Office for National Statistics

Statistical bulletin

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

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.

Contact:
Health Research Group
Health.Data@ons.gov.uk
+44 1329 444110

Release date:
5 February 2025

Next release:
To be announced

Table of contents

1 . Main points

- Endometriosis is a chronic gynaecological condition that has physical, psychological, social, and economic impacts; however, there has been no population-level analysis of the labour market impacts of this condition in England.
- There was a statistically significant average decrease in monthly earnings among women aged 25 to 54 years in England who received a diagnosis of endometriosis between April 2016 and December 2022, from one to five years after diagnosis, compared with the two-year period before being diagnosed with the condition.
- Among all women in the dataset, including both paid employees and those not in paid employment, monthly pay initially dropped on average in the first three months post-diagnosis, then returned to pre-diagnosis levels from 4 to 12 months; afterward, pay decreased on average each year, reaching a £130 monthly reduction in the four to five years post-diagnosis compared with the two years before diagnosis.
- Among those in paid work, monthly pay decreased on average from one to five years after the condition was identified, compared with the two years prior, reaching an average decrease of £56 per month in the four to five years post-diagnosis; this suggests that, following the diagnosis, women in work may be taking lower-paying jobs or working fewer hours.
- The probability of being a paid employee statistically significantly decreased after an endometriosis diagnosis, decreasing by 2.7 percentage points in the four to five years post-diagnosis, compared with the two years before diagnosis.

All the datasets used for this analysis have been de-identified in a secure virtual environment before they are combined and analysed. In line with the **Code of Practice for Statistics**, the de-identified linked data will only be used for statistical production and research. Read more in **Section 5: Data sources and quality**.

2 . Results of the analysis

We used fixed effects regression models to estimate average changes in employee pay and probability of being in employment, which are attributable to being diagnosed with endometriosis among women aged 25 to 54 years in England. Outcomes were estimated at different time periods after diagnosis of endometriosis in an NHS hospital, compared with the two-year period before the month of diagnosis.

Average change in monthly employee pay was first estimated for the whole sample, and then among only those in paid work. We accounted for changes in labour market outcomes over calendar time (reflecting changes in background economic conditions), individuals' ages (as individuals' pay and likelihood of working tend to vary throughout their working lives) and births (as births can have a substantial effect on pay and employment) over the follow-up period.

The main results are shown in Figure 1. Further analysis, including estimates stratified by age group, ethnic group, Index of Multiple Deprivation (IMD) quintile group and region can be found in our accompanying dataset.

Figure 1: There was a sustained average decrease in monthly employee pay and probability of being a paid employee up to five years after endometriosis diagnosis, compared with the two years before diagnosis

Changes in monthly employee pay and the probability of being a paid employee, with time since endometriosis diagnosis, compared with the two-year period before diagnosis, among 25- to 54-year-olds who were diagnosed with endometriosis in an NHS hospital between 1 April 2016 and 31 December 2022, England

Notes:

1. Data include women who had a primary diagnosis of endometriosis in an NHS hospital between 1 April 2016 and 31 December 2022, aged 25 to 54 years at the time of diagnosis and resident in England.
2. The bar plotted from month 0 to 1 is the month in which the diagnosis of endometriosis occurred.
3. The error bars are 95% confidence intervals.
4. Pay is gross monthly earnings paid to employees, in 2023 equivalent values.
5. Being a paid employee is defined as receiving a monthly pay greater than £0.

Download the data

Downloac

3 . Data on the impact of an endometriosis diagnosis on monthly employee pay and employee status in England

The impact of an endometriosis diagnosis on monthly employee pay and employee status, England
Dataset | Released 5 February 2025
Descriptive statistics and model estimates for the change in monthly employee pay and employee status attributable to having had an endometriosis diagnosis in an NHS hospital between April 2016 and December 2022, compared with the two-year period before diagnosis. Includes breakdowns by age group, ethnic group, Index of Multiple Deprivation (IMD) quintile group and region.

4 . Glossary

Endometriosis

Endometriosis is a condition where endometrial tissue, similar to the lining of the uterus, grows in other places, such as the ovaries and fallopian tubes. Common symptoms include chronic pelvic pain, fatigue, heavy menstrual bleeding, pain during or after sex, painful urination and bowel movements, and reduced fertility, as described in the Nature Reviews Endometriosis article. Endometriosis usually affects women during their reproductive years (between menarche and menopause), but can affect women of any age, as described by the Royal College of Nursing in their What is Endometriosis publication. Read the NHS Endometriosis information page for more information.

95% confidence intervals

A confidence interval (CI) is a measure of the uncertainty around a specific estimate. If a CI is calculated at the 95% level, it is expected that the interval will contain the true value on 95 occasions, if repeated 100 times. The level of uncertainty about where the true value lies increases as intervals around estimates widen. More information is available on our Uncertainty and how we measure it for our surveys web page.

Fixed effects regression models

A fixed effects regression model is a statistical model that can be applied to panel data, where there are multiple measurements per individual.

Within the fixed effects model, an individual's labour market status in any time period is compared with their own previous status. This means that all sources of time-invariant confounding (the effect of factors that do not change over time and that influence both the likelihood of diagnosis and labour market status) are implicitly controlled for.

Sources of time-varying confounding (such as calendar time, ageing and births) are accounted for by including them as additional terms in the fixed effects regression model. Confidence intervals are calculated using clustered standard errors to account for correlation between the measurements for each individual.

5 . Data sources and quality

Linked dataset

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

- Census 2011
- Hospital Episode Statistics (HES) Admitted Patient Care (APC) records from 1 April 2009 to 31 December 2022
- Office for National Statistics (ONS) birth registrations, covering 1 January 2010 to 31 December 2022
- Office for National Statistics (ONS) death registrations, covering deaths occurring from 1 April 2016 to 31 December 2022 and registered by 31 December 2023
- 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 have previously described the data security processes we employ in our blog post, Using the power of linked data to understand factors preventing people from working.

All the datasets used for this analysis have been de-identified so no individual's attribute information can ever be directly identified from the data held by the ONS. This is because information that can be used to directly identify individuals such as names, addresses and NHS numbers have been removed in a secure virtual environment before the datasets are combined and analysed. In line with the Code of Practice for Statistics, the de-identified linked data will only be used for statistical production and research; it cannot be used for operational purposes, such as making decisions over individuals' access to healthcare or benefits. More information on the use of data at the ONS can be found in our Sources of Data article. Ethical approval for this work was provided by the National Statistician's Data Ethics Advisory Committee.

Census ID was linked to HMRC records via the Demographic Index (PDF, 550KB). We have published a report detailing this in our 2011 Census linkage to DWP master key and encrypted NINo methodology. Census ID was linked to the HES, birth and death registration datasets using the Patient Register (PR) 2011 to 2013. For inclusion in the study dataset, individuals were required to have a 2011 Census record 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 from Pay As You Earn Real Time Information (PAYE RTI) data methodology, to derive monthly employee pay (gross earnings). Where an individual had a Census ID linking to multiple monthly PAYE records, pay was summed across all matching records for each month.

Negative monthly pay records were imputed to be zero, and monthly pay above the 99.9% centile was set to the value at the 99.9% centile. Monthly pay was deflated to 2023 prices using the Consumer Price Index including owner occupier's housing costs (CPIH). Being a paid employee was defined as receiving a monthly pay greater than £0.

Data inclusion criteria

We used International Classification of Diseases, Tenth Revision (ICD-10) codes N80.0 to N80.9 to identify endometriosis diagnoses using the HES APC data (see our accompanying dataset for specific codes used). Each HES record includes up to 20 diagnosis values, as outlined in NHS England's HES Data Dictionary. The first value (primary diagnosis) records the main condition being treated or investigated during the episode. The other values record any relevant secondary or subsidiary diagnoses.

Individuals were included if they had a record of an endometriosis diagnosis in the HES APC data between 1 April 2016 and 31 December 2022, with endometriosis recorded as the primary diagnosis. Where there were multiple qualifying records for an individual, the earliest record was taken. Individuals were excluded if they had a record for prior endometriosis diagnosis, recorded as either a primary or secondary diagnosis, between 1 April 2009 and 31 March 2016.

Sociodemographic information was linked to these individuals from the 2011 Census. The sample was restricted to 55,290 individuals who were:

- Enumerated in the 2011 Census
- Resident in England, as recorded in HES if available and the 2011 Census if not
- Aged 25 to 54 years on the date of endometriosis diagnosis
- Recorded as being female in both HES and the 2011 Census
- Had no primary or secondary diagnosis of endometriosis in the HES APC data between 1 April 2009 and 31 March 2016
- Linked to NHS and HMRC information

Follow-up

Individuals were followed-up for a maximum of two years pre-diagnosis and five years post-diagnosis, between 1 April 2014 and 31 December 2022. Follow-up time was censored at time of death, if applicable.

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 receiving £0 pay 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 the Labour Force Survey). People who are employed but not currently receiving pay (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 from regular pay, so we could not investigate the effects of an endometriosis diagnosis on long-term sickness absence.

Acknowledgements

This analysis was produced in collaboration with:

- University of Leicester
- University of Exeter
- Department of Health and Social Care

This project was funded by the UK Government's Labour Markets Evaluation and Pilots Fund (2024 to 2025).

6 . Related links

Characteristics of women with an endometriosis diagnosis in England - Office for National Statistics
Statistical bulletin | Released 10 December 2024
A population-level analysis of the characteristics of women receiving an endometriosis diagnosis in an NHS hospital in England between 2011 and 2021.

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 wellbeing of individuals and the economy.

Labour market overview, UK
Statistical bulletin | Released 21 January 2025
Estimates of employment, unemployment, economic inactivity and other employment-related statistics for the UK.

Rising ill-health and economic inactivity because of long-term sickness, UK: 2019 to 2023
Article | Released 26 July 2023
Experimental statistics estimating the different health conditions of the working-age population and those economically inactive because of long-term sickness.

7 . Cite this statistical bulletin

Office for National Statistics (ONS), released 05 February 2025, ONS website, bulletin, The impact of an endometriosis diagnosis on monthly employee pay and employee status, England: February 2025