Maternal, Newborn and Infant Clinical Outcome Review Programme

MBRRACE-UK
Mothers and Babies: Reducing Risk through Audits and Confidential Enquiries across the UK

MBRRACE-UK
Perinatal Mortality Surveillance Report

UK Perinatal Deaths for Births from January to December 2017

October 2019

HQIP Healthcare Quality Improvement Partnership
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University of Birmingham
The Newcastle upon Tyne Hospitals NHS Foundation Trust
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on behalf of the MBRRACE-UK collaboration

October 2019

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Foreword

In this, the fifth MBRRACE-UK national perinatal mortality surveillance report, we are pleased to announce that the extended perinatal mortality rate for the UK decreased in 2017 compared with 2016. This was largely due to a fall in the stillbirth rate and more particularly in the rate of stillbirths of babies who had reached term. Compared with the first MBRRACE-UK perinatal mortality surveillance report in 2013, this represents ~500 fewer deaths in 2017. So whilst we reflect that the figures in the report represent 4,107 much wanted babies who will never realise the potential anticipated by their parents and other families members, the findings do give us cause for hope that the decreasing trend in the national perinatal mortality rate will continue. The national focus in all four countries of the UK aimed at improving maternity services and reducing perinatal death appears to be having an overall effect, although we can never be certain which, of the many initiatives underway, has had the greatest impact.

It is also heartening to see that the proportion of stillbirths identified as having an intrapartum cause has also reduced substantially. This, together with the increase in the proportion of deaths where the cause of death has been identified, suggests that service improvements are indeed having an effect. Greater attention is also being paid to understanding the causes and circumstances of perinatal deaths, when they do occur, and this is likely to be feeding into a model of continuous service improvement.

There have been several changes to the presentation of the figures in this report including a change to definitions for the colour coding used to represent mortality rates in the maps and tables, and the presentation of rates calculated both including and excluding babies who died from congenital anomalies in the perinatal period.

The calculation of rates excluding babies who died from congenital anomalies show the contribution of these developmental structural abnormalities to the perinatal death rate. This highlights the fact that even with the best care, at present not all perinatal deaths are avoidable. Continuing efforts to understand the causes and to prevent such anomalies will be key to reducing perinatal mortality from this wide group of conditions. These findings also underline the importance of the provision of high quality compassionate and empathic care for the parents of these babies.

We instituted the change in the definition of the colour coding to move away from the message that the previous colour coding seemingly conveyed that having an ‘average’ perinatal mortality rate, where the average is based on the national rate, is acceptable. We know that our national perinatal mortality rate is in the bottom half of rates compared with our European peers and other similar high income countries. The national ambition in England is to halve the perinatal mortality rate by 2025. To achieve this, and the other country specific goals, will require a greater rate of decline in the national rate than we have seen in recent years. So whilst the continuing downward trend is encouraging, we cannot be complacent. We hope that this new presentation of the colour coding will provide encouragement for the range of local activates which will be needed to achieve the various national ambitions, stretch aims and aspirations.

In addition to continuing national perinatal surveillance and carrying out the current confidential enquiries into deaths in twins, in the past year we have also released the MBRRACE-UK Real-time Data Monitoring Tool (RDMT). The RDMT enables MBRRACE-UK registered staff in Trusts and Health Boards to directly view and monitor the number of perinatal deaths in their organisation and the time between each death. Staff are able to identify, in real-time, if they are experiencing a cluster of similar types of perinatal deaths. Adding this information to the information they derive from their local reviews of deaths carried out using the national Perinatal Mortality Review Tool (PMRT) will help organisations to identify where improvements in the care they deliver is needed. However, the RDMT only works in ‘real-time’ if Trusts and Health Boards notify MBRRACE-UK of their deaths immediately following the event. It is therefore, disappointing that only just over half of all deaths were notified to us within the benchmark time of 30 days and only 20% of Trusts and Health Boards notified 90% of their

deaths within the benchmark. We hope that the availability of the RDMT will encourage these organisations to improve their speed of notification to enable them to benefit from its functionality.

The figures yet again highlight the fact that the perinatal mortality rate remains disproportionately high for some groups in the population compared with others. In particular we see again that the death rate for Black, Black British and Asian babies remains high, although encouragingly for the first time since 2013 the stillbirth rate for these groups of babies has decreased. However, this reduction is not reflected in the neonatal mortality rate. The reasons for these differences cannot be discerned from the surveillance of the mortality rates, but MBRRACE-UK collaborators and other researchers are undertaking research to improve our understanding of why there are these differences and to provide guidance as to the actions required to address these disparities.

We know there is no single solution to reducing the number of babies dying. A complex series of service quality improvements is required to ensure that every potentially avoidable death is indeed prevented. Local reviews, national level investigations, confidential enquiries and research all have their part to play in helping us to understand why deaths occur and where service improvements can make a difference to outcomes. However, in the final analysis it will be the commitment of local teams to continuous service quality improvement that will make the difference and drive down the perinatal mortality rate for the population they serve.

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Definitions used in this report

Late fetal loss	A baby delivered between 22^{+0} and 23^{+6} weeks gestational age showing no signs of life, irrespective of when the death occurred.
Stillbirth	A baby delivered at or after 24^{+0} weeks gestational age showing no signs of life, irrespective of when the death occurred.
Antepartum stillbirth	A baby delivered at or after 24^{+0} weeks gestational age showing no signs of life and known to have died before the onset of care in labour.
Intrapartum stillbirth	A baby delivered at or after 24^{+0} weeks gestational age showing no signs of life and known to have been alive at the onset of care in labour.
Neonatal death	A liveborn baby (born at 20^{+0} weeks gestational age or later, or with a birthweight of 400g or more where an accurate estimate of gestation is not available), who died before 28 completed days after birth.
Early neonatal death	A liveborn baby (born at 20^{+0} weeks gestational age or later, or with a birthweight of 400g or more where an accurate estimate of gestation is not available) who died before 7 completed days after birth.
Late neonatal death	A liveborn baby (born at 20^{+0} weeks gestational age or later, or with a birthweight of 400g or more where an accurate estimate of gestation is not available) who died after 7 completed days but before 28 completed days after birth.
Perinatal death	A stillbirth or early neonatal death.
Extended perinatal death	A stillbirth or neonatal death.
Termination of pregnancy	The deliberate ending of a pregnancy, normally carried out before the embryo or fetus is capable of independent life.

Executive Summary

Background

This is the fifth MBRRACE-UK Perinatal Mortality Surveillance Report and provides information on extended perinatal deaths in the UK and Crown Dependencies arising from births during 2017. MBRRACE-UK is commissioned by the Healthcare Quality Improvement Partnership (HQIP) to undertake the Maternal, Newborn and Infant Clinical Outcome Review Programme (MNI-CORP) on behalf of NHS England, the Welsh Government, the Scottish Government Health and Social Care Directorate, the Northern Ireland Department of Health, the States of Guernsey, the States of Jersey, and the Isle of Man Government.

The aims of the MNI-CORP are to collect, analyse and report national surveillance data and conduct national confidential enquiries in order to stimulate and evaluate improvements in health care for mothers and babies.

As in the surveillance reports for 2013 to 2016, the main report summarised here focuses on the surveillance of all late fetal losses (22^{+0} to 23^{+6} weeks gestational age), stillbirths, and neonatal deaths, with data presented by country, by commissioning organisation (including Sustainability and Transformation Partnerships (STPs) or country of residence), by health care provider (Trusts or Health Boards and Neonatal Networks) and by Local Authority.

The availability of five years of data from across the UK (a cohort of just under four million births) and the improving quality of the data submitted to MBRRACE-UK has permitted, in addition, an exploration of:

- time trends in stillbirth, neonatal, and extended perinatal mortality rates for the UK and each of the constituent countries;
- time trends in stillbirth, neonatal, and extended perinatal mortality rates by gestational age;
- improvements in data quality over time;
- time trends in reported CODAC classification of cause of death;
- time trends in the offer and consent for post-mortems for stillbirths and neonatal deaths.

The report also includes a chapter describing the characteristics and factors involved in deaths in twin pregnancies.

Methods

Deaths to be reported to MBRRACE-UK since 1 January 2013 through the secure online reporting system are:

- late fetal losses: a baby delivered between 22^{+0} and 23^{+6} weeks gestational age showing no signs of life, irrespective of when the death occurred;
- stillbirths: a baby delivered at or after 24^{+0} weeks gestational age showing no signs of life, irrespective of when the death occurred;
- neonatal deaths: a liveborn baby (born at 20^{+0} weeks gestational age or later, or with a birthweight of 400g or more where an accurate estimate of gestation is not available), who died before 28 completed days after birth.

Individual level information on all births in the UK is obtained in order to generate mortality rates adjusted for maternal, baby, and socio-demographic risk factors. This information is acquired through the collaboration of the following organisations: Patient Demographic Service (PDS) and Office for National Statistics (ONS) birth registration data (for England, Wales, and the Isle of Man); National Records Scotland (NRS) and Information Services Division (ISD) (for Scotland); Northern Ireland Maternity System (NIMATS) (for Northern Ireland); the Health and Social Services Department (for the Bailiwick of Guernsey); and Health Intelligence Unit (for the

Bailiwick of Jersey). The data is combined to give a single dataset of births for the whole of the UK and the Crown Dependencies. This data is then amalgamated with the information about the deaths to obtain the final data for analysis.

Analysis

The main findings of the report are presented in a combination of maps and tables showing crude, stabilised and stabilised & adjusted mortality rates for stillbirths, neonatal deaths, and extended perinatal deaths (stillbirths and neonatal deaths combined). Stabilisation is designed to take account of some of the random variation inherent in this type of data and adjustment takes account of some of the factors known to affect perinatal mortality rates in particular populations, e.g. the level of socio-economic deprivation.

In order to ensure comparability of mortality rates, the main analyses are shown after excluding births occurring at less than 24^{+0} weeks gestational age and terminations of pregnancy. Analysis of data for countries, commissioning organisations, Local Authorities, and populations covered by STPs is based on mother's postcode at the time of delivery. Analysis of data for Trusts and Health Boards as well as Neonatal Networks is based on the place of birth. For comparison purposes, the mortality rates for individual organisations are presented compared to the UK average, except for Trusts and Health Boards where the average mortality in organisations providing similar levels of services is used.

Key findings

1. There has been a reduction in the rate of extended perinatal mortality in the UK in 2017: 5.40 per 1,000 total births for babies born at 24^{+0} weeks gestational age or later compared with 5.64 in 2016. This represents a 12% reduction in extended perinatal mortality since 2013, equivalent to nearly 500 fewer deaths in 2017.

2. The stillbirth rate for the UK in 2017 has reduced to 3.74 per 1,000 total births from 4.20 in 2013, which represents 350 fewer stillbirths.

3. The rate of neonatal mortality for babies born at 24 weeks gestational age or later in the UK continues to show a steady decline over the period 2013 to 2017 from 1.84 to 1.67 deaths per 1,000 live births. This represents a 10% reduction in neonatal mortality over the last five years.

4. The largest fall in stillbirth and neonatal death rates is seen in term babies (37^{+0} to 41^{+6} weeks gestational age), accounting for half of the reduction seen in these rates.

5. Just over half of deaths were notified within the MBRRACE-UK benchmark time of 30 days (57% of stillbirths and 51% of neonatal deaths). Only 39% of Trusts and Health Boards had an average notification time of less than 30 days for stillbirths and 29% for neonatal deaths.

6. There has been an increase in the completeness of carbon monoxide monitoring data for both stillbirths and neonatal deaths over the period 2015 to 2017: from 36.4% to 48.3% for stillbirths and 31.4% to 44.5% for neonatal deaths. This improvement is clearly linked to the Saving Babies' Lives Care Bundle [1] as well as enhanced communication between care providers via the MBRRACE-UK web based system.

7. Despite overall improvements in mortality, out of 224 commissioning organisations, stabilised mortality rates were more than 5% higher than the overall UK average in 52 organisations for stillbirth and 57 organisations for neonatal death. There were only two commissioning organisations with a stabilised stillbirth rate more than 15% lower than the UK average and only six with a stabilised neonatal mortality rate more than 15% lower than the UK average.

8. The neonatal mortality rates for Trusts and Health Boards which care for the most complex pregnancies and births show wide variation, with rates of between 1.68 and 3.35 per 1,000 live births in those with Level 3 Neonatal Intensive Care Units (NICUs) and surgical provision. Exclusion of congenital anomalies from stabilised & adjusted neonatal mortality rates reduces this variation to between 0.98 and 1.79 per 1,000 live births.

9. There has been a substantial reduction in stillbirths recorded as having an intrapartum cause in the CODAC classification of cause of death from 189 (5.8%) stillbirths in 2014 to 51 (1.8%) stillbirths in 2017. The proportion of stillbirths reported as having an unknown cause of death using CODAC has reduced from around a half (46.0%) in 2014 to around one third (34.6%) in 2017.

10. Mortality rates remain high for Black or Black British and Asian or Asian British babies. Whilst stillbirth rates for these groups have reduced over the period 2015 to 2017 from 8.17 to 7.46 and from 5.88 to 5.70 per 1,000 total births, respectively, conversely neonatal mortality rates have increased over the same period from 2.45 to 2.77 and from 2.50 to 2.86 per 1,000 live births, respectively.

11. The reduction in both the stillbirth and neonatal death rate ratios associated with twin pregnancies (relative to singletons) over the period 2014 to 2016 has not been sustained, with small increases in risk seen in 2017 for stillbirths from 1.60 (95% CI, 1.36 to 1.88) to 1.93 (95% CI, 1.65 to 2.25) and for neonatal deaths from 3.33 (95% CI, 2.80 to 3.98) to 3.53 (95% CI, 2.97 to 4.21).

Recommendations

1. In order to achieve the various UK Governments' ambitions renewed efforts need to be focused on implementing existing national initiatives to reduce stillbirths and continue the slow but steady decline in neonatal mortality rates observed since 2013. Particular emphasis should be placed on reducing preterm birth.

2. Trusts and Health Boards should aim to notify all deaths via the MBRRACE-UK system within 30 days of the death occurring. Mechanisms for timely notification should be incorporated into local processes, and must have adequate staff, time allocation and resources. Trusts and Health Boards should aim for completion of all surveillance data within 90 days in order to facilitate data sharing with the PMRT and aid discussions with parents at follow-up appointments.

3. Trusts and Health Boards should use the MBRRACE-UK real time data monitoring tool to monitor the completeness of their data. Particular emphasis should be placed on carbon monoxide monitoring and other data items feeding into national initiatives such as the Saving Babies' Lives Care Bundle version 2.

4. Commissioning organisations should review both their crude and stabilised mortality rates alongside their high risk population characteristics (e.g. deprivation and ethnicity) to facilitate the development of public health initiatives and to target focused interventions, such as the continued rollout of continuity of carer as recommended by Better Births, with a particular focus on women in high-risk ethnic groups and those living in areas of high deprivation.

5. Trusts and Health Boards with a stabilised & adjusted stillbirth, neonatal mortality or extended perinatal mortality rate that falls into the red or amber band should carry out an initial investigation of their data quality and possible contributing local factors. Organisations should review their performance against national outcome measures with a view to understanding where improvement may be required.

6. Trust and Health Boards should use Perinatal Mortality Review Tool multidisciplinary meetings to improve the quality of cause of death coding.

7. Trusts and Health Boards should review their policies to ensure that the parents of ALL babies who die are provided with unbiased counselling for post-mortem to enable them to make an informed decision.

8. Trusts and Health Boards should work to implement fully the National Bereavement Care Pathway to ensure that all parents are offered high quality, individualised bereavement care after the loss of their baby.

9. Placental histology should be undertaken for all stillbirths and if possible all anticipated neonatal deaths, preferably by a perinatal pathologist.

Contents

Figures

Tables

Abbreviations

BMI	Body Mass Index
CCG	Clinical Commissioning Group
CHI	Community Health Index (Scotland)
CI	Confidence Interval
CODAC	Cause Of Death & Associated Conditions
CTG	Cardiotocography
EDD	Estimated Date of Delivery
FAQ	Frequently Asked Questions
HQIP	Healthcare Quality Improvement Partnership
ISA	International Stillbirth Alliance
ISD	Information Services Division (Scotland)
LFL	Late Fetal Loss
MBRRACE-UK	Mothers and Babies: Reducing Risk through Audits and Confidential Enquiries across the UK
MNI-CORP	Maternal, Newborn and Infant Clinical Outcome Review Programme
NICU	Neonatal Intensive Care Unit
NIMACH	Northern Ireland Maternal and Child Health
NIMATS	Northern Ireland Maternity System
NISRA	Northern Ireland Statistics and Research Agency
NRS	National Records of Scotland
ONS	Office for National Statistics
PDS	Personal Demographics Service
PMRT	Perinatal Mortality Review Tool
RCOG	Royal College of Obstetricians and Gynaecologists
SMR	Standardised Mortality Ratio
SMR02	Maternity Inpatient and Day Case Dataset (Scotland)
STP	Sustainability and Transformation Partnership

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It is with grateful thanks that the MBRRACE-UK collaboration would like to acknowledge the contribution of the many healthcare professionals and staff from the health service and other organisations who were involved in the reporting of perinatal deaths in the UK. It is only through this generous contribution of their time and expertise that it has been possible to conduct this national perinatal mortality surveillance and to continue the UK tradition of national self-audit to improve care for mothers, babies and their families.

We would particularly like to thank all MBRRACE-UK Lead Reporters and other staff in NHS Trusts, Health Boards and Health and Social Care Trusts across the UK, and those from the Crown Dependencies, whose contribution made it possible to carry out this surveillance. Due to the large number of individuals involved all Lead Reporters are acknowledged and listed in Appendix A2.

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1. Introduction / background

This is the fifth MBRRACE-UK Perinatal Mortality Surveillance Report and provides information on extended perinatal deaths in the UK and Crown Dependencies arising from births during 2017.

MBRRACE-UK is commissioned by the Healthcare Quality Improvement Partnership (HQIP) to undertake the Maternal, Newborn and Infant Clinical Outcome Review Programme (MNI-CORP). The aims of the MNI-CORP are to collect, analyse and report national surveillance data and conduct national confidential enquiries in order to stimulate and evaluate improvements in health care for mothers and babies (Box 1). This report focuses on **the surveillance of all late fetal losses (22^{+0} to 23^{+6} weeks gestational age), stillbirths, and neonatal deaths**.

Box 1: Scope of the Maternal, Newborn and Infant Clinical Outcome Review Programme

- Surveillance and confidential enquiries of all maternal deaths – that is, deaths of women who are pregnant or who die up to 1 year after their pregnancy ends.
- Confidential enquiries of an annual rolling programme of topic-specific, serious maternal morbidity.
- Surveillance of all late fetal losses (22^{+0} to 23^{+6} weeks gestational age), stillbirths, and neonatal deaths.
- A biennial programme of topic-specific confidential enquiries into aspects of stillbirth and infant death or serious infant morbidity.

Perinatal mortality surveillance involves the identification and notification of all eligible deaths and the timely collection of a limited and tightly defined demographic and clinical dataset. The goal is to receive notification of every death and to collect high-quality data about each one. This information allows the calculation of 'stabilised & adjusted' mortality rates which take into account the effects of chance variation and also allow for key factors known to increase the risk of perinatal mortality (see Chapter 2 for further explanation). The information is presented in order to assist clinicians, commissioners, managers, parents, and the public in raising standards of obstetric and neonatal care in order to reduce perinatal mortality across the UK.

1.1 Overview of this report and changes from previous reports

This report is divided into ten chapters, with additional information provided in the Appendices.

In Chapter 2 the MBRRACE-UK data collection process is described, together with the methods used for reporting mortality including a description of the revised colour coding of the rates for organisations.

Chapter 3 presents the national mortality rates for stillbirth, neonatal mortality, and extended perinatal mortality rates for babies born at 24^{+0} weeks gestational age or later (excluding terminations of pregnancy) for the UK as a whole and the individual nations, including trends in perinatal mortality for the whole period of the MBRRACE-UK programme: 2013-2017. This chapter also includes the national mortality rates for babies born at 22^{+0}-23^{+6} weeks as well as the gestation-specific mortality rates for the UK from 2014 to 2017.

An expanded review of data quality and the timeliness of data reporting to MBRRACE-UK is presented in Chapter 4.

In Chapter 5 the mortality rates by the organisation responsible for population-based care commissioning (based on mother's postcode at time of delivery) are presented as crude and stabilised (previously crude and stabilised & adjusted) mortality rates for babies born at 24^{+0} weeks gestational age or later (excluding terminations of

pregnancy) followed by a tabulation of the risk factor profiles for these populations. Mortality rates are also reported in this chapter by Sustainability and Transformation Partnership (STP) areas in England.

Crude and stabilised & adjusted mortality rates by service delivery organisation based on place of birth are reported in Chapter 6, firstly for Trusts and Health Boards and then aggregated by Neonatal Network. Following the investigation of the impact of congenital anomalies on mortality rates in a previous report [2] Trusts and Health Boards mortality rates are now presented both including and excluding deaths due to congenital anomalies.

Chapter 7 provides crude and stabilised mortality rates (previously crude and stabilised & adjusted) by Local Authority of the mother's residence.

Chapter 8 presents trends in the causes of death (known and unknown) reported by local teams using the Cause of Death & Associated Conditions (CODAC) categorisation over the period 2014-2017. Trends in the offer and consent for post-mortem examination are also presented.

In Chapter 9 trends in the mortality rates for those mothers and babies who are considered to have significant risk factors are shown.

In the final chapter (Chapter 10) the characteristics and factors involved in deaths in twin pregnancies are described.

The full version of this report is only available as a downloadable document, obtainable from the MBRRACE-UK website (www.npeu.ox.ac.uk/mbrrace-uk/reports).

1.2 Perinatal mortality in the UK – policy and initiative overview

Data from statutory birth and death registrations in 2017 show that stillbirth rates for the UK as a whole have reduced from 4.4 per 1,000 total births to 4.1 per 1,000 total births since 2016 (Appendix A1). However, this is not reflected in the UK neonatal mortality figures where the rate has remained static since 2016, mainly due to increasing rates of registered deaths for babies born at, or below the extremes of viability [3]. Rates of stillbirth and neonatal death continue to remain high compared with other similar, high income countries.

The Perinatal Mortality Review Tool (PMRT) was launched in England, Wales and Scotland in early 2018. The tool has been designed with user and parent involvement to support high quality standardised local perinatal reviews on the principle of 'review once, review well'.

The PMRT is integrated into the MBRRACE-UK perinatal surveillance system (see Chapter 4). All Trusts and Health Boards in England, Wales and Scotland have registered to use the PMRT and all have started at least one review, with the exception of the very small number of Trusts and Health Boards that have not experienced a perinatal death and one other small Health Board in Scotland. As of 10th July 2019 over 5,500 PMRT reviews have been started of which approximately half have been completed and the final report has been produced and is available to share with the parents. In England, as part of the NHS Resolution Maternity Incentive Scheme to support the delivery of best practices in maternity and neonatal care, use of the PMRT has been identified as one of ten actions which need to be met. More information about the PMRT, including support for implementation and information for bereaved parents, is available at: www.npeu.ox.ac.uk/pmrt. The first national report highlighting learning from the PMRT will be published in the autumn of 2019 and will be available to download from the website.

Following a two-wave pilot across 53 sites in England, the National Bereavement Care Pathway is now being rolled out across England, with five early adopter sites in Scotland having been announced in June 2019. In addition to the publication of three independent evaluations, the project has also published guidance documents covering five pregnancy and baby loss pathways: Miscarriage (including molar and ectopic pregnancy); Termination of Pregnancy due to Fetal Anomaly (TOPFA); Stillbirth; Neonatal Death; and Sudden Unexpected Death in Infancy up to 12 months.

England

NHS England's Long Term Plan [4] was launched in January 2019, and reaffirmed the commitment to a 50% reduction in stillbirth and neonatal mortality by 2025 first set out in the Department of Health's 2016 "Safer Maternity Care" report [5]. Whilst the reduction of stillbirths is on track to meet the initial target of a 20% reduction by 2020, there will need to be more determined action if the later 50% target is to be met.

Version 2 of the Saving Babies' Lives Care Bundle was launched in March 2019 and part of NHS England's Long Term Plan is a commitment to fully implement this second version by 30th March 2020. For Version 2 the focus has been expanded to cover neonatal deaths as well as stillbirths and to build on the established elements encompassing: reducing smoking in pregnancy; highlighting the importance of staff training for those pregnancies most at risk of fetal growth retardation; increasing awareness, detecting, reporting and competency in the management and interpretation of cardiotocographs (CTGs); and the use of a standardised risk assessment tool at the onset of labour. A new, fifth element has been introduced to focus on predicting and preventing preterm birth and ensuring women and babies are best prepared when preterm delivery cannot be avoided. The aim of this new element is to reduce preterm birth from 8% to 6% by 2025, in response to the Department of Health's "Maternity Safety Ambition" [5].

The Healthcare Safety Investigation Branch now has full national coverage, with all 130 Trusts with maternity services in England referring incidents of intrapartum stillbirth, early neonatal death and severe brain injury. A preliminary assessment of the first 300 cases is expected to be completed by summer 2019, leading to an annual review setting out the key themes. New Child Death Review statutory guidance was released in October 2018, setting out the key features of what a good child death review process should look like. The aim of the new guidance is to standardise the review process as much as possible in order to improve the experience for both bereaved parents and professionals, allow better data capture and to enhance shared learning at both the local and national level.

NHS Improvement's Maternal & Neonatal Health Safety Collaborative now has a number of resources to help support staff in maternity and neonatal services. These resources cover five areas identified by NHS Improvement as key to improving the safety and outcomes of maternity and neonatal care: smoking cessation, stabilisation of very preterm babies, detection and management of diabetes in pregnancy, detection and management of neonatal hypoglycaemia, and recognition and management of deterioration during labour. Accompanying these resources are a number of case studies from Trusts involved in the collaboration.

In February 2019, NHS Improvement announced plans to expand the role of Maternity Safety Champions. As part of this expansion, and in response to a recommendation made by the National Neonatal Critical Care Review, all Trusts have been asked to nominate a Neonatal Safety Champion who will work alongside the Maternity Safety Champion at Board level, as Perinatal Safety Champions.

Scotland

The Maternity and Children Quality Improvement Collaborative, part of the Scottish Patient Safety Programme, published its revised Maternity Care Core Measurement Plan in November 2018 [6]. Key priorities for Scotland were identified in three main areas: reducing the stillbirth rate by 35% through a focus on fetal movements, fetal monitoring (CTG) and fetal growth; reducing the rate of post-partum haemorrhage; and a reduction of the neonatal mortality rate by 15%, with a particular focus on reducing the number of deaths of babies born preterm. A total of 25 separate measures have been identified, with the focus on fetal movements being, in part, a direct response to recommendations made in the MBRRACE-UK confidential enquiry into term, antepartum stillbirths.

Wales

In July 2019 the Welsh Government launched "Maternity Care in Wales: A Five Year Vision for the Future (2019-2024)" [7], which sets out five principles of maternity care and a number actions to support and improve each principle. There will be a national strategy to reduce variation in care across Wales including the development of a nationwide electronic records system, so that maternity information can be shared between Health Boards

across Wales. An “All Wales Maternity Performance Indicator” dataset will also be developed to help reduce stillbirth and neonatal deaths, as well as to tackle smoking and obesity in pregnancy. Prompt, multidisciplinary reviewing of care using the PMRT will be promoted and opportunities for shared learning will be co-ordinated by the Maternity and Neonatal Network. Health Boards will also be expected to ensure local guidance is up-to-date and responsive to changes in national guidance, including recommendations made in the MBRRACE-UK perinatal mortality surveillance and perinatal confidential enquiry reports.

Northern Ireland

In Northern Ireland the Maternity Quality Improvement Collaborative, under the direction of the Maternity Strategy Implementation group, continues to act as the focus and driving force for safety and service quality improvement work in maternity services across the region. The Department of Health England’s 2016 Saving Babies’ Lives Care Bundle [1] has been implemented in all Trusts and work is underway to implement version 2. All Trusts also implement NICE guidance as endorsed by the Department of Health in Northern Ireland. Existing pathways and frameworks for bereavement care and perinatal mental health are under review in order to improve and strengthen these services. Specific focus in recent years has been on improving skills in perinatal mortality review. A confidential enquiry of all term stillbirths in Northern Ireland in 2016 was carried out during 2017, with recommendations being implemented with the support of the Maternity Quality Improvement Collaborative. MBRRACE-UK is working closely with service leads to adapt the PMRT for use in Northern Ireland. Developments to the Northern Ireland dedicated Maternity Information System (NIMATS) have also facilitated better use of data to track pregnancy outcomes, support service planning and benchmarking.

2. MBRRACE-UK methods for reporting perinatal mortality rates

2.1 Deaths reported to MBRRACE-UK

Deaths reported to MBRRACE-UK since 1 January 2013 are:

- *late fetal losses*: a baby delivered between 22^{+0} and 23^{+6} weeks gestational age showing no signs of life, irrespective of when the death occurred;
- *stillbirths*: a baby delivered at or after 24^{+0} weeks gestational age showing no signs of life, irrespective of when the death occurred;
- *neonatal deaths*: a liveborn baby (born at 20^{+0} weeks gestational age or later) who died before 28 completed days after birth.

These definitions also include any late fetal loss, stillbirth, or neonatal death resulting from a termination of pregnancy.

In an effort to ensure complete data collection and to facilitate international comparisons, the eligibility criteria for MBRRACE-UK are based on gestational age at delivery irrespective of when the death occurred. Therefore, all births delivered from 22^{+0} weeks gestational age showing no signs of life must be reported, irrespective of when the death occurred; the date of delivery and date of confirmation of death are both reported for these deaths. For all deaths, where an accurate estimate of gestation is not available a minimum birthweight of 400g is used to determine eligibility.

MBRRACE-UK has established a secure online reporting system which can be accessed by all UK Trusts and Health Boards. Responsibility for reporting a death and for the completeness and the quality of the data reported to MBRRACE-UK lies with the Trust or Health Board where the death occurred. Each Trust and Health Board has identified a small number of MBRRACE-UK Lead Reporters who act as key points of contact between their organisation and MBRRACE-UK. A comprehensive network of more than 500 Lead Reporters has been established across all UK delivery sites (see Appendix A2). In order to check for any relevant deaths that have not been reported to MBRRACE-UK, details of statutorily registered deaths are obtained from the Office for National Statistics (ONS) (England and Wales), National Records of Scotland (NRS) (Scotland), Northern Ireland Maternity System (NIMATS) and Northern Ireland Statistics and Research Agency (NISRA) (Northern Ireland), Health Intelligence Unit (Bailiwick of Jersey) and Health and Social Services Department (Bailiwick of Guernsey). More details of the MBRRACE-UK reporting system are given in Appendix A4.

2.2 Information collected by MBRRACE-UK

Comprehensive information about each death is requested by MBRRACE-UK in order to allow detailed examination of the risk factors for perinatal mortality in the UK. Data items are collected with the aims of, first, offering more appropriate adjustment of the crude mortality rates than had previously been possible and, second, providing a clearer insight into the health, social and lifestyle factors most commonly associated with stillbirth or neonatal death. The data relating to each death consists of information about the following:

- mother's and baby's identifying information (to permit the cross-checking of each death against other national databases and to facilitate the identification of duplicate records);
- mother's health, lifestyle and previous pregnancy history;
- mother's antenatal care;
- labour and delivery;

- cause of death and post-mortem examination.

Details of the data requested for each late fetal loss, stillbirth and neonatal death can be found in Appendix A3. Approvals have been obtained from all relevant authorities in order for identifiable data to be collected without consent and to access statutory birth and death information (Appendix A4.1).

Details of the completeness of key variables reported by Trusts and Health Boards in relation to deaths of babies born in 2017 are given in Appendix A5.

2.3 The 2017 birth cohort

In this report rates of stillbirth, neonatal death and extended perinatal death are presented for births from 1 January 2017 to 31 December 2017; thus, neonatal deaths of babies born in December 2017 which occurred in January 2018 are included. The reporting of mortality for a birth cohort is in contrast to statutory publications, which are based on deaths in a calendar year. This method of reporting allows more accurate estimates of mortality rates to be produced as appropriate denominators are available.

Individual level information on all births in the UK and Crown Dependencies is obtained in order to generate mortality rates adjusted for maternal, baby, and socio-demographic risk factors. Information for England, Wales and the Isle of Man (Personal Demographics Service (PDS) and ONS birth registration data), Scotland (NRS and Information Services Division; ISD), Northern Ireland (NIMATS), Bailiwick of Guernsey (Health and Social Services Department) and the Bailiwick of Jersey (Health Intelligence Unit) were combined to give a single dataset of births for the whole UK and Crown Dependencies. This data was then combined with the information on the deaths to obtain the final data for analysis. Details of the generation of the births dataset are provided in Appendix A4.

It is important to note that, since 29 April 2016, NHS Digital removes certain patient records from data provided for England where a patient has requested an opt-out. The NHS Constitution states *"You have the right to request that your confidential information is not used beyond your own care and treatment and to have your objections considered".* To support those NHS constitutional rights, patients within England are able to opt out from their personal confidential information being shared by NHS Digital for purposes other than their own direct care, this is known as the 'Type 2 opt-out'. Patients are able to register the opt-out at their GP practice. There were 19,631 Type 2 opt-outs relating to births in 2017. As indicated in previous reports, these do not appear to be distributed randomly across the country, suggesting external influences are playing a role in some opt-outs. As a result of the opt-outs, there are considerably higher numbers of births with missing information about gestational age and ethnicity in this report for England, since the data from NHS Digital is the only source of this information for all births. MBRRACE-UK is unable to measure the impact of this.

2.4 Deaths included in reported mortality rates

In order to facilitate the comparability of mortality rates between organisations, with the exception of Tables 3, 4 and 6-11 in Chapter 3, which include data from 22 and 23 week births, **births less than 24^{+0} weeks gestational age and terminations of pregnancy have been excluded from the mortality rates reported in the main maps and tables**. This avoids the influence of the wide disparity in the classification of babies born before 24^{+0} weeks gestational age as a neonatal death or a fetal loss, as well as the known variation in the rate of termination of pregnancy for congenital anomaly across the UK. MBRRACE-UK is currently leading a national working group to develop guidelines to aid health professionals in the assessment of signs of life in babies born at the threshold of survival with the aim of reducing this variation in the future. The mortality rates reported in the main maps and tables include all eligible deaths, including deaths due to congenital anomalies.

The number of deaths of babies born in 2017 in the UK reported here will differ from that of statutorily registered deaths published by ONS (England and Wales), NRS (Scotland) and NISRA (Northern Ireland) because of the exclusion criteria used in this report to ensure standardisation of mortality rates. It is important to recognise that data sources from statutorily registered births and deaths include both birth and death registrations following termination of pregnancy from 24^{+0} weeks gestational age and variable inclusion of births at 23^{+6} weeks

gestational age and below, depending on whether they were reported as being liveborn or not. MBRRACE-UK received stillbirth and neonatal death registrations from statutory sources for babies born in 2017. This data was matched to the detailed MBRRACE-UK death notifications. Of these registered deaths, neonatal deaths were excluded if delivery was before 24^{+0} weeks gestational age or they were a termination of pregnancy (deaths were classified as resulting from a termination of pregnancy based on the detailed MBRRACE-UK data).

In addition to registered deaths obtained from ONS, ISD and NISRA, additional deaths are reported to MBRRACE-UK for:

- the small number of deaths statutorily registered with ONS, ISD or NISRA only after considerable delay, most often because an inquest was being held;
- late fetal losses delivered at 22^{+0} to 23^{+6} weeks gestational age which are not subject to statutory registration;
- stillbirths delivered at 24^{+0} weeks gestational age or greater where the death was confirmed before 24^{+0} weeks gestational age; these are not routinely registered as stillbirths, as recommended by RCOG guidance and agreed with the Department of Health [8, 9].

2.5 Organisations for which mortality rates are reported

Rates of stillbirth, neonatal death, and extended perinatal death are reported for four groups of clinical and administrative organisations:

1. **Organisations responsible for population-based care commissioning based on postcode of mother's residence at time of delivery:**
    - England: Clinical Commissioning Groups (CCGs); STP areas;
    - Scotland: National and Health Boards;
    - Wales: National and Health Boards;
    - Northern Ireland: National and Local Commissioning Groups;
    - Crown Dependencies: Isle of Man, Bailiwick of Guernsey, and Bailiwick of Jersey.
2. **Service delivery organisations based on place of birth:**
    - England: NHS Trusts;
    - Scotland: Health Boards;
    - Wales: Health Boards;
    - Northern Ireland: Health and Social Care Trusts;
    - Crown Dependencies: Isle of Man, Bailiwick of Guernsey, and Bailiwick of Jersey.
3. **UK Neonatal networks based on place of birth.**
4. **Local government areas based on postcode of mother's residence at time of delivery**:
    - England: Single tier authorities, upper tier authorities and London boroughs;
    - Scotland: Unitary authorities;
    - Wales: Local authorities;
    - Northern Ireland: Local government districts;
    - Crown Dependencies: Isle of Man, Bailiwick of Guernsey, and Bailiwick of Jersey.

2.6 Analysis of mortality rates

Three mortality outcomes are reported for each organisation: stillbirth, neonatal death, and extended perinatal death. These mortality rates are presented in a number of different ways: as a 'crude' mortality rate, a 'stabilised' mortality rate and a 'stabilised & adjusted' mortality rate.

The **crude mortality rate** is the number of deaths divided by the number of total births (or live births in the case of neonatal mortality) for 2017 and provides an annual snapshot of the mortality in an organisation.

While the crude rate is informative, in that it describes exactly what happened for the organisation, it can be potentially misleading when trying to highlight organisations where the mortality rate is higher than expected due to variation in the quality of care. First, the number of perinatal deaths for many organisations is likely to be small, as these deaths are rare, and there will be more deaths in some years than in others just by chance. This can lead to large fluctuations in the annual crude mortality rate, especially for organisations that have a very small number of births. Second, some organisations have more women at high risk of experiencing a stillbirth or neonatal death (for example, due to areas of high socio-economic deprivation) and thus the case-mix of the population served can influence mortality rates even when high quality maternity and neonatal care is provided.

In order to compare organisations more fairly, **stabilised** and **stabilised & adjusted mortality rates** have been calculated and presented alongside the crude mortality rates. Where there is only a small number of births in an organisation it is difficult in any one year to be sure that any extreme value seen for the crude mortality rate is real and not just a chance finding. A ***stabilised*** rate allows for the effects of chance variation due to small numbers. For this reason, the stabilised mortality rate will tend to be closer to the average mortality rate than will the crude mortality rate, especially for organisations with a small number of births. For organisations commissioning care or carrying out public health initiatives to reduce perinatal mortality, crude and stabilised mortality rates are presented followed by a table detailing the risk factor profiles for each population to facilitate the development and targeting of interventions.

The mortality rates are also ***adjusted*** to account for key factors which are known to increase the risk of perinatal mortality. The extent of the adjustment is limited to those factors that are collected for all births across the whole of the UK: mother's age; socio-economic deprivation based on the mother's residence; baby's ethnicity; baby's sex; whether they are from a multiple birth; and gestational age at birth (neonatal deaths only). Therefore, some factors that might be associated with poor perinatal outcomes could not be taken into account in the adjustment because they are not universally collected on all births; for example, maternal smoking and body mass index (BMI) (see Appendix A5 for more details). As for stabilised rates, the stabilised & adjusted mortality rate will also tend to be closer to the average mortality rate than will the crude mortality rate, especially for organisations with a small number of births.

It is important to remember that the mortality rates reported are not definitive measures of the quality of care received by any individual or group. Some of the variation in mortality rates shown in this report might be the result of differences in the proportion of high-risk pregnancies that cannot be accounted for in the analyses due to a lack of routinely collected detailed clinical information for all births (as described above). However, given the information that is available, the rates reported here are robust and make an important contribution in highlighting those organisations where extra investigations should be targeted in order to improve the quality of perinatal and neonatal care in the UK.

2.7 Identifying potentially high and low rates of death

The crude, stabilised and stabilised & adjusted mortality rates are presented as both tables and maps. In the maps, each organisation has been colour coded based on the extent to which their particular mortality rate is above or below the 'average' mortality rate. For the organisations based on the postcodes of the mothers' residences at time of delivery, and for Neonatal Networks, this average is the overall observed mortality rate for the whole of the UK and the Crown Dependencies.

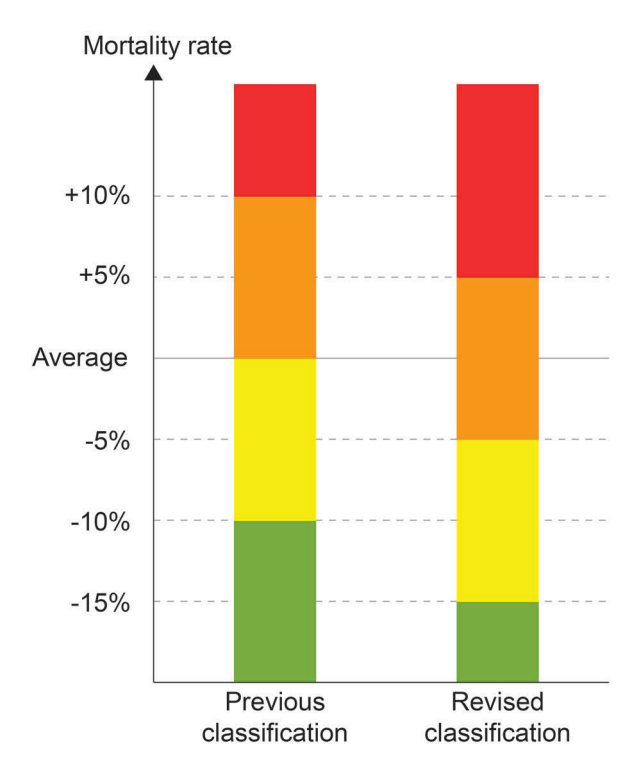
However, it is known that service delivery organisations based on the place of birth vary widely in the risk profile of pregnancies referred to their service; therefore, it is reasonable to anticipate variation in their expected mortality rates. To help account for the variation due to the risk profile, all Trusts and Health Boards have been classified hierarchically into five mutually exclusive comparator groups based on their level of service provision and are compared to the average mortality rate within their comparator group. The five comparator groups are:

1. Level 3 Neonatal Intensive Care Unit (NICU) and neonatal surgery;
2. Level 3 NICU;
3. 4,000 or more births per annum at 22 weeks or later;
4. 2,000-3,999 births per annum at 22 weeks or later;
5. Under 2,000 births per annum at 22 weeks or later.

Revised colour coding for maps and tables

The colour coding used in the maps and tables has been revised for this report and is presented in Figure 1.

Figure 1: Revised colour coding for maps and tables



The rationale for this change is based on the fact that many comparable high income countries have significantly lower mortality rates than the UK [10].

Revision of the coding system to include mortality rates from 5% lower than average rates in the amber band is designed to stimulate the continuing need for further improvement in mortality rates by organisations to meet national stillbirth and neonatal death initiatives.

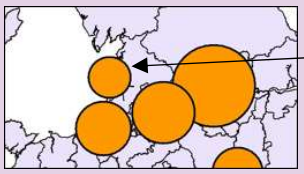
- Green: more than 15% lower than the average.
- Yellow: more than 5% and up to 15% lower than the average.

- Amber: up to 5% higher or up to 5% lower than the average.
- Red: more than 5% higher than the average.

The size of the circles on each map represents the number of births in the population covered by the particular organisation, although there is a minimum size in order that the colour can be adequately seen.

The accompanying tables show either both the crude and the stabilised rate for stillbirth, neonatal death, and extended perinatal death or the crude and the stabilised & adjusted rate for stillbirth, neonatal death, and extended perinatal death for each organisation, as appropriate, and are presented in the format shown in Figure 2. In order to avoid the effect of any local policy decisions regarding the classification of live and stillbirth at the extremes of viability, particular emphasis is given to the extended perinatal mortality rate and each organisation has been colour coded based on their crude, stabilised or stabilised & adjusted extended perinatal mortality rate in an identical manner to the maps.

Figure 2: Example of the presentation of the mortality rates in this report



Stabilised & adjusted extended perinatal mortality rate up to 5% higher or up to 5% lower than the UK average

Neonatal Network	Total births§	Rate per 1,000 births§						
		Stillbirth†		Neonatal‡		Extended perinatal†		
		Crude	Stabilised & adjusted (95% CI)	Crude	Stabilised & adjusted (95% CI)	Crude	Stabilised & adjusted (95% CI)#	
North West (Cheshire and Merseyside)	28,966	3.31	3.68 (3.26 to 4.18)	2.18	1.88 (1.73 to 2.23)	5.49	5.57 (5.51 to 6.24)	●
North West (Greater Manchester)	36,933	4.01	3.70 (3.24 to 3.95)	1.71	1.60 (1.55 to 1.84)	5.71	5.30 (4.95 to 5.85)	●
North West (Lancashire and South Cumbria)	16,714	4.43	3.97 (3.55 to 4.59)	1.68	1.65 (1.54 to 1.84)	6.10	5.59 (5.55 to 6.25)	●

2.8 Suppression of rates calculated when there are few deaths

In order to avoid disclosure of information which could potentially identify individuals, crude mortality rates based on a very small number of deaths have not been included, in line with guidance from ONS [11] and the Government Statistical Service [12]. Suppressed mortality rates are shown as a white dot (○) on the maps and as an asterisk in the tables, where appropriate.

3. Perinatal mortality rates in the UK: 2017

The data in this chapter mainly relates to the information available for the UK about the rates of stillbirth, neonatal death, and extended perinatal death (stillbirth and neonatal deaths combined) for births that occurred in 2017 at 24^{+0} weeks gestational age or later (excluding terminations of pregnancy). We have also included national mortality rates for the late fetal losses and neonatal deaths of babies born at 22^{+0} to 23^{+6} weeks gestational age in the tables where the numbers and rates of stillbirths, neonatal deaths and extended perinatal mortality are presented by gestational age band (Table 3 and Table 4).

Mortality numbers and rates for stillbirths, neonatal deaths and extended perinatal deaths are presented across several chapters in the main MBRRACE-UK report in order to make the information more straightforward to find. In this chapter we have included data for the UK as a whole and individually for the four countries of the UK and for the Crown Dependencies for 2017 alone. Trends in mortality rates over the past four years of MBRRACE-UK (2014 to 2017) are then presented in both tabular and graphical format.

Crude and stabilised mortality rates for the various commissioning organisations (CCGs and STPs) across the UK, based on the postcode of the mother's place of residence at time of delivery, are presented in Chapter 5. Risk factor profiles for CCGs and STPs are also provided in this chapter to enable these organisations to identify their high risk populations for the targeting of interventions to reduce stillbirths and neonatal deaths. In Chapter 6 crude and stabilised & adjusted mortality rates are given both for Trusts and Health Boards across the UK that provide perinatal care and also by Neonatal Network, where deaths have been allocated based on the Trust or Health Board in which the baby was born. Given the impact of congenital anomalies on mortality rates, in particular neonatal mortality, maps and tables are provided showing these rates both with and without congenital anomalies. Chapter 7 presents crude and stabilised mortality rates by the Local Authority of the mother's place of residence and the risk factor profiles for these populations.

3.1 Mortality rates for the UK as a whole, the four countries of the UK, and the Crown Dependencies

The data shown in Table 1 and Table 2 below is derived from a number of sources in addition to the information submitted via the MBRRACE-UK reporting system: ONS, PDS, NRS, ISD, NISRA, Health and Social Services Department (Bailiwick of Guernsey), and the Health Intelligence Unit (Bailiwick of Jersey).

The UK total is based on all births for the UK (irrespective of country of residence) whereas the number of births for each individual UK country and the Crown Dependencies is based on those births for which the country of residence of the mother was known.

The total number of births at 24^{+0} weeks or greater gestational age (excluding terminations of pregnancy) in 2017 for the UK was 760,169, almost 20,000 less than in 2016 (780,043). There was a decrease in both the total number of stillbirths (2,840 in 2017 compared with 3,065 in 2016) and the total number of neonatal deaths (1,267 in 2017 compared with 1,337 in 2016). These reductions are reflected in a decrease in the reported mortality rates for 2017 across the UK as a whole; the crude extended perinatal mortality rate was 5.40 per 1,000 total births (5.64 in 2016), comprising 3.74 stillbirths per 1,000 total births (3.93 in 2016) and 1.67 neonatal deaths per 1,000 live births (1.72 in 2016).

Table 1 also presents the number of births, stillbirths, neonatal deaths and extended perinatal deaths separately for the four countries of the UK and the Crown Dependencies, based on the mother's country of residence. The associated mortality rates are shown in Table 2. Overall rates of stillbirth and type of stillbirth showed no significant variation between countries, although the rate of stillbirth was highest for Northern Ireland at 4.63 per

1,000 total births compared with the other UK countries. The lowest rate of stillbirth in 2017 was in England at 3.68 per 1,000 total births. The lowest rate of neonatal mortality in 2017 was in Scotland at 1.59 per 1,000 live births, with the highest neonatal mortality rate being in Northern Ireland (2.07 per 1,000 live births). However, it is important to note that stillbirth and neonatal mortality rates in Northern Ireland are affected by differences in the law relating to termination of pregnancy, with more babies affected by major congenital anomalies being carried into the later stages of pregnancy and resulting in early neonatal deaths. This issue is addressed in Chapter 6 where mortality rates are produced for Trusts and Health Boards as well as Neonatal Networks both with and without babies affected by congenital anomalies. As in previous years the number of babies born in the Crown Dependencies is too few to permit reliable comparison with the four countries of the UK.

Table 1: Number of births, stillbirths, neonatal deaths, and extended perinatal deaths by country of residence: United Kingdom and Crown Dependencies, for births in 2017

Number[§]	UK[^]	England	Scotland	Wales	Northern Ireland[○]	Crown Dep.
Total births	**760,169**	**648,982**	**53,156**	**32,306**	**23,319**	**2,248**
Live births	**757,329**	**646,593**	**52,949**	**32,177**	**23,211**	**2,241**
Stillbirths	**2,840**	**2,389**	**207**	**129**	**108**	**7**
Antepartum	2,503	2,102	186	115	95	5
Intrapartum	241	204	17	9	9	2
Unknown timing	96	83	4	5	4	0
Neonatal deaths	**1,267**	**1,069**	**84**	**62**	**48**	**2**
Early neonatal deaths	846	717	47	40	41	1
Late neonatal deaths	421	352	37	22	7	1
Perinatal deaths	**3,686**	**3,106**	**254**	**169**	**149**	**8**
Extended perinatal deaths	**4,107**	**3,458**	**291**	**191**	**156**	**9**

[§] excluding terminations of pregnancy and births <24^{+0} weeks gestational age
[^] including the Crown Dependencies
[○] different laws exist in Northern Ireland for the termination of pregnancy
Data sources: MBRRACE-UK, ONS, PDS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey

Table 2: Stillbirth, neonatal, and extended perinatal mortality rates (95% confidence intervals (CIs)) by country of residence: United kingdom and Crown Dependencies, for births in 2017

Rate per 1,000 births[§]	UK[^]	England	Scotland	Wales	Northern Ireland[○]	Crown Dep.
Stillbirths[†]	**3.74**	**3.68**	**3.89**	**3.99**	**4.63**	**3.11**
	(3.6 to 3.87)	**(3.53 to 3.83)**	**(3.36 to 4.42)**	**(3.31 to 4.68)**	**(3.76 to 5.5)**	**(0.81 to 5.42)**
Antepartum[†]	3.29	3.24	3.50	3.56	4.07	2.22
	(3.16 to 3.42)	(3.1 to 3.38)	(3 to 4)	(2.91 to 4.21)	(3.26 to 4.89)	(0.28 to 4.17)
Intrapartum[†]	0.32	0.31	0.32	0.28	0.39	0.89
	(0.28 to 0.36)	(0.27 to 0.36)	(0.17 to 0.47)	(0.1 to 0.46)	(0.13 to 0.64)	(0 to 2.12)
Unknown timing[†]	0.13	0.13	0.08	0.15	0.17	0.00
	(0.1 to 0.15)	(0.1 to 0.16)	(0 to 0.15)	(0.02 to 0.29)	(0 to 0.34)	(0 to 1.33)
Neonatal deaths[‡]	**1.67**	**1.65**	**1.59**	**1.93**	**2.07**	**0.89**
	(1.58 to 1.77)	**(1.55 to 1.75)**	**(1.25 to 1.93)**	**(1.45 to 2.41)**	**(1.48 to 2.65)**	**(0 to 2.13)**
Early neonatal deaths[‡]	1.12	1.11	0.89	1.24	1.77	0.45
	(1.04 to 1.19)	(1.03 to 1.19)	(0.63 to 1.14)	(0.86 to 1.63)	(1.23 to 2.31)	(0 to 1.32)
Late neonatal deaths[‡]	0.56	0.54	0.70	0.68	0.30	0.45
	(0.5 to 0.61)	(0.49 to 0.6)	(0.47 to 0.92)	(0.4 to 0.97)	(0.08 to 0.52)	(0 to 1.32)
Perinatal deaths[†]	**4.85**	**4.79**	**4.78**	**5.23**	**6.39**	**3.56**
	(4.69 to 5.01)	**(4.62 to 4.95)**	**(4.19 to 5.36)**	**(4.44 to 6.02)**	**(5.37 to 7.41)**	**(1.1 to 6.02)**
Extended perinatal deaths[†]	**5.40**	**5.33**	**5.47**	**5.91**	**6.69**	**4.00**
	(5.24 to 5.57)	**(5.15 to 5.51)**	**(4.85 to 6.1)**	**(5.08 to 6.75)**	**(5.64 to 7.74)**	**(1.39 to 6.61)**

[†] per 1,000 total births
[‡] per 1,000 live births
[§] excluding terminations of pregnancy and births <24^{+0} weeks gestational age
[○] different laws exist in Northern Ireland for the termination of pregnancy
[^] including the Crown Dependencies
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey

The numbers and rates of stillbirths and neonatal deaths for the UK are presented as a whole and by sub-category in Tables 3 and 4, subdivided by gestational age at birth. These tables include details for late fetal losses and neonatal deaths of babies born at 22 and 23 weeks gestational age. This data shows the marked impact of preterm birth in relation to both stillbirth and neonatal death rates in the UK, with this data for 2017 showing that almost three-quarters of both stillbirths and neonatal deaths were for births before 37 weeks gestational age. As in 2016, of registrable stillbirths in 2017 (≥24 weeks gestational age) a quarter occurred in babies who were very preterm (<28 weeks gestational age) and just under half of neonatal deaths were babies born very preterm, once again emphasising the size of this problem in the UK. The new element of the Saving Babies' Lives Care Bundle version 2 [13] has recognised this issue with a focus on the prediction and prevention of preterm birth aiming to reduce the preterm birth rate from 8% to 6% by 2025, thus impacting positively on the reduction of stillbirth and neonatal death rates. There are similar initiatives in the other devolved nations.

3.2 Outcomes of babies born before 27^{+0} weeks gestational age: 2016

This year MBRRACE-UK released a supplementary section to the 2016 Perinatal Mortality Surveillance Report on the outcomes of babies born before 27^{+0} weeks gestational age arising from births between 1 January 2016 and 31 December 2016 in Great Britain [14]. This supplementary report links routine data on post-neonatal deaths to obtain survival estimates up to one year of age and includes babies born to mothers resident in Great Britain (i.e. England, Scotland and Wales) as post neonatal mortality data was not available for Northern Ireland and the Crown Dependencies.

The percentage of babies surviving to one year are presented in terms of four different denominators, to allow interpretation of survival at different stages of the care pathway:

1. Births alive at onset of care in labour;
2. Live births;
3. Live births receiving active respiratory care;
4. Births admitted to neonatal intensive care.

This range of different denominators offer important information for counselling parents throughout the care pathway. In addition, comparisons with survival rates in other countries (where there is variety in their approach to the reporting of births at the threshold of survival as liveborn) are facilitated as well as with other UK cohorts based solely on admissions to neonatal care. The report highlights increased survival for babies born at 22^{+0} to 26^{+6} weeks gestational age compared to reported rates over the last 10 years, with the biggest improvements being at the lower gestational ages. The findings suggest a change in attitudes over the past decade towards the reporting of babies at 22^{+0} to 22^{+6} weeks gestational age as liveborn and increased admissions to neonatal intensive care units at 23^{+0} weeks gestational age and over.

3.3 Gestation specific mortality for births in 2017

Table 3: Number of births, stillbirths, neonatal deaths, and extended perinatal deaths by gestational age at birth: United Kingdom and Crown Dependencies, for births in 2017

Number[§]	Gestational age at birth (weeks)					
	22^{+0}-23^{+6}	24^{+0}-27^{+6}	28^{+0}-31^{+6}	32^{+0}-36^{+6}	37^{+0}-41^{+6}○	≥42^{+0}
Total births	**1,078**	**3,227**	**6,540**	**50,296**	**660,980**	**16,212**
Live births	**547**	**2,517**	**6,058**	**49,566**	**660,086**	**16,190**
Stillbirths	**531**	**710**	**482**	**730**	**894**	**22**
Antepartum	279	587	448	670	782	14
Intrapartum	177	97	17	36	84	7
Unknown timing	75	26	17	24	28	1
Neonatal deaths	**385**	**365**	**187**	**270**	**428**	**11**
Early neonatal deaths	339	237	133	191	272	8
Late neonatal deaths	46	128	54	79	156	3
Perinatal deaths	**870**	**947**	**615**	**921**	**1,166**	**30**
Extended perinatal deaths	**916**	**1,075**	**669**	**1,000**	**1,322**	**33**

§ excluding terminations of pregnancy
○ births with missing information for gestational ages were excluded (n=22,914)
Data sources: MBRRACE-UK, ONS, PDS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey

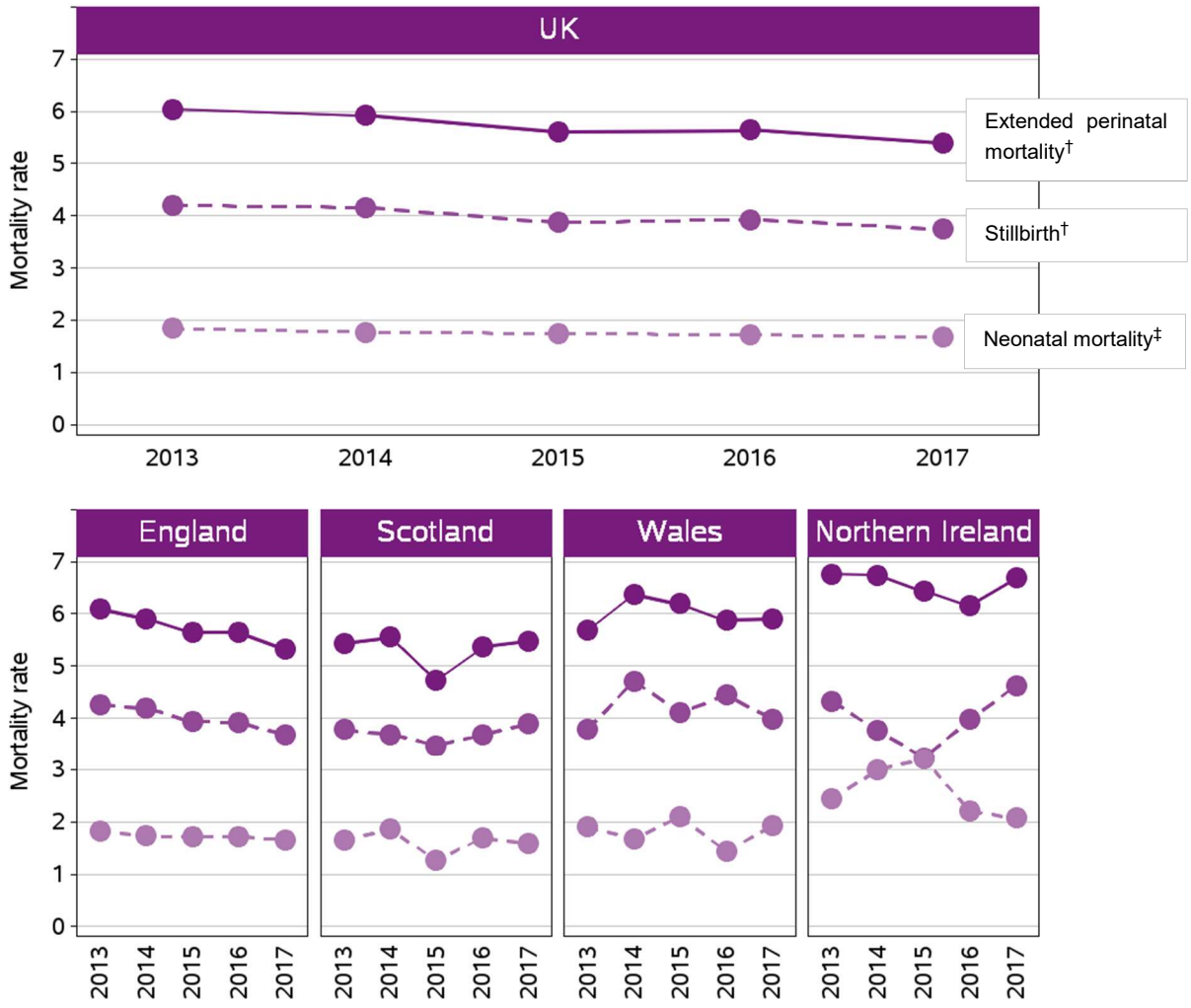
Table 4: Stillbirth, neonatal, and extended perinatal mortality rates (95% CIs) by gestational age at birth: United Kingdom and Crown Dependencies, for births in 2017

Rate per 1,000 births[§]	Gestational age at birth (weeks)					
	22^{+0}-23^{+6}	24^{+0}-27^{+6}	28^{+0}-31^{+6}	32^{+0}-36^{+6}	37^{+0}-41^{+6}○	≥42^{+0}
Stillbirths[†]	**491.65**	**220.02**	**73.70**	**14.51**	**1.35**	**1.36**
	(461.8 to 521.5)	**(205.7 to 234.3)**	**(67.4 to 80.0)**	**(13.5 to 15.6)**	**(1.3 to 1.4)**	**(0.8 to 1.9)**
Antepartum[†]	257.88	181.90	68.50	13.32	1.18	0.86
	(231.8 to 284)	(168.6 to 195.2)	(62.4 to 74.6)	(12.3 to 14.3)	(1.1 to 1.3)	(0.4 to 1.3)
Intrapartum[†]	164.19	30.06	2.60	0.72	0.13	0.43
	(142.1 to 186.3)	(24.2 to 36.0)	(1.4 to 3.8)	(0.5 to 1.0)	(0.1 to 0.2)	(0.1 to 0.8)
Unknown timing[†]	69.57	8.06	2.60	0.48	0.04	0.06
	(54.4 to 84.8)	(5.0 to 11.1)	(1.4 to 3.8)	(0.3 to 0.7)	(0.0 to 0.1)	(0.0 to 0.2)
Neonatal deaths[‡]	**704.38**	**145.01**	**30.87**	**5.45**	**0.65**	**0.68**
	(666.2 to 742.6)	**(131.2 to 158.8)**	**(26.5 to 35.2)**	**(4.8 to 6.1)**	**(0.6 to 0.7)**	**(0.3 to 1.1)**
Early neonatal deaths[‡]	620.44	94.16	21.95	3.85	0.41	0.49
	(579.8 to 661.1)	(82.8 to 105.6)	(18.3 to 25.6)	(3.3 to 4.4)	(0.4 to 0.5)	(0.2 to 0.8)
Late neonatal deaths[‡]	83.94	50.85	8.91	1.59	0.24	0.19
	(60.7 to 107.2)	(42.3 to 59.4)	(6.6 to 11.3)	(1.2 to 2.0)	(0.2 to 0.3)	(0.0 to 0.4)
Perinatal deaths[†]	**807.05**	**293.46**	**94.04**	**18.31**	**1.76**	**1.85**
	(783.5 to 830.6)	**(277.8 to 309.2)**	**(87.0 to 101.1)**	**(17.1 to 19.4)**	**(1.7 to 1.9)**	**(1.2 to 2.5)**
Extended perinatal deaths[†]	**849.72**	**333.13**	**102.29**	**19.88**	**2.00**	**2.04**
	(828.4 to 871.1)	**(316.9 to 349.4)**	**(95.0 to 110.0)**	**(18.7 to 21.1)**	**(2.0 to 2.1)**	**(1.3 to 2.7)**

[§] excluding terminations of pregnancy, births
○ births with missing information for gestational ages were excluded (n=22,914)
[†] per 1,000 total births
[‡] per 1,000 live births
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey

3.4 Time trends

Figure 3: Stillbirth, neonatal, and extended perinatal mortality rates for the UK and by country of residence: United Kingdom, for births in 2017



† per 1,000 total births
‡ per 1,000 live births
Excluding terminations of pregnancy and births <24^{+0} weeks gestational age
Different laws exist in Northern Ireland for the termination of pregnancy
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey

The trends in stillbirth, neonatal mortality and extended perinatal mortality rates for the UK and the devolved nations over the five years of the MBRRACE-UK programme, 2013 to 2017, are shown in Figure 3 and Table 5. The data is equivalent to that included in Table 1, where the UK total is based on all births for the UK (irrespective of country of residence) and the number of births for each individual UK country and the Crown Dependencies is based on those births for which the country of residence of the mother was known. In the UK there has been a reduction in all three mortality rates, with a fall of over 10% across the five years of the MBRRACE-UK programme. This overall pattern reflects a decline over the five year period in England but little evidence of change over time in the remaining devolved nations as their rates are more affected by short term variations due to their smaller population size.

Table 5: Stillbirth, neonatal, and extended perinatal mortality rates for the UK and by country of residence: United Kingdom, for births from 2013 to 2017

Rate per 1,000 births§	UK^	England	Scotland	Wales	Northern Ireland◦	Crown Dep.
Stillbirths†						
2013	4.20 (4.06 to 4.35)	4.26 (4.10 to 4.42)	3.78 (3.30 to 4.32)	3.78 (3.18 to 4.50)	4.33 (3.58 to 5.24)	3.25 (1.65 to 6.40)
2014	4.12 (3.98 to 4.326	4.19 (4.04 to 4.35)	3.69 (3.19 to 4.19)	4.71 (3.98 to 5.44)	3.76 (2.99 to 4.52)	1.24 (0.00 to 2.64)
2015	3.87 (3.73 to 4.01)	3.93 (3.78 to 4.08)	3.47 (2.98 to 3.96)	4.10 (3.41 to 4.78)	3.24 (2.53 to 3.95)	1.67 (0.03 to 3.3)
2016	3.93 (3.79 to 4.07)	3.92 (3.77 to 4.07)	3.67 (3.17 to 4.18)	4.44 (3.73 to 5.16)	3.97 (3.18 to 4.76)	3.36 (1.04 to 5.68)
2017	3.74 (3.6 to 3.87)	3.68 (3.53 to 3.83)	3.89 (3.36 to 4.42)	3.99 (3.31 to 4.68)	4.63 (3.76 to 5.5)	3.11 (0.81 to 5.42)
Neonatal deaths‡						
2013	1.84 (1.75 to 1.94)	1.83 (1.73 to 1.94)	1.66 (1.36 to 2.04)	1.90 (1.49 to 2.42)	2.44 (1.89 to 3.15)	1.22 (0.42 to 3.59)
2014	1.76 (1.67 to 1.86)	1.73 (1.63 to 1.83)	1.86 (1.51 to 2.22)	1.67 (1.23 to 2.10)	2.99 (2.31 to 3.68)	1.24 (0.00 to 2.65)
2015	1.74 (1.65 to 1.84)	1.71 (1.62 to 1.81)	1.26 (0.96 to 1.55)	2.10 (1.61 to 2.59)	3.21 (2.5 to 3.92)	1.25 (0.00 to 2.67)
2016	1.72 (1.63 to 1.81)	1.72 (1.62 to 1.82)	1.69 (1.34 to 2.03)	1.43 (1.02 to 1.84)	2.2 (1.61 to 2.79)	1.26 (0 to 2.69)
2017	1.67 (1.58 to 1.77)	1.65 (1.55 to 1.75)	1.59 (1.25 to 1.93)	1.93 (1.45 to 2.41)	2.07 (1.48 to 2.65)	0.89 (0 to 2.13)
Extended perinatal deaths†						
2013	6.04 (5.87 to 6.21)	6.09 (5.90 to 6.28)	5.43 (4.86 to 6.08)	5.68 (4.93 to 6.53)	6.76 (5.81 to 7.87)	4.47 (2.50 to 7.98)
2014	5.88 (5.71 to 6.04)	5.91 (5.73 to 6.10)	5.55 (4.93 to 6.16)	6.37 (5.52 to 7.22)	6.74 (5.71 to 7.76)	2.48 (0.50 to 4.46)
2015	5.61 (5.44 to 5.77)	5.64 (5.46 to 5.81)	4.72 (4.15 to 5.29)	6.19 (5.35 to 7.03)	6.44 (5.44 to 7.44)	2.92 (0.76 to 5.08)
2016	5.64 (5.48 to 5.281	5.64 (5.46 to 5.82)	5.36 (4.74to 5.97)	5.87 (5.04 to 6.69)	6.16 (5.18 to 67.15	4.62 (1.90 to 7.34)
2017	5.40 (5.24 to 5.57)	5.33 (5.15 to 5.51)	5.47 (4.85 to 6.1)	5.91 (5.08 to 6.75)	6.69 (5.64 to 7.74)	4.00 (1.39 to 6.61)

§ excluding terminations of pregnancy and births <24^{+0} weeks gestational age
^ including the Crown Dependencies
◦ different laws exist in Northern Ireland for the termination of pregnancy
† per 1,000 total births
‡ per 1,000 live births
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey

Trends in gestation-specific mortality for the UK over the four years from 2014 to 2017 are shown in Tables 6 to 11. There have been reductions in extended perinatal mortality rates across all gestational age groups from 22^{+0} to 41^{+6} weeks gestational age. This pattern is not seen for babies born at 42^{+0} weeks and over but this group are most affected by short term variations because the number of deaths is extremely small. Applying the rates observed in 2014 to the population of births in 2017 indicates that there were 458 fewer deaths in 2017 (than if rates had remained the same). Almost half of this reduction in deaths (48%) is associated with births at 37^{+0} to 41^{+6} weeks, 28% with those at 32^{+0} to 36^{+6} weeks, 13% with those at 28^{+0} to 31^{+6} weeks and 9% with those at 24^{+0} to 27^{+6} weeks.

The largest reduction in deaths is seen for stillbirths at 37^{+0} to 41^{+6} weeks, with a 16% fall in mortality rates over the four year period, and this is likely to reflect initiatives in place across the UK focusing on the reduction of term stillbirths. Stillbirths at 32^{+0} to 36^{+6} weeks and 28^{+0} to 31^{+6} weeks have also fallen by over 10%. For neonatal deaths the largest reductions were also seen at later gestations with a 13% fall at 32^{+0} to 36^{+6} weeks and an 8% fall at 37^{+0} to 41^{+6} weeks.

Table 6: Number and percentage of stillbirths by gestational age at birth: United Kingdom and Crown Dependencies, for births from 2014 to 2017

Gestational age at birth (weeks)		2014	2015	2016	2017
22^{+0}-23^{+6}	Births§	1,010	1,001	1,040	1,078
	Stillbirths N (%)	499 (13.4)	524 (14.7)	529 (14.7)	530 (15.7)
24^{+0}-27^{+6}	Births§	3,192	3,221	3,269	3,227
	Stillbirths N (%)	722 (19.4)	733 (20.6)	717 (19.9)	710 (21.1)
28^{+0}-31^{+6}	Births§	6,469	6,558	6,620	6,540
	Stillbirths N (%)	537 (14.4)	495 (13.9)	512 (14.2)	482 (14.3)
32^{+0}-36^{+6}	Births§	49,385	49,652	50,371	50,296
	Stillbirths N (%)	802 (21.5)	762 (21.4)	786 (21.9)	730 (21.7)
37^{+0}-41^{+6}	Births§	700,709	704,733	678,093	660,980
	Stillbirths N (%)	1143 (30.7)	1025 (28.8)	1031 (28.7)	894 (26.5)
≥42	Births§	21,854	18,980	18,277	16,212
	Stillbirths N (%)	21 (0.6)	15 (0.4)	19 (0.5)	22 (0.7)
	Total births	**782,619**	**784,145**	**757,670**	**738,333**

Table 7: Stillbirth rates by gestational age at birth: United Kingdom and Crown Dependencies, for births from 2014 to 2017

Gestational age at birth (weeks)		2014	2015	2016	2017
22^{+0}-23^{+6}	Births§	1,010	1,001	1,040	1,078
	Rates per 1,000 births†	494.1	523.5	508.7	491.7
24^{+0}-27^{+6}	Births§	3,192	3,221	3,269	3,227
	Rates per 1,000 births†	226.2	227.6	219.3	220.0
28^{+0}-31^{+6}	Births§	6,469	6,558	6,620	6,540
	Rates per 1,000 births†	83.0	75.5	77.3	73.7
32^{+0}-36^{+6}	Births§	49,385	49,652	50,371	50,296
	Rates per 1,000 births†	16.2	15.3	15.6	14.5
37^{+0}-41^{+6}	Births§	700,709	704,733	678,093	660,980
	Rates per 1,000 births†	1.6	1.5	1.5	1.4
≥42	Births§	21,854	18,980	18,277	16,212
	Rates per 1,000 births†	1.0	0.8	1.0	1.4
	Total births	**782,619**	**784,145**	**757,670**	**738,333**

Table 8: Number and percentage of neonatal deaths by gestational age at birth: United Kingdom and Crown Dependencies, for births from 2014 to 2017

Gestational age at birth (weeks)		2014	2015	2016	2017
22^{+0}-23^{+6}	Live births§	511	477	511	548
	Neonatal deaths N (%)	376 (21.5)	342 (20.1)	360 (21.3)	386 (23.4)
24^{+0}-27^{+6}	Live births§	2,470	2,488	2,552	2,517
	Neonatal deaths N (%)	384 (21.9)	383 (22.5)	404 (23.9)	365 (22.2)
28^{+0}-31^{+6}	Live births§	5,932	6,063	6,108	6,058
	Neonatal deaths N (%)	182 (10.4)	205 (12)	177 (10.5)	187 (11.4)
32^{+0}-36^{+6}	Live births§	48,583	48,890	49,585	49,566
	Neonatal deaths N (%)	305 (17.4)	271 (15.9)	275 (16.2)	270 (16.4)
37^{+0}-41^{+6}	Live births§	699,566	703,708	677,062	660,086
	Neonatal deaths N (%)	493 (28.2)	495 (29.1)	468 (27.6)	428 (26)
≥42	Live births§	21,833	18,965	18,258	16,190
	Neonatal deaths N (%)	10 (0.6)	7 (0.4)	9 (0.5)	11 (0.7)
	Total live births	**778,895**	**780,591**	**754,076**	**734,965**

§ excluding terminations of pregnancy and births <24^{+0} weeks gestational age
† per 1,000 total births
‡ per 1,000 live births
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey

Table 9: Neonatal mortality rates by gestational age at birth: United Kingdom and Crown Dependencies, for births from 2014 to 2017

Gestational age at birth (weeks)		2014	2015	2016	2017
22^{+0}-23^{+6}	Live births§	511	477	511	548
	Rates per 1,000 births‡	735.8	717.0	704.5	704.4
24^{+0}-27^{+6}	Live births§	2,470	2,488	2,552	2,517
	Rates per 1,000 births‡	155.5	153.9	158.3	145.0
28^{+0}-31^{+6}	Live births§	5,932	6,063	6,108	6,058
	Rates per 1,000 births‡	30.7	33.8	29.0	30.9
32^{+0}-36^{+6}	Live births§	48,583	48,890	49,585	49,566
	Rates per 1,000 births‡	6.3	5.5	5.5	5.4
37^{+0}-41^{+6}	Live births§	699,566	703,708	677,062	660,086
	Rates per 1,000 births‡	0.7	0.7	0.7	0.6
≥42	Births§	21,833	18,965	18,258	16,190
	Rates per 1,000 births‡	0.5	0.4	0.5	0.7
	Total live births	**778,895**	**780,591**	**754,076**	**734,965**

Table 10: Number and percentage of extended perinatal deaths by gestational age at birth: United Kingdom and Crown Dependencies, for births from 2014 to 2017

Gestational age at birth (weeks)		2014	2015	2016	2017
22^{+0}-23^{+6}	Births§	1,010	1,001	1,040	1,078
	Extended perinatal deaths N (%)	875 (16)	866 (16.5)	889 (16.8)	916 (18.3)
24^{+0}-27^{+6}	Births§	3,192	3,221	3,269	3,227
	Extended perinatal deaths N (%)	1106 (20.2)	1116 (21.2)	1121 (21.2)	1075 (21.4)
28^{+0}-31^{+6}	Births§	6,469	6,558	6,620	6,540
	Extended perinatal deaths N (%)	719 (13.1)	700 (13.3)	689 (13)	669 (13.3)
32^{+0}-36^{+6}	Births§	49,385	49,652	50,371	50,296
	Extended perinatal deaths N (%)	1107 (20.2)	1033 (19.6)	1061 (20.1)	1000 (19.9)
37^{+0}-41^{+6}	Births§	700,709	704,733	678,093	660,980
	Extended perinatal deaths N (%)	1636 (29.9)	1520 (28.9)	1499 (28.4)	1322 (26.4)
≥42	Births§	21,854	18,980	18,277	16,212
	Extended perinatal deaths N (%)	31 (0.6)	22 (0.4)	28 (0.5)	33 (0.7)
	Total births	**782,619**	**784,145**	**757,670**	**738,333**

Table 11: Extended perinatal mortality rates by gestational age at birth: United Kingdom and Crown Dependencies, for births from 2014 to 2017

Gestational age at birth (weeks)		2014	2015	2016	2017
22^{+0}-23^{+6}	Births§	1,010	1,001	1,040	1,078
	Rates per 1,000 births†	866.3	865.1	854.8	849.7
24^{+0}-27^{+6}	Births§	3,192	3,221	3,269	3,227
	Rates per 1,000 births†	346.5	346.5	342.9	333.1
28^{+0}-31^{+6}	Births§	6,469	6,558	6,620	6,540
	Rates per 1,000 births†	111.1	106.7	104.1	102.3
32^{+0}-36^{+6}	Births§	49,385	49,652	50,371	50,296
	Rates per 1,000 births†	22.4	20.8	21.1	19.9
37^{+0}-41^{+6}	Births§	700,709	704,733	678,093	660,980
	Rates per 1,000 births†	2.3	2.2	2.2	2.0
≥42	Births§	21,854	18,980	18,277	16,212
	Rates per 1,000 births†	1.4	1.2	1.5	2.0
	Total births	**782,619**	**784,145**	**757,670**	**738,333**

§ excluding terminations of pregnancy and births <24^{+0} weeks gestational age
† per 1,000 total births
‡ per 1,000 live births
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey

MBRRACE-UK Recommendation 1

In order to achieve the various UK Governments' ambitions renewed efforts need to be focused on implementing existing national initiatives to reduce stillbirths and continue the slow but steady decline in neonatal mortality rates observed since 2013. Particular emphasis should be placed on reducing preterm birth.

4. Data quality

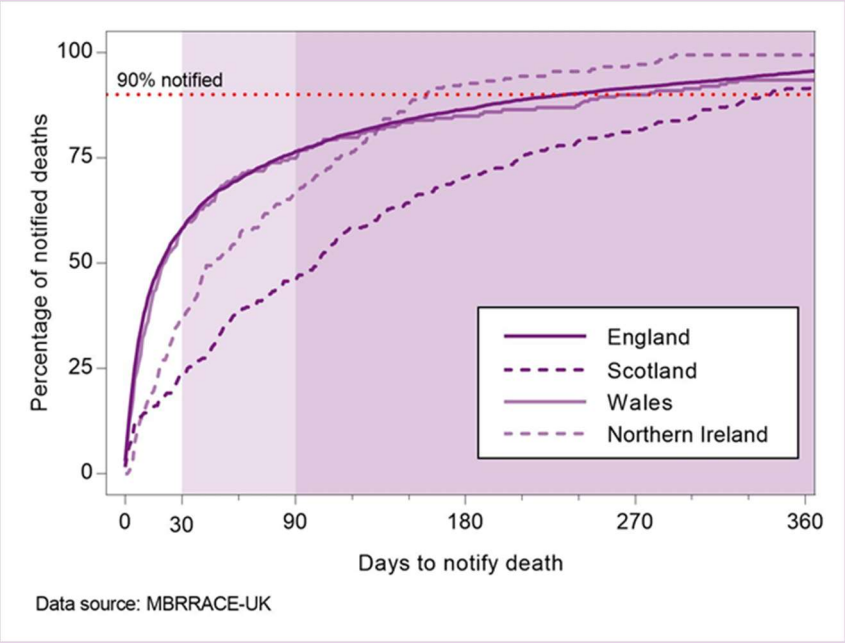
Effective perinatal surveillance is dependent upon timeliness of data collection in order to drive improvement by providing rapid feedback. High quality data is needed to provide a true picture of what is happening and where intervention is required. At the launch meeting of the previous Perinatal Mortality Surveillance Report in June 2018 we proposed two new benchmarks relating to the timeliness of data collection: (i) for the notification of deaths and (ii) for the completion of surveillance data. First, all deaths should be notified to MBBRACE-UK within 30 days of the death occurring. The full data does not have to be complete at this point but, as a minimum, we suggested that all deaths should be notified within this timeframe. Second, Trusts and Health Boards should aim to complete data entry for each death within 90 days of the death occurring. These benchmarks have been developed in part to facilitate data sharing with the Perinatal Mortality Review Tool (PMRT) that was launched in January 2018. The PMRT requires prompt notification and completion of data entry for deaths to ensure Trusts and Health Boards can conduct timely reviews, minimising the risk of duplicate data entry.

Late notification of deaths results in 'missing' cases. These are initial death notifications created by MBRRACE-UK when a death identified in routine data sources cannot be matched to a death notified via the MBRRACE-UK system. Missing cases are therefore identified by MBRRACE-UK to ensure all eligible deaths are notified. Missing cases use additional resources and as a result can delay the notification of other deaths. The introduction of a 30-day benchmark for notification was intended not only to reduce the amount of additional workload generated by late-notified deaths, but also to allow for the development of additional real-time reporting methods in order to give Trusts and Health Boards more timely access to their data. New ways for Trusts and Health Boards to interrogate and monitor deaths are examined later in this chapter

4.1 Timing of notification by type of death

The variation in the timing of the notification of deaths on the MBRRACE-UK system for 2017 across the four countries of the UK is shown in Figure 4. The number of days taken to notify deaths ranged from zero to more than 600 (UK-wide average 77 days). A small proportion of late notifications were due to deaths which occurred outside a clinical setting where the maternity or neonatal team were not informed of the death and which were identified later by MBRRACE-UK from routine data sources. However, this is unlikely to account for the full 5% of deaths which were notified more than a year after the death occurred. Most deaths notified after more than six months are the result of "missing" cases identified by MBRRACE-UK.

Figure 4: Time to notify late fetal lossses, stillbirths and neonatal deaths via the MBRRACE-UK system in days since death: births in 2017

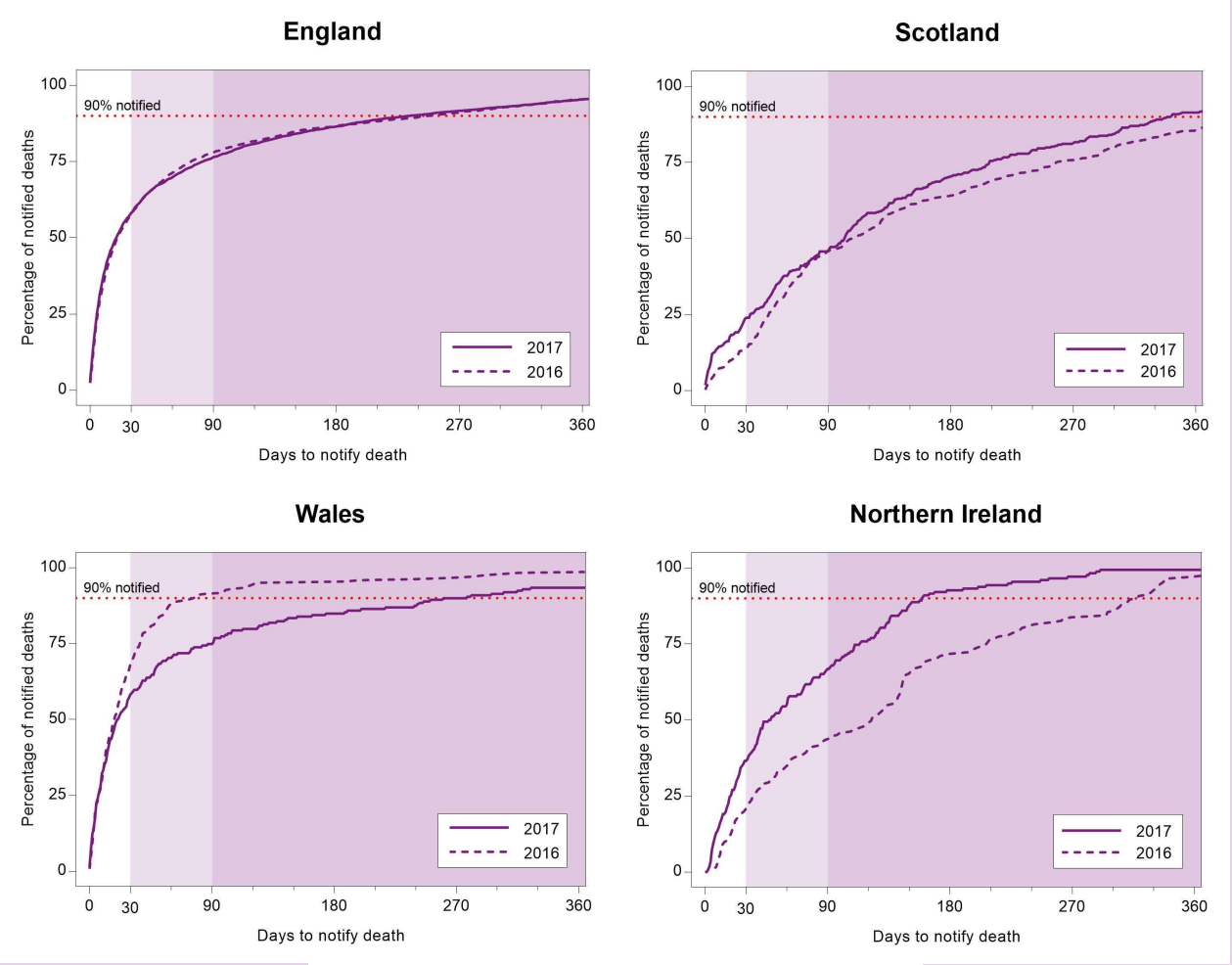


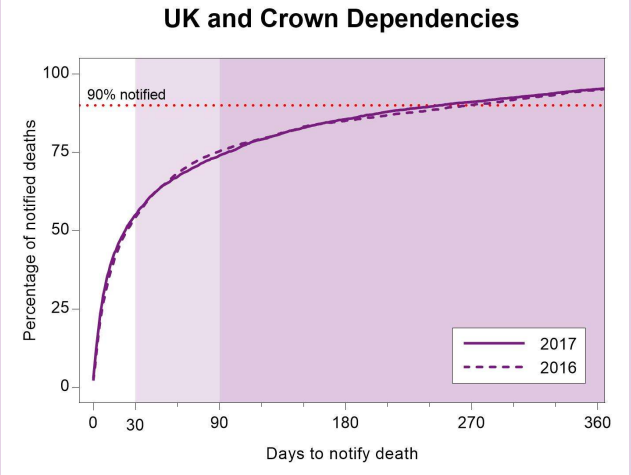
Excluding terminations of pregnancy

Comparison with 2016 (Figure 5) reveals that notification time in England has remained static. Scotland has shown a small improvement, but remains the slowest of the four countries. The most significant changes are in Wales and Northern Ireland.

Overall notification times for the UK as a whole and England remained fairly constant in 2017 compared with the previous year. However, whilst Wales was the most timely notifier of deaths in 2016, with 68% of deaths being notified within 30 days and 90% of deaths being notified by 77 days, in 2017 Welsh notification rates were much slower, with only 58% of deaths being notified within 30 days and the time taken to reach 90% of notified deaths showing a more than threefold increase to 278 days. For Northern Ireland the trend is reversed, with cases notified within 30 days increasing from 21% to 37% between 2016 and 2017. Data entry is carried out centrally in Northern Ireland by the NIMACH office, and despite this contributing to an initial delay in notification of deaths, Northern Ireland was the most timely notifier overall in 2017, with 90% of deaths being notified to MBRRACE-UK within 160 days (down from 318 days in 2016). For the UK as a whole the proportion of stillbirths and neonatal deaths notified within the 30 day benchmark was 57% and 51% respectively.

Figure 5: Time to notify deaths via the MBRRACE-UK system by country: births in 2016 and 2017

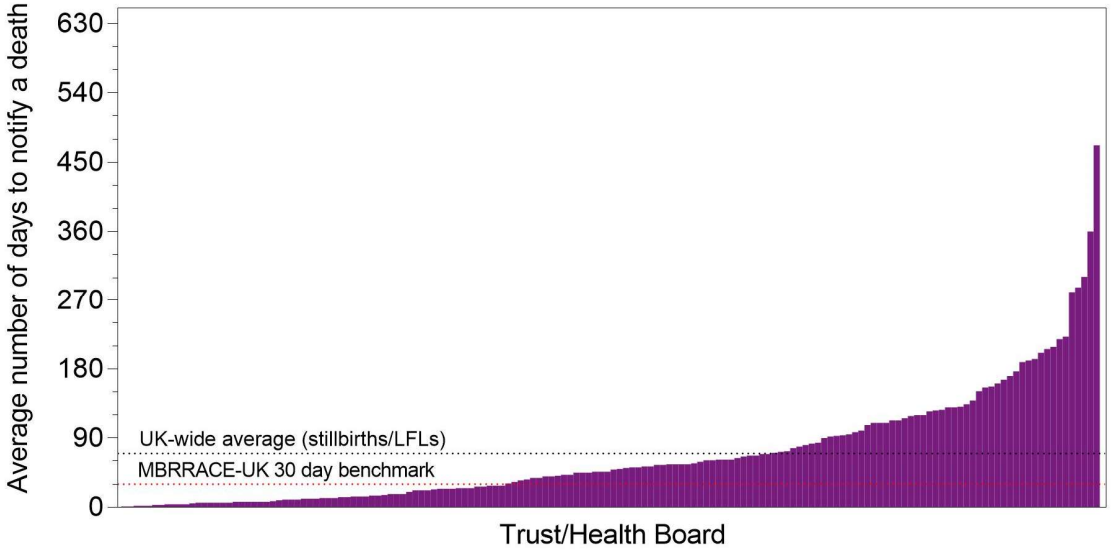




Excluding terminations of pregnancy
Data source: MBRRACE-UK

At Trust and Health Board level (Figures 6, 7 and 8), the average number of days to notify a death was above the 30 day benchmark for both stillbirths and neonatal deaths. For stillbirths the average notification time was 70 days, with only 39% of Trusts and Health Boards having an average notification time which met the benchmark. For neonatal deaths the time taken to notify a death was even longer, with an average time of 92 days and only 29% of Trusts and Health Boards having an average notification time which met the benchmark.

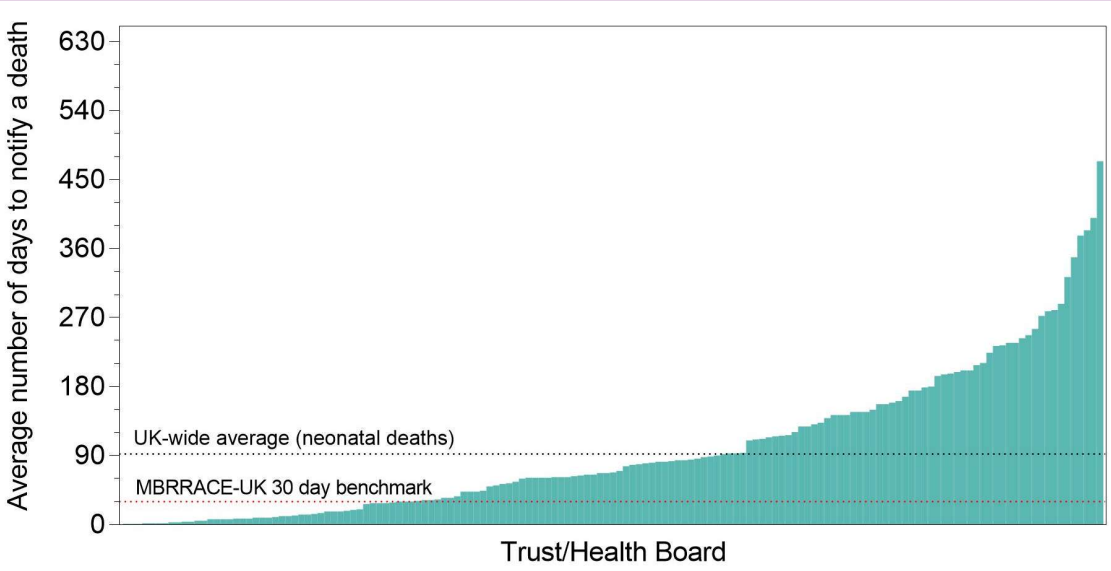
Figure 6: Average time to notify a death via the MBRRACE-UK system in days since death: stillbirths and late fetal losses, 2017



Data source: MBRRACE-UK

Excluding terminations of pregnancy

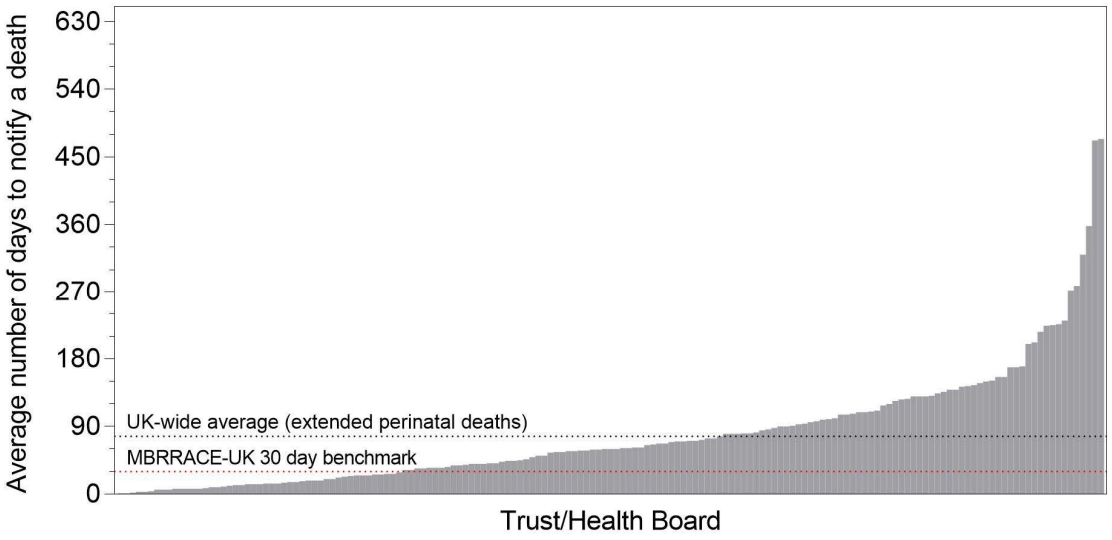
Figure 7: Average time to notify a death via the MBRRACE-UK system in days since death: neonatal deaths, 2017



Data source: MBRRACE-UK

Excluding terminations of pregnancy

Figure 8: Average time to notify a death via the MBRRACE-UK system in days since death: extended perinatal deaths, 2017

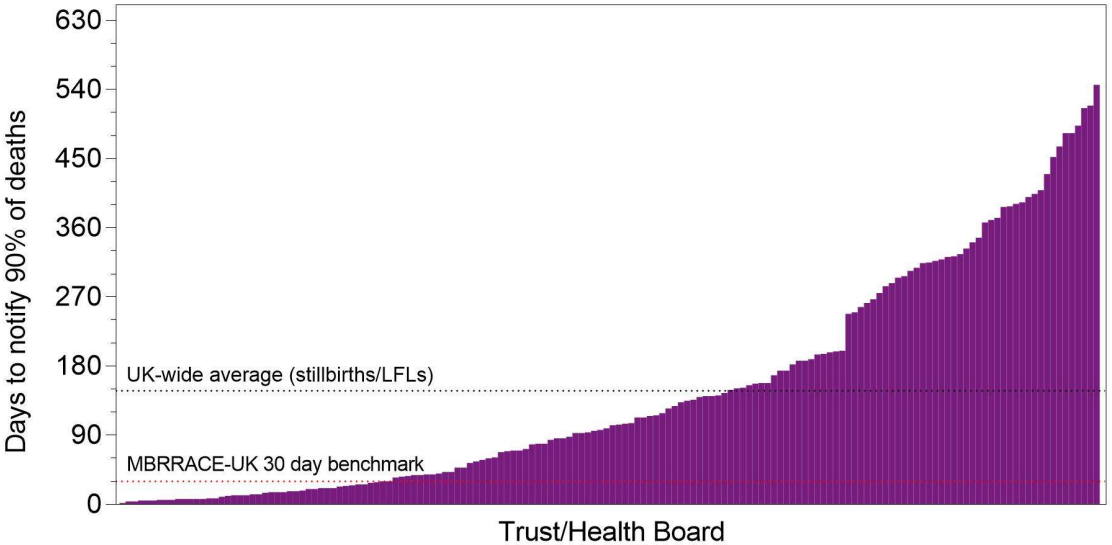


Data source: MBRRACE-UK

Excluding terminations of pregnancy

Whilst it may not always be possible to notify 100% of deaths within 30 days (due to specific circumstances e.g. where the death has been referred to the Coroner/Procurator Fiscal in order to determine whether or not the baby was liveborn), 20% of Trusts and Health Boards were able to notify 90% of deaths within the 30 day period (UK average 176 days), demonstrating that the benchmark is certainly attainable (Figures 9, 10 and 11). Notification of 90% of stillbirths and late fetal losses was achieved by 28% of Trusts and Health Boards (UK average 148 days), but again the notification of neonatal deaths was slower, with only 22% of Trusts managing to notify 90% of deaths within 30 days (UK average 215 days).

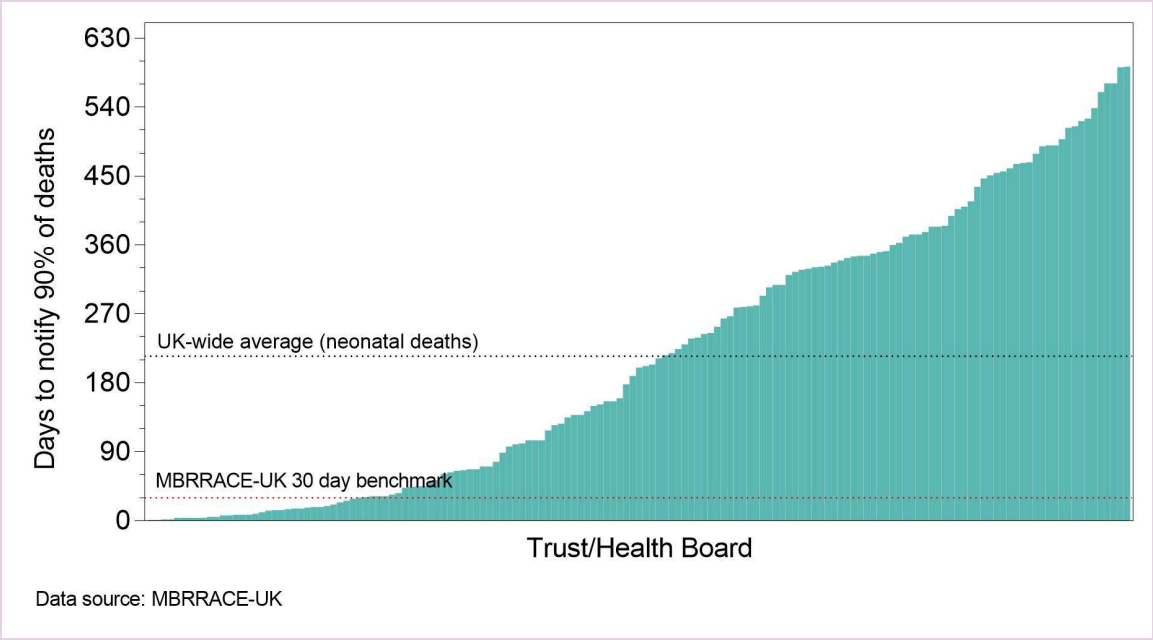
Figure 9: Number of days to notify 90% of deaths: stillbirths and late fetal losses, 2017



Data source: MBRRACE-UK

Excluding terminations of pregnancy

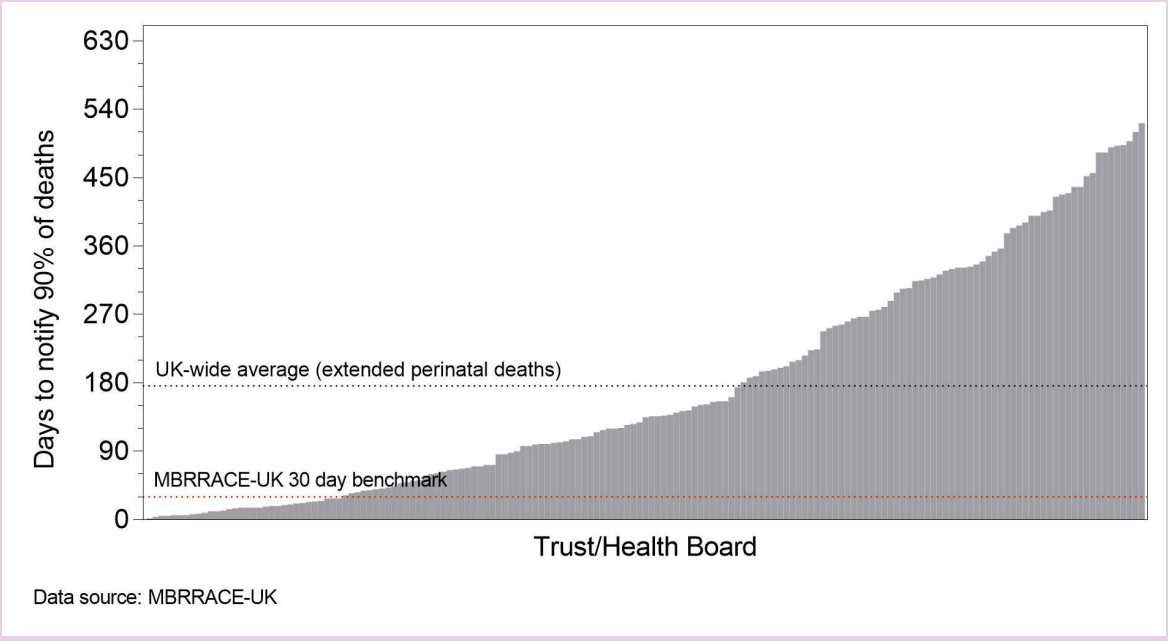
Figure 10: Number of days to notify 90% of deaths: neonatal deaths, 2017



Data source: MBRRACE-UK

Excluding terminations of pregnancy

Figure 11: Number of days to notify 90% of deaths: extended perinatal deaths, 2017



Data source: MBRRACE-UK

Excluding terminations of pregnancy

MBRRACE-UK Recommendation 2

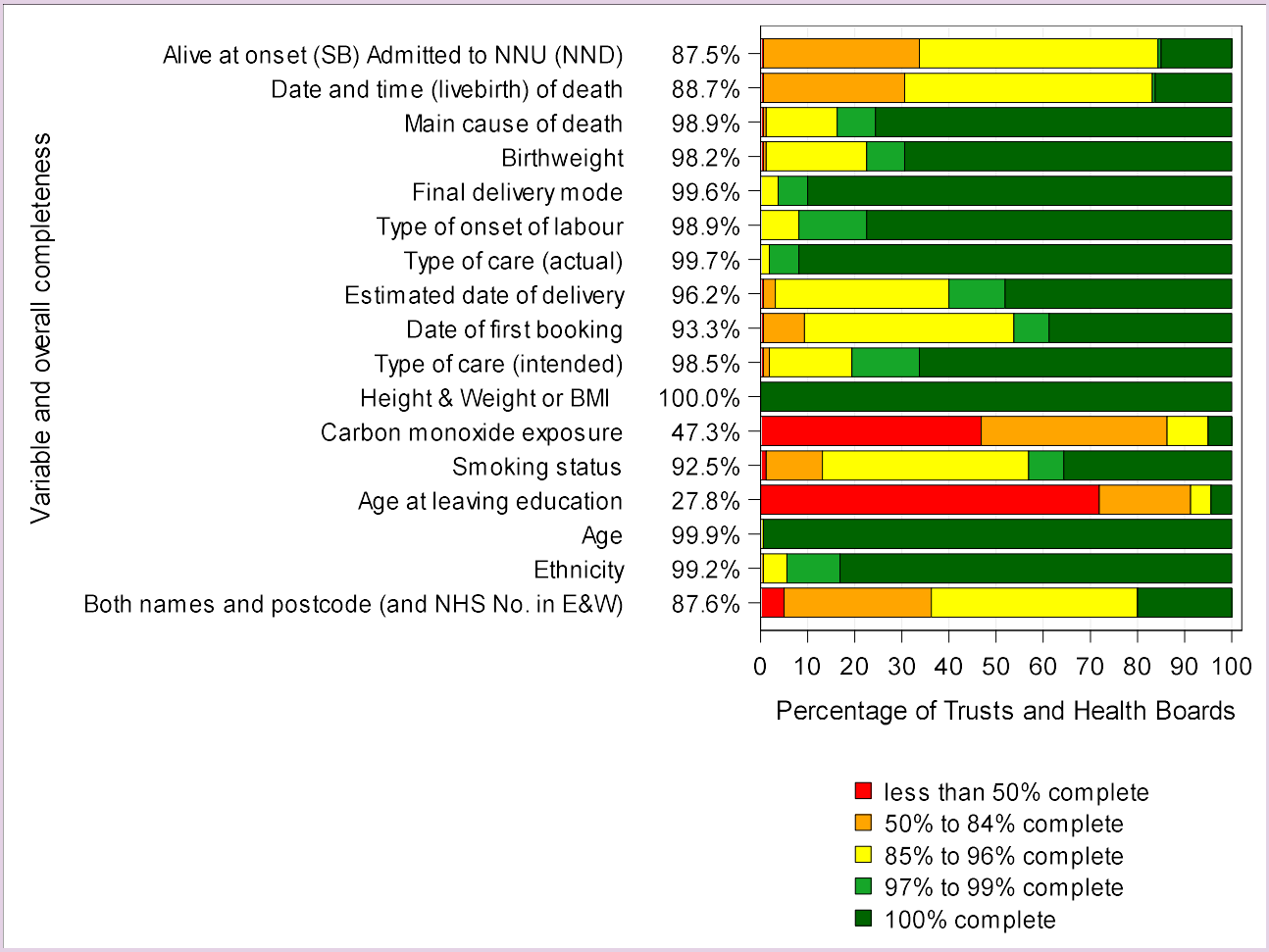
Trusts and Health Boards should aim to notify all deaths via the MBRRACE-UK system within 30 days of the death occurring. Mechanisms for timely notification should be incorporated into local processes, and must have adequate staff, time allocation and resources. Trusts and Health Boards should aim for completion of all surveillance data within 90 days in order to facilitate data sharing with the PMRT and aid discussions with parents at follow-up appointments.

4.2 Completeness of key data items 2015 to 2017

As well as the timeliness of reporting, the information we are able to provide in this report is dependent on the quality of the data reported by Trusts and Health Boards. Data quality (in terms of both accuracy and completeness) is of the utmost importance in the production of accurate risk-adjusted mortality rates and for data sharing with the Perinatal Mortality Review Tool. MBRRACE-UK is continuing to monitor the completeness of this data for both stillbirths and neonatal deaths and the proportion of missing data for neonatal deaths due to difficulties accessing the maternal notes is being gradually reduced over time. Reporters to MBRRACE-UK are now familiar with the reporting system and frequently use the facility to temporarily assign cases between the Trusts and Health Boards where care was provided in order to facilitate data collection from the maternal notes.

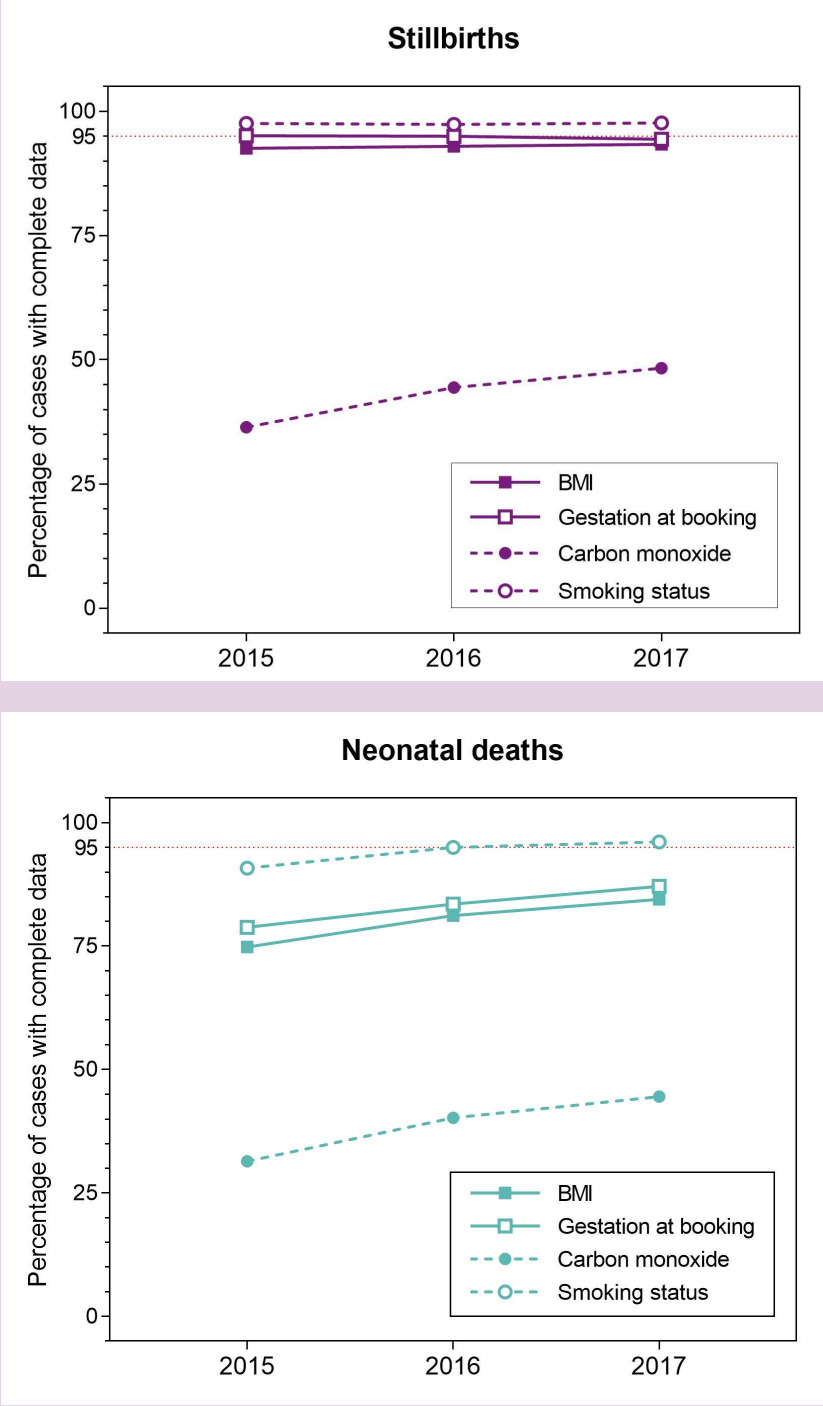
In Figure 12, the overall completeness of selected key variables is shown together with details of the proportion of Trusts and Health Boards achieving different levels of completeness for their data.

Figure 12: Level of completeness of data reported by Trusts and Health Boards: United Kingdom and Crown Dependencies, for births in 2017



In the previous report we noted that whilst data completeness was steadily improving, there continued to be an issue with some of the maternal data items, particularly carbon monoxide exposure monitoring, one of the elements of the NHS England Saving Babies' Lives Care Bundle [1]. The completeness of maternal data continues to be lower for neonatal deaths than for stillbirths. Figure 13 illustrates the completeness of a small number of key data items that identify whether a mother is high or low risk and determine the care provision a mother receives. For neonatal deaths the completeness of these variables has been a particular problem.

Figure 13: Completeness of key data items reported by Trusts and Health Boards: 2015 to 2017



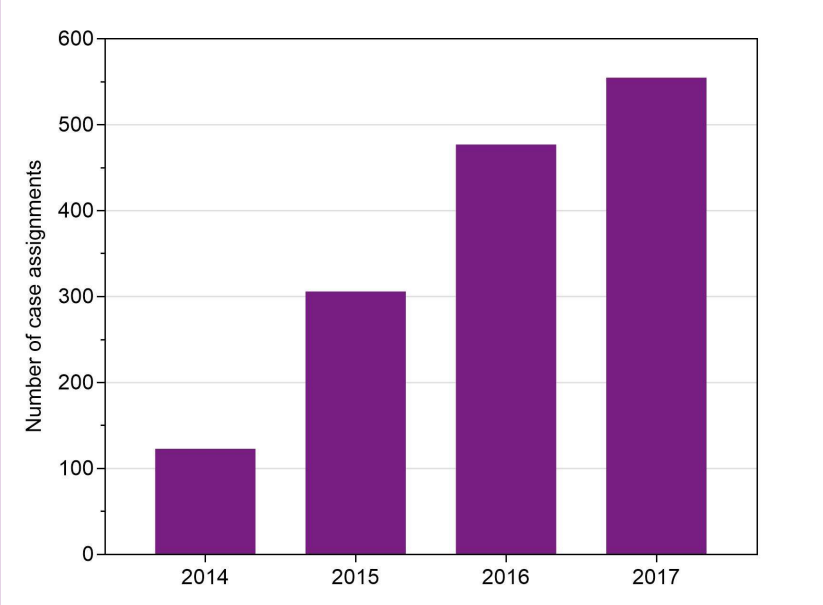
Excluding terminations of pregnancy and births <24^{+0} weeks gestational age.
Data source: MBRRACE-UK

The reporting of BMI has remained static over the three year period for stillbirths and has not yet reached 95% complete (2017: 93.4%). The completeness of gestation at booking and smoking status have also remained

static for stillbirths, whilst there has been a clear improvement in the completeness of carbon monoxide monitoring data from 36.4% to 48.3%.

For neonatal deaths there has been a clear increase in the completeness of BMI data over the three years 2015 to 2017 (74.8% to 84.5%). However, the level of completeness is well below 95% so there is still much room for improvement. There has also been an increase in completeness for gestation at booking and smoking status (78.8% to 87.1% and 90.8% to 96.1%, respectively). These steady increases may reflect improved communication between neonatal units and birth hospitals and more consistent use of the case assignment facility in the MBRRACE-UK system, which allows Trusts and Health Boards to request additional data from other units (Figure 14). As for stillbirths there is a clear improvement in the completeness of carbon monoxide monitoring data for neonatal deaths, from 31.4% to 44.5%. However, this information continues to be missing for more than half of reported deaths, despite the Saving Babies' Lives Care Bundle [1] recommendation that all women are offered carbon monoxide testing as part of their antenatal care.

Figure 14: Assignment of cases between Trusts and Health Boards 2014 to 2017



4.3 Updates to the MBRRACE-UK system

In February 2019 we introduced a number of changes to the MBRRACE-UK reporting system in order to improve notification speed, reduce duplicate data entry, and further integrate the MBRRACE-UK surveillance system and PMRT. Deaths are now reported via an initial notification containing key information about the mother, baby and care providers. This initial notification is then shared by both the surveillance system and PMRT enabling each to be completed independently whilst still relying on the same core information.

In order to avoid incorrect classification of deaths by individual reporters, the case definition for each death is now determined by the MBRRACE-UK system, using the information provided in the initial notification. For deaths that fall outside of the MBRRACE-UK reporting criteria but are supported for review using the PMRT (e.g. post-neonatal deaths), additional surveillance information will not be required. The MBRRACE-UK system clearly identifies those cases which require surveillance information and those where notification is sufficient. Similarly, the PMRT identifies which deaths are supported for review.

In addition to notifying a death, the revised case management screen allows users to search for cases using a number of key identifiers, as well as viewing different subsets of cases in order to identify those requiring further action. Cases requiring surveillance information or that are ready for review using the PMRT are easily identified. Users can also perform a number of case-specific actions such as assigning the surveillance record to another Trust or Health Board, reopening a closed case, or requesting a case be cancelled. Users are also able to

download reports containing summaries and case lists as well as customized versions of the annual perinatal surveillance reports, containing additional information specific to their Trust or Health Board.

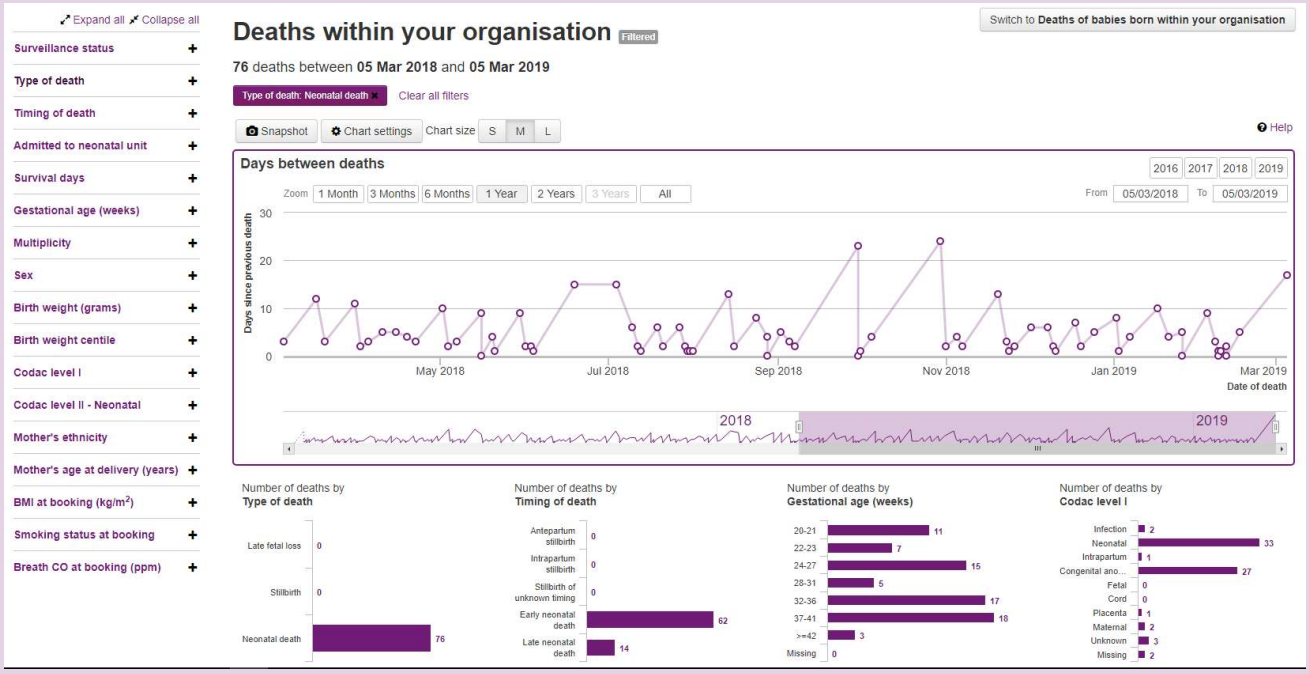
The MBRRACE-UK reporting system is under constant review to increase our efficiency, ensure high quality data capture and provide support for Trust and Health Board staff. We are happy to receive feedback at any time via email: mbrrace-uk@npeu.ox.ac.uk.

4.4 Real-time data monitoring

In May 2019, MBRRACE-UK introduced a new real-time data monitoring tool, incorporated into the MBRRACE-UK web-based system (Figure 15). The tool allows registered users of the MBRRACE-UK surveillance system to monitor, filter and summarise the perinatal deaths reported for their organisation, using live surveillance data from the MBRRACE-UK system. To make full use of the tool, it is therefore essential that deaths are notified and surveillance data entered as soon as possible after the death.

The centrepiece of the tool is a chart which plots the number of days between deaths, allowing Trusts and Health Boards to identify unusual patterns and clusters within their organisation. The addition of statistical process control features places each death in a more historical context for that organisation, and highlights clusters of deaths occurring closer together than would be expected based on that historical data. Users can click each point on the chart to see further information about the death it corresponds to, as well as viewing the MBRRACE-UK surveillance data if required.

Figure 15: Real-time data monitoring tool



Accompanying the main chart are a number of bar charts which plot the number of deaths in user-selected categories such as type of death, gestational age and BMI. A snapshot facility also allows users to make comparisons across different time periods. Finally, a filters panel allows maternity and neonatal units the flexibility to view data on the deaths most relevant to them, with live updating of the charts as filters are added or removed.

MBRRACE-UK Recommendation 3

Trusts and Health Boards should use the MBRRACE-UK real time data monitoring tool to monitor the completeness of their data. Particular emphasis should be placed on carbon monoxide monitoring and other data items feeding into national initiatives such as the Saving Babies' Lives Care Bundle version 2.

5. Mortality rates by commissioning organisation

This chapter focuses on the geographical distribution of stillbirth, neonatal, and extended perinatal mortality rates for organisations responsible for the commissioning of health care and maintaining its quality. **New for this report**, data is presented as crude mortality rates and stabilised rates. The process of stabilisation has a major effect in terms of smoothing apparently extreme (very high or very low) crude mortality rates by taking into account the size of the population. However, in order to facilitate the development and targeting of interventions to reduce perinatal mortality for these organisations the maps and associated tables (Figures 16 to 27 and Tables 12 and 14) **DO NOT** (as in previous reports) adjust for those key factors known to increase the risk of perinatal mortality. Instead, tables 13 and 15 provide details of the risk factor profiles for these organisations to identify the specific factors affecting the populations. Factors presented are the proportion of mothers giving birth in each organisation with the following characteristics: babies of Black or Black British ethnicity; babies of Asian or Asian British ethnicity; mothers aged <20 years; mothers aged over 39 years; mothers living in the most deprived quintile of socioeconomic deprivation; multiple births; and very preterm births (24^{+0} to 31^{+6} weeks gestation).

A pair of maps is provided for each mortality outcome: one presents the crude rate and the other the stabilised rate. The colour coding for each organisation represents the extent to which it is above or below the UK average mortality rate, based on the approach described in Section 2.7. The first set of maps and tables in Section 5.1 presents the mortality rates by CCG (England), Health Board (Scotland and Wales), Local Commissioning Group (Northern Ireland), and Crown Dependency. The maps are followed by Table 12, in which the numerical values of the crude and the stabilised rates for each of the relevant organisations are provided. There are some organisations where mortality rates increase as a result of the stabilisation. Some of these will be organisations with low or high crude mortality rates just by chance due to the small size of their populations.

Across the commissioning organisations for the UK, stabilised rates of stillbirth, neonatal mortality and extended perinatal mortality (Table 12) ranged from 3.16 to 4.83 per 1,000 total births, from 1.31 to 2.44 per 1,000 live births and from 4.52 to 6.76 per 1,000 total births, respectively. Out of a total of 224 commissioning organisations, 52 fell into the red category (more than 5% higher than the overall UK average) for stillbirths, with 57 organisations and 40 organisations falling into the red category for neonatal deaths and extended perinatal mortality, respectively. Six commissioning organisations fell into the green category (more than 15% lower than the UK average) for neonatal deaths.

In Section 5.2 a similar set of maps and tables to those outlined above are presented for the STPs in England and for each devolved nation.

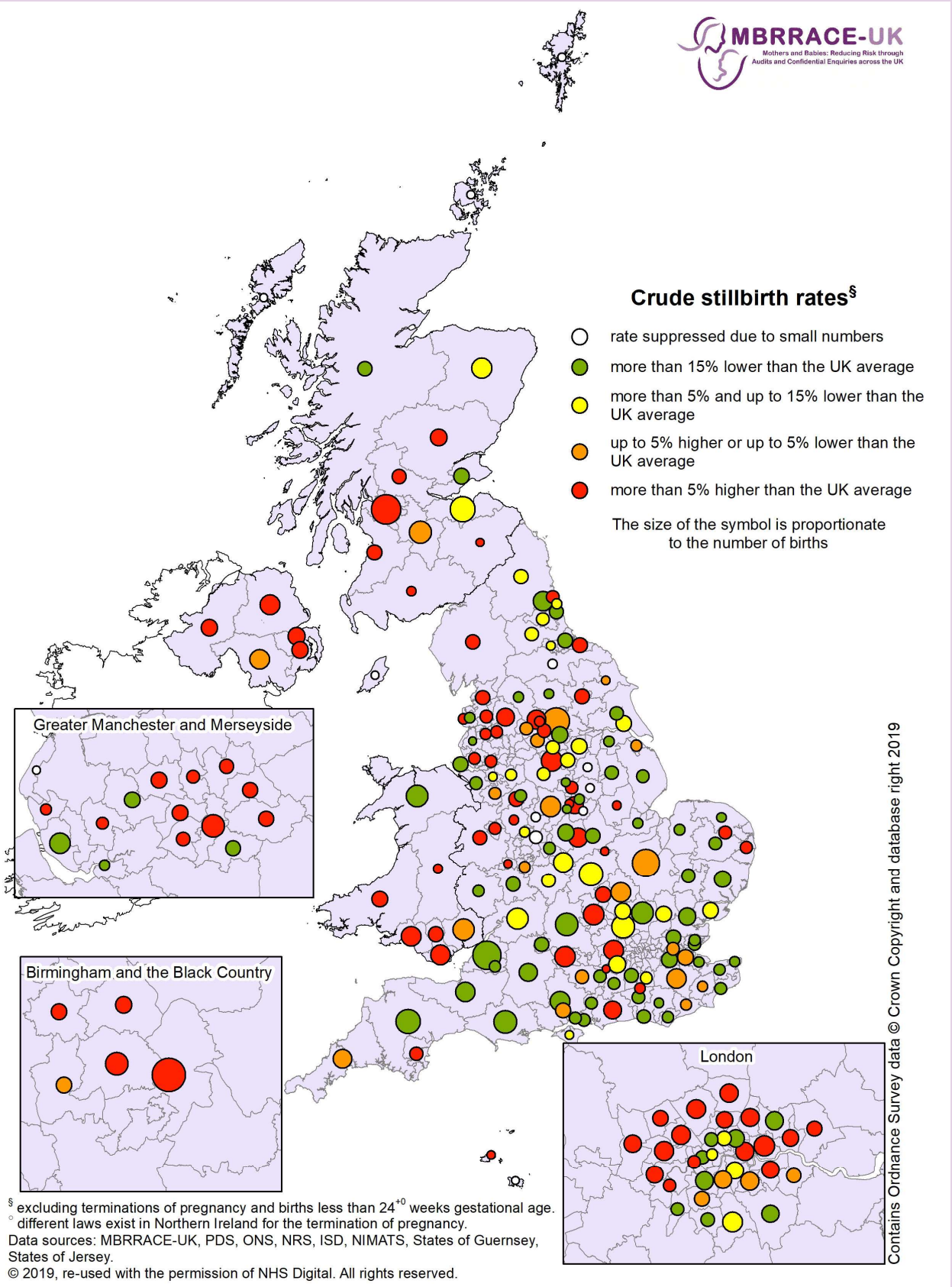
Commissioning organisations will need to work with their relevant care providers to try to understand more fully the factors underlying their particular mortality rates in the context of their data quality, population characteristics and quality of care provision. Population characteristics for Enfield CCG, which has the highest stabilised rate of stillbirth, shows that their births in 2017 were in the highest quintile of commissioning organisations for the proportion of Black or Black British babies, mothers aged more than 39 years and premature births of 24^{+0} to 31^{+6} weeks gestational age (Table 13). The highest stabilised neonatal mortality rate was for Sandwell and West Birmingham CCG, where their births in 2017 were in the highest quintile of commissioning organisations for the proportion of Asian or Asian British babies, Black or Black British babies and for mothers in the most deprived quintile of child poverty.

In Chapter 6 we highlight the impact of congenital anomalies on the various mortality rates. It seems clear that these births are responsible for significant variation in the rates of death observed between organisations and therefore local factors and policies affecting the number of deaths in these categories should also be considered as part of any review.

5.1 Mortality rates by Clinical Commissioning Group (England), Health Board (Scotland and Wales), Local Commissioning Group (Northern Ireland), and Crown Dependency

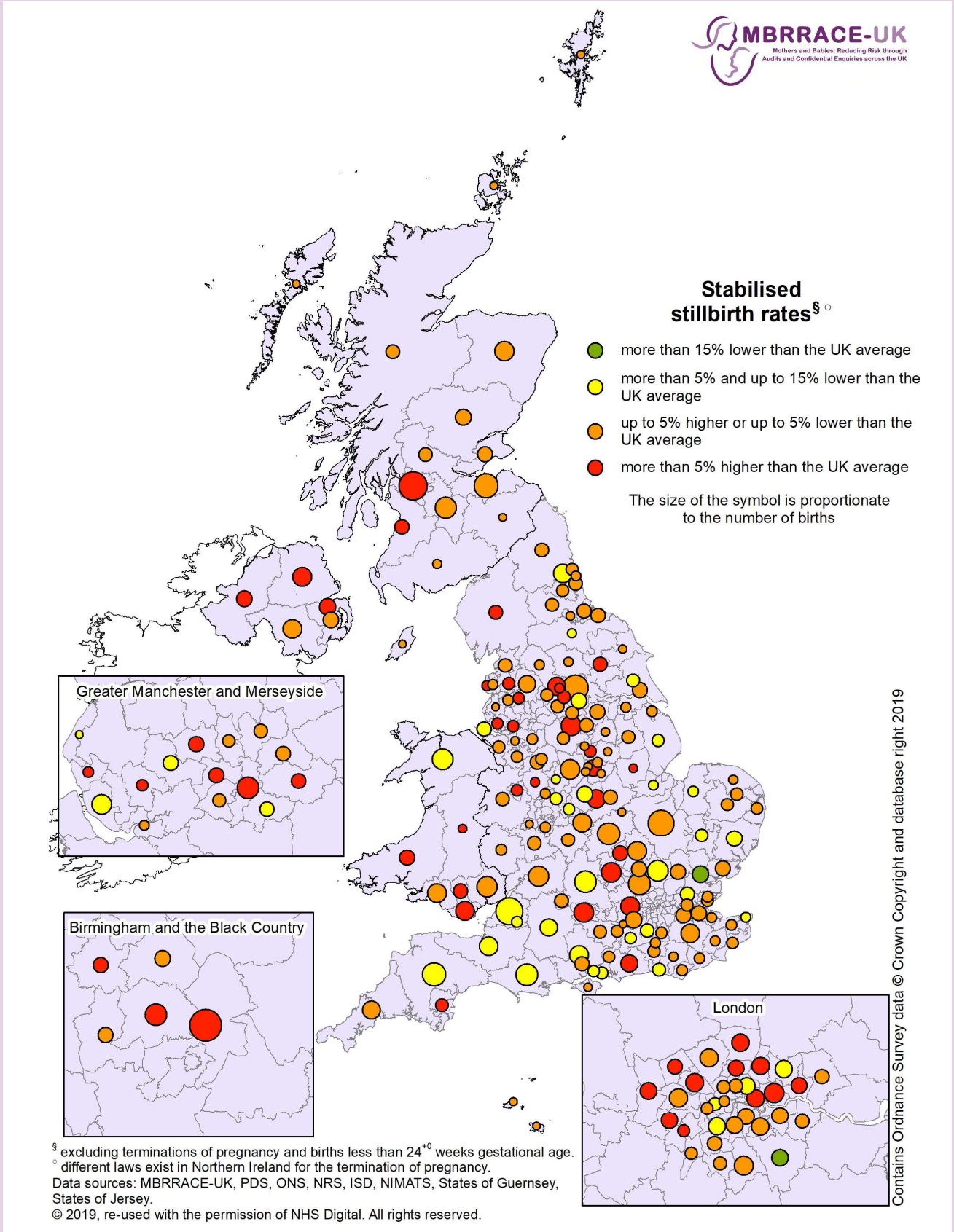
Maps begin on page 44.

Figure 16: Crude stillbirth rates by Clinical Commissioning Group (England), Health Board (Scotland and Wales), Local Commissioning Group (Northern Ireland), and Crown Dependency based on postcode of mother's residence at time of delivery: United Kingdom and Crown Dependencies, for births in 2017



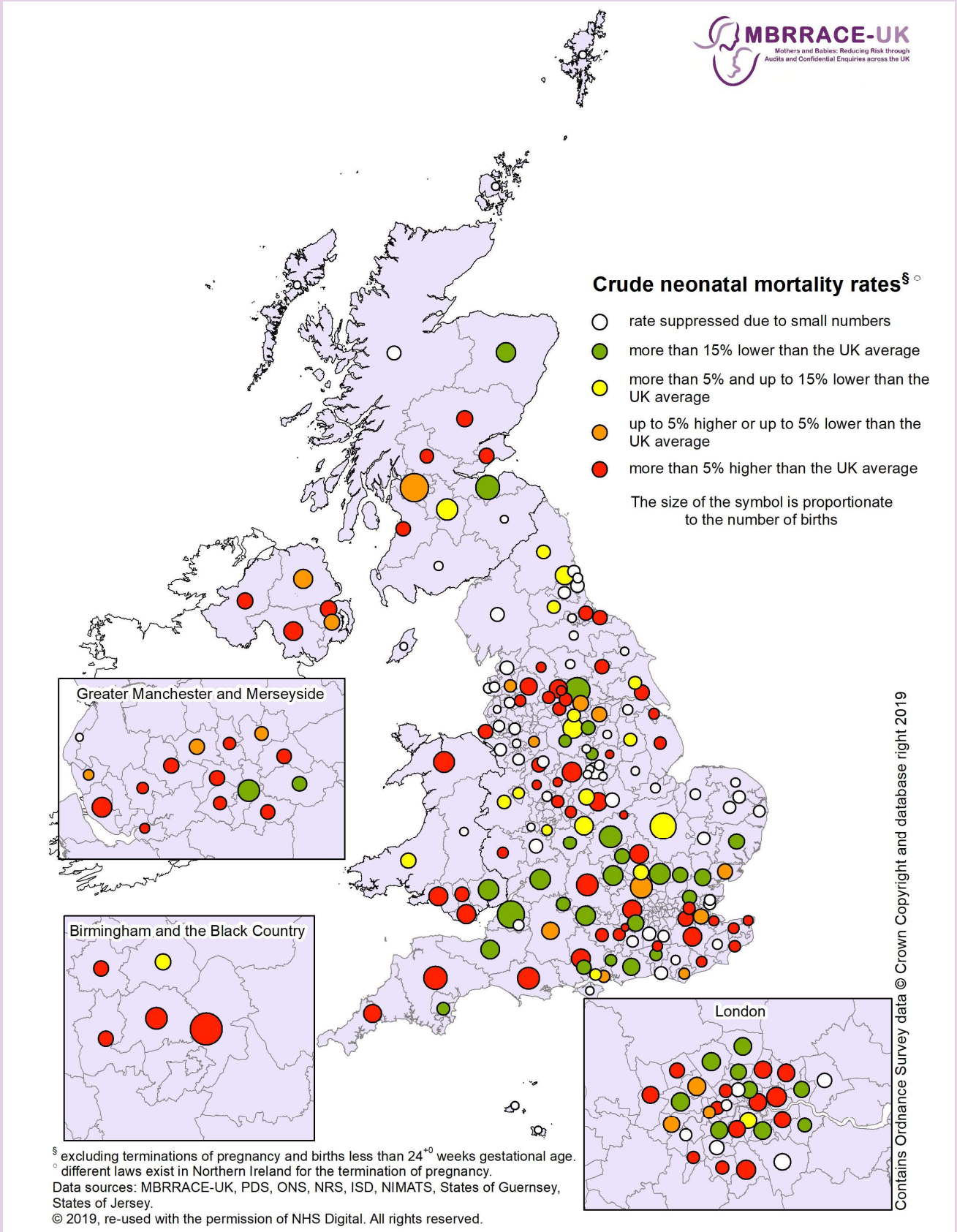
§ excluding terminations of pregnancy and births less than 24^{+0} weeks gestational age.
° different laws exist in Northern Ireland for the termination of pregnancy.
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey.

Figure 17: Stabilised stillbirth rates by Clinical Commissioning Group (England), Health Board (Scotland and Wales), Local Commissioning Group (Northern Ireland), and Crown Dependency based on postcode of mother's residence at time of delivery: United Kingdom and Crown Dependencies, for births in 2017



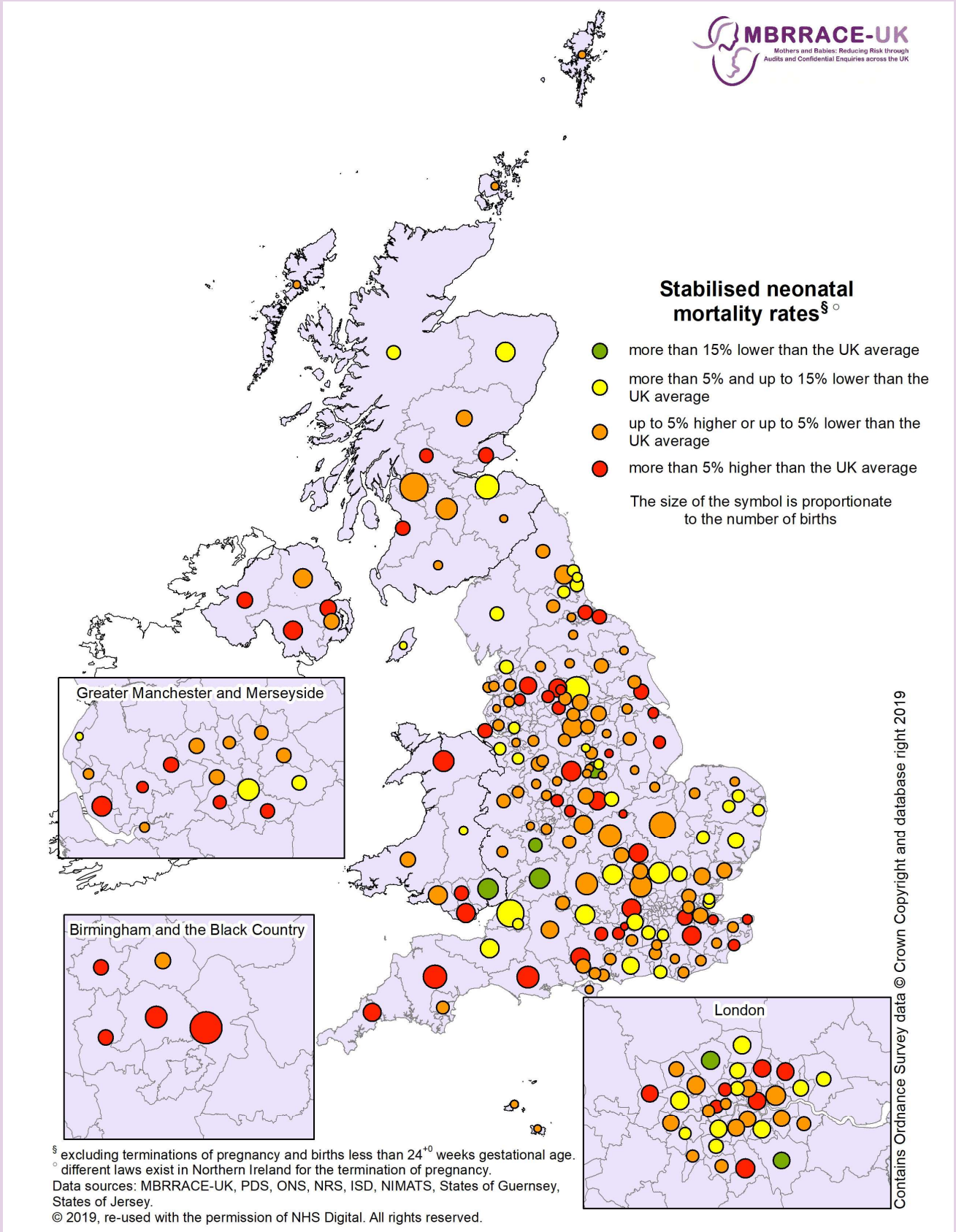
§ excluding terminations of pregnancy and births less than 24^{+0} weeks gestational age.
○ different laws exist in Northern Ireland for the termination of pregnancy.
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey.

Figure 18: Crude neonatal mortality rates by Clinical Commissioning Group (England), Health Board (Scotland and Wales), Local Commissioning Group (Northern Ireland), and Crown Dependency based on postcode of mother's residence: United Kingdom and Crown Dependencies, for births in 2017



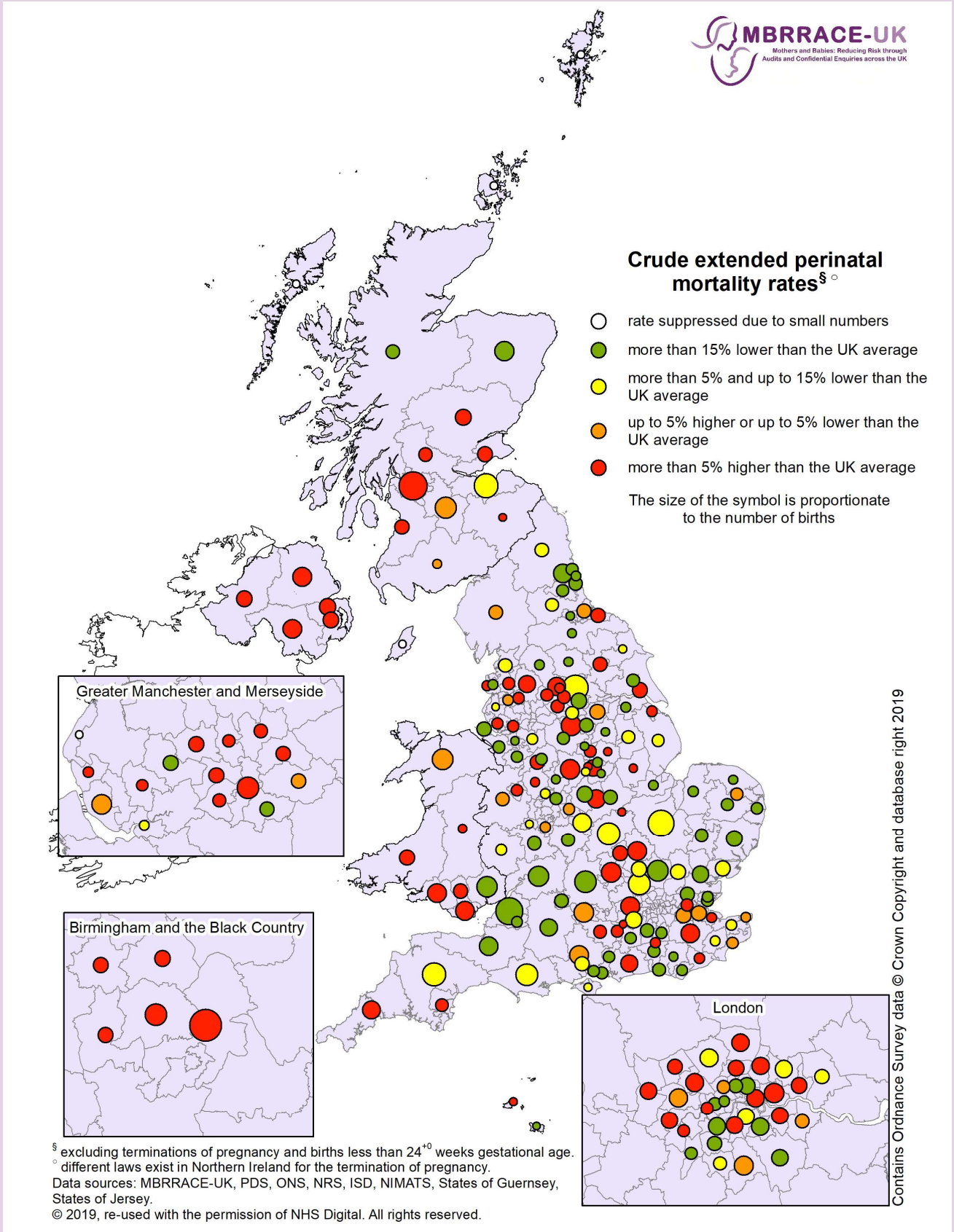
§ excluding terminations of pregnancy and births less than 24^{+0} weeks gestational age.
○ different laws exist in Northern Ireland for the termination of pregnancy.
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey.

Figure 19: Stabilised neonatal mortality rates by Clinical Commissioning Group (England), Health Board (Scotland and Wales), Local Commissioning Group (Northern Ireland), and Crown Dependency based on mother's residence: United Kingdom and Crown Dependencies, for births in 2017



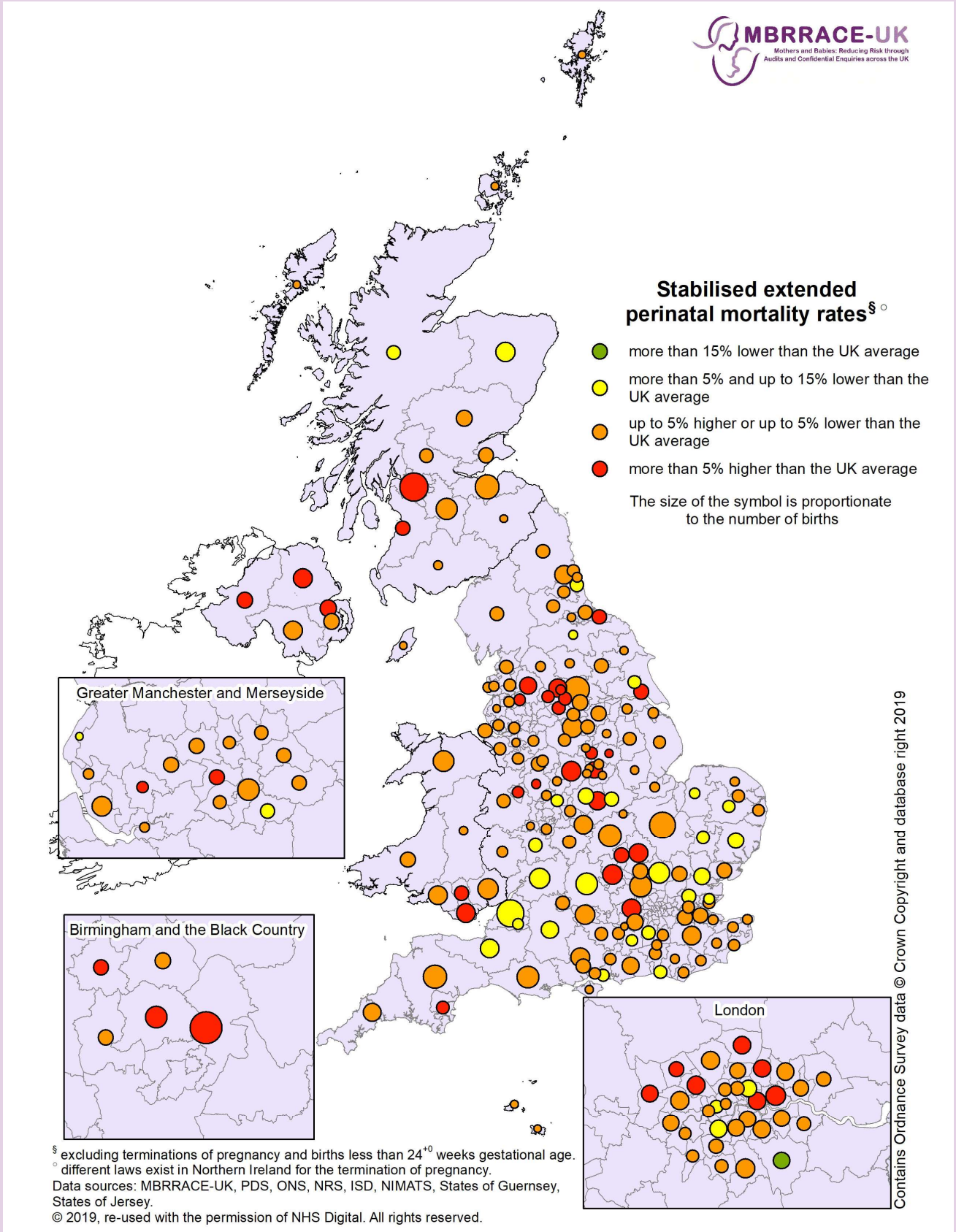
§ excluding terminations of pregnancy and births less than 24^{+0} weeks gestational age.
○ different laws exist in Northern Ireland for the termination of pregnancy.
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey.

Figure 20: Crude extended perinatal mortality rates by Clinical Commissioning Group (England), Health Board (Scotland and Wales), Local Commissioning Group (Northern Ireland), and Crown Dependency based on mother's residence: United Kingdom and Crown Dependencies, for births in 2017



§ excluding terminations of pregnancy and births less than 24^{+0} weeks gestational age.
○ different laws exist in Northern Ireland for the termination of pregnancy.
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey.

Figure 21: Stabilised extended perinatal mortality rates by Clinical Commissioning Group (England), Health Board (Scotland and Wales), Local Commissioning Group (Northern Ireland), and Crown Dependency based on mother's residence: United Kingdom and Crown Dependencies, for births in 2017



§ excluding terminations of pregnancy and births less than 24^{+0} weeks gestational age.
○ different laws exist in Northern Ireland for the termination of pregnancy.
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey.

Table 12: Crude and stabilised stillbirth, neonatal, and extended perinatal mortality rates by Clinical Commissioning Group (England), Health Board (Scotland and Wales), Local Commissioning Group (Northern Ireland), and Crown Dependency based on postcode of mother's residence at time of delivery: United Kingdom and Crown Dependencies, for births in 2017

Organisation	Total births§	Rate per 1,000 births§						
		Stillbirth†		Neonatal‡		Extended perinatal†		
		Crude	Stabilised (95% CI)	Crude	Stabilised (95% CI)	Crude	Stabilised (95% CI)#	
ENGLAND								
Airedale, Wharfedale and Craven	1569	2.55	3.61 (2.69 to 4.94)	1.92	1.70 (1.15 to 2.60)	4.46	5.30 (4.24 to 6.85)	
Ashford	1570	*	3.75 (2.86 to 5.00)	*	1.64 (1.11 to 2.42)	5.1	5.38 (4.38 to 6.83)	
Barking and Dagenham	3856	4.67	3.99 (3.06 to 5.25)	1.04	1.54 (1.08 to 2.29)	5.71	5.53 (4.48 to 7.03)	
Barnet	5233	4.2	3.90 (3.09 to 5.09)	0.58	1.39 (0.95 to 2.08)	4.78	5.29 (4.38 to 6.59)	
Barnsley	2761	3.26	3.66 (2.82 to 4.79)	1.45	1.64 (1.15 to 2.49)	4.71	5.29 (4.26 to 6.66)	
Basildon and Brentwood	3292	1.82	3.35 (2.51 to 4.39)	1.22	1.59 (1.09 to 2.41)	3.04	4.93 (3.96 to 6.25)	
Bassetlaw	1206	*	3.55 (2.66 to 4.63)	*	1.61 (1.10 to 2.48)	2.49	5.15 (4.11 to 6.52)	
Bath and North East Somerset	1724	*	3.49 (2.65 to 4.61)	*	1.56 (1.02 to 2.33)	2.32	5.04 (4.04 to 6.39)	
Bedfordshire	5390	3.9	3.81 (2.99 to 4.91)	2.42	1.92 (1.31 to 2.87)	6.31	5.72 (4.75 to 7.09)	
Berkshire West	5916	4.39	3.98 (3.15 to 5.08)	1.02	1.49 (1.02 to 2.13)	5.41	5.47 (4.48 to 6.78)	
Bexley	3062	3.92	3.79 (2.89 to 4.94)	1.31	1.61 (1.10 to 2.38)	5.23	5.40 (4.35 to 6.81)	
Birmingham and Solihull	16090	4.72	4.37 (3.54 to 5.47)	2.44	2.16 (1.59 to 2.97)	7.15	6.51 (5.49 to 7.87)	
Blackburn with Darwen	2015	5.46	4.01 (3.05 to 5.35)	3.99	2.02 (1.33 to 3.15)	9.43	6.01 (4.89 to 7.70)	
Blackpool	1635	*	3.97 (3.06 to 5.29)	*	1.63 (1.08 to 2.51)	6.73	5.59 (4.50 to 7.20)	
Bolton	3734	4.55	3.95 (3.03 to 5.17)	1.61	1.67 (1.16 to 2.39)	6.16	5.62 (4.51 to 6.95)	
Bradford City	1618	6.8	4.13 (3.08 to 5.60)	4.36	2.00 (1.29 to 3.18)	11.12	6.12 (4.85 to 7.93)	
Bradford Districts	4907	4.48	3.98 (3.13 to 5.09)	2.46	1.91 (1.34 to 2.85)	6.93	5.88 (4.82 to 7.29)	
Brent	5244	4.96	4.15 (3.26 to 5.41)	1.72	1.70 (1.18 to 2.46)	6.67	5.85 (4.80 to 7.44)	
Brighton and Hove	2718	*	3.40 (2.50 to 4.50)	*	1.53 (0.99 to 2.25)	2.58	4.92 (3.86 to 6.25)	
Bristol, North Somerset and South Gloucestershire	11279	2.93	3.38 (2.73 to 4.21)	1.33	1.54 (1.08 to 2.15)	4.26	4.91 (4.12 to 5.98)	
Bromley	4235	*	3.17 (2.39 to 4.15)	*	1.36 (0.88 to 2.06)	1.65	4.52 (3.58 to 5.69)	
Buckinghamshire	5910	4.91	4.17 (3.28 to 5.34)	1.19	1.54 (1.06 to 2.22)	6.09	5.70 (4.71 to 7.02)	
Bury	2255	3.99	3.79 (2.86 to 5.07)	1.78	1.70 (1.17 to 2.54)	5.76	5.48 (4.41 to 6.95)	
Calderdale	2413	3.73	3.75 (2.83 to 4.98)	3.33	1.96 (1.32 to 2.99)	7.05	5.69 (4.57 to 7.21)	
Cambridgeshire and Peterborough	10398	3.56	3.68 (2.96 to 4.62)	1.54	1.64 (1.20 to 2.29)	5.1	5.31 (4.35 to 6.39)	

Organisation	Total births§	Rate per 1,000 births§						
		Stillbirth†		Neonatal‡		Extended perinatal†		
		Crude	Stabilised (95% CI)	Crude	Stabilised (95% CI)	Crude	Stabilised (95% CI)#	
Camden	2666	3	3.61 (2.68 to 4.67)	2.26	1.78 (1.23 to 2.75)	5.25	5.39 (4.37 to 6.71)	
Cannock Chase	1481	*	3.70 (2.79 to 4.83)	*	1.65 (1.15 to 2.44)	4.73	5.34 (4.28 to 6.74)	
Canterbury and Coastal	1816	2.75	3.61 (2.72 to 4.78)	2.21	1.75 (1.20 to 2.64)	4.96	5.35 (4.28 to 6.92)	
Castle Point and Rochford	1697	*	3.57 (2.65 to 4.71)	*	1.50 (0.97 to 2.27)	2.36	5.06 (4.02 to 6.44)	
Central London (Westminster)	1765	*	3.70 (2.76 to 4.90)	*	1.62 (1.03 to 2.39)	4.53	5.31 (4.23 to 6.80)	
Chorley and South Ribble	1867	*	3.82 (2.96 to 5.09)	*	1.61 (1.07 to 2.38)	5.36	5.42 (4.46 to 6.86)	
City and Hackney	4483	2.9	3.53 (2.70 to 4.56)	1.34	1.60 (1.11 to 2.31)	4.24	5.12 (4.18 to 6.35)	
Coastal West Sussex	4661	4.72	4.04 (3.16 to 5.41)	1.08	1.53 (1.03 to 2.16)	5.79	5.57 (4.53 to 7.03)	
Corby	970	5.15	3.85 (2.82 to 5.16)	3.11	1.78 (1.16 to 2.73)	8.25	5.62 (4.43 to 7.19)	
Coventry and Rugby	5639	3.19	3.58 (2.81 to 4.63)	1.42	1.61 (1.17 to 2.35)	4.61	5.19 (4.32 to 6.45)	
Crawley	1573	5.09	3.91 (2.93 to 5.22)	1.92	1.70 (1.17 to 2.45)	6.99	5.60 (4.65 to 7.11)	
Croydon	5651	3.36	3.63 (2.86 to 4.64)	1.95	1.78 (1.21 to 2.56)	5.31	5.40 (4.43 to 6.64)	
Darlington	1144	*	3.72 (2.81 to 5.03)	*	1.61 (1.06 to 2.46)	4.37	5.33 (4.33 to 6.93)	
Dartford, Gravesham and Swanley	3478	3.16	3.62 (2.78 to 4.70)	2.31	1.82 (1.25 to 2.72)	5.46	5.43 (4.43 to 6.80)	
Doncaster	3467	3.46	3.69 (2.82 to 4.91)	1.74	1.70 (1.18 to 2.43)	5.19	5.38 (4.37 to 6.77)	
Dorset	7142	2.8	3.41 (2.69 to 4.38)	1.97	1.80 (1.30 to 2.57)	4.76	5.20 (4.29 to 6.45)	
Dudley	3715	3.77	3.76 (2.88 to 4.97)	2.43	1.86 (1.26 to 2.73)	6.19	5.61 (4.62 to 7.05)	
Durham Dales, Easington and Sedgefield	2762	3.26	3.66 (2.83 to 4.72)	1.45	1.64 (1.12 to 2.44)	4.71	5.29 (4.38 to 6.60)	
Ealing	5157	4.27	3.92 (3.07 to 4.94)	0.97	1.50 (1.02 to 2.17)	5.24	5.41 (4.46 to 6.71)	
East Berkshire	5660	4.59	4.04 (3.12 to 5.18)	2.48	1.95 (1.36 to 2.89)	7.07	5.98 (4.80 to 7.48)	
East Lancashire	4597	4.13	3.87 (2.98 to 5.19)	2.4	1.89 (1.31 to 2.83)	6.53	5.74 (4.66 to 7.35)	
East Leicestershire and Rutland	3273	*	3.60 (2.81 to 4.63)	*	1.43 (0.90 to 2.13)	3.36	5.02 (4.12 to 6.42)	
East Riding of Yorkshire	2719	2.21	3.47 (2.61 to 4.59)	1.47	1.65 (1.12 to 2.48)	3.68	5.11 (4.09 to 6.53)	
East Staffordshire	1409	*	3.43 (2.53 to 4.55)	*	1.72 (1.19 to 2.67)	2.84	5.15 (4.14 to 6.55)	
East Surrey	2146	*	3.67 (2.77 to 4.89)	*	1.52 (0.93 to 2.31)	3.73	5.18 (4.18 to 6.67)	
East and North Hertfordshire	6653	2.56	3.34 (2.53 to 4.33)	1.36	1.58 (1.12 to 2.28)	3.91	4.92 (4.06 to 6.04)	
Eastbourne, Hailsham and Seaford	1730	2.31	3.56 (2.68 to 4.77)	1.74	1.69 (1.14 to 2.46)	4.05	5.24 (4.23 to 6.63)	
Eastern Cheshire	1871	3.21	3.67 (2.81 to 4.85)	1.61	1.67 (1.11 to 2.42)	4.81	5.34 (4.33 to 6.80)	
Enfield	4769	7.13	4.83 (3.70 to 6.63)	1.27	1.58 (1.10 to 2.35)	8.39	6.41 (5.13 to 8.39)	

Organisation	Total births§	Rate per 1,000 births§						
		Stillbirth†		Neonatal‡		Extended perinatal†		
		Crude	Stabilised (95% CI)	Crude	Stabilised (95% CI)	Crude	Stabilised (95% CI)#	
Erewash	1057	*	3.67 (2.75 to 4.85)	*	1.69 (1.11 to 2.48)	4.73	5.35 (4.22 to 6.73)	
Fareham and Gosport	1968	2.03	3.51 (2.59 to 4.72)	1.53	1.66 (1.12 to 2.56)	3.56	5.16 (4.14 to 6.59)	
Fylde & Wyre	1609	*	3.59 (2.77 to 4.84)	*	1.63 (1.08 to 2.47)	3.73	5.22 (4.27 to 6.71)	
Gloucestershire	6548	3.36	3.62 (2.83 to 4.59)	0.46	1.31 (0.86 to 1.92)	3.82	4.93 (4.08 to 5.99)	
Great Yarmouth and Waveney	2181	*	3.81 (2.87 to 4.99)	*	1.51 (0.98 to 2.25)	4.59	5.32 (4.16 to 6.66)	
Greater Huddersfield	2653	3.77	3.75 (2.88 to 4.97)	3.41	2.00 (1.40 to 3.10)	7.16	5.74 (4.57 to 7.44)	
Greater Preston	2361	5.08	3.98 (3.05 to 5.23)	1.7	1.69 (1.13 to 2.52)	6.78	5.66 (4.53 to 7.10)	
Greenwich	4431	4.29	3.91 (3.03 to 5.01)	1.81	1.72 (1.19 to 2.54)	6.09	5.62 (4.67 to 6.99)	
Guildford and Waverley	1962	*	3.51 (2.61 to 4.62)	*	1.60 (1.06 to 2.33)	3.06	5.10 (4.05 to 6.51)	
Halton	1482	2.7	3.63 (2.75 to 4.81)	2.03	1.72 (1.14 to 2.56)	4.72	5.34 (4.29 to 6.80)	
Hambleton, Richmondshire and Whitby	1347	*	3.52 (2.62 to 4.69)	*	1.59 (1.05 to 2.39)	2.23	5.10 (4.03 to 6.56)	
Hammersmith and Fulham	2467	4.46	3.87 (2.93 to 5.01)	1.63	1.67 (1.14 to 2.41)	6.08	5.54 (4.51 to 6.99)	
Hardwick	1146	*	3.64 (2.74 to 4.77)	*	1.55 (1.01 to 2.31)	2.62	5.19 (4.12 to 6.54)	
Haringey	3939	5.08	4.10 (3.16 to 5.57)	1.02	1.54 (1.03 to 2.30)	6.09	5.64 (4.57 to 7.21)	
Harrogate and Rural District	1401	*	3.58 (2.68 to 4.85)	*	1.65 (1.10 to 2.47)	3.57	5.22 (4.09 to 6.65)	
Harrow	3741	5.08	4.09 (3.18 to 5.40)	1.88	1.73 (1.25 to 2.56)	6.95	5.81 (4.75 to 7.29)	
Hartlepool and Stockton-on-Tees	3177	3.15	3.62 (2.79 to 4.73)	2.21	1.79 (1.22 to 2.68)	5.35	5.41 (4.38 to 6.80)	
Hastings and Rother	1788	3.91	3.77 (2.81 to 4.98)	2.25	1.75 (1.20 to 2.73)	6.15	5.51 (4.41 to 7.04)	
Havering	3367	*	3.84 (2.95 to 4.91)	*	1.47 (1.01 to 2.12)	4.75	5.31 (4.31 to 6.68)	
Herefordshire	1737	2.3	3.56 (2.73 to 4.73)	2.31	1.76 (1.19 to 2.68)	4.61	5.31 (4.27 to 6.84)	
Herts Valleys	7337	3.27	3.58 (2.84 to 4.59)	1.64	1.68 (1.22 to 2.46)	4.91	5.25 (4.39 to 6.41)	
Heywood, Middleton and Rochdale	2946	4.07	3.82 (3.01 to 5.00)	1.7	1.69 (1.15 to 2.49)	5.77	5.50 (4.51 to 7.04)	
High Weald Lewes Havens	1417	*	3.65 (2.83 to 4.83)	*	1.65 (1.10 to 2.46)	4.23	5.29 (4.30 to 6.60)	
Hillingdon	4364	5.27	4.19 (3.34 to 5.64)	2.07	1.79 (1.24 to 2.53)	7.33	5.97 (4.92 to 7.59)	
Horsham and Mid Sussex	2401	2.92	3.61 (2.72 to 4.71)	1.25	1.62 (1.13 to 2.40)	4.16	5.22 (4.14 to 6.70)	
Hounslow	4177	4.55	3.97 (3.12 to 5.25)	1.68	1.69 (1.19 to 2.55)	6.22	5.65 (4.70 to 7.13)	
Hull	3453	3.48	3.69 (2.83 to 4.80)	3.49	2.10 (1.41 to 3.30)	6.95	5.78 (4.75 to 7.32)	
Ipswich and East Suffolk	4065	2.21	3.37 (2.55 to 4.48)	0.99	1.53 (1.02 to 2.29)	3.2	4.89 (3.86 to 6.12)	
Isle of Wight	1233	*	3.70 (2.74 to 4.97)	*	1.67 (1.14 to 2.51)	4.87	5.36 (4.32 to 6.87)	

Organisation	Total births§	Rate per 1,000 births§						
		Stillbirth†		Neonatal‡		Extended perinatal†		
		Crude	Stabilised (95% CI)	Crude	Stabilised (95% CI)	Crude	Stabilised (95% CI)#	
Islington	3013	*	3.66 (2.73 to 4.81)	*	1.50 (1.02 to 2.21)	3.98	5.16 (4.08 to 6.58)	
Kernow	5179	3.67	3.73 (2.93 to 4.77)	2.13	1.82 (1.28 to 2.57)	5.79	5.55 (4.62 to 6.75)	
Kingston	2222	2.7	3.58 (2.69 to 4.80)	1.81	1.70 (1.17 to 2.51)	4.5	5.28 (4.27 to 6.76)	
Knowsley	2022	*	3.93 (3.00 to 5.20)	*	1.59 (1.04 to 2.33)	5.93	5.51 (4.43 to 6.99)	
Lambeth	4392	3.87	3.79 (2.95 to 5.02)	1.83	1.73 (1.22 to 2.42)	5.69	5.51 (4.56 to 7.05)	
Leeds	10052	3.58	3.69 (2.95 to 4.59)	1.3	1.53 (1.10 to 2.13)	4.87	5.22 (4.31 to 6.30)	
Leicester City	4958	4.84	4.09 (3.21 to 5.43)	2.43	1.91 (1.32 to 2.80)	7.26	5.99 (4.86 to 7.50)	
Lewisham	4808	3.74	3.76 (2.96 to 4.79)	0.84	1.47 (1.00 to 2.26)	4.58	5.22 (4.27 to 6.51)	
Lincolnshire East	2252	2.22	3.51 (2.61 to 4.60)	2.67	1.83 (1.23 to 2.82)	4.88	5.33 (4.25 to 6.75)	
Lincolnshire West	2542	3.15	3.64 (2.77 to 4.80)	1.58	1.67 (1.16 to 2.43)	4.72	5.30 (4.30 to 6.59)	
Liverpool	5944	2.69	3.41 (2.63 to 4.33)	2.87	2.10 (1.44 to 3.15)	5.55	5.50 (4.53 to 6.91)	
Luton	3439	3.2	3.63 (2.77 to 4.68)	1.46	1.64 (1.14 to 2.48)	4.65	5.26 (4.31 to 6.56)	
Manchester	7543	4.51	4.07 (3.17 to 5.18)	1.2	1.52 (1.06 to 2.15)	5.7	5.59 (4.64 to 6.86)	
Mansfield and Ashfield	2347	5.54	4.06 (3.13 to 5.48)	1.29	1.62 (1.11 to 2.42)	6.82	5.68 (4.57 to 7.38)	
Medway	3594	3.9	3.79 (2.92 to 4.88)	1.68	1.68 (1.19 to 2.43)	5.56	5.47 (4.49 to 6.67)	
Merton	3196	*	3.75 (2.91 to 4.86)	*	1.49 (0.96 to 2.23)	4.38	5.24 (4.20 to 6.68)	
Mid Essex	4269	1.41	3.16 (2.24 to 4.25)	1.41	1.62 (1.13 to 2.38)	2.81	4.78 (3.80 to 6.02)	
Milton Keynes	3593	5.29	4.13 (3.21 to 5.61)	1.4	1.63 (1.11 to 2.30)	6.68	5.75 (4.72 to 7.24)	
Morecambe Bay	2970	*	3.81 (2.94 to 5.00)	*	1.51 (1.00 to 2.22)	4.71	5.31 (4.35 to 6.65)	
Nene	7787	3.47	3.65 (2.88 to 4.67)	1.42	1.60 (1.13 to 2.29)	4.88	5.24 (4.34 to 6.47)	
Newark and Sherwood	1196	*	3.55 (2.67 to 4.74)	*	2.15 (1.41 to 3.65)	8.36	5.69 (4.52 to 7.63)	
Newcastle Gateshead	5378	2.98	3.52 (2.73 to 4.53)	1.49	1.64 (1.14 to 2.37)	4.46	5.15 (4.19 to 6.50)	
Newham	6055	6.44	4.76 (3.65 to 6.39)	1.83	1.74 (1.26 to 2.55)	8.26	6.50 (5.24 to 8.30)	
North Cumbria	3017	*	3.94 (3.12 to 5.18)	*	1.50 (0.98 to 2.20)	5.3	5.44 (4.46 to 6.95)	
North Derbyshire	2460	3.25	3.66 (2.76 to 4.81)	1.22	1.61 (1.07 to 2.31)	4.47	5.27 (4.24 to 6.50)	
North Durham	2278	*	3.71 (2.81 to 4.80)	*	1.57 (1.04 to 2.39)	4.39	5.27 (4.32 to 6.54)	
North East Essex	3581	3.35	3.66 (2.85 to 4.76)	1.68	1.69 (1.21 to 2.49)	5.03	5.34 (4.41 to 6.65)	
North East Hampshire and Farnham	2342	2.99	3.62 (2.74 to 4.79)	3	1.89 (1.27 to 2.79)	5.98	5.51 (4.51 to 6.87)	
North East Lincolnshire	1797	3.9	3.77 (2.89 to 5.06)	2.79	1.82 (1.24 to 2.82)	6.68	5.58 (4.47 to 7.24)	
North Hampshire	2485	3.62	3.73 (2.81 to 4.90)	2.83	1.88 (1.31 to 2.92)	6.44	5.59 (4.58 to 7.15)	

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		Stillbirth†		Neonatal‡		Extended perinatal†		
		Crude	Stabilised (95% CI)	Crude	Stabilised (95% CI)	Crude	Stabilised (95% CI)#	
North Kirklees	2556	7.04	4.38 (3.28 to 6.00)	1.97	1.73 (1.21 to 2.59)	9	6.11 (4.89 to 7.99)	
North Lincolnshire	1663	*	3.65 (2.80 to 4.84)	*	1.63 (1.05 to 2.43)	4.21	5.27 (4.22 to 6.64)	
North Norfolk	1366	*	3.66 (2.70 to 4.97)	*	1.59 (1.03 to 2.31)	3.66	5.24 (4.12 to 6.74)	
North Staffordshire	1955	*	3.65 (2.75 to 4.76)	*	1.60 (1.07 to 2.35)	4.09	5.24 (4.18 to 6.60)	
North Tyneside	2228	*	3.79 (2.92 to 4.94)	*	1.51 (0.96 to 2.23)	4.49	5.30 (4.29 to 6.73)	
North West Surrey	4277	3.51	3.69 (2.88 to 4.65)	1.17	1.56 (1.05 to 2.28)	4.68	5.25 (4.30 to 6.47)	
Northern, Eastern and Western Devon	8574	3.15	3.52 (2.72 to 4.53)	1.99	1.82 (1.30 to 2.65)	5.13	5.33 (4.43 to 6.62)	
Northumberland	2769	3.25	3.66 (2.81 to 4.81)	1.45	1.64 (1.13 to 2.33)	4.69	5.29 (4.32 to 6.71)	
Norwich	2307	*	3.92 (2.93 to 5.17)	*	1.56 (1.02 to 2.29)	5.64	5.48 (4.42 to 7.06)	
Nottingham City	4234	*	4.51 (3.37 to 6.08)	*	1.41 (0.94 to 2.09)	6.85	5.91 (4.67 to 7.74)	
Nottingham North and East	1638	*	3.66 (2.79 to 4.90)	*	1.50 (0.98 to 2.17)	3.05	5.16 (4.14 to 6.60)	
Nottingham West	1095	*	3.81 (2.84 to 5.13)	*	1.69 (1.14 to 2.63)	6.39	5.50 (4.36 to 6.97)	
Oldham	3336	4.5	3.92 (3.06 to 5.17)	1.81	1.71 (1.18 to 2.50)	6.29	5.63 (4.70 to 7.05)	
Oxfordshire	7185	2.64	3.36 (2.58 to 4.27)	1.81	1.74 (1.25 to 2.42)	4.45	5.09 (4.20 to 6.24)	
Portsmouth	2411	1.66	3.40 (2.54 to 4.42)	1.66	1.68 (1.13 to 2.51)	3.32	5.08 (4.03 to 6.35)	
Redbridge	4640	2.16	3.32 (2.59 to 4.35)	2.59	1.94 (1.34 to 2.81)	4.74	5.25 (4.25 to 6.60)	
Redditch and Bromsgrove	1910	3.66	3.73 (2.78 to 5.00)	1.58	1.67 (1.09 to 2.44)	5.24	5.40 (4.26 to 6.84)	
Richmond	2461	*	3.95 (3.02 to 5.26)	*	1.55 (1.06 to 2.26)	5.69	5.49 (4.41 to 7.07)	
Rotherham	3069	3.26	3.65 (2.80 to 4.80)	1.31	1.61 (1.10 to 2.46)	4.56	5.26 (4.26 to 6.67)	
Rushcliffe	1083	*	3.58 (2.67 to 4.82)	*	1.62 (1.06 to 2.50)	2.77	5.20 (4.13 to 6.70)	
Salford	3554	4.5	3.93 (3.05 to 5.22)	1.98	1.75 (1.19 to 2.57)	6.47	5.68 (4.60 to 7.23)	
Sandwell and West Birmingham	7571	5.15	4.34 (3.46 to 5.65)	3.45	2.44 (1.62 to 3.76)	8.59	6.76 (5.41 to 8.58)	
Scarborough and Ryedale	1056	*	3.75 (2.78 to 4.92)	*	1.62 (1.07 to 2.43)	4.73	5.36 (4.23 to 6.84)	
Sheffield	6530	4.29	3.96 (3.12 to 5.15)	1.54	1.65 (1.17 to 2.31)	5.82	5.60 (4.58 to 6.91)	
Shropshire	2795	3.94	3.79 (2.94 to 4.97)	1.44	1.64 (1.11 to 2.37)	5.37	5.42 (4.38 to 6.82)	
Somerset	5368	2.24	3.30 (2.49 to 4.28)	0.93	1.48 (1.04 to 2.17)	3.17	4.78 (3.89 to 5.98)	
South Cheshire	1972	*	3.72 (2.83 to 4.87)	*	1.53 (0.98 to 2.24)	4.06	5.25 (4.22 to 6.62)	
South Devon and Torbay	2567	5.84	4.14 (3.17 to 5.61)	1.18	1.60 (1.12 to 2.34)	7.01	5.74 (4.60 to 7.40)	
South East Staffordshire and Seisdon Peninsula	2223	*	3.31 (2.49 to 4.37)	*	1.77 (1.20 to 2.58)	3.15	5.07 (4.00 to 6.39)	

Organisation	Total births§	Rate per 1,000 births§						
		Stillbirth†		Neonatal‡		Extended perinatal†		
		Crude	Stabilised (95% CI)	Crude	Stabilised (95% CI)	Crude	Stabilised (95% CI)#	
South Eastern Hampshire	2137	2.81	3.60 (2.77 to 4.89)	1.41	1.64 (1.11 to 2.42)	4.21	5.24 (4.26 to 6.70)	
South Kent Coast	2061	2.91	3.62 (2.73 to 4.70)	2.43	1.79 (1.22 to 2.69)	5.34	5.40 (4.36 to 6.80)	
South Lincolnshire	1552	*	3.54 (2.66 to 4.62)	*	1.64 (1.08 to 2.46)	3.22	5.17 (4.19 to 6.47)	
South Norfolk	2253	*	3.64 (2.72 to 4.73)	*	1.45 (0.91 to 2.22)	3.11	5.09 (4.07 to 6.41)	
South Sefton	1747	5.15	3.93 (3.02 to 5.18)	1.73	1.69 (1.14 to 2.52)	6.87	5.61 (4.61 to 7.10)	
South Tees	3394	4.42	3.91 (2.99 to 5.12)	2.66	1.90 (1.29 to 2.86)	7.07	5.80 (4.74 to 7.40)	
South Tyneside	1566	*	3.68 (2.83 to 4.93)	*	1.57 (1.01 to 2.41)	3.83	5.25 (4.21 to 6.73)	
South Warwickshire	2620	3.44	3.69 (2.77 to 4.87)	1.15	1.60 (1.06 to 2.32)	4.58	5.28 (4.23 to 6.61)	
South West Lincolnshire	1156	*	4.04 (3.11 to 5.57)	*	1.61 (1.11 to 2.53)	7.79	5.65 (4.53 to 7.40)	
South Worcestershire	2992	*	3.60 (2.75 to 4.80)	*	1.39 (0.91 to 2.09)	3.01	4.99 (4.00 to 6.33)	
Southampton	3164	3.79	3.76 (2.87 to 4.98)	1.27	1.61 (1.10 to 2.34)	5.06	5.36 (4.34 to 6.88)	
Southend	2211	*	3.59 (2.74 to 4.76)	*	1.57 (1.07 to 2.35)	3.62	5.15 (4.22 to 6.61)	
Southern Derbyshire	5771	3.64	3.72 (2.90 to 4.73)	3.13	2.18 (1.48 to 3.30)	6.76	5.89 (4.87 to 7.40)	
Southport and Formby	1004	*	3.46 (2.55 to 4.63)	*	1.56 (1.05 to 2.34)	*	5.01 (4.00 to 6.38)	
Southwark	4468	3.36	3.65 (2.91 to 4.75)	1.57	1.66 (1.17 to 2.35)	4.92	5.30 (4.31 to 6.59)	
St Helens	2035	4.91	3.92 (3.08 to 5.25)	2.96	1.86 (1.27 to 2.80)	7.86	5.78 (4.66 to 7.43)	
Stafford and Surrounds	1370	6.57	4.05 (2.97 to 5.54)	2.2	1.73 (1.16 to 2.62)	8.76	5.77 (4.58 to 7.47)	
Stockport	3313	1.81	3.34 (2.47 to 4.48)	2.12	1.78 (1.22 to 2.67)	3.92	5.11 (4.08 to 6.51)	
Stoke on Trent	3354	4.17	3.85 (2.95 to 5.01)	1.8	1.71 (1.18 to 2.53)	5.96	5.55 (4.53 to 6.94)	
Sunderland	2918	*	3.62 (2.79 to 4.73)	*	1.51 (1.00 to 2.21)	3.77	5.12 (4.14 to 6.42)	
Surrey Downs	3029	*	3.53 (2.65 to 4.66)	*	1.50 (0.98 to 2.24)	3.3	5.02 (4.00 to 6.31)	
Surrey Heath	1035	4.83	3.83 (2.90 to 5.16)	2.91	1.77 (1.13 to 2.73)	7.73	5.59 (4.41 to 7.31)	
Sutton	2604	2.69	3.56 (2.65 to 4.71)	1.93	1.72 (1.17 to 2.55)	4.61	5.28 (4.23 to 6.73)	
Swale	1482	2.7	3.63 (2.72 to 4.74)	3.38	1.86 (1.27 to 2.88)	6.07	5.48 (4.37 to 6.91)	
Swindon	2939	3.06	3.61 (2.70 to 4.77)	1.37	1.63 (1.13 to 2.36)	4.42	5.23 (4.17 to 6.61)	
Tameside and Glossop	3194	4.7	3.96 (3.03 to 5.30)	0.94	1.54 (1.03 to 2.32)	5.64	5.50 (4.41 to 7.02)	
Telford and Wrekin	2091	7.65	4.38 (3.32 to 6.23)	1.45	1.65 (1.11 to 2.45)	9.09	6.03 (4.80 to 7.98)	
Thanet	1609	1.86	3.52 (2.58 to 4.69)	3.74	1.92 (1.27 to 2.96)	5.59	5.43 (4.30 to 7.00)	
Thurrock	2421	3.72	3.74 (2.86 to 4.91)	2.07	1.74 (1.21 to 2.65)	5.78	5.48 (4.43 to 6.99)	
Tower Hamlets	4716	6.36	4.57 (3.45 to 6.08)	2.77	2.00 (1.38 to 2.97)	9.12	6.56 (5.32 to 8.46)	

Organisation	Total births§	Rate per 1,000 births§						
		Stillbirth†		Neonatal‡		Extended perinatal†		
		Crude	Stabilised (95% CI)	Crude	Stabilised (95% CI)	Crude	Stabilised (95% CI)#	
Trafford	2686	4.1	3.81 (2.92 to 5.07)	2.24	1.78 (1.21 to 2.72)	6.33	5.59 (4.51 to 7.12)	
Vale Royal	1161	*	3.72 (2.81 to 5.00)	*	1.61 (1.06 to 2.50)	4.31	5.32 (4.36 to 6.88)	
Vale of York	3226	4.65	3.95 (3.06 to 5.21)	1.87	1.72 (1.20 to 2.48)	6.51	5.67 (4.62 to 7.09)	
Wakefield	4013	2.49	3.44 (2.62 to 4.47)	1.75	1.70 (1.18 to 2.50)	4.24	5.14 (4.16 to 6.38)	
Walsall	3852	4.15	3.86 (2.99 to 5.05)	1.56	1.66 (1.15 to 2.48)	5.71	5.51 (4.52 to 7.00)	
Waltham Forest	4737	4.43	3.96 (3.09 to 5.15)	2.12	1.81 (1.26 to 2.61)	6.54	5.76 (4.75 to 7.04)	
Wandsworth	4798	2.92	3.52 (2.74 to 4.65)	1.05	1.52 (1.08 to 2.19)	3.96	5.04 (4.12 to 6.31)	
Warrington	2174	*	3.96 (3.10 to 5.33)	*	1.58 (1.06 to 2.40)	5.98	5.53 (4.49 to 7.05)	
Warwickshire North	2158	1.39	3.39 (2.50 to 4.55)	4.18	2.07 (1.37 to 3.27)	5.56	5.45 (4.30 to 7.22)	
West Cheshire	2406	*	3.61 (2.75 to 4.74)	*	1.55 (1.03 to 2.29)	3.74	5.16 (4.15 to 6.52)	
West Essex	3691	3.52	3.70 (2.84 to 4.88)	1.09	1.56 (1.04 to 2.24)	4.61	5.25 (4.33 to 6.56)	
West Hampshire	5307	3.01	3.53 (2.70 to 4.47)	2.46	1.93 (1.39 to 2.80)	5.46	5.45 (4.45 to 6.70)	
West Kent	5433	3.68	3.74 (2.93 to 4.81)	2.22	1.86 (1.31 to 2.68)	5.89	5.58 (4.63 to 6.96)	
West Lancashire	1042	*	3.67 (2.74 to 4.82)	*	1.70 (1.16 to 2.55)	4.8	5.36 (4.22 to 6.78)	
West Leicestershire	3990	2.51	3.45 (2.68 to 4.43)	1.51	1.65 (1.16 to 2.40)	4.01	5.09 (4.21 to 6.23)	
West London	2673	1.5	3.35 (2.45 to 4.46)	2.25	1.78 (1.21 to 2.66)	3.74	5.12 (4.02 to 6.58)	
West Norfolk	1715	*	3.50 (2.63 to 4.60)	*	1.62 (1.04 to 2.36)	2.92	5.11 (4.11 to 6.50)	
West Suffolk	2473	*	3.46 (2.54 to 4.56)	*	1.49 (1.00 to 2.19)	2.43	4.94 (3.91 to 6.30)	
Wigan Borough	3628	1.93	3.34 (2.50 to 4.42)	2.21	1.81 (1.25 to 2.67)	4.13	5.14 (4.13 to 6.56)	
Wiltshire	4846	2.68	3.45 (2.64 to 4.44)	1.66	1.68 (1.19 to 2.47)	4.33	5.13 (4.19 to 6.44)	
Wirral	3375	2.07	3.39 (2.51 to 4.55)	2.38	1.83 (1.28 to 2.64)	4.44	5.22 (4.17 to 6.50)	
Wolverhampton	3548	6.76	4.51 (3.34 to 6.24)	2.55	1.88 (1.31 to 2.78)	9.3	6.38 (5.08 to 8.26)	
Wyre Forest	992	*	3.76 (2.92 to 4.95)	*	1.63 (1.05 to 2.46)	5.04	5.39 (4.35 to 6.86)	
SCOTLAND								
Ayrshire and Arran	3318	4.82	4.00 (3.11 to 5.28)	2.12	1.78 (1.24 to 2.62)	6.93	5.77 (4.71 to 7.34)	
Borders	1000	*	3.92 (2.99 to 5.33)	*	1.63 (1.06 to 2.58)	7	5.55 (4.39 to 7.22)	
Dumfries and Galloway	1265	*	3.76 (2.90 to 4.98)	*	1.67 (1.08 to 2.56)	5.53	5.43 (4.44 to 6.96)	
Fife	3482	3.16	3.62 (2.76 to 4.73)	2.88	1.96 (1.35 to 2.97)	6.03	5.56 (4.51 to 7.12)	
Forth Valley	2898	4.14	3.83 (2.96 to 5.08)	2.08	1.76 (1.18 to 2.58)	6.21	5.58 (4.50 to 7.05)	
Grampian	5959	3.19	3.57 (2.82 to 4.56)	1.01	1.49 (1.01 to 2.15)	4.2	5.06 (4.17 to 6.27)	

Organisation	Total births[§]	Rate per 1,000 births[§]						
		Stillbirth[†]		Neonatal[‡]		Extended perinatal[†]		
		Crude	Stabilised (95% CI)	Crude	Stabilised (95% CI)	Crude	Stabilised (95% CI)[#]	
Greater Glasgow and Clyde	12188	4.51	4.18 (3.34 to 5.20)	1.73	1.73 (1.28 to 2.40)	6.24	5.90 (4.91 to 7.07)	
Highland	2763	*	3.59 (2.74 to 4.69)	*	1.46 (0.92 to 2.21)	3.26	5.05 (4.06 to 6.39)	
Lanarkshire	6801	3.82	3.79 (3.03 to 4.88)	1.48	1.62 (1.19 to 2.32)	5.29	5.41 (4.51 to 6.74)	
Lothian	9057	3.42	3.63 (2.88 to 4.57)	1.33	1.55 (1.11 to 2.17)	4.75	5.18 (4.30 to 6.32)	
Orkney	186	*	3.68 (2.76 to 4.97)	*	1.65 (1.06 to 2.57)	*	5.32 (4.25 to 6.82)	
Shetland	221	*	3.75 (2.81 to 5.08)	*	1.72 (1.15 to 2.67)	*	5.47 (4.38 to 7.21)	
Tayside	3798	3.95	3.80 (2.91 to 4.81)	1.85	1.73 (1.20 to 2.57)	5.79	5.52 (4.50 to 6.80)	
Western Isles	218	*	3.84 (2.90 to 5.23)	*	1.65 (1.11 to 2.47)	*	5.48 (4.37 to 7.24)	
WALES								
Abertawe Bro Morgannwg University Health Board	5328	4.13	3.88 (3.08 to 5.11)	1.88	1.75 (1.22 to 2.53)	6.01	5.62 (4.65 to 7.07)	
Aneurin Bevan University Health Board	6402	3.75	3.76 (2.98 to 4.85)	0.78	1.41 (0.95 to 2.05)	4.53	5.17 (4.21 to 6.48)	
Betsi Cadwaladr University Health Board	7019	2.28	3.23 (2.44 to 4.23)	3	2.20 (1.56 to 3.25)	5.27	5.42 (4.39 to 6.89)	
Cardiff and Vale University Health Board	5567	4.31	3.94 (3.05 to 4.99)	2.53	1.96 (1.36 to 2.83)	6.83	5.90 (4.78 to 7.19)	
Cwm Taf University Health Board	3334	5.4	4.13 (3.18 to 5.57)	2.11	1.78 (1.21 to 2.68)	7.5	5.90 (4.74 to 7.63)	
Hywel Dda University Health Board	3509	4.56	3.94 (3.05 to 5.20)	1.43	1.63 (1.09 to 2.38)	5.98	5.57 (4.54 to 7.06)	
Powys Teaching Health Board	1147	*	4.12 (3.06 to 5.53)	*	1.55 (0.99 to 2.30)	7.85	5.67 (4.47 to 7.15)	
NORTHERN IRELAND								
Belfast	4374	5.26	4.19 (3.26 to 5.57)	2.76	1.98 (1.32 to 3.05)	8	6.15 (5.00 to 7.96)	
Northern	5597	5	4.18 (3.29 to 5.60)	1.62	1.67 (1.19 to 2.39)	6.61	5.85 (4.80 to 7.37)	
South Eastern	4015	4.23	3.88 (3.01 to 5.07)	1.75	1.70 (1.18 to 2.42)	5.98	5.58 (4.58 to 6.90)	
Southern	5396	3.89	3.80 (2.92 to 4.86)	2.23	1.86 (1.32 to 2.68)	6.12	5.66 (4.59 to 7.06)	
Western	3935	4.83	4.03 (3.13 to 5.44)	2.04	1.77 (1.26 to 2.63)	6.86	5.80 (4.69 to 7.33)	
CROWN DEPENDENCIES								
Guernsey	559	*	3.90 (2.85 to 5.37)	*	1.61 (1.03 to 2.47)	7.16	5.50 (4.32 to 7.14)	
Isle of Man	733	*	3.60 (2.65 to 4.71)	*	1.59 (1.04 to 2.44)	*	5.19 (4.14 to 6.54)	
Jersey	956	*	3.62 (2.69 to 4.83)	*	1.71 (1.15 to 2.55)	4.18	5.32 (4.25 to 6.79)	

[§] excluding terminations of pregnancy and births <24^{+0} weeks gestational age
[†] per 1,000 total births
[‡] per 1,000 live births
[#] colours represent variation from comparator group average extended perinatal mortality rate

° different laws exist in Northern Ireland for the termination of pregnancy
* entry suppressed because of small number of deaths
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey

The shading in Table 13 represents the quintiles of all commissioning organisations:

- 5th quintile: highest 20% of commissioning organisations;
- 4th quintile
- 3rd quintile
- 2nd quintile
- 1st quintile: lowest 20% of commissioning organisations.

Example: 19.1% of mothers giving birth in Airedale, Wharfedale and Craven CCG are Asian or Asian British, which places this CCG in the in the 5th quintile or highest 20% of commissioning organisations for this population characteristic.

Table 13: Proportion of mothers giving birth in population characteristic groups by Clinical Commissioning Group (England), Health Board (Scotland and Wales), Local Commissioning Group (Northern Ireland), and Crown Dependencies, for births in 2017

Clinical Commissioning Group	Asian or Asian British§	Black or Black British§	Mother's age <20 years§	Mother's age >39 years§	Top quintile of child poverty§	Multiple birth§	Born at 24 to 31 weeks§
ENGLAND							
Airedale, Wharfedale and Craven	19.1	0.4	2.1	3.6	16.2	2.9	1.3
Ashford	4.5	2.1	3.2	2.7	12.4	3.7	1.7
Barking and Dagenham	24.8	22.3	3.1	4.2	10.8	2.7	1.1
Barnet	11.7	7.3	0.9	6.2	5.3	3.6	1.1
Barnsley	0.4	0.4	5.4	1.8	28.6	2.7	1.6
Basildon and Brentwood	4.2	3.2	2.9	3.6	12.8	3.4	1.2
Bassetlaw	0.8	0.1	3.7	3.5	13.8	4.5	1.6
Bath and North East Somerset	0.7	0.2	1.8	4.8	3.0	3.1	1.2
Bedfordshire	7.7	2.9	2.5	4.0	5.7	3.2	1.2
Berkshire West	12.2	4.3	1.9	5.3	4.6	4.2	1.2
Bexley	8.2	12.2	2.4	4.1	11.0	3.6	1.3
Birmingham and Solihull	28.5	7.7	3.2	3.7	45.5	2.7	1.3
Blackburn with Darwen	40.5	0.7	3.3	2.1	24.6	2.7	1.1
Blackpool	1.7	0.1	6.0	2.1	40.0	2.5	2.0
Bolton	22.2	5.8	3.6	3.4	27.9	2.3	1.3
Bradford City	66.8	3.6	3.5	2.8	60.1	1.9	2.1
Bradford Districts	36.1	1.8	3.3	3.3	32.9	3.2	2.0

Clinical Commissioning Group	Asian or Asian British§	Black or Black British§	Mother's age <20 years§	Mother's age >39 years§	Top quintile of child poverty§	Multiple birth§	Born at 24 to 31 weeks§
Brent	28.3	14.5	1.7	5.9	10.3	3.9	1.4
Brighton and Hove	4.3	2.7	2.5	8.2	14.9	3.2	1.5
Bristol, North Somerset and South Gloucestershire	4.3	4.9	2.3	4.6	16.6	3.4	1.3
Bromley	6.5	6.6	1.1	6.7	13.9	4.1	0.9
Buckinghamshire	14.7	2.3	1.5	5.6	0.4	2.8	1.5
Bury	12.7	1.9	2.3	3.8	10.0	3.4	1.4
Calderdale	17.2	0.6	3.4	3.1	26.0	1.9	1.1
Cambridgeshire and Peterborough	7.4	1.8	2.9	4.0	6.1	3.0	1.3
Camden	13.4	8.2	0.8	7.5	49.0	4.2	0.8
Cannock Chase	0.9	0.3	2.8	2.9	9.8	3.2	1.0
Canterbury and Coastal	2.1	0.9	3.9	4.1	19.2	2.5	1.2
Castle Point and Rochford	1.4	0.6	3.1	3.2	8.2	3.7	0.9
Central London (Westminster)	12.1	6.7	0.6	7.6	34.2	4.1	1.5
Chorley and South Ribble	2.2	0.4	2.8	3.6	4.0	1.9	0.9
City and Hackney	7.5	18.1	1.7	6.8	37.7	2.4	1.0
Coastal West Sussex	2.2	0.5	2.9	4.5	5.7	3.5	1.4
Corby	1.3	2.6	3.0	2.9	13.9	2.8	3.0
Coventry and Rugby	13.5	7.9	3.6	4.1	25.4	3.0	1.8
Crawley	17.1	5.1	2.5	3.6	2.0	3.3	1.5
Croydon	16.1	21.0	2.4	5.8	4.8	3.6	1.2
Darlington	3.6	0.6	5.2	2.8	33.4	3.4	1.5
Dartford, Gravesham and Swanley	8.5	6.9	2.2	3.6	12.8	3.5	1.6
Doncaster	3.3	1.0	5.0	2.5	38.3	2.7	1.8
Dorset	2.1	0.4	2.5	3.9	7.9	3.0	1.2
Dudley	11.2	2.3	4.0	2.9	33.2	2.9	1.4
Durham Dales, Easington and Sedgefield	0.4	0.1	5.5	2.9	41.9	3.3	1.3
Ealing	29.9	11.1	1.0	6.8	8.4	3.6	1.4
East Berkshire	27.7	4.4	1.5	4.9	0.0	3.3	1.5
East Lancashire	21.0	0.2	4.1	3.2	17.0	2.6	1.2
East Leicestershire and Rutland	9.8	0.9	2.1	3.7	0.6	3.7	1.2

Clinical Commissioning Group	Asian or Asian British§	Black or Black British§	Mother's age <20 years§	Mother's age >39 years§	Top quintile of child poverty§	Multiple birth§	Born at 24 to 31 weeks§
East Riding of Yorkshire	0.7	0.1	3.0	2.7	10.8	2.5	1.2
East Staffordshire	12.3	1.1	3.4	4.3	2.5	3.1	1.0
East Surrey	6.0	2.2	1.6	5.9	1.8	4.0	1.3
East and North Hertfordshire	5.0	3.7	1.9	4.9	2.5	3.5	1.2
Eastbourne, Hailsham and Seaford	2.1	1.2	2.9	3.8	12.2	3.1	1.4
Eastern Cheshire	2.6	0.5	1.7	6.5	0.6	3.1	0.7
Enfield	8.0	19.3	2.7	5.9	29.0	3.6	1.6
Erewash	1.7	0.5	2.6	3.3	17.9	4.5	1.5
Fareham and Gosport	1.3	0.5	3.2	4.0	5.7	3.0	1.5
Fylde and Wyre	0.7	0.2	3.9	3.3	15.7	2.9	0.9
Gloucestershire	2.7	1.4	2.3	4.0	7.4	3.8	1.0
Great Yarmouth and Waveney	1.4	1.5	5.4	2.3	21.6	2.9	0.9
Greater Huddersfield	18.7	3.4	2.9	3.9	22.8	1.8	1.4
Greater Preston	15.2	1.5	3.6	2.7	15.4	2.8	1.3
Greenwich	10.2	19.3	2.1	5.7	24.5	4.1	1.2
Guildford and Waverley	3.2	1.0	1.3	6.0	0.8	3.0	0.9
Halton	0.9	0.3	4.7	2.6	23.0	2.4	0.9
Hambleton, Richmondshire and Whitby	1.2	2.0	2.5	3.5	1.6	3.3	0.9
Hammersmith and Fulham	5.1	11.6	1.3	7.8	18.8	3.6	1.2
Hardwick	1.0	0.3	3.9	2.3	30.5	2.6	1.6
Haringey	6.2	16.3	1.8	7.3	32.2	3.7	1.7
Harrogate and Rural District	1.1	0.6	1.6	4.9	0.0	3.1	0.7
Harrow	38.7	6.1	1.7	5.1	0.0	2.8	1.2
Hartlepool and Stockton-on-Tees	5.3	1.2	4.8	2.4	47.6	3.1	1.2
Hastings and Rother	2.5	0.7	4.5	3.6	36.0	3.4	1.6
Havering	10.3	7.6	2.2	3.4	11.6	3.3	1.0
Herefordshire	1.4	0.2	3.7	3.1	4.1	2.4	1.5
Herts Valleys	11.1	3.2	1.3	5.4	2.8	3.5	1.3
Heywood, Middleton and Rochdale	23.4	3.3	3.7	2.9	32.3	3.0	1.7
High Weald Lewes Havens	1.6	0.5	2.4	5.9	2.5	3.6	1.5

Clinical Commissioning Group	Asian or Asian British§	Black or Black British§	Mother's age <20 years§	Mother's age >39 years§	Top quintile of child poverty§	Multiple birth§	Born at 24 to 31 weeks§
Hillingdon	37.2	8.6	1.6	4.4	6.0	2.8	1.0
Horsham and Mid Sussex	3.2	0.9	1.1	5.3	0.0	3.6	1.0
Hounslow	34.7	8.1	1.7	6.0	1.8	3.6	1.6
Hull	2.8	1.5	4.8	1.9	52.7	2.6	1.7
Ipswich and East Suffolk	2.2	1.7	3.7	3.2	11.9	3.1	1.1
Isle of Wight	0.5	0.2	4.2	3.7	17.7	4.1	1.2
Islington	6.7	13.9	1.2	7.2	58.6	3.9	1.3
Kernow	0.4	0.1	3.3	3.9	13.6	3.2	1.2
Kingston	13.5	2.3	1.0	6.3	1.2	3.4	0.8
Knowsley	0.8	0.4	3.9	2.2	48.3	4.2	1.6
Lambeth	5.2	23.2	1.8	7.6	30.4	3.8	1.1
Leeds	11.4	7.2	3.4	3.9	35.8	3.1	1.2
Leicester City	33.5	6.5	3.2	4.2	30.5	2.8	1.6
Lewisham	6.2	22.9	1.9	6.5	22.6	3.6	1.2
Lincolnshire East	0.7	0.4	5.3	2.2	17.6	3.0	1.1
Lincolnshire West	1.3	0.3	4.0	2.3	23.1	4.0	1.3
Liverpool	3.2	2.4	3.1	3.5	51.1	3.0	1.7
Luton	41.1	7.4	2.5	4.1	16.1	3.3	1.1
Manchester	21.0	13.0	2.6	4.1	48.1	2.5	1.2
Mansfield and Ashfield	1.4	0.6	4.8	2.0	31.6	3.1	1.6
Medway	5.3	4.6	3.9	3.3	22.9	3.7	1.1
Merton	16.0	8.0	1.3	6.9	5.3	4.6	0.8
Mid Essex	2.1	1.5	1.8	3.8	4.3	3.6	1.3
Milton Keynes	12.2	10.0	2.4	4.6	8.3	3.2	1.9
Morecambe Bay	0.2	0.1	3.9	3.0	10.6	2.6	1.0
Nene	4.9	5.1	3.3	3.9	9.2	3.4	1.3
Newark and Sherwood	0.9	0.6	3.3	3.2	14.6	4.4	1.7
Newcastle Gateshead	8.0	2.7	4.3	3.1	37.7	2.7	1.1
Newham	42.1	15.2	1.9	4.1	10.8	2.4	1.4
North Cumbria	0.6	0.3	3.8	2.7	6.6	2.4	1.1
North Derbyshire	1.0	0.2	2.2	4.9	12.4	3.6	1.0

Clinical Commissioning Group	Asian or Asian British§	Black or Black British§	Mother's age <20 years§	Mother's age >39 years§	Top quintile of child poverty§	Multiple birth§	Born at 24 to 31 weeks§
North Durham	1.0	0.3	4.1	2.6	19.8	2.8	0.7
North East Essex	2.7	2.0	3.2	3.7	24.2	2.7	1.1
North East Hampshire and Farnham	7.5	2.9	1.9	5.7	0.6	3.6	1.0
North East Lincolnshire	1.1	0.4	6.3	1.8	50.9	2.3	1.5
North Hampshire	4.8	2.2	2.0	4.1	0.8	2.3	1.1
North Kirklees	35.6	0.7	4.2	2.7	18.1	2.7	1.6
North Lincolnshire	4.8	0.3	4.8	2.5	20.3	2.6	1.9
North Norfolk	0.4	0.2	2.3	3.9	0.0	2.9	0.8
North Staffordshire	1.7	0.6	4.0	3.5	10.2	3.5	0.9
North Tyneside	2.4	0.6	3.0	3.6	18.2	2.2	0.6
North West Surrey	11.9	1.8	1.4	6.0	3.6	3.9	1.5
Northern, Eastern and Western Devon	1.6	0.6	3.3	3.7	12.4	3.4	1.2
Northumberland	1.2	0.0	3.9	3.1	24.7	2.8	1.2
Norwich	3.0	2.6	3.3	3.8	22.0	2.6	1.4
Nottingham City	15.9	8.9	4.5	3.1	59.8	2.9	1.8
Nottingham North and East	3.6	2.4	2.6	3.6	8.6	3.1	1.0
Nottingham West	6.3	1.1	2.7	3.3	10.0	3.1	1.3
Oldham	31.5	3.6	4.0	2.4	32.6	2.4	1.5
Oxfordshire	6.3	2.1	1.8	4.9	3.3	3.0	1.3
Portsmouth	5.3	3.4	3.7	2.9	24.4	2.7	1.4
Redbridge	49.0	7.5	1.6	4.7	0.8	2.7	1.1
Redditch and Bromsgrove	5.1	0.8	3.1	3.7	8.7	2.7	1.6
Richmond	7.4	1.6	1.2	10.2	0.9	4.5	1.1
Rotherham	6.5	1.0	4.8	2.1	33.2	2.2	1.3
Rushcliffe	5.8	0.4	1.2	5.9	1.7	5.9	1.4
Salford	4.8	7.0	3.3	2.7	32.5	2.5	1.4
Sandwell and West Birmingham	34.8	13.1	3.6	3.5	50.2	2.5	1.5
Scarborough and Ryedale	0.6	0.2	4.9	3.3	17.4	3.0	1.1
Sheffield	11.6	5.2	3.5	3.4	43.7	3.0	1.3
Shropshire	0.9	0.3	3.6	3.7	6.8	4.5	0.9
Somerset	1.0	0.3	3.1	3.6	6.0	2.7	1.2

Clinical Commissioning Group	Asian or Asian British§	Black or Black British§	Mother's age <20 years§	Mother's age >39 years§	Top quintile of child poverty§	Multiple birth§	Born at 24 to 31 weeks§
South Cheshire	1.2	0.1	3.6	3.2	7.2	2.8	1.2
South Devon and Torbay	0.6	0.2	3.4	4.6	16.1	2.6	1.6
South East Staffordshire and Seisdon Peninsula	1.9	0.4	3.3	2.7	7.8	3.9	1.2
South Eastern Hampshire	1.5	0.4	2.7	3.9	13.5	3.5	1.6
South Kent Coast	3.2	0.8	5.4	2.9	28.3	2.8	1.4
South Lincolnshire	0.8	0.2	2.3	3.7	1.7	3.5	1.0
South Norfolk	0.8	0.4	2.5	2.9	1.2	3.7	1.2
South Sefton	0.8	0.2	3.3	2.3	35.0	3.3	1.4
South Tees	7.1	2.0	6.5	2.5	53.6	3.4	1.2
South Tyneside	3.0	0.3	4.3	2.4	53.6	2.4	1.5
South Warwickshire	5.2	0.7	2.4	5.3	1.6	2.9	1.1
South West Lincolnshire	1.1	0.4	4.2	3.5	7.2	3.0	1.0
South Worcestershire	3.2	0.4	3.2	3.6	14.8	3.1	1.1
Southampton	8.3	2.8	3.5	3.6	24.7	3.0	1.2
Southend	4.7	2.4	3.3	4.4	29.4	4.0	1.4
Southern Derbyshire	10.5	1.8	3.7	3.2	22.6	3.5	1.5
Southport and Formby	0.9	0.3	2.2	4.9	0.0	2.6	1.0
Southwark	6.1	27.9	1.6	7.4	27.2	3.7	1.5
St Helens	1.2	0.2	3.7	2.8	28.5	3.1	1.6
Stafford and Surrounds	2.8	0.9	2.9	3.4	6.1	2.4	0.9
Stockport	7.5	0.9	2.2	4.0	11.8	3.7	0.9
Stoke on Trent	13.7	3.1	4.6	2.7	39.9	2.4	1.6
Sunderland	3.7	1.0	6.0	2.2	40.4	1.9	1.3
Surrey Downs	6.0	1.1	1.2	6.9	1.1	2.8	0.8
Surrey Heath	7.9	1.8	1.4	4.0	0.0	3.9	2.2
Sutton	13.2	5.2	1.3	5.6	0.9	2.5	1.0
Swale	1.0	2.0	6.2	2.5	24.1	2.2	0.9
Swindon	10.9	2.8	3.3	3.3	12.6	3.6	1.2
Tameside and Glossop	9.9	2.2	3.0	2.5	16.5	2.5	1.3
Telford and Wrekin	5.6	3.0	4.4	2.2	24.2	3.2	1.5
Thanet	1.7	0.6	5.3	2.9	40.6	2.9	0.9

Clinical Commissioning Group	Asian or Asian British§	Black or Black British§	Mother's age <20 years§	Mother's age >39 years§	Top quintile of child poverty§	Multiple birth§	Born at 24 to 31 weeks§
Thurrock	6.7	12.1	2.6	3.6	9.2	3.5	1.2
Tower Hamlets	50.7	6.1	0.8	5.0	69.6	3.2	1.3
Trafford	11.9	2.8	1.6	5.1	9.6	3.4	1.0
Vale Royal	1.5	0.3	4.3	2.6	8.5	2.3	0.7
Vale of York	1.8	0.8	2.7	4.1	3.4	3.3	1.5
Wakefield	5.0	1.5	4.4	2.7	18.1	2.5	1.1
Walsall	20.5	4.3	5.8	3.1	52.1	3.4	1.7
Waltham Forest	20.3	11.5	2.0	5.3	11.5	3.4	1.3
Wandsworth	8.7	7.3	1.1	7.5	13.2	3.5	1.1
Warrington	3.4	0.9	2.4	2.9	3.1	3.2	1.1
Warwickshire North	5.4	1.3	4.0	1.9	12.4	2.9	1.6
West Cheshire	1.6	0.7	1.7	4.5	11.2	2.7	1.5
West Essex	4.6	3.2	1.7	4.4	0.7	3.7	1.1
West Hampshire	1.8	0.6	1.9	4.7	1.8	3.2	1.1
West Kent	2.9	0.9	2.4	4.8	6.8	3.1	1.1
West Lancashire	0.3	0.2	4.0	3.8	17.5	3.1	0.5
West Leicestershire	5.3	1.0	2.6	3.7	5.1	3.0	1.4
West London	7.6	7.2	0.9	9.9	30.2	4.9	1.6
West Norfolk	1.1	0.3	4.1	3.6	11.9	2.8	1.1
West Suffolk	1.9	0.6	2.4	3.5	1.4	2.6	1.1
Wigan Borough	1.3	1.4	3.7	2.5	16.2	2.9	1.5
Wiltshire	1.4	2.1	2.0	3.9	3.7	3.2	1.3
Wirral	1.7	0.1	3.3	3.5	31.6	2.8	0.9
Wolverhampton	18.6	8.7	4.1	2.8	52.7	2.5	1.9
Wyre Forest	2.2	0.4	4.3	2.4	23.9	3.0	1.8
SCOTLAND							
Ayrshire and Arran	0.8	0.1	4.6	2.9	36.3	4.2	1.4
Borders	0.2	0.2	2.9	4.3	8.2	6.2	0.9
Dumfries and Galloway	0.1	0.1	4.2	2.5	11.7	4.6	1.3
Fife	1.4	0.5	5.1	3.0	24.4	7.0	1.5
Forth Valley	1.7	0.6	4.2	4.0	19.4	4.8	2.0

Clinical Commissioning Group	Asian or Asian British§	Black or Black British§	Mother's age <20 years§	Mother's age >39 years§	Top quintile of child poverty§	Multiple birth§	Born at 24 to 31 weeks§
Grampian	2.9	3.1	2.6	3.3	4.7	4.5	0.9
Greater Glasgow and Clyde	4.0	1.3	3.0	3.9	35.3	4.3	1.2
Highland	1.0	0.7	3.4	3.9	8.2	6.7	1.1
Lanarkshire	1.0	0.1	3.8	3.7	22.1	4.3	1.4
Lothian	4.8	2.2	2.6	4.9	17.4	4.3	1.1
Orkney	0.5	0.0	1.6	6.5	0.0	6.5	0.0
Shetland	0.0	0.5	0.0	5.0	0.0	5.0	2.3
Tayside	3.2	0.6	4.4	3.1	23.1	4.9	1.2
Western Isles	0.5	0.0	2.8	6.4	4.6	6.0	1.4
WALES							
Abertawe Bro Morgannwg University Health Board	0.9	0.4	4.7	2.8	35.7	1.8	1.4
Aneurin Bevan University Health Board	3.1	0.9	4.5	3.0	31.3	2.8	1.5
Betsi Cadwaladr University Health Board	0.9	0.2	4.7	3.5	20.5	2.7	1.6
Cardiff and Vale University Health Board	7.7	4.0	3.4	4.4	32.8	2.5	1.1
Cwm Taf University Health Board	1.1	0.4	5.2	2.0	37.0	3.1	1.3
Hywel Dda University Health Board	0.2	0.0	4.6	2.5	19.3	3.0	1.2
Powys Teaching Health Board	0.5	0.0	2.6	4.3	9.3	2.2	1.4
NORTHERN IRELAND							
Belfast	1.8	1.8	4.5	4.2	51.2	2.7	1.1
Northern	0.4	0.3	2.9	3.3	18.4	2.8	1.4
South Eastern	0.6	0.3	2.5	4.1	19.6	3.2	1.0
Southern	0.4	0.9	2.3	3.6	16.6	2.9	0.8
Western	0.4	0.1	2.5	4.0	36.8	2.2	1.0
GUERNSEY	0.2	0.0	2.3	5.7	0.0	95.5	0.5
JERSEY	1.4	0.5	3.3	6.0	0.0	3.5	0.8
ISLE OF MAN	0.0	0.0	1.2	6.9	0.0	2.0	0.4

§ Percentage of all births in each commissioning organisation which fall within this category
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey

5.2 Mortality rates by Sustainability and Transformation Partnerships (England), or country of residence

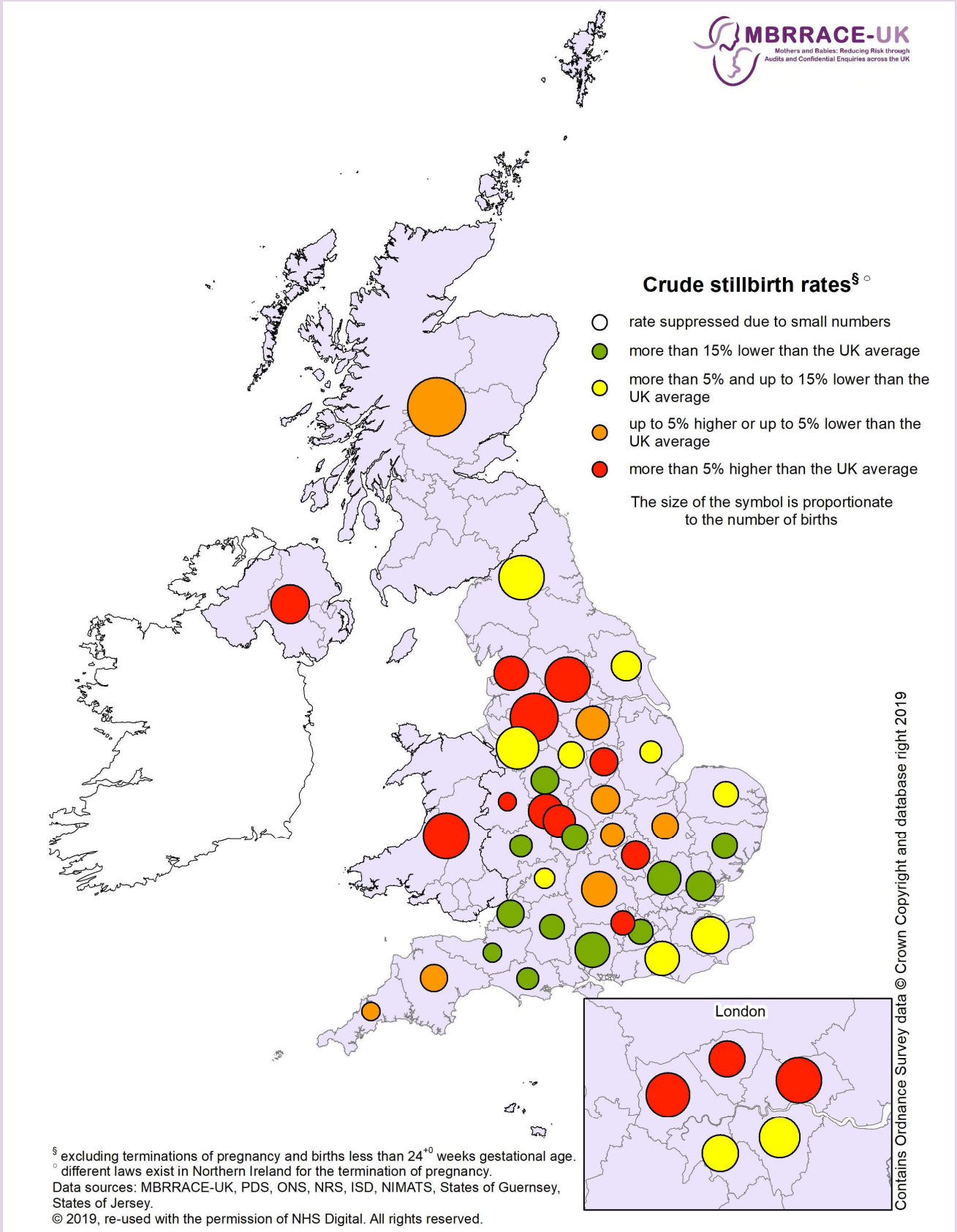
As part of NHS England's Five Year Forward View [15] every health and care system in England has been asked to create their own place-based plan for five years – Sustainability and Transformation Partnerships (STPs). These are local partnerships between care providers and organisations providing the funding for care, loosely based on groups of CCGs. Similar work is being carried out in the devolved nations at national government level. In this section, mortality rates are provided by STP for England and for each devolved nation. Crude and stabilised mortality rates are presented in the maps and tables in Figures 22 to 27 and Table 14, followed by a table detailing the risk factor profile for mothers giving birth in their organisation (Table 15), to provide information to STPs to facilitate the investigation of stillbirth and neonatal mortality rates and the development of targeted intervention strategies.

Overall, stabilised stillbirth rates for the STPs in England ranged from 3.15 to 4.43 per 1,000 total births (Table 14) with nine of the 42 STPs having a stabilised stillbirth rate more than 5% higher than the UK average and one STP (Mid and South Essex) having a stabilised stillbirth rate more than 15% lower than the UK average. Stabilised stillbirth rates for the devolved nations showed rates more than 5% higher than the UK average for Wales and Northern Ireland and between 5% lower and 5% higher than the UK average for Scotland.

Stabilised neonatal mortality rates for STPs in England ranged from 1.37 to 2.21 per 1,000 live births (Table 14) with 14 STPs having a stabilised neonatal mortality rate more than 5% higher than the UK average and three STPs (Norfolk & Waveney, North Central London, and Gloucestershire) having a stabilised neonatal mortality rate more than 15% lower than the UK average. Neonatal mortality rates for the devolved nations followed a similar pattern to their stillbirth rates showing rates more than 5% higher than the UK average for Wales and Northern Ireland and between 5% lower and 5% higher than the UK average for Scotland.

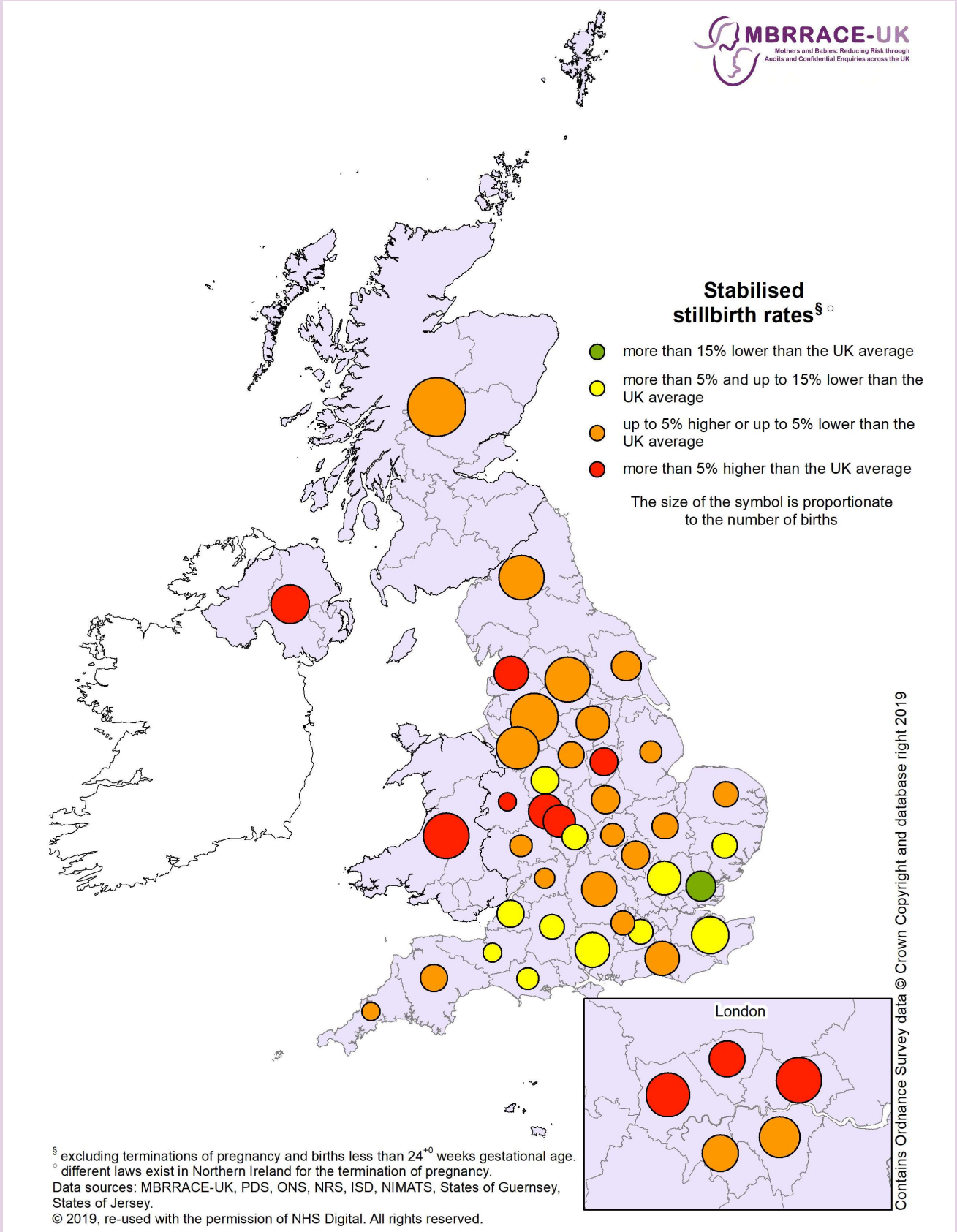
Population characteristics for the Black Country STP that has the highest stabilised rate of both stillbirth and neonatal mortality show that their births in 2017 were in the highest quintile for the proportion of Asian or Asian British mothers, Black or Black British mothers, mothers aged less than 20 years, mothers in the top quintile of child poverty and premature births of 24 to 31 week gestation (Table 15).

Figure 22: Crude stillbirth rates by Sustainability and Transformation Partnership (England) and country of residence (Scotland, Wales and Northern Ireland) based on postcode of mother's residence at time of delivery: United Kingdom, for births in 2017



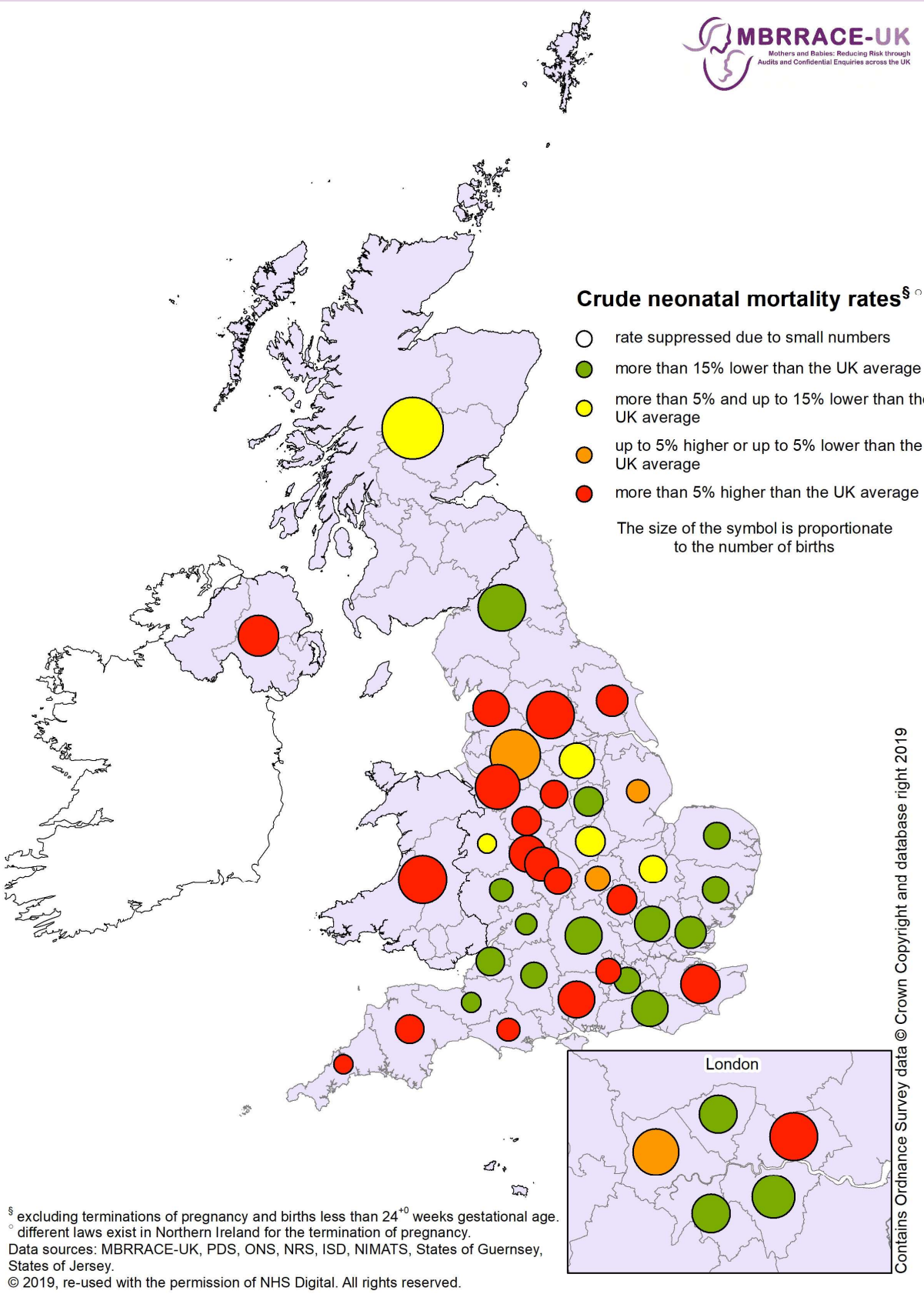
§ excluding terminations of pregnancy and births less than 24^{+0} weeks gestational age.
◦ different laws exist in Northern Ireland for the termination of pregnancy.
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey.

Figure 23: Stabilised stillbirth rates by Sustainability and Transformation Partnership (England) and country of residence (Scotland, Wales and Northern Ireland) based on postcode of mother's residence at time of delivery: United Kingdom, for births in 2017



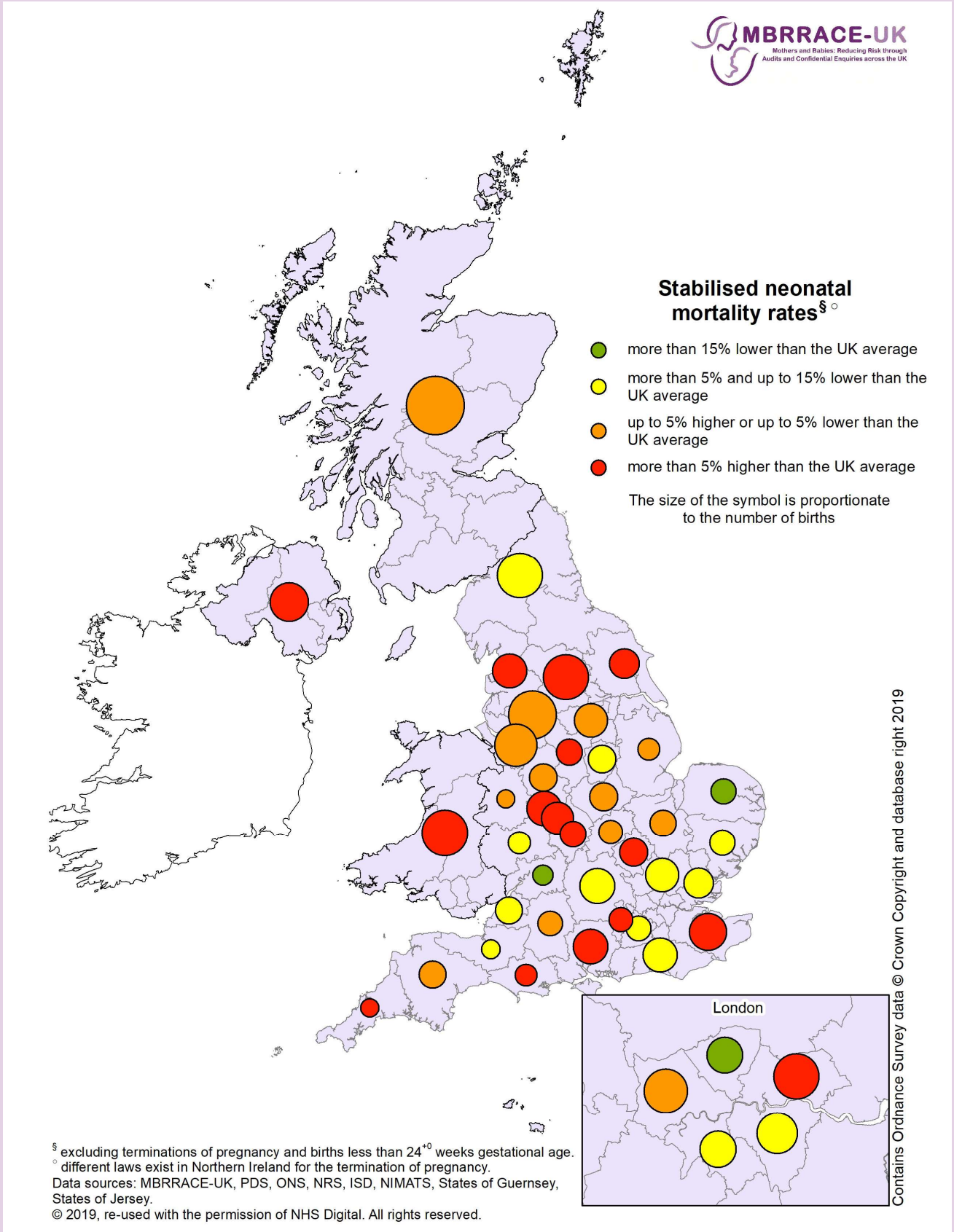
§ excluding terminations of pregnancy and births less than 24^{+0} weeks gestational age.
◦ different laws exist in Northern Ireland for the termination of pregnancy.
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey.

Figure 24: Crude neonatal mortality rates by Sustainability and Transformation Partnership (England) and country of residence (Scotland, Wales and Northern Ireland) based on postcode of mother's residence at time of delivery: United Kingdom, for births in 2017



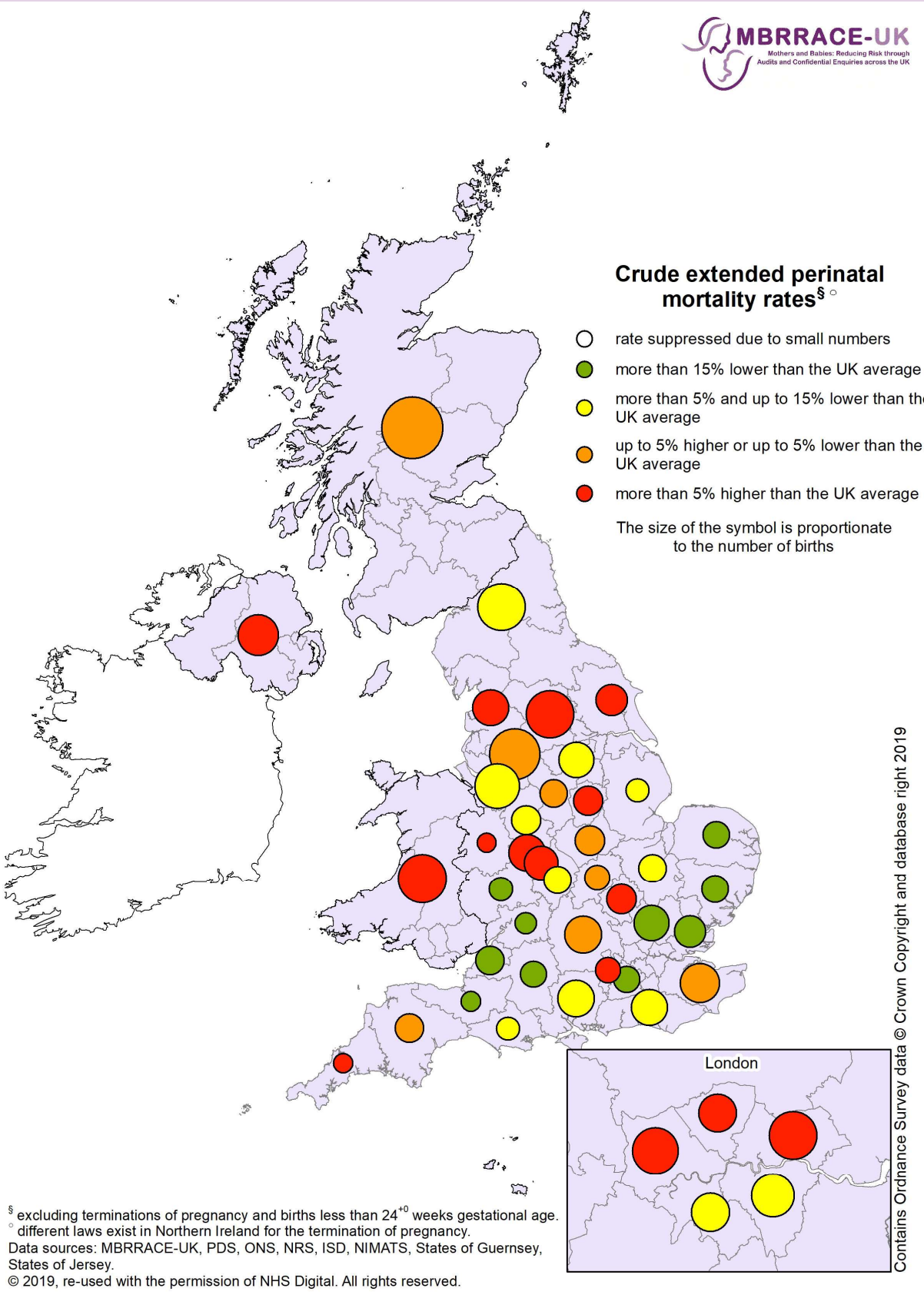
§ excluding terminations of pregnancy and births less than 24^{+0} weeks gestational age.
○ different laws exist in Northern Ireland for the termination of pregnancy.
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey.

Figure 25: Stabilised neonatal mortality rates by Sustainability and Transformation Partnership (England) and country of residence (Scotland, Wales and Northern Ireland) based on postcode of mother's residence at time of delivery: United Kingdom, for births in 2017



§ excluding terminations of pregnancy and births less than 24^{+0} weeks gestational age.
○ different laws exist in Northern Ireland for the termination of pregnancy.
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey.

Figure 26: Crude extended perinatal mortality rates by Sustainability and Transformation Partnership (England) and country of residence (Scotland, Wales and Northern Ireland) based on postcode of mother's residence at time of delivery: United Kingdom, for births in 2017



§ excluding terminations of pregnancy and births less than 24^{+0} weeks gestational age.
○ different laws exist in Northern Ireland for the termination of pregnancy.
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey.

Figure 27: Stabilised extended perinatal mortality rates by Sustainability and Transformation Partnership (England) and country of residence (Scotland, Wales and Northern Ireland) based on postcode of mother's residence at time of delivery: United Kingdom, for births in 2017

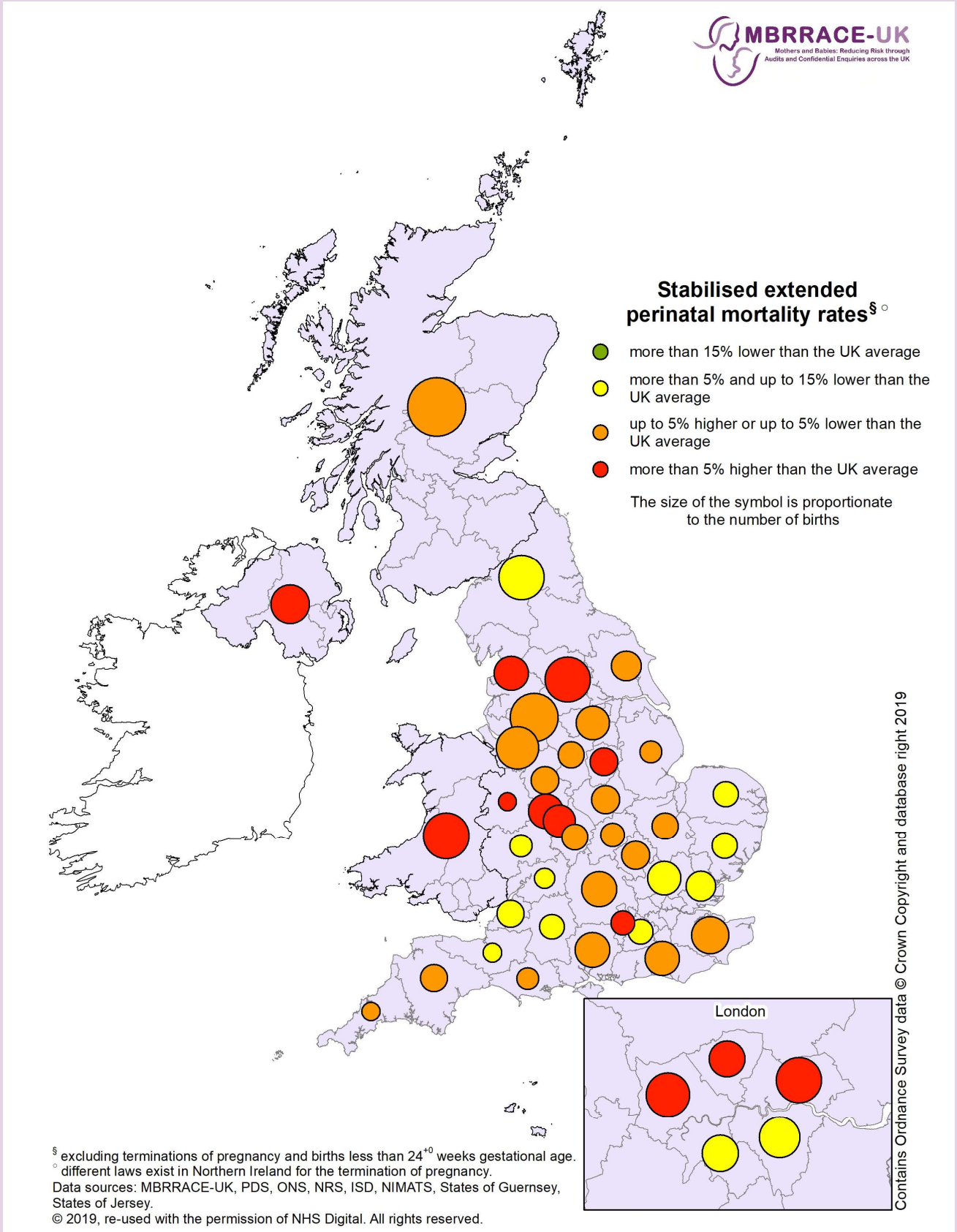


Table 14: Crude and stabilised stillbirth, neonatal, extended perinatal mortality rates by Sustainability and Transformation Partnership (England) and country of residence (Scotland, Wales, Northern Ireland) based on postcode of mother's residence at time of delivery: United Kingdom, for births in 2017

Organisation	Total births§	Rate per 1,000 births§						
		Stillbirth†		Neonatal‡		Extended perinatal†		
		Crude	Stabilised (95% CI)	Crude	Stabilised (95% CI)	Crude	Stabilised (95% CI)#	
ENGLAND								
Bath, Swindon and Wiltshire	9,509	2.63	3.40 (2.67 to 4.24)	1.37	1.59 (1.19 to 2.13)	4.00	4.98 (4.16 to 5.96)	
Birmingham and Solihull	16,090	4.72	4.25 (3.45 to 5.32)	2.44	2.04 (1.52 to 2.79)	7.15	6.29 (5.38 to 7.54)	
Bristol, North Somerset and South Gloucestershire	11,279	2.93	3.46 (2.83 to 4.29)	1.33	1.57 (1.18 to 2.05)	4.26	5.03 (4.33 to 6.01)	
Buckinghamshire, Oxfordshire and Berkshire West	19,011	3.89	3.86 (3.24 to 4.62)	1.37	1.55 (1.21 to 1.99)	5.26	5.40 (4.71 to 6.23)	
Cambridgeshire and Peterborough	10,398	3.56	3.70 (3.06 to 4.49)	1.54	1.64 (1.24 to 2.18)	5.10	5.34 (4.60 to 6.24)	
Cheshire and Merseyside	27,193	3.35	3.55 (3.05 to 4.20)	1.77	1.75 (1.39 to 2.23)	5.11	5.30 (4.65 to 6.10)	
Cornwall and the Isles of Scilly	5,179	3.67	3.74 (3.02 to 4.67)	2.13	1.77 (1.31 to 2.45)	5.79	5.51 (4.69 to 6.61)	
Coventry and Warwickshire	10,417	2.88	3.46 (2.81 to 4.23)	1.93	1.77 (1.35 to 2.36)	4.80	5.23 (4.47 to 6.12)	
Cumbria and North East	31,978	3.44	3.60 (3.04 to 4.31)	1.32	1.48 (1.18 to 1.90)	4.75	5.08 (4.45 to 5.88)	
Derbyshire	10,434	3.35	3.63 (2.99 to 4.47)	2.21	1.87 (1.42 to 2.56)	5.56	5.49 (4.71 to 6.50)	
Devon	11,141	3.77	3.78 (3.11 to 4.61)	1.80	1.73 (1.35 to 2.31)	5.57	5.50 (4.75 to 6.45)	
Dorset	7,142	2.80	3.50 (2.75 to 4.27)	1.97	1.76 (1.33 to 2.37)	4.76	5.26 (4.33 to 6.25)	
Frimley Health	9,037	4.20	3.92 (3.20 to 4.79)	2.67	2.01 (1.47 to 2.85)	6.86	5.92 (4.99 to 7.10)	
Gloucestershire	6,548	3.36	3.66 (2.96 to 4.50)	0.46	1.41 (0.93 to 1.97)	3.82	5.06 (4.25 to 6.08)	
Greater Manchester	36,189	3.92	3.92 (3.38 to 4.57)	1.69	1.71 (1.39 to 2.15)	5.61	5.62 (4.98 to 6.43)	
Hampshire and the Isle of Wight	18,705	2.94	3.38 (2.83 to 4.09)	1.93	1.82 (1.43 to 2.36)	4.87	5.19 (4.47 to 6.02)	
Herefordshire and Worcestershire	7,631	3.15	3.59 (2.90 to 4.48)	1.05	1.52 (1.11 to 2.08)	4.19	5.10 (4.31 to 6.12)	
Hertfordshire and West Essex	17,681	3.05	3.45 (2.85 to 4.16)	1.42	1.57 (1.20 to 2.07)	4.47	5.01 (4.33 to 5.94)	
Humber, Coast and Vale	13,914	3.52	3.68 (3.10 to 4.46)	2.16	1.89 (1.43 to 2.53)	5.68	5.56 (4.82 to 6.58)	
Kent and Medway	21,043	3.28	3.54 (2.99 to 4.29)	2.29	2.02 (1.51 to 2.68)	5.56	5.55 (4.83 to 6.53)	
Lancashire and South Cumbria	18,096	4.31	4.07 (3.39 to 4.92)	1.83	1.77 (1.38 to 2.27)	6.13	5.83 (5.00 to 6.84)	
Leicester, Leicestershire and Rutland	12,221	3.60	3.71 (3.05 to 4.51)	1.56	1.65 (1.25 to 2.20)	5.16	5.35 (4.51 to 6.28)	
Lincolnshire	7,502	3.20	3.61 (2.91 to 4.45)	1.74	1.70 (1.28 to 2.31)	4.93	5.30 (4.53 to 6.36)	
Mid and South Essex	13,890	2.23	3.15 (2.53 to 3.91)	1.23	1.51 (1.12 to 2.02)	3.46	4.66 (3.92 to 5.54)	

Organisation	Total births§	Rate per 1,000 births§						
		Stillbirth†		Neonatal‡		Extended perinatal†		
		Crude	Stabilised (95% CI)	Crude	Stabilised (95% CI)	Crude	Stabilised (95% CI)#	
Milton Keynes, Bedfordshire and Luton	12,422	4.11	3.92 (3.27 to 4.79)	1.86	1.76 (1.35 to 2.36)	5.96	5.67 (4.97 to 6.73)	
Norfolk and Waveney	9,822	3.46	3.67 (3.00 to 4.54)	0.61	1.37 (0.95 to 1.93)	4.07	5.03 (4.27 to 6.11)	
North Central London	19,620	4.79	4.35 (3.61 to 5.29)	1.08	1.41 (1.05 to 1.86)	5.86	5.75 (4.95 to 6.86)	
North East London	31,854	4.55	4.32 (3.65 to 5.19)	1.83	1.79 (1.42 to 2.30)	6.37	6.11 (5.35 to 7.09)	
North West London	29,588	4.39	4.20 (3.49 to 4.99)	1.66	1.69 (1.32 to 2.12)	6.05	5.89 (5.10 to 6.78)	
Northamptonshire	8,757	3.65	3.73 (3.08 to 4.58)	1.60	1.66 (1.27 to 2.23)	5.25	5.39 (4.62 to 6.40)	
Nottinghamshire	11,593	4.66	4.13 (3.35 to 5.08)	1.39	1.59 (1.22 to 2.13)	6.04	5.71 (4.89 to 6.78)	
Shropshire and Telford and Wrekin	4,886	5.53	4.14 (3.33 to 5.27)	1.44	1.64 (1.21 to 2.20)	6.96	5.77 (4.89 to 7.07)	
Somerset	5,368	2.24	3.43 (2.70 to 4.30)	0.93	1.53 (1.10 to 2.10)	3.17	4.96 (4.12 to 5.99)	
South East London	25,396	3.43	3.60 (3.05 to 4.32)	1.26	1.47 (1.14 to 1.91)	4.69	5.07 (4.42 to 5.90)	
South West London	20,932	3.34	3.57 (3.01 to 4.23)	1.39	1.55 (1.21 to 2.01)	4.73	5.12 (4.46 to 5.92)	
South Yorkshire and Bassetlaw	17,033	3.58	3.70 (3.09 to 4.45)	1.47	1.60 (1.24 to 2.10)	5.05	5.29 (4.56 to 6.16)	
Staffordshire	11,792	3.14	3.54 (2.91 to 4.36)	1.79	1.73 (1.30 to 2.25)	4.92	5.26 (4.54 to 6.25)	
Suffolk and North East Essex	10,119	2.57	3.36 (2.71 to 4.20)	1.09	1.50 (1.10 to 2.00)	3.66	4.86 (4.07 to 5.85)	
Surrey Heartlands	9,268	2.91	3.49 (2.81 to 4.32)	0.97	1.48 (1.06 to 2.00)	3.88	4.96 (4.21 to 5.91)	
Sussex and East Surrey	18,434	3.47	3.64 (3.11 to 4.36)	1.25	1.50 (1.11 to 1.93)	4.72	5.13 (4.50 to 5.92)	
The Black Country	18,686	4.98	4.43 (3.61 to 5.54)	2.69	2.21 (1.66 to 3.03)	7.65	6.63 (5.65 to 7.97)	
West Yorkshire	31,182	3.94	3.92 (3.36 to 4.66)	2.12	1.98 (1.53 to 2.59)	6.06	5.89 (5.12 to 6.79)	
SCOTLAND	53,156	3.89	3.92 (3.40 to 4.55)	1.59	1.64 (1.33 to 2.04)	5.47	5.55 (4.94 to 6.29)	
WALES	32,306	3.99	3.95 (3.36 to 4.65)	1.93	1.86 (1.47 to 2.42)	5.91	5.80 (5.08 to 6.65)	
NORTHERN IRELAND◦	23,319	4.63	4.30 (3.58 to 5.13)	2.07	1.91 (1.48 to 2.52)	6.69	6.20 (5.38 to 7.18)	

§ excluding terminations of pregnancy and births <24^{+0} weeks gestational age
† per 1,000 total births
‡ per 1,000 live births
# colours represent variation from comparator group average extended perinatal mortality rate
◦ different laws exist in Northern Ireland for the termination of pregnancy
* entry suppressed because of small number of deaths
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey

The shading in Table 15 represents the quintiles of all commissioning organisations:

- 5th quintile: highest 20% of commissioning organisations;
- 4th quintile
- 3rd quintile
- 2nd quintile
- 1st quintile: lowest 20% of commissioning organisations.

Example: 4.2% of mothers giving birth in Bath, Swindon and Wiltshire STP are Asian or Asian British, which places this STP in the 3rd quintile of STPs for this population characteristic.

Table 15: Proportion of mothers giving birth in population characteristic groups by Sustainability and Transformation Partnerships (England) or country of residence, for births in 2017

Sustainability and Transformation Partnership	Asian or Asian British§	Black or Black British§	Mother's age <20 years§	Mother's age >39 years§	Top quintile of child poverty§	Multiple birth§	Born at 24 to 31 weeks§
Bath, Swindon and Wiltshire	4.2	2.0	2.4	3.9	6.3	3.3	1.2
Birmingham and Solihull	28.5	7.7	3.2	3.7	45.5	2.7	1.3
Bristol, North Somerset and South Gloucestershire	4.3	4.9	2.3	4.6	16.6	3.4	1.3
Buckinghamshire, Oxfordshire and Berkshire West	10.7	2.8	1.8	5.2	2.8	3.3	1.3
Cambridgeshire and Peterborough	7.4	1.8	2.9	4.0	6.1	3.0	1.3
Cheshire and Merseyside	1.9	0.8	3.1	3.5	26.5	3.0	1.3
Cornwall and the Isles of Scilly	0.4	0.1	3.3	3.9	13.6	3.2	1.2
Coventry and Warwickshire	9.8	4.7	3.4	3.9	16.7	2.9	1.6
Cumbria and North East	3.7	1.1	4.6	2.8	33.4	2.8	1.1
Derbyshire	6.4	1.1	3.3	3.5	20.6	3.6	1.4
Devon	1.3	0.5	3.3	3.9	13.3	3.2	1.3
Dorset	2.1	0.4	2.5	3.9	7.9	3.0	1.2
Frimley Health	20.2	3.7	1.6	5.0	0.2	3.4	1.5
Gloucestershire	2.7	1.4	2.3	4.0	7.4	3.8	1.0
Greater Manchester	15.3	5.3	3.0	3.4	27.2	2.8	1.3
Hampshire and the Isle of Wight	3.6	1.5	2.8	4.0	11.3	3.1	1.3
Herefordshire and Worcestershire	3.1	0.4	3.4	3.3	12.0	2.8	1.4
Hertfordshire and West Essex	7.5	3.4	1.6	5.0	2.3	3.6	1.2
Humber, Coast and Vale	2.0	0.7	4.2	2.7	26.3	2.7	1.5
Kent and Medway	4.1	2.7	3.6	3.6	17.9	3.2	1.2

Sustainability and Transformation Partnership	Asian or Asian British§	Black or Black British§	Mother's age <20 years§	Mother's age >39 years§	Top quintile of child poverty§	Multiple birth§	Born at 24 to 31 weeks§
Lancashire and South Cumbria	12.3	0.4	3.9	3.0	17.2	2.6	1.1
Leicester, Leicestershire and Rutland	18.0	3.2	2.7	3.9	14.2	3.1	1.4
Lincolnshire	1.0	0.3	4.1	2.7	14.6	3.4	1.1
Mid and South Essex	3.7	3.8	2.6	3.7	11.6	3.6	1.2
Milton Keynes, Bedfordshire and Luton	18.3	6.2	2.5	4.2	9.3	3.2	1.4
Norfolk and Waveney	1.5	1.1	3.6	3.2	12.3	3.0	1.1
North Central London	9.1	13.2	1.5	6.7	30.6	3.7	1.3
North East London	30.8	12.7	1.9	4.8	22.0	2.8	1.2
North West London	27.3	9.7	1.4	6.4	10.8	3.6	1.4
Northamptonshire	4.5	4.8	3.3	3.8	9.7	3.3	1.5
Nottinghamshire	7.8	3.9	3.7	3.2	32.1	3.4	1.6
Shropshire and Telford and Wrekin	2.9	1.5	3.9	3.0	14.2	4.0	1.2
Somerset	1.0	0.3	3.1	3.6	6.0	2.7	1.2
South East London	7.0	19.2	1.8	6.5	22.2	3.8	1.2
South West London	12.7	9.7	1.5	6.9	5.5	3.7	1.0
South Yorkshire and Bassetlaw	6.4	2.5	4.4	2.7	36.2	2.8	1.5
Staffordshire	6.5	1.3	3.7	3.1	16.7	3.1	1.2
Suffolk and North East Essex	2.3	1.6	3.2	3.4	13.7	2.8	1.1
Surrey Heartlands	8.1	1.4	1.3	6.3	2.1	3.4	1.1
Sussex and East Surrey	4.3	1.6	2.5	5.2	8.8	3.5	1.4
The Black Country	24.1	8.3	4.2	3.2	47.7	2.8	1.6
West Yorkshire	20.3	3.4	3.4	3.5	28.4	2.7	1.4
Scotland	2.7	1.2	3.4	3.8	21.9	4.8	1.2
Wales	2.4	1.0	4.4	3.2	28.5	2.6	1.4
Northern Ireland	0.7	0.7	2.9	3.8	27.4	2.8	1.1

§ Percentage of births in each commissioning organisation which fall within this category
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS

5.3 How local organisations should respond to this information

This information is intended to give local teams an insight into clinical performance based not just on crude mortality rates but also having taken account of the variation in the size of the organisation. The tables providing information about some of the important socio-demographic factors that influence pregnancy outcomes will facilitate this process. The red, amber, yellow and green banding facilitates the comparison of organisations' mortality rates, indicating their overall performance in comparison to the national average.

Previous reports have highlighted the prioritisation of carrying out reviews for those organisations whose performance fall into the red and amber bands. As a first step for any commissioning organisation whose performance falls in the red ● or amber ● band a more detailed local review of their data quality and investigation of local factors should be carried out, in liaison with their local Trusts and Health Boards, to identify if these issues explain the high rate.

MBRRACE-UK Recommendation 4

Commissioning organisations should review both their crude and stabilised mortality rates alongside their high risk population characteristics to facilitate the development of public health initiatives and to target focused interventions, such as the continued rollout of continuity of carer as recommended by Better Births, with a particular focus on women in high-risk ethnic groups and those living in areas of high deprivation.

6. Mortality rates by healthcare provider

In this chapter the stillbirth, neonatal death, and extended perinatal mortality rates for individual Trusts and Health Boards as well as Neonatal Networks are summarised. For the healthcare providers data is presented as both crude mortality rates and 'stabilised & adjusted' rates. The process of stabilisation and adjustment has a major effect in terms of smoothing apparently extreme (very high or very low) crude mortality rates by taking into account the size of the population, and known influences on stillbirth and neonatal mortality, allowing us to make direct comparisons between different organisations providing direct healthcare (e.g. those treating women identified as low risk versus those providing high risk care). There are some Trusts and Health Boards where mortality rates increase as a result of the stabilisation and adjustment. While some of these will be Trusts and Health Boards with low crude mortality rates just by chance, some will be those where rates are relatively low but where the characteristics of their population are such that rates should be even lower (e.g. they serve a comparatively low risk population).

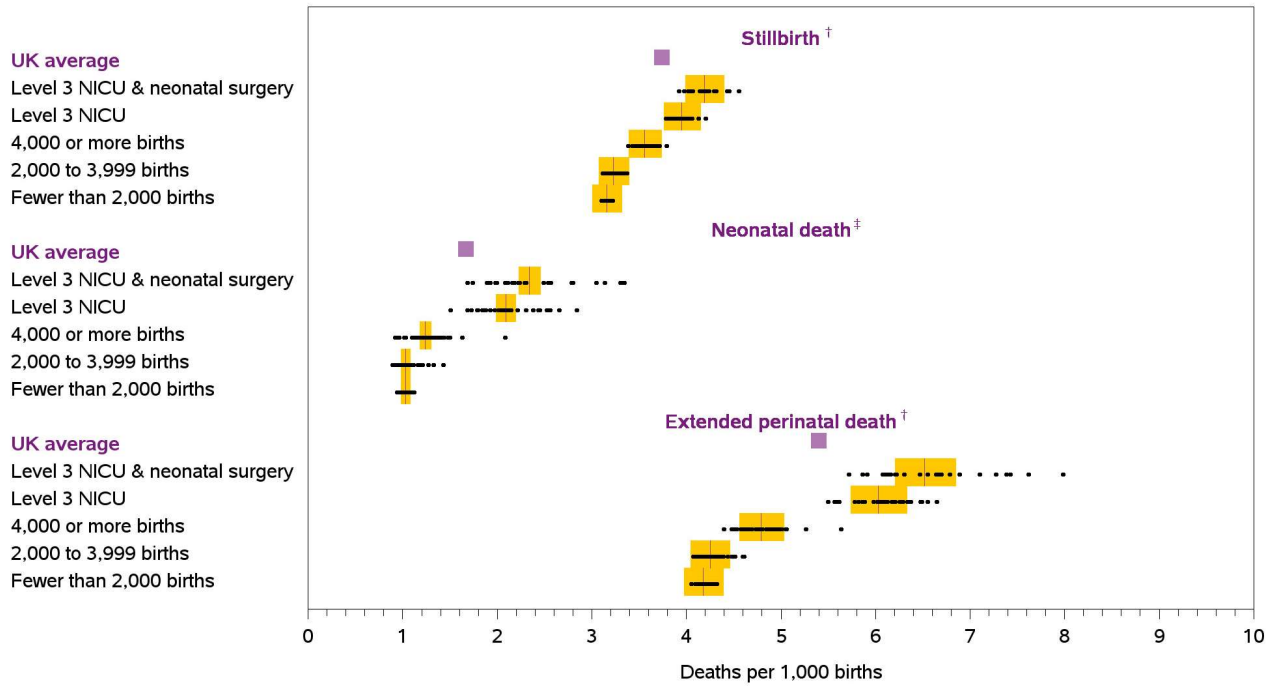
Babies have been allocated based on the Trust or Health Board in which they were born irrespective of where they died. These mortality rates are presented in two different ways: as a 'crude' mortality rate and as a 'stabilised & adjusted' mortality rate (see Section 2.6). For Trusts and Health Boards the mortality rates are presented both with and without deaths due to congenital anomalies to allow for the variation in local factors and policies affecting the number of deaths in this category.

In addition, to account for the wide variation in case-mix, Trusts and Health Boards have been classified hierarchically into five mutually exclusive comparator groups, based on their level of service provision:

1. Level 3 NICU and neonatal surgery;
2. Level 3 NICU;
3. 4,000 or more births per annum at 24 weeks or later;
4. 2,000-3,999 births per annum at 24 weeks or later;
5. Under 2,000 births per annum at 24 weeks or later.

In Figure 28, below, the extent to which this classification reflects the risk profiles of the different types of unit is demonstrated. The average mortality rate for each comparator group is shown as a vertical black line, with a shaded box representing the amber band (i.e. up to 5% higher or up to 5% lower than the average). This shows that the stabilised & adjusted stillbirth rates show little variation, with most Trust and Health Boards falling within 5% of their comparator group average. This is not the case for the stabilised & adjusted rate of neonatal mortality where there is wide variation especially in comparator groups 1 and 2.

Figure 28: Stabilised & adjusted mortality rates by NHS Trust (England), Health Board (Scotland and Wales), Health and Social Care Trust (Northern Ireland), and Crown Dependency based on place of birth: United Kingdom and Crown Dependencies, for births in 2017



† per 1,000 total births
‡ per 1,000 live births
§ excluding terminations of pregnancy and births <24+0 weeks gestational age
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey
Note: different laws exist in Northern Ireland for the termination of pregnancy

This categorisation is useful as it allows units to consider their performance in relation to a comparator group of broadly similar units. However, we recognise that there are some limitations in the approach we have taken. This particularly affects units that happen to fall on the boundary between categories and within the group that provides Level 3 neonatal intensive care and have neonatal surgical provision, i.e. those units which provide intensive care to the most high risk cases. The latter includes units that are the focus for delivery of babies known to have a major cardiac anomaly and those units with a particularly high number of births with major congenital anomalies (e.g. Belfast). Such units will inevitably have higher rates of mortality when compared to otherwise similar services who do not provide intensive care for these types of babies.

In order to address this issue the crude and the stabilised & adjusted stillbirth, neonatal mortality and extended perinatal mortality rates for UK Trusts and Health Boards are presented in Figures 29 to 34 and Tables 16 to 20 **including** congenital anomalies and in Figures 35 to 40 and Tables 23 to 27 **excluding** congenital anomalies. Each of the tables contains data for one of the five comparator groups. The average mortality rate used in each of the five tables is that of the relevant comparator group; for example, the reported mortality rates for Trusts and Health Boards with neonatal surgical provision and level 3 NICUs have been compared to the average mortality rate derived from all of the Trusts and Health Boards providing this level of care and neonatal surgical provision. It is important to note that this is in contrast to the stabilised, or stabilised & adjusted data presented in the rest of the report relating to commissioning organisations, STPs, Neonatal Networks and Local Authorities, where the comparison is in relation to the UK average for births in 2017.

Overall stabilised & adjusted stillbirth rates for Trusts and Health Boards across the UK ranged from 3.92 to 4.56 per 1,000 total births for those with a level 3 NICU and neonatal surgery (Table 16) and from 3.10 to 3.22 for Trusts and Health Boards with under 2,000 births per annum (Table 20).

Stabilised neonatal mortality rates for Trusts and Health Boards across the UK ranged from 1.68 to 3.35 per 1,000 total births for those with a level 3 NICU and neonatal surgery (Table 16) and from 0.94 to 1.12 for Trusts and Health Boards with under 2,000 births per annum (Table 20).

It should be noted that exclusion of congenital anomalies from crude mortality rates (in particular neonatal mortality rates) reduces the actual number of deaths for many Trusts and Health Boards to less than three meaning that they are suppressed in the figures and tables.

Individual detailed Trust and Health Board reports are produced to facilitate discussions of the findings from this report at Trust and Health Board level. These are uploaded onto the MBRRACE-UK web-based system and lead reporters and quality managers are notified of the availability (see Appendix A7 for an example).

Crude and stabilised & adjusted mortality rates for Neonatal Networks are presented in Figures 41 to 46 and Table 28. As indicated previously these rates are compared to the UK average for births as a whole.

6.1 Mortality rates for individual Trusts and Health Boards

Maps begin on page 82.

Figure 29: Crude stillbirth mortality rates by NHS Trust (England), Health Board (Scotland and Wales), Health and Social Care Trust (Northern Ireland), and Crown Dependency based on place of birth: United Kingdom and Crown Dependencies, for births in 2017

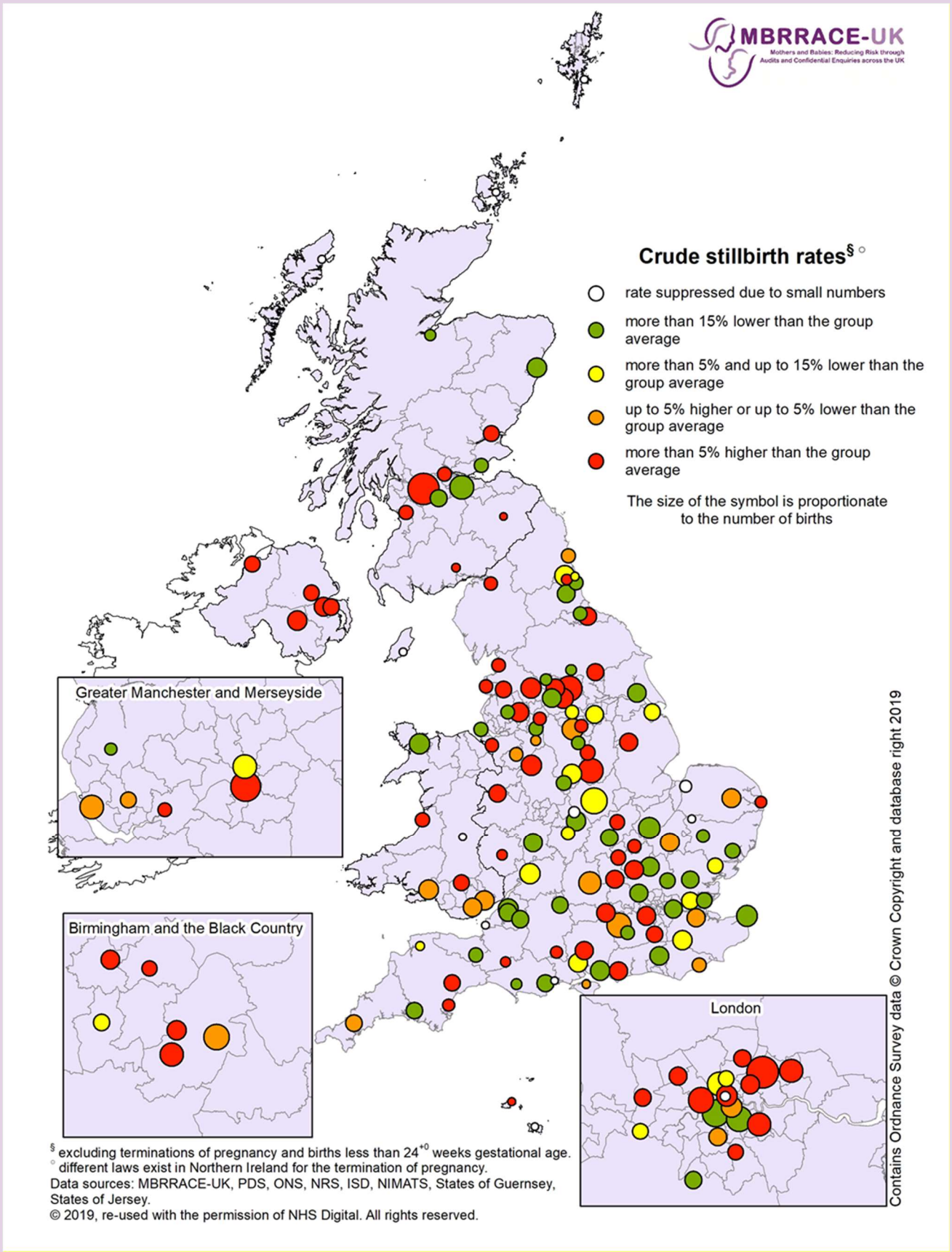


Figure 30: Stabilised & adjusted stillbirth mortality rates by NHS Trust (England), Health Board (Scotland and Wales), Health and Social Care Trust (Northern Ireland), and Crown Dependency based on place of birth: United Kingdom and Crown Dependencies, for births in 2017

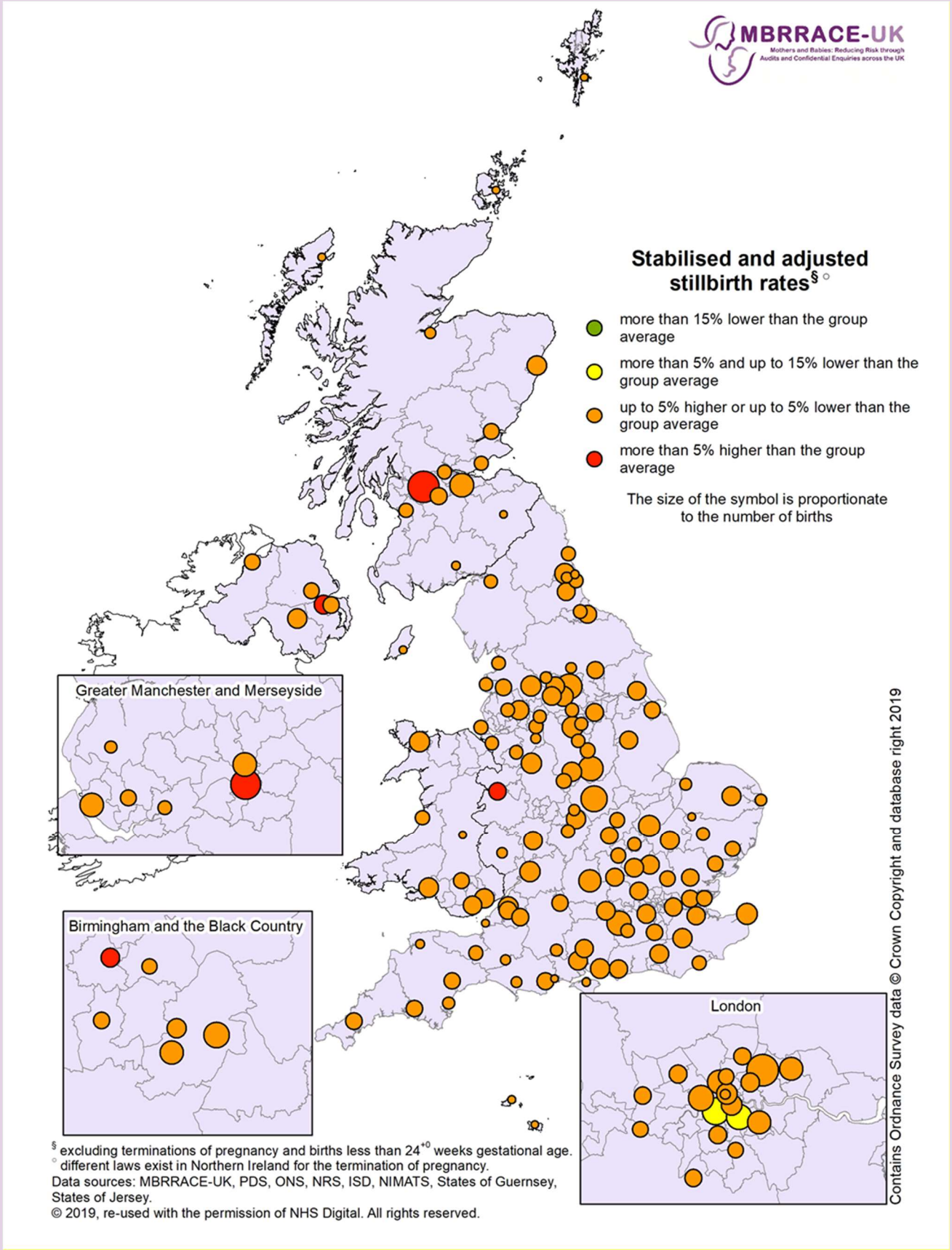


Figure 31: Crude neonatal mortality rates by NHS Trust (England), Health Board (Scotland and Wales), Health and Social Care Trust (Northern Ireland), and Crown Dependency based on place of birth: United Kingdom and Crown Dependencies, for births in 2017

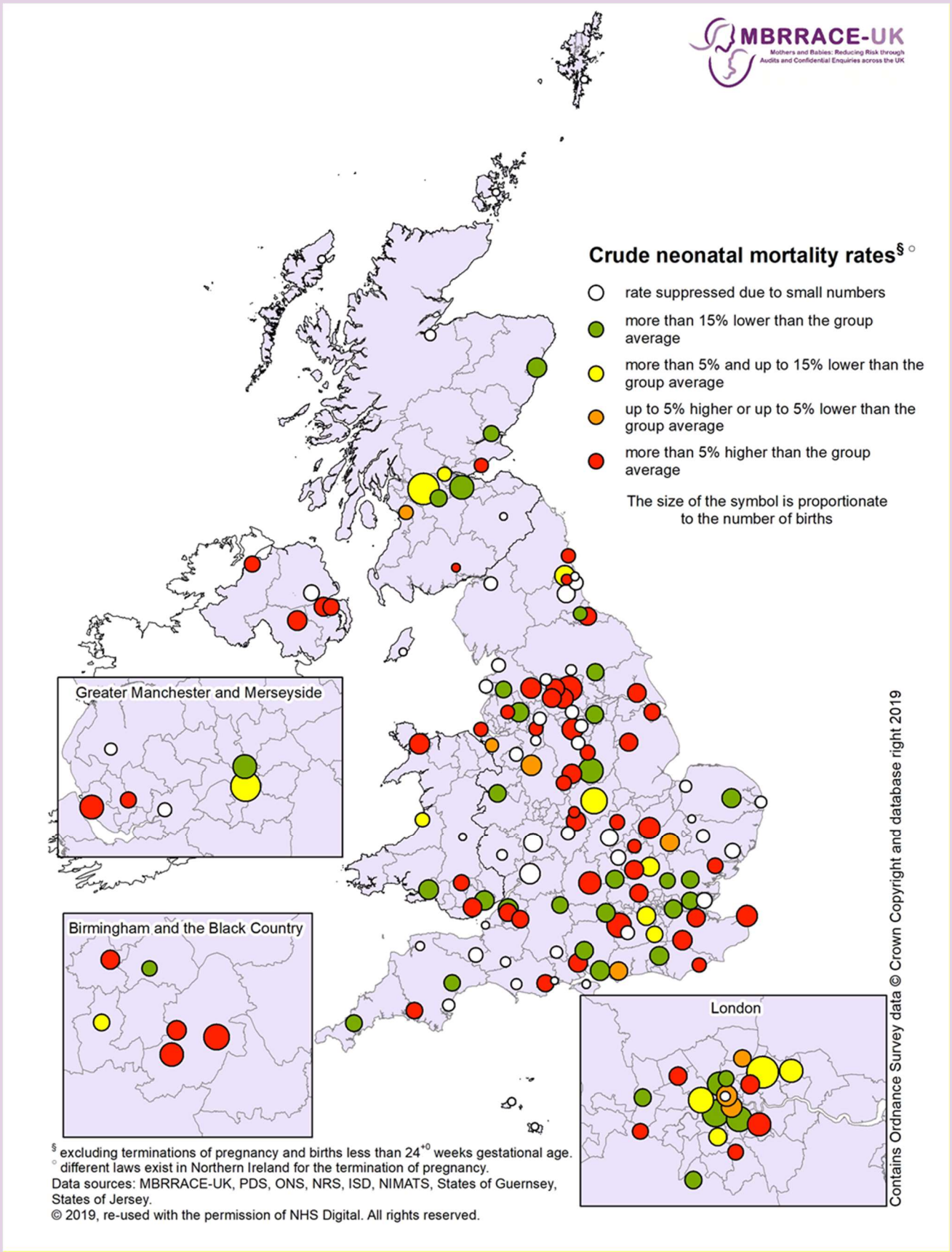
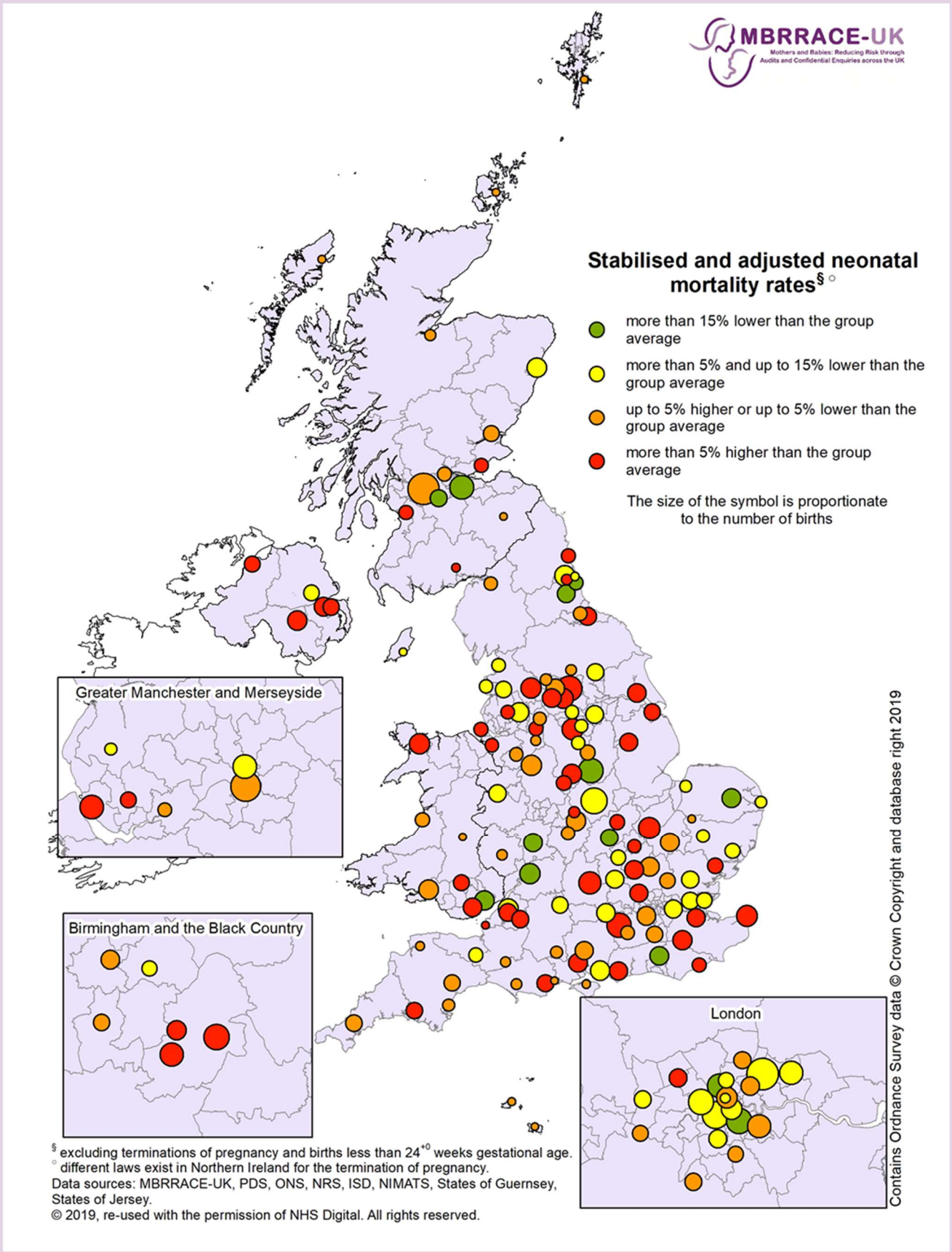


Figure 32: Stabilised & adjusted neonatal mortality rates by NHS Trust (England), Health Board (Scotland and Wales), Health and Social Care Trust (Northern Ireland), and Crown Dependency based on place of birth: United Kingdom and Crown Dependencies, for births in 2017



§ excluding terminations of pregnancy and births less than 24^{+0} weeks gestational age.
◦ different laws exist in Northern Ireland for the termination of pregnancy.
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey.

Figure 33: Crude extended perinatal mortality rates by NHS Trust (England), Health Board (Scotland and Wales), Health and Social Care Trust (Northern Ireland), and Crown Dependency based on place of birth: United Kingdom and Crown Dependencies, for births in 2017

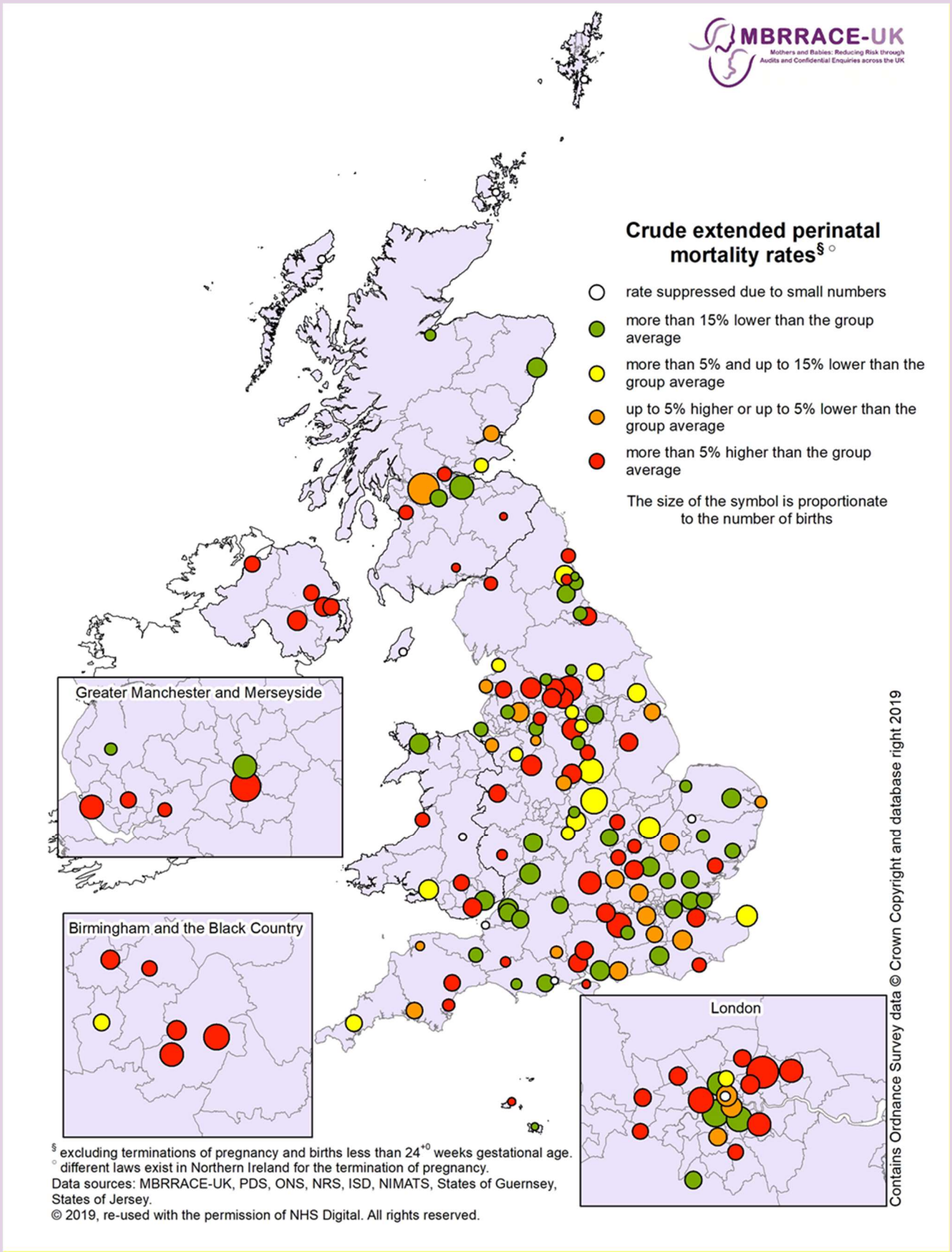


Figure 34: Stabilised & adjusted extended perinatal mortality rates by NHS Trust (England), Health Board (Scotland and Wales), Health and Social Care Trust (Northern Ireland), and Crown Dependency based on place of birth: United Kingdom and Crown Dependencies, for births in 2017

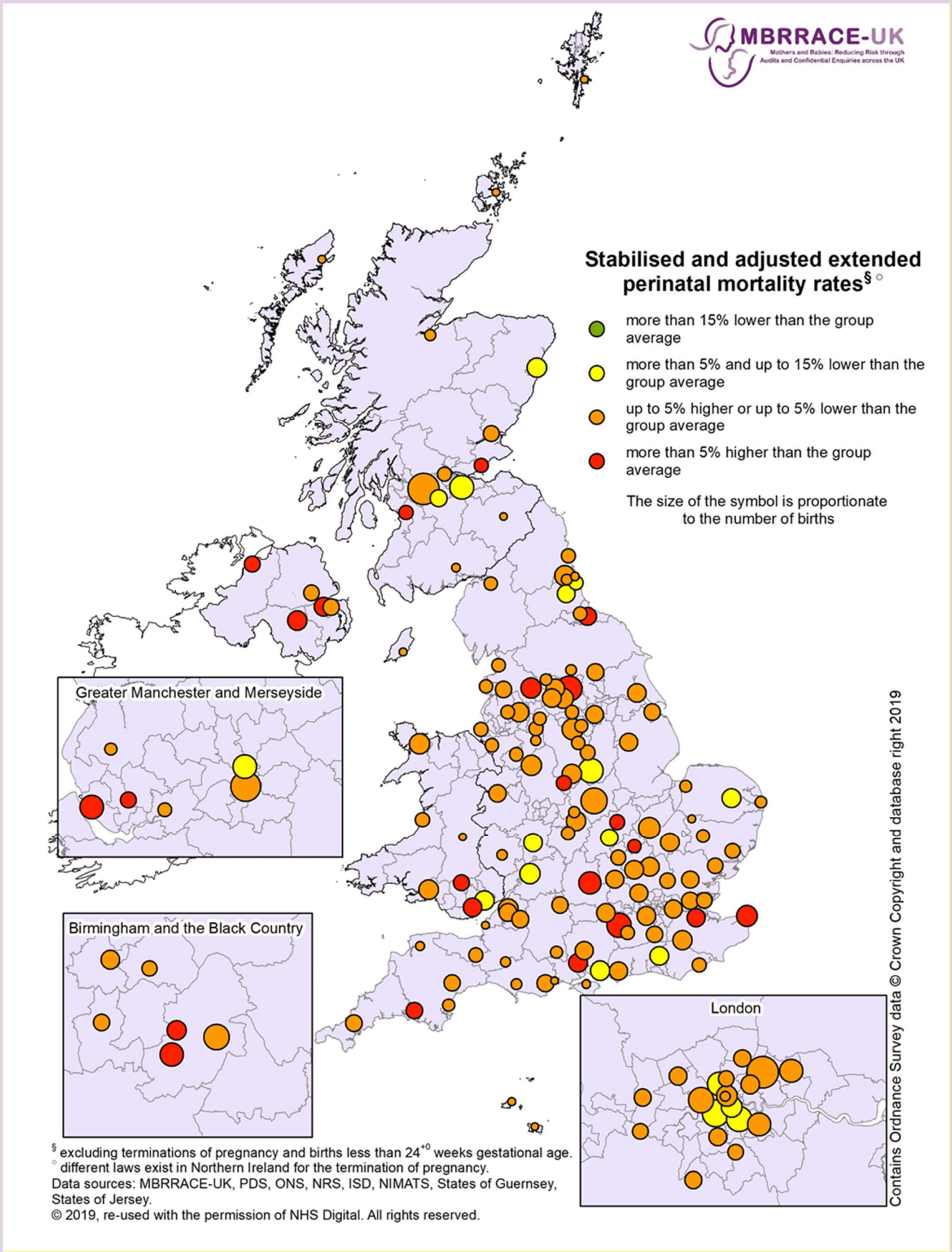


Table 16: Crude and stabilised & adjusted stillbirth, neonatal, and extended perinatal mortality rates by NHS Trust (England), Health Board (Scotland and Wales), Health and Social Care Trust (Northern Ireland), and Crown Dependency based on place of birth: United Kingdom and Crown Dependencies, for births in 2017

FOR TRUSTS AND HEALTH BOARDS WITH NEONATAL SURGICAL PROVISION AND A LEVEL 3 NICU

Organisation	Total births§	Rate per 1,000 births§						
		Stillbirth†		Neonatal‡		Extended perinatal†		
		Crude	Stabilised & adjusted (95% CI)	Crude	Stabilised & adjusted (95% CI)	Crude	Stabilised & adjusted (95% CI)#	
Average for comparator group			4.19		2.34		6.52	
ENGLAND								
Barts Health NHS Trust	16,064	5.17	4.14 (3.54 to 4.96)	2.19	2.16 (1.53 to 3.00)	7.35	6.30 (5.63 to 7.73)	
Birmingham Women's and Children's NHS Foundation Trust	8,264	5.57	4.30 (3.64 to 5.15)	3.65	2.79 (2.01 to 3.86)	9.20	7.10 (6.19 to 8.73)	
Brighton and Sussex University Hospitals NHS Trust	5,456	2.38	4.05 (3.28 to 4.78)	0.92	1.74 (1.10 to 2.75)	3.30	5.72 (4.88 to 7.20)	
Cambridge University Hospitals NHS Foundation Trust	5,348	4.11	4.30 (3.58 to 5.23)	2.25	2.29 (1.56 to 3.37)	6.36	6.55 (5.60 to 8.36)	
Chelsea and Westminster Hospital NHS Foundation Trust	11,494	3.22	3.97 (3.18 to 4.81)	1.57	2.10 (1.51 to 3.01)	4.79	6.08 (5.22 to 7.47)	
Guy's and St Thomas' NHS Foundation Trust	6,934	4.04	4.03 (3.28 to 4.79)	2.32	2.11 (1.50 to 3.11)	6.35	6.12 (5.38 to 7.73)	
Hull and East Yorkshire Hospitals NHS Trust	5,410	2.77	4.07 (3.33 to 4.82)	2.78	2.56 (1.74 to 3.89)	5.55	6.65 (5.65 to 8.51)	
King's College Hospital NHS Foundation Trust	9,756	3.08	3.92 (3.09 to 4.84)	1.34	1.92 (1.32 to 2.82)	4.41	5.86 (5.03 to 7.41)	
Liverpool Women's NHS Foundation Trust	8,686	4.14	4.22 (3.53 to 4.97)	4.05	3.05 (2.19 to 4.28)	8.17	7.38 (6.34 to 9.11)	
Manchester University NHS Foundation Trust	13,519	5.33	4.43 (3.75 to 5.37)	2.08	2.22 (1.57 to 3.08)	7.40	6.64 (5.83 to 8.14)	
Norfolk and Norwich University Hospitals NHS Foundation Trust	5,586	4.30	4.30 (3.62 to 5.19)	0.54	1.68 (1.10 to 2.61)	4.83	5.91 (5.12 to 7.49)	
Nottingham University Hospitals NHS Trust	9,639	4.46	4.24 (3.54 to 5.05)	1.46	1.89 (1.27 to 2.77)	5.91	6.11 (5.37 to 7.53)	
Oxford University Hospitals NHS Trust	7,633	4.19	4.32 (3.59 to 5.22)	3.29	2.54 (1.83 to 3.65)	7.47	6.89 (5.92 to 8.63)	
Sheffield Teaching Hospitals NHS Foundation Trust	6,971	4.30	4.21 (3.56 to 4.94)	2.88	2.49 (1.76 to 3.67)	7.17	6.70 (5.84 to 8.43)	
St George's University Hospitals NHS Foundation Trust	4,988	4.21	4.17 (3.45 to 4.98)	2.21	2.08 (1.44 to 3.07)	6.42	6.21 (5.40 to 7.76)	
The Leeds Teaching Hospitals NHS Trust	9,817	4.48	4.20 (3.55 to 4.93)	3.48	3.30 (2.32 to 4.70)	7.95	7.42 (6.45 to 9.15)	

Organisation	Total births§	Rate per 1,000 births§						
		Stillbirth†		Neonatal‡		Extended perinatal†		
		Crude	Stabilised & adjusted (95% CI)	Crude	Stabilised & adjusted (95% CI)	Crude	Stabilised & adjusted (95% CI)#	
The Newcastle upon Tyne Hospitals NHS Foundation Trust	6,554	3.66	4.14 (3.46 to 4.87)	1.99	2.11 (1.47 to 3.21)	5.65	6.22 (5.42 to 7.79)	🟠
University College London Hospitals NHS Foundation Trust	6,735	4.45	4.18 (3.54 to 4.91)	2.24	2.30 (1.57 to 3.28)	6.68	6.47 (5.64 to 8.03)	🟠
University Hospital Southampton NHS Foundation Trust	5,697	3.86	4.21 (3.51 to 5.00)	4.05	3.35 (2.26 to 5.10)	7.90	7.62 (6.42 to 9.80)	🔴
University Hospitals Bristol NHS Foundation Trust	5,178	2.51	4.02 (3.25 to 4.81)	2.90	2.80 (1.84 to 4.15)	5.41	6.79 (5.65 to 8.65)	🟠
University Hospitals of Leicester NHS Trust	10,337	3.58	4.05 (3.32 to 4.81)	2.04	2.18 (1.53 to 3.11)	5.61	6.22 (5.47 to 7.62)	🟠
SCOTLAND								
NHS Grampian	6,060	3.30	4.18 (3.49 to 4.97)	1.16	1.99 (1.34 to 3.00)	4.46	6.16 (5.37 to 7.68)	🟡
NHS Greater Glasgow and Clyde	15,009	4.66	4.45 (3.59 to 5.44)	2.01	2.24 (1.64 to 3.04)	6.66	6.66 (5.84 to 8.25)	🟠
NHS Lothian	9,167	3.49	4.16 (3.51 to 4.91)	1.31	1.98 (1.34 to 2.91)	4.80	6.13 (5.42 to 7.54)	🟡
WALES								
Cardiff and Vale University Health Board	5,686	4.40	4.22 (3.54 to 5.06)	3.18	3.14 (2.07 to 4.67)	7.56	7.27 (6.26 to 9.08)	🔴
NORTHERN IRELAND								
Belfast Health and Social Care Trust	5,472	6.76	4.56 (3.59 to 5.98)	4.42	3.33 (2.23 to 4.93)	11.15	7.98 (6.59 to 10.38)	🔴

§ excluding terminations of pregnancy and births <24^{+0} weeks gestational age
† per 1,000 total births
‡ per 1,000 live births
# colours represent variation from comparator group average extended perinatal mortality rate
◦ different laws exist in Northern Ireland for the termination of pregnancy
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey

Table 17: Crude and stabilised & adjusted stillbirth, neonatal, and extended perinatal mortality rates by NHS Trust (England), Health Board (Scotland and Wales), Health and Social Care Trust (Northern Ireland), and Crown Dependency based on place of birth: United Kingdom and Crown Dependencies, for births in 2017
FOR TRUSTS AND HEALTH BOARDS WITH A LEVEL 3 NICU

Organisation	Total births§	Rate per 1,000 births§						
		Stillbirth†		Neonatal‡		Extended perinatal†		
		Crude	Stabilised & adjusted (95% CI)	Crude	Stabilised & adjusted (95% CI)	Crude	Stabilised & adjusted (95% CI)#	
Average for comparator group			3.95		2.09		6.03	
ENGLAND								
Ashford and St Peter's Hospital NHS Foundation Trust	3,987	3.51	3.96 (3.23 to 4.74)	3.02	2.08 (1.41 to 3.09)	6.52	6.02 (5.08 to 7.75)	
Bolton NHS Foundation Trust	5,853	4.44	4.01 (3.37 to 4.79)	1.37	1.79 (1.19 to 2.77)	5.81	5.78 (5.03 to 7.22)	
Bradford Teaching Hospitals NHS Foundation Trust	5,698	5.62	4.02 (3.41 to 4.91)	2.82	2.04 (1.40 to 2.88)	8.42	6.04 (5.30 to 7.55)	
City Hospitals Sunderland NHS Foundation Trust	3,149	*	3.84 (3.12 to 4.63)	*	1.72 (1.12 to 2.70)	2.86	5.57 (4.67 to 6.89)	
East Kent Hospitals University NHS Foundation Trust	6,996	2.72	3.82 (3.11 to 4.59)	3.01	2.84 (1.93 to 4.18)	5.72	6.64 (5.67 to 8.41)	
East Lancashire Hospitals NHS Trust	6,354	4.56	4.01 (3.31 to 4.83)	2.85	2.56 (1.68 to 3.87)	7.40	6.55 (5.63 to 8.29)	
Heart of England NHS Foundation Trust	9,780	3.99	3.86 (3.22 to 4.54)	2.36	2.45 (1.64 to 3.50)	6.34	6.25 (5.45 to 7.67)	
Homerton University Hospital NHS Foundation Trust	5,690	5.45	4.04 (3.41 to 4.89)	2.47	2.10 (1.41 to 3.14)	7.91	6.13 (5.40 to 7.62)	
Imperial College Healthcare NHS Trust	10,185	4.71	4.01 (3.37 to 4.89)	1.97	1.88 (1.34 to 2.71)	6.68	5.86 (5.20 to 7.33)	
Lancashire Teaching Hospitals NHS Foundation Trust	4,431	5.19	4.13 (3.35 to 5.00)	1.59	1.97 (1.29 to 3.02)	6.77	6.07 (5.18 to 7.70)	
Luton and Dunstable University Hospital NHS Foundation Trust	5,325	4.51	3.98 (3.26 to 4.77)	2.26	2.22 (1.51 to 3.39)	6.76	6.18 (5.40 to 7.80)	
Medway NHS Foundation Trust	5,039	3.77	3.95 (3.31 to 4.67)	2.59	2.43 (1.59 to 3.71)	6.35	6.37 (5.53 to 8.06)	
North Bristol NHS Trust	6,171	3.08	3.91 (3.21 to 4.61)	1.46	1.92 (1.31 to 2.86)	4.54	5.82 (4.97 to 7.30)	
North Tees and Hartlepool NHS Foundation Trust	2,833	2.47	3.86 (3.17 to 4.69)	1.42	2.03 (1.32 to 3.10)	3.88	5.88 (5.01 to 7.54)	
Plymouth Hospitals NHS Trust	4,163	2.88	3.90 (3.22 to 4.59)	3.37	2.52 (1.61 to 3.78)	6.25	6.49 (5.39 to 8.29)	
Portsmouth Hospitals NHS Trust	5,779	2.25	3.81 (2.99 to 4.66)	1.73	1.85 (1.28 to 2.76)	3.98	5.61 (4.76 to 7.19)	
South Tees Hospitals NHS Foundation Trust	5,272	4.17	4.00 (3.35 to 4.84)	2.48	2.38 (1.64 to 3.43)	6.64	6.37 (5.53 to 7.94)	
The Pennine Acute Hospitals NHS Trust	9,011	3.55	3.80 (3.06 to 4.58)	1.56	1.80 (1.22 to 2.62)	5.10	5.60 (4.83 to 6.94)	

Organisation	Total births§	Rate per 1,000 births§						
		Stillbirth†		Neonatal‡		Extended perinatal†		
		Crude	Stabilised & adjusted (95% CI)	Crude	Stabilised & adjusted (95% CI)	Crude	Stabilised & adjusted (95% CI)#	
The Royal Wolverhampton NHS Trust	5,412	6.47	4.21 (3.41 to 5.55)	2.42	2.10 (1.49 to 3.16)	8.87	6.29 (5.36 to 8.25)	
University Hospitals Coventry and Warwickshire NHS Trust	6,154	3.25	3.86 (3.14 to 4.58)	2.45	2.12 (1.47 to 3.18)	5.69	5.98 (5.15 to 7.49)	
University Hospitals of North Midlands NHS Trust	6,454	4.34	4.04 (3.32 to 4.97)	2.02	2.14 (1.47 to 3.17)	6.35	6.18 (5.38 to 7.69)	
Wirral University Teaching Hospital NHS Foundation Trust	3,312	1.21	3.78 (2.96 to 4.64)	3.02	2.38 (1.50 to 3.72)	4.23	6.20 (5.09 to 8.04)	
SCOTLAND								
NHS Ayrshire & Arran	3,240	4.94	4.06 (3.38 to 5.05)	2.17	2.30 (1.41 to 3.64)	7.10	6.34 (5.45 to 7.95)	
NHS Fife	3,210	2.49	3.87 (3.18 to 4.56)	3.12	2.66 (1.65 to 4.11)	5.61	6.48 (5.47 to 8.16)	
NHS Lanarkshire	4,490	3.34	3.94 (3.24 to 4.71)	0.89	1.68 (1.04 to 2.56)	4.23	5.57 (4.73 to 7.09)	
NHS Tayside	4,034	4.46	4.05 (3.38 to 5.03)	1.49	2.05 (1.34 to 3.25)	5.95	6.10 (5.32 to 7.85)	
WALES								
Abertawe Bro Morgannwg University Health Board	5,803	4.14	4.03 (3.34 to 4.81)	1.56	2.02 (1.35 to 3.05)	5.69	6.04 (5.25 to 7.42)	
Aneurin Bevan University Health Board	5,975	4.02	4.01 (3.32 to 4.74)	0.50	1.50 (0.90 to 2.36)	4.52	5.50 (4.76 to 6.97)	

§ excluding terminations of pregnancy and births <24^{+0} weeks gestational age
† per 1,000 total births
‡ per 1,000 live births
# colours represent variation from comparator group average extended perinatal mortality rate
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey

Table 18: Crude and stabilised & adjusted stillbirth, neonatal, and extended perinatal mortality rates by NHS Trust (England), Health Board (Scotland and Wales), Health and Social Care Trust (Northern Ireland), and Crown Dependency based on place of birth: United Kingdom and Crown Dependencies, for births in 2017
FOR TRUSTS AND HEALTH BOARDS WITH 4,000 OR MORE BIRTHS ≥24+0 WEEKS GESTATIONAL AGE PER ANNUM

Organisation	Total births§	Rate per 1,000 births§						
		Stillbirth†		Neonatal‡		Extended perinatal†		
		Crude	Stabilised & adjusted (95% CI)	Crude	Stabilised & adjusted (95% CI)	Crude	Stabilised & adjusted (95% CI)#	
Average for comparator group			3.56		1.24		4.79	
ENGLAND								
Barking, Havering and Redbridge University Hospitals NHS Trust	8,304	4.09	3.52 (3.02 to 4.25)	1.09	1.13 (0.76 to 1.72)	5.18	4.65 (4.14 to 5.70)	
Basildon and Thurrock University Hospitals NHS Foundation Trust	4,568	3.06	3.51 (2.93 to 4.18)	0.88	1.12 (0.72 to 1.79)	3.94	4.62 (4.08 to 5.75)	
Buckinghamshire Healthcare NHS Trust	5,143	4.08	3.64 (3.05 to 4.36)	0.59	1.11 (0.69 to 1.79)	4.67	4.74 (4.19 to 5.91)	
Calderdale and Huddersfield NHS Foundation Trust	5,336	3.00	3.47 (2.89 to 4.14)	2.26	1.50 (0.97 to 2.23)	5.25	4.99 (4.26 to 6.06)	
County Durham and Darlington NHS Foundation Trust	4,891	*	3.50 (2.90 to 4.11)	*	1.02 (0.60 to 1.68)	3.07	4.53 (3.92 to 5.52)	
Dartford and Gravesham NHS Trust	4,954	2.62	3.46 (2.81 to 4.14)	0.81	1.14 (0.71 to 1.79)	3.43	4.59 (3.91 to 5.68)	
Derby Teaching Hospitals NHS Foundation Trust	5,820	3.09	3.50 (2.88 to 4.18)	2.24	1.43 (1.00 to 2.26)	5.33	4.99 (4.35 to 6.25)	
Doncaster and Bassetlaw Hospitals NHS Foundation Trust	4,880	3.07	3.51 (2.91 to 4.13)	0.82	1.10 (0.71 to 1.72)	3.89	4.59 (3.94 to 5.60)	
East and North Hertfordshire NHS Trust	5,640	2.30	3.45 (2.84 to 4.20)	1.07	1.24 (0.80 to 1.95)	3.37	4.69 (4.04 to 5.80)	
Epsom and St Helier University Hospitals NHS Trust	4,799	2.50	3.48 (2.87 to 4.12)	1.04	1.22 (0.80 to 1.93)	3.54	4.69 (4.05 to 5.71)	
Frimley Health NHS Foundation Trust	9,652	3.73	3.60 (3.07 to 4.35)	2.08	1.63 (1.05 to 2.49)	5.80	5.27 (4.55 to 6.57)	
Gloucestershire Hospitals NHS Foundation Trust	6,276	*	3.56 (3.06 to 4.29)	*	0.96 (0.59 to 1.54)	3.51	4.49 (3.95 to 5.49)	
Great Western Hospitals NHS Foundation Trust	4,423	2.94	3.53 (2.97 to 4.14)	0.68	1.11 (0.69 to 1.77)	3.62	4.62 (3.98 to 5.77)	
Hampshire Hospitals NHS Foundation Trust	5,250	4.19	3.69 (3.09 to 4.55)	0.96	1.24 (0.77 to 1.98)	5.14	4.93 (4.24 to 6.19)	
Kingston Hospital NHS Foundation Trust	5,493	3.82	3.61 (3.08 to 4.38)	1.10	1.28 (0.82 to 2.02)	4.92	4.88 (4.21 to 6.08)	
Lewisham and Greenwich NHS Trust	8,587	4.31	3.52 (2.99 to 4.16)	1.40	1.28 (0.87 to 1.91)	5.71	4.80 (4.26 to 5.80)	

Organisation	Total births§	Rate per 1,000 births§						
		Stillbirth†		Neonatal‡		Extended perinatal†		
		Crude	Stabilised & adjusted (95% CI)	Crude	Stabilised & adjusted (95% CI)	Crude	Stabilised & adjusted (95% CI)#	
London North West University Healthcare NHS Trust	5,049	5.74	3.69 (3.09 to 4.58)	1.59	1.32 (0.87 to 2.10)	7.33	5.01 (4.32 to 6.32)	
Maidstone and Tunbridge Wells NHS Trust	5,883	3.06	3.56 (3.01 to 4.28)	1.53	1.44 (0.92 to 2.22)	4.59	4.99 (4.34 to 6.17)	
Mid Essex Hospital Services NHS Trust	4,735	1.69	3.43 (2.72 to 4.06)	0.85	1.15 (0.75 to 1.79)	2.53	4.57 (3.84 to 5.64)	
North Middlesex University Hospital NHS Trust	4,725	6.35	3.72 (3.14 to 4.57)	1.28	1.18 (0.78 to 1.80)	7.62	4.89 (4.29 to 6.16)	
North West Anglia NHS Foundation Trust	7,301	3.01	3.51 (2.87 to 4.13)	1.51	1.37 (0.91 to 2.14)	4.52	4.88 (4.18 to 5.93)	
Northampton General Hospital NHS Trust	4,819	*	3.48 (2.88 to 4.13)	*	1.03 (0.62 to 1.65)	3.11	4.51 (3.87 to 5.55)	
Northern Lincolnshire and Goole Hospitals NHS Foundation Trust	4,261	3.29	3.54 (2.94 to 4.25)	1.65	1.30 (0.83 to 2.11)	4.93	4.84 (4.17 to 6.03)	
Poole Hospital NHS Foundation Trust	4,584	2.18	3.46 (2.86 to 4.10)	1.75	1.43 (0.89 to 2.34)	3.93	4.90 (4.16 to 6.16)	
Royal Berkshire NHS Foundation Trust	5,327	4.51	3.67 (3.13 to 4.48)	0.75	1.13 (0.70 to 1.81)	5.26	4.80 (4.22 to 5.99)	
Royal Cornwall Hospitals NHS Trust	4,118	3.40	3.57 (2.96 to 4.28)	0.97	1.22 (0.77 to 2.02)	4.37	4.79 (4.14 to 5.93)	
Royal Devon and Exeter NHS Foundation Trust	4,200	4.29	3.66 (3.07 to 4.47)	0.96	1.19 (0.74 to 1.88)	5.24	4.84 (4.22 to 6.13)	
Royal Free London NHS Foundation Trust	8,773	3.19	3.47 (2.93 to 4.09)	0.34	0.92 (0.58 to 1.48)	3.53	4.40 (3.86 to 5.35)	
Royal United Hospitals Bath NHS Foundation Trust	4,586	2.18	3.49 (2.86 to 4.08)	1.31	1.30 (0.83 to 1.99)	3.49	4.79 (4.14 to 5.85)	
Sandwell and West Birmingham Hospitals NHS Trust	5,882	5.61	3.60 (3.09 to 4.26)	3.93	2.09 (1.36 to 3.42)	9.52	5.64 (4.86 to 7.24)	
St Helens and Knowsley Teaching Hospitals NHS Trust	4,096	3.66	3.58 (3.07 to 4.31)	1.96	1.49 (0.90 to 2.43)	5.62	5.06 (4.34 to 6.35)	
Surrey and Sussex Healthcare NHS Trust	4,472	3.80	3.61 (3.08 to 4.34)	1.12	1.20 (0.79 to 1.97)	4.92	4.80 (4.25 to 6.03)	
The Dudley Group NHS Foundation Trust	4,470	3.13	3.49 (2.90 to 4.09)	1.12	1.18 (0.74 to 1.87)	4.25	4.67 (4.09 to 5.75)	
The Hillingdon Hospitals NHS Foundation Trust	4,823	5.60	3.66 (3.08 to 4.55)	1.04	1.13 (0.71 to 1.74)	6.63	4.78 (4.20 to 5.97)	
The Mid Yorkshire Hospitals NHS Trust	6,292	3.97	3.58 (3.06 to 4.21)	1.44	1.31 (0.86 to 2.08)	5.40	4.88 (4.29 to 6.00)	
The Princess Alexandra Hospital NHS Trust	4,080	1.96	3.45 (2.85 to 4.15)	0.98	1.24 (0.77 to 1.98)	2.94	4.68 (4.03 to 5.84)	
The Shrewsbury and Telford Hospital NHS Trust	4,738	5.70	3.79 (3.11 to 4.97)	0.85	1.18 (0.75 to 1.92)	6.54	4.95 (4.24 to 6.44)	
United Lincolnshire Hospitals NHS Trust	5,165	4.45	3.68 (3.05 to 4.45)	1.36	1.33 (0.82 to 2.12)	5.81	5.00 (4.23 to 6.25)	

Organisation	Total births§	Rate per 1,000 births§						
		Stillbirth†		Neonatal‡		Extended perinatal†		
		Crude	Stabilised & adjusted (95% CI)	Crude	Stabilised & adjusted (95% CI)	Crude	Stabilised & adjusted (95% CI)#	
West Hertfordshire Hospitals NHS Trust	4,918	2.85	3.50 (2.90 to 4.10)	1.84	1.48 (0.94 to 2.41)	4.68	4.98 (4.28 to 6.19)	
Western Sussex Hospitals NHS Foundation Trust	5,051	3.76	3.63 (3.06 to 4.36)	1.19	1.33 (0.84 to 2.14)	4.95	4.95 (4.31 to 6.19)	
Worcestershire Acute Hospitals NHS Trust	5,448	*	3.52 (2.99 to 4.18)	*	0.96 (0.55 to 1.50)	3.12	4.48 (3.94 to 5.45)	
York Teaching Hospital NHS Foundation Trust	4,674	3.85	3.63 (3.08 to 4.41)	0.64	1.15 (0.69 to 1.84)	4.49	4.78 (4.17 to 5.96)	
WALES								
Betsi Cadwaladr University Health Board	6,591	1.97	3.38 (2.67 to 4.14)	1.67	1.33 (0.88 to 2.09)	3.64	4.74 (3.98 to 5.95)	
NORTHERN IRELAND◦								
South Eastern Health and Social Care Trust	4,242	3.77	3.61 (3.06 to 4.35)	1.42	1.39 (0.89 to 2.31)	5.19	4.99 (4.34 to 6.33)	
Southern Health and Social Care Trust	5,859	3.93	3.64 (3.06 to 4.42)	1.54	1.41 (0.87 to 2.23)	5.46	5.05 (4.41 to 6.29)	

§ excluding terminations of pregnancy and births <24^{+0} weeks gestational age
† per 1,000 total births
‡ per 1,000 live births
# colours represent variation from comparator group average extended perinatal mortality rate
* entry suppressed because of small number of deaths
◦ different laws exist in Northern Ireland for the termination of pregnancy
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey

Table 19: Crude and stabilised & adjusted stillbirth, neonatal, and extended perinatal mortality rates by NHS Trust (England), Health Board (Scotland and Wales), Health and Social Care Trust (Northern Ireland), and Crown Dependency based on place of birth: United Kingdom and Crown Dependencies, for births in 2017
FOR TRUSTS AND HEALTH BOARDS WITH 2,000 TO 3,999 BIRTHS ≥24^{+0} WEEKS GESTATIONAL AGE PER ANNUM

Organisation	Total births§	Rate per 1,000 births§						
		Stillbirth†		Neonatal‡		Extended perinatal†		
		Crude	Stabilised & adjusted (95% CI)	Crude	Stabilised & adjusted (95% CI)	Crude	Stabilised & adjusted (95% CI)#	
Average for comparator group			3.23		1.03		4.25	
ENGLAND								
Airedale NHS Foundation Trust	2,118	*	3.17 (2.54 to 3.73)	*	1.00 (0.61 to 1.60)	2.83	4.16 (3.46 to 5.21)	
Barnsley Hospital NHS Foundation Trust	3,029	*	3.21 (2.62 to 3.83)	*	0.96 (0.56 to 1.57)	3.63	4.16 (3.53 to 5.16)	
Bedford Hospital NHS Trust	2,879	4.17	3.28 (2.67 to 4.00)	2.44	1.33 (0.80 to 2.19)	6.60	4.61 (3.90 to 5.77)	
Blackpool Teaching Hospitals NHS Foundation Trust	2,935	*	3.25 (2.73 to 3.94)	*	0.96 (0.59 to 1.59)	4.43	4.20 (3.61 to 5.14)	
Burton Hospitals NHS Foundation Trust	3,428	1.46	3.12 (2.44 to 3.72)	2.63	1.43 (0.86 to 2.57)	4.08	4.52 (3.73 to 5.79)	
Chesterfield Royal Hospital NHS Foundation Trust	2,838	*	3.13 (2.46 to 3.77)	*	0.94 (0.55 to 1.55)	1.76	4.08 (3.46 to 5.00)	
Colchester Hospital University NHS Foundation Trust	3,788	2.90	3.20 (2.63 to 3.86)	1.59	1.18 (0.73 to 1.93)	4.49	4.38 (3.72 to 5.38)	
Countess of Chester Hospital NHS Foundation Trust	2,936	3.41	3.25 (2.68 to 3.96)	1.03	1.08 (0.65 to 1.80)	4.43	4.33 (3.70 to 5.37)	
Croydon Health Services NHS Trust	3,780	3.97	3.20 (2.61 to 3.82)	1.33	1.05 (0.67 to 1.69)	5.29	4.25 (3.65 to 5.29)	
East Sussex Healthcare NHS Trust	3,281	3.35	3.23 (2.63 to 3.88)	1.83	1.21 (0.70 to 2.10)	5.18	4.44 (3.72 to 5.57)	
George Eliot Hospital NHS Trust	2,147	*	3.14 (2.44 to 3.74)	*	1.10 (0.66 to 1.88)	2.33	4.22 (3.45 to 5.14)	
James Paget University Hospitals NHS Foundation Trust	2,134	*	3.24 (2.68 to 3.85)	*	0.97 (0.55 to 1.53)	4.22	4.21 (3.55 to 5.21)	
Kettering General Hospital NHS Foundation Trust	3,449	3.77	3.26 (2.66 to 3.95)	2.62	1.27 (0.81 to 2.05)	6.38	4.60 (3.84 to 5.83)	
Mid Cheshire Hospitals NHS Foundation Trust	3,055	*	3.25 (2.71 to 3.88)	*	0.99 (0.59 to 1.59)	3.93	4.24 (3.65 to 5.17)	
Milton Keynes University Hospital NHS Foundation Trust	3,695	*	3.26 (2.69 to 3.99)	*	0.92 (0.55 to 1.45)	4.60	4.17 (3.60 to 5.16)	
North Cumbria University Hospitals NHS Trust	2,924	*	3.33 (2.77 to 4.19)	*	1.00 (0.59 to 1.61)	5.47	4.33 (3.72 to 5.46)	
Northumbria Healthcare NHS Foundation Trust	3,248	3.39	3.24 (2.73 to 3.90)	1.24	1.11 (0.68 to 1.85)	4.62	4.35 (3.76 to 5.44)	

Organisation	Total births§	Rate per 1,000 births§						
		Stillbirth†		Neonatal‡		Extended perinatal†		
		Crude	Stabilised & adjusted (95% CI)	Crude	Stabilised & adjusted (95% CI)	Crude	Stabilised & adjusted (95% CI)#	
Royal Surrey County Hospital NHS Foundation Trust	2,869	*	3.19 (2.61 to 3.80)	*	1.01 (0.60 to 1.68)	2.79	4.20 (3.51 to 5.17)	
Salisbury NHS Foundation Trust	2,248	*	3.26 (2.67 to 3.93)	*	1.03 (0.63 to 1.71)	4.45	4.29 (3.63 to 5.28)	
Sherwood Forest Hospitals NHS Foundation Trust	3,483	5.46	3.37 (2.78 to 4.28)	1.15	1.03 (0.64 to 1.66)	6.60	4.39 (3.73 to 5.54)	
South Devon Healthcare NHS Foundation Trust	2,311	*	3.36 (2.77 to 4.32)	*	1.02 (0.62 to 1.64)	6.92	4.37 (3.73 to 5.67)	
South Warwickshire NHS Foundation Trust	2,954	*	3.24 (2.68 to 3.94)	*	1.03 (0.61 to 1.72)	3.72	4.27 (3.64 to 5.27)	
Southend University Hospital NHS Foundation Trust	3,814	*	3.18 (2.53 to 3.81)	*	0.95 (0.58 to 1.56)	3.15	4.13 (3.47 to 5.13)	
Southport & Ormskirk Hospital NHS Trust	2,453	*	3.18 (2.59 to 3.78)	*	0.96 (0.57 to 1.59)	2.45	4.14 (3.53 to 5.08)	
Stockport NHS Foundation Trust	3,275	1.22	3.11 (2.46 to 3.74)	1.53	1.16 (0.70 to 1.92)	2.75	4.26 (3.56 to 5.26)	
Tameside Hospital NHS Foundation Trust	2,469	*	3.25 (2.67 to 3.99)	*	0.99 (0.61 to 1.66)	4.86	4.24 (3.63 to 5.28)	
Taunton and Somerset NHS Foundation Trust	3,216	*	3.16 (2.51 to 3.76)	*	0.94 (0.54 to 1.52)	2.49	4.09 (3.42 to 5.09)	
The Ipswich Hospital NHS Trust	3,601	*	3.18 (2.55 to 3.83)	*	0.93 (0.57 to 1.48)	3.05	4.11 (3.46 to 5.00)	
The Queen Elizabeth Hospital King's Lynn NHS Foundation Trust	2,268	*	3.13 (2.42 to 3.76)	*	0.95 (0.57 to 1.60)	1.32	4.08 (3.40 to 5.05)	
The Rotherham NHS Foundation Trust	2,648	*	3.22 (2.66 to 3.82)	*	0.89 (0.54 to 1.42)	3.78	4.09 (3.50 to 5.02)	
University Hospitals of Morecambe Bay NHS Foundation Trust	2,994	*	3.28 (2.72 to 3.94)	*	0.92 (0.56 to 1.52)	4.01	4.17 (3.60 to 5.23)	
Walsall Healthcare NHS Trust	3,660	3.83	3.21 (2.63 to 3.89)	0.82	0.91 (0.56 to 1.46)	4.64	4.11 (3.51 to 5.08)	
Warrington and Halton Hospitals NHS Foundation Trust	2,793	*	3.28 (2.75 to 3.96)	*	0.98 (0.57 to 1.59)	4.65	4.24 (3.66 to 5.27)	
West Suffolk NHS Foundation Trust	2,514	*	3.20 (2.56 to 3.78)	*	0.90 (0.52 to 1.49)	2.39	4.10 (3.50 to 5.01)	
Whittington Health	3,793	2.90	3.15 (2.55 to 3.77)	0.79	0.97 (0.60 to 1.53)	3.69	4.11 (3.48 to 5.06)	
Wrightington, Wigan and Leigh NHS Foundation Trust	2,806	1.43	3.14 (2.45 to 3.71)	2.14	1.19 (0.73 to 1.95)	3.56	4.35 (3.64 to 5.46)	
SCOTLAND								
NHS Forth Valley	3,092	3.56	3.25 (2.71 to 3.92)	0.97	1.00 (0.61 to 1.65)	4.53	4.25 (3.53 to 5.38)	
NHS Highland	2,159	*	3.20 (2.61 to 3.83)	*	0.99 (0.58 to 1.69)	2.78	4.19 (3.57 to 5.18)	
WALES								

Organisation	Total births§	Rate per 1,000 births§						
		Stillbirth†		Neonatal‡		Extended perinatal†		
		Crude	Stabilised & adjusted (95% CI)	Crude	Stabilised & adjusted (95% CI)	Crude	Stabilised & adjusted (95% CI)#	
Cwm Taf University Health Board	3,803	4.73	3.32 (2.75 to 4.13)	1.59	1.16 (0.69 to 1.90)	6.31	4.48 (3.81 to 5.64)	●
Hywel Dda University Health Board	3,275	4.27	3.30 (2.75 to 4.05)	0.92	1.03 (0.65 to 1.65)	5.19	4.32 (3.72 to 5.39)	●
NORTHERN IRELAND◦								
Northern Health and Social Care Trust	3,914	*	3.31 (2.76 to 4.16)	*	0.93 (0.58 to 1.51)	4.60	4.22 (3.60 to 5.40)	●
Western Health and Social Care Trust	3,952	4.05	3.28 (2.71 to 3.96)	1.78	1.21 (0.75 to 1.89)	5.82	4.49 (3.80 to 5.59)	●

§ excluding terminations of pregnancy and births <24^{+0} weeks gestational age
† per 1,000 total births
‡ per 1,000 live births
# colours represent variation from comparator group average extended perinatal mortality rate
* entry suppressed because of small number of deaths
◦ different laws exist in Northern Ireland for the termination of pregnancy
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey

Table 20: Crude and stabilised & adjusted stillbirth, neonatal, and extended perinatal mortality rates by NHS Trust (England), Health Board (Scotland and Wales), Health and Social Care Trust (Northern Ireland), and Crown Dependency based on place of birth: United Kingdom and Crown Dependencies, for births in 2017
FOR TRUSTS AND HEALTH BOARDS WITH FEWER THAN 2,000 BIRTHS ≥24+0 WEEKS GESTATIONAL AGE PER ANNUM

Organisation	Total births§	Rate per 1,000 births§						
		Stillbirth†		Neonatal‡		Extended perinatal†		
		Crude	Stabilised & adjusted (95% CI)	Crude	Stabilised & adjusted (95% CI)	Crude	Stabilised & adjusted (95% CI)#	
Average for comparator group			3.16		1.03		4.18	
ENGLAND								
Dorset County Hospital NHS Foundation Trust	1,858	*	3.13 (2.33 to 3.86)	*	1.00 (0.54 to 1.80)	3.23	4.12 (3.08 to 5.38)	
East Cheshire NHS Trust	1,635	*	3.17 (2.42 to 4.04)	*	1.06 (0.56 to 2.07)	4.28	4.22 (3.31 to 5.60)	
Gateshead Health NHS Foundation Trust	1,855	3.77	3.17 (2.52 to 4.14)	1.62	1.12 (0.63 to 2.11)	5.39	4.29 (3.47 to 5.73)	
Harrogate and District NHS Foundation Trust	1,882	*	3.16 (2.45 to 3.95)	*	0.99 (0.52 to 1.80)	3.19	4.15 (3.28 to 5.41)	
Isle of Wight NHS Trust	1,213	*	3.16 (2.41 to 4.04)	*	1.07 (0.58 to 2.00)	4.95	4.22 (3.32 to 5.59)	
Northern Devon Healthcare NHS Trust	1,433	*	3.15 (2.45 to 3.93)	*	1.07 (0.57 to 1.99)	4.19	4.22 (3.23 to 5.38)	
RAF Lakenheath (48th Medical Group)	330	*	3.14 (2.42 to 3.89)	*	1.01 (0.55 to 1.81)	*	4.15 (3.22 to 5.37)	
South Tyneside NHS Foundation Trust	1,057	*	3.15 (2.41 to 4.05)	*	0.96 (0.47 to 1.73)	2.84	4.10 (3.12 to 5.46)	
The Portland Hospital for Women and Children	1,542	*	3.10 (2.29 to 3.92)	*	0.94 (0.47 to 1.60)	*	4.05 (3.07 to 5.11)	
The Royal Bournemouth and Christchurch Hospitals NHS Foundation Trust	249	*	3.15 (2.40 to 4.02)	*	1.02 (0.54 to 1.82)	*	4.16 (3.27 to 5.38)	
Weston Area Health NHS Trust	112	*	3.17 (2.54 to 4.12)	*	1.10 (0.61 to 2.08)	*	4.25 (3.50 to 5.58)	
Wye Valley NHS Trust	1,736	*	3.22 (2.65 to 4.26)	*	1.02 (0.53 to 1.87)	5.76	4.23 (3.50 to 5.78)	
Yeovil District Hospital NHS Foundation Trust	1,491	*	3.19 (2.54 to 4.07)	*	1.06 (0.56 to 1.98)	5.37	4.25 (3.43 to 5.80)	
SCOTLAND								
NHS Borders	1,003	*	3.20 (2.52 to 4.32)	*	1.03 (0.57 to 1.88)	5.98	4.23 (3.40 to 5.83)	
NHS Dumfries & Galloway	1,244	4.02	3.18 (2.51 to 4.08)	2.42	1.12 (0.65 to 2.11)	6.43	4.32 (3.49 to 5.89)	
NHS Orkney	122	*	3.16 (2.43 to 3.95)	*	1.02 (0.52 to 1.86)	*	4.17 (3.28 to 5.49)	
NHS Shetland	121	*	3.16 (2.43 to 4.10)	*	1.02 (0.52 to 1.84)	*	4.17 (3.26 to 5.50)	
NHS Western Isles	161	*	3.19 (2.50 to 4.14)	*	1.02 (0.54 to 1.90)	*	4.21 (3.37 to 5.58)	

Organisation	Total births§	Rate per 1,000 births§						
		Stillbirth†		Neonatal‡		Extended perinatal†		
		Crude	Stabilised & adjusted (95% CI)	Crude	Stabilised & adjusted (95% CI)	Crude	Stabilised & adjusted (95% CI)#	
WALES								
Powys Teaching Health Board	221	*	3.15 (2.36 to 4.00)	*	1.02 (0.52 to 1.89)	*	4.17 (3.19 to 5.48)	●
ISLE OF MAN								
Department of Health	734	*	3.14 (2.36 to 3.89)	*	0.97 (0.50 to 1.74)	*	4.10 (3.18 to 5.28)	●
STATES OF GUERNSEY								
Health & Social Services	556	*	3.18 (2.55 to 4.06)	*	1.00 (0.53 to 1.85)	7.19	4.20 (3.38 to 5.50)	●
STATES OF JERSEY								
Health & Social Services	951	*	3.15 (2.40 to 4.01)	*	1.03 (0.55 to 1.88)	3.15	4.18 (3.26 to 5.46)	●

§ excluding terminations of pregnancy and births <24^{+0} weeks gestational age
† per 1,000 total births
‡ per 1,000 live births
# colours represent variation from comparator group average extended perinatal mortality rate
* entry suppressed because of small number of deaths
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey

6.2 Mortality rates for individual Trusts and Health Boards excluding congenital anomalies

In this section of the report Figures 35, 36, 37, 38, 39 and 40 and Tables 23, 24, 25, 26 and 27 present mortality rates for Trust and Health Boards benchmarked against the average of their comparator group **excluding** congenital anomalies. Summary tables showing the impact of the exclusion of congenital anomalies on the colour coding for Trusts and Health Boards on stillbirth and neonatal mortality rates are presented below (Table 21 and Table 22). As anticipated the exclusion of congenital anomalies has little effect on stillbirth rates and the colour coding for Trusts and Health Boards, with only two changes overall: one from amber (up to 5% higher or up to 5% lower than the comparator average) to red (more than 5% higher than the comparator average) and one from red to amber. However, given that the cause of death for over a third of neonatal deaths is due to a congenital anomaly (see chapter 8) and that there is a wide variation in the proportion of babies with major congenital anomalies within Trusts and Health Boards, the colour coding of over a third (n=59, 36.2%) of Trusts and Health Boards changes following their exclusion (Table 22). The most significant negative changes are for two Trust and Health Boards where the colour coding for neonatal mortality is changed by two categories: i.e. one from green (more than 15% lower than the comparator average) to amber, and one from yellow (more than 5% and up to 15% lower than the comparator average) to red. Conversely, there are six Trusts and Health Boards where there is a positive change by two or three categories: five representing a change of two categories (three of which are from Northern Ireland) and one where exclusion of congenital anomalies changes the colour coding for neonatal mortality from red to green (also from Northern Ireland).

Table 21: Colour coding for Trusts and Health Boards, stillbirths including and excluding congenital anomalies

Including deaths due to congenital anomalies	Excluding deaths due to congenital anomalies				
					Total
	0	0	0	0	**0**
	0	2	0	0	**2**
	0	0	155	1	**156**
	0	0	1	4	**5**
Total	**0**	**2**	**156**	**5**	**163**

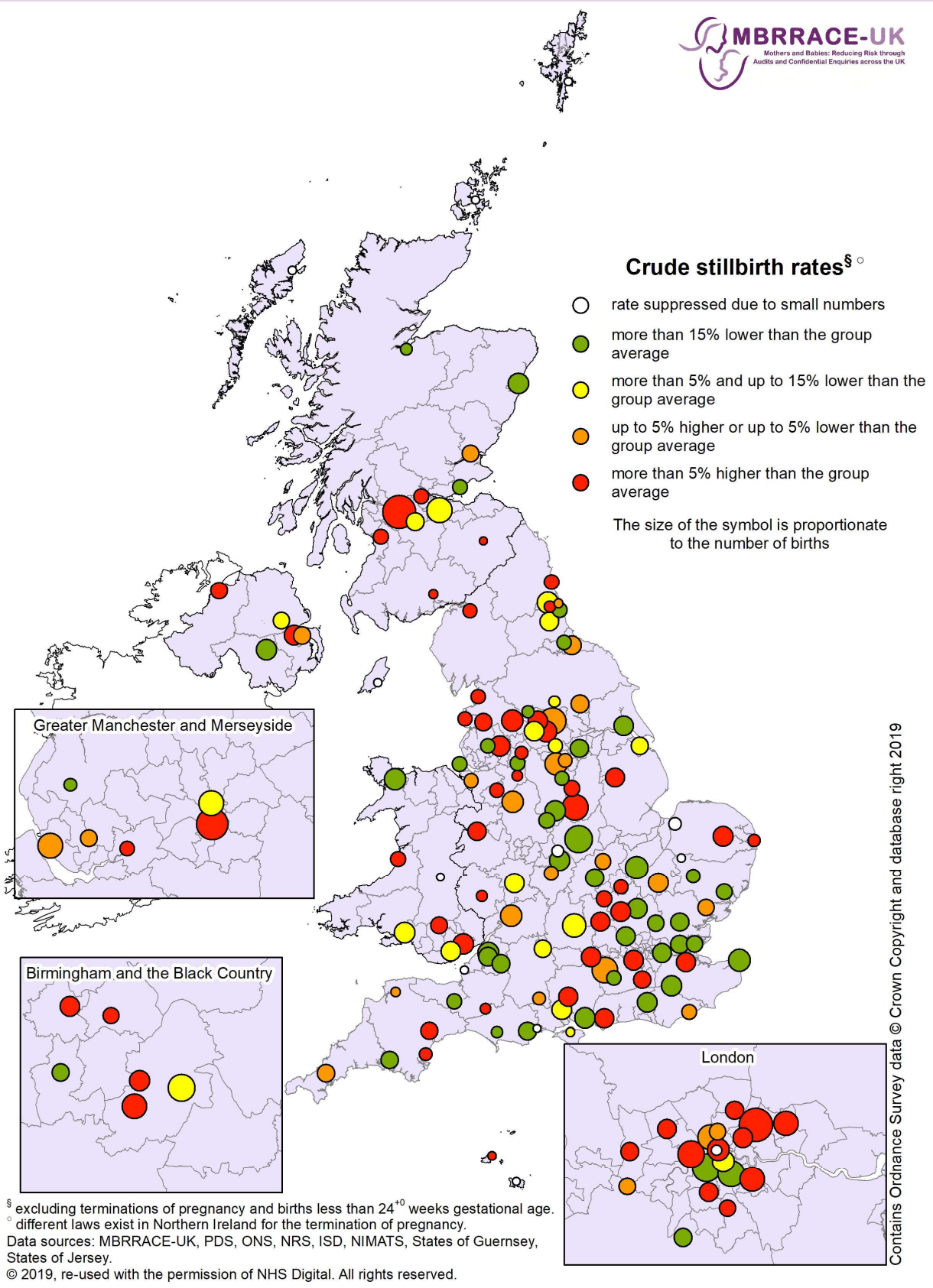
Table 22: Colour coding for Trusts and Health Boards, neonatal deaths including and excluding congenital anomalies

Including deaths due to congenital anomalies	Excluding deaths due to congenital anomalies				
					Total
	7	5	1	0	**13**
	5	22	15	1	**43**
	1	12	33	8	**54**
	1	4	6	42	**53**
Total	**14**	**43**	**55**	**51**	**163**

Key:

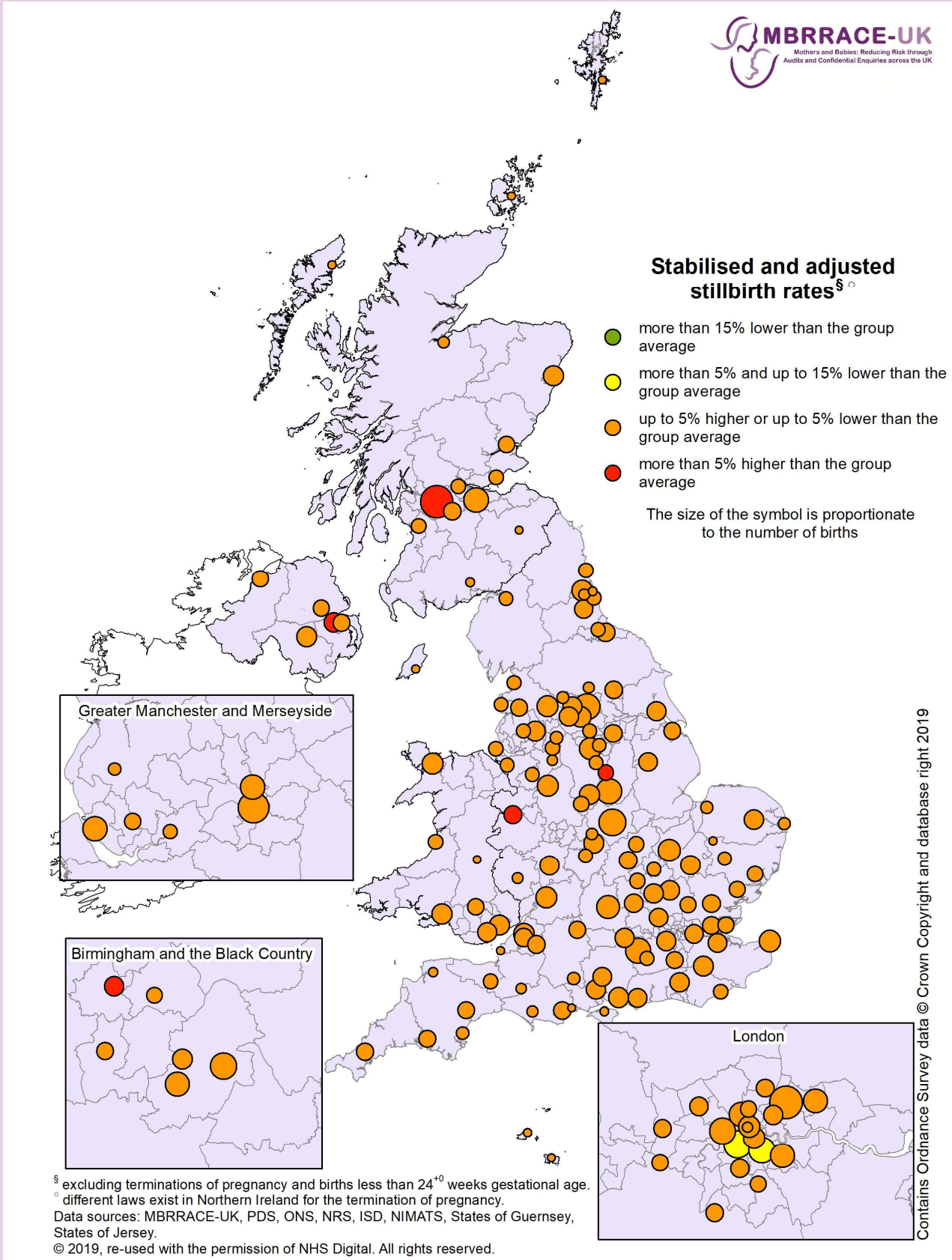
- more than 15% lower than the group average
- more than 5% and up to 15% lower than the group average
- up to 5% higher or up to 5% lower than the group average
- more than 5% higher than the group average

Figure 35: Crude stillbirth mortality rates excluding congenital anomalies by NHS Trust (England), Health Board (Scotland and Wales), Health and Social Care Trust (Northern Ireland), and Crown Dependency based on place of birth: United Kingdom and Crown Dependencies, for births in 2017



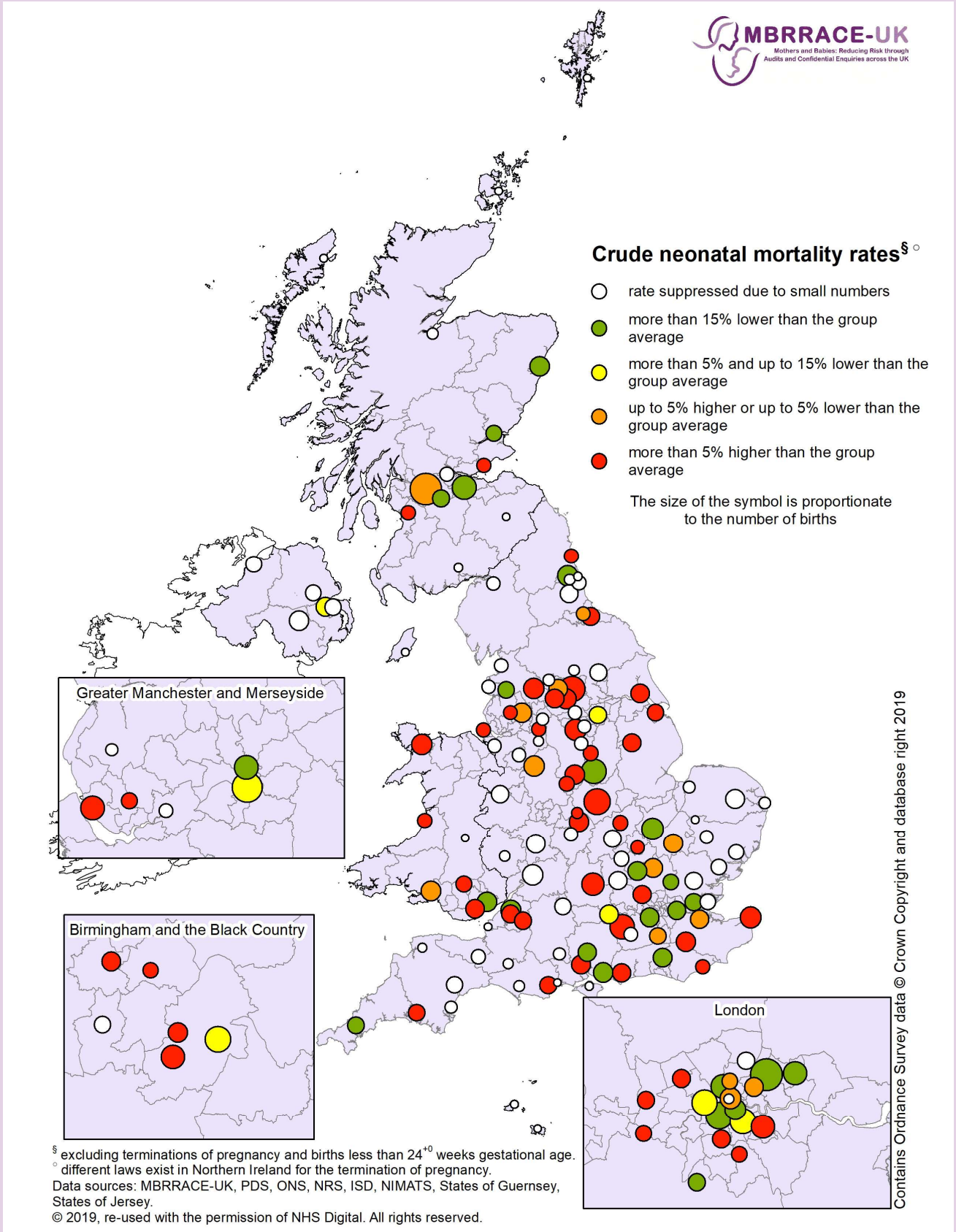
§ excluding terminations of pregnancy and births less than 24^{+0} weeks gestational age.
○ different laws exist in Northern Ireland for the termination of pregnancy.
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey.

Figure 36: Stabilised & adjusted stillbirth mortality rates excluding congenital anomalies by NHS Trust (England), Health Board (Scotland and Wales), Health and Social Care Trust (Northern Ireland), and Crown Dependency based on place of birth: United Kingdom and Crown Dependencies, for births in 2017



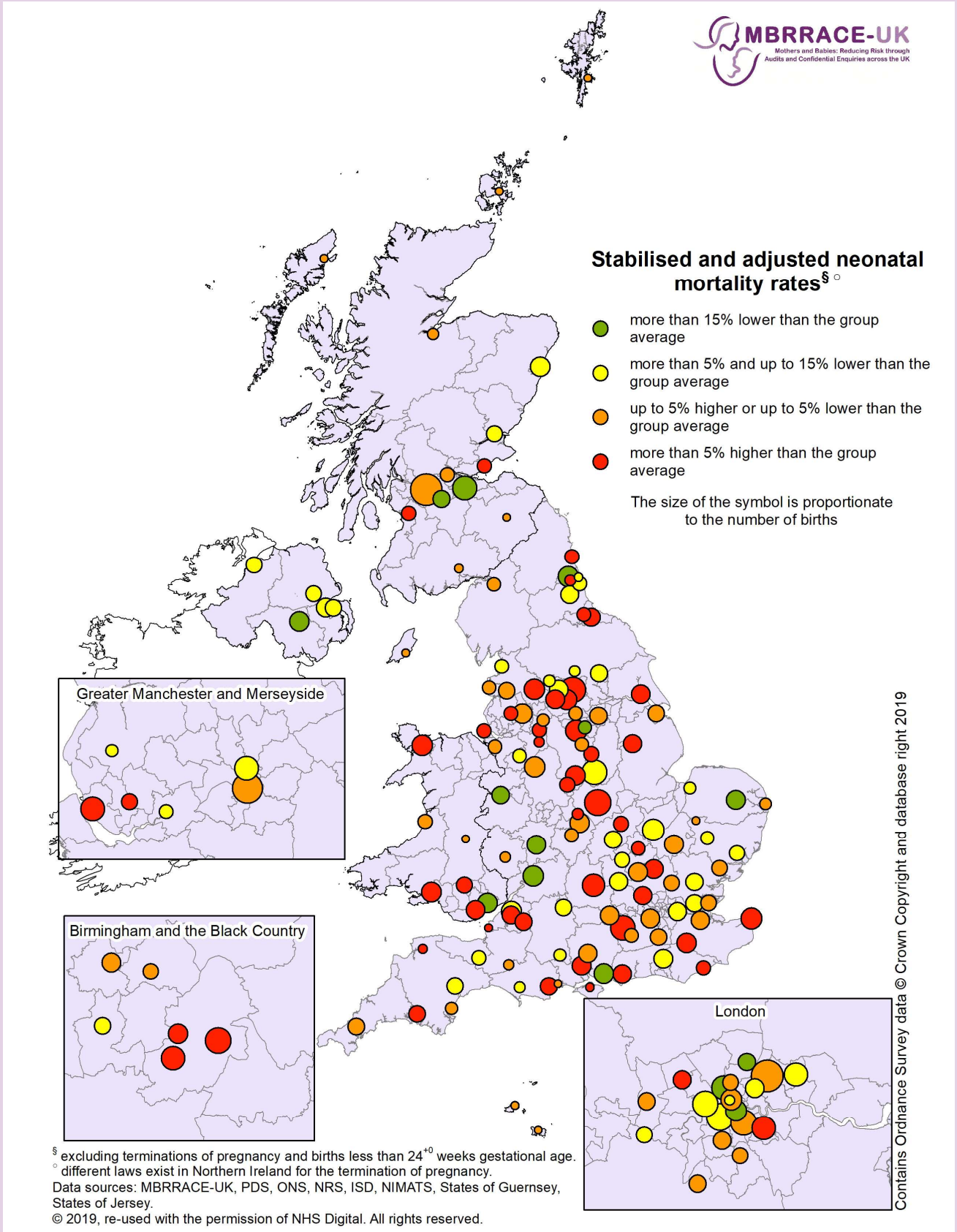
§ excluding terminations of pregnancy and births less than 24^{+0} weeks gestational age.
○ different laws exist in Northern Ireland for the termination of pregnancy.
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey.

Figure 37: Crude neonatal mortality rates excluding congenital anomalies by NHS Trust (England), Health Board (Scotland and Wales), Health and Social Care Trust (Northern Ireland), and Crown Dependency based on place of birth: United Kingdom and Crown Dependencies, for births in 2017



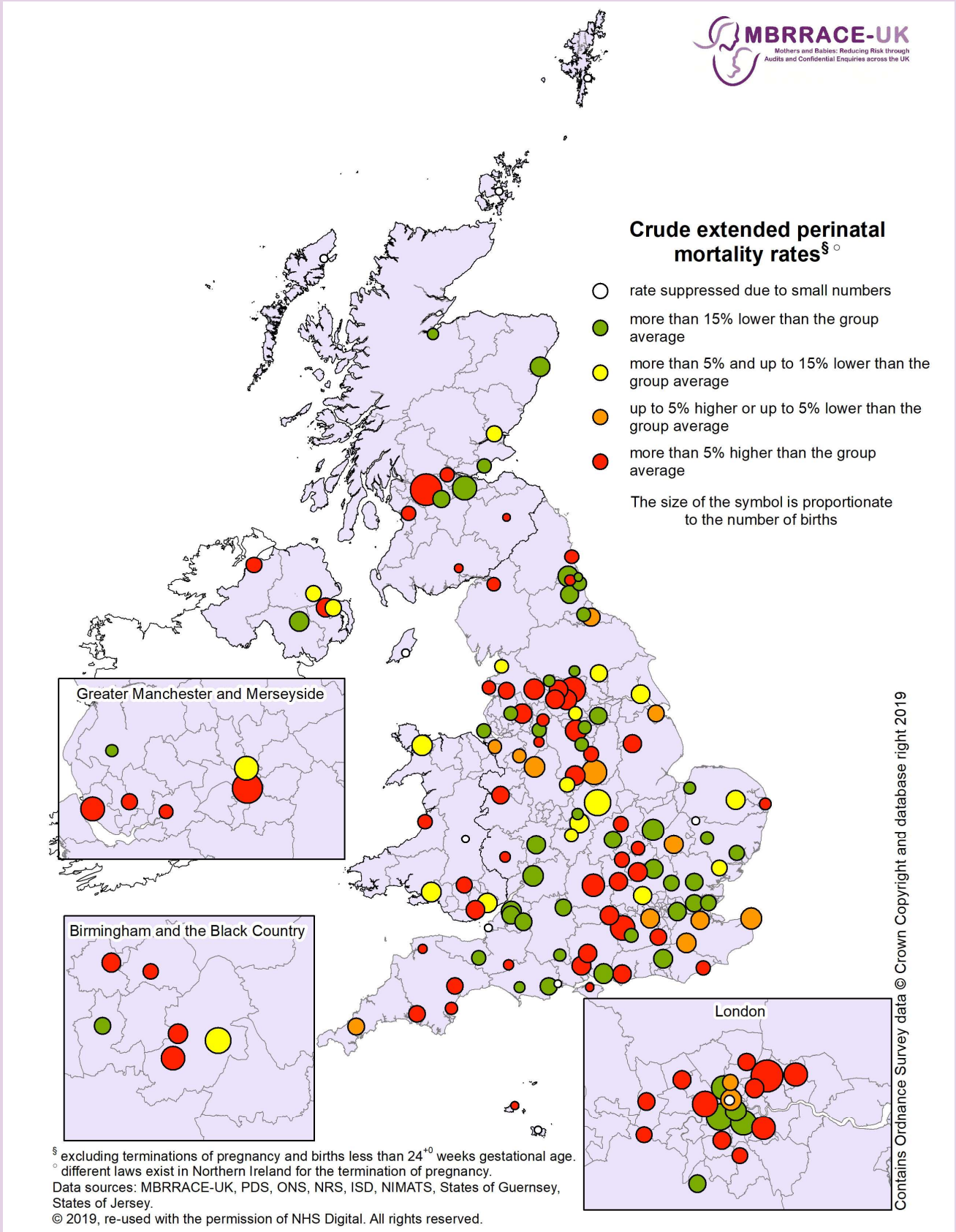
§ excluding terminations of pregnancy and births less than 24^{+0} weeks gestational age.
○ different laws exist in Northern Ireland for the termination of pregnancy.
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey.

Figure 38: Stabilised & adjusted neonatal mortality rates excluding congenital anomalies by NHS Trust (England), Health Board (Scotland and Wales), Health and Social Care Trust (Northern Ireland), and Crown Dependency based on place of birth: United Kingdom and Crown Dependencies, for births in 2017



§ excluding terminations of pregnancy and births less than 24^{+0} weeks gestational age.
○ different laws exist in Northern Ireland for the termination of pregnancy.
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey.

Figure 39: Crude extended perinatal mortality rates excluding congenital anomalies by NHS Trust (England), Health Board (Scotland and Wales), Health and Social Care Trust (Northern Ireland), and Crown Dependency based on place of birth: United Kingdom and Crown Dependencies, for births in 2017



§ excluding terminations of pregnancy and births less than 24^{+0} weeks gestational age.
○ different laws exist in Northern Ireland for the termination of pregnancy.
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey.

Figure 40: Stabilised & adjusted extended perinatal mortality rates excluding congenital anomalies by NHS Trust (England), Health Board (Scotland and Wales), Health and Social Care Trust (Northern Ireland), and Crown Dependency based on place of birth: United Kingdom and Crown Dependencies, for births in 2017

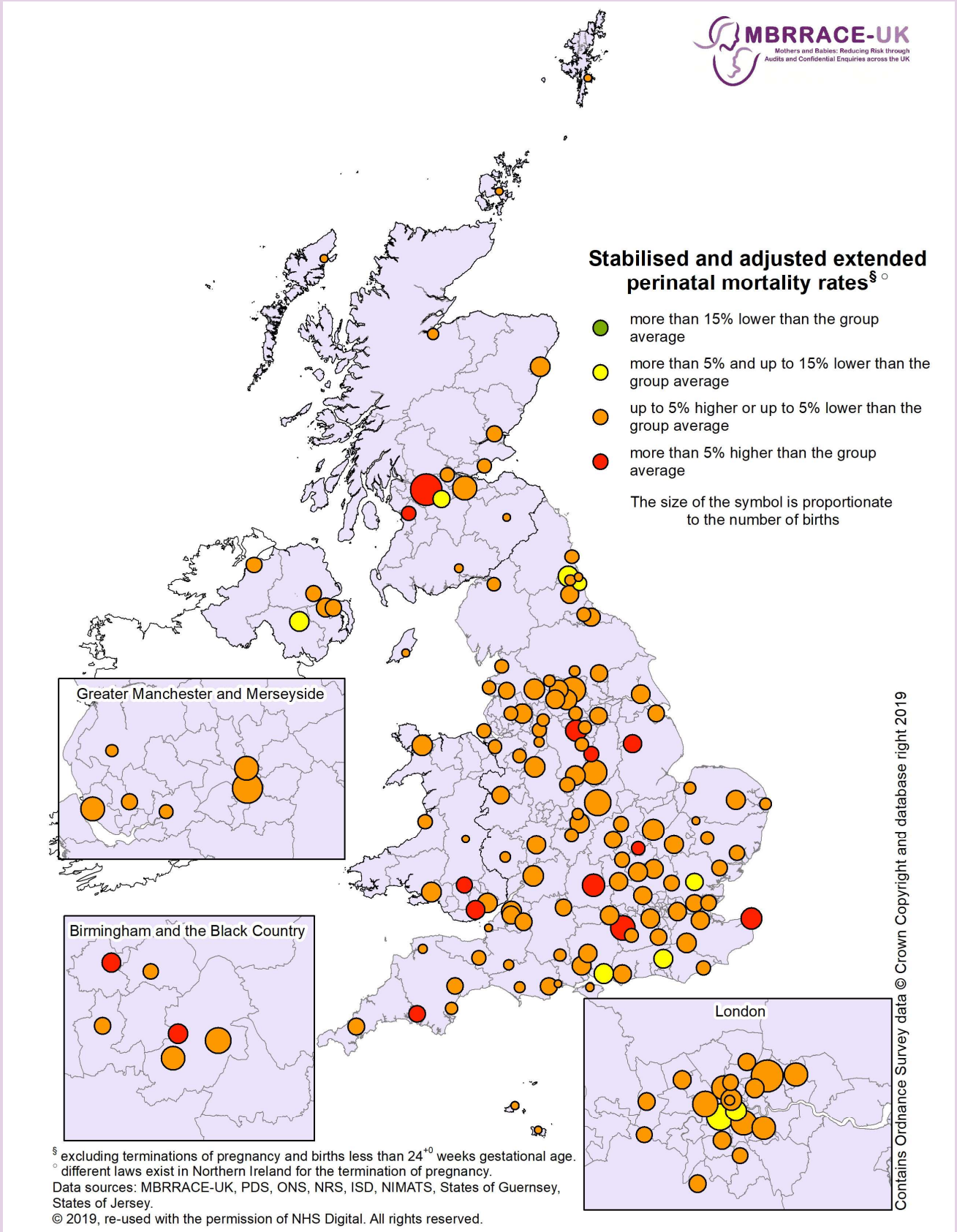


Table 23: Crude and stabilised & adjusted stillbirth, neonatal, and extended perinatal mortality rates excluding congenital anomalies by NHS Trust (England), Health Board (Scotland and Wales), Health and Social Care Trust (Northern Ireland), and Crown Dependency based on place of birth: United Kingdom and Crown Dependencies, for births in 2017
FOR TRUSTS AND HEALTH BOARDS WITH NEONATAL SURGICAL PROVISION AND A LEVEL 3 NICU

Organisation	Total births§	Rate per 1,000 births§						
		Stillbirth†		Neonatal‡		Extended perinatal†		
		Crude	Stabilised & adjusted (95% CI)	Crude	Stabilised & adjusted (95% CI)	Crude	Stabilised & adjusted (95% CI)#	
Average for comparator group			3.76		1.26		5.01	
ENGLAND								
Barts Health NHS Trust	16,038	4.74	3.77 (3.24 to 4.58)	1.00	1.22 (0.79 to 1.77)	5.74	4.99 (4.46 to 6.02)	
Birmingham Women's and Children's NHS Foundation Trust	8,240	4.85	3.84 (3.23 to 4.57)	1.59	1.32 (0.89 to 2.06)	6.43	5.16 (4.57 to 6.35)	
Brighton and Sussex University Hospitals NHS Trust	5,456	2.38	3.66 (2.89 to 4.47)	0.92	1.12 (0.71 to 1.79)	3.30	4.75 (3.98 to 6.03)	
Cambridge University Hospitals NHS Foundation Trust	5,342	3.93	3.88 (3.19 to 4.86)	1.32	1.21 (0.77 to 1.84)	5.24	5.05 (4.30 to 6.41)	
Chelsea and Westminster Hospital NHS Foundation Trust	11,475	2.53	3.49 (2.74 to 4.40)	0.70	1.14 (0.70 to 1.74)	3.22	4.63 (3.84 to 5.86)	
Guy's and St Thomas' NHS Foundation Trust	6,919	3.47	3.59 (2.95 to 4.45)	0.73	0.98 (0.60 to 1.55)	4.19	4.55 (3.92 to 5.69)	
Hull and East Yorkshire Hospitals NHS Trust	5,405	2.59	3.66 (2.98 to 4.40)	2.04	1.51 (0.94 to 2.40)	4.63	5.20 (4.42 to 6.58)	
King's College Hospital NHS Foundation Trust	9,753	2.97	3.56 (2.89 to 4.40)	1.13	1.31 (0.85 to 1.99)	4.10	4.85 (4.10 to 6.02)	
Liverpool Women's NHS Foundation Trust	8,666	3.92	3.82 (3.22 to 4.58)	1.97	1.39 (0.95 to 2.07)	5.89	5.23 (4.53 to 6.40)	
Manchester University NHS Foundation Trust	13,492	4.30	3.84 (3.29 to 4.61)	1.12	1.24 (0.81 to 1.93)	5.41	5.08 (4.45 to 6.17)	
Norfolk and Norwich University Hospitals NHS Foundation Trust	5,584	*	3.89 (3.23 to 4.74)	*	1.01 (0.61 to 1.69)	4.48	4.85 (4.20 to 6.16)	
Nottingham University Hospitals NHS Trust	9,632	4.36	3.87 (3.26 to 4.76)	0.83	1.08 (0.71 to 1.65)	5.19	4.93 (4.33 to 6.12)	
Oxford University Hospitals NHS Trust	7,623	3.54	3.83 (3.19 to 4.67)	2.63	1.62 (1.06 to 2.53)	6.17	5.62 (4.72 to 7.18)	
Sheffield Teaching Hospitals NHS Foundation Trust	6,962	3.73	3.75 (3.08 to 4.46)	2.16	1.57 (0.99 to 2.39)	5.89	5.36 (4.63 to 6.62)	
St George's University Hospitals NHS Foundation Trust	4,984	4.01	3.77 (3.18 to 4.55)	1.61	1.26 (0.79 to 1.96)	5.62	5.02 (4.39 to 6.31)	
The Leeds Teaching Hospitals NHS Trust	9,792	3.88	3.74 (3.19 to 4.39)	1.54	1.49 (0.99 to 2.37)	5.41	5.21 (4.64 to 6.34)	

Organisation	Total births[§]	Rate per 1,000 births[§]						
		Stillbirth[†]		Neonatal[‡]		Extended perinatal[†]		
		Crude	Stabilised & adjusted (95% CI)	Crude	Stabilised & adjusted (95% CI)	Crude	Stabilised & adjusted (95% CI)[#]	
The Newcastle upon Tyne Hospitals NHS Foundation Trust	6,542	3.21	3.70 (3.13 to 4.36)	0.61	0.99 (0.59 to 1.63)	3.82	4.65 (4.11 to 5.79)	●
University College London Hospitals NHS Foundation Trust	6,725	4.01	3.75 (3.14 to 4.47)	1.19	1.25 (0.79 to 1.87)	5.20	4.99 (4.43 to 6.05)	●
University Hospital Southampton NHS Foundation Trust	5,682	3.52	3.78 (3.16 to 4.56)	1.77	1.44 (0.89 to 2.33)	5.28	5.25 (4.46 to 6.53)	●
University Hospitals Bristol NHS Foundation Trust	5,168	2.13	3.59 (2.87 to 4.36)	1.36	1.34 (0.83 to 2.20)	3.48	4.93 (4.11 to 6.22)	●
University Hospitals of Leicester NHS Trust	10,325	3.10	3.61 (2.93 to 4.42)	1.36	1.35 (0.91 to 2.12)	4.46	4.96 (4.25 to 6.19)	●
SCOTLAND								
NHS Grampian	6,055	3.14	3.77 (3.14 to 4.46)	0.50	1.08 (0.68 to 1.79)	3.63	4.85 (4.19 to 5.97)	●
NHS Greater Glasgow and Clyde	14,995	4.47	4.06 (3.29 to 5.07)	1.27	1.31 (0.86 to 2.00)	5.74	5.36 (4.55 to 6.81)	●
NHS Lothian	9,159	3.38	3.77 (3.16 to 4.52)	0.55	1.07 (0.64 to 1.72)	3.93	4.84 (4.27 to 5.92)	●
WALES								
Cardiff and Vale University Health Board	5,674	3.35	3.71 (3.07 to 4.42)	2.12	1.79 (1.04 to 3.04)	5.46	5.42 (4.69 to 6.92)	●
NORTHERN IRELAND[◦]								
Belfast Health and Social Care Trust	5,449	5.87	4.05 (3.28 to 5.31)	1.11	1.17 (0.73 to 1.82)	6.97	5.17 (4.43 to 6.81)	●

[§] excluding terminations of pregnancy and births <24^{+0} weeks gestational age
[†] per 1,000 total births
[‡] per 1,000 live births
[#] colours represent variation from comparator group average extended perinatal mortality rate
[◦] different laws exist in Northern Ireland for the termination of pregnancy
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey

Table 24: Crude and stabilised & adjusted stillbirth, neonatal, and extended perinatal mortality rates excluding congenital anomalies by NHS Trust (England), Health Board (Scotland and Wales), Health and Social Care Trust (Northern Ireland), and Crown Dependency based on place of birth: United Kingdom and Crown Dependencies, for births in 2017
FOR TRUSTS AND HEALTH BOARDS WITH A LEVEL 3 NICU

Organisation	Total births§	Rate per 1,000 births§						
		Stillbirth†		Neonatal‡		Extended perinatal†		
		Crude	Stabilised & adjusted (95% CI)	Crude	Stabilised & adjusted (95% CI)	Crude	Stabilised & adjusted (95% CI)#	
Average for comparator group			3.55		1.42		4.96	
ENGLAND								
Ashford and St Peter's Hospital NHS Foundation Trust	3,982	3.52	3.59 (2.96 to 4.41)	1.76	1.25 (0.82 to 1.93)	5.27	4.71 (3.97 to 6.05)	
Bolton NHS Foundation Trust	5,852	4.27	3.63 (2.98 to 4.39)	1.37	1.43 (0.90 to 2.18)	5.64	5.05 (4.30 to 6.27)	
Bradford Teaching Hospitals NHS Foundation Trust	5,689	5.45	3.67 (3.10 to 4.46)	1.41	1.27 (0.81 to 2.00)	6.86	4.92 (4.36 to 6.27)	
City Hospitals Sunderland NHS Foundation Trust	3,149	*	3.46 (2.76 to 4.13)	*	1.24 (0.76 to 2.03)	2.86	4.70 (4.03 to 5.89)	
East Kent Hospitals University NHS Foundation Trust	6,990	2.43	3.43 (2.75 to 4.12)	2.44	2.03 (1.24 to 3.26)	4.86	5.47 (4.56 to 6.96)	
East Lancashire Hospitals NHS Trust	6,343	4.10	3.60 (2.98 to 4.38)	1.58	1.60 (1.04 to 2.55)	5.68	5.19 (4.55 to 6.51)	
Heart of England NHS Foundation Trust	9,762	3.28	3.42 (2.76 to 4.11)	1.23	1.53 (0.97 to 2.34)	4.51	4.91 (4.20 to 6.04)	
Homerton University Hospital NHS Foundation Trust	5,681	4.93	3.63 (3.05 to 4.49)	1.42	1.32 (0.85 to 2.00)	6.34	4.94 (4.32 to 6.28)	
Imperial College Healthcare NHS Trust	10,173	4.23	3.61 (2.99 to 4.32)	1.28	1.29 (0.86 to 2.00)	5.50	4.88 (4.28 to 6.01)	
Lancashire Teaching Hospitals NHS Foundation Trust	4,425	4.29	3.66 (3.04 to 4.56)	1.13	1.35 (0.88 to 2.13)	5.42	4.99 (4.32 to 6.36)	
Luton and Dunstable University Hospital NHS Foundation Trust	5,317	4.14	3.58 (2.99 to 4.26)	1.13	1.36 (0.87 to 2.07)	5.27	4.94 (4.32 to 6.06)	
Medway NHS Foundation Trust	5,033	3.78	3.59 (2.95 to 4.38)	1.40	1.49 (0.92 to 2.29)	5.17	5.07 (4.41 to 6.40)	
North Bristol NHS Trust	6,166	2.59	3.49 (2.84 to 4.17)	1.14	1.34 (0.89 to 2.13)	3.73	4.82 (4.22 to 5.97)	
North Tees and Hartlepool NHS Foundation Trust	2,832	2.12	3.46 (2.80 to 4.17)	1.42	1.50 (0.90 to 2.34)	3.53	4.94 (4.21 to 6.27)	
Plymouth Hospitals NHS Trust	4,159	2.89	3.52 (2.87 to 4.18)	2.41	1.63 (1.06 to 2.61)	5.29	5.21 (4.43 to 6.66)	
Portsmouth Hospitals NHS Trust	5,775	2.25	3.44 (2.73 to 4.13)	1.04	1.18 (0.72 to 1.86)	3.29	4.56 (3.82 to 5.75)	
South Tees Hospitals NHS Foundation Trust	5,264	3.42	3.55 (2.86 to 4.30)	1.72	1.59 (0.98 to 2.38)	5.13	5.14 (4.42 to 6.46)	
The Pennine Acute Hospitals NHS Trust	9,004	3.22	3.43 (2.76 to 4.18)	1.11	1.34 (0.87 to 2.04)	4.33	4.76 (4.07 to 5.91)	

Organisation	Total births§	Rate per 1,000 births§						
		Stillbirth†		Neonatal‡		Extended perinatal†		
		Crude	Stabilised & adjusted (95% CI)	Crude	Stabilised & adjusted (95% CI)	Crude	Stabilised & adjusted (95% CI)#	
The Royal Wolverhampton NHS Trust	5,407	6.10	3.81 (2.99 to 5.07)	1.86	1.47 (0.97 to 2.24)	7.95	5.26 (4.44 to 6.81)	🔴
University Hospitals Coventry and Warwickshire NHS Trust	6,145	2.44	3.41 (2.73 to 4.17)	1.79	1.48 (1.00 to 2.26)	4.23	4.90 (4.19 to 6.16)	🟠
University Hospitals of North Midlands NHS Trust	6,446	3.72	3.60 (2.97 to 4.22)	1.40	1.48 (0.96 to 2.29)	5.12	5.07 (4.45 to 6.26)	🟠
Wirral University Teaching Hospital NHS Foundation Trust	3,310	1.21	3.40 (2.66 to 4.13)	2.42	1.64 (1.03 to 2.58)	3.63	5.10 (4.24 to 6.60)	🟠
SCOTLAND								
NHS Ayrshire & Arran	3,239	4.94	3.67 (3.02 to 4.72)	1.86	1.65 (1.02 to 2.64)	6.79	5.31 (4.52 to 6.93)	🔴
NHS Fife	3,205	1.87	3.45 (2.81 to 4.10)	2.19	1.77 (1.12 to 3.06)	4.06	5.17 (4.38 to 6.65)	🟠
NHS Lanarkshire	4,488	3.12	3.54 (2.91 to 4.29)	0.67	1.17 (0.70 to 1.87)	3.79	4.66 (4.06 to 5.88)	🟡
NHS Tayside	4,027	3.48	3.58 (2.95 to 4.32)	0.75	1.32 (0.76 to 2.16)	4.22	4.91 (4.24 to 6.22)	🟠
WALES								
Abertawe Bro Morgannwg University Health Board	5,797	3.28	3.55 (2.94 to 4.28)	1.38	1.49 (0.95 to 2.36)	4.66	5.04 (4.39 to 6.42)	🟠
Aneurin Bevan University Health Board	5,974	3.85	3.62 (2.98 to 4.37)	0.50	1.14 (0.69 to 1.85)	4.35	4.75 (4.09 to 5.94)	🟠

§ excluding terminations of pregnancy and births <24^{+0} weeks gestational age
† per 1,000 total births
‡ per 1,000 live births
# colours represent variation from comparator group average extended perinatal mortality rate
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey

Table 25: Crude and stabilised & adjusted stillbirth, neonatal, and extended perinatal mortality rates excluding congenital anomalies by NHS Trust (England), Health Board (Scotland and Wales), Health and Social Care Trust (Northern Ireland), and Crown Dependency based on place of birth: United Kingdom and Crown Dependencies, for births in 2017
FOR TRUSTS AND HEALTH BOARDS WITH 4,000 OR MORE BIRTHS ≥24^{+0} WEEKS GESTATIONAL AGE PER ANNUM

Organisation	Total births§	Rate per 1,000 births§						
		Stillbirth†		Neonatal‡		Extended perinatal†		
		Crude	Stabilised & adjusted (95% CI)	Crude	Stabilised & adjusted (95% CI)	Crude	Stabilised & adjusted (95% CI)#	
Average for comparator group			3.28		0.88		4.16	
ENGLAND								
Barking, Havering and Redbridge University Hospitals NHS Trust	8,300	3.98	3.28 (2.79 to 3.90)	0.73	0.81 (0.53 to 1.35)	4.70	4.09 (3.61 to 5.08)	
Basildon and Thurrock University Hospitals NHS Foundation Trust	4,565	2.63	3.21 (2.63 to 3.82)	0.66	0.81 (0.50 to 1.31)	3.29	4.01 (3.47 to 5.00)	
Buckinghamshire Healthcare NHS Trust	5,142	*	3.39 (2.83 to 4.15)	*	0.81 (0.47 to 1.40)	4.47	4.19 (3.69 to 5.25)	
Calderdale and Huddersfield NHS Foundation Trust	5,332	3.00	3.22 (2.69 to 3.88)	1.50	1.02 (0.63 to 1.67)	4.50	4.26 (3.66 to 5.33)	
County Durham and Darlington NHS Foundation Trust	4,891	*	3.24 (2.64 to 3.87)	*	0.77 (0.46 to 1.28)	3.07	4.03 (3.42 to 5.00)	
Dartford and Gravesham NHS Trust	4,952	2.42	3.19 (2.60 to 3.79)	0.61	0.83 (0.50 to 1.42)	3.03	4.02 (3.42 to 4.98)	
Derby Teaching Hospitals NHS Foundation Trust	5,815	2.58	3.20 (2.63 to 3.80)	1.90	1.06 (0.66 to 1.73)	4.47	4.32 (3.68 to 5.47)	
Doncaster and Bassetlaw Hospitals NHS Foundation Trust	4,877	2.46	3.20 (2.60 to 3.84)	0.82	0.84 (0.55 to 1.42)	3.28	4.04 (3.49 to 4.96)	
East and North Hertfordshire NHS Trust	5,639	2.31	3.20 (2.64 to 3.79)	0.89	0.93 (0.59 to 1.59)	3.19	4.13 (3.53 to 5.23)	
Epsom and St Helier University Hospitals NHS Trust	4,796	2.29	3.21 (2.62 to 3.89)	0.63	0.85 (0.52 to 1.44)	2.92	4.05 (3.44 to 5.02)	
Frimley Health NHS Foundation Trust	9,645	3.32	3.30 (2.76 to 3.97)	1.77	1.26 (0.75 to 2.14)	5.08	4.61 (3.98 to 5.88)	
Gloucestershire Hospitals NHS Foundation Trust	6,275	*	3.31 (2.83 to 4.05)	*	0.68 (0.41 to 1.18)	3.35	3.95 (3.49 to 4.99)	
Great Western Hospitals NHS Foundation Trust	4,422	*	3.28 (2.67 to 3.87)	*	0.78 (0.49 to 1.30)	3.39	4.04 (3.50 to 5.04)	
Hampshire Hospitals NHS Foundation Trust	5,247	4.00	3.42 (2.84 to 4.24)	0.57	0.86 (0.52 to 1.47)	4.57	4.27 (3.69 to 5.49)	
Kingston Hospital NHS Foundation Trust	5,489	3.46	3.33 (2.85 to 4.05)	0.73	0.91 (0.56 to 1.54)	4.19	4.23 (3.73 to 5.25)	
Lewisham and Greenwich NHS Trust	8,582	3.96	3.25 (2.70 to 3.83)	1.17	0.99 (0.66 to 1.62)	5.13	4.23 (3.72 to 5.28)	

Organisation	Total births§	Rate per 1,000 births§						
		Stillbirth†		Neonatal‡		Extended perinatal†		
		Crude	Stabilised & adjusted (95% CI)	Crude	Stabilised & adjusted (95% CI)	Crude	Stabilised & adjusted (95% CI)#	
London North West University Healthcare NHS Trust	5,043	4.96	3.38 (2.84 to 4.12)	1.20	0.98 (0.62 to 1.62)	6.15	4.35 (3.81 to 5.43)	
Maidstone and Tunbridge Wells NHS Trust	5,880	2.72	3.27 (2.72 to 3.88)	1.36	1.06 (0.64 to 1.81)	4.08	4.35 (3.72 to 5.41)	
Mid Essex Hospital Services NHS Trust	4,733	*	3.17 (2.55 to 3.82)	*	0.77 (0.48 to 1.34)	2.11	3.93 (3.35 to 4.89)	
North Middlesex University Hospital NHS Trust	4,716	*	3.40 (2.81 to 4.18)	*	0.71 (0.43 to 1.23)	5.73	4.12 (3.54 to 5.19)	
North West Anglia NHS Foundation Trust	7,292	2.61	3.21 (2.70 to 3.83)	0.69	0.83 (0.53 to 1.38)	3.29	4.03 (3.53 to 5.03)	
Northampton General Hospital NHS Trust	4,817	*	3.19 (2.64 to 3.82)	*	0.79 (0.47 to 1.26)	2.70	3.98 (3.44 to 4.92)	
Northern Lincolnshire and Goole Hospitals NHS Foundation Trust	4,258	3.05	3.26 (2.70 to 3.86)	1.18	0.92 (0.58 to 1.52)	4.23	4.18 (3.66 to 5.20)	
Poole Hospital NHS Foundation Trust	4,578	1.31	3.13 (2.43 to 3.80)	1.31	1.03 (0.62 to 1.71)	2.62	4.16 (3.44 to 5.28)	
Royal Berkshire NHS Foundation Trust	5,323	3.76	3.34 (2.82 to 4.01)	0.75	0.88 (0.54 to 1.50)	4.51	4.22 (3.68 to 5.25)	
Royal Cornwall Hospitals NHS Trust	4,117	3.40	3.32 (2.78 to 4.04)	0.73	0.87 (0.52 to 1.46)	4.13	4.18 (3.68 to 5.22)	
Royal Devon and Exeter NHS Foundation Trust	4,197	*	3.39 (2.84 to 4.19)	*	0.81 (0.49 to 1.43)	4.53	4.18 (3.62 to 5.33)	
Royal Free London NHS Foundation Trust	8,773	3.19	3.24 (2.68 to 3.91)	0.34	0.73 (0.44 to 1.23)	3.53	3.98 (3.47 to 4.92)	
Royal United Hospitals Bath NHS Foundation Trust	4,585	2.18	3.23 (2.61 to 3.81)	1.09	0.95 (0.59 to 1.60)	3.27	4.19 (3.54 to 5.23)	
Sandwell and West Birmingham Hospitals NHS Trust	5,878	5.44	3.36 (2.86 to 4.02)	3.42	1.76 (1.03 to 3.48)	8.85	5.01 (4.31 to 6.65)	
St Helens and Knowsley Teaching Hospitals NHS Trust	4,092	3.42	3.30 (2.70 to 3.98)	1.23	1.01 (0.58 to 1.79)	4.64	4.29 (3.70 to 5.47)	
Surrey and Sussex Healthcare NHS Trust	4,471	3.80	3.36 (2.83 to 4.14)	0.90	0.88 (0.57 to 1.54)	4.70	4.23 (3.63 to 5.32)	
The Dudley Group NHS Foundation Trust	4,465	*	3.20 (2.63 to 3.80)	*	0.77 (0.46 to 1.29)	3.14	3.96 (3.45 to 4.95)	
The Hillingdon Hospitals NHS Foundation Trust	4,822	5.39	3.40 (2.87 to 4.27)	1.04	0.93 (0.58 to 1.59)	6.43	4.32 (3.80 to 5.58)	
The Mid Yorkshire Hospitals NHS Trust	6,290	3.82	3.32 (2.78 to 4.00)	1.28	1.03 (0.62 to 1.68)	5.09	4.35 (3.78 to 5.45)	
The Princess Alexandra Hospital NHS Trust	4,079	1.96	3.20 (2.64 to 3.85)	0.74	0.90 (0.55 to 1.53)	2.70	4.09 (3.56 to 5.09)	
The Shrewsbury and Telford Hospital NHS Trust	4,734	*	3.54 (2.79 to 4.77)	*	0.70 (0.41 to 1.18)	5.70	4.21 (3.55 to 5.75)	
United Lincolnshire Hospitals NHS Trust	5,163	4.26	3.41 (2.82 to 4.24)	1.17	0.98 (0.62 to 1.69)	5.42	4.39 (3.76 to 5.53)	

Organisation	Total births§	Rate per 1,000 births§						
		Stillbirth†		Neonatal‡		Extended perinatal†		
		Crude	Stabilised & adjusted (95% CI)	Crude	Stabilised & adjusted (95% CI)	Crude	Stabilised & adjusted (95% CI)#	
West Hertfordshire Hospitals NHS Trust	4,914	2.65	3.23 (2.69 to 3.85)	1.22	1.01 (0.62 to 1.73)	3.87	4.24 (3.63 to 5.34)	●
Western Sussex Hospitals NHS Foundation Trust	5,049	3.57	3.35 (2.85 to 4.09)	0.99	0.99 (0.59 to 1.70)	4.56	4.34 (3.76 to 5.45)	●
Worcestershire Acute Hospitals NHS Trust	5,448	*	3.27 (2.72 to 3.91)	*	0.73 (0.42 to 1.27)	3.12	3.99 (3.48 to 4.97)	●
York Teaching Hospital NHS Foundation Trust	4,670	*	3.33 (2.81 to 4.07)	*	0.78 (0.46 to 1.32)	3.64	4.10 (3.63 to 5.16)	●
WALES								
Betsi Cadwaladr University Health Board	6,590	1.97	3.13 (2.53 to 3.80)	1.67	1.07 (0.68 to 1.81)	3.64	4.26 (3.60 to 5.38)	●
NORTHERN IRELAND◦								
South Eastern Health and Social Care Trust	4,235	*	3.31 (2.76 to 4.03)	*	0.79 (0.47 to 1.38)	3.54	4.11 (3.53 to 5.07)	●
Southern Health and Social Care Trust	5,842	*	3.21 (2.69 to 3.83)	*	0.72 (0.42 to 1.21)	2.57	3.93 (3.42 to 4.88)	●

§ excluding terminations of pregnancy and births <24^{+0} weeks gestational age
† per 1,000 total births
‡ per 1,000 live births
# colours represent variation from comparator group average extended perinatal mortality rate
* entry suppressed because of small number of deaths
◦ different laws exist in Northern Ireland for the termination of pregnancy
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey

Table 26: Crude and stabilised & adjusted stillbirth, neonatal, and extended perinatal mortality rates excluding congenital anomalies by NHS Trust (England), Health Board (Scotland and Wales), Health and Social Care Trust (Northern Ireland), and Crown Dependency based on place of birth: United Kingdom and Crown Dependencies, for births in 2017
FOR TRUSTS AND HEALTH BOARDS WITH 2,000 TO 3,999 BIRTHS ≥24+0 WEEKS GESTATIONAL AGE PER ANNUM

Organisation	Total births§	Rate per 1,000 births§						
		Stillbirth†		Neonatal‡		Extended perinatal†		
		Crude	Stabilised & adjusted (95% CI)	Crude	Stabilised & adjusted (95% CI)	Crude	Stabilised & adjusted (95% CI)#	
Average for comparator group			2.98		0.78		3.75	
ENGLAND								
Airedale NHS Foundation Trust	2,117	*	2.93 (2.36 to 3.49)	*	0.73 (0.43 to 1.26)	2.36	3.66 (3.15 to 4.56)	
Barnsley Hospital NHS Foundation Trust	3,028	*	2.96 (2.41 to 3.60)	*	0.75 (0.44 to 1.28)	3.30	3.70 (3.11 to 4.63)	
Bedford Hospital NHS Trust	2,879	4.17	3.04 (2.52 to 3.80)	2.44	1.08 (0.61 to 2.03)	6.60	4.16 (3.47 to 5.48)	
Blackpool Teaching Hospitals NHS Foundation Trust	2,934	*	3.00 (2.42 to 3.66)	*	0.74 (0.43 to 1.24)	4.09	3.73 (3.17 to 4.67)	
Burton Hospitals NHS Foundation Trust	3,425	1.17	2.87 (2.30 to 3.45)	2.05	1.07 (0.58 to 2.03)	3.21	3.90 (3.20 to 5.04)	
Chesterfield Royal Hospital NHS Foundation Trust	2,837	*	2.88 (2.21 to 3.52)	*	0.74 (0.42 to 1.29)	1.41	3.62 (2.98 to 4.52)	
Colchester Hospital University NHS Foundation Trust	3,784	*	2.97 (2.44 to 3.58)	*	0.74 (0.44 to 1.27)	3.44	3.71 (3.12 to 4.59)	
Countess of Chester Hospital NHS Foundation Trust	2,934	*	3.00 (2.47 to 3.68)	*	0.81 (0.48 to 1.40)	3.75	3.80 (3.26 to 4.75)	
Croydon Health Services NHS Trust	3,779	3.97	2.98 (2.44 to 3.61)	1.06	0.80 (0.49 to 1.33)	5.03	3.78 (3.27 to 4.69)	
East Sussex Healthcare NHS Trust	3,278	3.05	2.98 (2.42 to 3.68)	1.22	0.87 (0.53 to 1.53)	4.27	3.84 (3.25 to 4.84)	
George Eliot Hospital NHS Trust	2,147	*	2.90 (2.29 to 3.51)	*	0.88 (0.52 to 1.65)	2.33	3.75 (3.12 to 4.79)	
James Paget University Hospitals NHS Foundation Trust	2,134	*	3.00 (2.48 to 3.65)	*	0.76 (0.43 to 1.30)	4.22	3.77 (3.25 to 4.77)	
Kettering General Hospital NHS Foundation Trust	3,443	2.90	2.97 (2.43 to 3.63)	1.75	0.89 (0.54 to 1.48)	4.65	3.90 (3.25 to 4.87)	
Mid Cheshire Hospitals NHS Foundation Trust	3,054	*	3.01 (2.50 to 3.76)	*	0.73 (0.41 to 1.29)	3.60	3.74 (3.21 to 4.69)	
Milton Keynes University Hospital NHS Foundation Trust	3,693	*	3.00 (2.50 to 3.71)	*	0.72 (0.41 to 1.20)	4.06	3.71 (3.22 to 4.66)	
North Cumbria University Hospitals NHS Trust	2,924	*	3.10 (2.53 to 3.95)	*	0.79 (0.46 to 1.35)	5.47	3.88 (3.30 to 4.98)	
Northumbria Healthcare NHS Foundation Trust	3,248	3.39	3.01 (2.49 to 3.70)	1.24	0.90 (0.54 to 1.56)	4.62	3.90 (3.30 to 5.00)	

Organisation	Total births§	Rate per 1,000 births§						
		Stillbirth†		Neonatal‡		Extended perinatal†		
		Crude	Stabilised & adjusted (95% CI)	Crude	Stabilised & adjusted (95% CI)	Crude	Stabilised & adjusted (95% CI)#	
Royal Surrey County Hospital NHS Foundation Trust	2,869	*	2.95 (2.39 to 3.52)	*	0.80 (0.45 to 1.44)	2.79	3.75 (3.12 to 4.74)	
Salisbury NHS Foundation Trust	2,245	*	3.00 (2.43 to 3.69)	*	0.70 (0.38 to 1.25)	3.12	3.70 (3.10 to 4.66)	
Sherwood Forest Hospitals NHS Foundation Trust	3,483	5.46	3.14 (2.59 to 4.23)	1.15	0.82 (0.49 to 1.38)	6.60	3.95 (3.32 to 5.18)	
South Warwickshire NHS Foundation Trust	2,953	*	3.10 (2.54 to 4.04)	*	0.80 (0.44 to 1.33)	6.49	3.89 (3.29 to 5.05)	
Southend University Hospital NHS Foundation Trust	3,811	*	3.01 (2.47 to 3.71)	*	0.76 (0.41 to 1.34)	3.39	3.77 (3.22 to 4.73)	
Southport & Ormskirk Hospital NHS Trust	2,452	*	2.90 (2.31 to 3.54)	*	0.75 (0.43 to 1.33)	2.36	3.65 (3.05 to 4.60)	
Stockport NHS Foundation Trust	3,275	1.22	2.94 (2.44 to 3.55)	*	0.69 (0.37 to 1.23)	2.04	3.64 (3.10 to 4.62)	
Tameside Hospital NHS Foundation Trust	2,468	*	2.88 (2.24 to 3.47)	1.53	0.94 (0.57 to 1.63)	2.75	3.81 (3.11 to 4.75)	
Taunton and Somerset NHS Foundation Trust	3,215	*	3.00 (2.50 to 3.69)	*	0.78 (0.46 to 1.28)	4.46	3.78 (3.23 to 4.77)	
The Ipswich Hospital NHS Trust	3,599	*	2.93 (2.28 to 3.55)	*	0.69 (0.38 to 1.15)	2.18	3.59 (3.01 to 4.47)	
The Queen Elizabeth Hospital King's Lynn NHS Foundation Trust	2,268	*	2.93 (2.36 to 3.50)	*	0.68 (0.39 to 1.11)	2.50	3.61 (3.08 to 4.41)	
The Rotherham NHS Foundation Trust	2,646	*	2.89 (2.28 to 3.50)	*	0.73 (0.43 to 1.21)	1.32	3.62 (3.00 to 4.50)	
Torbay and South Devon NHS Foundation Trust	2,310	*	2.97 (2.43 to 3.65)	*	0.64 (0.36 to 1.04)	3.02	3.58 (3.11 to 4.49)	
University Hospitals of Morecambe Bay NHS Foundation Trust	2,992	*	3.02 (2.45 to 3.69)	*	0.67 (0.36 to 1.13)	3.34	3.66 (3.09 to 4.57)	
Walsall Healthcare NHS Trust	3,659	3.55	2.96 (2.42 to 3.60)	0.82	0.74 (0.45 to 1.24)	4.37	3.70 (3.15 to 4.67)	
Warrington and Halton Hospitals NHS Foundation Trust	2,792	*	3.04 (2.52 to 3.83)	*	0.72 (0.40 to 1.22)	4.30	3.74 (3.18 to 4.83)	
West Suffolk NHS Foundation Trust	2,512	*	2.92 (2.33 to 3.51)	*	0.70 (0.37 to 1.18)	1.59	3.63 (3.03 to 4.50)	
Whittington Health	3,793	2.90	2.92 (2.36 to 3.49)	0.79	0.79 (0.45 to 1.40)	3.69	3.71 (3.15 to 4.59)	
Wrightington, Wigan and Leigh NHS Foundation Trust	2,804	1.43	2.90 (2.26 to 3.56)	1.43	0.84 (0.51 to 1.40)	2.85	3.76 (3.11 to 4.80)	
SCOTLAND								
NHS Forth Valley	3,091	*	3.02 (2.47 to 3.77)	*	0.74 (0.43 to 1.28)	4.21	3.75 (3.20 to 4.82)	
NHS Highland	2,159	*	2.96 (2.39 to 3.56)	*	0.77 (0.44 to 1.42)	2.78	3.73 (3.16 to 4.65)	

Organisation	Total births§	Rate per 1,000 births§						
		Stillbirth†		Neonatal‡		Extended perinatal†		
		Crude	Stabilised & adjusted (95% CI)	Crude	Stabilised & adjusted (95% CI)	Crude	Stabilised & adjusted (95% CI)#	
WALES								
Cwm Taf University Health Board	3,802	4.47	3.07 (2.54 to 3.92)	1.59	0.96 (0.57 to 1.65)	6.05	4.02 (3.43 to 5.24)	
Hywel Dda University Health Board	3,274	3.97	3.05 (2.50 to 3.78)	0.92	0.81 (0.46 to 1.38)	4.89	3.86 (3.28 to 4.94)	
NORTHERN IRELAND°								
Northern Health and Social Care Trust	3,909	*	2.98 (2.46 to 3.67)	*	0.72 (0.40 to 1.26)	3.33	3.69 (3.14 to 4.62)	
Western Health and Social Care Trust	3,945	*	3.02 (2.52 to 3.72)	*	0.73 (0.42 to 1.27)	4.06	3.75 (3.25 to 4.71)	

§ excluding terminations of pregnancy and births <24^{+0} weeks gestational age
† per 1,000 total births
‡ per 1,000 live births
# colours represent variation from comparator group average extended perinatal mortality rate
* entry suppressed because of small number of deaths
° different laws exist in Northern Ireland for the termination of pregnancy
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey

Table 27: Crude and stabilised & adjusted stillbirth, neonatal, and extended perinatal mortality rates excluding congenital anomalies by NHS Trust (England), Health Board (Scotland and Wales), Health and Social Care Trust (Northern Ireland), and Crown Dependency based on place of birth: United Kingdom and Crown Dependencies, for births in 2017
FOR TRUSTS AND HEALTH BOARDS WITH FEWER THAN 2,000 BIRTHS ≥24+0 WEEKS GESTATIONAL AGE PER ANNUM

Organisation	Total births§	Rate per 1,000 births§						
		Stillbirth†		Neonatal‡		Extended perinatal†		
		Crude	Stabilised & adjusted (95% CI)	Crude	Stabilised & adjusted (95% CI)	Crude	Stabilised & adjusted (95% CI)#	
Average for comparator group			2.88		0.70		3.58	
ENGLAND								
Dorset County Hospital NHS Foundation Trust	1,857	*	2.86 (2.11 to 3.63)	*	0.65 (0.28 to 1.20)	2.69	3.49 (2.61 to 4.64)	●
East Cheshire NHS Trust	1,635	*	2.90 (2.22 to 3.75)	*	0.76 (0.40 to 1.57)	4.28	3.65 (2.82 to 4.91)	●
Gateshead Health NHS Foundation Trust	1,854	*	2.91 (2.27 to 3.78)	*	0.75 (0.34 to 1.49)	4.85	3.66 (2.96 to 4.93)	●
Harrogate and District NHS Foundation Trust	1,881	*	2.89 (2.19 to 3.68)	*	0.64 (0.28 to 1.17)	2.66	3.53 (2.71 to 4.73)	●
Isle of Wight NHS Trust	1,212	*	2.87 (2.15 to 3.70)	*	0.76 (0.38 to 1.49)	4.13	3.63 (2.78 to 4.88)	●
Northern Devon Healthcare NHS Trust	1,433	*	2.88 (2.21 to 3.78)	*	0.77 (0.35 to 1.46)	4.19	3.65 (2.83 to 4.89)	●
RAF Lakenheath (48th Medical Group)	330	*	2.87 (2.13 to 3.60)	*	0.69 (0.29 to 1.35)	*	3.56 (2.66 to 4.65)	●
South Tyneside NHS Foundation Trust	1,057	*	2.87 (2.16 to 3.68)	*	0.66 (0.29 to 1.25)	2.84	3.54 (2.68 to 4.75)	●
The Portland Hospital for Women and Children	1,542	*	2.84 (2.09 to 3.56)	*	0.66 (0.27 to 1.20)	*	3.50 (2.56 to 4.53)	●
The Royal Bournemouth and Christchurch Hospitals NHS Foundation Trust	249	*	2.87 (2.14 to 3.65)	*	0.69 (0.31 to 1.33)	*	3.56 (2.68 to 4.64)	●
Weston Area Health NHS Trust	112	*	2.90 (2.19 to 3.68)	*	0.76 (0.36 to 1.48)	*	3.63 (2.83 to 4.78)	●
Wye Valley NHS Trust	1,735	*	2.93 (2.34 to 3.81)	*	0.72 (0.36 to 1.46)	5.19	3.66 (2.90 to 5.08)	●
Yeovil District Hospital NHS Foundation Trust	1,489	*	2.90 (2.22 to 3.81)	*	0.70 (0.31 to 1.30)	4.03	3.59 (2.76 to 4.96)	●
SCOTLAND								
NHS Borders	1,003	*	2.93 (2.29 to 3.91)	*	0.72 (0.35 to 1.46)	5.98	3.65 (2.91 to 5.17)	●
NHS Dumfries & Galloway	1,241	*	2.89 (2.20 to 3.81)	*	0.71 (0.32 to 1.32)	4.03	3.60 (2.76 to 4.87)	●
NHS Orkney	122	*	2.88 (2.17 to 3.73)	*	0.70 (0.32 to 1.36)	*	3.57 (2.68 to 4.79)	●
NHS Shetland	121	*	2.88 (2.15 to 3.64)	*	0.70 (0.31 to 1.35)	*	3.57 (2.75 to 4.66)	●
NHS Western Isles	161	*	2.92 (2.27 to 3.81)	*	0.70 (0.32 to 1.40)	*	3.61 (2.87 to 4.95)	●

Organisation	Total births§	Rate per 1,000 births§						
		Stillbirth†		Neonatal‡		Extended perinatal†		
		Crude	Stabilised & adjusted (95% CI)	Crude	Stabilised & adjusted (95% CI)	Crude	Stabilised & adjusted (95% CI)#	
WALES								
Powys Teaching Health Board	221	*	2.87 (2.14 to 3.66)	*	0.70 (0.31 to 1.28)	*	3.57 (2.67 to 4.70)	●
ISLE OF MAN								
Department of Health	734	*	2.86 (2.14 to 3.66)	*	0.67 (0.28 to 1.25)	*	3.52 (2.63 to 4.68)	●
STATES OF GUERNSEY								
Health & Social Services	555	*	2.89 (2.23 to 3.78)	*	0.69 (0.33 to 1.39)	5.41	3.58 (2.74 to 4.81)	●
STATES OF JERSEY								
Health & Social Services	949	*	2.86 (2.08 to 3.55)	*	0.67 (0.28 to 1.19)	*	3.52 (2.58 to 4.58)	●

§ excluding terminations of pregnancy and births <24^{+0} weeks gestational age
† per 1,000 total births
‡ per 1,000 live births
# colours represent variation from comparator group average extended perinatal mortality rate
* entry suppressed because of small number of deaths
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey

6.3 How healthcare providers should respond to this information

This information is intended to give local teams an insight into clinical performance based not just on crude mortality rates but also having taken account of at least some important socio-demographic factors that influence pregnancy outcomes: mother's age, socio-economic deprivation based on the mother's residence, baby's ethnicity, baby's sex, whether they are from a multiple birth, and gestational age at birth (neonatal deaths only). The red, amber, yellow and green banding facilitates the comparison of organisations' mortality rates, indicating their overall performance in comparison to the national or (for Trusts and Health Boards) peer group average.

Previous reports have highlighted the prioritisation of carrying out reviews by those organisations whose performance fall into the red and amber bands. Since the launch of the PMRT there is an expectation that all Trusts and Health Boards will carry out reviews of all their deaths, irrespective of where they fall in the spectrum of national performance. In order to ensure that Trusts in England engage with the use of the PMRT, Trusts must demonstrate that they have met the standards set by the Maternity Incentive Scheme, of which use of the PMRT to a specified standard is one of the requirements. However, as a first step for any healthcare provider whose performance falls in the red ● or amber ● band a more detailed local review of their data quality and investigation of local factors should be carried out to identify if these issues explain the high rate. At Trust and Health Board level this is now facilitated by the MBRRACE-UK real time data monitoring tool (Chapter 4).

To facilitate full engagement with the PMRT, local delivery sites should be encouraged to notify all late fetal losses, stillbirths and neonatal deaths within 30 days to allow for data sharing and to ensure that, going forward, MBRRACE-UK is able to provide the best possible insight into why their rates are different to the national average.

Where babies received care in more than one hospital, the PMRT recommends that the care across all hospitals should be reviewed by the teams involved in the care at each hospital and that this should be carried out as a joint activity wherever possible. The Trust or Health Board where the baby died is responsible for leading the review but all units involved in the care should be part of the review group to ensure that all aspects of the care

are considered. The PMRT aim is that the care of all the babies who die is reviewed irrespective of the colour of the banding reported here.

MBRRACE-UK Recommendation 5

Trusts and Health Boards with a stabilised & adjusted stillbirth, neonatal mortality or extended perinatal mortality rate that falls into the red or amber band should carry out an initial investigation of their data quality and possible contributing local factors. Organisations should review their performance against national outcome measures with a view to understanding where improvement may be required.

6.4 Mortality rates by Neonatal Network

Maps begin on page 122.

Figure 41: Crude stillbirth mortality rates by Neonatal Network based on place of birth: United Kingdom, for births in 2017

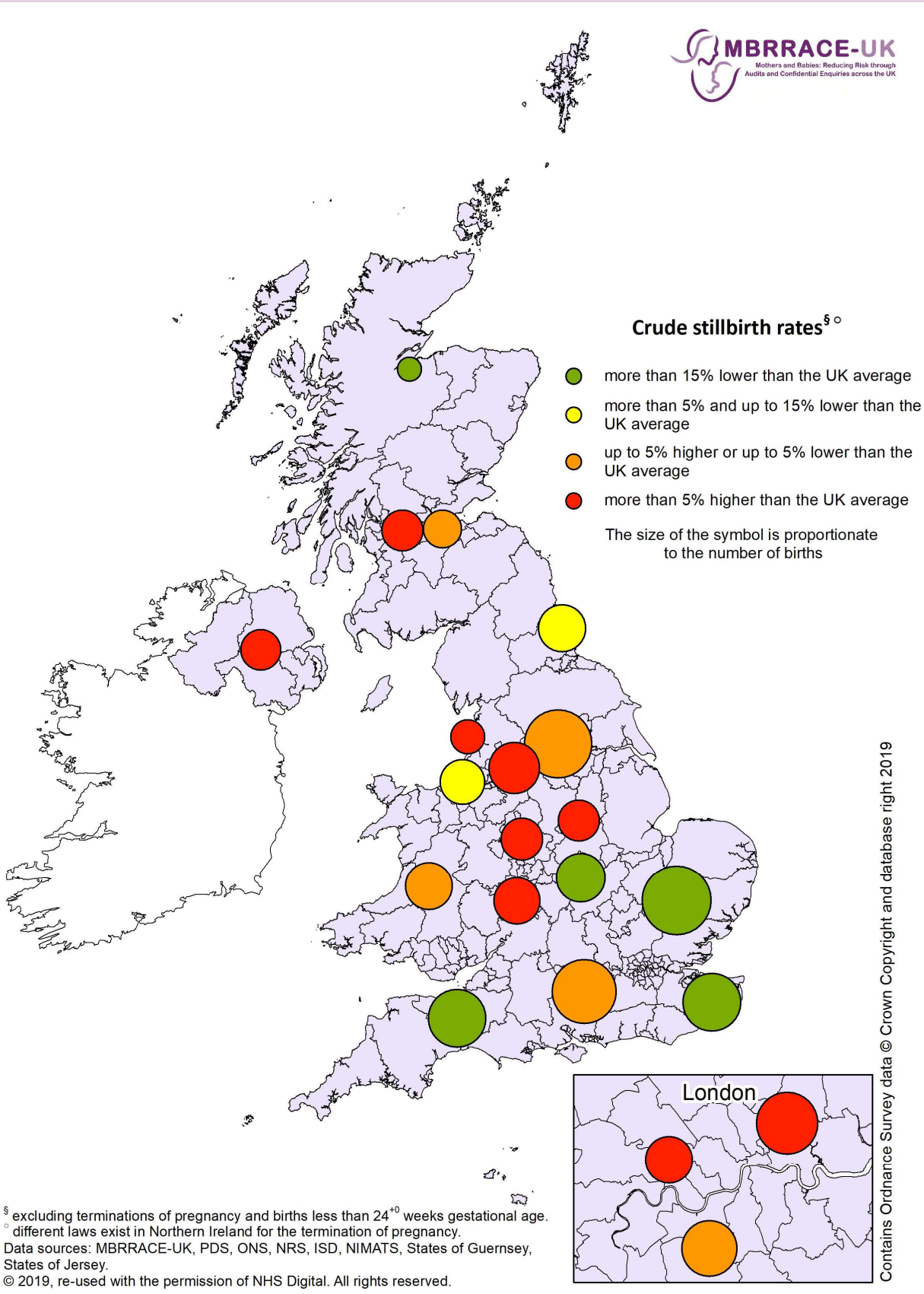


Figure 42: Stabilised & adjusted stillbirth mortality rates by Neonatal Network based on place of birth: United Kingdom, for births in 2017

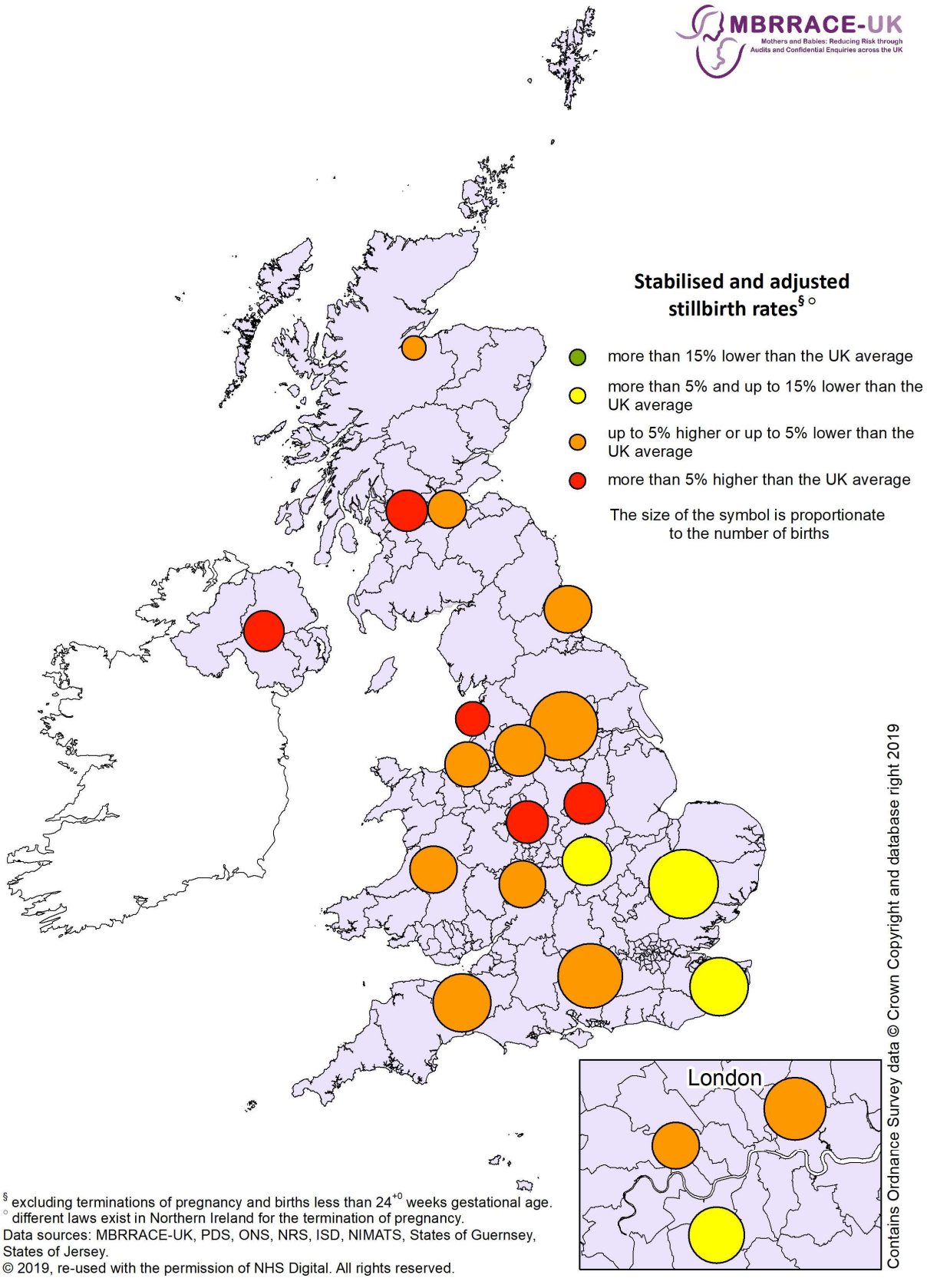


Figure 43: Crude neonatal mortality rates by Neonatal Network based on place of birth: United Kingdom, for births in 2017

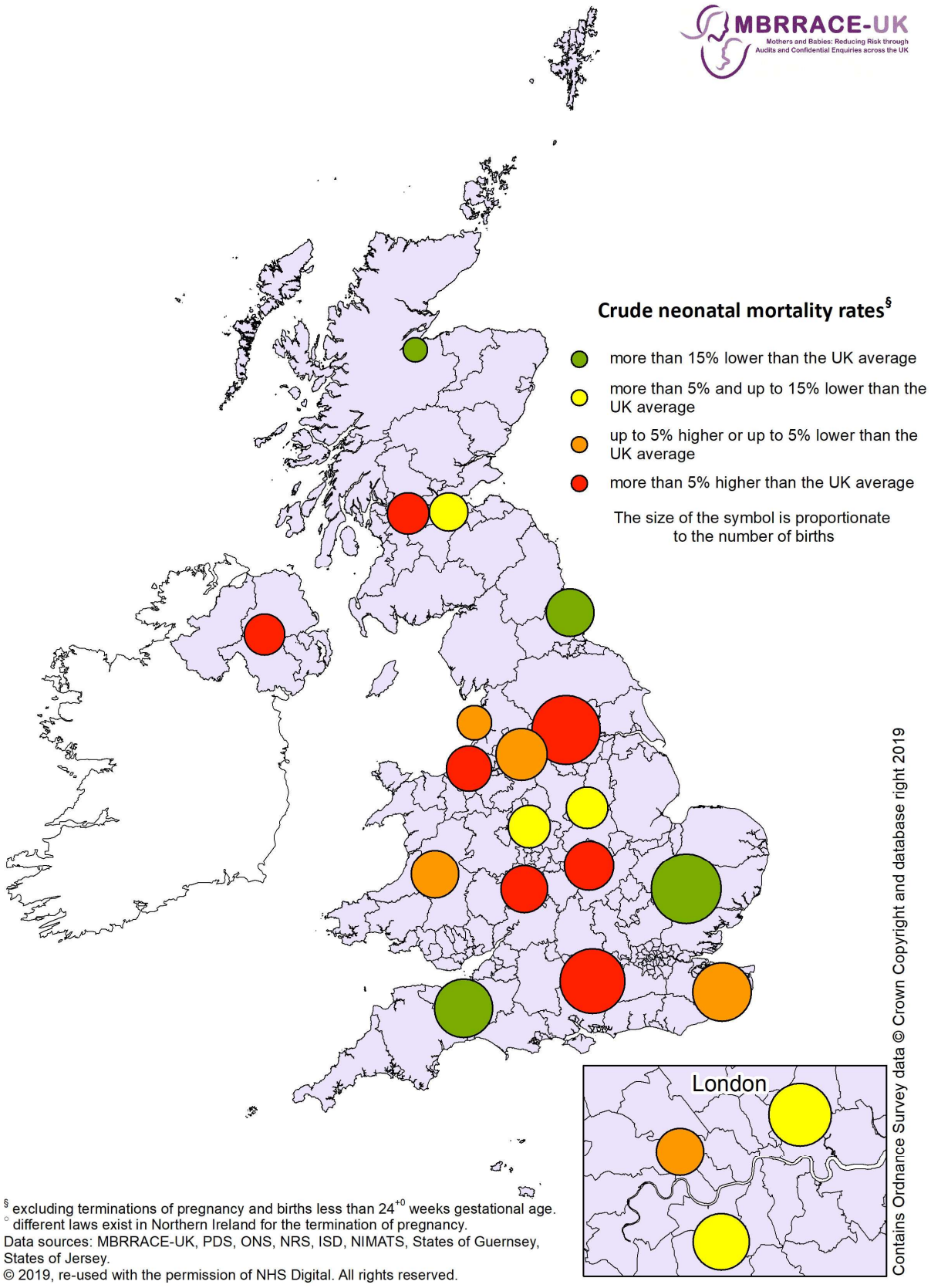


Figure 44: Stabilised & adjusted neonatal mortality rates by Neonatal Network based on place of birth: United Kingdom, for births in 2017

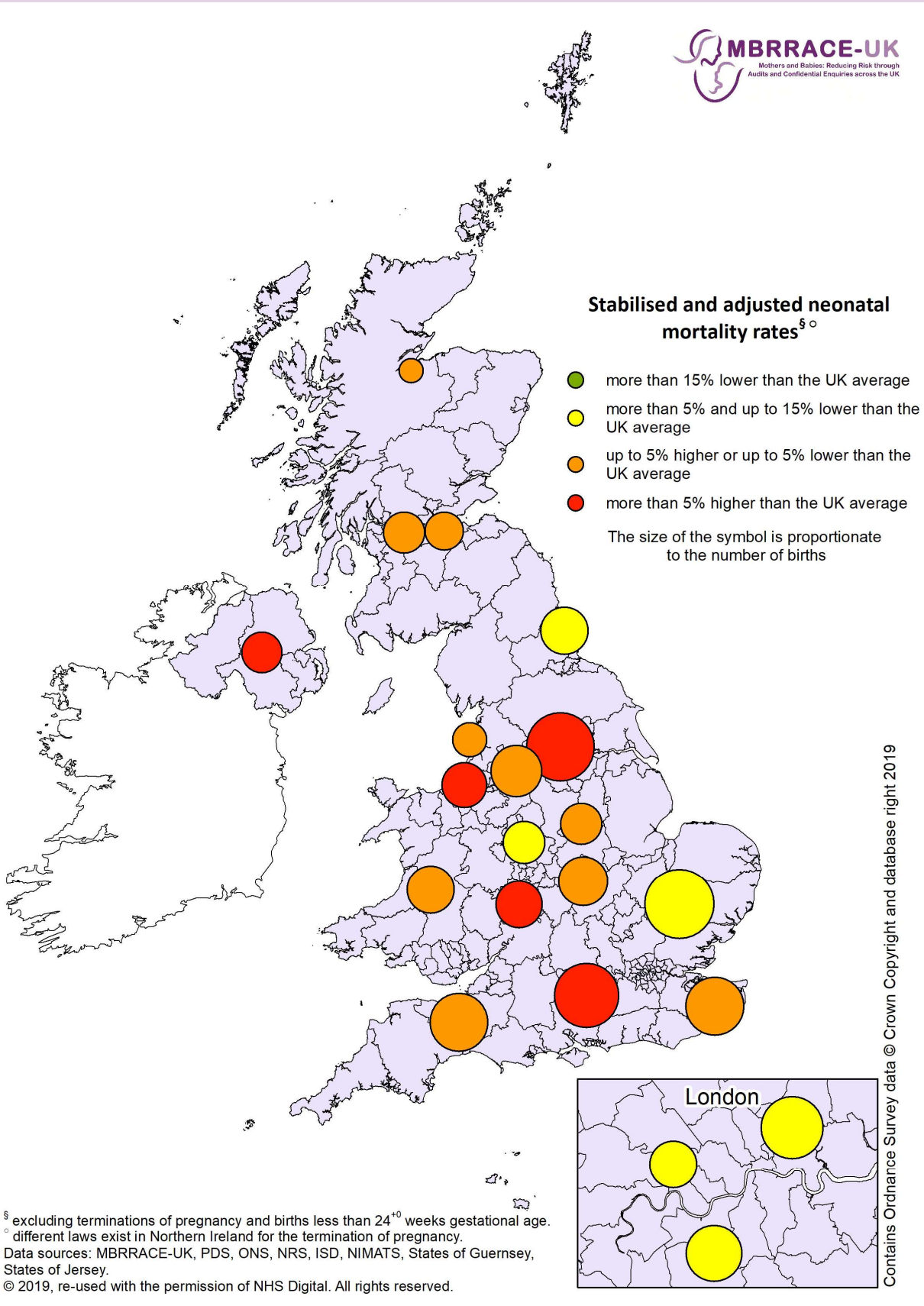


Figure 45: Crude extended perinatal mortality rates by Neonatal Network based on place of birth: United Kingdom, for births in 2017

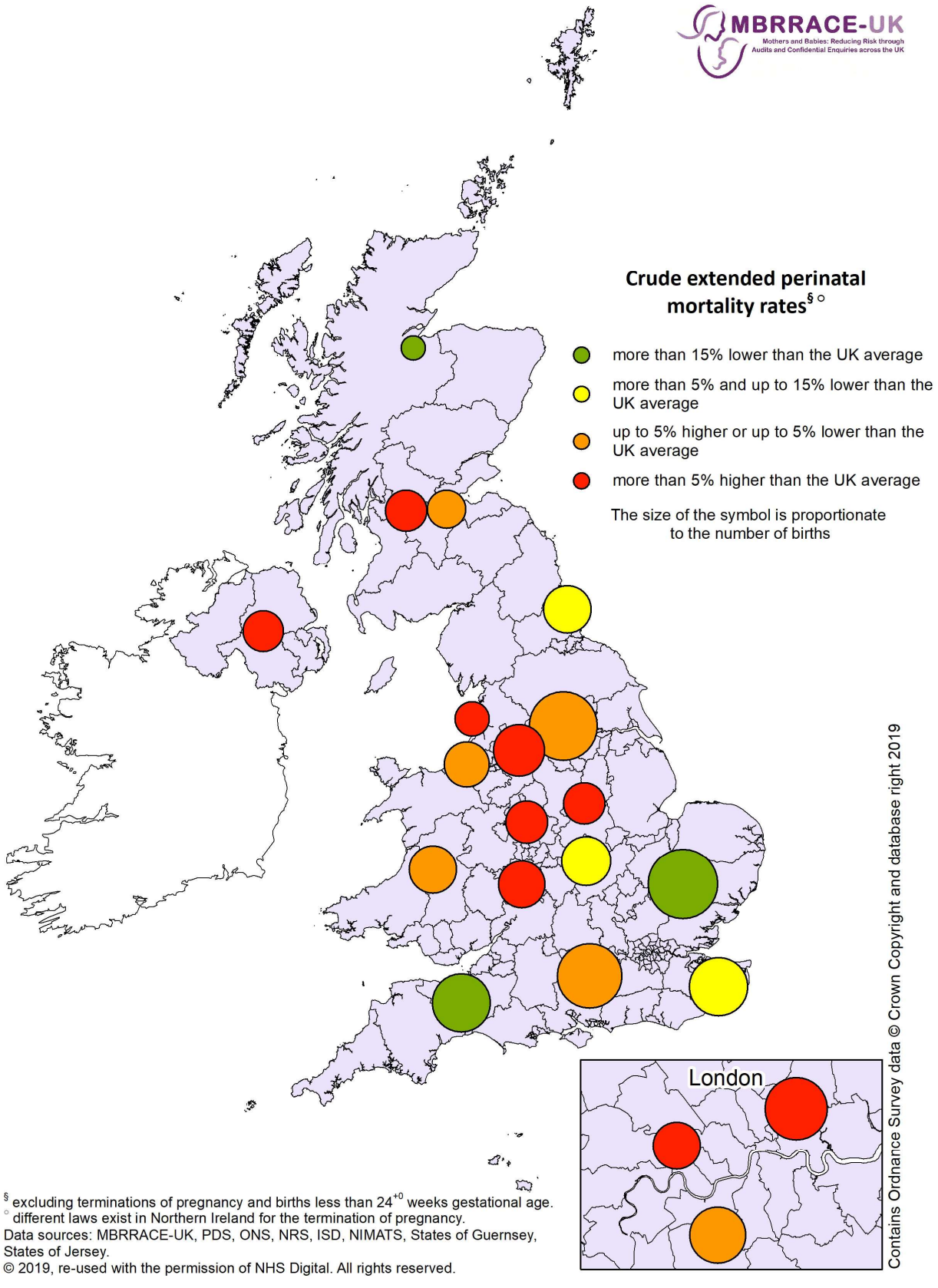


Figure 46: Stabilised & adjusted extended perinatal mortality rates by Neonatal Network based on place of birth: United Kingdom, for births in 2016

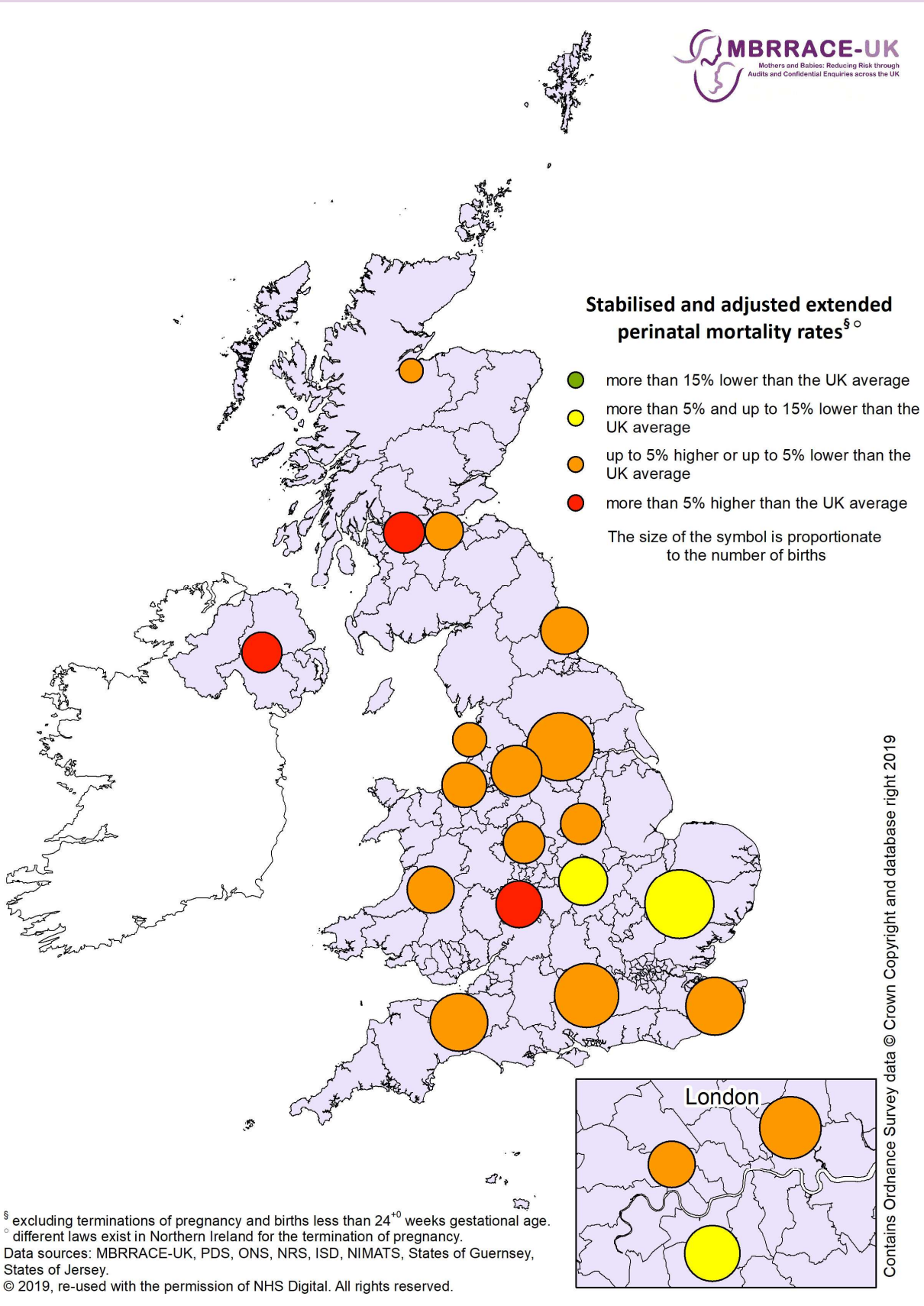


Table 28: Crude and stabilised & adjusted stillbirth, neonatal, and extended perinatal mortality rates by Neonatal Network based on place of birth: United Kingdom, for births in 2017

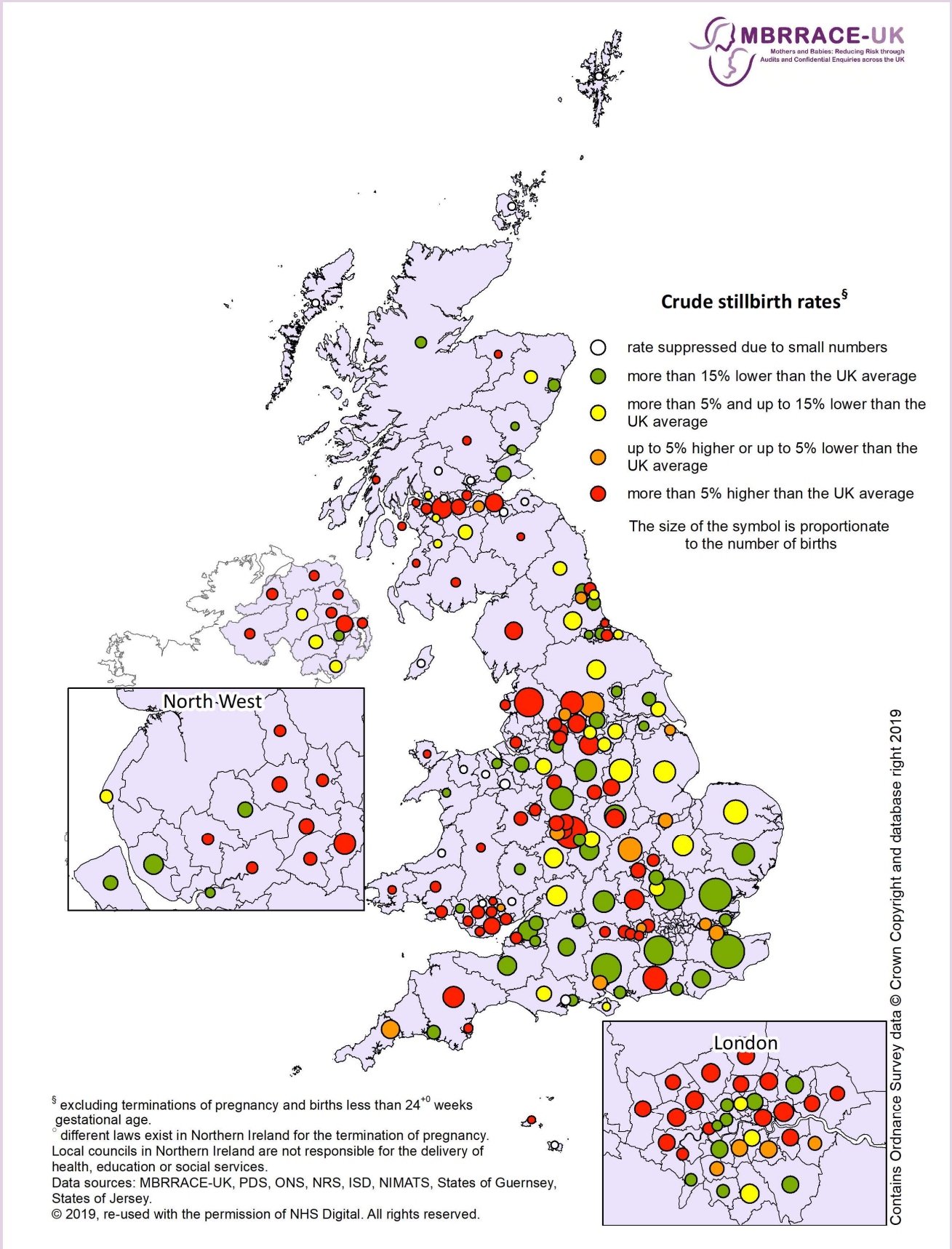
Neonatal Network	Total births[§]	Rate per 1,000 births[§]						
		Stillbirth[†]		Neonatal[‡]		Extended perinatal[†]		
		Crude	Stabilised & adjusted (95% CI)	Crude	Stabilised & adjusted (95% CI)	Crude	Stabilised & adjusted (95% CI)[#]	
ENGLAND								
Central	33,288	2.97	3.40 (2.83 to 4.09)	1.84	1.72 (1.44 to 2.10)	4.81	5.12 (4.65 to 6.08)	
East of England	68,499	3.02	3.42 (2.93 to 4.08)	1.23	1.54 (1.28 to 1.85)	4.25	4.96 (4.54 to 5.84)	
North Central & East London	54,084	4.57	3.70 (3.31 to 4.26)	1.58	1.54 (1.28 to 1.91)	6.14	5.24 (4.91 to 6.09)	
North West (Cheshire and Merseyside)	28,966	3.31	3.68 (3.17 to 4.31)	2.18	1.88 (1.48 to 2.41)	5.49	5.57 (5.08 to 6.67)	
North West (Greater Manchester)	36,933	4.01	3.70 (3.24 to 4.28)	1.71	1.60 (1.35 to 1.95)	5.71	5.30 (4.94 to 6.17)	
North West (Lancashire and South Cumbria)	16,714	4.43	3.97 (3.38 to 4.73)	1.68	1.65 (1.39 to 2.00)	6.10	5.59 (5.13 to 6.62)	
North West London	31,551	4.47	3.78 (3.35 to 4.37)	1.62	1.58 (1.28 to 1.93)	6.09	5.35 (4.96 to 6.22)	
Northern	31,783	3.43	3.63 (3.16 to 4.24)	1.33	1.59 (1.30 to 1.95)	4.75	5.21 (4.87 to 6.09)	
South East Coast	47,988	3.10	3.53 (3.07 to 4.17)	1.73	1.72 (1.46 to 2.07)	4.83	5.26 (4.89 to 6.14)	
South London	44,337	3.70	3.43 (2.94 to 4.07)	1.54	1.58 (1.32 to 1.95)	5.23	5.01 (4.58 to 5.96)	
South West	47,678	3.15	3.62 (3.15 to 4.15)	1.39	1.61 (1.34 to 1.97)	4.53	5.22 (4.86 to 6.04)	
Southern West Midlands	31,110	4.56	3.77 (3.28 to 4.36)	2.55	1.92 (1.51 to 2.45)	7.10	5.69 (5.22 to 6.65)	
Staffordshire, Shropshire and Black Country	24,734	4.77	4.04 (3.41 to 4.79)	1.54	1.57 (1.30 to 1.97)	6.31	5.57 (5.04 to 6.60)	
Thames Valley and Wessex	58,328	3.62	3.85 (3.35 to 4.38)	1.82	1.79 (1.47 to 2.17)	5.43	5.64 (5.18 to 6.45)	
Trent	24,107	4.27	3.94 (3.42 to 4.62)	1.58	1.64 (1.38 to 2.01)	5.85	5.55 (5.12 to 6.51)	
Yorkshire & Humber	65,854	3.64	3.59 (3.18 to 4.15)	1.94	1.76 (1.50 to 2.09)	5.57	5.36 (5.02 to 6.24)	
SCOTLAND								
North of Scotland	8,623	3.13	3.72 (3.21 to 4.34)	0.93	1.62 (1.30 to 2.03)	4.06	5.34 (4.88 to 6.32)	
South East Scotland & Tayside	20,506	3.61	3.79 (3.27 to 4.38)	1.57	1.69 (1.42 to 2.11)	5.17	5.47 (4.99 to 6.41)	
West of Scotland	23,983	4.42	4.09 (3.44 to 4.96)	1.84	1.70 (1.40 to 2.05)	6.25	5.76 (5.22 to 6.90)	
WALES	31,354	3.76	3.80 (3.32 to 4.45)	1.60	1.67 (1.42 to 2.03)	5.36	5.46 (5.08 to 6.41)	
NORTHERN IRELAND[◦]	23,439	4.61	4.21 (3.46 to 5.20)	2.06	1.88 (1.50 to 2.47)	6.66	6.08 (5.45 to 7.45)	

[§] excluding terminations of pregnancy and births <24[+0] weeks gestational age
[†] per 1,000 total births
[‡] per 1,000 live births
[#] colours represent variation from comparator group average extended perinatal mortality rate
[◦] different laws exist in Northern Ireland for the termination of pregnancy
* entry suppressed because of small number of deaths
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey

7. Mortality rates by Local Authority

This chapter presents the outcomes for populations covered by individual organisations responsible for public health (Local Authorities) in order to facilitate interventions to reduce mortality at a local level. Crude and stabilised stillbirth, neonatal mortality and extended perinatal mortality rates are presented in maps (Figures 47 to 52) and Table 29, followed by Table 30 which provide details of the proportion of mothers giving birth in each local authority by ethnicity, maternal age, highest deprivation quintile, multiplicity and preterm delivery (24 to 31 weeks gestation) for the development and targeting of public health initiatives (see Chapter 5).

Figure 47: Crude stillbirth rates by Local Authority based on postcode of mother's residence at time of delivery: United Kingdom and Crown Dependencies, for births in 2017



§ excluding terminations of pregnancy and births less than 24^{+0} weeks gestational age.
° different laws exist in Northern Ireland for the termination of pregnancy. Local councils in Northern Ireland are not responsible for the delivery of health, education or social services.
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey.

Figure 48: Stabilised stillbirth rates by Local Authority based on postcode of mother's residence at time of delivery: United Kingdom and Crown Dependencies, for births in 2017

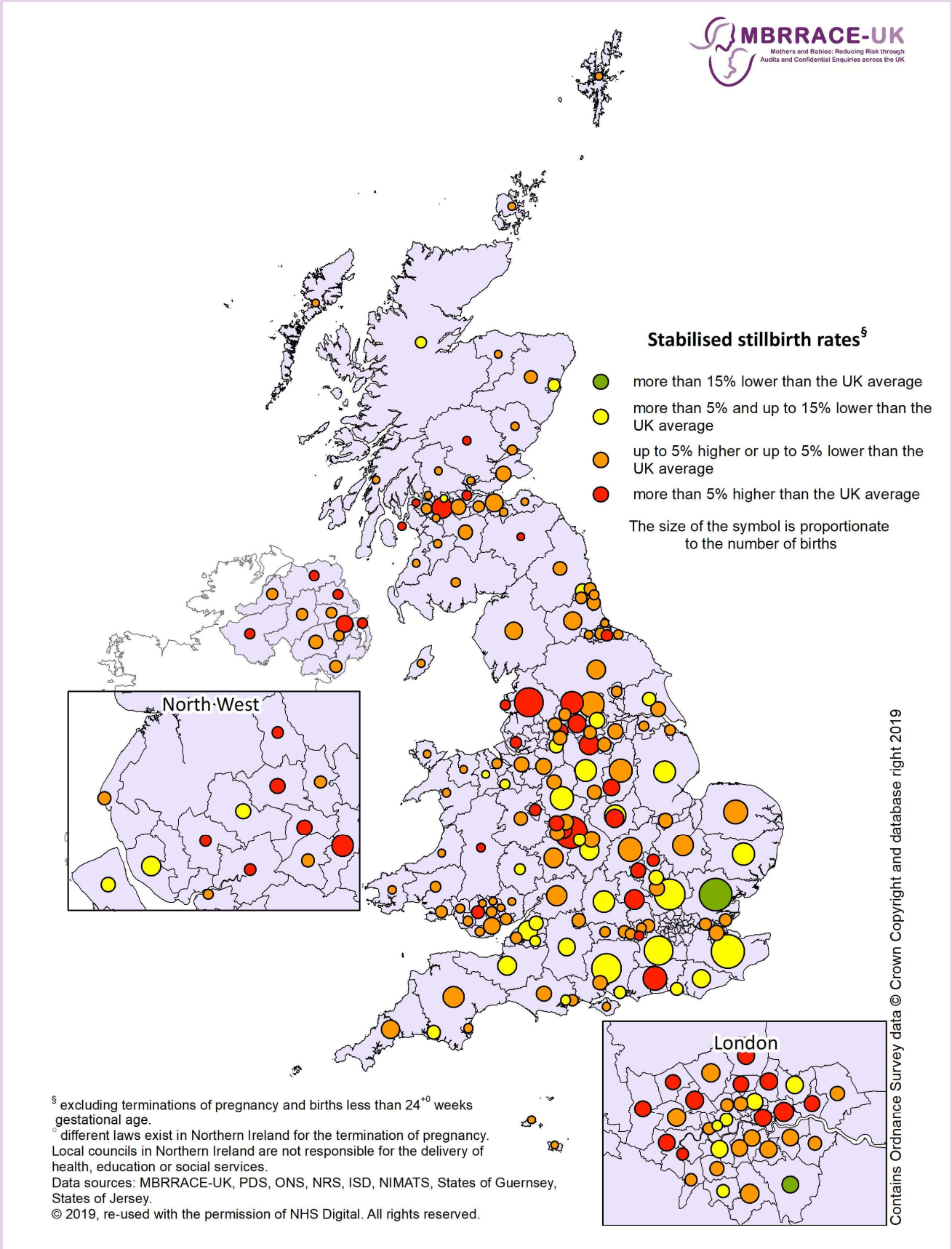


Figure 49: Crude neonatal mortality rates by Local Authority based on postcode of mother's residence at time of delivery: United Kingdom and Crown Dependencies, for births in 2017

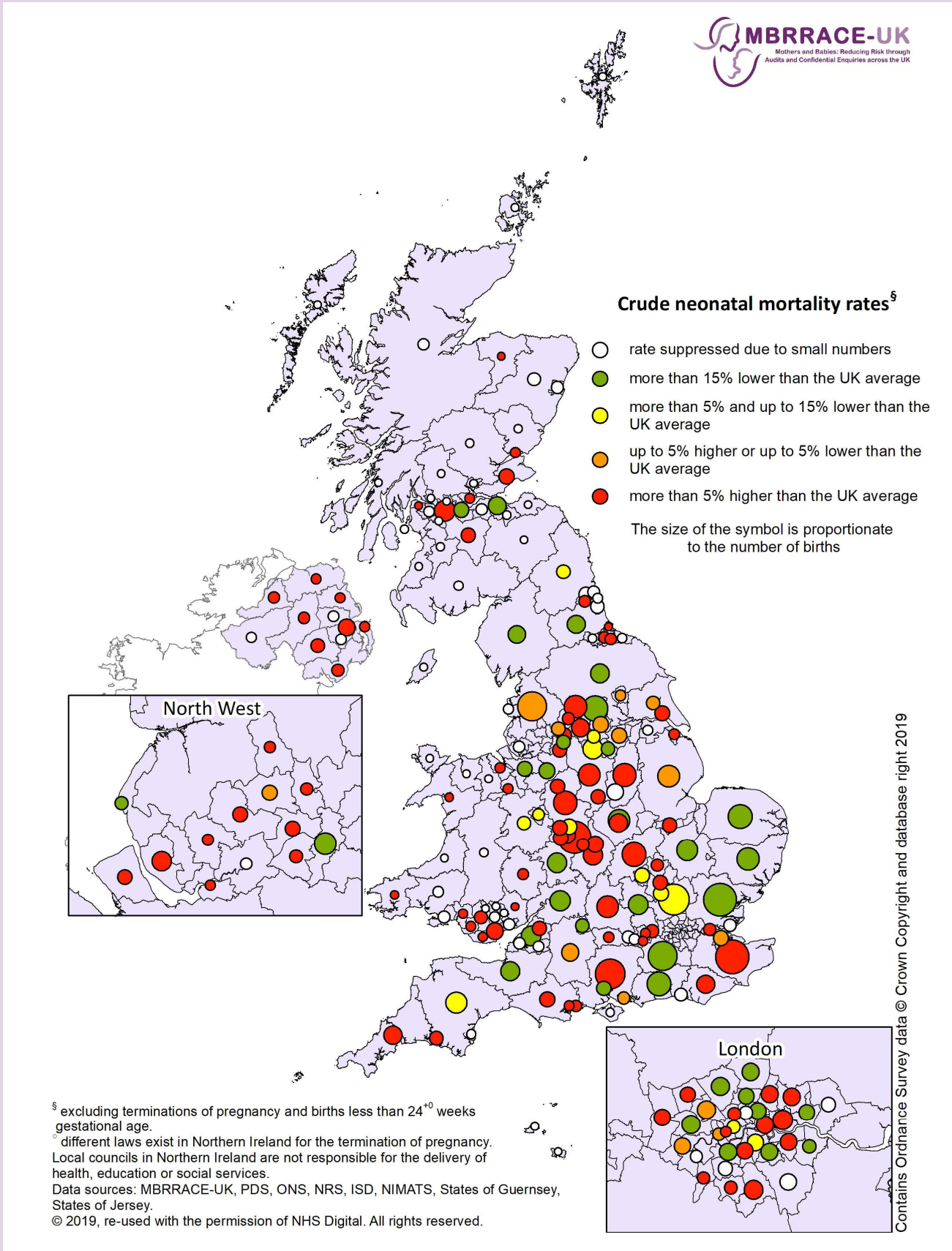


Figure 50: Stabilised neonatal mortality rates by Local Authority based on postcode of mother's residence at time of delivery: United Kingdom and Crown Dependencies, for births in 2017

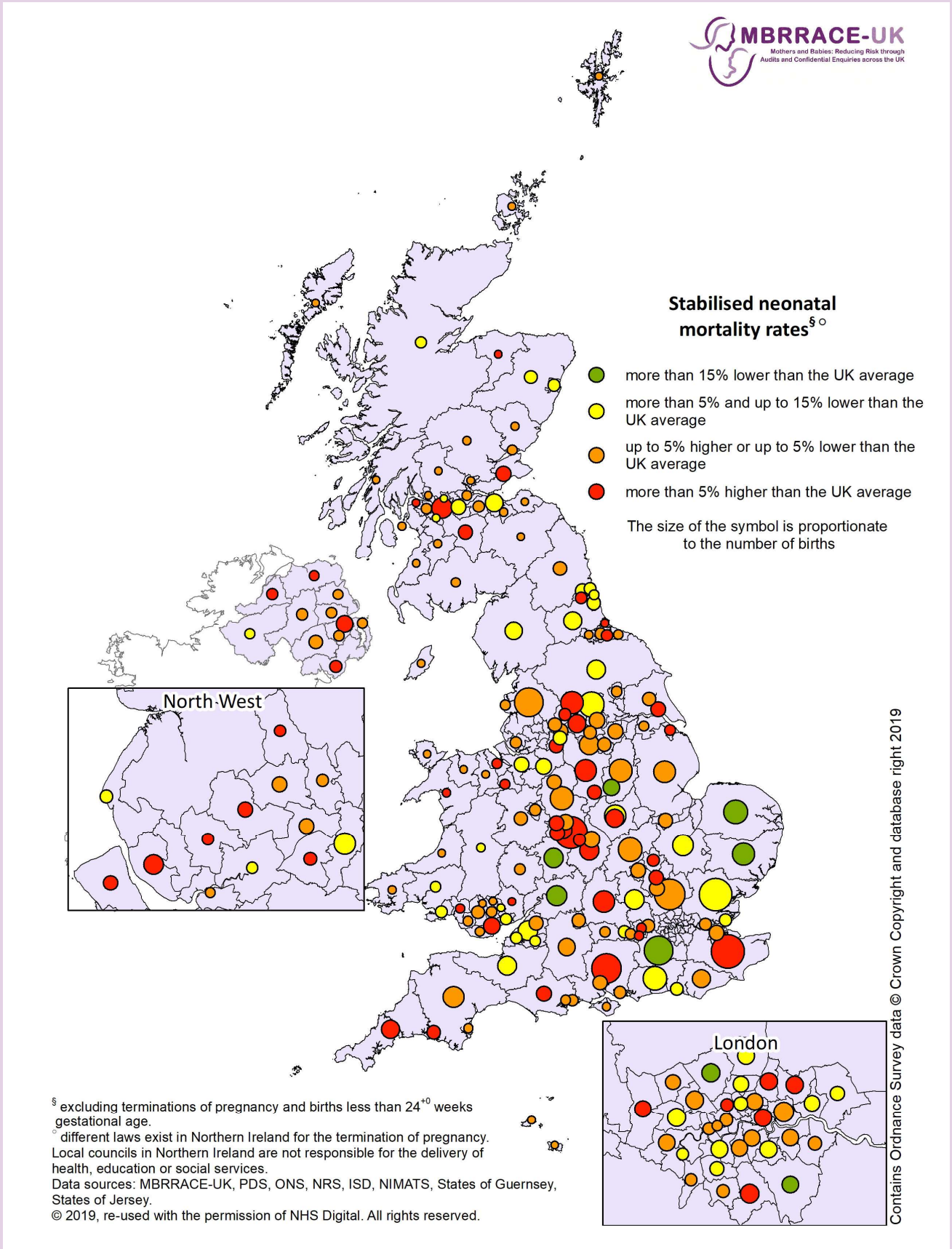


Figure 51: Crude extended perinatal mortality rates by Local Authority based on postcode of mother's residence at time of delivery: United Kingdom and Crown Dependencies, for births in 2017

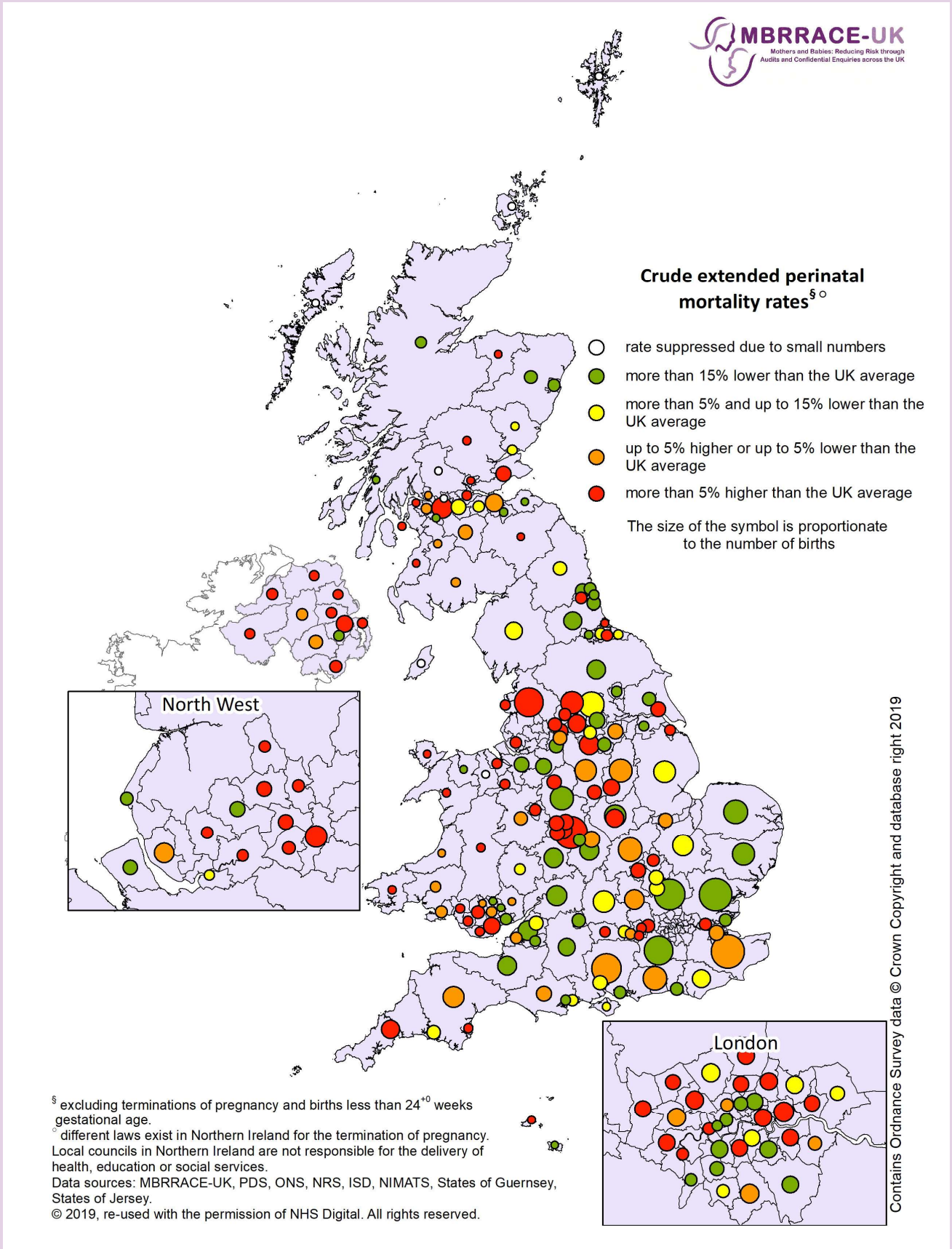


Figure 52: Stabilised extended perinatal mortality rates by Local Authority based on postcode of mother's residence at time of delivery: United Kingdom and Crown Dependencies, for births in 2017

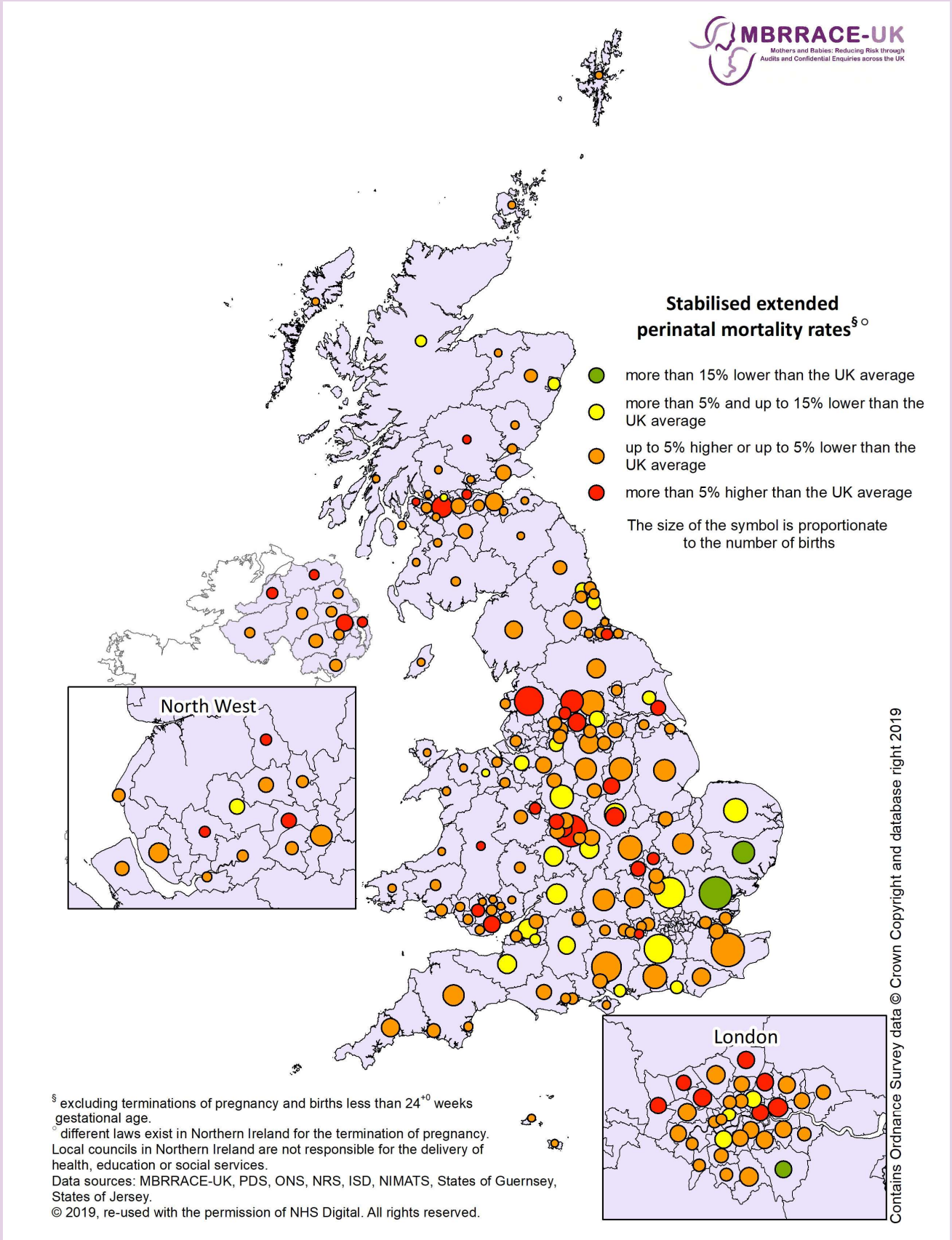


Table 29: Crude and stabilised stillbirth, neonatal, and extended perinatal mortality rates by Local Authority based on postcode of mother's residence at time of delivery: United Kingdom and Crown Dependencies, for births in 2017

Local Authority	Total births§	Rate per 1,000 births§						
		Stillbirth†		Neonatal‡		Extended perinatal†		
		Crude	Stabilised (95% CI)	Crude	Stabilised (95% CI)	Crude	Stabilised (95% CI)#	
ENGLAND								
Barking and Dagenham	3,856	4.67	3.99 (2.98 to 5.27)	1.04	1.55 (1.07 to 2.20)	5.71	5.54 (4.45 to 6.98)	
Barnet	5,233	4.20	3.90 (3.03 to 5.05)	0.58	1.39 (0.92 to 2.11)	4.78	5.29 (4.31 to 6.55)	
Barnsley	2,761	3.26	3.64 (2.70 to 4.80)	1.45	1.64 (1.17 to 2.42)	4.71	5.28 (4.25 to 6.75)	
Bath and North East Somerset	1,724	*	3.47 (2.58 to 4.68)	*	1.56 (1.03 to 2.28)	2.32	5.02 (3.96 to 6.55)	
Bedford	2,196	5.46	4.04 (3.03 to 5.34)	2.75	1.84 (1.25 to 2.73)	8.20	5.87 (4.68 to 7.45)	
Bexley	3,062	3.92	3.78 (2.85 to 5.12)	1.31	1.61 (1.11 to 2.32)	5.23	5.39 (4.40 to 6.94)	
Birmingham	16,669	5.16	4.66 (3.74 to 5.79)	2.71	2.33 (1.77 to 3.25)	7.86	6.97 (6.02 to 8.46)	
Blackburn with Darwen	2,015	5.46	4.02 (3.07 to 5.38)	3.99	2.01 (1.38 to 3.04)	9.43	6.02 (4.79 to 7.72)	
Blackpool	1,635	*	3.98 (2.99 to 5.43)	*	1.63 (1.13 to 2.48)	6.73	5.60 (4.48 to 7.30)	
Bolton	3,734	4.55	3.96 (3.03 to 5.18)	1.61	1.67 (1.16 to 2.40)	6.16	5.62 (4.67 to 6.96)	
Bournemouth	2,144	2.80	3.59 (2.70 to 4.84)	1.87	1.71 (1.20 to 2.66)	4.66	5.29 (4.26 to 6.78)	
Bracknell Forest	1,418	7.05	4.14 (3.07 to 5.71)	3.55	1.87 (1.28 to 2.87)	10.58	6.00 (4.83 to 7.91)	
Bradford	7,681	4.82	4.21 (3.30 to 5.43)	2.88	2.17 (1.44 to 3.04)	7.68	6.37 (5.16 to 7.78)	
Brent	5,244	4.96	4.16 (3.25 to 5.36)	1.72	1.70 (1.19 to 2.42)	6.67	5.85 (4.75 to 7.26)	
Brighton and Hove	2,718	*	3.37 (2.48 to 4.54)	*	1.53 (1.03 to 2.30)	2.58	4.89 (3.86 to 6.30)	
Bristol, City of	6,013	2.49	3.32 (2.56 to 4.38)	1.17	1.53 (1.09 to 2.17)	3.66	4.84 (3.98 to 6.05)	
Bromley	4,235	*	3.13 (2.29 to 4.18)	*	1.36 (0.88 to 2.06)	1.65	4.48 (3.58 to 5.68)	
Buckinghamshire	5,875	4.60	4.06 (3.18 to 5.21)	1.03	1.49 (1.01 to 2.12)	5.62	5.55 (4.51 to 6.87)	
Bury	2,255	3.99	3.78 (2.87 to 5.07)	1.78	1.69 (1.13 to 2.54)	5.76	5.47 (4.30 to 6.93)	
Calderdale	2,413	3.73	3.74 (2.87 to 4.94)	3.33	1.95 (1.31 to 3.00)	7.05	5.68 (4.59 to 7.21)	
Cambridgeshire	6,919	3.47	3.64 (2.88 to 4.57)	1.16	1.52 (1.09 to 2.14)	4.62	5.15 (4.31 to 6.32)	
Camden	2,666	3.00	3.60 (2.72 to 4.72)	2.26	1.78 (1.20 to 2.63)	5.25	5.37 (4.35 to 6.89)	
Central Bedfordshire	3,194	2.82	3.54 (2.69 to 4.68)	2.20	1.79 (1.24 to 2.67)	5.01	5.31 (4.24 to 6.77)	
Cheshire East	3,843	3.38	3.65 (2.81 to 4.75)	1.04	1.55 (1.09 to 2.21)	4.42	5.19 (4.23 to 6.41)	
Cheshire West and Chester	3,567	3.08	3.58 (2.75 to 4.75)	0.84	1.51 (1.04 to 2.18)	3.92	5.09 (4.11 to 6.45)	
Cornwall	5,170	3.68	3.72 (2.88 to 4.79)	2.14	1.82 (1.30 to 2.51)	5.80	5.53 (4.50 to 6.83)	

Local Authority	Total births§	Rate per 1,000 births§						
		Stillbirth†		Neonatal‡		Extended perinatal†		
		Crude	Stabilised (95% CI)	Crude	Stabilised (95% CI)	Crude	Stabilised (95% CI)#	
County Durham	5,040	3.37	3.63 (2.74 to 4.72)	1.19	1.56 (1.11 to 2.29)	4.56	5.18 (4.22 to 6.46)	
Coventry	4,451	3.37	3.64 (2.77 to 4.69)	1.80	1.72 (1.18 to 2.42)	5.17	5.35 (4.36 to 6.58)	
Croydon	5,650	3.36	3.62 (2.81 to 4.76)	1.95	1.77 (1.27 to 2.53)	5.31	5.38 (4.44 to 6.65)	
Cumbria	4,589	4.14	3.87 (2.95 to 5.03)	0.66	1.44 (0.96 to 2.13)	4.79	5.30 (4.30 to 6.57)	
Darlington	1,143	*	3.63 (2.72 to 4.93)	*	1.61 (1.03 to 2.32)	3.50	5.24 (4.17 to 6.78)	
Derby	3,198	4.07	3.82 (2.95 to 5.04)	2.20	1.79 (1.23 to 2.68)	6.25	5.60 (4.54 to 7.10)	
Derbyshire	7,566	3.17	3.52 (2.71 to 4.54)	2.12	1.86 (1.38 to 2.66)	5.29	5.36 (4.51 to 6.66)	
Devon	6,955	4.17	3.92 (3.11 to 5.12)	1.44	1.61 (1.14 to 2.28)	5.61	5.52 (4.57 to 6.94)	
Doncaster	3,467	3.46	3.67 (2.83 to 4.82)	1.74	1.70 (1.19 to 2.50)	5.19	5.36 (4.38 to 6.79)	
Dorset	3,458	3.47	3.68 (2.78 to 4.83)	2.03	1.76 (1.25 to 2.62)	5.49	5.43 (4.37 to 6.90)	
Dudley	3,715	3.77	3.75 (2.86 to 4.90)	2.43	1.86 (1.28 to 2.66)	6.19	5.60 (4.48 to 6.88)	
Ealing	5,157	4.27	3.92 (3.10 to 5.13)	0.97	1.50 (1.04 to 2.15)	5.24	5.41 (4.50 to 6.69)	
East Riding of Yorkshire	2,899	2.07	3.40 (2.54 to 4.58)	1.73	1.69 (1.19 to 2.52)	3.79	5.08 (4.19 to 6.43)	
East Sussex	4,935	3.04	3.53 (2.73 to 4.59)	1.83	1.73 (1.21 to 2.47)	4.86	5.25 (4.28 to 6.51)	
Enfield	4,769	7.13	4.89 (3.67 to 6.56)	1.27	1.58 (1.11 to 2.29)	8.39	6.47 (5.18 to 8.20)	
Essex	16,530	2.48	3.02 (2.41 to 3.78)	1.21	1.45 (1.06 to 1.94)	3.69	4.46 (3.68 to 5.39)	
Gateshead	2,095	3.82	3.75 (2.79 to 4.91)	2.87	1.85 (1.24 to 2.71)	6.68	5.59 (4.44 to 7.00)	
Gloucestershire	6,548	3.36	3.60 (2.85 to 4.58)	0.46	1.32 (0.85 to 1.87)	3.82	4.92 (4.01 to 6.04)	
Greenwich	4,431	4.29	3.91 (3.04 to 5.06)	1.81	1.72 (1.23 to 2.53)	6.09	5.62 (4.63 to 7.06)	
Hackney and City of London	4,483	2.90	3.50 (2.70 to 4.66)	1.34	1.60 (1.09 to 2.28)	4.24	5.10 (4.17 to 6.40)	
Halton	1,482	2.70	3.62 (2.69 to 4.91)	2.03	1.71 (1.17 to 2.54)	4.72	5.32 (4.27 to 6.95)	
Hammersmith and Fulham	2,467	4.46	3.88 (2.87 to 5.19)	1.63	1.67 (1.14 to 2.48)	6.08	5.54 (4.48 to 6.99)	
Hampshire	13,827	3.04	3.36 (2.68 to 4.25)	2.32	2.05 (1.49 to 2.79)	5.35	5.40 (4.44 to 6.48)	
Haringey	3,939	5.08	4.11 (3.17 to 5.50)	1.02	1.54 (1.07 to 2.23)	6.09	5.65 (4.54 to 7.22)	
Harrow	3,741	5.08	4.10 (3.14 to 5.43)	1.88	1.73 (1.20 to 2.45)	6.95	5.82 (4.77 to 7.32)	
Hartlepool	1,012	3.95	3.76 (2.82 to 5.00)	2.98	1.77 (1.19 to 2.68)	6.92	5.52 (4.47 to 7.05)	
Havering	3,367	*	3.84 (2.98 to 4.94)	*	1.47 (0.97 to 2.19)	4.75	5.32 (4.30 to 6.72)	
Herefordshire, County of	1,737	2.30	3.54 (2.61 to 4.70)	2.31	1.75 (1.18 to 2.61)	4.61	5.29 (4.20 to 6.78)	
Hertfordshire	14,256	2.95	3.31 (2.67 to 4.14)	1.48	1.59 (1.19 to 2.17)	4.42	4.90 (4.13 to 5.97)	
Hillingdon	4,364	5.27	4.20 (3.23 to 5.66)	2.07	1.79 (1.24 to 2.53)	7.33	5.98 (4.88 to 7.60)	

Local Authority	Total births§	Rate per 1,000 births§						
		Stillbirth†		Neonatal‡		Extended perinatal†		
		Crude	Stabilised (95% CI)	Crude	Stabilised (95% CI)	Crude	Stabilised (95% CI)#	
Hounslow	4,177	4.55	3.98 (3.09 to 5.28)	1.68	1.69 (1.17 to 2.62)	6.22	5.66 (4.63 to 7.22)	
Isle of Wight	1,233	*	3.69 (2.68 to 4.90)	*	1.67 (1.14 to 2.48)	4.87	5.35 (4.21 to 6.75)	
Islington	3,013	*	3.65 (2.75 to 4.75)	*	1.50 (1.01 to 2.27)	3.98	5.15 (4.18 to 6.54)	
Kensington and Chelsea	1,825	2.19	3.52 (2.61 to 4.64)	2.20	1.74 (1.18 to 2.64)	4.38	5.26 (4.20 to 6.68)	
Kent	17,449	3.15	3.39 (2.78 to 4.14)	2.41	2.15 (1.63 to 2.91)	5.56	5.53 (4.68 to 6.64)	
Kingston upon Hull, City of	3,453	3.48	3.68 (2.84 to 4.86)	3.49	2.09 (1.46 to 3.16)	6.95	5.76 (4.59 to 7.31)	
Kingston upon Thames	2,222	2.70	3.57 (2.66 to 4.73)	1.81	1.70 (1.21 to 2.56)	4.50	5.26 (4.24 to 6.72)	
Kirklees	5,209	5.38	4.31 (3.36 to 5.56)	2.70	1.99 (1.41 to 2.87)	8.06	6.29 (5.12 to 7.75)	
Knowsley	2,022	*	3.94 (2.98 to 5.24)	*	1.59 (1.11 to 2.40)	5.93	5.52 (4.47 to 6.98)	
Lambeth	4,392	3.87	3.78 (2.95 to 4.94)	1.83	1.72 (1.18 to 2.49)	5.69	5.50 (4.46 to 6.91)	
Lancashire	12,822	4.13	3.97 (3.20 to 4.95)	1.72	1.72 (1.26 to 2.35)	5.85	5.68 (4.74 to 6.79)	
Leeds	10,052	3.58	3.67 (2.90 to 4.65)	1.30	1.53 (1.09 to 2.16)	4.87	5.20 (4.35 to 6.37)	
Leicester	4,958	4.84	4.10 (3.16 to 5.32)	2.43	1.90 (1.34 to 2.74)	7.26	6.00 (4.87 to 7.53)	
Leicestershire and Rutland	7,263	2.75	3.36 (2.58 to 4.28)	0.97	1.45 (0.99 to 2.12)	3.72	4.81 (3.87 to 5.99)	
Lewisham	4,807	3.74	3.75 (2.92 to 4.81)	0.84	1.47 (0.99 to 2.09)	4.58	5.21 (4.24 to 6.43)	
Lincolnshire	7,502	3.20	3.53 (2.80 to 4.47)	1.74	1.71 (1.26 to 2.40)	4.93	5.23 (4.27 to 6.43)	
Liverpool	5,944	2.69	3.38 (2.61 to 4.39)	2.87	2.09 (1.45 to 3.12)	5.55	5.46 (4.45 to 6.84)	
Luton	3,439	3.20	3.61 (2.73 to 4.69)	1.46	1.64 (1.13 to 2.38)	4.65	5.24 (4.21 to 6.62)	
Manchester	7,543	4.51	4.07 (3.19 to 5.19)	1.20	1.52 (1.05 to 2.19)	5.70	5.59 (4.59 to 6.85)	
Medway	3,594	3.90	3.78 (2.91 to 4.97)	1.68	1.68 (1.17 to 2.38)	5.56	5.46 (4.49 to 6.88)	
Merton	3,196	*	3.75 (2.82 to 4.93)	*	1.49 (0.97 to 2.20)	4.38	5.23 (4.16 to 6.57)	
Middlesbrough	1,955	5.12	3.96 (3.01 to 5.37)	3.60	1.94 (1.30 to 2.90)	8.70	5.89 (4.71 to 7.52)	
Milton Keynes	3,535	5.37	4.16 (3.19 to 5.60)	1.42	1.63 (1.11 to 2.45)	6.79	5.79 (4.72 to 7.34)	
Newcastle upon Tyne	3,283	*	3.45 (2.48 to 4.52)	*	1.48 (1.00 to 2.27)	3.05	4.92 (3.86 to 6.31)	
Newham	6,055	6.44	4.80 (3.62 to 6.46)	1.83	1.74 (1.25 to 2.48)	8.26	6.53 (5.33 to 8.36)	
Norfolk	8,695	3.34	3.57 (2.77 to 4.56)	0.69	1.33 (0.88 to 1.93)	4.03	4.89 (4.00 to 6.06)	
North East Lincolnshire	1,797	3.90	3.76 (2.83 to 5.05)	2.79	1.82 (1.20 to 2.73)	6.68	5.57 (4.49 to 7.20)	
North Lincolnshire	1,663	*	3.64 (2.68 to 5.02)	*	1.63 (1.11 to 2.41)	4.21	5.26 (4.09 to 6.84)	
North Somerset	2,073	*	3.84 (2.97 to 5.09)	*	1.59 (1.06 to 2.31)	5.31	5.42 (4.41 to 6.91)	
North Tyneside	2,228	*	3.79 (2.83 to 5.08)	*	1.51 (0.99 to 2.20)	4.49	5.30 (4.26 to 6.74)	

Local Authority	Total births§	Rate per 1,000 births§						
		Stillbirth†		Neonatal‡		Extended perinatal†		
		Crude	Stabilised (95% CI)	Crude	Stabilised (95% CI)	Crude	Stabilised (95% CI)#	
North Yorkshire	5,451	3.49	3.66 (2.83 to 4.71)	1.10	1.52 (1.06 to 2.15)	4.59	5.18 (4.24 to 6.47)	
Northamptonshire	8,880	3.72	3.74 (2.92 to 4.72)	1.81	1.75 (1.26 to 2.43)	5.52	5.48 (4.57 to 6.67)	
Northumberland	2,769	3.25	3.64 (2.75 to 4.81)	1.45	1.64 (1.11 to 2.42)	4.69	5.28 (4.22 to 6.71)	
Nottingham	4,234	*	4.54 (3.47 to 6.07)	*	1.41 (0.96 to 2.03)	6.85	5.96 (4.76 to 7.57)	
Nottinghamshire	8,565	3.39	3.59 (2.86 to 4.58)	1.76	1.72 (1.24 to 2.45)	5.14	5.31 (4.47 to 6.42)	
Oldham	3,336	4.50	3.92 (3.00 to 5.21)	1.81	1.71 (1.19 to 2.47)	6.29	5.63 (4.55 to 7.15)	
Oxfordshire	7,367	2.85	3.39 (2.61 to 4.35)	1.91	1.77 (1.25 to 2.56)	4.75	5.16 (4.25 to 6.39)	
Peterborough	3,090	3.56	3.70 (2.75 to 4.94)	1.95	1.73 (1.21 to 2.59)	5.50	5.43 (4.45 to 6.83)	
Plymouth	2,843	2.11	3.41 (2.64 to 4.55)	2.82	1.89 (1.30 to 2.91)	4.92	5.29 (4.27 to 6.78)	
Poole	1,540	*	3.44 (2.56 to 4.59)	*	1.71 (1.17 to 2.58)	3.25	5.14 (4.12 to 6.55)	
Portsmouth	2,411	1.66	3.38 (2.56 to 4.39)	1.66	1.68 (1.16 to 2.48)	3.32	5.05 (4.05 to 6.28)	
Reading	2,408	*	3.89 (2.93 to 5.08)	*	1.50 (1.00 to 2.26)	4.98	5.39 (4.29 to 6.85)	
Redbridge	4,640	2.16	3.29 (2.43 to 4.31)	2.59	1.94 (1.30 to 2.88)	4.74	5.21 (4.16 to 6.51)	
Redcar and Cleveland	1,439	*	3.71 (2.74 to 4.96)	*	1.65 (1.12 to 2.55)	4.86	5.35 (4.21 to 6.91)	
Richmond upon Thames	2,461	*	3.96 (2.94 to 5.04)	*	1.55 (1.04 to 2.24)	5.69	5.50 (4.45 to 6.80)	
Rochdale	2,946	4.07	3.81 (2.89 to 4.99)	1.70	1.69 (1.16 to 2.46)	5.77	5.49 (4.45 to 6.87)	
Rotherham	3,069	3.26	3.64 (2.79 to 4.74)	1.31	1.61 (1.11 to 2.30)	4.56	5.24 (4.22 to 6.55)	
Salford	3,554	4.50	3.94 (3.05 to 5.10)	1.98	1.75 (1.24 to 2.59)	6.47	5.68 (4.61 to 7.19)	
Sandwell	4,690	5.33	4.25 (3.25 to 5.52)	3.00	2.06 (1.42 to 2.98)	8.32	6.30 (5.12 to 7.75)	
Sefton	2,751	3.27	3.65 (2.71 to 4.79)	1.09	1.58 (1.03 to 2.29)	4.36	5.23 (4.21 to 6.56)	
Sheffield	6,530	4.29	3.96 (3.12 to 5.09)	1.54	1.64 (1.22 to 2.35)	5.82	5.60 (4.62 to 6.91)	
Shropshire	2,795	3.94	3.78 (2.85 to 5.05)	1.44	1.64 (1.14 to 2.47)	5.37	5.42 (4.37 to 6.84)	
Slough	2,521	3.97	3.78 (2.88 to 5.05)	1.99	1.73 (1.17 to 2.65)	5.95	5.51 (4.45 to 7.07)	
Solihull	2,302	1.74	3.40 (2.54 to 4.45)	2.61	1.82 (1.30 to 2.75)	4.34	5.21 (4.20 to 6.64)	
Somerset	5,368	2.24	3.27 (2.48 to 4.24)	0.93	1.48 (1.00 to 2.18)	3.17	4.74 (3.84 to 5.91)	
South Gloucestershire	3,193	2.82	3.54 (2.74 to 4.70)	1.88	1.72 (1.17 to 2.56)	4.70	5.25 (4.31 to 6.58)	
South Tyneside	1,566	*	3.67 (2.75 to 5.01)	*	1.57 (1.03 to 2.30)	3.83	5.24 (4.26 to 6.73)	
Southampton	3,164	3.79	3.75 (2.86 to 5.09)	1.27	1.60 (1.12 to 2.34)	5.06	5.35 (4.30 to 6.82)	
Southend-on-Sea	2,211	*	3.57 (2.64 to 4.66)	*	1.57 (1.08 to 2.29)	3.62	5.14 (4.14 to 6.42)	
Southwark	4,468	3.36	3.63 (2.79 to 4.70)	1.57	1.66 (1.13 to 2.41)	4.92	5.28 (4.21 to 6.60)	

Local Authority	Total births§	Rate per 1,000 births§						
		Stillbirth†		Neonatal‡		Extended perinatal†		
		Crude	Stabilised (95% CI)	Crude	Stabilised (95% CI)	Crude	Stabilised (95% CI)#	
St. Helens	2,035	4.91	3.93 (3.00 to 5.22)	2.96	1.86 (1.26 to 2.90)	7.86	5.78 (4.69 to 7.42)	
Staffordshire	8,486	2.71	3.31 (2.53 to 4.27)	1.77	1.73 (1.25 to 2.33)	4.48	5.03 (4.14 to 6.29)	
Stockport	3,313	1.81	3.31 (2.46 to 4.40)	2.12	1.77 (1.25 to 2.60)	3.92	5.07 (4.06 to 6.48)	
Stockton-on-Tees	2,165	2.77	3.58 (2.67 to 4.75)	1.85	1.70 (1.17 to 2.48)	4.62	5.28 (4.20 to 6.67)	
Stoke-on-Trent	3,306	4.23	3.86 (2.98 to 5.08)	1.82	1.71 (1.20 to 2.50)	6.05	5.57 (4.49 to 7.05)	
Suffolk	7,665	2.48	3.24 (2.49 to 4.23)	0.65	1.34 (0.91 to 1.91)	3.13	4.58 (3.71 to 5.72)	
Sunderland	2,918	*	3.60 (2.75 to 4.69)	*	1.51 (0.97 to 2.21)	3.77	5.11 (4.04 to 6.45)	
Surrey	12,923	3.02	3.36 (2.68 to 4.22)	1.09	1.41 (1.02 to 1.98)	4.10	4.78 (4.00 to 5.88)	
Sutton	2,604	2.69	3.54 (2.66 to 4.72)	1.93	1.72 (1.16 to 2.56)	4.61	5.25 (4.20 to 6.62)	
Swindon	2,850	3.16	3.62 (2.69 to 4.83)	1.41	1.63 (1.12 to 2.38)	4.56	5.25 (4.22 to 6.77)	
Tameside	2,864	4.54	3.91 (2.99 to 5.18)	1.05	1.57 (1.09 to 2.26)	5.59	5.48 (4.42 to 6.94)	
Telford and Wrekin	2,091	7.65	4.42 (3.32 to 6.09)	1.45	1.65 (1.12 to 2.42)	9.09	6.07 (4.79 to 7.92)	
Thurrock	2,421	3.72	3.74 (2.81 to 5.00)	2.07	1.74 (1.21 to 2.58)	5.78	5.47 (4.39 to 6.91)	
Torbay	1,343	*	3.91 (2.92 to 5.32)	*	1.66 (1.11 to 2.53)	6.70	5.56 (4.39 to 7.22)	
Tower Hamlets	4,716	6.36	4.60 (3.57 to 6.16)	2.77	1.99 (1.37 to 2.93)	9.12	6.59 (5.35 to 8.45)	
Trafford	2,686	4.10	3.81 (2.90 to 5.17)	2.24	1.78 (1.23 to 2.59)	6.33	5.58 (4.53 to 7.15)	
Wakefield	4,013	2.49	3.41 (2.55 to 4.51)	1.75	1.70 (1.18 to 2.47)	4.24	5.11 (4.16 to 6.46)	
Walsall	3,852	4.15	3.85 (2.97 to 5.05)	1.56	1.66 (1.17 to 2.48)	5.71	5.51 (4.48 to 6.94)	
Waltham Forest	4,737	4.43	3.96 (3.00 to 5.20)	2.12	1.81 (1.25 to 2.68)	6.54	5.76 (4.66 to 7.35)	
Wandsworth	4,798	2.92	3.50 (2.65 to 4.56)	1.05	1.52 (1.06 to 2.17)	3.96	5.01 (4.07 to 6.27)	
Warrington	2,174	*	3.97 (2.95 to 5.26)	*	1.58 (1.06 to 2.36)	5.98	5.54 (4.38 to 6.90)	
Warwickshire	5,966	2.51	3.32 (2.58 to 4.25)	2.02	1.80 (1.29 to 2.52)	4.53	5.11 (4.16 to 6.25)	
West Berkshire	1,712	4.09	3.79 (2.86 to 5.08)	1.76	1.69 (1.15 to 2.55)	5.84	5.47 (4.38 to 7.04)	
West Sussex	8,635	4.28	4.00 (3.17 to 5.13)	1.28	1.54 (1.09 to 2.19)	5.56	5.53 (4.61 to 6.86)	
Westminster	2,613	2.30	3.47 (2.59 to 4.75)	1.53	1.66 (1.12 to 2.40)	3.83	5.12 (4.07 to 6.66)	
Wigan	3,628	1.93	3.31 (2.46 to 4.35)	2.21	1.80 (1.26 to 2.67)	4.13	5.10 (4.12 to 6.39)	
Wiltshire	4,846	2.68	3.43 (2.64 to 4.46)	1.66	1.68 (1.17 to 2.43)	4.33	5.10 (4.14 to 6.34)	
Windsor and Maidenhead	1,660	3.61	3.72 (2.80 to 5.00)	2.42	1.76 (1.20 to 2.64)	6.02	5.48 (4.44 to 7.07)	
Wirral	3,375	2.07	3.36 (2.49 to 4.35)	2.38	1.83 (1.25 to 2.73)	4.44	5.18 (4.17 to 6.48)	
Wokingham	1,796	*	3.84 (2.88 to 5.15)	*	1.61 (1.07 to 2.37)	5.57	5.45 (4.36 to 6.87)	

Local Authority	Total births§	Rate per 1,000 births§						
		Stillbirth†		Neonatal‡		Extended perinatal†		
		Crude	Stabilised (95% CI)	Crude	Stabilised (95% CI)	Crude	Stabilised (95% CI)#	
Wolverhampton	3,548	6.76	4.55 (3.39 to 6.21)	2.55	1.88 (1.31 to 2.80)	9.30	6.42 (5.11 to 8.38)	
Worcestershire	5,894	3.39	3.62 (2.81 to 4.65)	0.68	1.40 (0.95 to 2.05)	4.07	5.02 (4.06 to 6.21)	
York	1,864	2.68	3.59 (2.69 to 4.72)	1.61	1.67 (1.12 to 2.51)	4.29	5.25 (4.23 to 6.64)	
SCOTLAND								
Aberdeen City	2,396	*	3.52 (2.63 to 4.67)	*	1.50 (0.98 to 2.20)	2.92	5.01 (4.05 to 6.45)	
Aberdeenshire	2,690	*	3.66 (2.77 to 4.88)	*	1.53 (1.03 to 2.35)	4.09	5.19 (4.13 to 6.66)	
Angus	1,071	*	3.65 (2.76 to 4.98)	*	1.69 (1.15 to 2.55)	4.67	5.34 (4.30 to 6.91)	
Argyll and Bute	663	*	3.78 (2.81 to 5.14)	*	1.60 (1.07 to 2.35)	4.52	5.38 (4.32 to 6.88)	
City of Edinburgh	5,052	3.96	3.81 (2.96 to 4.86)	1.19	1.56 (1.10 to 2.33)	5.15	5.37 (4.44 to 6.68)	
Clackmannanshire	536	*	3.74 (2.80 to 5.08)	*	1.76 (1.18 to 2.66)	7.46	5.49 (4.37 to 7.02)	
Dumfries and Galloway	1,255	*	3.76 (2.77 to 5.18)	*	1.67 (1.11 to 2.50)	5.58	5.43 (4.32 to 7.05)	
Dundee City	1,504	2.66	3.61 (2.69 to 4.83)	2.00	1.71 (1.18 to 2.55)	4.65	5.31 (4.29 to 6.79)	
East Ayrshire	1,168	*	3.71 (2.77 to 5.07)	*	1.68 (1.14 to 2.49)	5.14	5.38 (4.31 to 7.00)	
East Dunbartonshire	1,029	*	3.42 (2.47 to 4.61)	*	1.56 (1.02 to 2.41)	*	4.98 (3.81 to 6.36)	
East Lothian	974	*	3.60 (2.70 to 4.86)	*	1.70 (1.16 to 2.58)	4.11	5.30 (4.15 to 6.80)	
East Renfrewshire	885	*	3.71 (2.77 to 4.92)	*	1.57 (1.04 to 2.39)	3.39	5.28 (4.17 to 6.63)	
Falkirk	1,561	5.77	4.00 (3.08 to 5.40)	1.93	1.70 (1.15 to 2.54)	7.69	5.70 (4.56 to 7.27)	
Fife	3,480	3.16	3.60 (2.74 to 4.71)	2.88	1.95 (1.32 to 2.94)	6.03	5.54 (4.53 to 7.05)	
Glasgow City	6,878	5.23	4.36 (3.42 to 5.63)	2.19	1.87 (1.34 to 2.71)	7.41	6.22 (5.10 to 7.77)	
Highland	2,096	*	3.52 (2.60 to 4.67)	*	1.52 (1.00 to 2.27)	2.86	5.04 (3.97 to 6.41)	
Inverclyde	676	7.40	3.96 (2.93 to 5.42)	4.47	1.81 (1.20 to 2.76)	11.83	5.77 (4.56 to 7.51)	
Midlothian	1,087	*	3.57 (2.68 to 4.90)	*	1.69 (1.10 to 2.54)	3.68	5.25 (4.19 to 6.84)	
Moray	867	4.61	3.80 (2.91 to 5.08)	3.48	1.79 (1.21 to 2.78)	8.07	5.58 (4.54 to 7.34)	
Na h-Eileanan Siar	217	*	3.85 (2.81 to 5.10)	*	1.65 (1.08 to 2.52)	*	5.49 (4.29 to 7.01)	
North Ayrshire	1,201	*	3.95 (2.95 to 5.34)	*	1.68 (1.13 to 2.53)	7.49	5.63 (4.46 to 7.27)	
North Lanarkshire	3,576	4.19	3.86 (2.93 to 5.09)	0.84	1.51 (1.05 to 2.21)	5.03	5.37 (4.33 to 6.78)	
Orkney Islands	184	*	3.67 (2.68 to 5.00)	*	1.65 (1.04 to 2.54)	*	5.32 (4.13 to 6.92)	
Perth and Kinross	1,213	*	4.04 (3.01 to 5.61)	*	1.68 (1.11 to 2.51)	8.24	5.71 (4.52 to 7.36)	
Renfrewshire	1,806	*	3.84 (2.89 to 5.22)	*	1.61 (1.08 to 2.43)	5.54	5.45 (4.40 to 6.98)	
Scottish Borders	932	*	3.96 (2.98 to 5.35)	*	1.64 (1.06 to 2.44)	7.51	5.59 (4.38 to 7.11)	

Local Authority	Total births§	Rate per 1,000 births§						
		Stillbirth†		Neonatal‡		Extended perinatal†		
		Crude	Stabilised (95% CI)	Crude	Stabilised (95% CI)	Crude	Stabilised (95% CI)#	
Shetland Islands	221	*	3.75 (2.75 to 5.00)	*	1.72 (1.16 to 2.67)	*	5.47 (4.28 to 7.00)	
South Ayrshire	946	*	3.86 (2.87 to 5.46)	*	1.71 (1.14 to 2.57)	7.40	5.56 (4.49 to 7.43)	
South Lanarkshire	3,214	3.42	3.67 (2.77 to 4.84)	2.19	1.78 (1.26 to 2.63)	5.60	5.45 (4.36 to 6.82)	
Stirling	798	*	3.57 (2.64 to 4.82)	*	1.65 (1.11 to 2.50)	*	5.22 (4.15 to 6.60)	
West Dunbartonshire	898	*	3.71 (2.70 to 5.00)	*	1.71 (1.16 to 2.60)	5.57	5.41 (4.23 to 6.93)	
West Lothian	1,936	*	3.72 (2.83 to 4.99)	*	1.60 (1.10 to 2.37)	4.65	5.32 (4.23 to 6.83)	
WALES								
Blaenau Gwent	731	*	3.76 (2.85 to 5.20)	*	1.59 (1.03 to 2.44)	4.10	5.35 (4.18 to 7.03)	
Bridgend	1,491	4.69	3.86 (2.90 to 5.38)	2.02	1.71 (1.15 to 2.53)	6.71	5.56 (4.48 to 7.27)	
Caerphilly	1,923	*	3.80 (2.84 to 5.09)	*	1.60 (1.06 to 2.30)	5.20	5.40 (4.31 to 6.90)	
Cardiff	4,190	4.30	3.90 (3.06 to 5.10)	2.64	1.93 (1.31 to 2.83)	6.92	5.82 (4.76 to 7.26)	
Carmarthenshire	1,831	*	3.91 (2.88 to 5.24)	*	1.55 (1.02 to 2.26)	5.46	5.46 (4.33 to 7.12)	
Ceredigion	554	*	3.73 (2.74 to 5.00)	*	1.68 (1.14 to 2.54)	5.42	5.40 (4.30 to 6.86)	
Conwy	1,022	*	3.59 (2.67 to 4.93)	*	1.70 (1.13 to 2.59)	3.91	5.28 (4.23 to 6.76)	
Denbighshire	978	*	3.44 (2.54 to 4.78)	*	1.63 (1.10 to 2.45)	*	5.06 (3.96 to 6.47)	
Flintshire	1,638	3.05	3.65 (2.75 to 4.99)	3.67	1.91 (1.28 to 3.09)	6.72	5.55 (4.41 to 7.18)	
Gwynedd	1,136	2.64	3.64 (2.71 to 4.95)	3.53	1.83 (1.20 to 2.75)	6.16	5.45 (4.35 to 7.02)	
Isle of Anglesey	663	*	3.87 (2.91 to 5.26)	*	1.67 (1.12 to 2.56)	7.54	5.53 (4.34 to 7.18)	
Merthyr Tydfil	710	*	3.68 (2.73 to 4.93)	*	1.73 (1.13 to 2.58)	5.63	5.41 (4.27 to 6.97)	
Monmouthshire	729	*	3.59 (2.70 to 4.84)	*	1.81 (1.22 to 2.83)	5.49	5.39 (4.26 to 6.97)	
Neath Port Talbot	1,456	2.75	3.62 (2.70 to 4.86)	3.44	1.86 (1.25 to 2.85)	6.18	5.47 (4.32 to 7.06)	
Newport	1,998	*	3.78 (2.81 to 5.06)	*	1.47 (0.95 to 2.25)	4.00	5.25 (4.10 to 6.66)	
Pembrokeshire	1,124	4.45	3.81 (2.87 to 5.23)	2.68	1.76 (1.18 to 2.62)	7.12	5.56 (4.43 to 7.15)	
Powys	1,147	*	4.15 (3.09 to 5.75)	*	1.55 (1.02 to 2.32)	7.85	5.70 (4.48 to 7.46)	
Rhondda Cynon Taf	2,624	6.10	4.23 (3.19 to 5.58)	1.92	1.72 (1.16 to 2.47)	8.00	5.94 (4.78 to 7.47)	
Swansea	2,381	*	3.90 (2.92 to 5.26)	*	1.56 (1.06 to 2.32)	5.46	5.46 (4.38 to 6.90)	
Torfaen	1,021	*	3.75 (2.82 to 5.10)	*	1.56 (1.00 to 2.38)	3.92	5.31 (4.19 to 6.80)	
Vale of Glamorgan	1,377	4.36	3.81 (2.91 to 5.09)	2.19	1.73 (1.15 to 2.53)	6.54	5.53 (4.47 to 7.04)	
Wrexham	1,582	*	3.43 (2.52 to 4.62)	*	1.99 (1.33 to 3.32)	5.69	5.42 (4.26 to 7.04)	

Local Authority	Total births§	Rate per 1,000 births§						
		Stillbirth†		Neonatal‡		Extended perinatal†		
		Crude	Stabilised (95% CI)	Crude	Stabilised (95% CI)	Crude	Stabilised (95% CI)#	
NORTHERN IRELAND°								
Antrim and Newtownabbey	1,699	*	3.87 (2.81 to 5.16)	*	1.62 (1.04 to 2.44)	5.89	5.49 (4.30 to 6.98)	
Ards and North Down	1,551	6.45	4.09 (3.08 to 5.84)	1.95	1.71 (1.14 to 2.60)	8.38	5.80 (4.67 to 7.72)	
Armagh City, Banbridge and Craigavon	2,896	3.45	3.68 (2.80 to 4.88)	2.08	1.75 (1.24 to 2.59)	5.52	5.43 (4.34 to 6.81)	
Belfast	4,229	5.68	4.32 (3.21 to 5.79)	2.62	1.92 (1.34 to 2.77)	8.28	6.24 (4.96 to 7.78)	
Causeway Coast and Glens	1,640	6.10	4.06 (3.07 to 5.53)	2.45	1.77 (1.19 to 2.60)	8.54	5.82 (4.63 to 7.62)	
Derry City and Strabane	1,964	4.58	3.87 (2.88 to 5.20)	3.07	1.87 (1.23 to 2.90)	7.64	5.73 (4.47 to 7.26)	
Fermanagh and Omagh	1,524	*	4.02 (2.92 to 5.53)	*	1.58 (1.05 to 2.34)	6.56	5.59 (4.37 to 7.35)	
Lisburn and Castlereagh	1,737	*	3.62 (2.74 to 4.88)	*	1.62 (1.06 to 2.43)	4.03	5.23 (4.17 to 6.70)	
Mid Ulster	2,126	3.29	3.67 (2.73 to 4.97)	1.89	1.71 (1.16 to 2.59)	5.17	5.37 (4.31 to 6.81)	
Mid and East Antrim	1,521	5.26	3.93 (2.91 to 5.28)	1.98	1.71 (1.18 to 2.59)	7.23	5.64 (4.48 to 7.33)	
Newry, Mourne and Down	2,430	3.29	3.66 (2.77 to 4.77)	2.48	1.81 (1.29 to 2.76)	5.76	5.46 (4.43 to 6.94)	
GUERNSEY	559	*	3.91 (2.92 to 5.48)	*	1.61 (1.07 to 2.38)	7.16	5.51 (4.36 to 7.09)	
ISLE OF MAN	734	*	3.59 (2.67 to 4.93)	*	1.59 (1.04 to 2.41)	*	5.17 (4.04 to 6.67)	
JERSEY	956	*	3.61 (2.63 to 4.86)	*	1.70 (1.17 to 2.53)	4.18	5.30 (4.18 to 6.85)	

§ excluding terminations of pregnancy and births <24^{+0} weeks gestational age
† per 1,000 total births
‡ per 1,000 live births
# colours represent variation from comparator group average extended perinatal mortality rate
* entry suppressed because of small number of deaths
° different laws exist in Northern Ireland for the termination of pregnancy
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey

The shading in Table 30, below, represents the quintiles of all Local Authorities:

- 5th quintile: highest 20% of Local Authorities;
- 4th quintile
- 3rd quintile
- 2nd quintile
- 1st quintile: lowest 20% of Local Authorities.

Example: 24.8% of mothers giving birth in Barking and Dagenham are Asian or Asian British, which places this Local Authority in the 5th quintile or highest 20% of Local Authorities for this population characteristic.

An illustration of the use of this information is provided in Chapter 5.

Table 30: Proportion of mothers giving birth in population characteristic groups by Local Authority, for births in 2017

Local Authority	Asian or Asian British§	Black or Black British§	Mother's age <20 years§	Mother's age >39 years§	Top quintile of child poverty§	Multiple birth§	Born at 24 to 31 weeks§
ENGLAND							
Barking and Dagenham	24.8	22.3	3.1	4.2	10.8	2.7	1.1
Barnet	11.7	7.3	0.9	6.2	5.3	3.6	1.1
Barnsley	0.4	0.4	5.4	1.8	28.6	2.7	1.6
Bath and North East Somerset	0.7	0.2	1.8	4.8	3.0	3.1	1.2
Bedford	13.6	3.9	2.6	3.7	6.4	2.9	1.4
Bexley	8.2	12.2	2.4	4.1	11.0	3.6	1.3
Birmingham	34.0	10.8	3.2	3.8	51.8	2.6	1.5
Blackburn with Darwen	40.5	0.7	3.3	2.1	24.6	2.7	1.1
Blackpool	1.7	0.1	6.0	2.1	40.0	2.5	2.0
Bolton	22.2	5.8	3.6	3.4	27.9	2.3	1.3
Bournemouth	4.2	1.0	2.3	4.3	12.2	2.9	1.4
Bracknell Forest	6.1	3.1	1.2	4.1	0.0	4.0	1.6
Bradford	40.9	2.0	3.2	3.2	36.9	2.9	2.0
Brent	28.3	14.5	1.7	5.9	10.3	3.9	1.4
Brighton and Hove	4.3	2.7	2.5	8.2	14.9	3.2	1.5
Bristol, City of	5.4	8.2	2.6	5.1	26.8	3.5	1.2
Bromley	6.5	6.6	1.1	6.7	13.9	4.1	0.9
Buckinghamshire	14.9	2.3	1.5	5.6	0.4	2.8	1.5
Bury	12.7	1.9	2.3	3.8	10.0	3.4	1.4
Calderdale	17.2	0.6	3.4	3.1	26.0	1.9	1.1
Cambridgeshire	3.7	1.0	2.4	4.6	2.8	3.2	1.3
Camden	13.4	8.2	0.8	7.5	49.0	4.2	0.8
Central Bedfordshire	3.7	2.2	2.4	4.1	5.3	3.4	1.0
Cheshire East	1.9	0.3	2.7	4.8	4.0	2.9	0.9
Cheshire West and Chester	1.5	0.6	2.6	3.9	10.3	2.6	1.3
Cornwall	0.4	0.1	3.3	3.9	13.6	3.2	1.2
County Durham	0.7	0.2	4.9	2.8	31.9	3.1	1.1
Coventry	15.3	9.4	3.8	4.0	32.2	2.9	1.9

Local Authority	Asian or Asian British§	Black or Black British§	Mother's age <20 years§	Mother's age >39 years§	Top quintile of child poverty§	Multiple birth§	Born at 24 to 31 weeks§
Croydon	16.1	21.0	2.4	5.8	4.8	3.6	1.2
Cumbria	0.4	0.2	3.7	2.8	7.3	2.6	1.0
Darlington	3.6	0.6	5.2	2.8	33.4	3.4	1.5
Derby	17.8	3.0	4.5	3.0	33.2	3.7	1.6
Derbyshire	1.3	0.3	2.7	3.7	14.8	3.4	1.3
Devon	1.2	0.3	2.8	4.4	4.4	3.5	1.2
Doncaster	3.3	1.0	5.0	2.5	38.3	2.7	1.8
Dorset	0.7	0.2	2.4	3.9	4.8	3.1	1.4
Dudley	11.2	2.3	4.0	2.9	33.2	2.9	1.4
Ealing	29.9	11.1	1.0	6.8	8.4	3.6	1.4
East Riding of Yorkshire	0.7	0.1	2.9	3.0	10.1	2.6	1.1
East Sussex	2.1	0.8	3.3	4.3	18.0	3.3	1.5
Enfield	8.0	19.3	2.7	5.9	29.0	3.6	1.6
Essex	3.1	2.2	2.4	3.8	9.9	3.4	1.1
Gateshead	2.2	1.4	4.2	2.9	29.5	3.1	1.4
Gloucestershire	2.7	1.4	2.3	4.0	7.4	3.8	1.0
Greenwich	10.2	19.3	2.1	5.7	24.5	4.1	1.2
Hackney and City of London	7.5	18.1	1.7	6.8	37.7	2.4	1.0
Halton	0.9	0.3	4.7	2.6	23.0	2.4	0.9
Hammersmith and Fulham	5.1	11.6	1.3	7.8	18.8	3.6	1.2
Hampshire	3.2	1.2	2.2	4.4	3.8	3.1	1.2
Haringey	6.2	16.3	1.8	7.3	32.2	3.7	1.7
Harrow	38.7	6.1	1.7	5.1	0.0	2.8	1.2
Hartlepool	2.3	0.6	6.7	2.0	58.4	3.1	1.3
Havering	10.3	7.6	2.2	3.4	11.6	3.3	1.0
Herefordshire, County of	1.4	0.2	3.7	3.1	4.1	2.4	1.5
Hertfordshire	8.1	3.4	1.6	5.1	2.6	3.5	1.2
Hillingdon	37.2	8.6	1.6	4.4	6.0	2.8	1.0
Hounslow	34.7	8.1	1.7	6.0	1.8	3.6	1.6
Isle of Wight	0.5	0.2	4.2	3.7	17.7	4.1	1.2
Isles of Scilly	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Local Authority	Asian or Asian British§	Black or Black British§	Mother's age <20 years§	Mother's age >39 years§	Top quintile of child poverty§	Multiple birth§	Born at 24 to 31 weeks§
Islington	6.7	13.9	1.2	7.2	58.6	3.9	1.3
Kensington and Chelsea	5.2	5.9	1.3	9.9	19.5	5.0	1.5
Kent	3.8	2.3	3.5	3.7	16.9	3.1	1.3
Kingston upon Hull, City of	2.8	1.5	4.8	1.9	52.7	2.6	1.7
Kingston upon Thames	13.5	2.3	1.0	6.3	1.2	3.4	0.8
Kirklees	27.0	2.1	3.6	3.3	20.5	2.2	1.5
Knowsley	0.8	0.4	3.9	2.2	48.3	4.2	1.6
Lambeth	5.2	23.2	1.8	7.6	30.4	3.8	1.1
Lancashire	10.8	0.5	3.8	3.2	14.3	2.6	1.1
Leeds	11.4	7.2	3.4	3.9	35.8	3.1	1.2
Leicester	33.5	6.5	3.2	4.2	30.5	2.8	1.6
Leicestershire and Rutland	7.3	1.0	2.4	3.7	3.1	3.3	1.3
Lewisham	6.2	22.9	1.9	6.5	22.6	3.6	1.2
Lincolnshire	1.0	0.3	4.1	2.7	14.6	3.4	1.1
Liverpool	3.2	2.4	3.1	3.5	51.1	3.0	1.7
Luton	41.1	7.4	2.5	4.1	16.1	3.3	1.1
Manchester	21.0	13.0	2.6	4.1	48.1	2.5	1.2
Medway	5.3	4.6	3.9	3.3	22.9	3.7	1.1
Merton	16.0	8.0	1.3	6.9	5.3	4.6	0.8
Middlesbrough	11.7	3.3	7.0	2.4	59.6	3.3	1.2
Milton Keynes	12.2	10.1	2.4	4.6	8.4	3.3	1.9
Newcastle upon Tyne	11.7	3.5	4.4	3.3	42.9	2.4	0.9
Newham	42.1	15.2	1.9	4.1	10.8	2.4	1.4
Norfolk	1.5	1.2	3.4	3.3	11.0	3.1	1.1
North East Lincolnshire	1.1	0.4	6.3	1.8	50.9	2.3	1.5
North Lincolnshire	4.8	0.3	4.8	2.5	20.3	2.6	1.9
North Somerset	1.4	0.3	2.2	4.6	9.2	2.9	1.5
North Tyneside	2.4	0.6	3.0	3.6	18.2	2.2	0.6
North Yorkshire	1.1	0.9	2.8	3.9	4.2	3.2	1.3
Northamptonshire	4.5	4.8	3.2	3.8	9.6	3.4	1.5
Northumberland	1.2	0.0	3.9	3.1	24.7	2.8	1.2

Local Authority	Asian or Asian British§	Black or Black British§	Mother's age <20 years§	Mother's age >39 years§	Top quintile of child poverty§	Multiple birth§	Born at 24 to 31 weeks§
Nottingham	15.9	8.9	4.5	3.1	59.8	2.9	1.8
Nottinghamshire	2.9	0.9	3.3	3.3	15.8	3.8	1.4
Oldham	31.5	3.6	4.0	2.4	32.6	2.4	1.5
Oxfordshire	6.1	2.1	1.8	4.9	3.3	3.1	1.3
Peterborough	16.5	3.5	4.3	2.6	14.1	2.6	1.2
Plymouth	1.9	1.3	4.4	2.8	28.8	2.8	1.3
Poole	2.1	0.2	3.1	3.4	8.6	3.1	0.6
Portsmouth	5.3	3.4	3.7	2.9	24.4	2.7	1.4
Reading	17.9	8.5	2.1	4.8	10.2	3.8	1.6
Redbridge	49.0	7.5	1.6	4.7	0.8	2.7	1.1
Redcar and Cleveland	0.9	0.2	5.9	2.8	45.4	3.4	1.1
Richmond upon Thames	7.4	1.6	1.2	10.2	0.9	4.5	1.1
Rochdale	23.4	3.3	3.7	2.9	32.3	3.0	1.7
Rotherham	6.5	1.0	4.8	2.1	33.2	2.2	1.3
Salford	4.8	7.0	3.3	2.7	32.5	2.5	1.4
Sandwell	27.1	8.3	4.4	3.1	40.5	2.6	1.3
Sefton	0.8	0.2	2.9	3.3	22.2	3.0	1.3
Sheffield	11.6	5.2	3.5	3.4	43.7	3.0	1.3
Shropshire	0.9	0.3	3.6	3.7	6.8	4.5	0.9
Slough	48.2	7.0	1.7	4.3	0.0	2.6	1.6
Solihull	11.9	1.9	2.2	3.6	25.2	2.8	0.9
Somerset	1.0	0.3	3.1	3.6	6.0	2.7	1.2
South Gloucestershire	4.2	1.5	1.7	3.6	2.0	3.5	1.2
South Tyneside	3.0	0.3	4.3	2.4	53.6	2.4	1.5
Southampton	8.3	2.8	3.5	3.6	24.7	3.0	1.2
Southend-on-Sea	4.7	2.4	3.3	4.4	29.4	4.0	1.4
Southwark	6.1	27.9	1.6	7.4	27.2	3.7	1.5
St. Helens	1.2	0.2	3.7	2.8	28.5	3.1	1.6
Staffordshire	3.6	0.6	3.3	3.3	7.5	3.3	1.0
Stockport	7.5	0.9	2.2	4.0	11.8	3.7	0.9
Stockton-on-Tees	6.7	1.5	3.9	2.6	42.6	3.1	1.2

Local Authority	Asian or Asian British§	Black or Black British§	Mother's age <20 years§	Mother's age >39 years§	Top quintile of child poverty§	Multiple birth§	Born at 24 to 31 weeks§
Stoke-on-Trent	13.9	3.1	4.6	2.7	40.5	2.5	1.6
Suffolk	2.0	1.2	3.5	3.2	10.0	2.9	1.1
Sunderland	3.7	1.0	6.0	2.2	40.4	1.9	1.3
Surrey	7.6	1.5	1.3	6.1	1.8	3.6	1.2
Sutton	13.2	5.2	1.3	5.6	0.9	2.5	1.0
Swindon	11.2	2.8	3.3	3.3	13.0	3.6	1.2
Tameside	11.0	2.4	3.2	2.4	17.4	2.6	1.4
Telford and Wrekin	5.6	3.0	4.4	2.2	24.2	3.2	1.5
Thurrock	6.7	12.1	2.6	3.6	9.2	3.5	1.2
Torbay	0.9	0.2	3.6	3.8	26.1	2.8	1.6
Tower Hamlets	50.7	6.1	0.8	5.0	69.6	3.2	1.3
Trafford	11.9	2.8	1.6	5.1	9.6	3.4	1.0
Wakefield	5.0	1.5	4.4	2.7	18.1	2.5	1.1
Walsall	20.5	4.3	5.8	3.1	52.1	3.4	1.7
Waltham Forest	20.3	11.5	2.0	5.3	11.5	3.4	1.3
Wandsworth	8.7	7.3	1.1	7.5	13.2	3.5	1.1
Warrington	3.4	0.9	2.4	2.9	3.1	3.2	1.1
Warwickshire	5.6	1.2	3.1	3.9	5.2	3.0	1.4
West Berkshire	4.2	1.2	2.2	4.8	1.8	3.1	1.1
West Sussex	5.2	1.5	2.3	4.6	3.4	3.5	1.3
Westminster	12.3	7.8	0.4	8.4	40.4	4.3	1.6
Wigan	1.3	1.4	3.7	2.5	16.2	2.9	1.5
Wiltshire	1.4	2.1	2.0	3.9	3.7	3.2	1.3
Windsor and Maidenhead	15.2	1.6	1.6	6.7	0.0	3.6	1.4
Wirral	1.7	0.1	3.3	3.5	31.6	2.8	0.9
Wokingham	12.0	1.6	1.3	6.5	0.0	5.8	0.9
Wolverhampton	18.6	8.7	4.1	2.8	52.7	2.5	1.9
Worcestershire	3.6	0.5	3.4	3.4	14.3	3.0	1.4
York	2.7	0.9	2.8	4.3	5.3	2.8	0.9
SCOTLAND							
Aberdeen City	6.1	5.8	2.7	3.3	9.3	3.7	1.0

Local Authority	Asian or Asian British§	Black or Black British§	Mother's age <20 years§	Mother's age >39 years§	Top quintile of child poverty§	Multiple birth§	Born at 24 to 31 weeks§
Aberdeenshire	0.8	1.4	2.1	3.4	1.0	5.1	0.9
Angus	0.7	0.1	3.9	3.1	12.2	6.5	0.9
Argyll and Bute	0.5	0.0	2.3	4.2	11.2	6.5	1.4
City of Edinburgh	6.5	3.3	2.3	5.9	19.9	4.5	1.0
Clackmannanshire	1.9	0.0	5.4	2.4	35.1	3.9	1.1
Dumfries and Galloway	0.1	0.1	4.2	2.5	11.8	4.5	1.3
Dundee City	6.9	1.2	6.8	2.5	46.6	2.9	1.1
East Ayrshire	0.3	0.1	4.1	2.7	35.0	4.2	1.3
East Dunbartonshire	1.1	0.5	1.7	5.4	3.8	5.9	1.4
East Lothian	0.9	0.5	3.6	4.8	6.2	5.2	1.5
East Renfrewshire	4.3	0.5	1.0	6.0	4.9	4.7	1.1
Falkirk	1.5	0.4	4.5	4.0	15.3	5.3	2.6
Fife	1.4	0.5	5.1	3.0	24.4	6.9	1.5
Glasgow City	5.9	2.2	3.3	3.7	46.6	4.3	1.2
Highland	1.2	0.9	3.8	3.8	7.3	6.7	1.0
Inverclyde	0.6	0.0	2.7	3.4	34.2	5.0	0.6
Midlothian	2.2	0.9	2.9	3.7	14.9	3.3	0.9
Moray	0.6	0.9	3.7	3.2	3.3	4.8	0.8
Na h-Eileanan Siar	0.5	0.0	2.8	6.5	4.6	6.0	1.4
North Ayrshire	0.3	0.1	6.3	2.9	47.7	4.1	1.5
North Lanarkshire	1.0	0.0	4.1	3.6	24.9	4.2	1.6
Orkney Islands	0.5	0.0	1.6	6.5	0.0	6.5	0.0
Perth and Kinross	0.9	0.3	2.1	3.6	3.9	5.6	1.4
Renfrewshire	1.4	0.1	2.8	3.4	26.7	3.7	1.4
Scottish Borders	0.2	0.2	2.9	4.3	8.8	4.6	1.0
Shetland Islands	0.0	0.5	0.0	5.0	0.0	5.0	2.3
South Ayrshire	1.8	0.2	3.0	3.1	23.4	4.2	1.6
South Lanarkshire	1.1	0.2	3.5	3.7	19.1	4.3	1.1
Stirling	1.9	1.4	2.9	5.3	16.9	4.6	1.3
West Dunbartonshire	0.7	0.2	4.2	3.3	33.5	2.9	1.2
West Lothian	3.4	0.9	3.0	2.8	18.1	4.1	1.3

Local Authority	Asian or Asian British§	Black or Black British§	Mother's age <20 years§	Mother's age >39 years§	Top quintile of child poverty§	Multiple birth§	Born at 24 to 31 weeks§
WALES							
Blaenau Gwent	1.1	0.3	5.6	2.9	44.9	2.7	2.1
Bridgend	0.1	0.1	4.5	2.8	28.6	1.4	1.2
Caerphilly	0.6	0.0	4.7	2.6	31.5	2.8	1.6
Cardiff	9.9	5.3	3.5	4.4	38.3	2.4	1.2
Carmarthenshire	0.2	0.0	5.6	2.4	21.6	2.8	1.1
Ceredigion	0.2	0.0	2.9	3.6	5.8	3.1	2.2
Conwy	0.4	0.0	4.4	4.4	20.0	2.3	1.5
Denbighshire	0.7	0.0	5.3	2.6	29.3	3.5	2.1
Flintshire	0.5	0.2	3.8	3.6	13.1	2.5	1.4
Gwynedd	1.8	0.4	5.5	4.0	10.3	2.9	1.2
Isle of Anglesey	0.8	0.0	4.7	3.0	29.7	1.8	0.9
Merthyr Tydfil	0.8	0.0	4.5	2.0	28.2	3.8	1.0
Monmouthshire	0.5	0.4	2.3	5.2	3.0	2.1	0.4
Neath Port Talbot	0.5	0.1	5.0	2.3	40.4	2.0	1.5
Newport	8.5	2.6	4.4	2.8	35.8	2.7	1.3
Pembrokeshire	0.4	0.1	3.9	2.1	22.2	3.2	0.8
Powys	0.5	0.0	2.6	4.3	9.3	2.2	1.4
Rhondda Cynon Taf	1.2	0.5	5.3	2.1	39.3	2.9	1.4
Swansea	1.6	0.7	4.6	3.0	37.3	2.0	1.5
Torfaen	0.8	0.1	4.7	2.9	32.6	3.6	2.2
Vale of Glamorgan	1.2	0.4	3.1	4.4	16.0	2.8	0.9
Wrexham	1.0	0.5	4.8	3.2	26.6	3.1	2.0
NORTHERN IRELAND							
Antrim and Newtownabbey	1.1	0.4	2.6	3.8	19.9	2.9	1.8
Ards and North Down	0.8	0.3	2.2	4.8	21.9	3.5	1.0
Armagh City, Banbridge and Craigavon	0.4	0.9	2.9	4.0	11.1	3.2	0.9
Belfast	1.7	1.7	4.8	3.9	57.9	2.6	1.2
Causeway Coast and Glens	0.1	0.1	2.7	3.2	23.2	2.3	1.8
Derry City and Strabane	0.4	0.2	3.5	3.1	56.6	1.9	1.0

Local Authority	Asian or Asian British§	Black or Black British§	Mother's age <20 years§	Mother's age >39 years§	Top quintile of child poverty§	Multiple birth§	Born at 24 to 31 weeks§
Fermanagh and Omagh	0.4	0.1	1.3	5.4	15.5	2.4	1.2
Lisburn and Castlereagh	0.9	0.5	1.8	5.1	4.9	3.2	1.0
Mid Ulster	0.1	1.2	1.8	2.7	6.6	3.7	0.4
Mid and East Antrim	0.3	0.1	3.9	3.6	25.4	2.2	1.2
Newry, Mourne and Down	0.3	0.2	2.1	3.0	25.1	2.4	0.9
GUERNSEY	0.2	0.0	2.3	5.7	0.0	95.5	0.5
JERSEY	1.4	0.5	3.3	6.0	0.1	3.5	0.8
ISLE OF MAN	0.0	0.0	1.2	6.9	0.0	2.0	0.4

§ Percentage of all births in each LA which fall within this category
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey

8. Causes of death

8.1 Reported causes of death

Causes of death are reported to MBRRACE-UK using the Cause of Death & Associated Conditions (CODAC) classification system [16]. The CODAC system has a three level hierarchical tree for the coding of both the main cause of death and any associated conditions. The reported CODAC level 1 classification is presented in Table 31 for all stillbirths, neonatal deaths, and extended perinatal deaths for babies born at 24^{+0} weeks gestational age or later in 2017.

When reporting a death via the MBRRACE-UK data entry system reporters are asked to complete both a primary cause of death and up to two associated conditions which are coded using the CODAC system. Following our detailed review of the coding of deaths reported as due to congenital anomalies in the 2015 MBRRACE-UK report, all cause of death data in this report is presented using congenital anomaly for the cause of death for all cases where a congenital anomaly is coded as either the primary cause of death or an associated condition.

Table 31: Stillbirths, neonatal deaths, and extended perinatal deaths by CODAC level 1 cause of death: United Kingdom and Crown Dependencies, for births in 2017

CODAC cause of death: level 1	Stillbirths§		Neonatal deaths§		Extended perinatal deaths§	
	Number	%	Number	%	Number	%
Infection	121	4.3	95	7.5	216	5.3
Neonatal	41	1.4	517	40.8	558	13.6
Intrapartum	51	1.8	46	3.6	97	2.4
Congenital anomaly	262	9.2	458	36.1	720	17.5
Fetal	113	4.0	40	3.2	153	3.7
Cord	148	5.2	1	0.1	149	3.6
Placenta	904	31.8	25	2.0	929	22.6
Maternal	103	3.6	4	0.3	107	2.6
Unknown	982	34.6	49	3.9	1031	25.1
Missing	115	4.0	32	2.5	147	3.6

§ excluding terminations of pregnancy and births $<24^{+0}$ weeks gestational age
Data source: MBRRACE-UK

The reported level 1 CODAC cause of death for all stillbirths, neonatal deaths and extended perinatal deaths is presented in Table 31, with a breakdown of the CODAC level 2 categories for the neonatal deaths designated a CODAC level 1 neonatal cause provided in Table 32.

Table 32: Neonatal deaths by CODAC level 1 and level 2 cause of death: United Kingdom and Crown Dependencies, for births in 2017

CODAC cause of death	Neonatal deaths[§]	
	Number	%
Infection	**95**	**7.5**
Neonatal	**517**	**40.8**
Unspecified or other	19	1.5
Extreme prematurity	155	12.2
Neurological	139	11.0
Cardio-respiratory	119	9.4
Gastrointestinal	57	4.5
Multi-organ failure	20	1.6
Trauma or suffocation	7	0.6
Inadequate care	1	0.1
Intrapartum	**46**	**3.6**
Congenital anomaly	**458**	**36.1**
Fetal	**40**	**3.2**
Cord	**1**	**0.1**
Placenta	**25**	**2.0**
Maternal	**4**	**0.3**
Unknown	**49**	**3.9**
Missing	**32**	**2.5**

[§] excluding terminations of pregnancy and births <24^{+0} weeks gestational age
Data source: MBRRACE-UK

MBRRACE-UK Recommendation 6

Trust and Health Boards should use Perinatal Mortality Review Tool multidisciplinary meetings to improve the quality of cause of death coding.

8.2 Trends in causes of death 2014-2017

The trend in the CODAC level 1 cause of death for stillbirths over the four years 2014 to 2017 is presented in Table 33. Over this period there has been a substantial reduction in the number and proportion of stillbirths recorded as intrapartum deaths from 189 (5.8%) stillbirths in 2014 to 51 (1.8%) stillbirths in 2017. This is an extremely positive finding which can, at least partially, be attributed to the national initiatives focused on the reduction of stillbirths. Over the same period there has been an increasing proportion of stillbirths recorded with a primary cause of congenital anomalies (from 6.4% in 2014 to 9.2% in 2017) although the actual number of stillbirths in this category has remained fairly constant over the past three years: 268, 280 and 262 for 2015, 2016 and 2017, respectively. There has also been a steady increase in the number and proportion of stillbirths being recoded as due to placental causes over this period (from 712 (21.9%) in 2014 to 904 (31.8%) in 2017). Whilst nearly half (46.0%) of stillbirths were recorded as of unknown cause in 2014 this has reduced to around a third (34.6%) of stillbirths in 2017, which may reflect an increasing familiarity with the CODAC system as well as the implementation of additional quality checks by MBRRACE-UK.

Table 33: Number and percentage CODAC level 1 for stillbirths by cause, 2014-2017

CODAC cause of death: level 1	2014		2015		2016		2017	
	Number	%	Number	%	Number	%	Number	%
Infection	100	3.1	116	3.8	108	3.5	121	4.3
Neonatal	47	1.4	45	1.5	42	1.4	41	1.4
Intrapartum	189	5.8	84	2.8	71	2.3	51	1.8
Congenital anomaly	209	6.4	268	8.8	280	9.1	262	9.2
Fetal	149	4.6	150	4.9	149	4.9	113	4.0
Cord	129	4.0	140	4.6	130	4.2	148	5.2
Placenta	712	21.9	822	27.1	882	28.8	904	31.8
Maternal	114	3.5	129	4.3	122	4.0	103	3.6
Unknown	1499	46.0	1197	39.5	1145	37.4	982	34.6
Missing	110	3.4	83	2.7	136	4.4	115	4.0

Excluding terminations of pregnancy and births <24^{+0} weeks gestational age
Data source: MBRRACE-UK

Table 34: Number and percentage CODAC level 1 for neonatal deaths by cause, 2014-2017

CODAC cause of death: level 1	2014		2015		2016		2017	
	Number	%	Number	%	Number	%	Number	%
Infection	101	7.3	97	7.1	101	7.6	95	7.5
Neonatal	610	44.1	603	43.9	586	43.8	517	40.8
Intrapartum	67	4.8	34	2.5	27	2.0	46	3.6
Congenital anomaly	386	27.9	454	33.1	448	33.5	458	36.1
Fetal	67	4.8	35	2.5	49	3.7	40	3.2
Cord	2	0.1	5	0.4	2	0.1	1	0.1
Placenta	24	1.7	40	2.9	31	2.3	25	2.0
Maternal	4	0.3	2	0.1	5	0.4	4	0.3
Unknown	71	5.1	55	4.0	65	4.9	49	3.9
Missing	52	3.8	48	3.5	23	1.7	32	2.5

Excluding terminations of pregnancy and births <24^{+0} weeks gestational age
Data source: MBRRACE-UK

Table 35: Number and percentage CODAC level 2 ('Neonatal') deaths by cause, 2014-2017

CODAC cause of death:	2014		2015		2016		2017	
	Number	%	Number	%	Number	%	Number	%
Unspecified or other	19	1.4	36	2.6	29	2.2	19	1.5
Extreme prematurity	176	12.7	194	14.1	210	15.7	155	12.2
Neurological	179	12.9	177	12.9	157	11.7	139	11.0
Cardio-respiratory	154	11.1	148	10.8	127	9.5	119	9.4
Gastrointestinal	55	4.0	62	4.5	43	3.2	57	4.5
Multi-organ failure	23	1.7	33	2.4	16	1.2	20	1.6
Trauma or suffocation	4	0.3	2	0.1	4	0.3	7	0.6
Inadequate care	*Not reported*	*Not reported*	1	0.1	0	0.0	1	0.1

Excluding terminations of pregnancy and births <24^{+0} weeks gestational age
Data source: MBRRACE-UK

Tables 34 and 35 focus on trends in the cause of death for neonatal deaths over the four years 2014 to 2017, providing CODAC level 1 and then the level 2 categories for CODAC level 1 'Neonatal' causes. Whilst there has been an overall reduction in the number and proportion of neonatal deaths recorded as of intrapartum cause this has not been consistent over the four year period, with an increase in the rate of intrapartum-related neonatal deaths from 2016 to 2017 (2.0% to 3.6%,respectively). There has been an increasing trend in the proportion of neonatal deaths recorded as congenital anomalies (from 27.9% in 2014 to 36.1% in 2017) although numbers of neonatal deaths in this category have (as seen in stillbirths) remained fairly constant over the past three years: 454, 448 and 458 for 2015, 2016 and 2017, respectively. There has been a small, steady decrease in the number and proportion of neonatal deaths ascribed a neonatal cause (44.1% in 2014 to 40.8% in 2017) with this decrease being predominantly in the CODAC level 2 categories of Neurological and Cardio-respiratory.

8.3 Development of new international code

In order to facilitate the prevention of perinatal mortality on a global scale it is important to have a standardised, internationally accepted cause of death classification system to facilitate international comparisons [10]. There are currently many different classification systems in place for stillbirths and neonatal death which both vary in quality and limit the ability to carry out direct comparisons between countries. The World Health Organisation released a revision of ICD-10 in 2016 [17] for use with perinatal deaths (ICD-PM) which was primarily focused on trying to improve data collection in low income countries, providing yet another system for classifying these deaths. MBRRACE-UK is part of an international collaborative (led by Professor Vicky Flenady from Brisbane) which is developing a standardised approach to the classification of stillbirths and neonatal deaths for data-rich settings which will also map to ICD-PM. This three phase initiative included a systematic review of the classification systems currently in use [18] which, alongside the outcome of a 'Delph' panel of experts, provided the starting point for two workshops held at subsequent annual conferences for the International Stillbirth Alliance (ISA) in 2017 and 2018 to address phase two of the initiative: development of the new system. The first workshop defined the purpose, key principles and main condition categories for a classification system for stillbirths and neonatal deaths where there is access to perinatal pathology services (i.e. data rich settings). The second workshop focused on the development of rules, standardised definitions and mapping to ICD-PM. A consultation of international experts is being carried out to review and confirm broader agreement of the proposed classification system for finalisation at the ISA meeting in October 2019 in Madrid. Final steps will then be to evaluate and roll out the system for international use.

8.4 Post-mortem examination

Information about the proportion of perinatal deaths where there is an offer of post-mortem and whether consent was obtained, for births in 2017, are presented in Table 36. As in previous years half of the parents of stillborn babies and just over a quarter of the parents of neonates who died gave consent for full or limited post-mortem. This is a small increase over the three year period 2015-2017 from 48.1% to 50.0% for stillbirth and from 26.8% to 27.7% for neonatal deaths (Figure 53 and Figure 54). Parents were offered a post-mortem for almost all stillborn babies but only four-fifths of neonatal deaths: a slight increase over the period 2015 to 2017 from 97.7% to 98.0% for stillbirths as well as, for neonatal deaths, from 79.5% to 80.1%.

Whilst the difference between the proportion of deaths where post-mortem was offered and the uptake of the offer by parents is a personal choice (unless a post-mortem is requested by the coroner), the manner in which a post-mortem is offered by the clinical team has a direct effect on the uptake. Post-mortem following stillbirth may not provide a definitive diagnosis of the cause of death but may exclude some of the potential causes and provide valuable information for the counselling of parents for future pregnancies. In 2017 the offer of post-mortem was recorded for almost all stillbirths. However, in the case of neonatal deaths where the clinical team consider the cause of death to be known and that therefore a post-mortem is not required, parental counselling should be balanced and acknowledge that a post-mortem may identify or definitively exclude additional conditions or congenital anomalies that would contribute important information for parental counselling.

Abnormalities of the placenta, cord or membranes identified during placental histology are suggested as a cause or contributory factor in 11% to 65% of stillbirths [19, 20]. Placental histology can help diagnose the conditions

that affected the mother and baby as well as provide information for counselling mothers for future pregnancies [21]. Over time there has been a slow but steady increase in the proportion of stillbirths where placental histology was carried out: 91.2% of stillbirths in 2017 compared to 88.8% in 2015. However, in order to ensure optimal pathological analysis and interpretation, placental histology should if possible be undertaken for all stillbirths by a specialist pathologist. Placental histology can also provide insight into the underlying cause of conditions for babies and therefore should also be requested for liveborn babies where there is an anticipated high risk of death. For MBRRACE-UK purposes this has been defined as those deaths occurring on day one or which were classified as intrapartum-related deaths. In 2017, 300 out of 407 of this group of neonatal deaths (73.7%) had placental histology investigations carried out – a small increase from 73.2% in 2016.

Table 36: Number and percentage of post-mortems offered and consented to by type of death (stillbirth, neonatal death, extended perinatal death): United Kingdom and Crown Dependencies, for births in 2017

Post-mortem status*	Stillbirths§		Neonatal deaths§		Extended perinatal deaths§	
	Number	%	Number	%	Number	%
Not offered	28	1.0	153	12.1	181	4.4
Not known if offered	27	1.0	99	7.8	126	3.1
Offered but no consent	1342	47.3	637	50.3	1979	48.2
Offered but unknown consent	24	0.8	27	2.1	51	1.2
Offered and limited consent	161	5.7	20	1.6	181	4.4
Offered and full consent	1258	44.3	331	26.1	1589	38.7

§ Excluding terminations of pregnancy and births <24^{+0} weeks gestational age
* Some Trusts and Health Boards report the post-mortem status of deaths accepted by the Coroner/Procurator Fiscal as "Not offered", as the post-mortem is conducted without the requirement of parental consent
Data source: MBRRACE-UK

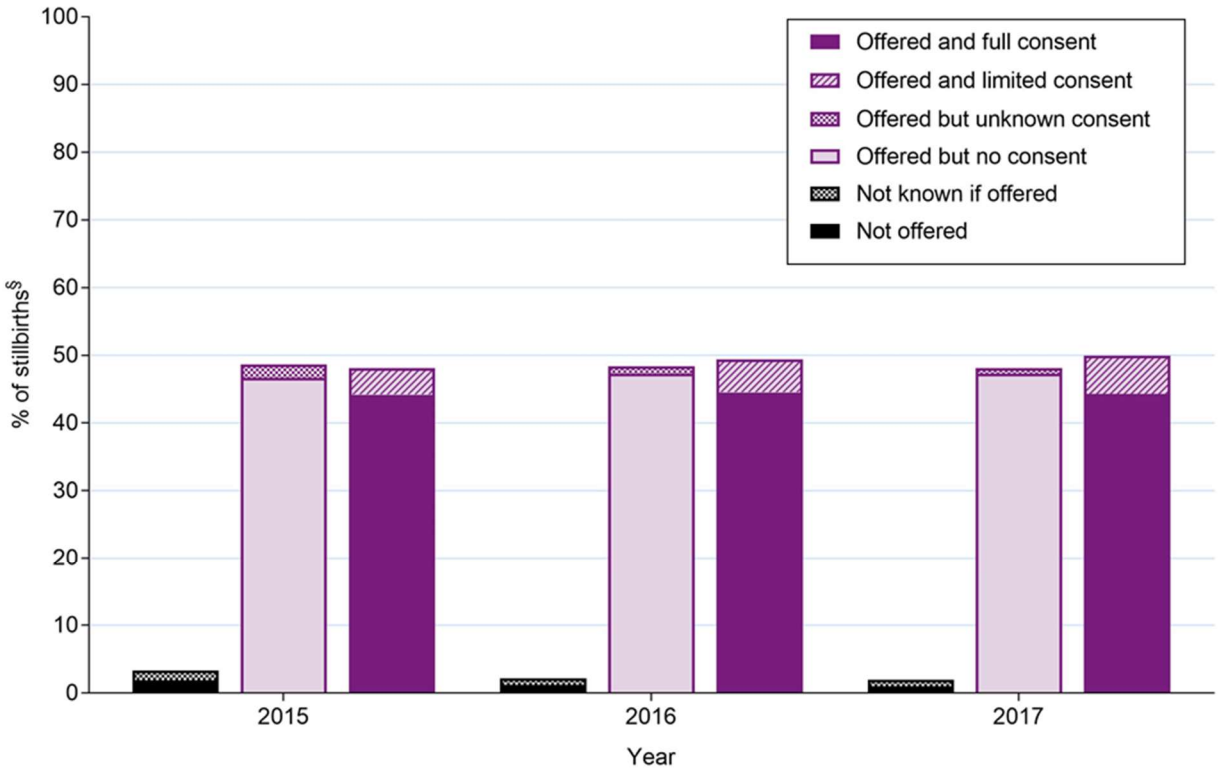
MBRRACE-UK Recommendation 7

Trusts and Health Boards should review their policies to ensure that the parents of ALL babies who die are provided with unbiased counselling for post-mortem to enable them to make an informed decision.

MBRRACE-UK Recommendation 8

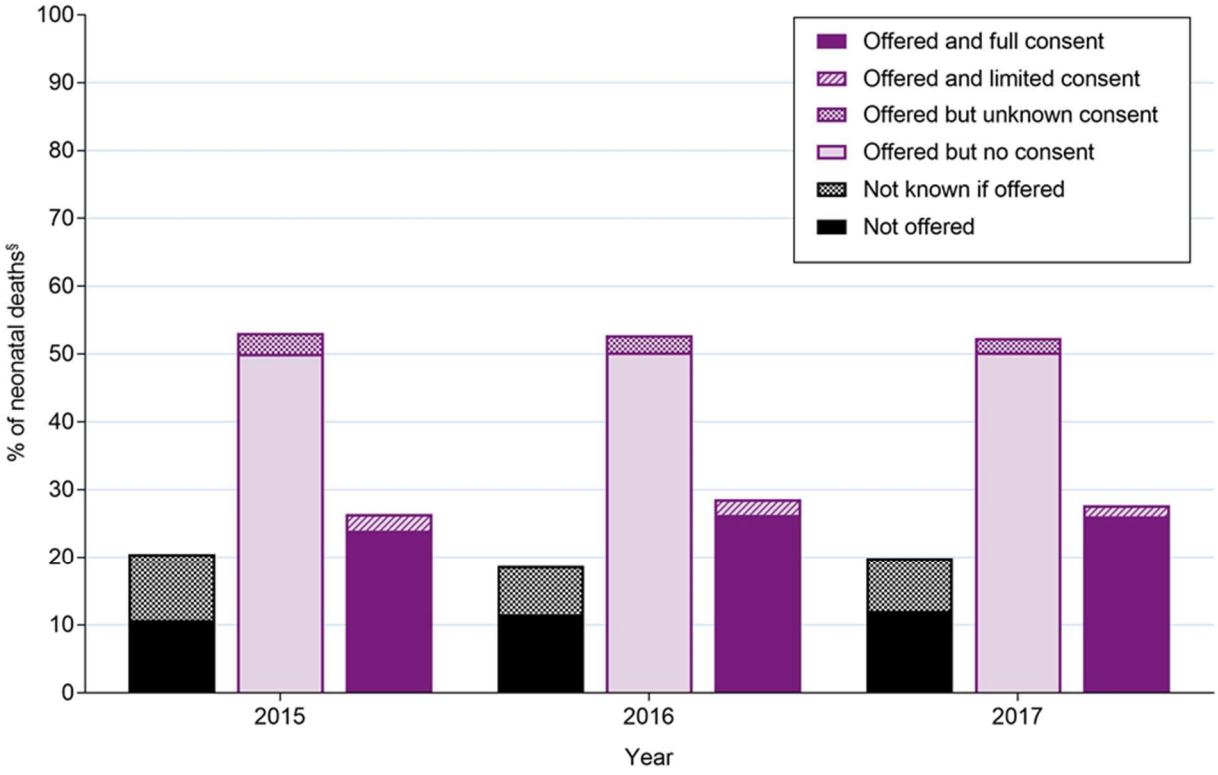
Trusts and Health Boards should work to implement fully the National Bereavement Care Pathway to ensure that all parents are offered high quality, individualised bereavement care after the loss of their baby.

Figure 53: Percentage of post-mortems offered and consented to for stillbirths: United Kingdom and Crown Dependencies, for births in 2015 to 2017



§ excluding terminations of pregnancy and births <24^{+0} weeks gestational age
Data source: MBRRACE-UK

Figure 54: Percentage of post-mortems offered and consented to for neonatal deaths: United Kingdom and Crown Dependencies, for births in 2015 to 2017



§ excluding terminations of pregnancy and births <24^{+0} weeks gestational age
Data source: MBRRACE-UK

MBRRACE-UK Recommendation 9

Placental histology should be undertaken for all stillbirths and if possible all anticipated neonatal deaths, preferably by a perinatal pathologist.

9. Factors affecting perinatal mortality

Information concerning the main known maternal and baby risk factors for stillbirth and neonatal death is included in the data reported for each death through the MBRRACE-UK online reporting system. As in previous reports, this chapter focuses on the trends in these factors for stillbirths and neonatal deaths over the last three years of data collection for MBRRACE-UK, i.e. births in 2015 to 2017. For risk factors where denominator data is available for all births, a crude population mortality rate is presented for stillbirths and neonatal deaths, together with an estimate of the relative risk associated with the factor in the form of a ratio of mortality rates (Tables 37 to 40). The quality of the denominator data for all births is dependent upon routine data submission about births from each Trust and Health Board and therefore it is important to ensure that the data submitted for birth and death registration and concerning inpatients is accurate and complete (see Appendix 4). Some of these factors have been used to calculate the stabilised & adjusted mortality rates presented in Chapters 5, 6 and 7. For factors where there is no routine denominator data for all births, the prevalence of the factor for stillbirths and neonatal deaths is presented. Moving forward, the MBRRACE-UK real-time data monitoring tool will provide Trusts and Health Boards with up-to-date information about the distribution and completeness of many of these factors to facilitate review of their mortality rates and the quality of their data.

9.1 Mortality rates and ratios of mortality rates: mothers' characteristics

The overall reduction in the stillbirth and neonatal mortality rates from 2015 to 2017 and investigation of the trends in mortality rates for individual characteristics can help identify whether this reduction occurred primarily within particular groups of mothers or equally across the population. Table 37 shows that whilst there has been little change in the rate of stillbirth over the period 2015 to 2017 across almost all age groups, for the youngest mothers (<20 years of age) the small increase seen from 2015 to 2016 continued into 2017 (from 4.65 to 5.31 stillbirths per 1,000 total births). This is in contrast to a small decrease in the neonatal mortality rate for mothers aged 20 years or more over the same period (Table 38). The mortality rate ratios have increased for stillbirths and neonatal deaths over the period 2015 to 2017 for very young mothers (<20 years) (Table 39) but have remained fairly static for mothers aged 20 years or more.

The direct relationship between higher levels of socio-economic deprivation (based on the mother's postcode of residence at time of delivery), using the Children in Low-Income Families Local Measure [22] and higher stillbirth and neonatal mortality rates can be seen for all years. Overall there remains a small but steady decline in mortality rates for stillbirths over the period 2015 to 2017 for all levels of deprivation, continuing the trend noted from 2014 to 2016. The mortality rates for neonatal deaths have decreased similarly over the three year period. Relative to the least deprived group, mortality rate ratios for the other four quintiles of socio-economic deprivation have decreased since 2016 across almost all levels of deprivation for both stillbirths and neonatal deaths, but they remain higher than 2015 (Tables 39 and 40). For the most deprived compared to the least deprived mothers there was an increase from 1.61 to 1.72 over the three years for stillbirths, but for neonatal deaths the mortality rate ratio showed a small decrease from 1.61 to 1.57 over the same period.

Table 37: Stillbirth rates by mothers' age and socio-economic deprivation quintile of residence by year: United Kingdom and Crown Dependencies, for births in 2015 to 2017

Mother's characteristic	Number (%)[§]						Rate per 1,000 births[§]		
	Stillbirths						Stillbirths[†]		
	2015		2016		2017		2015	2016	2017
Mother's age (years)									
<20	122	(4.0)	125	(4.1)	120	(4.2)	4.65	5.05	5.31
20-24	500	(16.5)	539	(17.6)	464	(16.3)	4.22	4.77	4.34
25-29	804	(26.5)	799	(26.1)	762	(26.8)	3.73	3.74	3.68
30-34	858	(28.3)	832	(27.1)	788	(27.7)	3.62	3.47	3.34
35-39	573	(18.9)	560	(18.3)	541	(19.0)	4.36	4.12	3.98
≥40	175	(5.8)	210	(6.9)	165	(5.8)	5.62	6.61	5.27
Not known	2	(0.1)	0	(0.0)	0	(0.0)	0.08	0.00	0.00
Socio-economic deprivation quintile•									
1 - Least deprived	464	(15.3)	456	(14.9)	424	(14.9)	3.00	2.96	2.81
2	513	(16.9)	546	(17.8)	471	(16.6)	3.25	3.48	3.12
3	570	(18.8)	608	(19.8)	545	(19.2)	3.68	3.95	3.58
4	690	(22.7)	671	(21.9)	660	(23.2)	4.44	4.33	4.34
5 - Most deprived	787	(25.9)	764	(24.9)	733	(25.8)	5.05	4.91	4.84
Not known	10	(0.3)	20	(0.7)	7	(0.2)	2.09	4.33	2.74

[§] excluding terminations of pregnancy and births <24^{+0} weeks gestational age
[†] per 1,000 total births
• based on mothers' postcodes at time of delivery, using the Children in Low-Income Families Local Measure
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey

Table 38: Neonatal mortality rates by mothers' age and socio-economic deprivation quintile of residence by year: United Kingdom and Crown Dependencies, for births in 2015 to 2017

Mother's characteristic	Number (%)§						Rate per 1,000 births§		
	Neonatal deaths						Neonatal deaths‡		
	2015		2016		2017		2015	2016	2017
Mother's age (years)									
<20	77	(5.6)	80	(6.0)	67	(5.3)	2.95	3.25	2.98
20-24	239	(17.4)	226	(16.9)	200	(15.8)	2.03	2.01	1.88
25-29	360	(26.2)	340	(25.4)	329	(26.0)	1.68	1.60	1.59
30-34	377	(27.5)	380	(28.4)	365	(28.8)	1.60	1.59	1.55
35-39	242	(17.6)	226	(16.9)	231	(18.2)	1.85	1.67	1.71
≥40	78	(5.7)	85	(6.4)	75	(5.9)	2.52	2.69	2.41
Not known	0	(0.0)	0	(0.0)	0	(0.0)	0.00	0.00	0.00
Socio-economic deprivation quintile•									
1 - Least deprived	218	(15.9)	186	(13.9)	199	(15.7)	1.41	1.21	1.32
2	237	(17.3)	234	(17.5)	212	(16.7)	1.51	1.50	1.41
3	247	(18.0)	257	(19.2)	230	(18.2)	1.60	1.68	1.52
4	310	(22.6)	303	(22.7)	310	(24.5)	2.00	1.96	2.05
5 - Most deprived	353	(25.7)	351	(26.3)	312	(24.6)	2.28	2.27	2.07
Not known	8	(0.6)	6	(0.4)	4	(0.3)	1.68	1.31	1.57

§ excluding terminations of pregnancy and births <24^{+0} weeks gestational age
• based on mothers' postcodes at time of delivery, using the Children in Low-Income Families Local Measure
‡ per 1,000 live births
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey

Table 39: Ratios of mortality rates for stillbirth by mothers' age and socio-economic deprivation quintile of residence by year: United Kingdom and Crown Dependencies, for births in 2015 to 2017

Mother's characteristic	Ratio of mortality rates (RR)§		
	Stillbirths		
	2015	2016	2017
Mother's age (years)			
<20	1.28 (1.06 to 1.55)	1.46 (1.29 to 1.65)	1.59 (1.33 to 1.9)
20-24	1.17 (1.04 to 1.30)	1.37 (1.29 to 1.46)	1.3 (1.19 to 1.42)
25-29	1.03 (0.94 to 1.13)	1.08 (1.02 to 1.14)	1.1 (1.03 to 1.18)
30-34	Reference	Reference	Reference
35-39	1.20 (1.08 to 1.34)	1.19 (1.11 to 1.27)	1.19 (1.09 to 1.3)
≥40	1.55 (1.32 to 1.82)	1.9 (1.76 to 2.06)	1.58 (1.35 to 1.84)
Socio-economic deprivation quintile•			
1 - Least deprived	Reference	Reference	Reference
2	1.08 (0.96 to 1.23)	1.18 (1.1 to 1.26)	1.11 (1.01 to 1.22)
3	1.23 (1.09 to 1.39)	1.33 (1.25 to 1.42)	1.27 (1.17 to 1.39)
4	1.48 (1.31 to 1.66)	1.46 (1.38 to 1.55)	1.54 (1.43 to 1.67)
5 - Most deprived	1.61 (1.36 to 1.91)	1.88 (1.7 to 2.07)	1.72 (1.6 to 1.86)

§ excluding terminations of pregnancy and births <24^{+0} weeks gestational age
• based on mothers' postcodes at time of delivery, using the Children in Low-Income Families Local Measure
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey

Table 40: Ratios of mortality rates for neonatal death by mothers' age and socio-economic deprivation quintile of residence by year: United Kingdom and Crown Dependencies, for births in 2015 to 2017

Mother's characteristic	Ratio of mortality rates (RR)§		
	Neonatal deaths		
	2015	2016	2017
Mother's age (years)			
<20	1.85 (1.44 to 2.36)	2.04 (1.7 to 2.45)	1.92 (1.51 to 2.45)
20-24	1.27 (1.08 to 1.49)	1.26 (1.12 to 1.42)	1.21 (1.05 to 1.4)
25-29	1.05 (0.91 to 1.21)	1.08 (1.02 to 1.14)	1.1 (1.03 to 1.18)
30-34	Reference	Reference	Reference
35-39	1.16 (0.99 to 1.36)	1.05 (0.93 to 1.19)	1.1 (0.97 to 1.26)
≥40	1.58 (1.24 to 2.01)	1.69 (1.41 to 2.03)	1.55 (1.24 to 1.95)
Socio-economic deprivation quintile•			
1 - Least deprived	Reference	Reference	Reference
2	1.07 (0.89 to 1.28)	1.24 (1.1 to 1.4)	1.07 (0.93 to 1.23)
3	1.13 (0.94 to 1.36)	1.39 (1.24 to 1.56)	1.15 (1.01 to 1.32)
4	1.42 (1.19 to 1.68)	1.62 (1.46 to 1.8)	1.55 (1.38 to 1.74)
5 - Most deprived	1.61 (1.36 to 1.91)	1.88 (1.7 to 2.07)	1.57 (1.4 to 1.76)

§ excluding terminations of pregnancy and births <24^{+0} weeks gestational age
• based on mothers' postcodes at time of delivery, using the Children in Low-Income Families Local Measure
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey

9.2 Mortality rates and ratios of rates: babies' characteristics

The prevalence of characteristics of babies in terms of sex, multiplicity of birth, ethnicity, gestational age at birth and birthweight, and their related ratios of mortality rate for stillbirths and neonatal deaths over the period 2015 to 2017 are presented in Tables 41 to 44.

Table 41: Stillbirth rates by babies' sex, multiplicity of birth, ethnicity, gestational age, and birthweight by year: United Kingdom and Crown Dependencies, for births in 2015 to 2017

Baby's characteristic	Number (%)§						Rate per 1,000 births§		
	Stillbirths						Stillbirths†		
	2015		2016		2017		2015	2016	2017
Sex									
Male	1,566	(51.6)	1504	(49.1)	1,481	(52.2)	3.90	3.76	3.81
Female	1,451	(47.8)	1522	(49.7)	1,325	(46.7)	3.81	4.00	3.57
Not known	17	(0.6)	36	(1.2)	30	(1.1)			
Multiplicity									
1	2,819	(92.9)	2912	(95.0)	2,667	(93.9)	3.72	3.86	3.63
2	200	(6.6)	145	(4.7)	164	(5.8)	8.34	6.16	6.99
≥3	13	(0.4)	7	(0.2)	9	(0.3)	21.81	11.78	17.11
Not known	2	(0.1)	1	(0.0)		(0.0)			
Baby's ethnicity									
White	1,987	(65.5)	2067	(67.4)	1,911	(67.3)	3.55	3.74	3.59
Mixed	162	(5.3)	164	(5.4)	184	(6.5)	4.11	4.01	4.56
Asian, Asian British	433	(14.3)	457	(14.9)	415	(14.6)	5.88	6.09	5.70
Black, Black British	269	(8.9)	275	(9.0)	239	(8.4)	8.17	8.29	7.46
Other	71	(2.3)	87	(2.8)	73	(2.6)	3.56	4.14	3.68
Refused/Not Known	112	(3.7)	15	(0.5)	18	(0.6)			
Gestational age at birth (weeks)									
24^{+0}-27^{+6}	733	(24.2)	717	(23.4)	710	(25.0)	227.57	219.33	220.02
28^{+0}-31^{+6}	495	(16.3)	512	(16.7)	482	(17.0)	75.48	77.34	73.70
32^{+0}-36^{+6}	762	(25.1)	786	(25.6)	730	(25.7)	15.35	15.60	14.51
37^{+0}-41^{+6}	1,025	(33.8)	1031	(33.6)	894	(31.5)	1.51	1.52	1.35
≥42^{+0}	15	(0.5)	19	(0.6)	22	(0.8)	0.79	1.04	1.36
Not known	4	(0.1)	0	(0.0)	2	(0.1)			
Birthweight (g)									
<1,500	1,283	(42.3)	1266	(41.3)	1,225	(43.1)	156.23	150.98	147.40
1,500-2,499	691	(22.8)	702	(22.9)	648	(22.8)	14.75	15.00	14.05
2,500-3,499	813	(26.8)	801	(26.1)	743	(26.2)	2.05	2.01	1.91
3,500-4,499	218	(7.2)	259	(8.5)	199	(7.0)	0.71	0.86	0.68
≥4,500	13	(0.4)	24	(0.8)	10	(0.4)	1.03	1.99	0.90
Not known	16	(0.5)	13	(0.4)	15	(0.5)			

§ excluding terminations of pregnancy and births <24^{+0} weeks gestational age
† per 1,000 total births
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey

A small reduction in mortality rates over time can be seen related to most of these characteristics for stillbirths. For the first time since 2013 [23] there has been a decrease in the rate of stillbirth for the Black or Black British ethnic group. Between 2013 and 2016 the stillbirth rate for this group rose from 7.02 per 1,000 births in 2013 to 8.29 per 1,000 births in 2016. In 2017 the rate decreased to 7.46 per 1,000 births.

Table 42: Neonatal mortality rates by babies' sex, multiplicity of birth, ethnicity, gestational age, and birthweight by year: United Kingdom and Crown Dependencies, for births in 2015 to 2017

Baby's characteristic	Number (%)§						Rate per 1,000 births§		
	Neonatal deaths						Neonatal deaths‡		
	2015		2016		2017		2015	2016	2017
Sex									
Male	819	(59.7)	711	(53.2)	723	(57.1)	2.05	1.79	1.87
Female	553	(40.3)	614	(45.9)	532	(42.0)	1.46	1.62	1.44
Not known	1	(0.1)	12	(0.9)	12	(0.9)			
Multiplicity									
1	1,235	(89.9)	1204	(90.1)	1,130	(89.2)	1.64	1.60	1.54
2	125	(9.1)	125	(9.3)	127	(10.0)	5.26	5.34	5.45
≥3	13	(0.9)	7	(0.5)	9	(0.7)	22.30	11.93	17.41
Not known	0	(0.0)	1	(0.1)	1	(0.1)			
Baby's ethnicity									
White	953	(69.4)	937	(70.1)	878	(69.3)	1.71	1.70	1.66
Mixed	65	(4.7)	71	(5.3)	54	(4.3)	1.66	1.74	1.34
Asian, Asian British	183	(13.3)	211	(15.8)	207	(16.3)	2.50	2.83	2.86
Black, Black British	80	(5.8)	84	(6.3)	88	(6.9)	2.45	2.55	2.77
Other	32	(2.3)	29	(2.2)	32	(2.5)	1.61	1.38	1.62
Refused/Not Known	60	(4.4)	5	(0.4)	8	(0.6)			
Gestational age at birth (weeks)									
24^{+0}-27^{+6}	387	(28.2)	404	(30.2)	365	(28.8)	155.55	158.31	145.01
28^{+0}-31^{+6}	207	(15.1)	177	(13.2)	187	(14.8)	34.14	28.98	30.87
32^{+0}-36^{+6}	271	(19.7)	275	(20.6)	270	(21.3)	5.54	5.55	5.45
37^{+0}-41^{+6}	500	(36.4)	468	(35.0)	428	(33.8)	0.74	0.69	0.65
≥42^{+0}	7	(0.5)	9	(0.7)	11	(0.9)	0.37	0.49	0.68
Not known	1	(0.1)	4	(0.3)	6	(0.5)			
Birthweight (g)									
<1,500	553	(40.3)	555	(41.5)	524	(41.4)	79.81	77.96	73.95
1,500-2,499	303	(22.1)	281	(21.0)	295	(23.3)	6.56	6.10	6.49
2,500-3,499	367	(26.7)	366	(27.4)	311	(24.5)	0.93	0.92	0.80
3,500-4,499	127	(9.2)	117	(8.8)	124	(9.8)	0.41	0.39	0.42
≥4,500	10	(0.7)	7	(0.5)	7	(0.6)	0.79	0.58	0.63
Not known	13	(0.9)	11	(0.8)	6	(0.5)			

§ excluding terminations of pregnancy and births <24^{+0} weeks gestational age
‡ per 1,000 live births
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey

Most neonatal mortality rates for baby characteristics either remained static or showed a small reduction over the three years presented in Table 42. In contrast to the stillbirth rates for the Black or Black British group, neonatal mortality rates increased from 2.45 per 1,000 live births in 2015 to 2.77 per 1,000 live births in 2017.

A small increase in neonatal mortality rates was also seen for the Asian or Asian British group, from 2.5 per 1,000 live births to 2.86 per 1,000 live births.

Table 43: Ratios of mortality rates for stillbirth by babies' sex, multiplicity of birth, ethnicity, gestational age, and birthweight by year: United Kingdom and Crown Dependencies, for births in 2015 to 2017

Baby's characteristic	Ratio of mortality rates (RR)§		
	Stillbirths		
	2015	2016	2017
Sex			
Male	1.02 (0.95 to 1.10)	0.94 (0.89 to 0.99)	1.07 (1.01 to 1.12)
Female	Reference	Reference	Reference
Multiplicity			
1	Reference	Reference	Reference
2	2.24 (1.94 to 2.59)	1.6 (1.36 to 1.88)	1.93 (1.65 to 2.25)
≥3	5.86 (3.40 to 10.10)	3.05 (1.46 to 6.38)	4.72 (2.47 to 9.02)
Baby's ethnicity			
White	Reference	Reference	Reference
Mixed	1.16 (0.99 to 1.36)	1.07 (0.92 to 1.25)	1.27 (1.1 to 1.47)
Asian, Asian British	1.66 (1.49 to 1.84)	1.63 (1.48 to 1.78)	1.59 (1.44 to 1.75)
Black, Black British	2.30 (2.03 to 2.61)	2.21 (1.97 to 2.49)	2.08 (1.83 to 2.36)
Other	1.00 (0.79 to 1.27)	1.1 (0.89 to 1.36)	1.02 (0.81 to 1.29)
Gestational age at birth (weeks)			
24^{+0}-27^{+6}	150.45 (136.84 to 165.41)	144.26 (135.09 to 154.04)	162.67 (152.27 to 173.78)
28^{+0}-31^{+6}	49.90 (44.82 to 55.55)	50.87 (46.76 to 55.33)	54.49 (49.95 to 59.45)
32^{+0}-36^{+6}	10.15 (9.24 to 11.14)	10.26 (9.57 to 11.01)	10.73 (9.97 to 11.55)
37^{+0}-41^{+6}	Reference	Reference	Reference
≥42+0	0.52 (0.31 to 0.87)	0.68 (0.44 to 1.07)	1 (0.66 to 1.53)
Birthweight (g)			
<1,500	220.00 (190.57 to 253.96)	176.19 (166.83 to 186.08)	216.59 (204.65 to 229.24)
1,500-2,499	20.77 (17.84 to 24.19)	17.51 (16.2 to 18.91)	20.64 (19.03 to 22.4)
2,500-3,499	2.89 (2.49 to 3.35)	2.35 (2.18 to 2.53)	2.8 (2.6 to 3.03)
3,500-4,499	Reference	Reference	Reference
≥4,500	1.45 (0.83 to 2.53)	2.33 (1.55 to 3.48)	1.32 (0.7 to 2.46)

§ excluding terminations of pregnancy and births <24^{+0} weeks gestational age
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey

The ratio of mortality rates for stillbirths has remained fairly constant over time in terms of baby's sex, ethnicity, gestational age and birthweight. However, the decrease in stillbirth rates in the Black or Black British group is also reflected in the risk ratio for the same group relative to White ethnicity, from a 130% increased risk in 2015 to a 108% increased risk in 2017.

Table 44: Ratios of mortality rates for neonatal death by babies' sex, multiplicity of birth, ethnicity, gestational age, and birthweight by year: United Kingdom and Crown Dependencies, for births in 2015 to 2017

Baby's characteristic	Ratio of mortality rates (RR)[§]		
	Neonatal deaths		
	2015	2016	2017
Sex			
Male	1.40 (1.26 to 1.56)	1.10 (1.02 to 1.19)	1.30 (1.20 to 1.40)
Female	Reference	Reference	Reference
Multiplicity			
1	Reference	Reference	Reference
2	3.21 (2.67 to 3.86)	3.33 (2.80 to 3.98)	3.53 (2.97 to 4.21)
≥3	13.62 (7.89 to 23.53)	7.45 (3.56 to 15.56)	11.28 (5.90 to 21.58)
Baby's ethnicity			
White	Reference	Reference	Reference
Mixed	0.97 (0.75 to 1.25)	1.02 (0.81 to 1.29)	0.81 (0.62 to 1.06)
Asian, Asian British	1.46 (1.25 to 1.71)	1.66 (1.45 to 1.90)	1.73 (1.50 to 1.98)
Black, Black British	1.43 (1.14 to 1.80)	1.50 (1.21 to 1.86)	1.67 (1.35 to 2.06)
Other	0.94 (0.66 to 1.34)	0.81 (0.56 to 1.17)	0.98 (0.69 to 1.38)
Gestational age at birth (weeks)			
24^{+0}-27^{+6}	210.49 (184.33 to 240.36)	229.03 (208.98 to 250.99)	223.65 (202.93 to 246.48)
28^{+0}-31^{+6}	46.20 (39.29 to 54.33)	41.92 (36.18 to 48.58)	47.61 (41.25 to 54.95)
32^{+0}-36^{+6}	7.50 (6.47 to 8.70)	8.02 (7.12 to 9.05)	8.40 (7.44 to 9.48)
37^{+0}-41^{+6}	Reference	Reference	Reference
≥42+0	0.50 (0.24 to 1.05)	0.71 (0.37 to 1.37)	1.05 (0.58 to 1.90)
Birthweight (g)			
<1,500	192.77 (158.96 to 233.77)	201.22 (184.19 to 219.82)	174.27 (159.20 to 190.77)
1,500-2,499	15.86 (12.89 to 19.51)	15.73 (13.88 to 17.83)	15.29 (13.53 to 17.27)
2,500-3,499	2.24 (1.83 to 2.74)	2.38 (2.13 to 2.66)	1.89 (1.67 to 2.13)
3,500-4,499	Reference	Reference	Reference
≥4,500	1.91 (1.00 to 3.63)	1.50 (0.71 to 3.18)	1.48 (0.70 to 3.13)

[§] excluding terminations of pregnancy and births <24^{+0} weeks gestational age
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey

The risk of neonatal mortality has continued to increase for babies of Asian or Asian British ethnicity (relative to white ethnicity), from 46% increased risk in 2015 to 73% increased risk in 2017. Asian or Asian British babies therefore continue to be at the highest risk for neonatal death despite a sharper increase in the risk of neonatal death for babies of Black or Black British ethnicity (from 43% increased risk in 2015 to 67% increased risk in 2017, compared to babies of white ethnicity).

9.3 Mothers' demographic, behavioural and pregnancy characteristics of deaths

Data is collected by MBRRACE-UK for a number of the mothers' characteristics known to be associated with increased perinatal mortality but for which UK-wide denominator data is not available. Therefore, mortality rates cannot be calculated for these characteristics. In Table 45 to Table 50 the prevalence of these factors is presented for stillbirths and neonatal deaths for the last three years of MBRRACE-UK data collection, i.e. 2015 to 2017. These tables show demographic, behavioural and pregnancy characteristics which appear to be fairly stable over time for both stillbirths and neonatal deaths. However, due to the levels of missing data for these characteristics we are unable to determine the exact proportions of stillbirths and neonatal deaths affected by specific characteristics. Further discussion of data quality and completeness can be found in Chapter 4.

Data items that identify whether a mother is high or low risk determine the care provision a mother receives and should be readily available from all maternal notes. Trusts and Health Boards are encouraged to check their data completeness in the overall summary for key variables in Figure 12 (Chapter 4) and Table 61 (Appendix A5), which provide information for the UK as a whole and for individual Trusts and Health Boards.

Table 45: Stillbirths by mothers' demographic characteristics by year: United Kingdom and Crown Dependencies, for births in 2015 to 2017

Mothers' demographic characteristics	Number (%)[§]					
	Stillbirths					
	2015		2016		2017	
Body Mass Index						
<16.0	9	(0.3)	4	(0.1)	2	(0.1)
16.0 to 18.4	70	(2.3)	69	(2.3)	67	(2.4)
18.5 to 24.9	1,163	(38.3)	1,183	(38.6)	1,092	(38.5)
25.0 to 29.9	806	(26.6)	830	(27.1)	773	(27.2)
30.0 to 34.9	449	(14.8)	431	(14.1)	400	(14.1)
≥35.0	314	(10.3)	333	(10.9)	319	(11.2)
Not known	223	(7.4)	215	(7.0)	187	(6.6)
Previous obstetric history[ν]						
Never pregnant	1,101	(38.2)	1091	(35.6)	1,023	(36.0)
Stillbirth or neonatal death	117	(4.1)	164	(5.4)	110	(3.9)
Pre 24 week loss	652	(22.6)	685	(22.3)	680	(23.9)
Surviving child	1,520	(52.7)	1591	(51.9)	1,489	(52.4)
Not known	8	(0.3)	0	(0.0)	0	(0.0)
Consanguinity						
Unrelated	2,636	(86.9)	2,698	(88.0)	2,516	(88.6)
First cousins or closer	80	(2.6)	82	(2.7)	79	(2.8)
Other relation	27	(0.9)	38	(1.2)	32	(1.1)
Not known	291	(9.6)	247	(8.1)	213	(7.5)
Born in the UK						
Yes	1,968	(64.9)	2,006	(65.4)	1,830	(64.4)
No	791	(26.1)	823	(26.9)	808	(28.5)
Not known	275	(9.1)	236	(7.7)	202	(7.1)

Mothers' demographic characteristics	Number (%)§					
	Stillbirths					
	2015		2016		2017	
Time resident in the UK~						
Less than 1 year	70	(2.3)	96	(3.1)	79	(2.8)
More than 1 year	2894	(95.4)	2, 891	(94.3)	654	(23.0)
Not known	71	(2.3)	78	(2.5)	75	(2.6)
Support during pregnancy						
Partner, cohabiting	2,526	(83.3)	2,547	(83.1)	2,354	(82.9)
Partner, not cohabiting	191	(6.3)	221	(7.2)	214	(7.5)
Family/friend	220	(7.3)	204	(6.7)	194	(6.8)
None	30	(1.0)	24	(0.8)	25	(0.9)
Not known	67	(2.2)	69	(2.3)	53	(1.9)
Employment status						
Employed or self-employed	1,789	(59.0)	1,748	(57.0)	1,660	(58.5)
Unemployed (looking for work)	329	(10.8)	363	(11.8)	352	(12.4)
Retired	0	(0.0)	1	(0.0)	1	(0.0)
Student	88	(2.9)	70	(2.3)	75	(2.6)
Looking after home/family	610	(20.1)	642	(20.9)	524	(18.5)
Permanently sick/disabled	16	(0.5)	16	(0.5)	12	(0.4)
Other	26	(0.9)	28	(0.9)	22	(0.8)
Not known	176	(5.8)	197	(6.4)	194	(6.8)

§ excluding terminations of pregnancy and births <24^{+0} weeks gestational age
ᵛ multiparous mothers can be included in more than one category
~ women not born in the UK
Data source: MBRRACE-UK

Table 46: Neonatal deaths by mothers' demographic characteristics by year: United Kingdom and Crown Dependencies, for births in 2015 to 2017

Mothers' demographic characteristics	Number (%)§					
	Neonatal deaths					
	2015		2016		2017	
Body Mass Index						
<16.0	3	(0.2)	1	(0.1)	3	(0.2)
16.0 to 18.4	41	(3.0)	46	(3.4)	42	(3.3)
18.5 to 24.9	449	(32.7)	482	(36.1)	457	(36.1)
25.0 to 29.9	274	(20.0)	273	(20.4)	276	(21.8)
30.0 to 34.9	153	(11.1)	170	(12.7)	159	(12.5)
≥35.0	107	(7.8)	113	(8.5)	133	(10.5)
Not known	346	(25.2)	252	(18.8)	197	(15.5)
Previous obstetric historyᵛ						
Never pregnant	437	(33.5)	462	(34.6)	445	(35.1)
Stillbirth or neonatal death	83	(6.4)	76	(5.7)	76	(6.0)
Pre 24 week loss	339	(26.0)	328	(24.5)	293	(23.1)
Surviving child	721	(55.3)	707	(52.9)	674	(53.2)
Not known	10	(0.8)	0	(0.0)	0	(0.0)

Mother's demographic characteristics	Number (%)§					
	Neonatal deaths					
	2015		2016		2017	
Consanguinity						
Unrelated	1,118	(81.4)	1,072	(80.2)	1,067	(84.2)
First cousins or closer	51	(3.7)	54	(4.0)	45	(3.6)
Other relation	23	(1.7)	18	(1.3)	19	(1.5)
Not known	181	(13.2)	193	(14.4)	136	(10.7)
Born in the UK						
Yes	925	(67.4)	860	(64.3)	831	(65.6)
No	235	(17.1)	295	(22.1)	262	(20.7)
Not known	213	(15.5)	182	(13.6)	174	(13.7)
Time resident in the UK~						
Less than 1 year	20	(1.5)	23	(1.7)	17	(1.3)
More than 1 year	1314	(95.7)	1, 264	(94.5)	213	(16.8)
Not known	39	(2.8)	50	(3.7)	32	(2.5)
Support during pregnancy						
Partner, cohabiting	1,120	(81.6)	1,113	(83.2)	1,044	(82.4)
Partner, not cohabiting	101	(7.4)	90	(6.7)	112	(8.8)
Family/friend	83	(6.0)	70	(5.2)	68	(5.4)
None	8	(0.6)	9	(0.7)	13	(1.0)
Not known	61	(4.4)	55	(4.1)	30	(2.4)
Employment status						
Employed or self-employed	689	(50.2)	709	(53.0)	674	(53.2)
Unemployed (looking for work)	132	(9.6)	141	(10.5)	125	(9.9)
Retired	0	(0.0)	0	(0.0)	0	(0.0)
Student	38	(2.8)	30	(2.2)	45	(3.6)
Looking after home/family	286	(20.8)	257	(19.2)	254	(20.0)
Permanently sick/disabled	1	(0.1)	7	(0.5)	6	(0.5)
Other	8	(0.6)	7	(0.5)	8	(0.6)
Not known	219	(16.0)	186	(13.9)	155	(12.2)

§ excluding terminations of pregnancy and births <24^{+0} weeks gestational age
Data source: MBRRACE-UK

Table 47: Stillbirths by mothers' behavioural characteristics by year: United Kingdom and Crown Dependencies, for births in 2015 to 2017

Mother's behavioural characteristics	Number (%)§					
	Stillbirths					
	2015		2016		2017	
Smoking status						
Never smoked	1,919	(63.3)	1,866	(60.9)	1,766	(62.2)
Non-smoker at booking (history unknown)	26	(0.9)	87	(2.8)	100	(3.5)
Gave up before pregnancy	273	(9.0)	253	(8.3)	257	(9.0)
Gave up during pregnancy	137	(4.5)	138	(4.5)	127	(4.5)
Smoker	605	(19.9)	640	(20.9)	525	(18.5)
Not known	73	(2.4)	81	(2.6)	65	(2.3)
Breath carbon monoxide (ppm)						
<4	863	(28.5)	1,002	(32.7)	1,017	(35.8)
≥4	240	(7.9)	359	(11.7)	356	(12.5)
Not known	1,930	(63.6)	1,704	(55.6)	1,467	(51.7)
Alcohol abuse						
No	2,934	(96.7)	2,958	(96.5)	2,761	(97.2)
Yes	24	(0.8)	32	(1.0)	19	(0.7)
Not known	75	(2.5)	75	(2.4)	60	(2.1)
Substance abuse						
No	2,879	(94.9)	2,890	(94.3)	2,703	(95.2)
Yes	83	(2.7)	104	(3.4)	85	(3.0)
Not known	72	(2.4)	71	(2.3)	52	(1.8)

§ excluding terminations of pregnancy and births <24^{+0} weeks gestational age
Data source: MBRRACE-UK

Table 48: Neonatal deaths by mothers' behavioural characteristics by year: United Kingdom and Crown Dependencies, for births in 2015 to 2017

Mother's behavioural characteristics	Number (%)§					
	Neonatal deaths					
	2015		2016		2017	
Smoking status						
Never smoked	797	(63.4)	779	(58.3)	741	(58.5)
Non-smoker at booking (history unknown)	36	(2.9)	91	(6.8)	90	(7.1)
Gave up before pregnancy	82	(6.5)	98	(7.3)	107	(8.4)
Gave up during pregnancy	52	(4.1)	56	(4.2)	44	(3.5)
Smoker	290	(23.1)	246	(18.4)	236	(18.6)
Not known	116	(9.2)	67	(5.0)	49	(3.9)
Breath carbon monoxide (ppm)						
<4	323	(23.5)	418	(31.3)	423	(33.4)
≥4	108	(7.9)	119	(8.9)	141	(11.1)
Not known	942	(68.6)	800	(59.8)	703	(55.5)
Alcohol abuse						
No	1,272	(92.6)	1,262	(94.5)	1,214	(95.8)
Yes	16	(1.2)	10	(0.7)	11	(0.9)
Not known	85	(6.2)	64	(4.8)	42	(3.3)
Substance abuse						
No	1,244	(90.6)	1242	(92.9)	1,198	(94.6)
Yes	47	(3.4)	32	(2.4)	28	(2.2)
Not known	82	(6.0)	63	(4.8)	41	(3.2)

§ excluding terminations of pregnancy and births <24^{+0} weeks gestational age
Data source: MBRRACE-UK

Table 49: Stillbirths by mothers' pregnancy characteristics by year: United Kingdom and Crown Dependencies, for births in 2015 to 2017

Mother's pregnancy characteristics	Number (%)§					
	Stillbirths					
	2015		2016		2017	
Booking (weeks gestational age)						
Less than 12^{+0}	2,103	(69.3)	2087	(68.1)	1,951	(68.7)
12^{+0} to 17^{+6}	566	(18.7)	577	(18.8)	531	(18.7)
18^{+0}	217	(7.2)	249	(8.1)	200	(7.0)
Not known	148	(4.9)	152	(5.0)	158	(5.6)
Documented poor antenatal care attender						
No	2,805	(92.5)	2774	(90.5)	2,575	(90.7)
Yes	114	(3.8)	157	(5.1)	134	(4.7)
Not known	115	(3.8)	134	(4.4)	131	(4.6)
Assisted conception						
Not assisted	2,850	(93.9)	2878	(93.9)	2,645	(93.1)
Ovulation induction only	26	(0.9)	14	(0.5)	19	(0.7)
In vitro fertilisation (IVF)◦	102	(3.4)	106	(3.5)	114	(4.0)
Artificial insemination□	3	(0.1)	8	(0.3)	8	(0.3)
Not known	53	(1.7)	59	(1.9)	54	(1.9)

Table 50: Neonatal deaths by mothers' pregnancy characteristics by year: United Kingdom and Crown Dependencies, for births in 2015 to 2017

Mother's pregnancy characteristics	Number (%)§					
	Neonatal deaths					
	2015		2016		2017	
Booking (weeks gestational age)						
Less than 12^{+0}	757	(55.1)	806	(60.3)	797	(62.9)
12^{+0} to 17^{+6}	240	(17.5)	220	(16.5)	221	(17.4)
18^{+0}	85	(6.2)	90	(6.7)	85	(6.7)
Not known	291	(21.2)	221	(16.5)	164	(12.9)
Documented poor antenatal care attender						
No	1,123	(81.8)	1098	(82.1)	1,057	(83.4)
Yes	29	(2.1)	36	(2.7)	38	(3.0)
Not known	221	(16.1)	203	(15.2)	172	(13.6)
Assisted conception						
Not assisted	1,145	(83.4)	1141	(85.3)	1,097	(86.6)
Ovulation induction only	8	(0.6)	11	(0.8)	13	(1.0)
In vitro fertilisation (IVF)◦	68	(5.0)	75	(5.6)	58	(4.6)
Artificial insemination□	2	(0.1)	3	(0.2)	2	(0.2)
Not known	150	(10.9)	107	(8.0)	97	(7.7)

§ excluding terminations of pregnancy and births <24^{+0} weeks gestational age
◦ including egg donation and intra-cytoplasmic sperm injection
□ with or without ovulation induction
Data source: MBRRACE-UK

10. Twin pregnancies

Twin pregnancies resulting in one or more late fetal loss, stillbirth or neonatal death in 2017 are the current focus of the MBRRACE-UK confidential enquiries. This chapter provides background data about twin pregnancies where at least one baby has been stillborn or born alive but died during the neonatal period, describing the characteristics of these babies and their mothers to provide a background for the next confidential enquiry report. In line with the other main analyses in this report the focus is on births at 24 weeks gestational age and over and excludes terminations of pregnancy.

Since the start of MBRRACE-UK in 2013 there has been a reduction in both the stillbirth and neonatal mortality rates for twins. Over the five years 2013 to 2017, the twin stillbirth rate has reduced by around a quarter from 9.03 to 6.99 per 1,000 total births whilst the twin neonatal mortality rate has reduced by nearly a third, from 8.01 to 5.45 per 1,000 live births. Despite these reductions the increased risk of mortality associated with twins compared to singletons is almost double for stillbirths (1.93 in 2017) and over threefold for neonatal deaths (3.53 in 2017) (see Chapter 9). This increased risk is associated with a number of factors including increased rates of congenital anomaly in twin pregnancies [24], many of which result from assisted conception and is known to vary by chorionicity [25].

Analysis of data for twin pregnancies is limited by the ability to directly link baby pairs to their mother. Whilst this is possible in the MBRRACE-UK system additional work is required with the births denominator data we receive in order for this to be achieved.

Table 51: Chorionicity, assisted conception and presence of a congenital anomaly for twin pregnancies where one or neither twin survived the neonatal period, for births 2015 to 2017

Factor	2015		2016		2017	
	Number	(%)	Number	(%)	Number	(%)
Number of pregnancies with one twin surviving the neonatal period	**184**		**176**		**201**	
Number of pregnancies with neither twin surviving the neonatal period	**72**		**47**		**45**	
Chorionicity						
Dichorionic diamniotic	123	(48.0)	113	(50.7)	131	(53.3)
Monochorionic (diamniotic and monoamniotic)	113	(44.1)	95	(42.6)	103	(41.9)
Unknown	20	(7.8)	15	(6.7)	12	(4.9)
Assisted conception						
No	186	(72.7)	154	(69.1)	187	(76.0)
Yes	58	(22.7)	50	(22.4)	47	(19.1)
Unknown	12	(4.7)	19	(8.5)	12	(4.9)
Congenital anomaly						
No	165	(64.5)	146	(65.5)	154	(62.6)
Yes	44	(17.2)	36	(16.1)	44	(17.9)
Unknown	47	(18.4)	41	(18.4)	48	(19.5)

Excluding terminations of pregnancy and births <24^{+0} weeks gestational age
Data source: MBRRACE-UK

In Table 51 the chorionicity for twin pregnancies resulting in one or more stillbirths and/or neonatal death is presented alongside the proportion of these pregnancies that were achieved following assisted conception and that were affected by one or more babies with a congenital anomaly for the UK by year: 2015 to 2017. Over this three year period there were a total of 725 twin pregnancies resulting in one or more stillbirths and/or neonatal

deaths, representing a total of 899 stillbirths and neonatal deaths. Just over two-fifths of these twin pregnancies were reported to the MBRRACE-UK system as monochorionic, with around 5% missing data for 2017. Around a fifth of these pregnancies resulted from assisted conception and just under a fifth were reported as being affected by one or more babies with a congenital anomaly.

Table 52: Mothers' characteristics for stillbirths by singleton and twin birth, for births in 2015 to 2017

Mother's characteristic	Singleton births			Twin births			
	Stillbirths†	(%)	Rate per 1,000 births§	Stillbirths†	(%)	Rate per 1,000 births§	Ratio of mortality rates (RR)§
Mother's age (years)							
<20	348	(4.1)	4.80	18	(3.5)	18.04	3.76 (2.37 to 5.95)
20-24	1434	(17.1)	4.33	64	(12.5)	9.92	2.29 (1.23 to 4.26)
25-29	2230	(26.5)	3.61	129	(25.2)	7.98	2.21 (1.11 to 4.41)
30-34	2317	(27.6)	3.37	156	(30.5)	6.78	2.01 (0.95 to 4.26)
35-39	1570	(18.7)	4.08	101	(19.8)	6.05	1.48 (0.67 to 3.28)
≥40	503	(6.0)	5.69	43	(8.4)	7.87	1.38 (0.69 to 2.78)
Not known	2	(0.0)	0.05	0	(0.0)	0.00	*
Socio-economic deprivation quintile•							
1- Least deprived	1218	(14.5)	2.79	116	(22.7)	7.48	2.68 (1.31 to 5.48)
2	1429	(17.0)	3.21	94	(18.4)	6.50	2.02 (0.94 to 4.36)
3	1617	(19.2)	3.67	99	(19.4)	7.27	1.98 (0.96 to 4.09)
4	1898	(22.6)	4.28	118	(23.1)	8.81	2.06 (1.07 to 3.97)
5- Most deprived	2200	(26.2)	4.94	78	(15.3)	6.36	1.29 (0.59 to 2.79)
Not known	42	(0.5)	3.90	6	(1.2)	6.64	*

† per 1,000 total births
‡ per 1,000 live births
§ excluding terminations of pregnancy and births <24^{+0} weeks gestational age
● based on mothers' postcodes at time of delivery, using the Children in Low-Income Families Local Measure
* This cannot be calculated due to no reported deaths
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey

The ratio of mortality rates for individual babies from twin pregnancies compared to singleton pregnancies for maternal age and quintiles of socio-economic deprivation are presented for stillbirths in Table 52 and neonatal deaths in Table 53. As indicated earlier maternal rates cannot be calculated due to a lack of denominator data with the ability to link mothers and baby pairs for twin pregnancies.

Compared to singleton births there is a negative correlation of decreasing maternal age with an increasing risk of stillbirth for twin births over the three year period ranging from 38% increased risk in the oldest mother (≥40 years) to a 276% increased risk for teenage mothers (Table 52). An increased risk of stillbirth for twin births compared with singletons is seen across all quintiles of deprivation with the highest risk for twins with mothers from the least deprived quintile (an increased risk of 168%) and the lowest from the most deprived quintile (an increased risk of 29%). The former may reflect, in part, an increased access to assisted conception by more affluent mothers.

There is a similar negative correlation between decreasing maternal age and an increasing risk of neonatal death for twin births (compared to singletons) over the three year period ranging from 99% increased risk in the oldest mothers (≥40 years) to a 311% increased risk for twins with mothers aged between 20 and 24 years (Table 53). The increased risk of neonatal death for twin births from teenage mothers is 204% but is based on only nine twin babies. An increased risk of neonatal death for twin births compared with singletons is seen across all quintiles of deprivation, once again with the lowest risk from the most deprived quintile (an increased

risk of 155%). The highest risk is seen for twin babies with mothers in the second least deprived quintile (an increased risk of 351%).

Table 53: Mothers' characteristics for neonatal deaths by singleton and twin birth, for births in 2015 to 2017

Mother's characteristic	Singleton births			Twin births			
	Neonatal deaths‡	(%)	Rate per 1,000 births§	Neonatal deaths‡	(%)	Rate per 1,000 births§	Ratio of mortality rates (RR)§
Mother's age (years)							
<20	215	(6.0)	2.97	9	(2.4)	9.02	3.04 (1.58 to 5.84)
20-24	613	(17.1)	1.85	49	(13.0)	7.60	4.11 (2.02 to 8.35)
25-29	935	(26.1)	1.51	92	(24.3)	5.69	3.77 (1.66 to 8.56)
30-34	1000	(27.9)	1.45	113	(29.9)	4.91	3.39 (1.4 to 8.19)
35-39	604	(16.9)	1.57	89	(23.5)	5.33	3.39 (1.45 to 7.93)
≥40	211	(5.9)	2.39	26	(6.9)	4.76	1.99 (0.81 to 4.9)
Not known	0	(0.0)	0.00	0	(0.0)	0.00	*
Socio-economic deprivation quintile●							
1- Least deprived	543	(15.2)	1.24	56	(14.8)	3.61	2.91 (1.04 to 8.17)
2	588	(16.4)	1.32	86	(22.8)	5.95	4.51 (2.02 to 10.06)
3	668	(18.7)	1.51	65	(17.2)	4.77	3.16 (1.29 to 7.74)
4	813	(22.7)	1.83	103	(27.2)	7.69	4.2 (2.08 to 8.51)
5- Most deprived	941	(26.3)	2.11	66	(17.5)	5.39	2.55 (1.1 to 5.94)
Not known	25	(0.7)	2.32	2	(0.5)	2.21	*

† per 1,000 total births
‡ per 1,000 live births
§ excluding terminations of pregnancy and births <24^{+0} weeks gestational age
● based on mothers' postcodes at time of delivery, using the Children in Low-Income Families Local Measure
* This cannot be calculated due to no reported deaths
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey

The ratio of mortality rates by baby characteristics for twins compared to singletons are presented for stillbirths in Table 54 and neonatal deaths in Table 55. Female twin babies are at slightly higher risk of both stillbirth and neonatal death compared with singletons than male twin babies (107% and 71% for stillbirths and 251% and 223% for neonatal deaths, respectively). Twin babies of White or Mixed ethnicity have the highest (and significant) increased risk of stillbirth compared to singleton babies of White or Mixed ethnicity: 117% and 192%, respectively. The risk of twin stillbirth for Asian or Asian British and Black or Black British is not significantly increased over their singleton counterparts. However, there is a significantly increased risk of neonatal mortality for twin babies compared with singletons for all ethnic groups (apart from Other ethnicity where there were only 5 neonatal deaths). Nevertheless, as for stillbirths, twin babies of White or Mixed ethnicity have the highest (and significant) increased risk of neonatal mortality compared to singleton babies of White and Mixed ethnicity: 268% and 314%, respectively.

Preterm twin babies are at a significantly reduced risk of stillbirth compared to singleton babies: 60%, 73% and 74% lower at 24^{+0} to 27^{+6}, 28^{+0} to 31^{+6} and 32^{+0} to 36^{+6} weeks gestational age, respectively). For neonatal death the risk for twin compared to singleton babies is similar to stillbirths for those born at 24^{+0} to 27^{+6} weeks gestational age and at term. However for twin babies born at 28^{+0} to 31^{+6} weeks gestational age the risk of neonatal mortality is significantly reduced: 56% lower than singletons at this gestational age. Similar patterns can be seen for the risk of stillbirth and neonatal death associated with birthweight for twin compared to singleton births.

Table 54: Babies' characteristics for stillbirths by singleton and twin birth, for births in 2015 to 2017

Baby's characteristic	Singleton births			Twin births			
	Stillbirths†	(%)	Rate per 1,000 births§	Stillbirths†	(%)	Rate per 1,000 births§	Ratio of mortality rates (RR)§
Sex							
Male	4316	(51.4)	3.79	228	(44.6)	6.49	1.71 (0.8 to 3.69)
Female	4018	(47.8)	3.71	268	(52.4)	7.67	2.07 (1.02 to 4.19)
Not known	70	(0.8)	530.30	15	(2.9)	416.70	
Baby's ethnicity							
White	5562	(66.2)	3.50	382	(74.8)	7.61	2.17 (1.07 to 4.41)
Mixed	482	(5.7)	4.13	28	(5.5)	7.65	1.85 (0.91 to 3.76)
Asian, Asian British	1262	(15.0)	5.86	44	(8.6)	7.88	1.34 (0.67 to 2.7)
Black, Black British	752	(8.9)	7.98	31	(6.1)	8.62	1.08 (0.55 to 2.1)
Other	212	(2.5)	3.59	18	(3.5)	10.47	2.92 (1.59 to 5.35)
Refused/Not Known	134	(1.6)	0.91	8	(1.6)	1.5	
Gestational age at birth (weeks)							
24^{+0}-27^{+6}	1972	(23.5)	253.9	185	(36.2)	101.8	0.4 (0.33 to 0.48)
28^{+0}-31^{+6}	1362	(16.2)	92.92	117	(22.9)	25.48	0.27 (0.19 to 0.4)
32^{+0}-36^{+6}	2107	(25.1)	18.3	163	(31.9)	4.77	0.26 (0.11 to 0.64)
37^{+0}-41^{+6}	2905	(34.6)	1.46	46	(9.0)	1.64	1.12 (0.24 to 5.19)
≥42^{+0}	56	(0.7)	1.05	0	(0.0)	0	*
Not known	2	(0.0)	0.05	0	(0.0)	0	
Birthweight (g)							
<1,500	3380	(40.2)	178.2	370	(72.4)	66.07	0.37 (0.29 to 0.47)
1,500-2,499	1946	(23.2)	18.47	94	(18.4)	2.94	0.16 (0.05 to 0.5)
2,500-3,499	2339	(27.8)	2.05	20	(3.9)	0.71	0.35 (0.03 to 3.54)
3,500-4,499	675	(8.0)	0.76	2	(0.4)	2.48	3.26 (0.94 to 11.33)
≥4,500	47	(0.6)	1.32	0	(0.0)	0	*
Not known	17	(0.2)	0.6	25	(4.9)	7.43	

† per 1,000 total births
‡ per 1,000 live births
§ excluding terminations of pregnancy and births <24^{+0} weeks gestational age
* This cannot be calculated due to no reported deaths
Small differences in the number of deaths are the result of minor updates to the data
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey

Table 55: Babies' characteristics for neonatal deaths by singleton and twin birth, for births in 2015 to 2017

Baby's characteristic	Singleton births			Twin births			
	Neonatal deaths‡	(%)	Rate per 1,000 births§	Neonatal deaths‡	(%)	Rate per 1,000 births§	Ratio of mortality rates (RR)§
Sex							
Male	2034	(56.8)	1.79	203	(53.7)	5.78	3.23 (1.43 to 7.28)
Female	1521	(42.5)	1.41	173	(45.8)	4.95	3.51 (1.46 to 8.46)
Not known	23	(0.6)	174.20	2	(0.5)	55.56	
Baby's ethnicity							
White	2466	(68.9)	1.55	287	(75.9)	5.71	3.68 (1.63 to 8.35)
Mixed	169	(4.7)	1.45	22	(5.8)	6.01	4.14 (1.86 to 9.25)
Asian, Asian British	558	(15.6)	2.59	39	(10.3)	6.98	2.69 (1.28 to 5.65)
Black, Black British	229	(6.4)	2.43	24	(6.3)	6.67	2.74 (1.28 to 5.87)
Other	88	(2.5)	1.49	5	(1.3)	2.91	1.95 (0.61 to 6.22)
Refused/Not Known	68	(1.9)	0.46	1	(0.3)	0.19	
Gestational age at birth (weeks)							
24^{+0}-27^{+6}	915	(25.6)	117.8	221	(58.5)	121.6	1.03 (0.87 to 1.22)
28^{+0}-31^{+6}	498	(13.9)	33.97	68	(18.0)	14.81	0.44 (0.26 to 0.72)
32^{+0}-36^{+6}	746	(20.8)	6.48	66	(17.5)	1.93	0.3 (0.07 to 1.22)
37^{+0}-41^{+6}	1382	(38.6)	0.7	23	(6.1)	0.82	1.17 (0.13 to 10.2)
≥42^{+0}	27	(0.8)	0.51	0	(0.0)	0	*
Not known	10	(0.3)	0.23	0	(0.0)	0	
Birthweight (g)							
<1,500	1321	(36.9)	69.66	286	(75.7)	51.07	0.73 (0.56 to 0.96)
1,500-2,499	812	(22.7)	7.71	69	(18.3)	2.16	0.28 (0.07 to 1.06)
2,500-3,499	1032	(28.8)	0.9	20	(5.3)	0.71	0.79 (0.08 to 8.08)
3,500-4,499	369	(10.3)	0.41	0	(0.0)	0	*
≥4,500	25	(0.7)	0.7	0	(0.0)	0	*
Not known	19	(0.5)	0.68	3	(0.8)	0.89	

† per 1,000 total births
‡ per 1,000 live births
§ excluding terminations of pregnancy and births <24^{+0} weeks gestational age
* This cannot be calculated due to no reported deaths
Small differences in the number of deaths are the result of minor updates to the data
Data sources: MBRRACE-UK, PDS, ONS, NRS, ISD, NIMATS, States of Guernsey, States of Jersey

The CODAC cause of death reported to MBRRACE-UK for singleton and twin babies for stillbirths and neonatal deaths is presented in Tables 56, 57, 58 and 59. The main differences in the reported CODAC cause of death for singleton and twin stillbirths is that around 30% of singleton babies have a placental cause compared to nearly 40% of twin babies and that the cause of death is coded as unknown or missing in around 40% of singleton babies compared to around 30% of twin babies. For neonatal deaths in twin babies, just under 60% have a reported neonatal cause, with a third of all neonatal deaths reported as extreme prematurity. Singleton neonatal deaths have a reported neonatal cause in around 40% of babies and only one in ten of all neonatal deaths are reported as due to extreme prematurity. Less than a quarter of twin babies are reported as having a cause of death of congenital anomaly compared to over a third of singleton babies.

Table 56: CODAC causes of death for stillbirths – singleton pregnancies, for births 2015 to 2017

CODAC cause of death	Stillbirths – singleton pregnancies§					
	2015		2016		2017	
	Number	%	Number	%	Number	%
Infection	110	3.9	106	3.6	114	4.3
Neonatal	41	1.5	35	1.2	39	1.5
Intrapartum	76	2.7	68	2.3	47	1.8
Congenital anomaly	252	8.9	265	9.1	246	9.2
Fetal	134	4.7	137	4.7	102	3.8
Cord	133	4.7	123	4.2	138	5.2
Placenta	728	25.8	826	28.4	838	31.4
Maternal	122	4.3	118	4.1	101	3.8
Unknown	1144	40.5	1100	37.8	930	34.9
Missing	87	3.1	134	4.6	112	4.2

§ excluding terminations of pregnancy and births <24^{+0} weeks gestational age
Data source: MBRRACE-UK

Table 57: CODAC causes of death for stillbirths – twin pregnancies, for births 2015 to 2017

CODAC cause of death	Stillbirths – twin pregnancies§					
	2015		2016		2017	
	Number	%	Number	%	Number	%
Infection	6	3.0	2	1.4	7	4.3
Neonatal	2	1.0	7	4.8	2	1.2
Intrapartum	8	4.0	3	2.1	4	2.4
Congenital anomaly	14	7.0	15	10.3	14	8.5
Fetal	12	6.0	12	8.3	10	6.1
Cord	7	3.5	7	4.8	10	6.1
Placenta	88	43.8	52	35.9	63	38.4
Maternal	7	3.5	3	2.1	2	1.2
Unknown	51	25.4	42	29.0	48	29.3
Missing	6	3.0	2	1.4	4	2.4

§ excluding terminations of pregnancy and births <24^{+0} weeks gestational age
Data source: MBRRACE-UK

Table 58: CODAC causes of death for neonatal deaths – singleton pregnancies, for births 2015 to 2017

CODAC cause of death	Neonatal deaths – singleton pregnancies[§]					
	2015		2016		2017	
	Number	%	Number	%	Number	%
Infection	**86**	**6.9**	**91**	**7.6**	**86**	**7.6**
Neonatal	**518**	**41.4**	**502**	**41.7**	**438**	**38.8**
Unspecified or other	30	2.4	28	2.3	19	1.7
Extreme prematurity	142	11.3	164	13.6	118	10.4
Neurological	157	12.5	146	12.1	128	11.3
Cardio-respiratory	111	8.9	108	9.0	102	9.0
Gastrointestinal	50	4.0	37	3.1	44	3.9
Multi-organ failure	25	2.0	15	1.2	19	1.7
Trauma or suffocation	2	0.2	4	0.3	7	0.6
Inadequate care	1	0.1		0.0	1	0.1
Intrapartum	**32**	**2.6**	**25**	**2.1**	**43**	**3.8**
Congenital anomaly	**421**	**33.6**	**426**	**35.4**	**426**	**37.7**
Fetal	**35**	**2.8**	**47**	**3.9**	**37**	**3.3**
Cord	**5**	**0.4**	**2**	**0.2**	**0**	**0.0**
Placenta	**38**	**3.0**	**26**	**2.2**	**19**	**1.7**
Maternal	**2**	**0.2**	**5**	**0.4**	**4**	**0.4**
Unknown	**52**	**4.2**	**60**	**5.0**	**48**	**4.2**
Missing	**63**	**5.0**	**20**	**1.7**	**29**	**2.6**

[§] excluding terminations of pregnancy and births <24^{+0} weeks gestational age
Data source: MBRRACE-UK

Table 59: CODAC causes of death for neonatal deaths – twin pregnancies, for births 2015 to 2017

CODAC cause of death	Neonatal deaths – twin pregnancies[§]					
	2015		2016		2017	
	Number	%	Number	%	Number	%
Infection	**11**	**8.4**	**10**	**8.0**	**8**	**6.3**
Neonatal	**73**	**55.7**	**79**	**63.2**	**73**	**57.5**
Unspecified or other	3	2.5	1	0.8	0	0.0
Extreme prematurity	37	30.6	40	32.0	36	28.3
Neurological	13	10.7	12	9.6	11	8.7
Cardio-respiratory	12	9.9	19	15.2	15	11.8
Gastrointestinal	4	3.3	6	4.8	10	7.9
Multi-organ failure	4	3.3	1	0.8	1	0.8
Trauma or suffocation	0	0.0		0.0	0	0.0
Inadequate care	0	0.0		0.0	0	0.0
Intrapartum	**2**	**1.5**	**2**	**1.6**	**2**	**1.6**
Congenital anomaly	**31**	**23.7**	**22**	**17.6**	**30**	**23.6**
Fetal	**0**	**0.0**	**2**	**1.6**	**3**	**2.4**
Cord	**0**	**0.0**	**0**	**0.0**	**1**	**0.8**
Placenta	**2**	**1.5**	**5**	**4.0**	**6**	**4.7**
Maternal	**0**	**0.0**	**0**	**0.0**	**0**	**0.0**
Unknown	**3**	**2.3**	**4**	**3.2**	**1**	**0.8**
Missing	**9**	**6.9**	**1**	**0.8**	**3**	**2.4**

[§] excluding terminations of pregnancy and births <24^{+0} weeks gestational age
Data source: MBRRACE-UK

Key findings

1. There has been a reduction in the rate of extended perinatal mortality in the UK in 2017: 5.40 per 1,000 total births for babies born at 24^{+0} weeks gestational age or later compared with 5.64 in 2016. This represents a 12% reduction in extended perinatal mortality since 2013, equivalent to nearly 500 fewer deaths in 2017.

2. The stillbirth rate for the UK in 2017 has reduced to 3.74 per 1,000 total births from 4.20 in 2013, which represents 350 fewer stillbirths.

3. The rate of neonatal mortality for babies born at 24 weeks gestational age or later in the UK continues to show a steady decline over the period 2013 to 2017 from 1.84 to 1.67 deaths per 1,000 live births. This represents a 10% reduction in neonatal mortality over the last five years.

4. The largest fall in stillbirth and neonatal death rates is seen in term babies (37^{+0} to 41^{+6} weeks gestational age), accounting for half of the reduction seen in these rates.

5. Just over half of deaths were notified within the MBRRACE-UK benchmark time of 30 days (57% of stillbirths and 51% of neonatal deaths). Only 39% of Trusts and Health Boards had an average notification time of less than 30 days for stillbirths and 29% for neonatal deaths.

6. There has been an increase in the completeness of carbon monoxide monitoring data for both stillbirths and neonatal deaths over the period 2015 to 2017: from 36.4% to 48.3% for stillbirths and 31.4% to 44.5% for neonatal deaths. This improvement is clearly linked to the Saving Babies' Lives Care Bundle [1] as well as enhanced communication between care providers via the MBRRACE-UK web based system.

7. Despite overall improvements in mortality, out of 224 commissioning organisations, stabilised mortality rates were more than 5% higher than the overall UK average in 52 organisations for stillbirth and 57 organisations for neonatal death. There were only two commissioning organisations with a stabilised stillbirth rate more than 15% lower than the UK average and only six with a stabilised neonatal mortality rate more than 15% lower than the UK average.

8. The neonatal mortality rates for Trusts and Health Boards which care for the most complex pregnancies and births show wide variation, with rates of between 1.68 and 3.35 per 1,000 live births in those with Level 3 Neonatal Intensive Care Units (NICUs) and surgical provision. Exclusion of congenital anomalies from stabilised & adjusted neonatal mortality rates reduces this variation to between 0.98 and 1.79 per 1,000 live births.

9. There has been a substantial reduction in stillbirths recorded as having an intrapartum cause in the CODAC classification of cause of death from 189 (5.8%) stillbirths in 2014 to 51 (1.8%) stillbirths in 2017. The proportion of stillbirths reported as having an unknown cause of death using CODAC has reduced from around a half (46.0%) in 2014 to around one third (34.6%) in 2017.

10. Mortality rates remain high for Black or Black British and Asian or Asian British babies. Whilst stillbirth rates for these groups have reduced over the period 2015 to 2017 from 8.17 to 7.46 and from 5.88 to 5.70 per 1,000 total births, respectively, conversely neonatal mortality rates have increased over the same period from 2.45 to 2.77 and from 2.50 to 2.86 per 1,000 live births, respectively.

11. The reduction in both the stillbirth and neonatal death rate ratios associated with twin pregnancies (relative to singletons) over the period 2014 to 2016 has not been sustained, with small increases in risk seen in 2017 for stillbirths from 1.60 (95% CI, 1.36 to 1.88) to 1.93 (95% CI, 1.65 to 2.25) and for neonatal deaths from 3.33 (95% CI, 2.80 to 3.98) to 3.53 (95% CI, 2.97 to 4.21).

Recommendations

1. In order to achieve the various UK Governments' ambitions renewed efforts need to be focused on implementing existing national initiatives to reduce stillbirths and continue the slow but steady decline in neonatal mortality rates observed since 2013. Particular emphasis should be placed on reducing preterm birth.

2. Trusts and Health Boards should aim to notify all deaths via the MBRRACE-UK system within 30 days of the death occurring. Mechanisms for timely notification should be incorporated into local processes, and must have adequate staff, time allocation and resources. Trusts and Health Boards should aim for completion of all surveillance data within 90 days in order to facilitate data sharing with the PMRT and aid discussions with parents at follow-up appointments.

3. Trusts and Health Boards should use the MBRRACE-UK real time data monitoring tool to monitor the completeness of their data. Particular emphasis should be placed on carbon monoxide monitoring and other data items feeding into national initiatives such as the Saving Babies' Lives Care Bundle version 2.

4. Commissioning organisations should review both their crude and stabilised mortality rates alongside their high risk population characteristics (e.g. deprivation and ethnicity) to facilitate the development of public health initiatives and to target focused interventions, such as the continued rollout of continuity of carer as recommended by Better Births, with a particular focus on women in high-risk ethnic groups and those living in areas of high deprivation.

5. Trusts and Health Boards with a stabilised & adjusted stillbirth, neonatal mortality or extended perinatal mortality rate that falls into the red or amber band should carry out an initial investigation of their data quality and possible contributing local factors. Organisations should review their performance against national outcome measures with a view to understanding where improvement may be required.

6. Trust and Health Boards should use Perinatal Mortality Review Tool multidisciplinary meetings to improve the quality of cause of death coding.

7. Trusts and Health Boards should review their policies to ensure that the parents of ALL babies who die are provided with unbiased counselling for post-mortem to enable them to make an informed decision.

8. Trusts and Health Boards should work to implement fully the National Bereavement Care Pathway to ensure that all parents are offered high quality, individualised bereavement care after the loss of their baby.

9. Placental histology should be undertaken for all stillbirths and if possible all anticipated neonatal deaths, preferably by a perinatal pathologist.

Appendices

A1. Perinatal mortality in the UK from routine sources

Data presented in Table 61 shows the stillbirth, neonatal death and extended perinatal death rates in the UK for 2007 to 2017 obtained from statutory registered births and deaths.

Table 60: Total stillbirth, neonatal, and extended perinatal mortality rates from statutory registrations by country: United Kingdom, 2007 to 2017

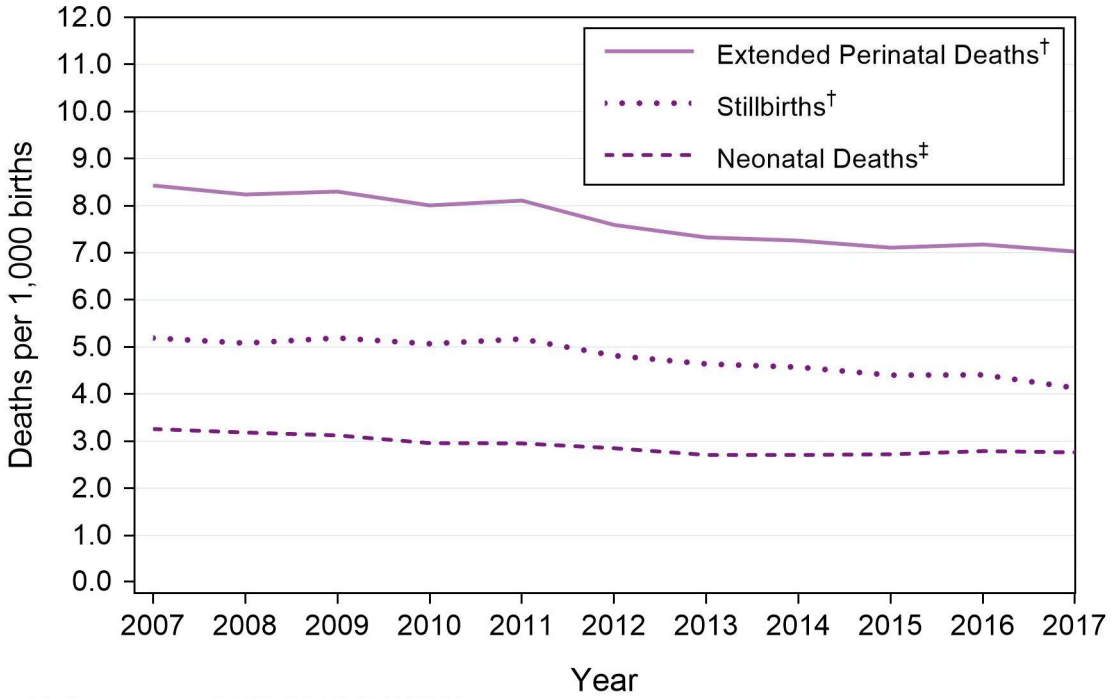
Rate per 1,000 births	Country	Year of death										
		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Stillbirths†	UK	5.19	5.08	5.19	5.07	5.17	4.82	4.64	4.57	4.40	4.41	4.13
	England	5.18	5.07	5.17	5.08	5.23	4.81	4.65	4.59	4.42	4.35	4.12
	Scotland	5.63	5.38	5.34	4.93	5.08	4.70	4.16	4.00	3.81	4.31	4.24
	Wales	4.94	4.61	5.13	5.26	4.67	5.11	4.51	5.25	4.73	4.98	4.73
	Northern Ireland	4.15	4.47	4.75	4.13	3.59	4.18	4.51	3.31	3.13	3.39	4.40
Neonatal deaths‡	UK	3.26	3.18	3.12	2.96	2.95	2.85	2.71	2.71	2.72	2.79	2.76
	England	3.24	3.18	3.10	2.93	2.94	2.86	2.71	2.69	2.73	2.80	2.87
	Scotland	3.25	2.80	2.79	2.55	2.71	2.55	2.34	2.42	2.03	2.68	2.25
	Wales	3.31	2.95	3.09	2.73	2.75	2.92	2.43	2.38	2.46	2.00	2.49
	Northern Ireland	3.31	3.71	3.89	4.58	3.48	2.77	3.38	3.94	4.21	3.57	2.77
Extended perinatal deaths†	UK	8.43	8.24	8.30	8.01	8.11	7.59	7.33	7.26	7.11	7.17	7.03
	England	8.40	8.24	8.25	8.00	8.16	7.58	7.34	7.26	7.14	7.13	6.98
	Scotland	8.86	8.17	8.12	7.46	7.78	7.24	6.49	6.41	5.84	6.98	6.48
	Wales	8.24	7.54	8.20	7.97	7.41	7.85	6.93	7.62	7.18	6.98	7.21
	Northern Ireland	7.45	8.16	8.63	8.69	7.06	6.94	7.87	7.23	7.33	6.95	7.16

† per 1,000 total births
‡ per 1,000 live births
Data sources: ONS, NRS, NISRA

Differences in the law in Northern Ireland relating to the termination of pregnancy means that a greater proportion of babies with severe congenital anomalies are born, but then die after birth. This may well be responsible for the relatively high rate of neonatal death for Northern Ireland.

The UK-wide rates are also shown in Figure 55, overleaf.

Figure 55: Total stillbirth, neonatal, and extended perinatal mortality rates from statutory registrations: United Kingdom, 2007 to 2017



Data sources: ONS, NRS & NISRA

† per 1,000 total births

‡ per 1,000 live births

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Naomi McDermott	The Royal Wolverhampton Hospitals NHS Trust
Carole Sadler	The Royal Wolverhampton Hospitals NHS Trust
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Wendy Tyler	The Shrewsbury and Telford Hospital NHS Trust
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Melanie Smith	United Lincolnshire Hospitals NHS Trust
Jude Wells	United Lincolnshire Hospitals NHS Trust
Lyn Gilbert	University College London Hospitals NHS Foundation Trust
Cherie Raphael	University College London Hospitals NHS Foundation Trust
Denise Symister	University College London Hospitals NHS Foundation Trust
Kim Allsop	University Hospital Southampton NHS Foundation Trust
Sarah Davidson	University Hospital Southampton NHS Foundation Trust
Mark Johnson	University Hospital Southampton NHS Foundation Trust
Victoria Puddy	University Hospital Southampton NHS Foundation Trust
Kate Blake	University Hospitals Coventry & Warwickshire NHST

Name of lead reporter	Trust or Health Board
Letoya Smith	University Hospitals Coventry & Warwickshire NHST
Ziju Elanjikal	University Hospitals of Bristol NHS Foundation Trust
Adele Farrow	University Hospitals of Bristol NHS Foundation Trust
Ingrid Henderson	University Hospitals of Bristol NHS Foundation Trust
Claire Stroud	University Hospitals of Bristol NHS Foundation Trust
Samantha Belton	University Hospitals of Leicester NHS Trust
Denise Brookes	University Hospitals of Leicester NHS Trust
Penny McParland	University Hospitals of Leicester NHS Trust
Julia Alcide	University Hospitals of Morecambe Bay NHS Foundation Trust
Rebecca Bleackley	University Hospitals of Morecambe Bay NHS Foundation Trust
Kath Granger	University Hospitals of Morecambe Bay NHS Foundation Trust
Celia Sykes	University Hospitals of Morecambe Bay NHS Foundation Trust
Lee Abbott	University Hospitals of North Midlands NHS Trust
Liz Jennings	University Hospitals of North Midlands NHS Trust
Sarah Lake	University Hospitals of North Midlands NHS Trust
Keira Cockerton	Walsall Healthcare NHS Trust
Carol Hollington	Walsall Healthcare NHS Trust
Lisa Poston	Walsall Healthcare NHS Trust
Rita Arya	Warrington & Halton Hospitals NHS Foundation Trust
Debra Yates	Warrington & Halton Hospitals NHS Foundation Trust
Justine Chung	West Hertfordshire Hospitals NHS Trust
Anastasia Katana	West Hertfordshire Hospitals NHS Trust
Justine Ladds	West Suffolk NHS Foundation Trust
Elizabeth Lovedale	West Suffolk NHS Foundation Trust
Nick Brennan	Western Sussex Hospitals NHS Foundation Trust
Fiona Churchill	Western Sussex Hospitals NHS Foundation Trust
Susan McRae	Western Sussex Hospitals NHS Foundation Trust
Juliette Phelan	Western Sussex Hospitals NHS Foundation Trust
Janice White	Western Sussex Hospitals NHS Foundation Trust
Lynn Woolley	Western Sussex Hospitals NHS Foundation Trust
Ailish Edwards	Weston Area Health NHS Trust
Donna Kerslake	Weston Area Health NHS Trust
Jane Laking	Whittington Health
Deborah Nash	Whittington Health
Elizabeth Thomas	Whittington Health
Sri Babarao	Wirral University Teaching Hospital NHS Foundation Trust
Clare MacGlashan	Wirral University Teaching Hospital NHS Foundation Trust
Rajeshwari Myagerimath	Wirral University Teaching Hospital NHS Foundation Trust
Trudy Berlet	Worcestershire Acute Hospitals NHS Trust
Karen Kokoska	Worcestershire Acute Hospitals NHS Trust
Lakshmi Thirumalaikumar	Worcestershire Acute Hospitals NHS Trust
Julie Armstrong	Wrightington, Wigan & Leigh NHS Foundation Trust
Sue Orchard	Wrightington, Wigan & Leigh NHS Foundation Trust
Cathy Stanford	Wrightington, Wigan & Leigh NHS Foundation Trust
Maxine Chong	Wye Valley NHS Trust

Name of lead reporter	Trust or Health Board
Wendy Huxley Marko	Wye Valley NHS Trust
Simon Meyrick	Wye Valley NHS Trust
Cathryn Seagrave	Wye Valley NHS Trust
Andrea Walker	Wye Valley NHS Trust
Natalie Avery	Yeovil District Hospital NHS Foundation Trust
Lindsey Burningham	Yeovil District Hospital NHS Foundation Trust
Helen Williams	Yeovil District Hospital NHS Foundation Trust
James Dwyer	York Teaching Hospital NHS Foundation Trust
Kirsten Mack	York Teaching Hospital NHS Foundation Trust
Rachel McCormack	York Teaching Hospital NHS Foundation Trust
Freya Oliver	York Teaching Hospital NHS Foundation Trust
Sundeep Sandhu	York Teaching Hospital NHS Foundation Trust
Louise Spicer	York Teaching Hospital NHS Foundation Trust

A3. Description of the data items reported to MBRRACE-UK

Woman's identifiers
- Family name/surname
- Given name/first name
- Address
- Postcode
- NHS/Community Health Index (CHI) number
- Date of birth/Age
- Hospital number in this hospital

Woman's details
- Ethnic category
- Country of birth
- Time resident in the UK at booking
- Documented communication difficulties?
- Type of communication difficulties
- Age at leaving full-time education
- Main support during pregnancy
- Employment status at booking
- Did woman have a partner?
- Partner's employment status at booking
- Blood relationship of woman to baby's father
- Was woman refugee or asylum seeker?

Woman's health
- Pre-existing medical problems
- Tobacco smoking status
- Electronic cigarette use
- Breath carbon monoxide
- Weekly alcohol consumption pre-pregnancy [d]
- Weekly alcohol consumption at booking [d]
- Was there documented alcohol abuse?
- Was there documented substance abuse?

Previous pregnancies [a]
- Outcome for fetus
- Birthweight
- Infant death
- Year
- Gestational age
- Fetal anomaly

Obstetric history
- Number of previous pregnancies
- Previous pregnancy complications

Booking
- Intended type of unit at booking
- Intended type of care at booking
- Intended care provider at booking
- Date of first booking appointment
- Final estimated date of delivery (EDD)
- Basis for EDD
- Number of fetuses present at booking/ultrasound
- Chorionicity
- Assisted conception
- Woman's height in cm
- Woman's first recorded weight in kg
- Was woman too heavy for hospital scales?
- First recorded BMI (if height/weight unavailable)
- Documented influenza vaccination in this pregnancy?
- Date of vaccination

Antenatal care provision
- Number of antenatal appointments attended
- Documented poor appointment attender
- Intended type of unit at onset
- Intended type of care at onset
- Intended care provider at onset
- Reason if transfer of care (between booking and onset)
- Actual type of unit at delivery
- Actual type of care at delivery
- Actual care provider at delivery
- Reason if transfer of care (post-onset)

Delivery and outcomes summary [a]
- Case definition
- Was this a termination?
- Reason for termination

Labour and delivery [a]
- Onset of labour
- Date of onset of care in labour
- Time of onset of care in labour
- Time of onset of labour
- Prolonged rupture of membranes (>24 hours)
- Date of rupture
- Presentation at delivery
- Attempted modes of delivery
- Final mode of delivery
- Type of caesarean section
- Primary indication for caesarean section
- Was the baby born in water?
- Delivery complications
- Date of delivery/birth
- Time of delivery/birth
- Were blood gases done?
- Source of the blood gases
- Arterial:
  - Cord pH
  - Base excess/deficit
  - Lactate
- Venous:
  - Cord pH
  - Base excess/deficit
  - Lactate

Baby/fetus outcomes [a]
- NHS/CHI number
- Sex of baby/fetus
- Ethnic category
- Birth order
- Birthweight
- Gestational age at delivery
- Was a heartbeat present in the first minute?
- Heartbeat rate band
- Was a cord pulse present in the first minute?
- Cord pulse rate band
- Active body movement in first minute
- Respiratory activity in first minute
- Apgar score at 1 minute
- Apgar score at 5 minutes

Baby/fetus outcomes *(cont'd)* [a]
- Was active respiratory support provided?
- Reason if no active respiratory support provided
- Outcome if active respiratory support provided
- Minutes after which active respiratory support attempts were stopped
- Were there documented child protection issues?
- Was there documented history of domestic abuse?
- Gestational age at confirmation of death [b]
- Date death confirmed [b]
- Was baby alive at onset of care process that led to delivery? [b]
- Was baby admitted to a neonatal unit? [c]
- Was baby transferred to another organisation after birth? [c]
- Primary reason for the first transfer [c]
- Number of transfers [c]
- Type of unit where death occurred [c]
- Care provider at time of death [c]
- Was the death unattended? [c]
- Date of death [c]
- Time of death [c]

Cause of death [a]
- Sources of information used to determine cause of death
- Was a mortality review undertaken for this case?
- Types of mortality review that apply
- Cause of death as written in notes or on the death certificate
- Primary cause of death:
  - condition
  - CODAC code
- Baby/fetus associated condition:
  - condition
  - CODAC code
- Is this the final, agreed cause of death following any inquest and all requested investigations?

Post-mortem [a]
- Was a post-mortem offered?
- Was consent given for a post-mortem?
- Consented post-mortem procedures
- Was a post-mortem undertaken?
- Undertaken procedures
- Was the placenta sent for histology?
- Was the case discussed with a coroner/procurator fiscal
- Was the case accepted as a corner/procurator fiscal's case?

Clinicians
- Obstetrician responsible for care
- Neonatologist/paediatrician responsible for care

---

[a] recorded for each baby/fetus
[b] stillbirth and late fetal losses only
[c] live births only
[d] collected until December 2016

A4. Further details of MBRRACE-UK data collection

A4.1 Approvals for collection of patient identifiable data

The necessary approvals obtained by the MNI-CORP programme prior to the start of the data collection process are listed below. These were applied for in order to collect patient identifiable data and access information collected by statutory organisations without consent.

Box 2: Approvals granted for UK collection of patient identifiable data and access to statutory data without consent

England and Wales

The Confidentiality Advisory Group of the Health Research Authority:

ECC 5-05 (f)/2012 (from 10.10.2012); 15/CAG/0119 (from 01.05.2015)

Health & Social Care Information Centre, Data Access Advisory Group: IC604DS

Scotland

The NHS Scotland Caldicott Guardian: 2014-62 MBRRACE-UK Programme – Update (2013-05)

The Privacy Advisory Committee, ISD, NHS National Services Scotland: PAC16/14

Northern Ireland

Due to the different data privacy arrangements in Northern Ireland only de-identified data is provided to the MNI-CORP programme and this is supplied by the NIMACH office

A4.2 The system for online data submission

Security

Access to the MBRRACE-UK website is via the internet using the secure HTTPS protocol. The web and database servers are housed in a secure data centre with firewall protection. All staff requesting online access must be approved by their Trust or Health Board and log-in is only possible with either an NHS or UK university email address. When an approved reporter first accesses the website they are required to request an activation code. This is used as a one-time password which must be changed on first access. All passwords must meet a set of criteria which ensures all passwords accepted are 'strong'. Reporters are assigned to a profile which restricts their access to only the appropriate parts of the website for their role (the system is used to report deaths, to review deaths with the PMRT, and to provide access to anonymised medical case notes for assessors taking part in MBRRACE-UK confidential enquiries).

All patient identifiers are encrypted before they are stored. Access to identifiable data is only allowed under very limited circumstances. Reporters may view the data from their own Trust or Health Board (subject to the use of a valid password) while access to identifiable data by MBRRACE-UK staff is subject to NHS information governance, security and confidentiality regulation (Box 2).

Data integrity and validation

Reporters wishing to report a new death or edit an existing death record are required to confirm the mother's details (NHS or CHI number, name, date of birth) on each occasion. The nationally defined algorithm for checking NHS and CHI numbers is used to ensure only valid numbers are entered.

Where appropriate, the information reported is checked against a range of acceptable values during the data entry process. For each such data item there is a range of expected values and an absolute range. If a value is

outside the expected range the reporter is warned and informed of the range. If it is outside the absolute range then the value cannot be entered and, additionally, the record cannot be closed. Before the reporter can close a record additional checks are carried out; for example, date values across the whole record are validated against each other to test for consistency.

In some circumstances there may be a small number of data items that are unavailable. In these situations reporters may indicate that an item is 'not known', with an opportunity to add the missing data at a later date,

For a significant number of deaths some of the data required will be held in more than one hospital, e.g. some aspects of maternal data after the death of a baby following postnatal transfer. If the additional information is held within the same Trust or Health Board but on a different site then reporters can access all the information they need in collaboration with obstetric, midwifery, neonatal or nursing colleagues. However, if the missing information is held by a different Trust or Health Board then the MBRRACE-UK system allows the reporter to temporarily assign ownership of the MBRRACE-UK record to the other Trust or Health Board who can then return it once the missing information has been provided.

Online help

Help is available on every data entry screen through Frequently Asked Questions (FAQs). In addition, many of the variables have specific help available by clicking on the 'Help' icon. Also, on every screen of the website there is a function to allow the reporter to enter a help request. This is sent via email to the MBRRACE-UK office for attention by the technical, clinical or administrative staff, as appropriate. A detailed user manual is also available to download from the MBRRACE-UK system.

Reports

The MBRRACE-UK online reporting system allows access to information relating to local deaths:

- the Trust/Health Board Reported Cases list provides abbreviated details of all deaths reported;
- the Trust/Health Board Summary provides the number of deaths by year, case-type and unit;
- the Trust/Health Board Case Review list provides the opportunity for local reporters to check the accuracy (within a fixed time frame) of the data reported by their organisation prior to the analysis for the report.

In addition, users can access a real-time data monitoring tool which allows them to view, filter and summarise live surveillance data for their Trust.

Web browser compatibility

The security requirements of the NHS in relation to electronic data flows mandate that the highest levels of security be employed. In order for this to be achieved, those accessing the MBRRACE-UK reporting system need access to an up-to-date web browser compatible with these security specifications. Appropriate browsers are available to download free of charge, although the installation of such software may require the co-operation of local NHS IT departments.

A4.3 Ensuring all births for 2017 and extended perinatal deaths are identified

The sources of data used to ensure complete data collection of births in 2017 and extended perinatal deaths for this cohort are listed in Box 3. The combining and checking of this data is outlined below.

Box 3: Data sources for the ascertainment of UK births and perinatal deaths

England and Wales

Birth registration data – ONS

Death registration data – ONS

PDS data on all births – NHS Digital (PDS)

Scotland

Birth registration data – NRS

Death registration data – NRS

Maternity Inpatient and Day Case Dataset (SMR02) inpatient data - ISD, NHS National Statistics Scotland

Northern Ireland

Birth registration data - NIMACH, Health and Social Care Public Health Agency – derived from NIMATS

Death registration data - NIMACH, Health and Social Care Public Health Agency – derived from NIMATS

Inpatient data - NIMACH, Health and Social Care Public Health Agency – derived from NIMATS

Crown Dependencies

Birth registration data - Health and Social Services Department, States of Guernsey

Death registration data - Health and Social Services Department, States of Guernsey

Birth registration data - Health Intelligence Unit, Public Health Services, States of Jersey

Death registration data - Health Intelligence Unit, Public Health Services, States of Jersey

PDS data on all births, Isle of Man – NHS Digital (PDS)

Identifying all extended perinatal deaths

Statutorily registered deaths which meet the MBRRACE-UK reporting criteria are matched to the deaths reported to MBRRACE-UK in order to identify any stillbirths or neonatal deaths which have not been reported to MBRRACE-UK. Due to the different system of implementation in Northern Ireland, the NIMACH office staff ensured full ascertainment of their data on our behalf.

For England, Wales and Scotland the matching is performed using a combination of deterministic and probabilistic matching methods based on the mother's given name, mother's family name, postcode of residence at time of delivery, Trust or Health Board of birth, baby's NHS number (England – where available), CHI number (Scotland), gestational age at delivery, birthweight, date of delivery and date of death.

Once the checking is complete the MBRRACE-UK Lead Reporters are notified of any known deaths that have occurred in their Trust or Health Board which could not be identified on the MBRRACE-UK system and asked to confirm that this was a death in their organisation and provide the missing information.

This checking for deaths missing from the MBRRACE-UK database cannot start until information on statutorily registered deaths are provided to MBRRACE-UK by ONS (England and Wales) and NRS (Scotland), meaning that we cannot inform MBRRACE-UK Lead Reporters of missing deaths until some months after the event.

Although most missing deaths can be identified in this way, not all deaths to be reported to MBRRACE-UK are available from statutory sources in a timely manner:

10. A small percentage of statutorily registered deaths are registered only after considerable delay, most often because an inquest was being held;

11. Late fetal losses delivered at 22^{+0} to 23^{+6} weeks gestational age are not officially registered;

12. RCOG guidance [8, 9] is that stillbirths delivered at 24^{+0} weeks gestational age or greater where the death was confirmed before 24^{+0} weeks gestational age should not be registered as stillbirths; however, in order to investigate variations in the reporting of stillbirths occurring at around 24^{+0} weeks gestational age, these deaths should all be reported to MBRRACE-UK.

There are no timely and easily accessible data sources for deaths that have not been officially registered and, therefore, it is not possible to ensure that all of these deaths have been reported to MBRRACE-UK.

Identifying all births in 2017

Individual information on all births in the UK and Crown Dependencies was obtained in order to generate mortality rates adjusted for maternal, baby, and socio-demographic risk factors. Information for England, Wales and the Isle of Man (PDS and ONS birth registration data), Scotland (NRS and ISD), Northern Ireland (NIMATS), Bailiwick of Guernsey (Health and Social Services Department) and the Bailiwick of Jersey (Health Intelligence Unit) were combined to give a single dataset of births for the whole UK and Crown Dependencies. This data was then combined with the information on the deaths to obtain the final data for analysis. See Appendix A4.4 for a more complete discussion of this process.

The allocation of births to an organisation is complex, given the wide variation in the recording of the notifying organisation, and it was not always possible to easily identify the place of birth from the data reported. In many cases this either required further detailed enquiry or correction of the place of birth, where an incorrect organisation had inadvertently been recorded. Complete and accurate recording is vital to enable MBRRACE-UK to allocate births to the appropriate Trust or Health Board for analysis and reporting.

Home births were allocated to the Trust or Health Board responsible for this service, whenever this was recorded, in order for the correct denominator(s) to be calculated. All Trusts and Health Boards in England, Wales and the Isle of Man completing information for the PDS should ensure that they are identified as the notifying organisation for all births related to their service.

A4.4 Generating the births dataset

The births and extended perinatal deaths identified using the sources and methods described in Appendix A4.3 were combined to generate a single dataset for analysis. Due to the variations in the data sources from the different countries, this was undertaken separately for each set of data sources as described below. Once the datasets had been generated for each country these were combined into a final, single dataset for analysis.

England and Wales

The complete dataset of births and extended perinatal deaths for England and Wales was generated using birth registration data (ONS), death registration data (ONS), PDS records, and MBRRACE-UK death notification records:

Step 1: All datasets were restricted to births in 2017.

Step 2: All records of births were combined into a single dataset (Figure 56): i.e. livebirth registrations (ONS); stillbirth registrations (ONS); PDS birth records; MBRRACE-UK notifications of late fetal loss. All of these datasets were used in order to obtain complete ascertainment of all births in England and Wales:

- late fetal losses are only recorded in the MBRRACE-UK death records;

- late birth registrations are captured by the PDS records;
- birth records removed from the PDS data because of patient opt-outs are captured by the ONS births records.

Step 3: Births at less than 22^{+0} weeks gestational age and pregnancies ended by a termination of pregnancy are removed from the dataset of births as these are not reported by MBRRACE-UK.

Step 4: Births at 22^{+0} to 23^{+6} weeks gestational age are removed from the dataset of births for the main tables and maps as these births are currently reported separately by MBRRACE-UK.

Step 5: All records of late fetal losses, stillbirths, and neonatal deaths were combined into a single dataset (Figure 57): i.e. death registrations (ONS); MBRRACE-UK death notifications. Both of these datasets are used in order to obtain complete ascertainment of all extended perinatal deaths in England and Wales.

Step 6: All deaths where the births occurred at less than 22^{+0} weeks gestational age and pregnancies ended by a termination of pregnancy are removed from the dataset of deaths as these are not reported by MBRRACE-UK.

Step 7: All deaths where the births occurred at less than 24^{+0} weeks gestational age are removed from the dataset of deaths for the main tables and maps as these deaths are currently reported separately by MBRRACE-UK.

Step 8: The dataset of deaths are merged into the dataset of births in order to create a single dataset for analysis.

Figure 56: Flowchart for combining data sources in order to generate dataset of births in England and Wales in 2017

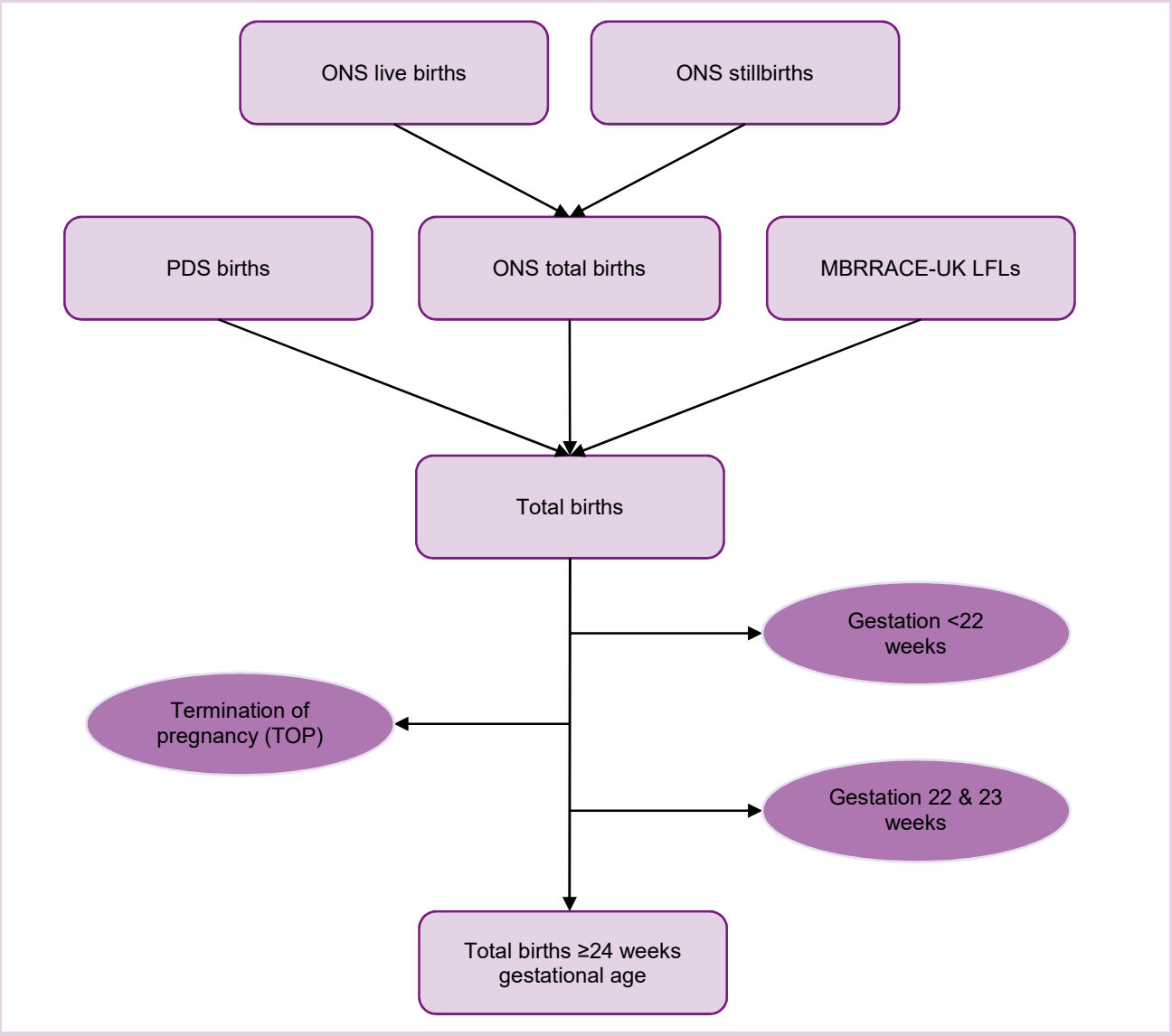
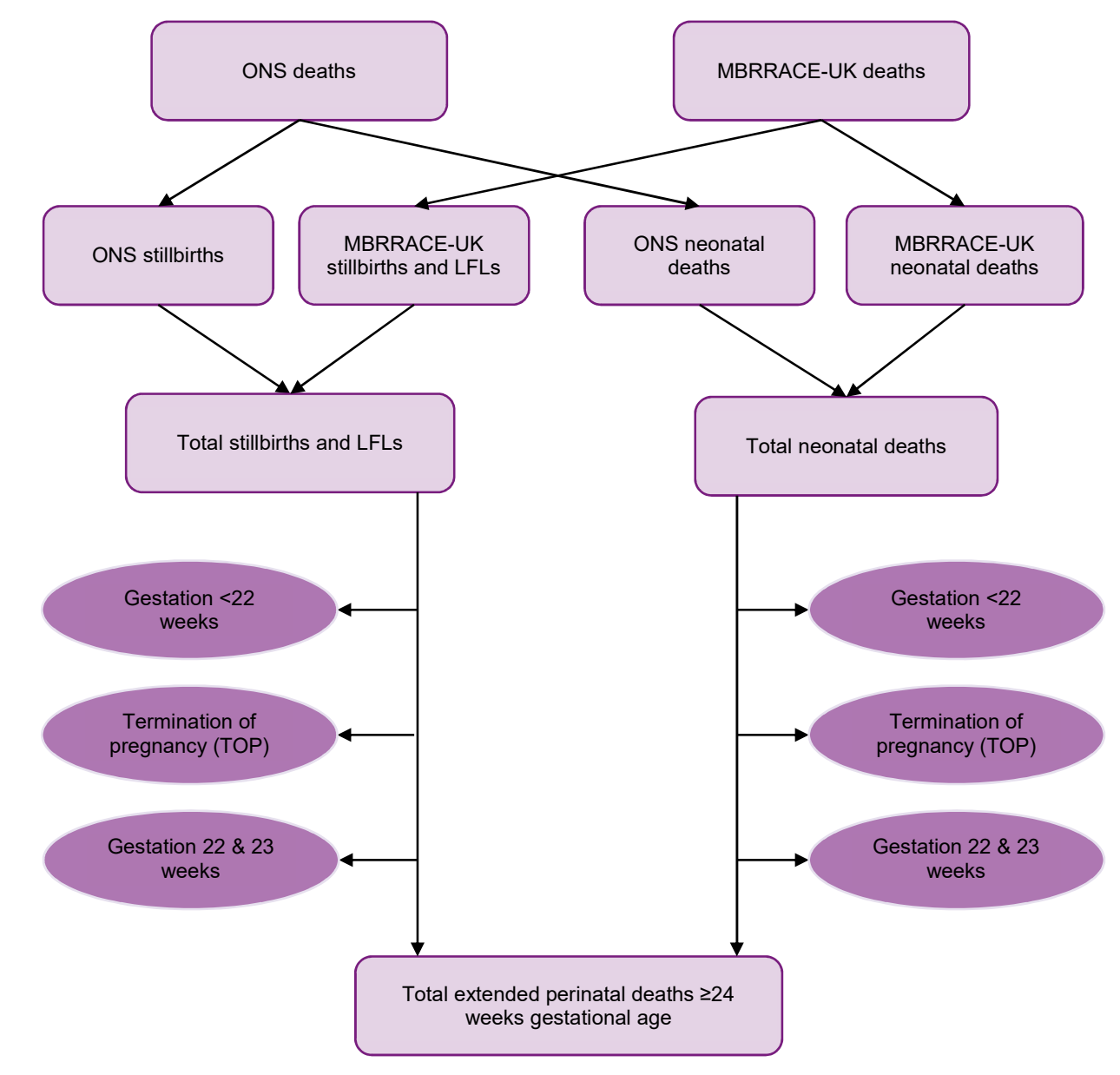


Figure 57: Flowchart for combining data sources in order to generate dataset of extended perinatal deaths for births in England and Wales in 2017



Scotland

The complete dataset of births and extended perinatal deaths for Scotland was generated using a similar approach to that used for England and Wales. For Scotland, data was obtained from birth registration data (NRS), death registration data (NRS), SMR02 Maternity Inpatient and Day Care Case records (ISD), and MBRRACE-UK death notification records. The birth registration data and the SMR02 data are merged before being released to MBRRACE-UK (ISD). The process undertaken by MBRRACE-UK was:

Step 1: All datasets were restricted to births in 2017.

Step 2: All records of births were combined into a single dataset (Figure 58): i.e. birth registrations/SMR02 (ISD); ISD notifications of late fetal losses; MBRRACE-UK notifications of late fetal loss. These datasets are used in order to obtain complete ascertainment of all births in Scotland:

Step 3: Births at less than 22^{+0} weeks gestational age and pregnancies ended by a termination of pregnancy are removed from the dataset of births as these are not reported by MBRRACE-UK.

Step 4: Births at 22^{+0} to 23^{+6} weeks gestational age are removed from the dataset of births for the main tables and maps as these births are currently reported separately by MBRRACE-UK.

Step 5: All records of late fetal losses, stillbirths, and neonatal deaths were combined into a single dataset (Figure 59): i.e. death registrations and SMR02 (ISD); MBRRACE-UK death notifications. Both of these datasets are used in order to obtain complete ascertainment of all extended perinatal deaths in Scotland.

Step 6: All deaths where the births occurred at less than 22^{+0} weeks gestational age and pregnancies ended by a termination of pregnancy are removed from the dataset of deaths as these are not reported by MBRRACE-UK.

Step 7: All deaths where the births occurred at less than 24^{+0} weeks gestational age are removed from the dataset of deaths for the main tables and maps as these deaths are currently reported separately by MBRRACE-UK.

Step 8: The dataset of deaths is merged into the dataset of births in order to create a single dataset for analysis.

Figure 58: Flowchart for combining data sources in order to generate dataset of births in Scotland in 2017

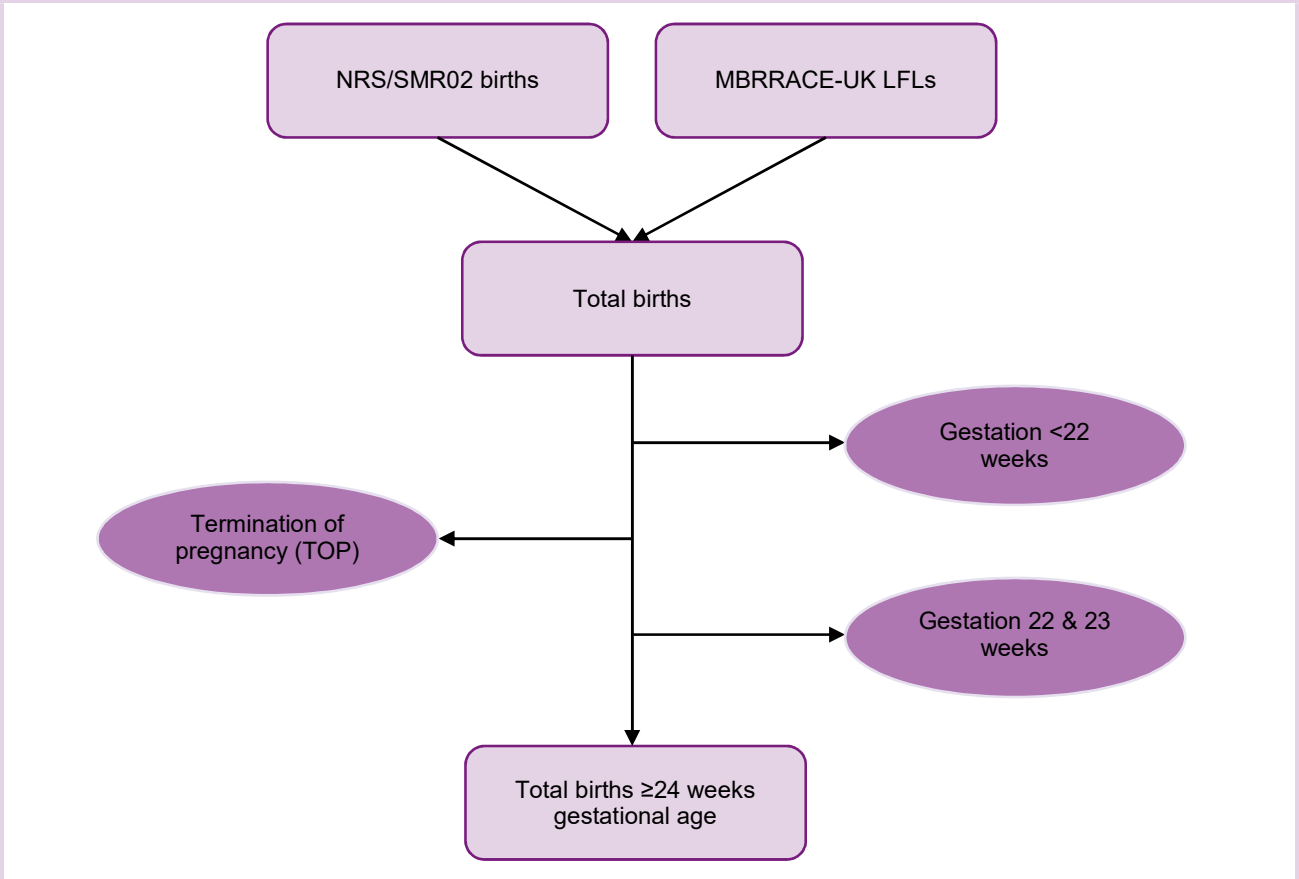
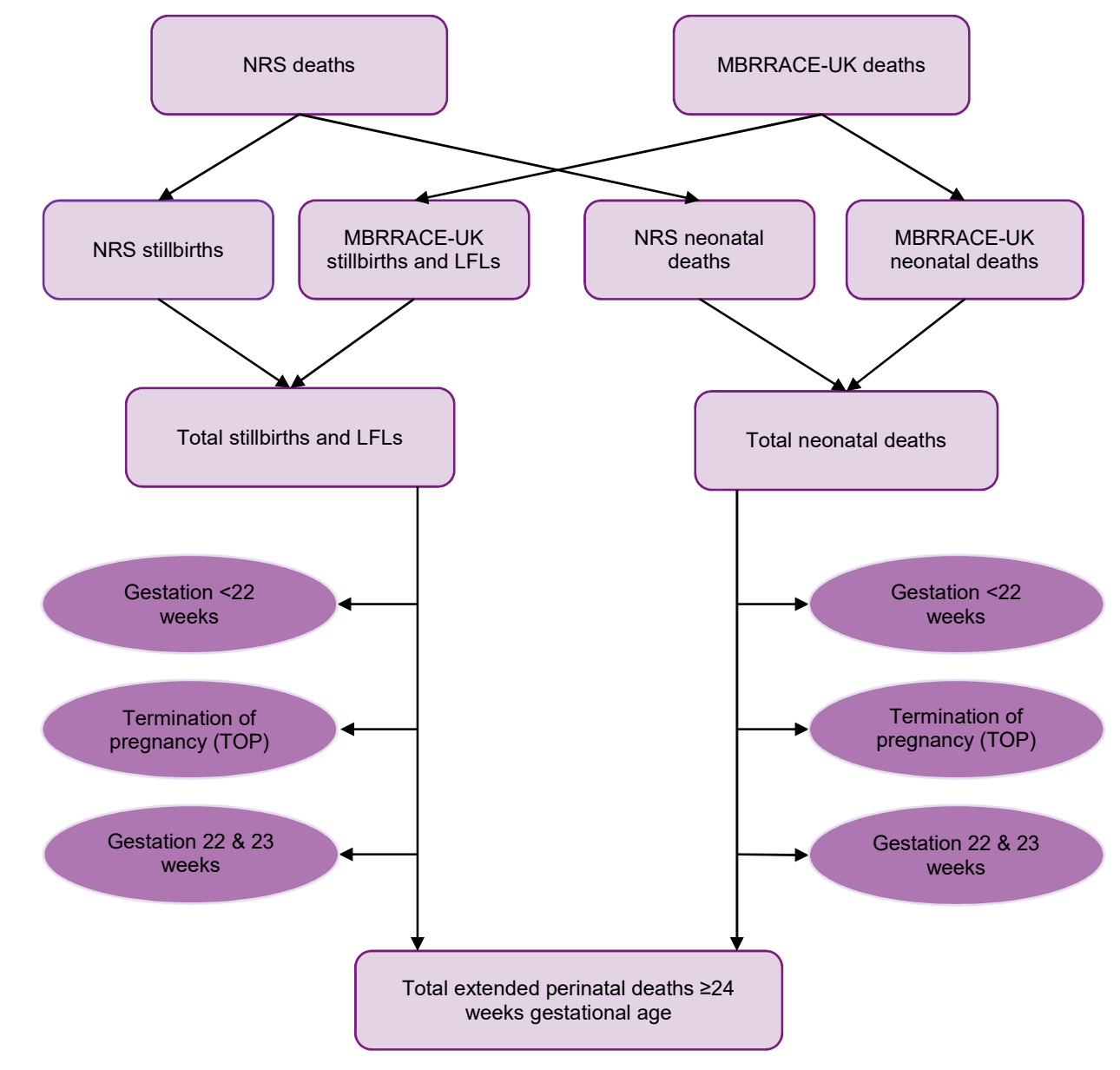


Figure 59: Flowchart for combining data sources in order to generate dataset of extended perinatal deaths for births in Scotland in 2017



Northern Ireland and the Crown Dependencies

Datasets of births and extended perinatal deaths for Northern Ireland, the Bailiwick of Guernsey, and the Bailiwick for Jersey are supplied to MBRRACE-UK as complete datasets from the appropriate national data providers. The birth records for the Isle of Man are obtained from the PDS records. In each case the birth and death records are then linked to the MBRRACE-UK records.

Data cleaning, linking and derived variables

Where information on a variable is available from more than one source a 'best value' algorithm was applied in order to obtain the value to be included in the analyses. The algorithm chosen was:

- where available, the value recorded in the MBRRACE-UK death record was used as the prime source;
- if unavailable (e.g. the baby survived the neonatal period) the value recorded in the statutory birth or

death registration record was taken as the secondary source;

- for England and Wales, the value recorded in the PDS record was used as the third source: the gestational age at delivery is only available from the PDS records.

A4.5 Location of mother's residence

The postcode of the mother's residence at the time of delivery was used to identify the country, CCG (England), Health Board (Scotland and Wales), Health and Social Care Trust (Northern Ireland), Crown Dependency, and Local Authority of reporting using postcode linked data supplied as part of GridLink. In addition, it was used to obtain the appropriate value for the child poverty index.

The Trust or Health Board of birth was derived using the most appropriate source from all available datasets. For England and Wales the recorded Communal Establishment Code in the ONS birth records was used as the primary source the location of the birth. When the place of birth could not be located from the ONS records (e.g. births at home and in-transit) the location was derived from the PDS record. If neither record provided a clear Trust or Health Board of birth then an estimate was made based on the postcode of birth.

The Trust or Health Board of death was obtained directly from the MBRRACE-UK death record.

A5. Completeness of the data reported to MBRRACE-UK

The completeness for groups of key data items reported to MBRRACE-UK for those deaths used in Chapter 6 is shown in Table 61, by reporting Trust and Health Board. The percentage shown is the combined percentage for all of the items in each group:

1. Mother's details: given name (not Northern Ireland); family name (not Northern Ireland); postcode of residence at time of delivery (not Northern Ireland); NHS Number (not Scotland or Northern Ireland); ethnicity; age, age at leaving full-time education.

2. Booking information: smoking status; breath carbon monoxide; BMI.

3. Antenatal care: intended type of care at booking; intended place of delivery at booking; EDD.

4. Delivery and baby's characteristics for stillbirths: actual place of delivery; date and time of delivery; final delivery mode; type of onset of labour; birthweight; gestational age at delivery.

5. Delivery and baby's characteristics for neonatal deaths: actual place of delivery; date and time of delivery; final delivery mode; type of onset of labour; birthweight; gestational age at delivery.

6. Baby's outcome: date death confirmed (stillbirths only); whether alive at onset of care in labour (stillbirths only), whether admitted to neonatal unit (neonatal deaths only); main cause of death.

The colours in Table 61 represent the level of data completeness for each Trust and Health Board:

- red: less than 70.0% complete;
- amber: 70.0% to 84.9% complete;
- yellow: 85.0% to 96.9% complete;
- light green: 97.0% to 99.9% complete;
- dark green: 100.0% complete.

Table 61: Completeness of selected data items reported to MBRRACE-UK by NHS Trust (England), Health Board (Scotland and Wales), Health and Social Care Trust (Northern Ireland), and Crown Dependency: United Kingdom and Crown Dependencies, for births in 2017

Trust or Health Board	Mother's details	Booking information	Antenatal care	Delivery and baby's characteristics for stillbirths	Delivery and baby's characteristics for neonatal deaths	Baby's outcome
ENGLAND						
Airedale NHS Foundation Trust	70	80	100	100	100	100
Ashford and St Peter's Hospital NHS Foundation Trust	73.8	76.2	93.7	100	99	87.3
Barking, Havering and Redbridge University Hospitals NHS Trust	77.6	93.8	97.2	100	97.2	90.3
Barnsley Hospital NHS Foundation Trust	90.4	82.1	94.9	98.1	*	76.9
Barts Health NHS Trust	79.5	77.3	97.4	98.2	96.4	93
Basildon and Thurrock University Hospitals NHS Foundation Trust	70.7	88.5	89.7	96.7	100	86.2
Bedford Hospital NHS Trust	80.9	72.5	94.1	100	100	88.2
Birmingham Women's and Children's NHS Foundation Trust	78.5	89.5	98.5	99.3	94.1	92.1
Blackpool Teaching Hospitals NHS Foundation Trust	100	100	100	100	100	100
Bolton NHS Foundation Trust	73.9	77.8	96.3	97.4	98.6	92.6
Bradford Teaching Hospitals NHS Foundation Trust	73.3	94.4	92.2	99.5	98.3	92.2
Brighton and Sussex University Hospitals NHS Trust	75	71.6	87.3	97.4	100	90.2
Buckinghamshire Healthcare NHS Trust	77.7	73.8	97.6	98.4	100	89.3
Burton Hospitals NHS Foundation Trust	85.7	68.3	96.8	100	100	87.3
Calderdale and Huddersfield NHS Foundation Trust	73.7	86.8	94.7	99	98.3	84.2
Cambridge University Hospitals NHS Foundation Trust	77.2	83.7	94.1	99.2	100	94.1
Chelsea and Westminster Hospital NHS Foundation Trust	78.2	77.9	97.2	99.5	98	88.7
Chesterfield Royal Hospital NHS Foundation Trust	89.3	71.4	100	100	100	85.7
City Hospitals Sunderland NHS Foundation Trust	72.9	77.8	100	100	100	86.1
Colchester Hospital University NHS Foundation Trust	87.5	93.9	98.5	100	100	81.8
Countess of Chester Hospital NHS Foundation Trust	75	87.9	100	100	100	100
County Durham and Darlington NHS Foundation Trust	71.7	84.1	94.2	98.8	100	82.6
Croydon Health Services NHS Trust	70.5	67.9	100	100	100	82.1
Dartford and Gravesham NHS Trust	95	100	100	100	100	86.7
Derby Teaching Hospitals NHS Foundation Trust	73.6	82.9	100	100	100	94.6

Trust or Health Board	Mother's details	Booking information	Antenatal care	Delivery and baby's characteristics for stillbirths	Delivery and baby's characteristics for neonatal deaths	Baby's outcome
Doncaster and Bassetlaw Hospitals NHS Foundation Trust	89.1	94.2	100	100	100	88.4
Dorset County Hospital NHS Foundation Trust	58.3	94.4	100	100	100	94.4
East Cheshire NHS Trust	62.5	88.9	83.3	100	66.7	100
East Kent Hospitals University NHS Foundation Trust	75	85.8	97.9	99.1	100	90.8
East Lancashire Hospitals NHS Trust	73	92.2	98	100	98	92.8
East Sussex Healthcare NHS Trust	82.1	78.6	100	100	91.7	100
East and North Hertfordshire NHS Trust	76.1	85.5	97.1	100	95.8	91.3
Epsom and St Helier University Hospitals NHS Trust	77.4	61.9	100	100	100	88.9
Frimley Health NHS Foundation Trust	91.3	96.2	99.4	100	100	91
Gateshead Health NHS Foundation Trust	75	62.5	87.5	97.6	100	95.8
George Eliot Hospital NHS Trust	75	100	100	100	100	66.7
Gloucestershire Hospitals NHS Foundation Trust	80.8	74.4	100	100	100	97.4
Great Western Hospitals NHS Foundation Trust	61.4	78.8	100	100	100	81.8
Guy's and St Thomas' NHS Foundation Trust	74.7	71.1	96.4	100	96.8	95.6
Hampshire Hospitals NHS Foundation Trust	73.1	70.4	93.8	99.2	100	95.1
Harrogate and District NHS Foundation Trust	95.8	83.3	94.4	100	*	88.9
Heart of England NHS Foundation Trust	77.1	85.2	99	99.1	100	96.7
Homerton University Hospital NHS Foundation Trust	72	77.6	98.9	98.9	100	90.2
Hull and East Yorkshire Hospitals NHS Trust	77.1	80.6	97.2	98.9	100	92.6
Imperial College Healthcare NHS Trust	81.7	82.1	90.3	99.7	95.5	90
Isle of Wight NHS Trust	75	55.6	100	100	100	100
James Paget University Hospitals NHS Foundation Trust	87.5	73.3	96.7	100	100	90
Kettering General Hospital NHS Foundation Trust	78	73.3	100	98.7	100	94.7
King's College Hospital NHS Foundation Trust	69	76.9	93.3	100	100	87.1
Kingston Hospital NHS Foundation Trust	90	68	100	100	100	90.7
Lancashire Teaching Hospitals NHS Foundation Trust	80.4	76.6	94.6	99.3	100	91.9
Lewisham and Greenwich NHS trust	71.1	72.4	93.2	99.5	100	85.9
Liverpool Women's NHS Foundation Trust	74.1	73.3	95.5	100	99.5	97.5
London North West University Healthcare NHS Trust	72.2	65.7	96.3	98.3	100	94.4

Trust or Health Board	Mother's details	Booking information	Antenatal care	Delivery and baby's characteristics for stillbirths	Delivery and baby's characteristics for neonatal deaths	Baby's outcome
Luton and Dunstable University Hospital NHS Foundation Trust	73.6	73.3	95.8	100	100	90.3
Maidstone and Tunbridge Wells NHS Trust	71.3	70.4	92.6	97.2	100	86.4
Manchester University NHS Foundation Trust	75	67.7	94.8	99.3	98.4	92.3
Medway NHS Foundation Trust	79.6	85.1	100	99.1	100	93
Mid Cheshire Hospitals NHS Foundation Trust	75	79.5	100	100	100	87.2
Mid Essex Hospital Services NHS Trust	94.2	84.6	100	100	100	100
Milton Keynes University Hospital NHS Foundation Trust	79.4	86.3	100	100	100	96.1
Norfolk and Norwich University Hospitals NHS Foundation Trust	83.8	72.5	100	99.3	100	91.2
North Bristol NHS Trust	81.7	82.2	98.9	99.1	100	88.9
North Cumbria University Hospitals NHS Trust	70.6	66.7	100	100	*	92.2
North Middlesex University Hospital NHS Trust	73.8	68.2	97.7	100	100	88.4
North Tees and Hartlepool NHS Foundation Trust	67.9	81	83.3	100	100	76.2
North West Anglia NHS Foundation Trust	81.3	86.5	93.8	99.2	100	91.7
Northampton General Hospital NHS Trust	81.3	81.7	100	98.7	100	85
Northern Devon Healthcare NHS Trust	87.5	83.3	100	100	100	100
Northern Lincolnshire and Goole Hospitals NHS Foundation Trust	80.6	88.9	98.1	98.8	100	94.4
Northumbria Healthcare NHS Foundation Trust	73.5	84.3	92.2	95.5	100	82.4
Nottingham University Hospitals NHS Trust	90.4	79.5	95.7	98.1	100	92.4
Oxford University Hospitals NHS Trust	82.9	74.1	93.9	100	99.4	96.1
Plymouth Hospitals NHS Trust	78.2	78.5	100	100	100	96.8
Poole Hospital NHS Foundation Trust	71.7	75.6	93.3	100	100	86.7
Portsmouth Hospitals NHS Trust	87.5	70	98.9	100	100	85.6
RAF Lakenheath (48th Medical Group)	75	83.3	83.3	*	*	100
Royal Berkshire NHS Foundation Trust	72.3	64.3	92.9	99.3	75	92.9
Royal Cornwall Hospitals NHS Trust	73.8	85	96.7	98.8	100	88.3
Royal Devon and Exeter NHS Foundation Trust	81.5	97.1	100	100	100	97.1
Royal Free London NHS Foundation Trust	75	65.7	95.4	99.4	100	96.3
Royal Surrey County Hospital NHS Foundation Trust	75	36.7	100	100	*	96.7
Royal United Hospitals Bath NHS Foundation Trust	72.1	92.2	96.1	98.3	100	80.4

Trust or Health Board	Mother's details	Booking information	Antenatal care	Delivery and baby's characteristics for stillbirths	Delivery and baby's characteristics for neonatal deaths	Baby's outcome
Salisbury NHS Foundation Trust	77.1	94.4	91.7	100	83.3	97.2
Sandwell and West Birmingham Hospitals NHS Trust	86.3	90.3	96.2	99	100	91.4
Sheffield Teaching Hospitals NHS Foundation Trust	76.1	82.1	98.6	100	99.4	95.7
Sherwood Forest Hospitals NHS Foundation Trust	76.1	89.9	97.1	100	100	92.8
South Devon Healthcare NHS Foundation Trust	94.1	84.3	100	100	100	90.2
South Tees Hospitals NHS Foundation Trust	72.6	87	94.3	99.2	100	91.9
South Tyneside NHS Foundation Trust	68.8	83.3	75	88.9	*	83.3
South Warwickshire NHS Foundation Trust	72.9	88.9	100	100	100	94.4
Southend University Hospital NHS Foundation Trust	95.3	77.1	100	100	*	89.6
Southport & Ormskirk Hospital NHS Trust	71.9	87.5	100	100	*	75
St George's University Hospitals NHS Foundation Trust	77.9	72.1	92.2	100	100	92.2
St Helens and Knowsley Teaching Hospitals NHS Trust	75	92	97.3	100	100	82.7
Stockport NHS Foundation Trust	75	90.5	100	100	100	90.5
Surrey and Sussex Healthcare NHS Trust	73.8	66.7	100	100	100	93.3
Tameside Hospital NHS Foundation Trust	76.8	78.6	100	100	*	90.5
Taunton and Somerset NHS Foundation Trust	83.3	96.3	88.9	94.4	*	74.1
The Dudley Group NHS Foundation Trust	75	94.9	96.2	100	100	84.6
The Hillingdon Hospitals NHS Foundation Trust	73	80.7	98.2	100	100	86.8
The Ipswich Hospital NHS Trust	73.2	71.4	97.6	100	100	95.2
The Leeds Teaching Hospitals NHS Trust	81	76.2	82.4	99.2	98.7	93.8
The Mid Yorkshire Hospitals NHS Trust	54.3	90.5	98.1	99.3	94.4	84.8
The Newcastle upon Tyne Hospitals NHS Foundation Trust	73.1	76.5	97.5	99.3	100	93.2
The Pennine Acute Hospitals NHS Trust	87.3	73.7	98.8	100	100	92.4
The Portland Hospital for Women and Children	100	66.7	83.3	100	*	100
The Princess Alexandra Hospital NHS Trust	82.1	88.1	100	100	100	90.5
The Queen Elizabeth Hospital King's Lynn NHS Foundation Trust	62.5	75	100	100	100	83.3
The Rotherham NHS Foundation Trust	92.3	92.3	100	98.1	100	89.7
The Royal Bournemouth and Christchurch Hospitals NHS Foundation Trust	50	33.3	0	*	*	33.3
The Royal Wolverhampton NHS Trust	83.2	89.6	96.2	99.5	98.8	95.6

Trust or Health Board	Mother's details	Booking information	Antenatal care	Delivery and baby's characteristics for stillbirths	Delivery and baby's characteristics for neonatal deaths	Baby's outcome
The Shrewsbury and Telford Hospital NHS Trust	74.3	96.2	98.1	99.4	100	93.3
United Lincolnshire Hospitals NHS Trust	73.5	82.4	96.1	100	100	92.2
University College London Hospitals NHS Foundation Trust	93.1	94.4	97.5	100	100	90.7
University Hospital Southampton NHS Foundation Trust	86.2	67.7	90.3	100	99.6	93.3
University Hospitals Bristol NHS Foundation Trust	76.8	78.6	92.9	100	100	97.6
University Hospitals Coventry and Warwickshire NHS Trust	82.1	86.4	99.3	100	100	92.5
University Hospitals of Leicester NHS Trust	76.3	77.2	95.2	100	96.8	93.9
University Hospitals of Morecambe Bay NHS Foundation Trust	85.4	75	97.2	100	100	97.2
University Hospitals of North Midlands NHS Trust	80.7	73.6	96.9	98.2	100	95.6
Walsall Healthcare NHS Trust	87.5	86.4	100	98.8	100	90.9
Warrington and Halton Hospitals NHS Foundation Trust	87.5	83.3	100	100	*	83.3
West Hertfordshire Hospitals NHS Trust	78	74.7	97.3	100	100	92
West Suffolk NHS Foundation Trust	75	72.2	100	100	*	100
Western Sussex Hospitals NHS Foundation Trust	75	66.7	96.4	100	100	88.1
Weston Area Health NHS Trust	75	100	100	100	*	100
Whittington Health	85.9	95.8	97.9	100	100	87.5
Wirral University Teaching Hospital NHS Foundation Trust	88.6	78.8	100	100	100	100
Worcestershire Acute Hospitals NHS Trust	94	88.9	100	100	*	90.5
Wrightington, Wigan and Leigh NHS Foundation Trust	80	73.3	100	100	94.4	76.7
Wye Valley NHS Trust	88.9	66.7	88.9	100	*	96.3
Yeovil District Hospital NHS Foundation Trust	87.5	95.8	100	100	100	100
York Teaching Hospital NHS Foundation Trust	83	97.3	100	100	100	89.3
Scotland						
NHS Ayrshire & Arran	83	93.3	90.7	97.9	100	90.7
NHS Borders	80	100	100	100	*	100
NHS Dumfries & Galloway	75	95.2	100	100	100	90.5
NHS Fife	76	88	97.3	100	100	89.3
NHS Forth Valley	75	95.6	95.6	98.5	100	91.1
NHS Grampian	80.8	82.2	92.2	97.5	100	92.2

Trust or Health Board	Mother's details	Booking information	Antenatal care	Delivery and baby's characteristics for stillbirths	Delivery and baby's characteristics for neonatal deaths	Baby's outcome
NHS Greater Glasgow and Clyde	85.4	85.3	94.2	97.9	99.1	95.6
NHS Highland	75	88.9	100	100	100	94.4
NHS Lanarkshire	74	86.1	95.8	100	97.2	91.7
NHS Lothian	74.5	91.2	97.5	100	100	89.9
NHS Tayside	75	84.5	96.4	99.1	100	86.9
NHS Western Isles	100	100	100	100	*	100
Wales						
Abertawe Bro Morgannwg University Health Board	74.4	73.8	92.9	98.6	100	91.3
Aneurin Bevan University Health Board	91.4	72.4	95.4	99.3	100	92
Betsi Cadwaladr University Health Board	71.4	70.2	92.9	98.7	98.5	91.7
Cardiff and Vale University Health Board	72.2	75.9	98.8	100	100	92
Cwm Taf University Health Board	73.3	86.7	88.9	99.1	100	87.8
Hywel Dda University Health Board	78.1	68.8	97.9	100	100	97.9
Northern Ireland						
Belfast Health and Social Care Trust	81.7	74.7	97.8	100	98.7	95.6
Northern Health and Social Care Trust	97.8	84.1	97.1	100	*	85.5
South Eastern Health and Social Care Trust	90.9	71.2	95.5	96.9	100	92.4
Southern Health and Social Care Trust	98	72.8	96.5	100	100	93
Western Health and Social Care Trust	81	64	98.7	100	100	96
Crown Dependencies						
States of Guernsey Health & Social Services	50	83.3	100	100	*	91.7
Isle of Man Department of Health and Social Care	100	100	100	100	*	100
States of Jersey Health & Social Services	50	55.6	100	100	100	100

* no stillbirths or neonatal deaths for this organisation

A6. Statistical methods to calculate stabilised & adjusted mortality rates

The stabilised & adjusted mortality rate for each organisation (m_j) is calculated by multiplying the appropriate 'comparator' mortality rate UK (M) by an organisation-specific standardised mortality ratio (SMR_j) calculated from the data, i.e.:

$m_j = M \times SMR_j$

where m_j is the estimated stabilised & adjusted mortality rate for organisation j

M is the appropriate comparator mortality rate

SMR_j is the estimated SMR for organisation j: $SMR_j = \frac{(\text{No. observed deaths})}{(\text{No. expected deaths})}$

Currently, for all organisations, except for the Trusts and Health Boards of birth, the comparator mortality rate is the overall mortality rate for the whole of the UK and Crown Dependencies. For the Trusts and Health Boards of birth the comparator mortality rate is the overall rate for Trusts and Health Boards in the same comparator group (described below). The SMR is estimated using a multilevel logistic regression model:

$$\text{logit}\left[P_{ij}\left(Y_{ij}=1\middle|\mathbf{x_{ij}}\right)\right]=\alpha+\boldsymbol{\beta}\mathbf{x}_{ij}+\boldsymbol{\Gamma}\mathbf{z}_j+\delta_j$$

where Y_{ij} is the indicator variable of death for the i^{th} baby in the j^{th} organisation:

Y_{ij} = 1 if a death, 0 otherwise

x_{ij} is the vector of risk-adjustment factors for the i^{th} baby in the j^{th} organisation

z_j is the vector of risk-adjustment factors for the j^{th} organisation

δ_j is the random term representing organisation j: $\delta \sim \text{Normal}(0,\sigma^2)$

A multilevel model is used as it can accommodate the hierarchical structure of the data through the random term; that is, births clustered within organisations. These models also allow the calculation of stabilised (also known as 'shrunken' or 'smoothed') estimates of the organisation-specific terms, which reduce the likelihood of organisations being falsely identified as outliers by chance alone.

Various approaches to calculating a SMR from a multilevel logistic model have been proposed [26]. The method used for the MBRRACE-UK report "… *is determined by dividing the smoothed, risk-adjusted, provider-specific estimate of mortality by the estimate of expected mortality obtained using the average intercept for all … providers*" [27]. In this approach, the observed number of deaths is replaced by a model-based predicted number reflecting sampling variation in the observed deaths; that is, a stabilised observed number of deaths is estimated for each organisation. Hence, the SMR is the ratio of the stabilised number of deaths to the deaths that would be expected if the organisation's patients were from an 'average' organisation:

$$SMR_j=\frac{\sum_{i=1}^{n_j}\frac{\exp\left[\alpha+\boldsymbol{\beta}\mathbf{x}_{ij}+\boldsymbol{\Gamma}\mathbf{z}_j+\delta_j\right]}{\left(1+\exp\left[\alpha+\boldsymbol{\beta}\mathbf{x}_{ij}+\boldsymbol{\Gamma}\mathbf{z}_j+\delta_j\right]\right)}}{\sum_{i=1}^{n_j}\frac{\exp\left[\alpha+\boldsymbol{\beta}\mathbf{x}_{ij}+\boldsymbol{\Gamma}\mathbf{z}_j\right]}{\left(1+\exp\left[\alpha+\boldsymbol{\beta}\mathbf{x}_{ij}+\boldsymbol{\Gamma}\mathbf{z}_j\right]\right)}}$$

and

$$m_j=M\times\frac{\sum_{i=1}^{n_j}\frac{\exp\left[\alpha+\boldsymbol{\beta}\mathbf{x}_{ij}+\boldsymbol{\Gamma}\mathbf{z}_j+\delta_j\right]}{\left(1+\exp\left[\alpha+\boldsymbol{\beta}\mathbf{x}_{ij}+\boldsymbol{\Gamma}\mathbf{z}_j+\delta_j\right]\right)}}{\sum_{i=1}^{n_j}\frac{\exp\left[\alpha+\boldsymbol{\beta}\mathbf{x}_{ij}+\boldsymbol{\Gamma}\mathbf{z}_j\right]}{\left(1+\exp\left[\alpha+\boldsymbol{\beta}\mathbf{x}_{ij}+\boldsymbol{\Gamma}\mathbf{z}_j\right]\right)}}$$

Risk-adjustment factors

The multilevel logistic regression model outlined in the previous section includes patient-level and organisation–level factors to adjust for differences in key factors which are known to increase the risk of stillbirth and neonatal mortality. The factors which can be included in the model are limited to those that are routinely collected for all

births across the whole UK. For this report the patient-level risk-adjustment factors included in the statistical model were:

- mother's age (<20 years, 20-24 years, 25-29 years, 30-34 years, 35-39 years, ≥40 years);
- child poverty (measured by Children in Low Income Families Local Measure [22] based on mother's residence (quintiles with approximately equal number of total births);
- baby's ethnicity (White, mixed or multiple ethnicity, Asian or Asian British, Black or Black British, other);
- baby's sex (male, non-male);
- multiple birth (singleton, multiple);
- interaction between child poverty and baby's ethnicity;
- interaction between child poverty and mother's age;
- gestational age at birth for neonatal death rates only (24^{+0} to 27^{+6} weeks, 28^{+0} to 31^{+6} weeks, 32^{+0} to 33^{+6} weeks, 34^{+0} to 36^{+6} weeks, 37^{+0} to 41^{+6} weeks, ≥42^{+0} weeks).

The only organisation-level factor (z_{ij}) currently included in the MBRRACE-UK analysis is a marker for the 'comparator group' of each organisation responsible for delivering maternity care. In the absence of detailed clinical data, to help account for the variation between organisations due to their differences in risk profile, all of the Trusts and Health Boards have been classified hierarchically into five mutually exclusive comparator groups based on their level of service provision. They are then compared to the average mortality rate within their comparator group. The five comparator groups are:

1. Availability of Level 3 NICU and Neonatal Surgery;
2. Availability of Level 3 NICU;
3. 4,000 or more births per annum at 24 weeks or later;
4. 2,000-3,999 births per annum at 24 weeks or later;
5. Under 2,000 births per annum at 24 weeks or later.

Statistical models

Two multilevel logistic regression models were used, one for the stillbirths as outcome and the other model for neonatal deaths. The reference group for the both models is the births surviving at least 28 days from birth. The multilevel logistic regression model for stillbirth compared to survival to the end of the neonatal period is:

$$\text{logit}\left[P_{(SB)ij}\left(Y_{(SB)ij}=1\middle|\mathbf{x_{ij}}\right)\right]=\alpha_{(SB)}+\boldsymbol{\beta}_{(SB)}\mathbf{x}_{ij}+\boldsymbol{\Gamma}_{(SB)}\mathbf{z}_{j}+\delta_{(SB)j}$$

where $Y_{(SB)ij}$ is the indicator variable of stillbirth for the i^{th} baby in the j^{th} organisation:

$Y_{(SB)ij}$ = 1 if stillbirth; 0 if survivor to end of neonatal period; missing if neonatal death;

x_{ij} is the vector of risk adjustment factors for the i^{th} baby in the j^{th} organisation;

z_{ij} is the vector of risk adjustment factors for the j^{th} organisation;

$\delta_{(SB)j}$ is the random term representing organisation j: $\delta \sim \text{Normal}(0,\sigma^2)$.

A similar model was estimated for neonatal deaths:

$$\text{logit}\left[P_{(NND)ij}\left(Y_{(NND)ij}=1\middle|\mathbf{x_{ij}}\right)\right]=\alpha_{(NND)}+\boldsymbol{\beta}_{(NND)}\mathbf{x}_{ij}+\boldsymbol{\Gamma}_{(NND)}\mathbf{z}_{j}+\delta_{(NND)j}$$

where $Y_{(NND)ij}$ is the indicator variable of neonatal death for the i^{th} baby in the j^{th} organisation:

$Y_{(NND)ij}$ = 1 if neonatal death; 0 if survivor to end of neonatal period; missing if stillbirth;

x_{ij} is the vector of risk adjustment factors for the i^{th} baby in the j^{th} organisation;

z_{ij} *i*s the vector of risk adjustment factors for the j^{th} organisation;

$\delta_{(NND)j}$ is the random term representing organisation j: $\delta \sim \text{Normal}(0,\sigma^2)$.

The SMR for stillbirth is then given by combining these two models:

$$\text{SMR}_{(\text{SB})j} = \frac{\sum_{i=1}^{n_j}\left[\dfrac{\exp\left(\alpha_{(SB)}+\boldsymbol{\beta}_{(SB)}\mathbf{x}_{ij}+\boldsymbol{\Gamma}_{(SB)}\mathbf{z}_j+\delta_{(SB)j}\right)}{1+\exp\left(\alpha_{(SB)}+\boldsymbol{\beta}_{(SB)}\mathbf{x}_{ij}+\boldsymbol{\Gamma}_{(SB)}\mathbf{z}_j+\delta_{(SB)j}\right)+\exp\left(\alpha_{(NND)}+\boldsymbol{\beta}_{(NND)}\mathbf{x}_{ij}+\boldsymbol{\Gamma}_{(NND)}\mathbf{z}_j+\delta_{(NND)j}\right)}\right]}{\sum_{i=1}^{n_j}\left[\dfrac{\exp\left(\alpha_{(SB)}+\boldsymbol{\beta}_{(SB)}\mathbf{x}_{ij}+\boldsymbol{\Gamma}_{(SB)}\mathbf{z}_j\right)}{1+\exp\left(\alpha_{(SB)}+\boldsymbol{\beta}_{(SB)}\mathbf{x}_{ij}+\boldsymbol{\Gamma}_{(SB)}\mathbf{z}_j\right)+\exp\left(\alpha_{NND}+\boldsymbol{\beta}_{(NND)}\mathbf{x}_{ij}+\boldsymbol{\Gamma}_{(NND)}\mathbf{z}_j\right)}\right]}$$

The SMR for neonatal deaths is derived directly from the second multilevel logistic regression model since stillbirths are not included in the calculation of neonatal death rates:

$$\text{SMR}_{(\text{NND})j} = \frac{\sum_{i=1}^{n_j}\left[\dfrac{\exp\left(\alpha_{(NND)}+\boldsymbol{\beta}_{(NND)}\mathbf{x}_{ij}+\boldsymbol{\Gamma}_{(NND)}\mathbf{z}_j+\delta_{(NND)j}\right)}{1+\exp\left(\alpha_{(NND)}+\boldsymbol{\beta}_{(NND)}\mathbf{x}_{ij}+\boldsymbol{\Gamma}_{(NND)}\mathbf{z}_j+\delta_{(NND)j}\right)}\right]}{\sum_{i=1}^{n_j}\left[\dfrac{\exp\left(\alpha_{(NND)}+\boldsymbol{\beta}_{(NND)}\mathbf{x}_{ij}+\boldsymbol{\Gamma}_{(NND)}\mathbf{z}_j\right)}{1+\exp\left(\alpha_{(NND)}+\boldsymbol{\beta}_{(NND)}\mathbf{x}_{ij}+\boldsymbol{\Gamma}_{(NND)}\mathbf{z}_j\right)}\right]}$$

The SMR for the extended perinatal deaths is obtained by combining the results of both models:

$$\text{SMR}_{(\text{EPD})j} = \frac{\sum_{i=1}^{n_j}\left[\dfrac{\exp\left(\alpha_{(SB)}+\boldsymbol{\beta}_{(SB)}\mathbf{x}_{ij}+\boldsymbol{\Gamma}_{(SB)}\mathbf{z}_j+\delta_{(SB)j}\right)+\exp\left(\alpha_{(NND)}+\boldsymbol{\beta}_{(NND)}\mathbf{x}_{ij}+\boldsymbol{\Gamma}_{(NND)}\mathbf{z}_j+\delta_{(NND)j}\right)}{1+\exp\left(\alpha_{(SB)}+\boldsymbol{\beta}_{(SB)}\mathbf{x}_{ij}+\boldsymbol{\Gamma}_{(SB)}\mathbf{z}_j+\delta_{(SB)j}\right)+\exp\left(\alpha_{(NND)}+\boldsymbol{\beta}_{(NND)}\mathbf{x}_{ij}+\boldsymbol{\Gamma}_{(NND)}\mathbf{z}_j+\delta_{(NND)j}\right)}\right]}{\sum_{i=1}^{n_j}\left[\dfrac{\exp\left(\alpha_{(SB)}+\boldsymbol{\beta}_{(SB)}\mathbf{x}_{ij}+\boldsymbol{\Gamma}_{(SB)}\mathbf{z}_j\right)+\exp\left(\alpha_{(NND)}+\boldsymbol{\beta}_{(NND)}\mathbf{x}_{ij}+\boldsymbol{\Gamma}_{(NND)}\mathbf{z}_j\right)}{1+\exp\left(\alpha_{(SB)}+\boldsymbol{\beta}_{(SB)}\mathbf{x}_{ij}+\boldsymbol{\Gamma}_{(SB)}\mathbf{z}_j\right)+\exp\left(\alpha_{(NND)}+\boldsymbol{\beta}_{(NND)}\mathbf{x}_{ij}+\boldsymbol{\Gamma}_{(NND)}\mathbf{z}_j\right)}\right]}$$

95% confidence intervals

The reported 95% confidence intervals for the stabilised & adjusted mortality rate are obtained through bootstrap methods [28]:

1. J organisations are sampled with replacement (where J is the total number of organisations).
2. The multilevel model is estimated for the sample, keeping each appearance of an organisation distinct if it is sampled more than once.
3. The estimated value, and prediction error, of the random term is obtained for each organisation: $\hat{\delta_j}$ and $\widehat{\text{er}}\text{or}[\delta_j]$ - if an organisation is sampled more than once then a single set of values is selected at random.
4. The bootstrap estimates for the fixed terms are noted (α^*, $\boldsymbol{\beta}^*$ and $\boldsymbol{\Gamma}^*$).
5. A new value (δ_j^*) for the organisation-specific random term is sampled, where $\delta_j^* \sim N(\hat{\delta_j}, \widehat{\text{er}}\text{or}[\delta_j])$.
6. The bootstrap stabilised & adjusted mortality rate (m^*_j) is obtained by substituting (α^*, $\boldsymbol{\beta}^*$, $\boldsymbol{\Gamma}^*$ and δ_j^* for α, $\boldsymbol{\beta}$, $\boldsymbol{\Gamma}$ and δ_j as appropriate.

7. This is repeated 1,500 times, giving approximately 1,000 values for the bootstrap stabilised & adjusted mortality rate for each organisation since organisations are not necessarily included in each bootstrap sample.

8. The lower and upper limits of the 95% confidence interval are obtained for each organisation from the 2.5th and 97.5th percentiles respectively of the distribution the bootstrap stabilised & adjusted mortality rates.

Probability of falling above a benchmark

The statistical methodology used allows the calculation of empirical Bayes posterior probabilities to estimate the probability that the underlying mortality rate for an organisation falls above (or below) a specified benchmark; for example, it would be possible to report the probability that the underlying stabilised & adjusted mortality rate for organisation *j* is greater than 6 per 1,000 births (m_j > 6.0). In this report, organisations have been identified when the probability that they fall above, or below, a specified benchmark is greater than 0.5; that is, 'it is more likely than not' that their underlying mortality rate falls outside the benchmark.

Missing data

Where information was unavailable for the risk-adjustment factors because it was missing from the routine data source, in order to allow all appropriate births to be included in the analyses the missing values were assumed to fall into the following categories:

- mother's age - 30 to 34 years (unknown for 2.7% of births in 2016);
- socio-economic deprivation - middle quintile (unknown for 0.6% of births in 2016);
- baby's ethnicity - white (unknown for 7.4% of births in 2016);
- baby's sex - male (unknown for <0.1% of births in 2016);
- multiple birth - singleton (unknown for 0.1% of births in 2016);
- gestational age at birth - 37^{+0} to 41^{+6} weeks (unknown for 3.0% of births in 2016).

Since missing observations are imputed with values generally representing low risk groups, stabilised & adjusted mortality rates are potentially overestimated for those organisations with missing data. However, as the proportion of missing data is low, and the effect of adjustment is relatively small, any overestimation will be small and unlikely to change any conclusions inferred from the reported rates.

A7. Individual Trust and Health Board report sample

Maternal, Newborn and Infant
Clinical Outcome Review Programme

MBRRACE-UK
Mothers and Babies: Reducing Risk through Audits and Confidential Enquiries across the UK

Name of NHS Trust or Health Board

MBRRACE-UK perinatal mortality report: 2017 births

This report concerns stillbirths and neonatal deaths among the 5,200 babies born within your Trust in 2017, EXCLUDING births before 24 weeks gestational age and all terminations of pregnancy. Neonatal deaths are reported by place of birth irrespective of where death occurred.

Perinatal mortality

Type of death	Number	Crude rate	Stabilised & adjusted rate (95% C.I.)		Comparison to the average for similar Trusts & Health Boards
Stillbirth	18	3.46	3.77	(3.15 to 4.50)	More than 5% and up to 15% lower
Neonatal	7	1.35	1.31	(0.79 to 1.80)	Up to 5% higher or up to 5% lower
Extended perinatal	25	4.81	5.05	(4.39 to 6.29)	Up to 5% higher or up to 5% lower

The crude mortality rate is the observed rate for your Trust and is a snapshot of mortality for births in 2017. The stabilised & adjusted mortality rate gives a more reliable estimate of the underlying mortality rate taking into account key factors known to increase the risk of stillbirth and neonatal mortality as well as the effects of chance variation, particularly where the number of deaths was small. While it is not possible to adjust for all potential risk factors, these measures do provide an important insight into the perinatal mortality for births within your Trust in 2017.

As two of the stabilised & adjusted mortality rates shown here are high compared with similar Trusts and Health Boards (see page 7 for more details), it is important to: a) review the data that was entered locally about your Trust to ensure it is accurate and complete; and b) review existing records regarding the deaths to ensure any avoidable factors have been identified and appropriate changes to care implemented.

Important reporting issues

It is vital that complete, accurate data is reported to MBRRACE-UK. For births in 2017, we received 99% of information on key data items for the deaths which occurred within your Trust.

Deaths relating to births before 24 weeks gestational age have been reported separately as there is variation across the UK as to whether babies at this gestation are reported as a late fetal loss or a neonatal death which biases mortality rates. Please continue to ensure that all late fetal losses at 22 to 23 weeks gestational age are reported to MBRRACE-UK.

About this report

MBRRACE-UK

This report presents one element of the work of MBRRACE-UK, a collaboration led from the National Perinatal Epidemiology Unit at the University of Oxford with members from the University of Leicester (who lead the perinatal aspects of the work), University of Birmingham, Bradford Institute for Health Research, and Sands (Stillbirth and neonatal death charity).

MBRRACE-UK is commissioned by the Healthcare Quality Improvement Partnership (HQIP) on behalf of NHS England, NHS Wales, the Scotland Government Health and Social Care Directorate, the Northern Ireland Department of Health, Social Services and Public Safety (DHSSPS), the States of Guernsey, the States of Jersey, and the Isle of Man Government.

Introduction

This is the fifth MBRRACE-UK perinatal mortality surveillance report produced for Trusts and Health Boards across the UK. It includes details of the late fetal losses (22^{+0} to 23^{+6} weeks gestational age), stillbirths and neonatal deaths for births that occurred in your Trust in 2017, as well as background information on all births. Neonatal deaths are reported by place of birth, irrespective of where the death occurred, as denominator data on the place of care is not available for all births.

Methods

Deaths were reported to MBRRACE-UK by the Trust or Health Board where the death occurred. The information about births was obtained from routine sources – the Office for National Statistics (ONS), Personal Demographics Service (PDS), National Records of Scotland (NRS), Information Services Division (ISD), Northern Ireland Maternal and Child Health (NIMACH), States of Guernsey Health and Social Services Department, and States of Jersey Health Intelligence Unit. Home births are reported where the birth was registered via a Trust or Health Board. Births and deaths are attributed according to the configuration of Trusts and Health Boards on 1 September 2018.

Deaths from all causes except termination of pregnancy are reported, including those resulting from congenital anomalies. The information in this report may not match other local or national reported rates as births before 24 weeks gestational age have been excluded from most tables due to the known poor reporting of such births by some Trusts and Health Boards in previous years. Further details on the methods we have used are available from the MBRRACE-UK website.

Nationally recommended actions

Trusts and Health Boards whose mortality rates are marked ● or ● should carry out an initial investigation of their data quality and possible contributing local factors that might explain the high rate. Irrespective of where they fall in the spectrum of national performance all Trusts and Health Boards should use the national PMRT to review all their stillbirths and neonatal deaths.

Definitions

Late fetal loss:	A baby delivered between 22^{+0} and 23^{+6} weeks gestational age showing no signs of life, irrespective of when the death occurred.
Stillbirth:	A baby delivered at or after 24^{+0} weeks gestational age showing no signs of life, irrespective of when the death occurred.
Neonatal death:	A live born baby who died before 28 completed days after birth.
Extended perinatal death:	A stillbirth or neonatal death.

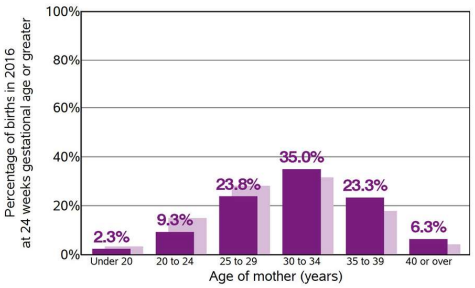
Your births

Your Trust UK-wide

Age of mother

The proportion of mothers aged 35 years old or older was considerably higher than that of the UK as a whole: 29.7% versus 22.1%.

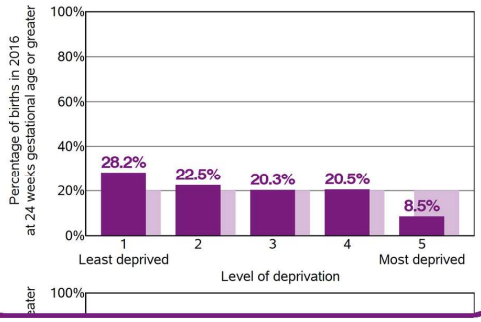
Across the UK the mothers were: 3.3% under 20; 14.9% 20 to 24; 28.2% 25 to 29; 31.6% 30 to 34; 17.9% 35 to 39; 4.2% 40 and over.



Socio-economic deprivation

This graph shows the distribution of births by level of deprivation, based on the postcode of the mother's residence and using the Children in Low-Income Families Local Measure.

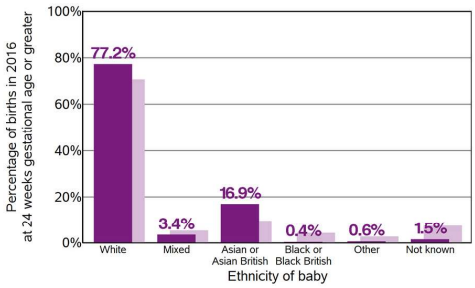
The mothers giving birth in your Trust were considerably less likely to live in areas of high deprivation than those giving birth across the UK as a whole.



Ethnicity of baby

The proportion of babies of Asian or Asian British ethnicity was higher than that of the UK as a whole: 16.9% versus 9.6%.

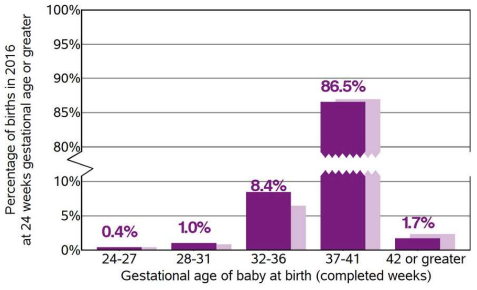
In the national MBRRACE-UK Perinatal Mortality Surveillance Report it was shown that mortality rates were higher for babies of Asian, Asian British, Black and Black British ethnicity compared with babies of White ethnicity.



Gestational age

In your Trust, 21 babies (0.4%) were born at 24 to 27 weeks gestational age, similar to the 0.4% seen in the UK as a whole. The percentage of babies born at 28 to 31 weeks was also similar to the national average: 1.0% versus 0.8%.

In addition, 88 babies (1.7%) were born post-term (42 weeks or greater), a lower percentage than the UK average of 2.3%.

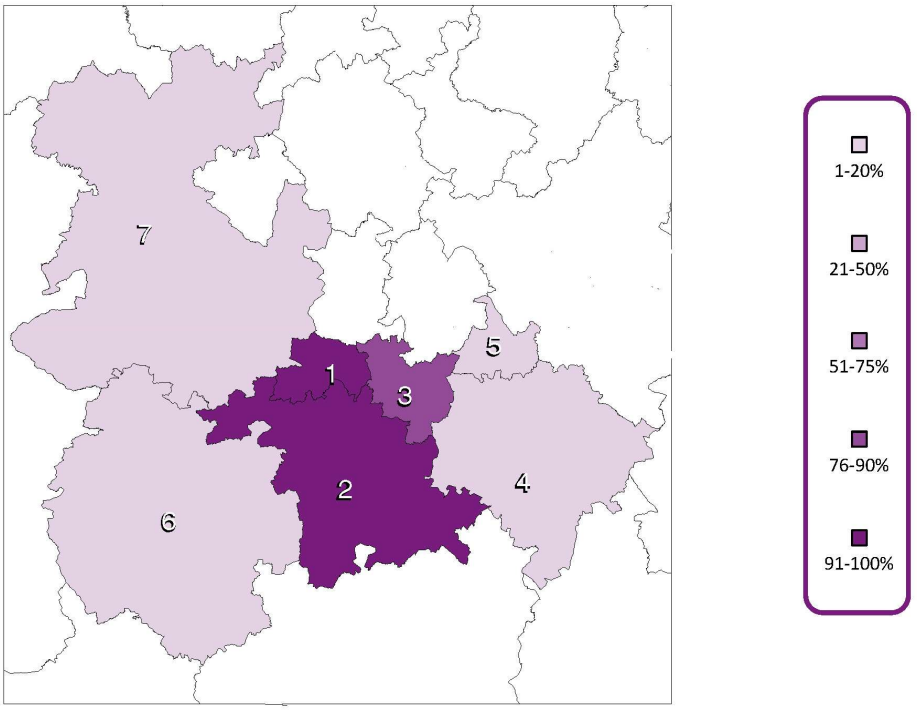


Your births *continued*

Percentage of births taking place in your Trust by commissioning organisation

The map below shows those commissioning organisations for which over 1% of their births at 24 weeks gestational age or later occurred within your Trust. These organisations are Clinical Commissioning Groups (CCGs) in England, Health Boards in Scotland and Wales and Local Commissioning Groups (LCGs) in Northern Ireland.

On the map, the area covered by each organisation is shaded according to the percent of their births which occurred within your Trust. In total, the births from these organisations accounted for 98.5% of your births at 24 weeks gestational age or later in 2017.



The table below provides the percentage and number of births in your Trust at 24 weeks gestational age or later from each of the commissioning organisations.

Commissioning organisation	% Births (N)		
1. First CCG	95.3% (1770)	2. Second CCG	92.6% (1099)
3. Third CCG	82.6% (1481)	4. Fourth CCG	42.0% (488)
5. Fifth CCG	8.4% (134)	6. Sixth CCG	8.3% (130)
7. Seventh CCG	2.5% (190)		

Your perinatal deaths

Deaths of babies born within your Trust

The crude mortality rates reported here are for babies born within your Trust, excluding births before 24 weeks gestational age and all terminations of pregnancy, together with the equivalent UK-wide rates.

These rates are subject to random variation, especially when the number of deaths is small. Stabilised & adjusted mortality rates are presented on page 7 which provide more reliable estimates of the underlying (long-term) mortality rates for your Trust.

Rates per 1,000 births		Stillbirths						Neonatal Deaths				Extended perinatal deaths	
		Antepartum		Intrapartum		Unknown		Early		Late			
Your Trust	*Rate (N)*	3.0	(16)	0.0	(0)	0.4	(2)	1.1	(6)	0.2	(1)	4.7	(25)
UK-wide	*Rate*	3.6		0.4		0.2		1.2		0.5		5.9	

The rates of extended perinatal death are shown below for your Trust by gestational age at delivery. Equivalent UK-wide rates are also shown for comparison.

Rates per 1,000 births		Extended perinatal deaths by gestational age									
		$24^{+0} - 27^{+6}$		$28^{+0} - 31^{+6}$		$32^{+0} - 36^{+6}$		$37^{+0} - 41^{+6}$		$\geq 42^{+0}$	
Your Trust	*Rate (N)*	650.0	(13)	129.0	(4)	10.9	(3)	1.0	(5)	0.0	(0)
UK-wide	*Rate*	346.5		111.1		22.4		2.3		1.4	

Cause of death

The tables below describe the cause of death reported to MBRRACE-UK for stillbirths which occurred in your Trust and for neonatal deaths of babies who were born in your Trust. They are listed by the primary categories of the 'Cause Of Death & Associated Conditions' (CODAC) system of death classification.

Congenital anomaly is reported as the cause of death for all deaths where a congenital anomaly is coded as either the primary cause of death or an associated condition.

In your Trust, 55.5% of stillbirths were reported as having an Unknown or Missing cause of death, which is higher than the UK average. In order to ensure accurate, consistent reporting using the CODAC system of death classification, Trust and Health Board Perinatal Review groups should focus on the quality of cause of death coding.

			Infection		Neonatal		Intra-partum		Congenital anomaly		Fetal	
Stillbirths	Your Trust	*% (N)*	16.7%	(3)	0.0%	(0)	0.0%	(0)	11.1%	(2)	0.0%	(0)
	UK-wide	*%*	3.1%		1.4%		5.8%		6.4%		4.6%	
Neonatal Deaths	Your Trust	*% (N)*	14.3%	(1)	71.4%	(5)	0.0%	(0)	0.0%	(0)	0.0%	(0)
	UK-wide	*%*	7.3%		44.1%		4.8%		27.9%		4.8%	

			Cord		Placental		Maternal		Unknown		Missing	
Stillbirths	Your Trust	*% (N)*	5.6%	(1)	11.1%	(2)	0.0%	(0)	44.4%	(8)	11.1%	(2)
	UK-wide	*%*	4.0%		21.9%		3.5%		46.0%		3.4%	
Neonatal Deaths	Your Trust	*% (N)*	0.0%	(0)	0.0%	(0)	14.3%	(1)	0.0%	(0)	0.0%	(0)
	UK-wide	*%*	0.1%		1.7%		0.3%		5.1%		3.8%	

Your perinatal deaths *continued*

Place of neonatal death by gestational age

In the table below, information is shown that differentiates between the neonatal deaths of live born babies who were born and subsequently died within your Trust and those who were born within your Trust but died elsewhere. The percentage and number of babies in each group is shown by gestational age at birth.

Place of Death		Gestational group									
		24^{+0} – 27^{+6}		28^{+0} – 31^{+6}		32^{+0} – 36^{+6}		37^{+0} – 41^{+6}		≥ 42^{+0}	
Within your Trust	*% (N)*	60%	(3)	50%	(1)		(0)		(0)		(0)
Outside your Trust	*% (N)*	40%	(2)	50%	(1)		(0)		(0)		(0)

Post-mortem

The percentage of stillbirths and neonatal deaths for which parents were offered a post-mortem examination is given below, differentiating between those who were born and subsequently died within your Trust and those who were born within your Trust but died elsewhere.

For births within your Trust, a post-mortem was offered for 100% of stillbirths and 71% of neonatal deaths, compared with 96% and 91% UK-wide.

Place of Death		Post-mortem offered (as % of deaths)			
		Stillbirths		Neonatal Deaths	
Within your Trust	*% (n/N)*	100%	(18/18)	75%	(3/4)
Outside your Trust	*% (n/N)*			67%	(2/3)
UK-wide	*%*	96%		91%	

The percentage of post-mortems offered or for which consent was obtained and where the cause of death was reported to MBRRACE-UK as Unknown is shown below. You are encouraged to update the reported cause of death on the MBRRACE-UK data reporting system once the post-mortem results are known.

		Post-mortem			
		Offered		Consent obtained	
Unknown cause of death	*% (N)*	100%	(8/8)	0%	(0/8)

Babies born at 22 to 23 weeks gestation

It is vital for MBRRACE-UK to be able to present perinatal mortality rates from 22 weeks gestational age onwards, as recommended by the World Health Organization, in order that UK rates can be compared internationally. As there is no statutory registration of late fetal losses at 22 and 23 weeks gestational age, it is vital that your Trust ensures that there is a rigorous system for reporting these deaths to MBRRACE-UK.

The number of late fetal losses at 22 and 23 weeks gestational age reported by your Trust for babies born in 2016 was 3. Please continue to review this information in order to ensure that all late fetal losses are reported to MBRRACE-UK.

		Deaths at 22^{+0} to 23^{+6} weeks gestational age	
		Late fetal losses	Neonatal deaths
Your Trust	*N*	3	1

Your perinatal deaths *continued*

Comparisons with similar Trusts, Health Boards and the UK average

The mortality rates are reported for babies born within your Trust at 24 weeks gestational age or later, excluding terminations of pregnancy. A 'crude' rate and a 'stabilised & adjusted' rate are presented for stillbirths, neonatal deaths and extended perinatal deaths. The **crude mortality rate** is the number of deaths for every 1,000 births (or 1,000 live births for neonatal mortality) and is a snapshot of mortality for your organisation for births in 2017. However, this can be misleading as a measure of the underlying (or long-term) mortality rate due to chance variation and differences between Trusts and Health Boards in the proportion of high risk pregnancies.

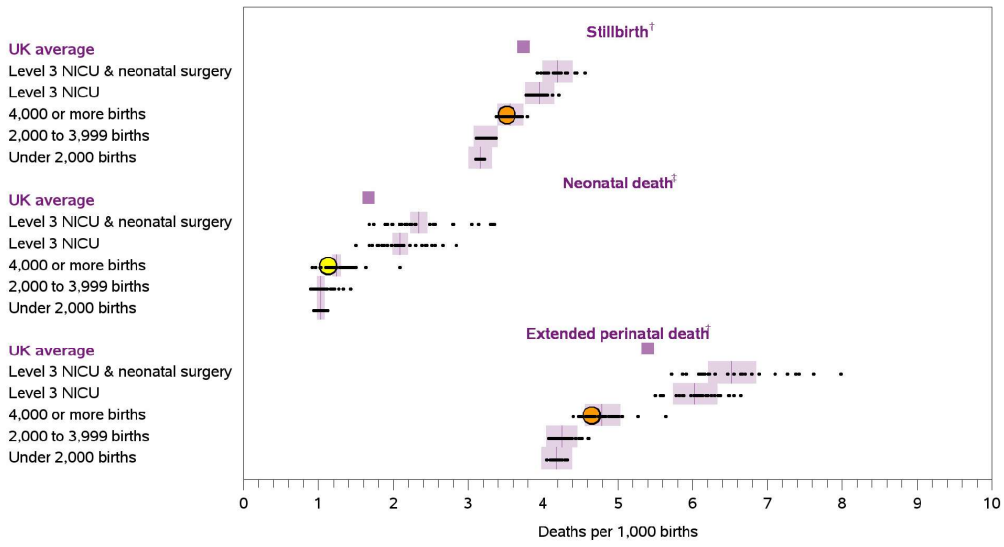
The **stabilised & adjusted mortality rate** is also reported which provides a more reliable estimate of the underlying mortality rate, accounting for mother's age, socio-economic deprivation, baby's sex and ethnicity, multiplicity, and (for neonatal deaths only) gestational age at birth. In addition, to account for the wide variation in case-mix, all Trusts and Health Boards have been classified hierarchically into five comparator groups: (i) Level 3 Neonatal Intensive Care Unit (NICU) and surgical provision (units routinely accepting for birth babies with a known congenital anomaly likely to require surgery in the neonatal period); (ii) Level 3 NICU; (iii) 4,000 or more births per annum at 22 weeks or later; (iv) 2,000-3,999 births per annum at 22 weeks or later; (v) under 2,000 births per annum at 22 weeks or later. Your Trust has been included in the comparator group with 4,000 or more births per annum.

	Mortality rate per 1,000 births [§] (95% confidence interval)		
	Stillbirth [†]	Neonatal [‡]	Extended perinatal [†]
Crude	3.46	1.35	4.81
Stabilised & adjusted [◊]	3.51 (3.20 to 3.75)	1.15 (0.71 to 1.41)	4.66 (4.39 to 4.78)

[§] excluding terminations of pregnancy and births <24+0; [†] per 1,000 total births; [‡] per 1,000 live births.

Your estimated stabilised & adjusted mortality rate for each type of death has been compared with the average mortality rate for Trusts and Health Boards in the same comparator group and is shown below as a circle:

- more than 15% lower than the average for the group
- more than 5% and up to 15% lower than the average for the group
- up to 5% higher or up to 5% lower than the average for the group
- more than 5% higher than the average for the group

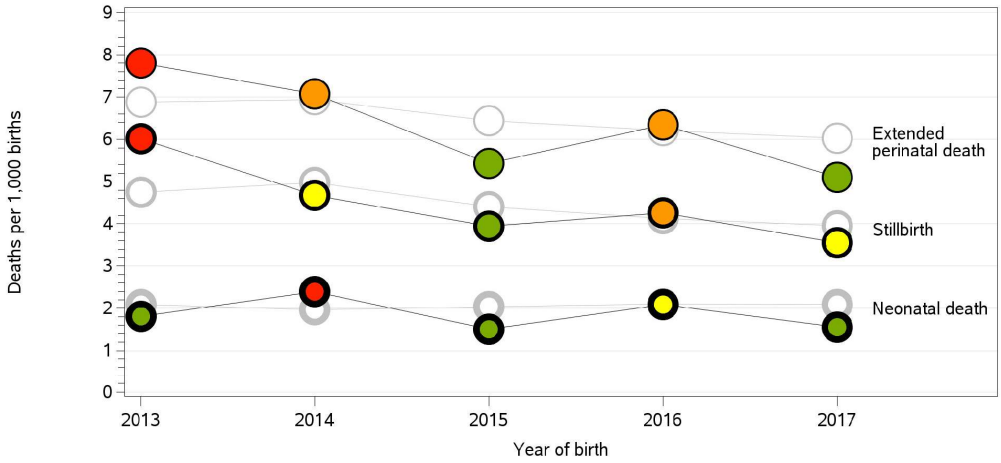


Mortality rates over time

Crude mortality by year of birth

Crude mortality rates for each type of death compared to the average mortality rate for Trusts and Health Boards in the same comparator group (shown in grey) by year of birth.

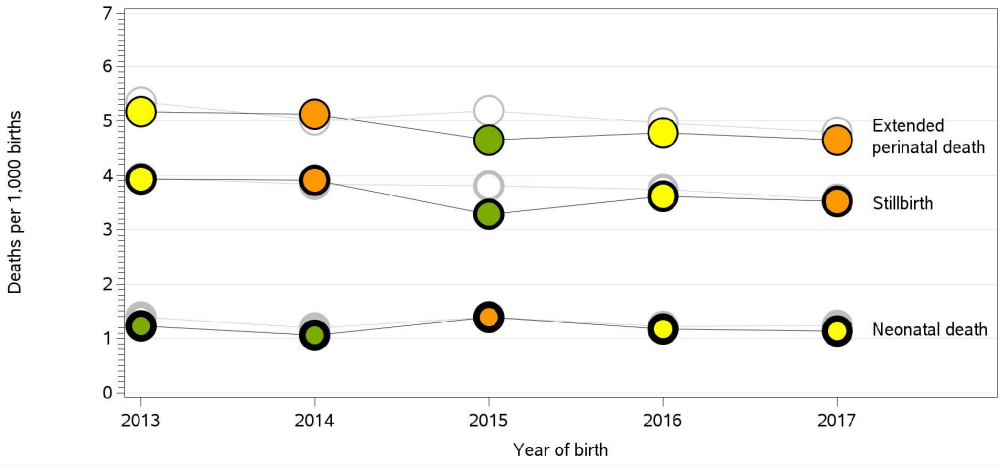
Due to updates to the data, these results might differ slightly from those in previous reports.



Stabilised & adjusted mortality by year of birth

Stabilised & adjusted mortality rates for each type of death compared to the average mortality rate for Trusts and Health Boards in the same comparator group (shown in grey) by year of birth.

Due to updates to the data and improvements to the statistical methodology used, these results might differ slightly from those in previous reports.



Data reporting

Completeness of key data items for DEATHS AT YOUR TRUST

The tables below provide details of completeness for key items in the data collection form. While the rest of this report concerns babies born within your Trust, these tables show the overall completeness of data for **deaths at your Trust no matter where they were born.** The percentage of data reported is given for each item, together with a coloured diamond denoting the level of completeness:

- less than 70.0% complete
- 70.0% to 84.9% complete
- 85.0% to 96.9% complete
- 97.0% to 99.9% complete
- 100% complete

These data items have been assessed as they are all readily available and essential to the accurate reporting of extended perinatal mortality for your Trust. For those items scoring red, orange or yellow it is essential that completeness is improved. Achieving this may well require collaboration with receiving and referring units.

Mother's details	Completeness
Name	100.0%
Postcode of residence	100.0%
Ethnicity	100.0%
Age	100.0%

Birth	Completeness
Type of onset of labour	100.0%
Actual place of birth	100.0%
Date and time of birth	100.0%
Final mode of birth	97.2%

Booking and antenatal care†	Completeness
Smoking	97.2%
Body mass index	100.0%
Intended type of care at booking	94.5%
Estimated date of delivery	97.2%

Baby's outcome	Completeness
Date death confirmed‡	100.0%
Whether alive at onset of care‡	96.8%
Whether admitted to NNU§	100.0%
Main cause of death	97.2%

Baby's characteristics	Completeness
Birth weight	100.0%
Gestational age at birth	97.2%

† excluding mothers reported as never booked; ‡ this data item is collected for stillbirths only; § this data item is collected for neonatal deaths only.

Timeliness of reporting

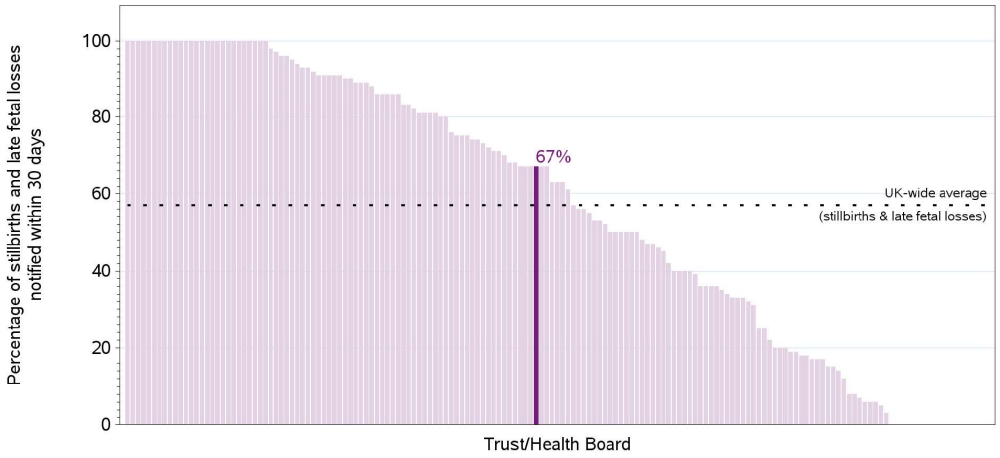
The MBRRACE-UK timeliness benchmarks for the notification of deaths and completion of surveillance data are:

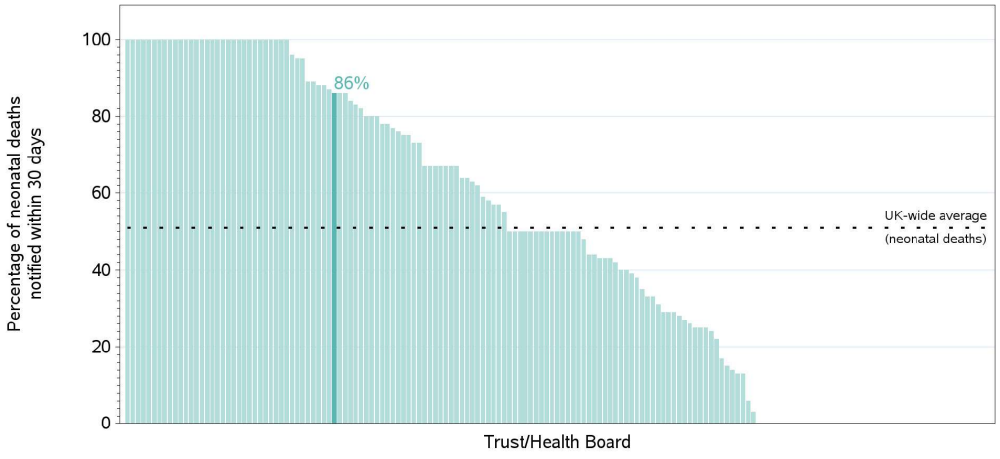
1) All deaths should be **notified** to MBBRACE-UK within 30 days of the death occurring. The full data does not have to be complete at this point.
2) Trusts and Health Boards should aim to **complete** data entry for each death within 90 days of the death occurring.

The graphs on the following page show the percentage of stillbirths & late fetal losses and neonatal deaths notified by your Trust within the 30-day benchmark period.

Data reporting *continued*

Percentage of deaths notified by your Trust within 30 days





MBRRACE-UK

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Name of NHS Trust or Health Board
MBRRACE-UK Perinatal Mortality Report, October 2019 *(MB000) v1.2*
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