoking and future rates of adverse birth and infant outcomes in England, in order to estimate the impact that reaching – or not reaching – the Tobacco Control Plan target of less than 6% of women smoking during pregnancy might have on achieving Maternity Transformation Programme targets around reducing stillbirth, neonatal death and preterm birth by 2025. Rates of low birthweight and sudden infant death syndrome (SIDS) will also be considered in the analysis, as outcomes similarly associated with smoking in pregnancy with a relatively high prevalence and significant burden on families affected.

## METHODS

### Smoking in pregnancy future scenarios

Projections for three different future scenarios of smoking rates were created to compare outcomes. The projections used current estimates of smoking in pregnancy taken from the Smoking at Time of Delivery (SATOD) dataset, published every quarter by NHS Digital.<sup>2</sup> The method of data analysis in the SATOD dataset was changed in 2017 to exclude ‘don’t knows’ from the denominator, so this updated methodology is used throughout. Years are given as financial years, following the SATOD reporting structure. As the TCP and MTP targets are for the end of each respective calendar year, this assumes that the target year for reducing smoking to under 6% is 2022/23, and for reducing stillbirth, neonatal death and preterm birth is 2025/26.

- *Scenario 1.* The TCP target is met and smoking declines by a consistent rate to 6% by 2022/23, and continues to fall at the same rate thereafter. The rate of decline was calculated by taking the difference between the current and target rate and dividing by the number of years to reach the target year  $((10.8-6)/5 = \text{decline of } 0.96\% \text{ per year})$ .
- *Scenario 2:* There is no change from the current rate of smoking, which in the latest available data is 10.8% (quarter 3 2017/18, NHS Digital).
- *Scenario 3:* Smoking continues to decrease at the historical rate of decline, calculated using a regression equation in Microsoft Excel and based on data from the SATOD dataset from 2009/10 to quarter 3 of 2017/18 (see Appendix A).

### Risk of adverse outcome

For each smoking scenario, numbers of stillbirths (defined as a baby born showing no signs of life at or after 20 weeks of gestation, following the meta-analysis by Marufu *et al.* 2015<sup>10</sup> below), neonatal deaths (death in the first 28 days of life), preterm births (birth before 37 completed weeks of gestation), babies of low birthweight (weight of less than 2.5kg at birth) and SIDS deaths (sudden and unexpected death of an infant aged between 28 days and 12 months that remains unexplained after thorough investigation) were projected for each year from 2017/18 to 2025/26. These were calculated by estimating the risk of each outcome in smokers and non-smokers using published estimates of the relative risk (RR) or odds ratio (OR; considered here to be equivalent to RR) of smoking on each outcome, the percentage of women smoking in pregnancy (as per the most recent rate reported in the SATOD dataset), and the proportion of each outcome, using the equation below.

$$\text{Risk of outcome if smoking} = \frac{(\text{RR} \times \text{proportion with outcome})}{(\text{RR} \times \text{Proportion smoking} + (1 - \text{Proportion smoking}))}$$

The proportions of the different outcomes were taken from data published by the Office for National Statistics (ONS) for numbers of stillbirths,<sup>4</sup> neonatal deaths,<sup>4</sup> low birthweight births<sup>7</sup> and SIDS deaths<sup>8</sup> in England in the most recent year for which data were available (2016 for stillbirths,

neonatal deaths and low birthweight, and 2015 for SIDS). As numbers for preterm births are only published by ONS for England and Wales combined, the proportion for this outcome was assumed to be the rate used in the MTP target, which was 8% of live births.<sup>5</sup> Outcomes were calculated as a proportion of the live births for that year, apart from stillbirth which was calculated as a proportion of total births (live births plus stillbirths).<sup>7,9</sup> These data can be found in Appendix B.

The RR/ORs used were all pooled estimates from the most recent meta-analyses available on the effects of smoking in pregnancy for each outcome, and are listed in table 1.

	RR/OR	95% CI	Source
<b>Stillbirth</b>	1.47	1.37–1.57	Marufu <i>et al.</i> 2015 <sup>10</sup>
<b>Neonatal death</b>	1.22	1.14–1.30	Pineles <i>et al.</i> 2016 <sup>11</sup>
<b>Preterm birth</b>	1.27	1.21–1.33	Shah & Bracken 2000 <sup>12</sup>
<b>Low birthweight</b>	2.00	1.77–2.26	Pereira <i>et al.</i> 2017 <sup>13</sup>
<b>Sudden infant death</b>	2.25	2.03–2.50	Zhang & Wang 2013 <sup>14</sup>

**Table 1:** relative risk/odds ratios and 95% confidence intervals used for calculating projected risk of each adverse outcome in pregnant smokers

### Projected estimated numbers of each outcome

For each outcome and future estimated smoking rate (given in table 2 below), the upper and lower confidence intervals were used to calculate the risk of that outcome, to give a range of the number of stillbirths, neonatal deaths, etc in each future year that could be attributed to smoking. This was calculated by multiplying the risk with the projected number of deliveries (i.e. births of one or more children, alive or stillborn) exposed to smoking in each future year. The numbers of deliveries were predicted using projections of live birth data published by ONS.<sup>15</sup> As the number of deliveries in NHS establishments reported in the SATOD dataset is consistently on average 95% of the number of total live births in England, this proportion was assumed to remain constant from 2017/18 to 2025/26 in order to estimate the number of future deliveries.

The main outcome of interest was the estimated number of stillbirths, neonatal deaths, preterm and low birthweight births, and sudden infant deaths that could be prevented in the future by reducing smoking to the target rate of 6% by 2022 compared to a) no change from the current rate of smoking in pregnancy and b) the current rate of decline.

## RESULTS

### Projected rates of smoking and number of live births and deliveries in NHS establishments in England, 2017/18–2025/26.

Year	Scenario 1: Smoking reduces to 6% by end of 2022	Scenario 2: No further change from 2017/18 rate* (NHS Digital 2018) <sup>2</sup>	Scenario 3: Smoking declines at historical rate	Live births (Principal projection, ONS 2016) <sup>15</sup>	Deliveries (Assumed to be constant proportion of 95% of live births)**
<b>2017/18</b> <i>(current year)</i>	10.80	10.80 (10.7–11.0)	10.80	661,283	628,218
<b>2018/19</b>	9.84	10.80 (10.7–11.0)	10.05	661,206	628,146
<b>2019/20</b>	8.88	10.80 (10.7–11.0)	9.60	660,728	627,692
<b>2020/21</b>	7.92	10.80 (10.7–11.0)	9.16	659,566	626,588
<b>2021/22</b>	6.96	10.80 (10.7–11.0)	8.71	658,488	625,564
<b>2022/23</b>	6.00	10.80 (10.7–11.0)	8.26	657,580	624,701
<b>2023/24</b>	5.04	10.80 (10.7–11.0)	7.81	656,451	623,628
<b>2024/25</b>	4.08	10.80 (10.7–11.0)	7.36	654,864	622,121
<b>2025/26</b>	3.12	10.80 (10.7–11.0)	6.91	653,077	620,423

**Table 2:** Projected rates of smoking at the time of delivery among pregnant women in per cent (95% CI), and projected numbers of live births and deliveries. England, 2017/18–2025/26.

\*Based on quarter 3 rate. Data are provisional

\*\*Based on comparison of NHS SATOD and ONS live birth data 2009–2016

The number of deliveries predicted to be exposed to smoking in each scenario is given in Appendix C.

**Numbers of adverse outcomes prevented by reducing smoking to 6% by 2022:**

**1. Stillbirth**

Future year	(a) Lives saved compared to no change from 2017/18 smoking rate	(b) Lives saved compared to historical rate of decline
2018/19	9–15	6–8
2019/20	18–29	7–10
2020/21	27–44	12–18
2021/22	36–58	16–26
2022/23	45–73	21–34
2023/24	55–87	26–41
2024/25	64–100	31–49
2025/26	73–114	36–56

**Table 3:** Projected number of stillbirths that could be prevented by reducing smoking in pregnancy to 6% by 2022 compared to (a) no decline from current rate and (b) reduction at current rate of decline.

**2. Neonatal deaths**

Future year	a) Lives saved compared to no change from 2017/18 smoking rate	(b) Lives saved compared to historical rate of decline
<b>2018/19</b>	2–5	2–3
<b>2019/20</b>	4–10	2–3
<b>2020/21</b>	7–15	3–6
<b>2021/22</b>	9–20	4–9
<b>2022/23</b>	11–25	5–12
<b>2023/24</b>	13–30	6–14
<b>2024/25</b>	16–35	8–17
<b>2025/26</b>	18–39	9–19

**Table 4:** Projected number of neonatal deaths that could be prevented by reducing smoking in pregnancy to 6% by 2022 compared to (a) no decline from current rate and (b) reduction at current rate of decline.

**3. Preterm births**

Future year	a) Preterm births prevented compared to no change from 2017/18 smoking rate	(b) Preterm births prevented compared to historical rate of decline
<b>2018/19</b>	97–160	68–93
<b>2019/20</b>	194–320	73–107
<b>2020/21</b>	290–479	125–196
<b>2021/22</b>	386–637	175–284
<b>2022/23</b>	482–796	225–371

<b>2023/24</b>	580–947	277–451
<b>2024/25</b>	677–1097	329–531
<b>2025/26</b>	773–1245	380–609

**Table 5:** Projected number of preterm births that could be prevented by reducing smoking in pregnancy to 6% by 2022 compared to (a) no decline from current rate and (b) reduction at current rate of decline.

#### 4. Low birthweight

<b>Future year</b>	<b>a) Low birthweight births prevented compared to no change from 2017/18 smoking rate</b>	<b>(b) Low birthweight births prevented compared to historical rate of decline</b>
<b>2018/19</b>	293–484	205–281
<b>2019/20</b>	585–967	221–324
<b>2020/21</b>	875–1449	376–594
<b>2021/22</b>	1165–1928	527–858
<b>2022/23</b>	1455–2407	678–1122
<b>2023/24</b>	1749–2864	834–1365
<b>2024/25</b>	2040–3318	992–1606
<b>2025/26</b>	2330–3768	1146–1841

**Table 6:** Projected number of low birthweight births that could be prevented by reducing smoking in pregnancy to 6% by 2022 compared to (a) no decline from current rate and (b) reduction at current rate of decline.

#### 5. SIDS deaths

<b>Future year</b>	<b>a) Lives saved compared to no change from 2017/18 smoking rate</b>	<b>(b) Lives saved compared to historical rate of decline</b>
<b>2018/19</b>	1–2	1–1
<b>2019/20</b>	3–4	1–1
<b>2020/21</b>	4–7	2–3
<b>2021/22</b>	6–9	3–4
<b>2022/23</b>	7–11	3–5
<b>2023/24</b>	9–13	4–6
<b>2024/25</b>	10–15	5–7
<b>2025/26</b>	12–17	6–8

**Table 7:** Projected number of SIDS deaths that could be prevented by reducing smoking in pregnancy to 6% by 2022 compared to (a) no decline from current rate and (b) reduction at current rate of decline.

## DISCUSSION

Using current data on smoking rates in pregnancy and the numbers of adverse outcomes related to smoking, it has been possible to estimate a range of the numbers of babies' lives that could be saved or improved in England by reducing smoking to the target of 6% by the end of 2022.

If the rate of decline is increased above the current rate to the level needed to meet the Government's target, then over the five years of the Tobacco Control Plan there will be a cumulative estimated reduction in the number of adverse outcomes of between 62 and 96 stillbirths; 16–33 neonatal deaths; 666–1,051 preterm births; 2,007–3,179 low birthweight births; and 10–14 sudden infant deaths.

Should this momentum continue through to the end of 2025, an additional 93–146 stillbirths, 23–50 neonatal deaths, 986–1,591 preterm births, 2,972–4,812 low birthweight births and 15–21 sudden infant deaths could be prevented. However, if rates of smoking remain at the level they have been in recent years then over the five years of the Tobacco Control Plan there will be many more avoidable deaths and adverse outcomes.

The Royal College of Physicians (RCP) has recently published a report on the impact of smoking on the NHS, which includes estimates of the impact of smoking in pregnancy.<sup>17</sup> Our analysis uses the same source meta-analyses for its calculations, however our methodology does differ in some ways, including reporting a range rather than a single figure to convey uncertainty in the estimates, using different rates of smoking in pregnancy, and estimating outcomes among all pregnancies exposed to smoking, whereas the RCP report counts only hospital episodes of each outcome identified by their respective ICD-10 codes.<sup>17</sup> Some of the differences between the two approaches can also be explained by our different objectives: while the RCP was seeking to directly estimate the impact of smoking in pregnancy on NHS care, our analysis seeks to understand what impact achieving the Government target on smoking will have on women and their families.

Achieving this target and reducing smoking to 6% would contribute to reaching the national ambition of halving stillbirth and neonatal deaths and reducing preterm birth from 8% to 6% by the end of 2025. Future rates of each outcome have not been estimated here as it is not known from this analysis how numbers of each outcome in women who do not smoke might change in the future, affecting the total numbers. As most poor birth outcomes will take place in women who do not smoke, work must continue to improve outcomes across all domains of maternity and paediatric care; however this analysis shows that supporting women to give up smoking should not be overlooked as a key component of this to help drive down rates.

This analysis also shows that the outcomes not currently subject to national ambitions, low birthweight and sudden infant death, could be positively impacted on by reducing smoking to 6%. Low birthweight in particular affects many thousands of babies in England every year, is associated with increased mortality and health problems extending through childhood and into adulthood,<sup>13</sup> and in 2015-16, cost the NHS over £10 million in admitted patient care for babies born at low birthweight as a consequence of maternal smoking in pregnancy.<sup>17</sup> Creating targets for these outcomes in the same way as stillbirth, neonatal death and preterm birth would help to focus efforts to reduce future rates and save babies' lives.

## Assumptions and limitations

There are some limitations of the data used in this analysis which mean the results should be interpreted with caution:

- The main limitation of the data is the implicit assumption that adverse outcomes that occur in women who smoke during pregnancy, for example stillbirth, happen as a direct result of smoking. However, despite the established negative physiological effects of smoking on maternal and fetal health,<sup>1</sup> stillbirths can occur for a multitude of reasons that are not related to smoking, even in smokers. The RRs/ORs used in this analysis were adjusted for these potential confounding factors in the meta-analyses referenced.
- Conversely, underreporting of smoking in pregnancy due to social stigma, as well as the fact that the SATOD dataset only captures smoking status at the end of pregnancy and not women who smoked at an earlier stage, mean that adverse outcomes that occur in the non-smoking group could actually be related to smoking. Improving data collection by universal CO screening and recording smoking status at the beginning of pregnancy, as per the currently experimental Maternity Service Monthly Statistics dataset, would make this data more reliable.
- The numbers presented for each outcome are dependent on the RR/OR selected from the research, which are based on samples that may not be directly applicable to women in England over the next eight years. Using pooled estimates from recent systematic review and meta-analyses, and offering a range based on upper and lower confidence intervals helps to improve the reliability of the projections, but the risk and predicted numbers would change depending on the study used.
- Stillbirth is defined in this paper as a baby being born showing no signs of life at or after 20 weeks of gestation as this is used in the paper by Marufu *et al.*<sup>10</sup> to provide the OR for stillbirth in smokers; however the standard definition of stillbirth in the UK is from 24 weeks of gestation. Marufu *et al.* do report an OR for 24 weeks (1.58, 95% CI 1.21–2.6), but as the confidence intervals are so wide a cut-off of 20 weeks was selected to provide more useful estimates in the analysis.
- The analysis only considers active maternal smoking, but it is known that exposure to secondhand smoke is an independent risk factor for lower birthweight and SIDS, and is likely to cause preterm birth.<sup>16</sup> Further analyses could take into account rates of exposure to secondhand smoke in addition to active smoking.
- The number of live births in the future comes from a projection published by ONS based on mid-2016 population statistics, which is by definition only an estimate.<sup>15</sup> The projection was further used in this analysis to estimate the number of future deliveries taking place in NHS establishments, as SATOD data comes from women delivering in NHS establishments only. Therefore this analysis does not take into account smoking rates or adverse outcomes that may occur in non-NHS facilities where women may give birth.
- SATOD data are reported per financial year, whereas ONS data are reported per calendar year. Therefore rates of smoking and rates of stillbirths, neonatal deaths, etc will not relate to one another precisely.

## CONCLUSIONS

Reducing smoking in pregnancy to the target level set out in the Tobacco Control Plan would help to save more babies' lives and improve more babies' health, compared to the current rate of decline. This analysis shows this is particularly true for babies born with a low birthweight, which is a significant risk factor for future morbidity and mortality, and would benefit from inclusion in national ambitions for maternity improvement work. Action must be taken to reach the Tobacco Control Plan target and support more women to quit, but alongside this, data collection must also improve to allow for more robust estimates of smoking rates, and more robust analyses of adverse outcomes. To reduce smoking to 6% by 2022 will require sustained effort and resource. However, based on the projections in this paper, for many babies born in England in the near future this action would prove life-changing, and life-saving.

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## REFERENCES

1. Royal College of Physicians. *Passive smoking and children*. A report by the Tobacco Advisory Group. London: RCP, 2010.
2. NHS Digital. Statistics on Women's Smoking Status at Time of Delivery: England. 2011/12–2017/18. Available at: <https://digital.nhs.uk/data-and-information/publications/statistical/statistics-on-women-s-smoking-status-at-time-of-delivery-england> [Accessed June 2018].
3. Department of Health and Social Care. *Towards a Smokefree Generation. A Tobacco Control Plan for England*. London: DHSC, 2017. Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/630217/Towards\\_a\\_Smoke\\_free\\_Generation\\_-\\_A\\_Tobacco\\_Control\\_Plan\\_for\\_England\\_2017-2022\\_\\_2\\_.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/630217/Towards_a_Smoke_free_Generation_-_A_Tobacco_Control_Plan_for_England_2017-2022__2_.pdf) [Accessed April 2018].
4. Office for National Statistics. *Statistical Bulletin: Child Mortality in England and Wales: 2016*. London: ONS, 2018. Available at: <https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/bulletins/childhoodinfantandperinatalmortalityinenglandandwales/2016> [Accessed June 2018].
5. Department for Health and Social Care. *Safer Maternity Care. The National Maternity Safety Strategy - Progress and Next Steps*. London: DHSC, 2017. Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/662969/Safer\\_maternity\\_care\\_-\\_progress\\_and\\_next\\_steps.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/662969/Safer_maternity_care_-_progress_and_next_steps.pdf) [Accessed April 2018].

6. NHS England. Saving Babies' Lives. A care bundle for reducing stillbirth. London: NHS England, 2016. Available at: <https://www.england.nhs.uk/wp-content/uploads/2016/03/saving-babies-lives-car-bundl.pdf> [Accessed June 2018].
7. Office for National Statistics. *Statistical Bulletin: Birth characteristics in England and Wales: 2016*. London: ONS, 2017. Available at: <https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/livebirths/bulletins/birthcharacteristicsinenglandandwales/2016> [Accessed April 2018].
8. Office for National Statistics. *Dataset: Unexplained deaths in infancy, England and Wales: 2015*. London, ONS: 2017. Available at: <https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/datasets/unexplaineddeathsininfancyenglandandwalesreferencetables> [Accessed April 2018].
9. Office for National Statistics. *Statistical Bulletin: Birth characteristics in England and Wales: 2015*. London: ONS, 2017. Available at: <https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/livebirths/bulletins/birthcharacteristicsinenglandandwales/2015> [Accessed April 2018].
10. Marufu TC, Ahankari A, Coleman T *et al.* Maternal smoking and the risk of still birth: systematic review and meta-analysis. *BMC Public Health* 2015;15:239.
11. Pineles BL, Hsu S, Park E *et al.* Systematic review and meta-analyses of perinatal death and maternal exposure to tobacco smoke during pregnancy. *Am J Epidemiol.* 2016;184(2):87–97.
12. Shah NR, Bracken MB. A systematic review and meta-analysis of prospective studies on the association between maternal cigarette smoking and preterm delivery. *Am J Obstet Gynecol.* 2000;182(2):465–472.
13. Pereira PP, Da Mata FA, Figueiredo AC *et al.* Maternal active smoking during pregnancy and low birth weight in the Americas: A systematic review and meta-analysis. *Nicotine Tob Res.* 2017;19(5):497-505.
14. Zhang K, Wang X. Maternal smoking and increased risk of sudden infant death syndrome: A meta-analysis. *Legal Medicine.* 2013;15(3):115–121.
15. Office for National Statistics. *2016-based National Population Projections. Principal Projection*. London: ONS, 2017. Available at: <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections> [Accessed April 2018].
16. U.S. Dept. of Health and Human Services. *The Health Consequences of Involuntary Exposure to Tobacco Smoke: A Report of the Surgeon General*. Atlanta (GA): Centers for Disease Control and Prevention (US), 2006. Available at: <https://www.surgeongeneral.gov/library/reports/secondhandsmoke/fullreport.pdf> [Accessed June 2018].
17. Royal College of Physicians. *Hiding in plain sight: treating tobacco dependency in the NHS*. London: RCP, 2018.

## APPENDICES

### Appendix A: SATOD data used in regression analysis to predict future smoking rates in Scenario 2 (smoking continues to decrease at current rate of decline)

Year	Rate (%)
2009/10	14.1
2010/11	13.36
2011/12	13.31
2012/13	12.84
2013/14	12.16
2014/15	11.73
2015/16	10.99
2016/17	10.71
2017/18	10.80*

**Table 8:** Rates of smoking at time of delivery in England, 2009–2018<sup>2</sup>

\*Quarter 3, provisional data

### Appendix B: Number of adverse outcomes and live births used to calculate risk of outcome if smoking in pregnancy

Outcome	Total	Year of latest data	Number of live births <sup>7,9</sup>	Proportion of outcome / births
Stillbirth <sup>4</sup>	2895	2016	666052 ( <i>total births i.e. live births + stillbirths</i> )	0.00435
Neonatal death <sup>4</sup>	1832	2016	663157	0.00276
Preterm birth (Assumed to be 8% of live births)	53053	2016	663157	0.08000
Low birthweight <sup>7</sup>	46183	2016	663157	0.06964
SIDS <sup>8</sup>	181	2015	664399	0.00027

**Table 9:** Data published by ONS used to calculate risk of each outcome if smoking in pregnancy

**Appendix C: Estimated numbers of women smoking in pregnancy in each future scenario**

Year	Scenario 1: Smoking reduces to 6% by end of 2022	Scenario 2: No further change from 2017/18 rate	Scenario 3: Smoking declines at current rate
<b>2017/18</b>	67,848–69,276	67,848–69,276	67,219–70,559
<b>2018/19</b>	61,810–63,111	67,840–69,268	65,453–63,682
<b>2019/20</b>	55,739–56,912	67,791–69,218	59,819–60,655
<b>2020/21</b>	49,626–50,670	67,671–69,096	56,957–57,574
<b>2021/22</b>	43,539–44,456	67,561–68,983	54,049–54,516
<b>2022/23</b>	37,482–38,271	67,468–68,888	51,163–51,475
<b>2023/24</b>	31,431–32,093	67,352–68,770	48,269–48,425
<b>2024/25</b>	25,383–25,917	67,189–68,604	45,415–45,367
<b>2025/26</b>	19,357–19,765	67,006–68,416	42,499–42,298

**Table 10:** Range of estimated pregnancies exposed to smoking, calculated by multiplying predicted future rate of smoking in each scenario by number of NHS deliveries predicted.