

Dorling, D. (2016) Where have all the women gone?, Statistics Views Blog, June 21<sup>st</sup>, <http://www.statisticsviews.com/details/feature/9478781/Where-have-all-the-women-gone.html>

# Where have all the women gone?

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(Public domain: Women officers in the IDF, 1950, Author: Brauner Teddy))

Recently I drew a graph and wondered what it was telling me. The graph is shown below and is of the proportion of the population who were estimated to be female and living in the UK each year from 1961 to 2014. This is the official estimate as published by UK's OPCS and later ONS, and as revised following each population census. In the graph below the census years are highlighted to show that the turning point in the trends are not those years.



First image appears courtesy of Wikimedia Commons. (Public domain: Women officers in the IDF, 1950, Author: Brauner Teddy))

What was surprising was how, after 1994, the proportion of people who were female in the UK fell every year, at a very consistent rate. The decline appears to be near linear. This is the case whether it is drawn on this scale or on a log scale because, until recently, the decline had been accelerating slightly. If the linear decline were to continue then, in just over 1500 years time, there will be no women in the UK. That, of course, is not going to happen (unless some catastrophe results in the final person living on the island of Britain being a solitary and very lonely man in the year 3550). But something unusual has been happening and it might be useful to know what has happened.

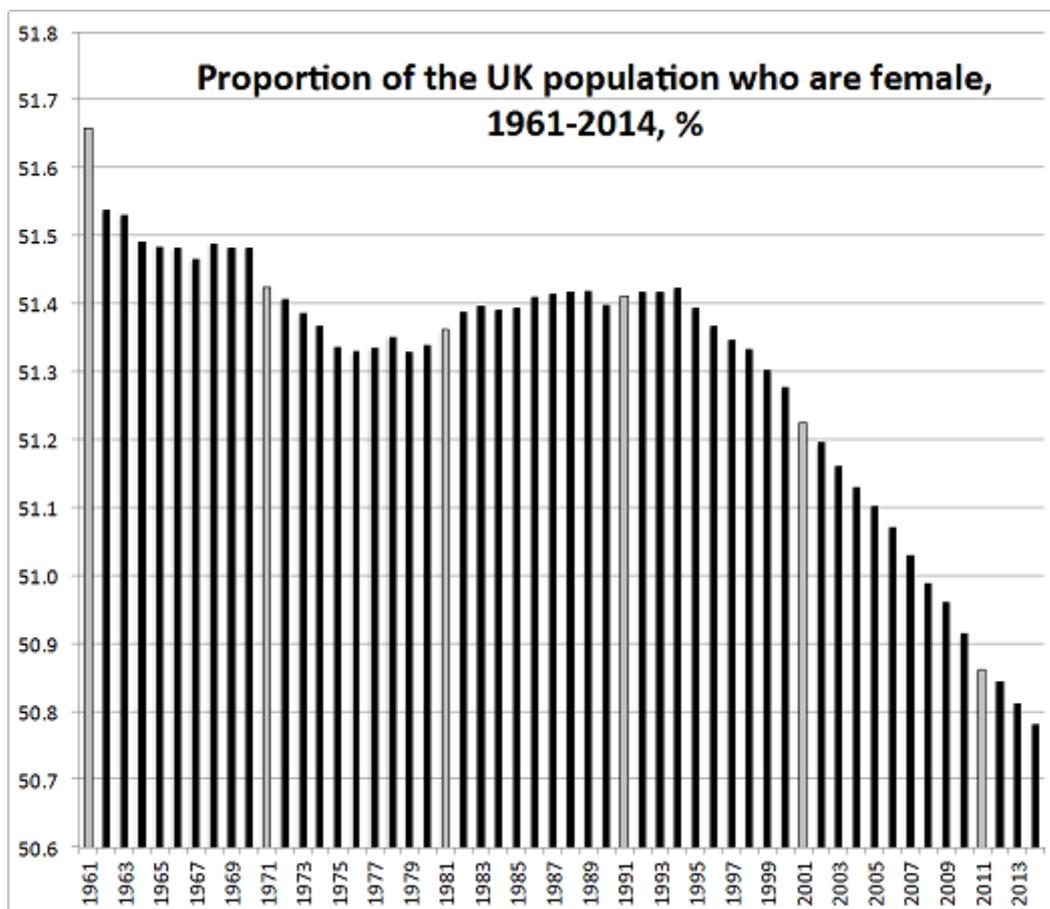


Figure 1: Mid-year population estimates by single year of age and sex for England & Wales and the UK 1961-2014 ('File updated to include 2014 data and 90-105+ SYOA). Note that a bar graph is not the best way to show this data but that it does highlight the recent dramatic decline.

If current trends continue for a short period, then by the year 2040 a minority of people in the UK will be women. This is a more realistic possibility but probably unlikely. Here's why.

More boys are born than girls. Men are the weaker sex. Male foetuses are more likely to be miscarried; boys are more likely to be stillborn or to die in their first year of life (1). This is one of the reasons why fractionally fewer babies that are conceived are female – because males are more fragile. The graph below also shows that the proportion of babies born female changes over time in ways that are not random. If it were random then the trends would not be as smooth, although what is shown here is a five-year moving average to smooth it out a little as there are annual fluctuations which can disguise the long term trends. The key long term trend is that historically unprecedented numbers of boys were born as compared to girls following the First World War, and then, for a much longer period following the Second World War.

**Proportion of live births that were female in Britain, 1900-2010**

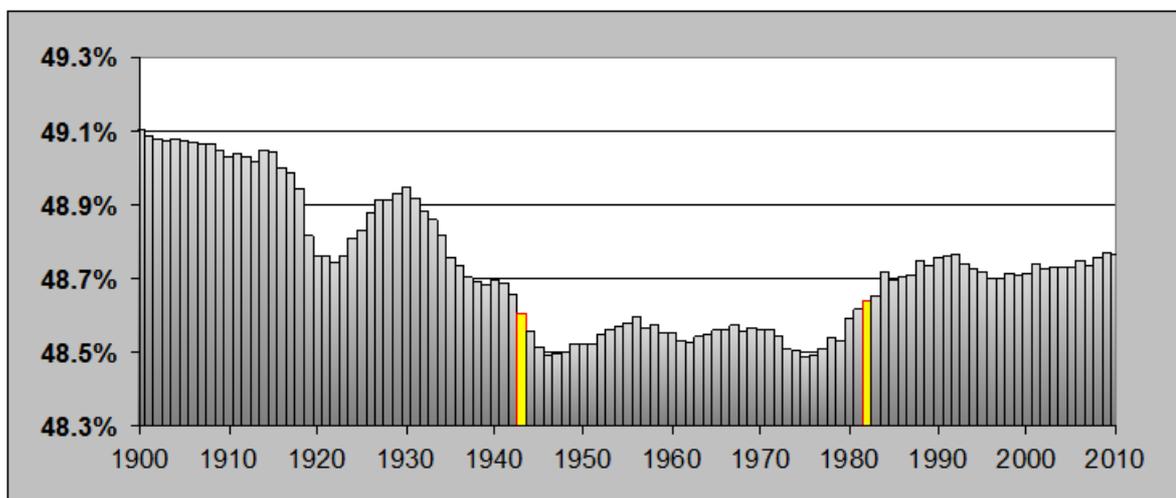


Figure 2: Moving average of last five years figure: Chapter 2 of "The population of the UK". Available here: <http://www.dannydorling.org/books/ukpopulation/Data.html>

During times of greater stress a higher proportion of girls are conceived and born. There is a small but still nascent literature on this and why it might be (2). The trend is possibly because fewer boys are miscarried in good times,

but it is also possible that slightly fewer girls are conceived when times are good. Remarkably few girls were conceived in the golden years of 1943 to 1982 in Britain and one of the reasons why the proportion of women may have fallen in recent years could be due to that.

Why were so few girls born between 1943 and 1982? My guess is that by 1943 it had become clear that Britain was not going to be on the losing side in the Second World War (following the battle of El Alamein in late 1942). On November 16th 1942 church bells were rung across the country to celebrate 'the end of the beginning' of the war. The mood of the country swung, and so interestingly did the sex ratio at birth nine months afterwards (3).

Conversely by 1982 (coincident with the Falklands war), the first year in which the ratio of girls born to boys rose to its pre-1943 high again, it became clear that mass unemployment, precarity, rising poverty and inequality had returned. In between were years of remarkably high equality and social progress, full employment, ever improving housing, education and health care, and the freedom to start a family young. For the purposes of this article it does not matter if those reasons were the most important, although living in a society that does not prevent you from having children in your twenties is important as miscarriage is rarer before age 30. What matters is that fewer girls are born in those good years and those girls would be women aged 34 to 73 years of age today.

Figure 3 is based on the mid year estimates of children living in the UK in their first year of life in the June of each year. The red line is very similar to the smoothed graph of births above, but infant mortality and the net migration of infants also plays a part here. More girls were born and survived through their first few weeks in 1968 (when students were on the streets in Paris), whereas 1973 saw the fewest girls born as compared to boys. But as the figure also shows, these trends in early sex ratio fluctuations are not that important overall; because the figure also includes sex ratios at ages 20, 40 and 60.

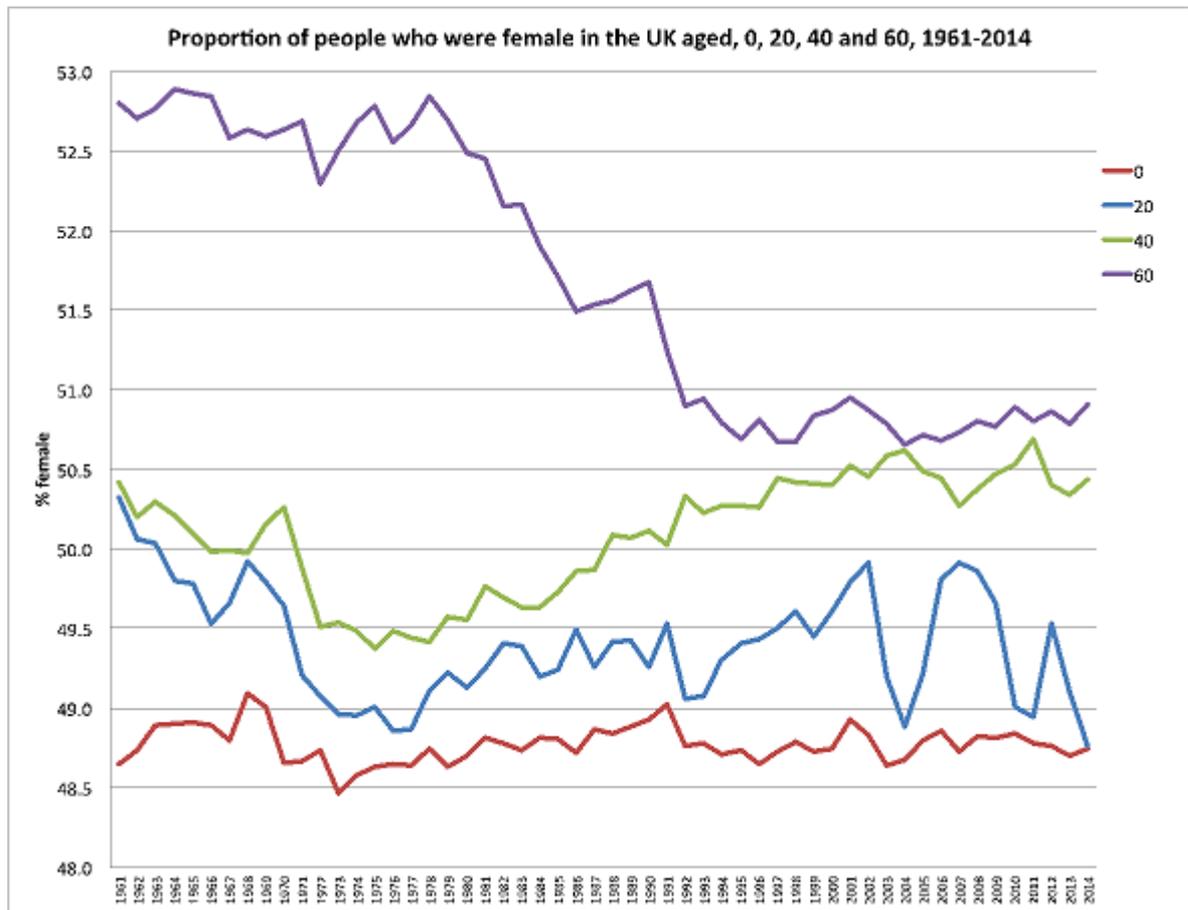


Figure 3: Mid-year population estimates by single year of age and sex for England & Wales and the UK 1961-2014 ('File updated to include 2014 data and 90-105+ SYOA)

Men are not just more likely to die as young children, or to be miscarried as male foetuses. They are also more vulnerable as older children and adults, especially to the danger of being hit by a car, or to otherwise die violently in other ways, including being sent to war. More young women survive to age 20 than do young men, so the proportion of 20 year olds who are female in the UK varies between 49% and 50% in most years. Net immigration of slightly more young men in the early 2000s and early noughties caused the lines for those in their 20s to oscillate recently (see the blue line in Figure 3). But again such things that look so important about children and young adults turn out not to matters so much in the greater scheme of things when we consider variations at older ages, and especially differential trends in mortality. In contrast to 20 year olds, there is far less fluctuation in the proportion of people aged 40 who are female over time, shown by the green line in the

graph above. That proportion has risen steady from the early 1970s onwards, perhaps as childbirth became much safer. Access to safe legal abortion services became widespread from the early 1970s onwards with the legalization of abortion on the 27th of April 1968 (4).

Men also fared worse in the 1980s years of mass unemployment. Someone who was unemployed in those years was twice as likely to die a year, all else being equal as compared to someone with a job in those years. However, all of that is dwarfed by the decline in the proportion of people aged 60 who were women, which fell each year between 1978 and 1998. Fewer men were dying before age 60 each year, often as a result of having smoked earlier in their lives when women were less likely to. Men used to smoke much more often than women. The purple line in Figure 3 falls in almost direct correlation to men giving up smoking two or even three decades earlier.

However, put all these four lines together in the graph above, and the other age groups not shown here, and they largely cancel each other out. It is not trends among those aged 60 and under that explain the fall in the proportion of women since the early 1990s.

So let's turn to older ages. And finally, and perhaps then we will begin to see what may lie behind the decline in the overall proportion of people who are female in the UK. The dot on each line in the graph below is for people born in 1896, we were aged 70 in 1966, 80 in 1976, 90 in 1986, 100 in 1996 and who are now all dead. Most, of course, never even made it to these ages. This is the age group who turned 18 just as the First World War began. The dot marks those who were just old enough to go to war – if they were men. There were very few civilian casualties in the First World war, and so apart from nurses working near the front lines, almost all of the dead were men.

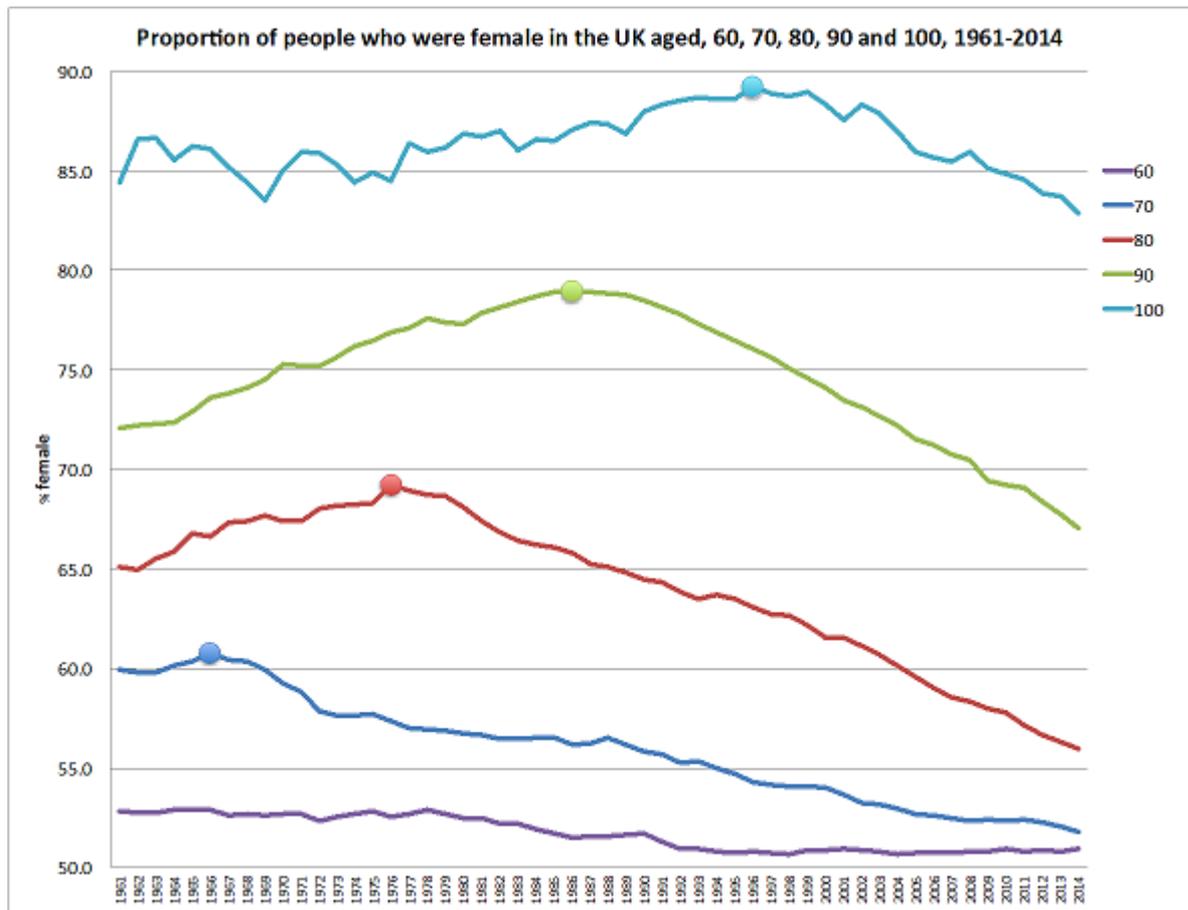


Figure 4: Source: Mid-year population estimates by single year of age and sex for England & Wales and the UK 1961-2014 ('File updated to include 2014 data and 90-105+ SYOA)

In the past, of people born in 1896 and earlier, far more women survived to old age than men, a growing proportion each year after age 70. Many more men than women died during the First World War, often from fighting but also (and possibly more often) from disease in the trenches and behind the lines. That is why the proportion of 80 year olds who were female in the UK rose until 1976, and 90 year olds until 1986, and 100 year olds until 1996. Many men took up smoking during World War One, including older men, so it was not only deaths during wartime that were accelerated by that war. It left a legacy of cancer and of damaged mental health.

The linear decline since 1994 in the proportion of women in the UK is, it appears, the last echo of a war that took place a century ago. If this is the case then the decline in the proportion of should have ended already, and it

can be expected to end any time now, perhaps even when the next statistics are released at the end of June 2016. However, since 2010 women have faced a new threat. Women are much more likely to be on their own in old age because they live longer than men and the majority tend to marry men a few years younger than them. A cohort who were young women after 1919 were much more likely to live just with other women and they were protected, but they are now almost all dead. Single elderly people are at far greater risk from changes in society such as those due to the advent of austerity usher in by the Coalition government of 2010 (5). So perhaps we will not see the decline in the proportion of the population who are women end very soon. The next set of annual statistics are released on June 23rd 2016.

#### **Sources:**

(1) "The human male is, on most measures, more vulnerable than the female. Part of the explanation is the biological fragility of the male foetus, which is little understood and not widely known." See : British Medical Journal 2000; 321:1609-12 doi:<http://dx.doi.org/10.1136/bmj.321.7276.1609>

<http://www.sebastiankraemer.com/docs/Kraemer%20the%20fragile%20male.pdf>

(2) These are the former and current acronyms for the UK's official statistical agency, now called the Office for National Statistics, formally the Office for Population, Censuses and Surveys.

(3) Extreme changes in sex ratios at birth after found during and after war. In Iraq after 2005 the proportion of girls born in the city of Fallujah increased sharply; prior to the Iraq war the birth ratio was usually around 105 boys to 100 girls. However, in Fallujah in the four years after the US assault, the birth ratio was reduced to 86 boys to 100 girls, an alteration last found in Hiroshima after the atomic bomb was dropped in 1945. For references and a debate on these issues see Dorling, D. (2011) So You Think You Know About Britain, pp.43-50.

(4) My grandmother told me this story when I was very young. She at first thought the bells were ringing for her. She was sitting in a hospital in London having just given birth the day before to her third son, who would later become my father. When the air raid sirens went and the bombs dropped the women were left in their beds as it was thought too dangerous to move them. The babies and nurses went down to the air raid shelters. See: <http://ww2today.com/16th-november-1942-british-celebrate-the-end-of-the-beginning>

(5) Abortion was legalized a few weeks after I was born. Before then you had to borrow money. If you did not have it, you had to find someone prepared to help you have a 'back-street abortion'. We easily forget how much has changed so quickly.

(6) In 2015 there was a large rise in mortality in the UK, especially among elderly women. Before then there were signs that their death rates were rising: <http://www.newstatesman.com/politics/2014/02/why-are-old-people-britain-dying-their-time>

**Danny's latest book is an Atlas drawn with Bethan Thomas:  
People and Places: <http://www.dannydorling.org/books/peopleandplaces/>**