Quality assurance of new data on birth registrations, as a result of changes to the Population Statistics Act –from May 2012 onwards

1. **Background and introduction**

   This paper describes the changes that have occurred to ONS birth statistics as a result of improvements to the statistical information collected at birth registration under the Population Statistics Act. It presents the findings from quality assurance of the new data.

### 1.1 Changes to the Population Statistics Act

ONS has recently initiated a legislative change to improve the statistical information collected at birth registration in England and Wales. Two amendments have been made to the Population (Statistics) Act 1938, the legislation which requires registrars to collect confidential information for statistical purposes. The changes were made within the Welfare Reform Act 2009 and were implemented by the Identity and Passport Service in May 2012.

Until May 2012, information on

(a) number of previous children with a current or former husband; and

(b) whether the mother had previously been married;

was only collected for births occurring within marriage. When the Population (Statistics) Act came into force in 1938, only 4% of live births in England and Wales occurred outside marriage so the information required was collected for nearly all mothers. However by 2011 nearly half of births (47%) took place outside marriage or civil partnership and so the legislation no longer reflected the reality of modern society.

### 1.2 The two amendments made to the Population (Statistics) Act mean that:

(a) 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). This has simplified the question asked by registrars and will provide improved coverage.

(b) information is now collected at **all** birth registrations on either (i) whether the mother has been previously married or in a civil partnership (if she is currently married or in a civil partnership) or (ii) whether the mother has ever been married or in a civil partnership (if she is not currently married or in a civil partnership). This brings the birth registration process more in line with equality legislation.

This information is collected at birth registration, and is treated as confidential by registrars. The data are passed to ONS for statistical purposes, and registrars make the informant aware of this at the time.

### 1.3 The statistical benefits from this change include the following:

- ONS previously published some births tables covering number of previous children for married women only. Following implementation of the changes to the Population Statistics Act, it is now possible to publish births tables that represent the characteristics of all births rather than just births to married women. An example of this can be seen in the [Characteristics of Mother 1](characteristics_of_mother_1) release published 16/10/2014.
• It is now possible to cross-tabulate number of previous children with variables other than age for the first time, enabling new analyses on health and demographic topics - for example number of previous children by mother’s country of birth.

• Before 2012 ONS estimated 'true birth order' for all women by combining the partial information available for married women from birth registration with social survey data. 'True birth order' no longer needs to be estimated, as full information on number of previous children is now collected from all women. This is expected to improve the quality of birth order data used in fertility analysis such as the Cohort Fertility Release. Because birth order data are also used in the fertility component of national population projections, there is expected to be a similar improvement in the quality of population projections.

2. Overall data findings

All birth registration data used by ONS goes through extensive quality assurance and error checking to ensure that it is of the highest possible quality. This occurs as part of the routine processing of registration data received. When the new data on previous children and previous marriages were received following the change to the legislation, more detailed analysis was conducted to understand the quality and if there were any issues for users to be aware of.

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. True missingness in the previous children variable is not possible to ascertain for 2011 and earlier, as this variable was intentionally missing for all unmarried women. The level of missingness for married women is shown for 2011. While the level of missingness in 2012 and 2013 is higher as shown below, it remains very small.

<table>
<thead>
<tr>
<th>Year</th>
<th>Missingness</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011 (married women only)</td>
<td>0.01%</td>
</tr>
<tr>
<td>2012 (whole year – married women only till 28th May, then all women)</td>
<td>0.17%</td>
</tr>
<tr>
<td>2013 (all women)</td>
<td>0.33%</td>
</tr>
</tbody>
</table>

Information on missingness in the previous marriages variable was not held by ONS before May 2012. However the information we have been able to examine shows just under 2,000 records where this question was asked (between May 2012 and October 2013), but no response or a refusal was given. This accounts for approximately 0.2% of all records, and so is not deemed to be a substantial issue.
3. The proportion of women reporting previous live births is higher than before the change

As well as expanding coverage of the previous children question to all women, rather than just married women, the question changed slightly. Before the change married women were asked only for births to current and previous husbands (even if they took place before the marriage), whereas after the change, all women are simply asked to provide information on all previous births.

In 2011 and earlier years an adjustment was applied to the collected data to enable an estimate to be made for unmarried women, and to control for the known gap in the coverage of the previous children question for married women. This adjustment was based on information collected in the General Household Survey and known as ‘true birth order’. This adjustment has not been applied to the new 2012 or 2013 data.

The information provided by women on the number of previous live born children they have had when registering their most recent birth shows higher proportions of married women saying they have previous children than had been recorded prior to the change. Some difference was expected due to the question change, as more previous births to married women are included in the new question compared to the old. The difference, between the old and new data, in the proportion of married women reporting previous births is larger than was expected purely from the question change.

Women who register a birth outside marriage have provided information on their previous births for the first time. The proportion of women reporting a previous birth 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. Further examination of the registration data, in particular for the youngest women, revealed patterns that merited further investigation.

Table 2 – Percentage of women reporting no previous live births at registration of most recent birth

<table>
<thead>
<tr>
<th>Registration group</th>
<th>Married women</th>
<th>Sole registrations</th>
<th>Joint registration by cohabiting woman</th>
<th>Joint registration by non-cohabiting woman</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2011 (raw data)¹</td>
<td>42.0</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>Not calculated</td>
</tr>
<tr>
<td>2011 (estimates)²</td>
<td>38.0</td>
<td></td>
<td>48.0³</td>
<td></td>
<td>42.8⁴</td>
</tr>
</tbody>
</table>

¹ For 2011 and previous years, data on previous children was not collected for unmarried women.
² These 2011 figures represent ONS’ estimates of true birth order distribution as used within cohort fertility releases, and projections. These figures have not previously been published.
³ Estimate for all unmarried women derived from GHS data.
⁴ The difference between the values in the highlighted cells show the area of concern for ONS in this table.
New 2012 data (28th May onwards)  

<table>
<thead>
<tr>
<th></th>
<th>33.6</th>
<th>41.3</th>
<th>42.1</th>
<th>40.5</th>
<th>37.4</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>34.3</td>
<td>42.0</td>
<td>43.1</td>
<td>40.2</td>
<td>38.1</td>
</tr>
</tbody>
</table>

Table 2 shows the proportion of women from each registration group reporting that they had no previous births when registering a birth in 2011 to 2013 and the true birth order estimates for 2011. The estimates for all women in 2011 are very similar to those for the previous years; the figures for the last 10 years (2002-2011) show only small fluctuations around 43%.

ONS was expecting a difference between the estimated figures for unmarried women from 2011, and the complete registration information collected since May 2012, as more complete data would be more accurate. The observed data for unmarried women in 2012 and 2013 show a decline from the level previously estimated (48% in 2011), to 40 – 43% in 2013.

The proportion of married women reporting no previous births has declined substantially in the new data, from 42% in 2011 to 34% in 2012 and 2013. Only part of this decline appears to be due to the question change. The difference between the observed raw data for 2012 or 2013, and the estimated data for 2011, is roughly comparable between married and unmarried women.

The key concern for ONS is the difference between the total level of births reported as first births (the cells highlighted in the table), between the 2011 estimates and the new data for 2012 and 2013.

3.1 Cause of the difference

Further research has revealed what ONS believes to be the reason for the decrease in women reporting no previous children. Evidence suggests that since May 2012 there has been an increase in women including their current births when reporting their number of previous children at birth registration.

Use of the ONS Longitudinal Study (LS) has allowed ONS to trace women through the study to understand their parity progression. This tracing has revealed that a substantial proportion of women do not appear to have consistency between the number of children they have given birth to according to historical birth registrations linked into the LS, and the number of previous children they report when registering a birth in 2012.

There are a number of reasons why this could occur, which can be broken down into valid reasons and incorrect reporting at birth registration:

Valid reasons

- Women may have had previous births outside the UK, in which case these births would be untraceable in the LS. This would be the case for migrants who had children before migration.
- The current birth being registered is part of a multiple birth. The effect of this on the data being analysed is likely to be small.

5Information on the Longitudinal Study (LS) can be found on the ONS website: http://www.ons.gov.uk/ons/guide-method/user-guidance/longitudinal-study/index.html
The reporting of stillbirths is different between the birth registrations and LS data\(^6\). The effect of this on the analysis is minimal in the data, accounting for less than 1% of records.

Incorrect reporting

- Women may be being asked the question incorrectly or unclearly at registration, or are misunderstanding it and so are mistakenly including their current birth.
- Women may be reporting the number of previous births they have had incorrectly at registration for some other reason.

It is likely that all of these factors play a part, and it is important to note that the inconsistency seen exists before the change to the Population Statistics Act data in May 2012.

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 (in May 2012).

Figure 1 shows information for women in the LS having a baby between January 2011 and December 2012. The number of children they report at birth registration (previous children reported, plus the current birth being registered) is compared with the total number of births linked into their LS history.

There are four possible results:

(A) **Match between the sources**— The total number of births in the LS and birth registrations match, indicating correct information has been supplied at birth registration.

(B) **Birth Registration shows one more birth than the LS**— The number of previous births reported at birth registration is one higher than the total number of births linked in the LS. This suggests that the mother has accidentally included the current birth in their number of previous children.

(C) **Birth Registration shows two or more extra births compared to the LS**— The number of previous births reported at birth registration is two or more higher than the total number of births linked in the LS. This could be because that some of the previous births have occurred overseas.

(D) **Birth Registration shows fewer births than the LS**— The number of previous births plus the current birth reported at birth registration is lower than the total number of births linked in the LS. This could be caused by the current birth being a multiple birth, or other reporting error.

Figure 1 below shows the distribution of women in the LS who registered a birth in 2011 or 2012. The majority of women fall into the “Match” group, indicating that they have reported consistent figures when asked for their number of previous children. The largest group of women reporting inconsistent figures are those in group B.

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\(^6\) The LS data used for analysis here include any previous stillbirths the mother has registered, whereas the previous children variable in the births data asks only about previous live births.
The rise in the proportion of women of type B (where the number of previous births reported at registration is one too high) since May 2012, suggests that the question on previous births is being misunderstood, and some women are including their current birth in the number of previous births. There is no evidence to suggest that this potential misreporting is confined to any one registration group, and is expected to affect all women equally. This is consistent with the age distributions that can be seen later in figure 2.

3.2 What action is ONS going to take as a result of the difference in previous children data?

ONS have been working with colleagues in the General Register Office (GRO) to ensure training for registrars, wording of guidance and display screens are all optimised to promote high quality data collection. Examination of further data in the Longitudinal Study was undertaken to allow ONS to consider whether an adjustment should be made to try to account for the issue found with previous children data.

ONS has decided that it is not appropriate to make an adjustment at this time for the following reasons:

- There is no alternative data source that could provide information to inform any adjustment.
- The LS shows more substantial differences when historical data are considered for 2008-2011. Without any way to further quality assure and ascertain the reason for these discrepancies, it is not sensible to apply an adjustment just to the most recent years.
- ONS is keen to minimise the amount of manipulation the new data goes through at this stage. It is judged preferable to allow a few years of complete collection of the data and continue to monitor closely.
- Users are being alerted to the issue, and can apply their own adjustments to the raw data if they judge it necessary and appropriate.

3.3 How were these differences discovered?
Extensive work was carried out to assess the quality of the data when first received. During this assessment the distribution of births by number of previous children for the new data in 2012 and 2013, was compared to the estimates for 2011. The 2011 estimates are derived from birth registrations for married women, combined with an estimation method using survey data for unmarried women (true birth order). It was clear that there was a substantial drop in the proportion of births to women reporting previous childlessness (table 2).

Table 3 – Previous children reported, for women registering a birth in 2011, 2012 and 2013

<table>
<thead>
<tr>
<th></th>
<th>2011 Data (includes estimation)</th>
<th>New 2012 data (28th May onwards)</th>
<th>2013 data (Whole year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 previous births</td>
<td>42.8</td>
<td>37.4</td>
<td>38.1</td>
</tr>
<tr>
<td>1 previous birth</td>
<td>33.8</td>
<td>36.4</td>
<td>36.1</td>
</tr>
<tr>
<td>2 previous births</td>
<td>14.4</td>
<td>16.3</td>
<td>16.0</td>
</tr>
<tr>
<td>3 previous births</td>
<td>5.3</td>
<td>6.1</td>
<td>6.1</td>
</tr>
<tr>
<td>4 or more previous births</td>
<td>3.8</td>
<td>3.8</td>
<td>3.8</td>
</tr>
</tbody>
</table>

ONS was expecting some change in the proportion of women reporting no previous children, as this information was previously based on partial estimation using survey data and the introduction of full coverage removed the need for estimation. However the size of the decline, approximately 5 percentage points, between 2011 and 2013 was larger than expected.

It is clear that the decrease in proportion of women with no previous children is matched by an increase in the proportion of women with one or more previous children (table 3). The proportion of women with high parities (4 or more previous births) has not changed, the majority of the increase being for women with one or two previous births.

Analysis was undertaken to establish whether the change in pattern of previous births was driven by any one age group. Figure 2 shows the proportion of women of each age reporting previous births, for 2011, the post change data for 2012, and for 2013. It can be seen that the difference between 2011 and subsequent years in the proportion of women reporting previous childlessness is fairly consistent across most of the age range, with decline in the older ages as the proportions converge. There is little difference for women aged over 40.

The proportion of women aged under 20 reporting a previous birth is higher than ONS expected (around a quarter of women aged under 20 reported at least one previous birth at registration), and is higher than expert opinion and international comparisons would suggest is likely. Extensive research on this was undertaken, but no teenage specific factors were identified. Although registration status of births to teenagers is not typical of births to women overall (fewer births registered by teenagers are within marriage, and more are

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7 The pre change data for 2012 is virtually identical to the 2011 data in terms of proportion of women reporting previous births.
8 ONS consulted with academics, professionals in Public Health England and specialist teenage pregnancy midwives who agreed that the levels of previous childlessness being reported seemed unlikely and at odds with their evidence.
registered by single women), this is not thought to be a factor in explaining the high proportion reporting a previous birth. The high proportion was simply more visible among teenagers because the majority giving birth would be expected to be having their first birth.

Based on this analysis ONS is confident that there is no specific age group that is responsible for the change over time in the proportion reporting a previous birth, and that it occurs across the age range. However the change over time is lower at higher ages, as can be seen in figure 2.

4. The proportion of women reporting a previous marriage is higher in 2012 and 2013 than in 2010 and 2011

The post change data show a higher proportion of married women registering a birth who reported a previous marriage than had been the case in previous years. This is unexpected, as the only change here was the inclusion of previous civil partnerships in the question, and while there will have been some women with a previous civil partnership, it is unlikely that the inclusion of previous civil partnerships would boost the previously married proportions by as much as has occurred.
However, when the 2012 and 2013 data are considered in a longer time series, the proportions of women reporting a previous marriage look acceptable. This can be seen in table 4. The downward trend seen over time is in line with the fall in remarriages seen in marriage statistics.

Table 4 – Percentage of currently married /civil partnered women who report a previous marriage or civil partnership

<table>
<thead>
<tr>
<th>Year</th>
<th>% previously married (currently married)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>5.4</td>
</tr>
<tr>
<td>2006</td>
<td>4.9</td>
</tr>
<tr>
<td>2007</td>
<td>4.4</td>
</tr>
<tr>
<td>2008</td>
<td>3.9</td>
</tr>
<tr>
<td>2009</td>
<td>3.5</td>
</tr>
<tr>
<td>2010</td>
<td>3.1</td>
</tr>
<tr>
<td>2011</td>
<td>2.9</td>
</tr>
<tr>
<td>2012</td>
<td>4.0</td>
</tr>
<tr>
<td>2013</td>
<td>4.2</td>
</tr>
</tbody>
</table>

As such, the only action being taken by ONS, is to work with colleagues in GRO emphasise to registrars the importance of checking respondents understand the term “civil partnership” correctly, and that it refers to same sex partnerships rather than opposite sex partnerships. We will also continue to monitor the quality of this variable.

5. **Conclusions**

- The change to collection of full information on previous children for all women in May 2012 has expanded the fertility data available for analysis for England and Wales.
- An unexpectedly large increase in the proportion of women reporting a previous birth was observed post change in 2012.
- ONS is not currently planning to make any adjustment to the births data, as there are no available sources that could inform such an adjustment.
- Proportions of births to previously married women are higher than in 2010 and 2011, but comparable with earlier years for the currently married group.
- ONS is working with GRO to ensure the quality of birth registrations is maximised and all registrars are clear about how data should be collected, and its importance.

Queries about any of points raised in this paper, the analysis performed, or any other aspect of the production of fertility estimates by ONS should be raised with the Fertility Analysis Team in ONS Titchfield. This team would be happy to assist and can be contacted by telephone (01329 444644) or email (Fertility@ons.gsi.gov.uk).

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See table 1 here