

## Data sources

This file provides the metadata related to the data sources used for England and Wales in the Human Multiple Births Database (<https://www.twinbirths.org/en/data-metadata/>).

### Summary

#### Data from 1938 to 2019:

**Source:** Office for National Statistics

#### **Coverage and completeness:**

- Birth statistics include births that occurred in England and Wales in a given calendar year, regardless of the usual place of residence of the mother. Births to women usually resident in England and Wales who give birth abroad are therefore not included in these statistics.
- Data for a given year include the births that occurred in that calendar year in England and Wales, i.e., from January 1<sup>st</sup> to December 31<sup>st</sup>. However, a very small number of late registrations from the previous year are also included. In order to allow increased capture of late registrations of births occurred in a given year, the ONS uses a cut-off date in the year after. This date was February 25 since 2001, but a later date was used in 2020 and 2021, due to disruptions in the registration services caused by the COVID-19 pandemic.
- Registration of live births in England and Wales is considered to be complete since the beginning of the 1880s. Information supplied at birth registration is generally believed to be correct. Furthermore, data validation checks are conducted by the registrars.

#### **Treatment of births by vitality:**

- ONS data used for the construction of the HMBD concerns deliveries (or maternities) by multiplicity. A maternity is a pregnancy resulting in the birth of one or more children, including stillbirths.
- In 1992, there was a change in the definition of a Stillbirth, as the minimum gestational age to register a child born without signs of life was lowered from 28 to 24 weeks.

### Data from 1975 to 1994:

**Source:** Dunn, A. and A. Macfarlane. (1996). "Recent trends in the incidence of multiple births and associated mortality in England and Wales". *Archives of Disease in Childhood-Fetal and Neonatal Edition*, 75(1): F10-F19.

Dunn and Macfarlane's study is based on register data, i.e., the same used by the ONS. We used Dunn and Macfarlane's article in the construction of the HMBD, because they provide details on births by multiplicity (i.e., twin, triplet, and quadruplet + deliveries) for the period 1975-1994, which are not available in ONS' website and online data archive.

**Coverage and completeness:** same as ONS data.

**Treatment of births by vitality:** same as ONS data.

## Detailed metadata by source

### Source 1: Office for National Statistics

<b>References</b>	<p>Office for National Statistics. "Birth Characteristics [dataset]", Available online: <a href="https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/livebirths/datasets/birthcharacteristicsinenglandandwales">https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/livebirths/datasets/birthcharacteristicsinenglandandwales</a>  Accessed: 22/08/2022</p> <p>Data extracted from this dataset come from the following Tables:</p> <ul style="list-style-type: none"> <li>• Table 13: Maternities with multiple births (numbers and rates): age of mother, 1938 to 2020</li> <li>• Table 14: All maternities by age of mother, multiplicity and type of outcome [annual table for the reference year, from 2014 to 2016]"</li> <li>• Table 16: All maternities by age of mother, multiplicity and type of outcome [annual table for the reference year, from 2017 to 2020]"</li> </ul> <p>Office for National Statistics. "Characteristics of birth 2, England and Wales [dataset]: Table 6: All maternities: age of mother, multiplicity and type of outcome, [annual table for the reference year, from 2009 to 2013]", Available online: <a href="https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/livebirths/datasets/characteristicsofbirth2englandandwalesreferencetable">https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/livebirths/datasets/characteristicsofbirth2englandandwalesreferencetable</a>  Accessed: 04/08/2020</p> <p>Office for National Statistics. "Birth Statistics, England and Wales (Series FM1): Table 6.4: All maternities: age of mother, multiplicity and type of outcome [annual table for the reference year, from 1998 to 2008]", Archived data, available online: <a href="https://webarchive.nationalarchives.gov.uk/ukgwa/20160108035551/http://www.ons.gov.uk/ons/rel/vsob1/birth-statistics--england-and-wales--series-fm1-/index.html">https://webarchive.nationalarchives.gov.uk/ukgwa/20160108035551/http://www.ons.gov.uk/ons/rel/vsob1/birth-statistics--england-and-wales--series-fm1-/index.html</a>  Accessed: 23/08/2022</p> <p>Office for National Statistics. "Births in England and Wales: Summary Tables [dataset]: Table 1: Summary of key birth statistics, 1838 to 2021". Available online: <a href="https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/livebirths/datasets/birthsummarytables">https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/livebirths/datasets/birthsummarytables</a>  Accessed: 22/08/2022</p> <p>Data obtained from the Office for National Statistics under the Open Government Licence: <a href="https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/">https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/</a></p>
<b>Period covered</b>	1938-2020
<b>Code in database</b>	ONS

<p><b>Coverage and completeness<sup>1</sup></b></p>	<p>Birth statistics published by the ONS are derived from civil registration of births, a legal requirement under the <i>Births and Deaths Registration Act 1836</i>. Formal registration of live births started in England and Wales on 01/07/1837. Stillbirths have been registered only since 01/07/1927, although there was informal registration of stillbirths since 1918. Further details on births, including information on multiplicity, are available from 1938, after the <i>Population (Statistics) Act 1938</i>. During the first decades of civil registration, live births were under-registered in England and Wales. However, birth registration improved in the following decades and was complete by the beginning of the 1880s.<sup>2</sup></p> <p>Most of the information collected at birth registration is usually supplied by the parents.<sup>3</sup> Information can also be supplied by any other person present at the birth or any person having charge of the child. For live births, details on birthweight are obtained from the birth notification, i.e., a document completed by the doctor or midwife present at the birth. For stillbirths, details on cause of death, duration of pregnancy and weight of the fetus are obtained from a certificate or notification by a doctor or midwife who was present at the birth. Information supplied at birth registration is generally believed to be correct, because willfully supplying false information may render the informant liable to prosecution for perjury. Furthermore, data validation checks are conducted by the registrars. From 2007, almost all register offices were submitting data electronically. Any remaining birth registrations that were held on paper were later entered onto the web-based registration system, called the Registration Online (RON) system. Once all birth records were available electronically, a rigorous statistical quality assurance process was completed by the ONS. The RON system is used by all register offices since 2009.</p> <p>Birth statistics include births that occurred and were registered in England and Wales in a given calendar year, regardless of the usual place of residence of the mother. Births occurred and registered in England and Wales to mothers whose usual residence is outside of England and Wales are included in total figures, but they are excluded from any sub-division of England and Wales. Births to women usually resident in England and Wales who give birth abroad are not included in these statistics. The number of births to residents of England and Wales occurring outside the country is likely to be similar to the number of births occurring in England and Wales to visitors resident elsewhere. Therefore, the effect on fertility rates is assumed to be negligible.</p>
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<sup>1</sup> The information presented in this section was extracted from the following ONS publications (accessed: 23/08/2022): “Births: Quality and Methodology Information” (URL: <https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/livebirths/methodologies/birthsqmi>) and “User guide to birth statistics” (URL: <https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/livebirths/methodologies/userguidetobirthstatistics>).

<sup>2</sup> Glass, D. V. (1951). A Note on the Under-Registration of Births in Britain in the Nineteenth Century, *Population Studies*, 5(1): 70-88.

<sup>3</sup> After the *Human Fertilisation and Embryology Act 2008*, same-sex female couples are allowed to register the birth of a child as mother and second parent since 01/09/2009. This new law applied to fertility treatments carried out on or after 06/04/2009. The Act also made provision for two men to be officially recognized as the parents of a child through the provision of a parental order, obtainable through the courts.

	<p>Data for a given year include the births that occurred in that calendar year in England and Wales, i.e., from January 1<sup>st</sup> to December 31<sup>st</sup>. However, a very small number of late registrations from the previous year are also included. Parents are allowed 42 days to register a birth; however, some births are registered later than that. In order to allow increased capture of late registrations of births occurred in a given year, the ONS uses a cut-off date in the year after. From 2001 until 2019, the cut-off date was February 25, that is, in those years, annual data on births published by the ONS included births occurring in the reference year that were registered by February 25 of the following year, as well as births occurring before the reference year but registered late (i.e., after the previous February 25 cut-off). A later cut-off date was used in 2020, due to substantial birth registration delays because of the COVID-19 pandemic (see <b>Footnotes: 8</b>).</p> <p>From 2001, the cut-off date was extended to February 25, to allow increased capture of late registrations. Up to 1993, the cut-off date was January 31<sup>st</sup> of the following year, but from 1994 this was extended to the legal limit by which a birth should be registered (42 days). To avoid artificially inflating the data for 2001 through the increased capture of late registrations, the start and end cut-off dates for the 2000 dataset were moved by two weeks. Thus, data for the year 2000 include the births that occurred in 2000 which were registered by 11/02/2001, as well as the births occurring in 1999 that were registered between 12/02/2000 and 11/02/2001. The number of late registrations that miss the cut-off date and end up in the following year's statistics has decreased over time: it was between 1500 and 3000 births per year from 1987 to 1993, then it dropped to about 500-600 per year, and since 2001 it has been less than 400 births per year. Very late registrations (i.e., births that have not been registered 14 months after the end of the reference year) are not included in any birth statistic. Since 2001, there have been fewer than 70 of these each year.</p>
<p><b>Definitions and treatment of births by vitality</b></p>	<p><b><u>Live births:</u></b></p> <p>A baby is considered born alive if it shows any sign of life at birth.</p> <p><b><u>Stillbirths:</u></b></p> <p>Until 30/09/1992, under Section 41 of the <i>Births and Deaths Registration Act 1953</i>, a stillbirth was defined as “a child which has issued forth from its mother after the 28<sup>th</sup> week of pregnancy and which did not at any time after being completely expelled from its mother breath or show other signs of life”. On 01/10/1992, the <i>Stillbirth Definition Act 1992</i> came into force, altering the previous definition of a stillbirth to 24 or more weeks of completed gestation. Therefore, figures for stillbirths from 1993 onwards are not fully comparable with those for previous years.</p> <p>In addition, according to Dunn and Macfarlane’s<sup>4</sup> examination of civil register data in England and Wales, “registration data may underestimate the extent of multiple births (...) if a set includes a fetal death that does not satisfy the criteria for registration as a stillbirth, then only the live births within the set will be</p>

<sup>4</sup> See Source 2 in page 8.

	<p>registered” (p. F11). The way these cases are handled is not described in ONS’ documentation on birth statistics. However, an analysis of twins born in 1975-1978 showed that, among sets with one twin born alive and the other stillborn, there was an unexpectedly high number of cases where the gestational age of the stillborn twin was given as 28 weeks.<sup>5</sup> This suggests that some of those twins may have been born before the end of the 28<sup>th</sup> week of gestation, but the gestational age indicated in the certificate of the stillborn twin was 28 weeks, so that both babies could be registered.</p> <p><b><u>Maternity:</u></b></p> <p>A maternity is a pregnancy resulting in the birth of one or more children, including stillbirths. It therefore represents the number of women giving birth - including stillbirths, rather than the number of babies born.</p>
<p><b>Footnotes<sup>6</sup></b></p>	<p><b>1</b> - For 1940, the total number of maternities reported by the ONS<sup>7</sup> is 622376, which is larger than the total number of children reported for that year (612899 children, including live births and stillbirths). No explanation for this was found in the original data source. In the HMBD, data for 1940 are reported as found in the original data files, without further calculations on the number of singletons and the number of multiple children.</p> <p><b>2</b> - A registrars strike took place in 1981. This resulted in the delay of live birth returns and processing of live births was consequently restricted to a 10% sample. Maternity figures for 1981 are therefore unavailable.</p> <p><b>3</b> - Change in the definition of a Stillbirth (see <b>Definitions and treatment of births by vitality</b>).</p> <p><b>4</b> - Values reported in the following columns of the HMBD come from ONS’ annual data release corresponding to the reference year. These figures are not updated in subsequent publications by the ONS: <i>Singletons</i>, <i>Twin_deliveries</i>, <i>Triplet_deliveries</i>, <i>Quadruplet_plus_deliveries</i>, <i>Quadruplet_plus_children</i>. In contrast the total number of maternities and the total number of children (reported in HMBD’s columns <i>Total_deliveries</i> and <i>Total_children</i>, respectively) are updated annually by the ONS, in summary tables with data for various years. For this reason, there may be small discrepancies in the number of multiple children calculated based on data on deliveries and that based on updated numbers of children. Those discrepancies do not exceed 2 children (except in 2003, see <b>Footnotes: 6</b>), therefore their impact on the calculations is negligible.</p> <p><b>5</b> - From 2001, the cut-off date for registering a birth that occurred in a given year was extended to February 25 of the following year, to allow increased</p>

<sup>5</sup> Botting, B. J., Davies, I. M., and Macfarlane, A. J. (1987). Recent trends in the incidence of multiple births and associated mortality. *Archives of Disease in Childhood*, 62(9): 941-950. When this analysis was carried out, the previous definition of a Stillbirth was in use (i.e., 28 weeks of completed gestation). See **Definitions and treatment of births by vitality**.

<sup>6</sup> Number indicated in the variable *Footnotes*.

<sup>7</sup> “Births in England and Wales: Summary Tables [dataset]: Table 1: Summary of key birth statistics, 1838 to 2021”, see **References**.

	<p>capture of late registrations. Up to 1993, the cut-off date was January 31<sup>st</sup> of the following year, but from 1994 this was extended to the legal limit by which a birth should be registered (42 days).</p> <p><b>6</b> - Data for 2003 on the total number of maternities (or deliveries) and their distribution by multiplicity do not include 27 stillbirths, as some register offices in England and Wales failed to notify all stillbirths that occurred in that year<sup>8</sup>. The unrevised number of stillbirths for 2003 is 3585, whereas the revised number is 3612. Figures on maternities in 2003 and their distribution by multiplicity were unfortunately not revised by the ONS. Thus, the values reported in the following columns of the HMBD come from the original, unrevised publication for 2003: <i>Singletons</i>, <i>Twin_deliveries</i>, <i>Triplet_deliveries</i>, <i>Quadruplet_plus_deliveries</i>, <i>Quadruplet_plus_children</i>, <i>Multiple_deliveries</i> and <i>Total_deliveries</i>. Unlike data on maternities, the total number of children for 2003 in the HMBD is the revised figure (i.e., the number of live- and still-born children combined, reported in the column <i>Total_children</i> in the input data file for England and Wales). For the sake of consistency with data on maternities, the total number of multiple children calculated in the HMBD for the year 2003 is based on the unrevised data on maternities by multiplicity. This calculation results in 18395 multiple children. If one assumes that the 27 missing stillbirths have the same distribution between singleton and multiple maternities as the 3585 stillbirths initially recorded that year, and taking into account the updated total number of children in 2003, the number of multiple children would be 18400. Thus, the impact of using the unrevised data on maternities for calculating the number of multiple children in 2003 is minimal.</p> <p><b>7</b> - For the year 2018, the total number of maternities was corrected in a later publication (649626 instead of 649624). The distribution of maternities by multiplicity was not updated.</p> <p><b>8</b> - In the year 2020 registration services were temporarily disrupted by the COVID-19 pandemic, which resulted in severe registration delays. Because of this, the cut-off date was exceptionally postponed from February 25 to August 12, in order to include more late registrations of births occurred in 2020. Thus, the births dataset for 2020 used by the ONS for publications include: births occurring in 2020 that were registered by 12/08/2021, as well as 194 births occurring in 2019 but registered late (i.e., between 25/02/2020 and 12/08/2021). Nevertheless, births occurred in 2020 may be slightly underestimated in the 2020 birth registrations data, but the magnitude of this underestimation (<math>\approx</math> 2300 live births<sup>9</sup>) should not change the general patterns and trends on births. Late registrations for 2020 will be included in ONS' 2021 births datasets.</p>
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<sup>8</sup> ONS. (2006). "Birth statistics: Review of the Registrar General on births and patterns of family building in England and Wales, 2004", Series FM1 no. 33 (Revised), URL: <https://webarchive.nationalarchives.gov.uk/ukgwa/20160108035551/http://www.ons.gov.uk/ons/rel/vsob1/birth-statistics--england-and-wales--series-fm1-/index.html> (Accessed: 23/08/2022).

<sup>9</sup> ONS. "Births in England and Wales explained: 2020", URL: <https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/livebirths/articles/birthsinenglandandwalesexplained/2020> (Accessed: 23/08/2022).

## Source 2: Dunn and Macfarlane (1996)

<b>References</b>	Dunn, A. and A. Macfarlane. (1996). "Recent trends in the incidence of multiple births and associated mortality in England and Wales". <i>Archives of Disease in Childhood-Fetal and Neonatal Edition</i> , 75(1): F10-F19.
<b>Period covered</b>	1975-1994
<b>Code in database</b>	Dunn_Macfarlane
<b>Coverage and completeness</b>	<p>Births data used in this article come from civil registration in England and Wales, through the Office of Population Censuses and Surveys (OPCS). The OPCS merged with the Central Statistical Office in 1996, creating the ONS.</p> <p>Coverage and completeness of registration data in England and Wales is discussed in the metadata for the ONS (see pages 4-5). The reason for using additional data from Dunn and Macfarlane's study in the construction of the HMBD is that details on births by multiplicity (i.e., twin, triplet, and quadruplet + deliveries) are only available from 1998 onwards in ONS' website and online data archive. For every year from 1975 until 1994, Dunn and Macfarlane's article provides the same numbers of multiple deliveries and total deliveries as the figures available in ONS' datasets, further confirming the validity of ONS' metadata for this source too (with the exception of 1994, see <b>Footnotes</b>: 3).</p> <p>In addition to general trends in twin and other multiple births, Dunn and Macfarlane's study explore other aspects related to multiple births in England and Wales during the period 1975-1994, for example, birthweight, mortality, and zygosity. For that, they use further, more detailed data sources. Since the data that we obtained from their article for the construction of the HMBD concerns only civil registration data on births, we do not include a discussion of the other data sources used in their study in this metadata sheet.</p>
<b>Definitions and treatment of births by vitality</b>	ONS's definitions on live births, stillbirths and maternities are also valid for the data used by Dunn and Macfarlane, as both sources use England and Wales' civil registration data (see p. 5-6).
<b>Footnotes<sup>10</sup></b>	<p><b>1</b> - In 1981, details on births by multiplicity were not coded, as local registrars of births and deaths went in strike.</p> <p><b>2</b> - In 1992, there was a change in the definition of a stillbirth (see <b>Definitions and treatment of births by vitality</b> in p. 5-6).</p> <p><b>3</b> - For 1994, the total number of deliveries reported in Dunn and Macfarlane's study is 659126, that is, 419 deliveries less than those reported by the ONS for that year (659545). In the HMBD, we used the latter figure for 1994, as ONS' data files are revised. Despite the discrepancy concerning the total number of deliveries, the number of multiple deliveries in 1994 is the same according to both sources (8719). For all other years covered by Dunn and Macfarlane's paper (1975-1993), the number of multiple deliveries and the total number of deliveries is the same in both sources.</p>

<sup>10</sup> Number indicated in the variable *Footnotes*.