

Statistical bulletin

The impact of adverse pregnancy events on monthly employee earnings and employment, England: April 2014 to December 2022

The change in employee earnings and employment after adverse pregnancy events, including miscarriages, ectopic pregnancies, molar pregnancies, stillbirths and neonatal deaths.

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1 . Main points

- Following a stillbirth, earnings were lower for at least five years compared with a year before the event, with a total loss of £13,581 over this period; the probability of employment returned to its pre-event level by two years after a stillbirth, with the period of maximum difference being in the first quarter after the event (4.8 percentage points lower than one year pre-event).
- For women who experienced a neonatal death, earnings were lower for almost five years compared with a year before the event, with a total loss of £12,441 in this period; the probability of employment returned to pre-event levels two years after a neonatal death, but the difference peaked at 4.8 percentage points lower in the quarter after the event.
- Following a missed miscarriage, there was a sustained decrease in earnings five years after the event compared with one year before the event, equating to a total loss of £3,511 over this period; the probability of employment reduced until one and a half years after the event compared with pre-event levels, with a maximum difference one year after the event (0.7 percentage points lower).
- After a spontaneous miscarriage, earnings remained significantly lower five years after the event, compared with levels one year before the event, with a total loss of earnings of £4,101 over this period; the probability of employment returned to pre-event levels, after the largest reduction of 0.8 percentage points one year after the event.
- Following an ectopic pregnancy, earnings were lower for at least three and a half years after the event, with a total loss of £2,040 in this period; probability of employment had returned to pre-event levels one and a half years after the event, with the maximum difference occurring one year after the ectopic pregnancy (0.7 percentage points less).

This article deals with adverse pregnancy events, such as stillbirths, neonatal deaths, miscarriages and ectopic pregnancy. If you need support, please contact:

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The data used for this analysis are de-identified in a secure virtual environment before being combined and analysed. In line with the [Code of Practice for Statistics](#), the de-identified linked data is only used for statistical production and research. Read more in [Section 9: Data sources and quality](#).

2 . Effects of stillbirth on earnings and employment

Five years (Quarter 20) after a stillbirth, earnings were significantly reduced compared with a year before the event (baseline period), with a total loss of £13,581 over this period. There was a decrease of £252 per month in the quarter of the event, with a maximum average decrease during the follow-up period of £493 per month (Quarter 1). Please see [Section 9: Data sources and quality](#), for further details of our methodology.

There was a drop in the probability of employment up to two years following the stillbirth. In the quarter of the stillbirth, the probability of being employed dropped by 4.1 percentage points and then further to 4.8 percentage points in Quarter 2.

Among those in employment, we saw the same pattern with earnings remaining significantly lower five years after the event, with a total loss in earnings over this period of £14,039. There was a reduction in average earnings of £280 per month in the quarter of the stillbirth and a maximum average decrease of £593 per month in the quarter after the stillbirth, compared with the baseline period.

While we cannot identify the reasons for this loss in earnings, these data suggest that the effect on total earnings is mainly caused by:

- changes to employment status
- changes to pay because of moving to part-time work or a different type of employment

Figure 1: There is a sustained decrease in earnings for at least five years following a stillbirth compared with one year before the event

Changes in monthly employee earnings, the probability of being in paid employment and monthly employee earnings among people who are employed, compared with one year before a stillbirth, between 1 April 2014 and 31 December 2022, England

Notes:

1. Data include individuals who had a stillbirth between 1 April 2014 and 31 December 2022, who had no previous records of stillbirths, neonatal deaths, miscarriages, ectopic pregnancies or molar pregnancies and had not previously had a child.
2. Pay is gross monthly earnings paid to employees, in 2023 equivalent values.
3. We define being a paid employee as receiving a monthly pay greater than £0.
4. The error bars show 95% confidence limits.
5. Outcomes for each time period are compared with the one-year period before stillbirth, including the quarter when the stillbirth occurred.

3 . Effects of neonatal death on earnings and employment

Earnings were significantly reduced for almost five years (until Quarter 19) after a neonatal death, compared with the baseline period (a year before the neonatal death) with a total loss of £12,441 in earnings over this period. Earnings dropped on average by £253 per month in the quarter of the neonatal death, with a maximum relative average decrease in earnings, occurring in Quarter 2, of £481 per month.

The probability of being in employment was not significantly different two years after the neonatal death (Quarter 8). In the quarter of the neonatal death, the probability of being employed decreased by 4.2 percentage points and decreased further to 4.8 percentage points in Quarter 2.

For people in employment, earnings were significantly lower up to five years after the neonatal death with a total loss of £13,035 in earnings over this period. Earnings reduced relative to baseline by an average of £267 per month in the quarter of the neonatal death and reached a maximum average decrease of £564 per month in the quarter after the neonatal death (Quarter 2).

Figure 2: There is a sustained decrease in earnings up to five years after a neonatal death compared with one year before the event

Changes in monthly employee earnings, the probability of being in paid employment and monthly employee earnings among people who are employed, compared with one year before a neonatal death, between 1 April 2014 and 31 December 2022, England

Notes:

1. Data include individuals who had a neonatal death between 1 April 2014 and 31 December 2022, who had no previous records of stillbirths, neonatal deaths, miscarriages, ectopic pregnancies or molar pregnancies and had not previously had a child.
2. Pay is gross monthly earnings paid to employees, in 2023 equivalent values.
3. We define being a paid employee as receiving a monthly pay greater than £0.
4. The error bars show 95% confidence limits.
5. Outcomes for each time period are compared with the one-year period before the neonatal death, including the quarter when the neonatal death occurred.

4 . Effects of missed miscarriage on earnings and employment

Compared with one year before the event, earnings were significantly lower for women who had experienced a missed miscarriage until at least five years after the event, with a total loss of £3,511 in earnings over this period. Earnings reduced by an average of £49 per month in the quarter of the missed miscarriage, with a maximum relative average decrease of £72 per month two years after the missed miscarriage (Quarter 8).

Probability of being in work did not immediately reduce but decreased between Quarters 3 and 5 to a maximum of 0.7 percentage points (Quarter 4) and was not significantly different to pre-event levels by one and a half years after the event (Quarter 6).

Among those in work, earnings remained significantly lower until almost four and a half years after the event (Quarter 17) equivalent to a total loss in earnings of £3,146 over this period. In the quarter of the missed miscarriage, earnings reduced on average by £68 per month. By one and a half years (Quarter 6) after the missed miscarriage, earnings decreased by a maximum average of £75, relative to the baseline period.

Figure 3: There is a sustained decrease in earnings for at least five years following a missed miscarriage compared with one year before the event

Changes in monthly employee earnings, the probability of being in paid employment and monthly employee earnings among people who are employed, compared with one year before a missed miscarriage, between 1 April 2014 and 31 December 2022, England

Notes:

1. Data include individuals who had a missed miscarriage between 1 April 2014 and 31 December 2022, who had no previous records of stillbirths, neonatal deaths, miscarriages, ectopic pregnancies or molar pregnancies and had not previously had a child.
2. Pay is gross monthly earnings paid to employees, in 2023 equivalent values.
3. We define being a paid employee as receiving a monthly pay greater than £0.
4. The error bars show 95% confidence limits.
5. Outcomes for each time period are compared with the one-year period before the missed miscarriage, including the quarter when the missed miscarriage occurred.

5 . Effects of spontaneous miscarriage on earnings and employment

Following a spontaneous miscarriage, earnings significantly reduced for at least five years after the event, compared with one year prior to the event, totalling a loss in earnings of £4,101 over this period. In the quarter of the event, earnings dropped by an average of £67 per month with a maximum average relative reduction of £83 per month just over two years after the event (Quarter 9).

The probability of being in work reduced until one and a half years (Quarter 6) after a spontaneous miscarriage, when the difference to the baseline period became non-significant. In the quarter of the event, there was a reduction in the probability of being in work by 0.4 percentage points, with a maximum decrease of 0.8 percentage points one year after the event.

There was a significant reduction in earnings among those in employment on average until almost five years (Quarter 19) after the spontaneous miscarriage, totalling a loss in earnings of £3,567. In the quarter of the event, there is a maximum average reduction in earnings of £81 per month, and this reduction was sustained at around £73 per month on average, until around two years after the event (Quarter 8), compared with the baseline period.

Figure 4: There is a sustained decrease in earnings for at least five years following a spontaneous miscarriage compared with one year before the event

Changes in monthly employee earnings, monthly employee earnings among people who are employed and the probability of being in paid employment, compared with one year before a spontaneous miscarriage, between 1 April 2014 and 31 December 2022, England

Notes:

1. Data include individuals who had a spontaneous miscarriage between 1 April 2014 and 31 December 2022, who had no previous records of stillbirths, neonatal deaths, miscarriages, ectopic pregnancies or molar pregnancies and had not previously had a child.
2. Pay is gross monthly earnings paid to employees, in 2023 equivalent values.
3. We define being a paid employee as receiving a monthly pay greater than £0.
4. The error bars show 95% confidence limits.
5. Outcomes for each time period are compared with the one-year period before the spontaneous miscarriage, including the quarter when the spontaneous miscarriage occurred.

6 . Effects of ectopic pregnancies on earnings and employment

Following an ectopic pregnancy, there was a significant reduction in earnings for up to three and a half years (Quarter 14) after the event, compared with the baseline period, totalling a loss in earnings of £2,040 over this period. There was a maximum average reduction in earnings by £64 per month in the quarter of the ectopic pregnancy.

There was a reduction in the probability of employment one year and a quarter after the ectopic pregnancy (Quarter 5). There was a maximum reduction in the probability of employment by 0.7 percentage points one year after the ectopic pregnancy.

Among those in work, there was a significant reduction in earnings up to three years (Quarter 12) following an ectopic pregnancy, totalling a loss of £1,885 in earnings over this period. There was a maximum average reduction in earnings of £85 per month in the quarter of the ectopic pregnancy, relative to the baseline period.

Figure 5: There is a sustained decrease in earnings for three and a half years following an ectopic pregnancy compared with one year before the event

Changes in monthly employee earnings, the probability of being in paid employment and monthly employee earnings among people who are employed, compared with one year before an ectopic pregnancy, between 1 April 2014 and 31 December 2022, England

Notes:

1. Data includes individuals who had an ectopic pregnancy between 1 April 2014 and 31 December 2022, who had no previous records of stillbirths, neonatal deaths, miscarriages, ectopic pregnancies or molar pregnancies and had not previously had a child.
2. Pay is gross monthly earnings paid to employees, in 2023 equivalent values.
3. We define being a paid employee as receiving a monthly pay greater than £0.
4. The error bars show 95% confidence limits.
5. Outcomes for each time period are compared with the one-year period before the ectopic pregnancy, including the quarter when the ectopic pregnancy occurred.

7 . Data on the impact of adverse pregnancy events on monthly employee earnings and employment, England

[The impact of adverse pregnancy events on monthly employee earnings and employment, England](#)

Dataset | Released 11 June 2025

Estimates of changes in monthly employee earnings and employment status attributable to an adverse pregnancy event compared with one year prior to the event.

8 . Glossary

Calendar quarters

Quarters are defined as periods of three calendar months. Each quarter covers the months January to March, or April to June, or July to September, or October to December.

Ectopic pregnancy

An ectopic pregnancy is when a fertilised egg implants itself outside of the womb. Please find more information on the [NHS's Ectopic pregnancy web page](#).

Fixed effect regression

A fixed effects regression model is a statistical model that can be applied to panel data, where there are multiple measurements per individual. Please find more information in our [bulletin on The Impact of bariatric surgery on monthly employee pay and employee status, England: April 2014 to December 2022, Section 4: Glossary](#).

Miscarriage

A spontaneous miscarriage is defined as the loss of a baby up to 23 weeks and six days pregnant. Please find more information on the [NHS's Spontaneous miscarriage web page](#).

A missed miscarriage is defined as a miscarriage that occurs but without symptoms of a miscarriage, such as bleeding or pain. It is often discovered during a routine ultrasound scan in antenatal care. Please find more information on the [Tommy's Pregnancy and baby charity Missed miscarriage web page](#).

In this analysis we look at spontaneous and missed miscarriages separately.

Molar pregnancy

A molar pregnancy is when there is a problem with a fertilised egg and the baby and placenta do not develop as they should. Please find more information on the [NHS's Molar pregnancy web page](#).

Neonatal death

A neonatal death is when a baby dies within 28 days of being born. Please find more information on the [Tommy's Pregnancy and baby charity neonatal death web page](#).

Stillbirth

When a baby dies before or during labour after 24 weeks of pregnancy it is known as a stillbirth. Please find more information on the [Tommy's Pregnancy and baby charity stillbirth web page](#).

9 . Data sources and quality

We used fixed effects regression modelling to estimate average changes in monthly employee earnings and probability of being a paid employee that are attributable to experiencing different adverse pregnancy events: stillbirth, neonatal death, missed miscarriage, spontaneous miscarriage, ectopic pregnancy and molar pregnancy. For definitions of fixed effect modelling and adverse events, see [Section 8: Glossary](#).

We estimated the average change in monthly employee earnings for everyone in the sample and only among those in work, and the probability of being in employment. Change in monthly employee earnings includes pay equalling £0, whereas pay among those in employment only includes months where pay was greater than £0. For all analyses, earnings and probability of employment in a quarter were compared with one year before the event for each event type.

Further analysis, including descriptive statistics, sociodemographic breakdowns by event type and longer follow-up periods (up to 8.5 years after an event) can be found in our [accompanying dataset](#). The dataset also contains results for molar pregnancies, which are not included in the main article because of low event counts and high levels of statistical uncertainty.

Linked datasets

We used an extension of the Public Health Data Asset (PHDA) to include data on employee earnings. The de-identified, linked panel dataset includes data from:

- Census 2011
- Hospital Episode Statistics (HES) Admitted Patient Care and Outpatient records from the National Health Service (NHS) from 1 April 2009 to 31 December 2022
- HES Accident and Emergency records from the National Health Service (NHS) from 1 April 2009 to 31 March 2020
- Office for National Statistics (ONS) death registrations, covering deaths registered from 1 April 2014 to 31 December 2023 and occurring up to 31 December 2022
- ONS birth registrations, covering births registered from 1 April 2014 to 31 December 2023 and occurring up to 31 December 2022
- Pay As You Earn (PAYE) Real-Time information (RTI) records from HM Revenue and Customs (HMRC) covering 1 April 2014 to 31 December 2022

We describe the data security processes we use in our National Statistical blog, [Using the power of linked data to understand factors preventing people from working](#). Information on how and why we de-identify the datasets used in this analysis is described in our [October 2024 article on bariatric surgery](#). Ethical approval for this work was provided by the [National Statistician's Data Ethics Advisory Committee](#).

We linked Census IDs to HMRC records via the [Demographic Index \(PDF, 549KB\)](#). The approach to linkage and achieved linkage rates are available in our [2011 Census linkage methodology](#). Census ID was linked to the HES, births and death registration datasets using the Patient Registers (PR) 2011 to 2013. For inclusion in the study dataset, individuals were required to have a census record in 2011 that could be linked to NHS and HMRC information.

The PAYE data were calendarised, in line with the methods described in our [Monthly earnings and employment estimates methodology](#), to derive monthly employee earnings. More information can be found in our [Explaining income and earnings: important questions answered methodology](#). Where an individual had a Census ID linking to multiple monthly PAYE records, earnings were summed across all matching records for each month.

Negative monthly employee earnings records were imputed to be zero. Monthly employee earnings above the 99% centile were set to the value at the 99% centile. Monthly employee earnings were deflated to 2023 prices using our [Consumer Price Index including owner occupier's housing costs \(CPIH\) dataset](#). Being a paid employee was defined as receiving monthly earnings greater than £0.

Inclusion criteria

Individuals were included if they had a record of a miscarriage, ectopic pregnancy, molar pregnancy, or other non-viable pregnancy in HES between 1 April 2014 and 31 December 2022. The [International Classification of Diseases: ICD-10 codes from Chapter XV](#) used to identify these events are listed in our [accompanying dataset](#). Where there were multiple records for one person, records were ordered chronologically and any events within 35 days of a prior event were removed.

Individuals were included if they had a record of a stillbirth in birth registrations or a record of a neonatal death in death registrations between 1 April 2014 and 31 December 2022.

Birth registrations were then linked to the adverse events cohorts to obtain the date of any prior or subsequent live births. Death registrations were also linked to the adverse events cohorts to infer whether the individual died during the study period.

For all individuals, if there was more than one adverse event (across all types of events in this study) the earliest event was analysed. If individuals had a live birth prior to an adverse event, they were removed from the study sample. Earnings were aggregated from monthly level to quarterly level. Quarters were removed from the analysis if they included or followed a subsequent live birth, death of the individual, or a second adverse event (of any type in this study).

Sociodemographic information was linked to these individuals from the 2011 Census. The cohort was restricted to females aged 23 to 60 years at the time of their adverse event, who were ordinarily resident in England, and who were aged 21 to 64 years in the study period. We included 147,131 people in our sample.

We included data from people who had not experienced any of the adverse pregnancy events in this study and not given birth previously to account for changes in labour market outcomes over calendar time (reflecting changes in background economic conditions) and individuals' age (as individuals' earnings and likelihood of working tend to vary throughout their working lives). This cohort was restricted to females aged 21 to 64 years during the study period, who were ordinarily resident in England. We took a 25% representative sample of this cohort, which contained 214,628 people.

Quality

The quality of PHDA and HMRC PAYE datasets are described in our bulletin on [The impact of bariatric surgery on monthly employee pay and employee status, England: April 2014 to December 2022 bulletin, Section 5: Data sources and quality](#).

Strengths and limitations

The PHDA is a population-level dataset for England. Of the 50,585,645 individuals with a non-imputed record in the 2011 Census, and resident in England at the time of the 2011 Census, 94.4% (47,729,962) could be linked to both NHS and HMRC information.

The PAYE data cover employees only, therefore self-employed people are recorded as earning £0 and categorised as "not a paid employee" for the purposes of this analysis (approximately 13% of working people are self-employed rather than employees, as recorded in our [Employees and self-employed by industry dataset](#)). People who are employed but not currently earning (for example, on maternity leave and not receiving maternity pay) are also categorised as "not a paid employee".

We did not have reliable data on hours worked. Therefore, we were unable to distinguish changes in hours worked from changes in hourly pay. We were also not able to distinguish sick pay, or other non-regular pay including maternity pay, from regular pay, so we could not investigate the effects of an adverse event on changes to working hours or pay structures.

Many people who experience a miscarriage receive primary healthcare services or do not seek medical treatment. These cases will not be represented in HES and as such, a proportion of miscarriages are likely to be excluded from our analysis. Our findings in relation to miscarriage may therefore not be generalisable to individuals who did not receive hospital care.

Acknowledgments

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10 . Related links

[Using the power of linked data to understand factors preventing people from working](#)

Blog | Released 1 October 2023

Emma Rourke explains how linked, population-level data can improve our understanding of the interplay between health and work, with the goal of improving the well-being of individuals and the economy.

[Labour market overview, UK](#)

Statistical bulletin | released 13 May 2025

Estimates of employment, unemployment, economic inactivity and other employment-related statistics for the UK.

[The impact of bariatric surgery on monthly employee pay and employee status, England: April 2014 to December 2022](#)

Article | Released 23 October 2024

The change in monthly employee pay and employee status attributable to having had bariatric surgery, in different time periods after surgery, compared with six months before surgery.

[The impact of NHS Talking Therapies on monthly employee pay and employment status, England: April 2014 to December 2022](#)

Statistical Bulletin | Released 9 December 2024

The change in monthly employee pay and employee status attributable to completing NHS Talking Therapies treatment in different time periods after therapy, compared with one year before first therapy.

[The impact of an endometriosis diagnosis on monthly employee pay and employee status, England: April 2016 to December 2022](#)

Statistical Bulletin | Released 5 February 2025

The change in monthly employee pay and employee status after an endometriosis diagnosis in an NHS hospital, compared with the two years prior to diagnosis.

11 . Cite this statistical bulletin

Office for National Statistics (ONS), released 11 June 2025, ONS website, statistical bulletin, [The impact of adverse pregnancy events on monthly employee earnings and employment, England: April 2014 to December 2022](#)