HUMAN FERTILITY DATABASE DOCUMENTATION:

THE UNITED KINGDOM,

ENGLAND & WALES, SCOTLAND, AND NORTHERN IRELAND

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1 General information

This report documents data provided for the Human Fertility Database project for the United Kingdom. In the United Kingdom (UK), the vital statistics data are collected by three separate statistical agencies for England & Wales, for Scotland, and for Northern Ireland. There are significant differences between these agencies in the reporting and publishing of birth statistics.

The territorial and administrative division of the United Kingdom is reflected in the HFD through the separate publication of data for England & Wales (country code GBRTENW[1]), Scotland (country code GBR_SCO), and Northern Ireland (country code GBR_NIR). Data for the entire United Kingdom (country code GBR_NP) are obtained by summing up data for the three countries. The procedure is as follows: births by Lexis triangles (age and birth cohort of mother) and exposure population by Lexis triangles (age and year of birth) are first calculated for each country and then these data are combined to produce corresponding Lexis data for the entire United Kingdom. Please refer to the HFD Methods Protocol for details.

The data consist of age-specific numbers of births and total numbers of births by calendar month and year. The Human Fertility Database (HFD) for the United Kingdom is based on the official data on birth counts published in vital statistics publications and in individual birth records, which were kindly provided by the Office for National Statistics of England and Wales (ONS), the General Register Office for Scotland (GRO), and the Northern Ireland Statistics and Research Agency (NISRA). From 1 April 2011, the General Register Office for Scotland merged with the National Archives of Scotland to become the National Records of Scotland (NRS).

Data on live births by age of mother and birth order are available for Northern Ireland, starting from 1997. For other parts of the United Kingdom (and for Northern Ireland prior to 1997), the birth data until 2012 did not specify the biological (true) birth order of each child, as the question was only asked of married women. Starting from 2013, data on live births by biological (true) birth order became available also for England & Wales and for Scotland.

[1] In the Human Mortality Database there are two datasets for England & Wales available: total population (GBRTENW), and civilian population (GBRCENW). The HFD provides data for total population only.

Live births by age of mother (for all birth orders) are available since 1938 for England & Wales, since 1945 for Scotland, and since 1974 for Northern Ireland. Population data have been processed and documented in the Human Mortality Database (HMD, www.mortality.org).

All the input data used for generating the HFD output data and indicators are specified in Appendix 1.

1.1 Data collection and territorial coverage

The United Kingdom is a constitutional monarchy and unitary state consisting of four countries: England, Northern Ireland, Scotland and Wales. The Channel Island Bailiwicks of Jersey and Guernsey and the Isle of Man are Crown Dependencies, which means they are constitutionally tied to the British Monarch but are not part of the United Kingdom. The United Kingdom has 14 overseas territories, which are not covered by the HFD. There have been no territorial changes in the United Kingdom since 1922, i.e. during the period covered by HFD data.

According to the census of 27 March 2011, the estimated population of England was 53.0 million, 5.3 million people in Scotland, 3.1 million people in Wales and 1.8 million people in Northern Ireland (ONS 2013).

The Office for National Statistics is responsible for compiling and publishing birth data for England & Wales, while the National Records of Scotland and the Northern Ireland Statistics and Research Agency are responsible for publishing data in their respective countries.

Detailed data definitions and notes for England & Wales are provided in the annual birth data report published by the Office of National Statistics (see ONS 2022). Detailed information about data on births for Scotland is available as National Records of Scotland's statistics of births – Background information (NRS 2022). Detailed information about data on births for the Northern Ireland is available as Registrar General Northern Ireland Annual Report 2020 (NISRA 2021).

1.2 Population covered

Births statistics for England & Wales comprises births occurring (and then registered) in England and Wales. Births born to women who are not usual residents of England and Wales are included, regardless of the women's nationality. In 2020, there were 99 live births in England & Wales to women whose usual residence was outside the United Kingdom (ONS 2022). Births occurring abroad are not included (ONS 2022).

Births recorded for Scotland are those occurring (and then registered) in Scotland. Births that take place in Scotland to women who are not usual residents of Scotland are included in the birth data for Scotland. Births occurring abroad are not included (NRS 2022).

In Northern Ireland births to women who are not usual residents of Northern Ireland were included in the figures up to 1980; since 1981, however, these births have been excluded from the birth statistics of Northern Ireland. Births occurring abroad are not included (NISRA 2021).

1.3 Registration of births

Relatively significant differences between the three statistical offices of the UK exist in the way how vital events are reported there. In Scotland and Northern Ireland, all vital events, including births, are published referring to the date of registration of the event and not to the date of occurrence (NISRA 2021, NRS 2022). By law, births must be registered within 21 days in Scotland and within 42 days in Northern Ireland. However, in response to the COVID-19 pandemic and the increased demand for timely vital statistics, the National Records of Scotland

started publishing monthly numbers of births by month of occurrence, backward from 1990. The HFD also switched to these numbers, and thus the earlier numbers of births by month of registration were replaced with the numbers of births by month of occurrence for the years 1990–2020. Similarly, the Northern Ireland Statistics and Research Agency started publishing monthly numbers of births by month of occurrence, backward from 2006. The HFD also switched to these numbers, and thus the earlier numbers of births by month of registration were replaced with the numbers of births by month of occurrence for the years 2006–2020.

In England & Wales, the birth statistics covers births that occurred within a calendar year and include a very small number of late registrations from the previous year. By law, births must be registered within 42 days in England & Wales (ONS 2022). Delayed registration births, registered by 11 February of the following year, are always included in the statistics of the year in which the births occurred. From 2001 on, following the extension of the legal time limit for birth registration, the annual birth totals include also births registered by 25 February of the following year. Births registered with a longer delay, i.e. between 26 February of the following year and 25 February of the subsequent year, are included in the birth statistics of the following year (these births amounted to less than 400 since 2001 each year). In cases when the birth is registered even later, it does not appear in any statistics (there were less than 70 such births since 2001 each year).

Due to extended delays in the registration of births in 2020, caused by the COVID-19 pandemic, 1,009 births occurring in 2020 were registered between 12 August 2021 and 15 May 2022, which was too late to include them into the 2020 dataset. These births will be published in the 2021 dataset.

According to the ONS (ONS 2022), the annual birth totals for 1994 through 1999 were derived in a similar way, except that late registration births from all the previous years, not just from the previous year, were included there. Up to 1993 the cut-off date for registering a birth occurring at the end of the year was 31 January of the following year, but in 1994 the time limit was extended to 42 days.

2.1 Birth count data

Birth count data included in the Human Fertility Database cover the period 1938–2020 for England & Wales, the period 1945–2020 for Scotland, and the period 1974–2020 for Northern Ireland.

Data by biological (true) birth order are available for Northern Ireland since 1997. Starting from 2013 such data became available also for England & Wales and for Scotland.

3 Population count data

Female exposure population by calendar year, age, and year of birth (Lexis triangles) for England & Wales, Scotland, and Northern Ireland is estimated using data on population size and deaths from the Human Mortality Database, which is available at http://www.mortality.org

Female exposure population for the entire UK is obtained by adding up female exposure population by Lexis triangles for England & Wales, Scotland, and Northern Ireland.

4 Specific details

4.1 Definitions of live birth

A live birth is defined as "*a baby showing signs of life at birth*", which is not identical to the WHO definition but is very close.

4.2 Age

The data are always available by the mother's age at her last birthday (age in completed years, ACY), i.e. by Lexis squares.

In 1981, the rounded counts are presented for ages 45 to 50+. These are based on a 10% sample due to registrar strike action in that year (OPCS 1981).

4.3 Birth order

In England & Wales and in Scotland, legislation until recently allowed for the collection of birth order information from married women only. The Population Statistics Acts of 1938 and 1960 specified that, when the birth is being registered within marriage, the number of previous children born to the woman "*by her present and any former husband*" should be recorded. This should therefore include previous births that took place outside of marriage where the father was the woman's present or any former husband, but excludes previous births outside marriage where the woman had never been married to the father. Therefore, these data are not used in the HFD. However, both England & Wales and Scotland have recently started to collect information on previous children from all women (not just married women). In England & Wales this information has been collected since May 2012 and in Scotland since January 2013. Thus, starting from 2013 the HFD includes information on births by true birth order for England & Wales, Scotland, and therefore also for the United Kingdom.

In England & Wales, two amendments have been made to the Population Statistics Act 1938. The changes were made within the Welfare Reform Act 2009 and implemented by the Identity and Passport Service in May 2012. Information is now collected at all birth registrations on the total numbers of previous live births and previous stillbirths that the mother has had (not just those with any current or former husband). The quality report of the first year of collection of true birth order raised some concerns about *"the proportion of women reporting a previous birth which is lower than the estimates derived from the GHS methodology used in 2011 and previously. It is important to note that the GHS derived estimates were known to be imperfect, hence ONS' work to improve the coverage of the Population Statistics Act data <…>. Women may be being asked the question incorrectly or unclearly at registration, or are misunderstanding it and so are mistakenly including their current birth <…>. ONS analysis of LS data from 2011 and 2012 shows that there was a substantial increase in the percentage of women incorrectly reporting their previous births by one (likely as a result of including the current birth in the number of previous births), at the same time as the changes to the Population Statistics Act came into force <…>. ONS has decided that it is not appropriate to make an adjustment at this time <…>. ONS believes the data quality has remained high, and that the expansion of coverage has not caused substantial missingness in the key variables affected by the change*" (ONS 2014).

In Scotland, the Population Statistics Act 1938 Modifications Order 2012 extended the collection of birth order to every registration of a birth or stillbirth (i.e. whatever the parents' marital status), with the question on "*the number of previous children born to the mother, and how many of them were*" (NRS 2014). The quality report of the first year of collection of true birth order discusses some issues, mainly the higher proportion of first births among non-married mothers, which is however regarded as "*credible*" (NRS 2014).

Legislation in Northern Ireland allows for information on birth order to be collected at the registration of the birth. The birth order in Northern Ireland is tabulated by both the previous number of total births and the previous number of live births the woman has had. We use the latter tabulation.

For England & Wales, births by true birth order for the cohorts of women born in 1920–1985 have been estimated by combining the partial data available from birth registration with General Household Survey data (Smallwood, 2002). These estimates are updated annually. Similarly, for Scotland the births by true birth order for the cohorts of women born in 1930–1980 were estimated by Chamberlain and Smallwood (2004), but these have not been updated. These estimates are not used in the HFD, however.

4.4 Parity distribution among women

There are no data on the parity distribution among women by age based on the official registration system. In England & Wales, parity distribution by true (biological) birth order has been reconstructed using registration data, combined with additional data obtained from the General Household Survey (Smallwood 2002). The tabulation is published for the estimated cumulated number of women who have a first birth by age and birth cohort, and, for selected cohorts and ages, for the estimated parity distribution among women. These data are not used in the Human Fertility Database.

4.5 Unknown cases

In England & Wales, if the mother's date of birth is not known, and it cannot be obtained from the birth notification, the mother's age was imputed from a similar record with complete and otherwise matching particulars. In 2005–2016, the mother's date of birth was not indicated for 0.4–2.1% of all live births. The corresponding proportion in 2017 was 0.3%, but only in 0.03% of these births, the information on the mother's date of birth was still missing following the birth notification matching. The imputation was discontinued in March 2018. The small number of records with the missing mother's age (8 births in 2018; 18 births in 2019; and 92 births in 2020) is included in the total counts of births but is excluded from any age breakdowns (ONS 2022).

From May 2012, England & Wales have not been imputing missing data on the birth order. This is because the level of missing data has been relatively low (in 2013–2018, the information on the birth order was missing for 0.2–0.7% of all live births). Published tables provide the numbers of records with the missing information on the birth order (about 0.2–0.7% in 2013–2020).

In 2019 and 2020, some numbers of births were suppressed if they were too low, to prevent disclosure of private information. This concerns very young reproductive ages (-19, birth order 2+), and very late reproductive ages (46+). We have combined these detailed data obtained from ONS (RefCode 34) with available online data by 5-year age groups (RefCode 41) to estimate the missing values, which are then denoted by Note=5.

At the younger age group -19, the unknown births were first distributed to the highest age empty slot in a given birth order (2, 3 or 4) to match the column sums by birth order in this age group. This concerns 11 births in 2019 and 16 births in 2020. The remaining births were assigned unknown birth order to match the row totals (by single age).

At the high reproductive age group 45+, the unknown births were first distributed to match the column sums (by birth order in given age group). The remaining births (2 births in 2019 and 1 birth in 2020) were assigned unknown birth order in the age categories with highest absolute

numbers of births to match the row totals (1 birth to age 46 and 1 birth to age 47 in 2019; 1 birth to age 47 in 2020).

In Scotland, the information on the mother's age is missing in around 0.1–0.3% of birth records in 1950–2014 (and is negligible since 2015), and there are no cases of unknown birth order.

For Northern Ireland, there are no births with unknown age of the mother or unknown birth order tabulated.

4.6 Specific issues

The jump in period age-specific fertility rates of about 1940–1965 among the cohorts of 1919–1920 is explained by the irregular population structure. The 1920 cohort is 25% larger than the 1918 cohort. In such cases, the standard methods of estimation of population exposures return biased estimates.

4.7 Revision history

Changes with the November 2015 revision:

Due to changes in the population exposure (related to revisions based on the 2011 census) in Scotland for 2001–2011 and in Northern Ireland for 2000–2011, values of HFD output data for these years may differ from the last revision as of 25.11.2013. In England & Wales the population estimates, adjusted on the basis of the 2011 census, were included already in the last release. The population exposure estimates for England & Wales have been slightly modified for the year 2011 only.

Changes with the September 2017 revision:

Data for 2014 were added.

Changes with the September 2018 revision:

Data for 2015 and 2016 were added.

Changes with the September 2020 revision:

Data for 2017 and 2018 were added.

Changes with the December 2022 revision:

Data for 2019 and 2020 were added.

The monthly birth counts for Scotland for the years 1990–2020 and the monthly birth counts for Northern Ireland for the years 2006–2020, which had previously been available by month of registration, were replaced with births by month of occurrence. This caused negligible changes in population exposure estimates, numbers of births, and values of fertility indicators in 2014–2018 for Scotland and for the UK as a whole.

References

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APPENDIX 1
INPUT DATA USED FOR HFD CALCULATIONS

ENGLAND & WALES [GBRTENW]

BIRTHS

Period	Type of data	Age scale	Birth order	RefCodes
1938–1973	Annual number of live births by age of mother (Lexis squares)	-14, 15, …, 44, 45+	–	1
1974–2011	Annual number of live births by age of mother (Lexis squares)	-14, 15, …, 49, 50+	–	1
2012	Annual number of live births by age of mother (Lexis squares)	-14, 15, …, 48, 49+	–	7
2013–2018	Annual number of live births by age of mother (Lexis squares) and birth order	12, 13, …, 49, 50+	1,…,11+	9, 16, 23, 27
2019–2020	Annual number of live births by age of mother (Lexis squares) and birth order	-14, 15, …, 49, 50+	1,…,5+	42
1938–2020	Annual number of live births by month of occurrence	–	–	1, 8, 14, 24, 28, 35

FEMALE POPULATION: Exposure by age and year of birth

Female exposure population by calendar year, age, and year of birth (Lexis triangles) is estimated using data on population size and deaths from the Human Mortality Database, which is available at http://www.mortality.org or http://www.humanmortality.de.

SCOTLAND [GBR_SCO]

BIRTHS

Period	Type of data	Age scale	Birth order	RefCodes
1945–1949	Annual number of live births by age of mother (Lexis squares)	-15, 16, …, 24, 25-29, …, 45-49, 50+	–	3
1950–2012	Annual number of live births by age of mother (Lexis squares)	12, …, 56	–	3
2013–2020	Annual number of live births by age of mother (Lexis squares) and birth order	-15, 16, …, 45, 46+	1,…,6+	6, 18, 21, 29, 36
1954–1989	Annual number of live births by month of registration	–	–	3
1990–2020	Annual number of live births by month of occurrence	–	–	37

FEMALE POPULATION: Exposure by age and year of birth

Female exposure population by calendar year, age, and year of birth (Lexis triangles) is estimated using data on population size and deaths from the Human Mortality Database, which is available at http://www.mortality.org or http://www.humanmortality.de.

NORTHERN IRELAND [GBR_NIR]

BIRTHS

Period	Type of data	Age scale	Birth order	RefCodes
1974–1996	Annual number of total births by age of mother (Lexis squares)	11, …, 52	–	4
1997–2020	Annual number of live births by age of mother and birth order (Lexis squares)	13, …, 52	1,…,11+	4, 10, 19, 25, 31, 38
1955–2005	Annual number of live births by month of registration	–	–	4
2006–2020	Annual number of live births by month of occurrence	–	–	43

FEMALE POPULATION: Exposure by age and year of birth

Female exposure population by calendar year, age, and year of birth (Lexis triangles) is estimated using data on population size and deaths from the Human Mortality Database, which is available at http://www.mortality.org or http://www.humanmortality.de.

UNITED KINGDOM [GBR_NP]

BIRTHS

Data on births for the United Kingdom (country code GBR_NP) are obtained by summing up estimates for the three countries. In other words, data on births by age of mother, mother's year of birth, and birth order for each subpopulation are calculated and then combined to produce data on births for the entire United Kingdom.

FEMALE POPULATION: Exposure by age and year of birth

Female exposure population by calendar year, age, and year of birth (Lexis triangles) for the entire UK is obtained by adding up female exposure population by Lexis triangles for England & Wales, Scotland, and Northern Ireland. Female exposure population by Lexis triangles for the three subpopulations are correspondingly estimated using data on population size and deaths from the Human Mortality Database, which is available at http://www.mortality.org or http://www.humanmortality.de.