## Cohort Fertility: 2011

Fertility by year of birth of mother, not the year of birth of child. Includes data on the number of live-born children and women remaining childless.

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## 1. Cohort fertility, England and Wales

- The average completed family size for women born in 1966, and reaching age 45 in 2011, was 1.91 children per woman. This compares with their mothers' generation, represented by women born in 1939, who had on average 2.36 children
- Two children was the most common family size for women born in both 1939 and 1966
- The level of childlessness among women born in 1966 is higher than for women born in 1939. One in five women born in 1966 remained childless, compared with about one in eight born in 1939
- One in ten women born in 1966 had four or more children, compared with nearly one in five women born in 1939
- Women born in 1981 have had slightly fewer children on average (1.01) by their 30th birthday than women born in 1966 (who had 1.17 children on average by the same age)


## 2. Introduction

This bulletin presents statistics on childbearing among women in England and Wales. These figures are presented by the year of birth of mother - for 'cohorts' of women born in the same year - rather than by the year of birth of child. The estimates have been updated with 2011 births, the latest data available, which means that completed family size for women born in 1966 (reaching age 45 , the end of their childbearing years in 2011) is presented for the first time.

These are also the first cohort fertility tables to include the impact of rebasing of population estimates from 20022010 in line with the results of the 2011 Census (affecting female cohorts born from 1957 to 1995), hence this bulletin is published slightly later than in previous years due to the rebasing timetable. More details on this rebasing can be found in the reference tables.

This statistical bulletin provides supporting commentary for the cohort fertility package which includes reference tables on:

- average number of live-born children, age and year of birth of woman, 1920-1996
- proportion of women who have had at least one live birth, age and year of birth of woman, 1920-1996. Includes proportion of women remaining childless (by the end of their childbearing years)
- percentage distribution of women of childbearing age by number of live-born children, age and year of birth of woman, 1920-1991
- age-specific fertility rates, age and year of birth of woman, 1920-1996


## 3. Key figures

Table A shows the average family size and estimated family size distribution for women who have completed their childbearing years in 2011, and of the cohort assumed to be their mothers. The 1939 cohort is assumed to be their mothers' generation because the average age of mothers giving birth in 1966 was 27 years, and women of that age were born in 1939.

This comparison of the most recent cohort to have finished their childbearing with their mothers' cohort lets us examine change over time. The completed family size of the 1966 cohort is much smaller than for the 1939 cohort, and the proportion of women remaining childless is substantially higher for the 1966 cohort.

Table A: Average family size and estimated family size distribution for women who have completed their families, by year of birth of woman, selected cohorts.

England and Wales

| Year of birth of woman | Average completed family size | Number of live-born children$(\%)^{1}$ |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Childless | 1 | 23 |  | Total |
| 1939 | 2.36 | 12 | 13 | 3522 | 18 | 100 |
| 1966 | 1.91 | 20 | 14 | 3818 | 10 | 100 |

Source: Office for National Statistics
Notes:

1. Percentage of women with $0,1,2,3$ or $4+$ children at age 45

## 4. What is cohort fertility?

A cohort is a group of women born in the same year. Cohort fertility analysis explores whether current generations of women of childbearing age are reaching, exceeding or falling short of the fertility levels of previous generations. This bulletin contains statistics on changes in average family size for past and present cohorts, levels of childlessness for different cohorts of women, and the proportions of women having one, two or more children.

The key cohort presented here is women born in 1966, who were aged 45 in 2011 (see note 1). This is the most recent cohort that is assumed to have completed their childbearing (see note 2). This statistical bulletin compares the completed family size of women born in 1966 with that of their mothers' generation; the average age of mothers giving birth in 1966 was 27 years, and women of that age were born in 1939.

Women born in 1981, who have reached age 30 in 2011, are also used as a comparison group, as age 30 may be considered the mid-point of childbearing age. This bulletin compares the achieved fertility of the 1981 cohort by this age with that of previous cohorts by the same age.

## Notes for what is cohort fertility?

1. The ages of women are presented in 'exact years'. Therefore figures should be interpreted as the average number of children a woman has had up to that birthday. So childbearing up to exact age 30 includes cumulative fertility through her lifetime up to the day before her 30th birthday. Any childbearing in the 12 months from her 29th birthday onwards will be included in fertility up to exact age 30. See background note 4 for a more technical explanation.
2. A woman is assumed to have completed her childbearing by the last day she is aged 45 , that is by her 46th birthday (exact age 46). Completed fertility includes fertility rates up to and including age 45 . See background note 4 for a more technical explanation.

## 5. Average family size

The average number of live-born children a woman has by the end of her childbearing years (completed family size) has been falling for recent cohorts (Figure 1). Women born in 1966 had on average 1.91 live-born children. This compares with women born in the 1930s and 1940s, who had on average between 2.1 and 2.4 children. Cohorts of women born from 1958 onwards have had on average fewer than two children per woman. This decrease in the average family size is mainly due to rising levels of childlessness, which is discussed further in the next section.

Figure 1 - Average number of live-born children, by age 30 and completed family size, by year of birth of woman

England and Wales


Source: Office for National Statistics

Notes:

1. Table 1 in the cohort fertility release and Figure 1 (above) measure cumulative fertility. For example, Figure 1 shows that women born in 1966 had given birth to 1.17 children on average up to their 30th birthday (this includes fertility up to and including age 29), and 1.91 by the end of their childbearing years
2. Completed family size includes births after the 46th birthday, achieved up to the end of 2011 by women born in 1966 and earlier years. See background note 2 for details of the impact of births after age 40
3. 1939 cohort - Mother of the 1966 cohort
4. 1966 cohort - latest to complete childbearing

The average number of children women have had up to their 30th birthday can give an indication of more recent trends in family size. The 1966 cohort had 1.17 children on average by their 30th birthday, compared with 1.87 by the same age for their mothers' generation, the 1939 cohort. Overall, women born in the 1960s and 1970s have had fewer children by age 30 than previous generations. This reflects their postponement of childbearing to older ages, for reasons including:

- increased participation in higher education
- delayed marriage and partnership formation
- the desire to establish a career, get on the housing ladder and ensure financial stability before starting a family (see notes 1 and 2)

However, Figure 1 shows a slight upturn in average family size by the 30th birthday for the most recent cohorts, from 0.99 children for the 1975 cohort to 1.01 for the 1981 cohort. This is mainly because women born in 1981 had higher fertility rates in their late twenties than those born in 1975. There is no single explanation for this increase, but possible reasons include the changes in support for families introduced since the late 1990s (such as tax credits and maternity/paternity leave), and the increasing proportion of women aged 25-29 who were born outside the UK (with fertility above the UK born average) (see note 3).

## Notes for average family size

1. Jefferies, $J$ (2008), Fertility assumptions for the 2006 -based national population projections ( 297 Kb Pdf), Population Trends, no 131, pp 18-27
2. Bhrolchain, M, Beaujouan, $E$ (2012) Fertility postponement is largely due to rising educational enrolment, Population Studies, A Journal of Demography, Volume 66, issue 3, pp. 311-327
3. Zumpe, J, Dormon, O, and Jefferies, J (2012) Childbearing among UK born and non-UK born women living in the UK. Office for National Statistics

## 6. Childlessness

Childlessness is estimated as the proportion of women who have not had a live birth by a specific age.

Figure 2 - Percentage of women remaining childless by their 30th birthday and at completion of childbearing, by year of birth of woman

England and Wales


Figure 2 shows that the level of childlessness for women reaching age 45, born in 1966, has levelled off at the 40 year high that it reached for the 1961 cohort and remains comparable with that of women born in 1920. One in five women born in 1966 (and 1920) remained childless by the end of their childbearing years compared with one
in eight women born in 1939. The lowest level of childlessness in the series was seen for the 1946 cohort, where only one in eleven women remained childless at age 45. A wide range of explanations relating to circumstances and choices have been put forward for the increasing childlessness seen in recent cohorts. These include the decline in the proportion of women married, changes in the perceived costs and benefits of childrearing versus work and leisure activities, greater social acceptability of the childfree lifestyle and the postponement of decisions about whether to have children until it may be biologically too late (see note 1).

By their 30th birthday, 45\% of the 1981 cohort were childless, a slightly higher proportion than for the 1966 cohort at the same age (42\%). This highlights the trend that women have been increasingly delaying having children to older ages. However, Figure 2 shows that the proportion of women childless by age 30 has been falling for successive cohorts born from 1975 onwards (when $48 \%$ of women had not yet had a live birth by age 30). This suggests a slight reversal and reflects the higher levels of childbearing among women in their late twenties born in 1981 compared with those born five years earlier.

Figure 3: Percentage of women remaining childless by their 20th birthday, by year of birth of woman


Source: Office for National Statistics
Notes:

1. The percentage of women remaining childless by age 20 is calculated as 1 minus the proportion of women who have had at least one live birth by that age, multiplied by 100. This calculation takes into account all first live births from a woman's teenage years through to the last day she is 19 (the day before her 20th birthday)

Figure 3 shows that the proportion of women remaining childless by age 20 has been gradually increasing for more recent cohorts, from around eight in ten for women born in 1950, to around nine in ten women for those born in 1991, the most recent cohort to reach age 20. This shows that the proportion of women becoming mothers during their teenage years is falling. The level of childlessness in 20 year old women remains below that of the cohorts born in the early 1920s where around $93 \%$ of women remained childless by age 20.

1. For reasons for increasing childlessness, see for example:

O'Leary, L, Natamba, E, Jefferies, J and Wilson, B (2010) Fertility and partnership status in the last two decades (2.5 Mb Pdf) , Population Trends 140, pp 5-35

Simpson, R (2009) Delayed childbearing and childlessness in Britain, in Stillwell, J, Kneale, D and Coast, E (eds.) Fertility, Living Arrangements, Care and Mobility Understanding Population Trends and Processes Volume 1, Springer, Dordrecht, pp. 23-40.

Kneale D, Joshi H (2008) Postponement and childlessness: Evidence from two British cohorts Volume 19, Article 58,

Basten, S (2009) Voluntary childlessness and being Childfree. The Future of Human Reproduction: Working Paper \#5, St Johns College, Oxford and Vienna Institute of Demography,

Berrington, A M. (2004) Perpetual postponers? Women's, men's and couple's fertility intentions and subsequent fertility behaviour (137.7 Kb Pdf). Population Trends 117: 9-19

## 7. Number of children

Figure 4: Estimated family size distribution for women born between 1920 and 1966 who are assumed to have completed their childbearing


Source: Office for National Statistics

The traditional two-child family remains the most common family type in England and Wales, with 38\% of women born in 1966 having two children (Figure 4, Table B). Childlessness is the second most common family size for the 1966 cohort. This is a recent development first encountered among the 1964 cohort, whereas for those born between the late 1930s and early 1960s, three children was the second most common family size. A woman born in 1939 was more likely to have one, three or, 'four or more' children than not to have any. Only one in ten women born in 1966 had four or more children, compared with nearly one in five in the 1939 cohort (Table B).

Table B: Average family size and estimated family size distribution for women who are assumed to have completed their childbearing, by year of birth of woman, 1920 to 1966

England and Wales


Source: Office for National Statistics
Notes:

1. Percentage of women with $0,1,2,3$ or, $4+$ children who have completed their childbearing

The proportion of women with a one-child family remained relatively stable for women born between 1940 and 1966 with $14 \%$ of women born in 1966 having a one-child family. The proportion of women with only one child was highest for women born in the 1920s, where around one-fifth had one child - this may be because their marriage and childbearing was delayed or disrupted by World War II.

## 8. The changing age pattern of fertility

Looking at the fertility rates of selected cohorts at particular age milestones highlights how the age distribution of women giving birth has varied over time. As an example, the two vertical lines on Figure 5 allow a comparison of the age profile of fertility in the 1966 cohort, who have completed their childbearing, with that of the 1981 cohort to date.

Figure 5 - Age-specific fertility rates at selected ages, by year of birth of woman, 1935 to 1991
England and Wales


For the 1966 cohort the highest fertility rate of those shown was at the age of 25 , closely followed by age 30 . Lower levels of fertility were recorded at the ages of 20 and 35, while the number of live births per 1,000 women at age 40 was lower still. On average the 1966 cohort had 1.91 children per woman.

Age-specific fertility rates for the 1981 cohort are currently only available up to the age of 30 . For this cohort, fertility rates at age 30 were a little higher than for the 1966 cohort and at a level last encountered by women born in the late 1930s. In contrast, fertility at age 20 was similar to the 1966 cohort, while at the age of 25 it was much lower for the 1981 cohort than for the 1966 cohort.

Fertility at age 25 hit a low for women born in 1977 before rising slightly among cohorts born between 1978 and 1985. Consequently, 25 year olds born in 1981 had $25 \%$ fewer live births per 1,000 women at this age ( 91 births per 1000 women) than 25 year olds who were born in 1966 ( 115 births per 1000 women).

If recent trends continue, the 1981 cohort would be expected to have an older average age at childbearing than the 1966 cohort.

## 9. Further releases on live births in 2011 in England and Wales also published on 7 March 2013

Other releases published on 7 March 2013:

- Characteristics of Mother 2 - this package presents live birth statistics (numbers and rates) within and outside marriage/civil partnership. It also provides data on first live births by marriage/civil partnership duration, and live births within marriage/civil partnership by age of mother and number of previous live-born children
- Further Parental Characteristics - this package presents age-specific fertility rates for men, the average age of father, and paternities within and outside marriage/civil partnership. See Characteristics of Mother 1 and 2 for birth statistics by age of mother, type of registration (within marriage/civil partnership, joint, sole) and number of previous live-born children
- Live Births by Socio-economic Status of Father - this package presents data on birth registrations in England and Wales by National Statistics Socio-economic Classification (NS-SEC) of father as defined by occupation. For information on proposed changes please see the "Changes to Outputs" section


## Key findings from these releases:

- The standardised mean age of all fathers at the birth of their child has increased by nearly two years over the last two decades from 30.8 years in 1991 to 32.6 in 2011 (see background notes 6 and 7 ). The standardised mean age of mother increased by a similar amount over the same period, from 27.7 in 1991 to 29.7 in 2011
- For men, the 30-34 age group had the highest fertility rate in 2011, the same age group that had the highest fertility rate for women. Previously, men in their mid-to-late twenties had the highest fertility rate but were overtaken in 1993 by men in their early thirties. The same trend occurred among women a decade later, with the fertility of women in their early thirties overtaking that of women in their mid-to-late twenties in 2004
- The median interval between women in the UK having a first and second birth was 36 months in 2011. The median interval between second and third births was slightly longer (40 months)
- In 2011, $42 \%$ of live births within marriage/civil partnership were first births, $36 \%$ were second births and $14 \%$ were third births


## 10. Users and uses of birth statistics

The Office for National Statistics uses birth statistics to:

- produce population estimates and population projections, both national and subnational
- quality assure census estimates
- report on social and demographic trends

Department of Health are another key user of the data. Other users include academics, demographers, health researchers, lobby groups, international organisations and the media.

Cohort fertility statistics and estimates of fertility by family size are primarily used by ONS for producing the fertility component of population projections and for reporting on social and demographic trends.

The Department for Work and Pensions uses information on family size for modelling pensions, benefits and the future number of lone parents.

Estimates of childlessness are of interest to policymakers concerned with the support and care available to people at older ages. Estimates of family size are of use to special interest groups such as organisations and networks supporting large families and for people who are, or who have, an only child.

## 11. Further information

Cohort fertility figures in this release are based on all live births registered in England and Wales. However due to the method of estimating true birth order for certain tables (see background note 5), these figures cannot be disaggregated separately for England only and Wales only.

The file containing the reference tables also includes information on the other birth statistics packages released throughout the year and provides links to these packages on the ONS website.

For information on data quality, legislation and procedures relating to birth statistics for England and Wales, please see Births Metadata.

The ONS Births Quality and Methodology Information document provides overview notes which pull together key qualitative information on the various dimensions of quality as well as providing a summary of methods used to compile birth statistics.

An interactive mapping tool which enables trends in fertility to be analysed at the local level is available. The tool will be updated in Summer 2013 to include rates for 2011 and revised rates for 2002-2010 which take account of the 2011 Census. The Childbearing among UK and non-UK born women living in the UK report (25 October 2012, ONS) provides statistics and analysis on births by country of birth of mother, for the UK and constituent countries, plus London.

Quarterly and annual summary birth statistics for the UK and its constituent countries as well as international comparisons of live birth rates are available in the Vital Statistics: Population and Health Reference Tables.

National Records of Scotland provides more detailed birth statistics for Scotland, including cumulative fertility by cohort.

The Northern Ireland Statistics and Research Agency provides more detailed birth statistics for Northern Ireland, including cumulative fertility by cohort.

## 12. Changes to outputs

From the 2010 Cohort Fertility release onwards, woman's age is presented in exact years (that is, by an exact birthday), where previously it had been presented in completed years. More information on this change can be found in the 2010 Cohort Fertility release.

These changes affected Tables 1, 2 and 3 in the Cohort Fertility release. Table 4 was unaffected. This change has been made in response to feedback from users and brings the tables into line with other demographic statistics.

During May 2012 changes were made to the Population Statistics Act 1938, which means that information on the number of previous children and whether previously married is now collected from all mothers at birth registration and not just from married women. This will have an impact on a number of tables and proposals for changes (73 Kb Pdf) to outputs for 2012 and 2013 data are available on the ONS website.

Changes to the tables included within Live Births by Socio-economic Status of Father are proposed in addition to implementing the combined method for deriving the National Statistics Socio-economic Classification (using the higher NS-SEC of either parent rather than just the father's classification). An information note outlining proposed changes is available on the ONS website.

## 13. Background notes

1. Cohort fertility analysis allows the fertility experience of a group of women sharing the same year of birth (a cohort) to be traced through time and compared with the experience of other cohorts. Statistics relating to the family building of women born in given years shed light on the trends underlying year-to-year changes in fertility and are particularly valuable in helping to formulate models of future fertility.

Period measures of fertility, such as the Total Fertility Rate (TFR), provide a timely snapshot of the intensity of childbearing in a particular year. However the TFR should not be interpreted as a measure of family size because it is affected by the timing of childbearing. The TFR is likely to under or overestimate average family size during periods where women are delaying having children or later catching up. Cohort fertility analysis may not be as timely, but provides an accurate measure of trends in family size.

The TFR in England and Wales of 1.93 children per woman in 2011 represents the current level of childbearing among women of all childbearing ages. The average family size of 1.91 children is for women who have completed their childbearing in 2011. The two measures should not be directly compared for the reasons noted above.
2. A woman is assumed to have completed her childbearing by the last day she is aged 45 , that is by her 46th birthday (exact age 46). Completed fertility includes fertility rates up to and including age 45 . See background note 4 for a more technical explanation.

Any births that women aged 46 and over go on to have in subsequent years will actually be included in the births for the most recent cohort to reach age 45, rather than the actual cohort they were born in. This is a consequence of the methodology, but the impact is minimal due to the small numbers of births that occur to women aged over 45. It also means that estimates for cohorts who have reached age 45 do not change in subsequent years.
3. The ages of women are presented in 'exact years'. Therefore figures should be interpreted as the average number of children a woman has had up to that birthday. So childbearing up to exact age 30 includes cumulative fertility through her lifetime up to the day before her 30th birthday. Any childbearing in the 12 months from her 29th birthday onwards will be included in fertility up to exact age 30 . See background note 4 for a more technical explanation.
4. Completed fertility is the sum of age-specific fertility rates for ages 15 to 45 and therefore relates to fertility up to the 46th birthday. In this bulletin the 1966 cohort, who are aged 45 in 2011, are presented as the latest to complete their fertility up to the 46th birthday. Although women born in 1966 will not reach their 46th birthday until 2012, the age-specific fertility rate at age 45 includes births to women aged from 45 years and 0 days to 45 years and 364 days in 2011 and thus fertility up to (but not including) the 46th birthday.

In calculating estimates of completed family size for women born in different years, an assumption must be made about the year each woman was born, based on her age when she gives birth. In this case it is assumed that births at age 45 in 2011 are to women born in 1966. This assumption is necessary because information on the mother's year of birth is not available in historic births datasets so has to be assumed from the age of the mother when she gives birth. However women giving birth at age 45 during 2011 were actually born between January 1965 and December 1966 - half of these women will have their 45th birthday in 2011 (those born in 1966 who give birth after their 45th birthday,) and half will have their 46th birthday in 2011 (those born in 1965 who give birth before their 46th birthday). However for simplicity the latest cohort to complete their childbearing is presented as the 1966 cohort, with their completed fertility based on the sum of age-specific fertility rates from age 15 in 1981 to age 45 in 2011.

Similarly, the bulletin presents fertility up to exact age 30 for the 1981 cohort and other cohorts, as age 30 may be considered the mid-point of childbearing age. However fertility up to the 31st birthday for the 1981 cohort is available in the published Reference Tables 1 and 2 because cumulative fertility to exact age 31 includes the age-specific fertility rate for age 30 in 2011 (from Reference Table 4).
5. Estimates of childessness and number of children are based on estimates of true birth order. At birth registration, the number of previous births was only collected from married women (until 2012). This partial information on birth order from registration data is supplemented with data from the General Lifestyle Survey (formerly known as the General Household Survey) to give estimates of true birth order for all women. More information is available in the metadata sheet in the Cohort Fertility reference tables.
6. Measures of male fertility are estimated. The age of the father is not collected for births that are registered solely by the mother ( $5.8 \%$ in 2011), therefore these ages are estimated. More information is available from the metadata in the Further Parental Characteristics package on the ONS website.
7. Birth figures are based on births occurring in the data year, but incorporate a small number of late registrations from births occurring in the previous year. More information can be found in the Births Metadata.
8. The standardised mean age is a measure which allows fertility trends to be separated out from the effects of changes in the population's age structure. It is therefore useful for comparing mean ages across population subgroups and over time.
9. There is a large degree of comparability in birth and death statistics between countries within the UK. However, there are some differences although these are believed to have a negligible impact on the comparability of the statistics. These differences are outlined in ONS Births Quality and Methodology Information document.
10. Special extracts and tabulations of births data for England and Wales are available to order (subject to legal frameworks, disclosure control, resources and agreements of costs, where appropriate).

Such enquiries should be made to Vital Statistics Outputs Branch (VSOB):
Tel: +44 (0)1329 444110
E-mail: vsob@ons.gsi.gov.uk
Enquiries on Cohort Fertility should be made to:
Demographic Analysis Unit (DAU)
Tel: +44 (0)1329 444644
E-mail: fertility@ons.gsi.gov.uk
Next publication:
January/February 2014
11. Follow ONS on Twitter and Facebook.
12. A list of the names of those given pre-publication access to the statistics and written commentary is available in pre-release access - Cohort Fertility ( 28 Kb Pdf) . The rules and principles which govern prerelease access are featured within the Pre-release Access to Official Statistics Order 2008.
13. Details of the policy governing the release of new data are available by visiting www.statisticsauthority.gov. uk/assessment/code-of-practice/index.html or from the Media Relations Office email: media.relations@ons. gsi.gov.uk

The United Kingdom Statistics Authority has designated these statistics as National Statistics, in accordance with the Statistics and Registration Service Act 2007 and signifying compliance with the Code of Practice for Official Statistics.

Designation can be broadly interpreted to mean that the statistics:

- meet identified user needs
- are well explained and readily accessible
- are produced according to sound methods
- are managed impartially and objectively in the public interest

Once statistics have been designated as National Statistics it is a statutory requirement that the Code of Practice shall continue to be observed.

