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The Gendered Landscape of Informal Caregiving: Cohort Effects and Socioeconomic Inequalities in England.

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Abstract

We provide the first detailed cohort analysis to investigate both the effect of individual-level poverty and meso-level deprivation on the gender care gap, highlighting how individual circumstances and place shape caregiving provision. Using data from the UK Household Longitudinal Study (N =40,324), we apply two complementary approaches: (i) multilevel mixed-effect logistic regression to provide detailed age cohort analysis of the probability of providing informal care by sex, accounting for the nested data structure; and (ii) Multilevel Analysis of Individual Heterogeneity and Discriminatory Accuracy (MAIHDA) to examine whether the factors that shape the probability of providing care have additive or multiplicative reinforcing effects.

Results reveal a clear age pattern in caregiving, peaking between ages 60–70 before declining, with earlier-born cohorts showing higher caregiving likelihood at the same ages compared to later-born cohorts. The gender care gap is most pronounced among middle-born cohorts (1969–1978, 1959–1968, and 1949–1958), particularly between ages 50 and 60. Both poverty and geographic deprivation significantly shape gendered caregiving inequalities: the gender care gap is wider among individuals above the poverty line and in deprived local authority districts. The caregiving likelihood is primarily driven by the independent effects of cohort, gender, poverty, and meso-level deprivation, with limited evidence of multiplicative intersectional effects.

These findings demonstrate that the gender care gap is not a uniform phenomenon. Policy attempts to address the gender care gap need to be mindful of these variations, not least because they potentially elucidate the potential sources of gender inequalities in care.

Introduction

Informal (unpaid) carers are vital to long-term care systems internationally, providing essential support to sick, disabled, or older people without formal compensation (Humphries 2023). In England, austerity measures and cuts to long-term care budgets have increased the pressure on carers (Brimblecombe et al., 2018), where over 4.6 million people now provide informal care. The support they provide to relatives, friends, and neighbours is worth an estimated £151 billion, equivalent to the National Health Service (NHS) budget and approximately four times the amount of state-supported long-term care services (Petrillo and Bennett 2023). Informal care is also at the heart of gender inequality (Ferrant et al. 2014). Women disproportionately take on caregiving responsibilities (Swinkels et al., 2019; Cascella Carbó and García-Orellán, 2020; Petrillo and Bennett, 2023; Carr et al., 2018) across all stages of life (Glaser et al., 2013; Grigoryeva, 2017; Patterson and Margolis, 2019). This gendered division of caregiving is deeply rooted in societal expectations and cultural norms that associate caregiving with women, a norm internalised by both genders that creates a self-reinforcing cycle of caregiving inequality (Ophir and Polos, 2022; Glauber, 2017).

An Age-Cohort Approach to the Gender Care Gap

In recent decades, sociodemographic shifts have reshaped caregiving trajectories for both women and men, raising important questions about the future of informal care supply and the persistence of the gender care gap. The 2021 Census reveals that the population of England and Wales has aged further since 2011, with those aged 65 and over increasing from 16.4% (9.2 million) in 2011 to 18.6% (over 11 million) in 2021. (Office for National Statistics, 2023a). Meanwhile, the total fertility rate continued to decline, with women today more likely than their mothers' generation to be childless or to have only one child (Office for National Statistics, 2024a). These trends, alongside later-life marriages and changing family structures (Office for National Statistics, 2024b), have far-reaching consequences for inter-cohort relations, raising pressing questions about the sustainability of informal care arrangements and the long-term care systems that rely on informal carers. With fewer adult children available to care for ageing parents and the duration of care needs extending, the tension between rising care demands and the

shrinking supply of informal caregivers within families is becoming critical (Ophir and Polos,2022; Agree and Glaser, 2009).

The first research question the current study seeks to address is how gender differences in informal care vary by age and across cohorts. Middle-aged adults (46–65) currently represent the largest share of informal carers, followed by older adults aged 66+, while younger groups (31-45 and 15-30) are less likely to take on caregiving roles (Petrillo et al., 2023). This pattern reflects cohort-specific experiences and opportunities, which may themselves be changing. For younger adults, caring responsibilities can disrupt early career development at a time when opportunities for education and training are crucial for long-term financial stability (Becker and Becker 2008; Brimblecombe et al., 2020; D'Amen et al, 2021). As women from later-born cohorts gain access to university education, they may become more likely to enter and remain in the labour market, potentially reducing their availability to provide informal care and increasing their labour supply along both the extensive and intensive margins. Middle-aged adults, often referred to as the "sandwich generation", as they are more likely to be sandwich carers – simultaneously responsible for caring for their children and ageing parents (Grundy and Henretta 2006; Vlachantoni et al, 2019). As individuals transition into retirement, caregiving tends to decline, partly because they may become care recipients themselves, face health limitations, or experience the loss of the person they had been caring for. However, the weight of demographic changes and cohort-driven pressures is not evenly distributed. Women remain the primary informal caregivers and, therefore, are more exposed to the consequences of these changes (Pickard, 2015). For instance, the pressure of providing both upward and downward intergenerational care is especially acute for women in midlife, particularly in later-born cohorts. However, higher labour market participation and increased divorce rates among women in earlier-born cohorts may be shifting this picture, for example, by alleviating their duties to care for in-laws. In contrast, male caregiving responsibilities typically emerge in later life, often after retirement, when they reallocate time from full-time work to spousal care (Kahn, McGill, and Bianchi, 2011; OECD, 2011; Zhang and Bennett, 2024). It remains unclear, however, whether this trend persists in later generations of men who are faced with a higher statutory retirement age. This dynamic is reinforced by the "gender health paradox," whereby women live longer than men but often in poor health, increasing their likelihood of both providing and needing care in old age (Rodrigues et al., 2023). While there is some evidence of narrowing gender gaps in later life due to increased male involvement in spousal care (Glauber, 2017; Hist, 2001), a pronounced gender care gap persists across most of the life course (Ophir

& Polos, 2022), albeit with only limited knowledge of how that gap may evolve across cohorts (Rodrigues et al, 2023).

Gender Care Gap and Poverty

A second key research question for our study is how the gender care gap intersects with poverty. The growing demand for informal caregiving comes with significant financial hardships for many carers. In the UK, 1.2 million informal carers live in poverty, with the poverty rate among unpaid carers being 50% higher than in the general population, highlighting the severe economic pressure associated with caregiving responsibilities (Wyjadlowska et al., 2024). This risk of financial hardship is worsened among those with intensive caregiving roles[1] (Thompson, S., 2024), as they often struggle to combine caregiving with employment (He & McHenry, 2016; Mazzotta, Bettio, & Zigante, 2020). In the UK, approximately 1.9 million people combine their caring roles alongside employment (Petrillo, Bennett and Pryce, 2023). Informal carers frequently experience income loss, reduced work hours, and difficulties maintaining employment (Carr et al., 2018; Jacobs et al., 2019; Longacre et al., 2017) as they may require more flexible work arrangements, which can be challenging to secure. Coupled with a lack of a support system or resources to help informal caregivers combine caregiving with employment, this may lead caregivers to prioritise caregiving over their work commitments (Lilly et al., 2007; Keating et al., 2014). Earlier studies (i.e. focusing on the experiences of women in earlier-born cohorts) showed that women were more likely than men to self-select into part-time or flexible roles or leave employment altogether when unable to find a balance (Dunham and Dietz, 2003; Dentinger and Clarkberg, 2002; Ettner, 1996). Currently, many women are still confronted with lower opportunity costs for care due to lower wages and employment opportunities. Caregiving adds to the inequality because informal care itself reduces relative income, and more so for women than men (Petrillo et al. 2024). Consequently, women often face long-term economic disadvantages, including lower lifetime earnings and reduced pension entitlements (Van Houtven et al., 2013; Gomez-Leon et al., 2019). These impacts are especially critical for middle-aged women (Mentzakis, McNamee, & Ryan, 2009; Nizalova, 2012; He and McHenry, 2016) and women with lower education (Rodrigues and Ilinca, 2021). This means that they are disproportionately affected by the intersection of caregiving responsibilities and employment challenges and are less able to outsource the former. Taken

[1] Intensive caregiving roles are characterized by extensive involvement in providing unpaid care, typically requiring at least 20 hours per week, and encompassing complex, multifaceted support for individuals with significant health or disability needs.

together, this means that women with limited access to economic opportunities are more likely to continue as caregivers even among later-born cohorts.

Gender Care Gap and Geographic Inequalities

Our third research question is how the gender care gap interacts with meso-level deprivation. Geographical context is potentially important as caregivers in socioeconomically deprived Local Authority Districts (LADs) often experience intensified pressures due to limited access to formal care, poorer health outcomes, increased social isolation and greater unemployment rates (Office for National Statistics, 2022; Laxton et al., 2024). In contrast, caregivers in economically prosperous areas may secure employment and a higher wage that better accommodate caregiving responsibilities (He and McHenry, 2016), thereby lessening the impact of caregiving on their livelihoods. Geographical disparities in caregiving are evidenced from Census data. In England, the rate of informal carers is 10.1% in the most deprived LADs compared to 8.1% in the least deprived (Office for National Statistics, 2023b). Those living in the most deprived local authorities are also more likely to provide more intensive levels of care, with 4.0% providing over 50 hours of care per week, compared to just 1.9% in the least deprived local authorities (Office for National Statistics, 2023b), with intense caregiving more likely to fall on women. The most deprived LADs are also more likely to have limited economic opportunities for employment, and this is likely to disproportionately affect women in those areas. These geographical disparities underscore the crucial role that location plays in shaping inequalities in the experience and opportunity of caregiving, as those in deprived local authorities often face compounded pressures from two phenomena: higher caregiving demands and fewer resources and formal services to support their caregiving roles. Additionally, the devolution of health and social care decision-making (NHS Confederation, 2024) further complicates this landscape; while a localised approach can help address regional disparities and better target care services, it also creates variability in service provision and resource distribution, potentially exacerbating existing inequalities among caregivers across time and cohorts.

The current study

We employ two analytical strategies to answer our research questions using nationally representative panel data of 40,324 individuals across 308 Local Authority (Local Authority District code for England as of December 2021) from 2009 to 2021 in England. We use this data to explore how the gender gap among informal caregivers has evolved across different cohorts over time in England. First, we implement a

multilevel mixed-effect logistic regression analysis to investigate both the effect of individual-level poverty and meso-level deprivation on the gender care gap, highlighting how individual circumstances and geographical location combine to explain variations in caregiving provision. To our knowledge, this is the first time such methods have been applied to UK data to provide detailed cohort analysis, and the first to examine the effects of poverty and meso-level deprivation within this framework. Second, we use a Multilevel Analysis of Individual Heterogeneity and Discriminatory Accuracy (MAIHDA) to develop a nuanced understanding of how the intersectional effects of gender, age cohort, individual poverty and meso-level deprivation shape inequalities in the provision of informal care.

Hypotheses

We expect women to be more likely than men to provide care during midlife, but we hypothesise that this difference will diminish in later-born cohorts due to the erosion of traditional gender roles and increased employment opportunities for women across generations (H1).

We expect individual-level poverty to increase the likelihood of providing informal care (H2). Our intuition is that: (i) individuals with limited financial resources will face greater barriers to formal care, and (ii) those on low wages will face lower opportunity costs of caregiving.

Alongside the impacts of individual-level poverty, we expect there to be meso-level deprivation effects. We anticipate higher rates of caregiving in geographically deprived local authorities, where there are fewer employment opportunities and more limited formal care provision (H3).

Because women are more likely to take on caregiving roles, they are also more likely to be adversely affected by both poverty and area effects, which are likely to intensify the gender divide in caregiving. We therefore hypothesise that women will be disproportionately affected by poverty (H4a) and meso-level deprivation effects (H4b).

In the empirical sections below, we explore how the size of the effects proposed by hypotheses H2, H3 and H4 varies across cohorts. Does the hypothesised positive association between individual-level poverty and caregiving (H2) become more or less pronounced for later cohorts? Do we find a similar cohort effect for meso-level deprivation effects (H3)? Is the impact of individual-level poverty and meso-level deprivation on gendered inequalities (H4a and H4b) larger or smaller for more recent cohorts?

Finally, we examine the intersectionality of these effects. We hypothesise that the intersection of sex, age cohort, individual poverty, and meso-level deprivation produces compounded and unequal caregiving outcomes, which cannot be fully explained by the additive effects of each factor alone (H5). The intuition is that we would expect different dimensions of disadvantage to interact and reinforce each other. This will create an overall effect that is larger than the sum of the parts.

Data and Sample Selection

We use geocoded data from the UK Household Longitudinal Study (UKHLS), a nationally representative individual and household panel study, spanning from wave 1 to 12 (years 2009-2021). This data source enables us to capture longitudinal information on people's lives and caregiving activities, and to merge that information with data on where people live to understand the role of contextual-level effects in addition to individual-level effects.

Our analytical sample contains two restrictions. Firstly, people living in England who entered the UKHLS sample for the first time in the first, second or third wave, and who participated in at least two panel waves overall. Secondly, cases with missing values for the dependent and key explanatory variables are dropped from our sample. Once these restrictions are considered, approximately 31.3% of the original full sample is excluded, resulting in a final analytical sample of 270,275 observations and 40,324 individuals.[2].

The sample was grouped into seven birth cohorts spanning 10-year intervals (with the exception of the first and last cohorts, due to the small sample sizes for those groups[3]).

- 1908-1938
- 1939-1948
- 1049-1958
- 1959-1968
- 1969-1978

[2] Starting with 393,357 observations from waves 1–12 in England, individuals who did not join the survey in waves 1–3 and were observed for only two waves or fewer were excluded (61,451 observations removed). An additional 61,632 observations were excluded due to missing information on carer status, sex, or cohort, resulting in a final analytical sample of 270,274 observations and 40,324 individuals

[3] For more insights on the sample size please refer to Supplementary Information Table S.1.

- 1979-1988
- 1989-2006

The details of the selected sample characteristics across Waves 1-12 (2009-2021) for each cohort considered are described in Table S.1[4].

Measures

Outcome variable: Caregiving status

The dependent variable is a binary variable indicating whether an individual is an informal carer, defined as providing informal care or special assistance to sick, disabled, or older individuals, whether residing within or outside their own household[5]. In the main analysis, no distinction is made by time intensity or by caregiving role. A breakdown by hours of caregiving is provided in the Supplementary Information.

Individual Level Poverty

We compute the poverty line at 60% of the median household income (no deduction costs), equalised using the McClements Scale equivalence to reflect the proportion of households earning less than a substantial fraction of the typical income (indicating relative individual-level poverty) (McClements, 1977).

Meso-level Deprivation

Geographical information on the location (Local Authority Districts) of the participants in UKHLS were obtained using Special Licence Access from the UK Data Service (SN 6666) and enabled us to merge average scores of the Index of Multiple Deprivation (IMD)[6] - a population-weighted average of the combined scores for the Lower Layer Super Output Areas (LSOAs) in a larger area. The average score summary measure is calculated by averaging the LSOA scores in each larger area after they have been population-weighted.

Additional Control Variables

[4] Within each cohort, the prevalence of caregiving increases with age for women and men in the sample. Women in all cohorts show a higher likelihood than men of providing informal care across all waves.
[5] See Supplementary Information S.1 for detailed information on our main dependent variable.
[6] Please refer to the Supplementary Information S.2 for more information on the IMD.

Additional covariates were included to reflect the evolving determinants of informal care, as identified in the literature, and to capture potential shifts in the gender care gap over time. The respondent's health status was captured by a binary variable taking value one if the respondent has any long-standing illness. The respondent's highest educational level was also considered, classified into primary, secondary, or tertiary education. Employment status was included as a binary variable, distinguishing between those who were employed and those who were not. The relationship status of the respondent was included as a binary variable, indicating whether the respondent is married/lives with a partner or is single. The analysis further accounted for the time elapsed between the first wave and the interview date, as well as sex (categorised as men or women), ethnicity (categorised as white, black, asian, mixed, other), and birth cohort[7] (Rodrigues et al, 2023).

Descriptive Statistics

Table 1 presents the demographic, social, and economic characteristics by meso-level deprivation and individual-level poverty status, disaggregated by sex. Care provision is consistently higher among females than males across all groups. Individuals in not-deprived LADs and above the poverty line tend to be older on average. Higher education attainment is more common among those in non-deprived LADs and above the poverty line. While White individuals constitute the majority across all groups, their proportion declines among the deprived and below-poverty-line populations. Employment rates are lowest among those below the poverty line, particularly for females (0.29) compared to males (0.41).

Figure 1 displays the gender composition of carers across cohorts. Women generally provide more care than men across most cohorts. The gender gap is most pronounced in the 1959-1968 and 1969-1978 cohorts, where female caregiving rates peak around 65-67%, while male rates remain much lower, around 33-35%. The highest percentage of female caregivers is observed within the 1969-1978 cohort, followed by the 1959-1968 and 1979-1988 cohorts. The highest proportion of male caregivers is found in the 1908-1938 cohort, closely followed by the 1939-1948 and 1989-2006 cohorts. These variations across cohorts may partly reflect age-related factors, underscoring the need for an analysis that distinguishes between cohort effects and age effects. Poverty affects men and women differently — male caregiving rates are slightly lower, on average, below the poverty line, while female caregiving rates tend to remain high or increase slightly, particularly in older cohorts. The effect of meso-level deprivation is less consistent than

[7] Please refer to Supplementary Information Table S.2 for more insight into the variables used in this analysis.

expected. Overall, caregiving rates are highest for women in earlier-born cohorts, particularly those in poverty, while men's caregiving rates are more stable across different conditions.

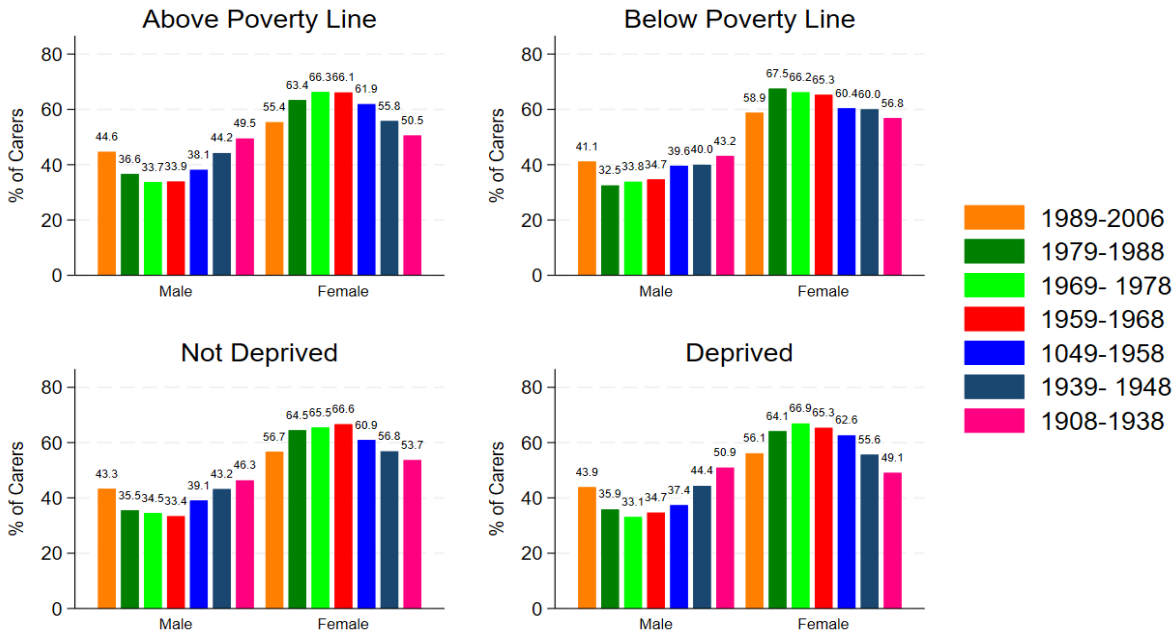

Figure 1: Percentage of people providing care by sex, individual level poverty status, and meso-level deprivation across birth cohorts
Source: UKHLS data, 2009- 2020, England.

	Deprived LAD		Not Deprived LAD		Below Poverty Line		Above Poverty Line	
	Male	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
Provide care	0.18	0.23	0.18	0.23	0.20	0.25	0.18	0.23
Age	47.87	45.99	51.56	49.37	47.54	44.80	50.24	48.32
Ethnicity								
White	0.73	0.71	0.91	0.90	0.66	0.67	0.85	0.84
Mixed	0.02	0.03	0.01	0.02	0.02	0.02	0.01	0.02
Asian	0.19	0.17	0.05	0.05	0.25	0.21	0.09	0.09
Black	0.05	0.07	0.02	0.02	0.05	0.08	0.03	0.04
Other ethnicity	0.01	0.01	0.01	0.01	0.02	0.02	0.01	0.01
Disability	0.33	0.35	0.34	0.34	0.36	0.36	0.33	0.34
Married	0.79	0.69	0.84	0.77	0.75	0.61	0.83	0.76
Education								
Low	0.39	0.40	0.36	0.35	0.51	0.52	0.36	0.35
Intermediate	0.25	0.29	0.24	0.30	0.26	0.29	0.25	0.29
Advanced	0.36	0.31	0.39	0.35	0.23	0.18	0.40	0.36
Employment	0.63	0.54	0.63	0.59	0.41	0.29	0.67	0.62

Table 1: Demographic, social, and economic characteristics by meso-level deprivation and individual level poverty status, disaggregated by sex.
Source: UKHLS data, 2009- 2020, England.

Methods

Our goal is to provide a detailed analysis of how caregiving varies by cohort, gender, individual poverty and meso-level deprivation. To achieve this, we adopt two analytical strategies. In our first approach, we visualise how the gender care gap varies by age and cohort. This graphical analysis draws on results generated by multilevel mixed-effect logistic regression analysis of the probability of providing informal care, while accounting for the nested nature of the data used (Rodrigues et al, 2023; Marshall et al., 2015). In our second analytical approach, we focus on the intersectional effects of age, sex, cohort, poverty and meso-level deprivation using MAIHDA methods to establish whether the factors that shape the probability of providing care have additive or intersectional (multiplicative) effects.

(i) Multilevel Mixed-Effect Logistic Regression

The first stage of our analysis involves a graphical analysis of the age-cohort analysis, which requires us to model each individual's informal care trajectory as a function of time. At the first level of the model, time-variant individual characteristics (e.g., relationship status, disability, employment status and education) are included to capture dynamic changes in caregiving roles. This allows us to understand how various factors influence and differentiate informal care trajectories across different individuals. At the second level, the model includes random effects at the observation level for each survey wave, addressing heterogeneity in informal care provision. This approach enables us to model each individual's informal care trajectory as a function of time. Time-invariant variables such as sex and ethnicity are also included at Level 2. Finally, the highest level (level 3) accounts for clustering at the local authority level, capturing variations in caregiving patterns across different areas. It recognises that caregiving experiences differ based on local policies, service availability, and socioeconomic conditions.

Formally:

Let Y_{tij} be the binary outcome variable indicating whether at time t $(t = 1, \dots, T)$ an individual i $(i = 1, \dots, I)$ in local authority j $(j = 1, \dots, J)$ provides care. The model can be expressed as:

$$
\begin{aligned}
logit\ P(Y_{tij} = 1) \\
&= \beta_0 + \beta_1 Female_i + \beta_2 Cohort_i + \beta_3 Time_t + \beta_4 (Time\ x\ Cohort)_{it} \\
&+ \beta_5 (Time\ x\ Female)_{it} + \beta_6\ (Cohort\ x\ Female)_i + \beta_7 Time_t^2 + X_{it} + u_j + v_{i(j)} \\
&+ \varepsilon_{ijt}
\end{aligned}
$$

Our model is designed to include the main effects for sex, cohort, and time, alongside interaction terms enabling distinct slope estimates across these factors. In particular:

- β_0 represents the mean probability of care provision across all local authorities when all predictors are at their reference category.
- β_1 (Female) indicates the effect of being female on the probability of providing care, compared to males.
- β_2 (Cohort) indicates the effect of birth cohort on the likelihood of providing care.
- β_3 (Time) indicates the effect of time on caregiving probability with $Time_t$ included as a continuous variable
- β_4 (Time × Cohort) tells how the effect of time on caregiving varies across birth cohorts.
- β_5 (Time × Female) tells how the effect of time on caregiving differs by sex.
- β_6 (Cohort × Female) tells how the effect of cohort on caregiving differs by sex.

We further include a quadratic term for time to capture nonlinearity in individual slopes (β_7) to take account of the nonlinear relationship expected between age and the probability of providing informal care.

We adjust our estimation by controlling for a vector of background individual characteristics (X_{it}).

Finally:

- $u_j \sim N(0, \sigma_v^2)$ captures variations in caregiving probability across local authority districts.
- $v_{ij} \sim N(0, \sigma_v^2)$ captures individual-level differences in caregiving probability.
- $\varepsilon_{tij} \sim N(0, \sigma_\varepsilon^2)$ is a residual error term. Time-specific deviation from an individual's predicted outcome

The described multilevel model offers two key methodological advantages. First, it effectively addresses the unbalanced panel structure by accommodating unequal group sizes, overcoming the limitations of conventional analytical methods. Second, it captures nuanced individual-level dynamics in caregiving decisions, allowing for a detailed examination of variability in caregiving activities among individuals.

(ii) MAIHDA

The second stage of our analysis explores the intersectional effects of age, sex, cohort, poverty and meso-level deprivation, which also enables us to distinguish between the additive and intersectional (multiplicative) effects of these different drivers. Additive effects occur when social characteristics independently contribute to variations in the provision of informal care, meaning their influence can be understood as the sum of their individual contributions. In contrast, multiplicative effects arise when the combination of these characteristics produces interactions that go beyond their independent contributions, altering the likelihood of caregiving due to their interaction. Disentangling additive and multiplicative effects of social characteristics on the likelihood of caring is crucial for a richer understanding of inequalities in care.

To investigate this, we employ a MAIHDA approach, which allows us to assess how much variation in the provision of informal care can be attributed to structural differences across social strata. Social strata are the unique combination of characteristics of each group and are defined in this study by the interaction of sex (2 categories), cohort (7 categories), individual-level poverty (2 categories) and meso-level deprivation (2 categories), resulting in 56 unique social strata (intersectional profiles).[8] This model is a logical extension of the previous multilevel mixed-effects logistic regression, where individuals at the first level are nested within the intersectional social strata at the second level (Evans et al., 2018; Evans et al., 2024). The strata variable created is then used as the level 2 context within a multi-level framework[9].

Results

(i) Multilevel Mixed-Effect Logistic Regression

An Age-Cohort Approach to the Gender Care Gap

Table 2 presents the Average Marginal Effects (AMEs) illustrating gender disparities in informal caregiving across cohorts, spanning overlapping age brackets[10]. Figure 2 visually represents informal caregiving

[8] For example, one social strata would be a female living in relative poverty, in an area of low deprivation, from the 1908-1938 cohort.

[9] The primary analysis focuses on Wave 1 because of its larger sample. Results are broadly similar across other waves.

[10] Our baseline model considers results from the adjusted model. See Supplementary Information Figure S.1 for the unadjusted model. For more information on the adjusted model, please refer to Tables S.3 and S.4.

trajectories for each cohort, delineating patterns for women and men separately over 11 years within our sample and across diverse age ranges. This graphical representation clearly distinguishes **cohort** and **age** effects by showing predicted probabilities of provision of informal care across overlapping age categories for each cohort[11]. The **cohort effect**, indicated by the gap in the overlapping cohorts for the same age groups, refers to the influence of the period when individuals were born on their likelihood of providing informal care. Graphically, this is visible as the vertical distance between overlapping lines for the same age ranges. The **age effect** refers to the influence of an individual's age on the likelihood of providing informal care and is graphically shown by the slope of each cohort line.

Figure 2 shows a clear age-related pattern in informal caregiving across cohorts: the likelihood of providing care increases with age, peaking between ages 60 and 70. After this point, the probability of providing informal care begins to decline. Earlier-born cohorts exhibit higher probabilities of caregiving at comparable ages than their later-born counterparts. The most significant cohort effects (distance between cohort lines for overlapping ages gets wider) are observed between the ages of 50 and 60, and although the cohort effects are similar for women and men they appear to be more pronounced for men, particularly among those born in the 1959-1968 and 1949-1958 cohorts. This difference starts to diminish with earlier-born cohorts, indicating a tapering effect as cohorts age. Finally, results highlight a significant and persistent gender care gap, particularly evident as the caregiving trajectories of women and men diverge with age (Table 2). The gap is most pronounced for the 1959-1968 and 1949-1958 cohorts, aged 50-70, underscoring the higher burden of care that falls on women during midlife. This supports H1, which posits a diminishing gender care gap in later-born cohorts.

[11] A similar analysis has been conducted taking into consideration the Intensity of care provided and the relationship between caregivers and care recipients. For more information, please refer to the Supplementary Information S.3 and Figures S.2 and S.3.

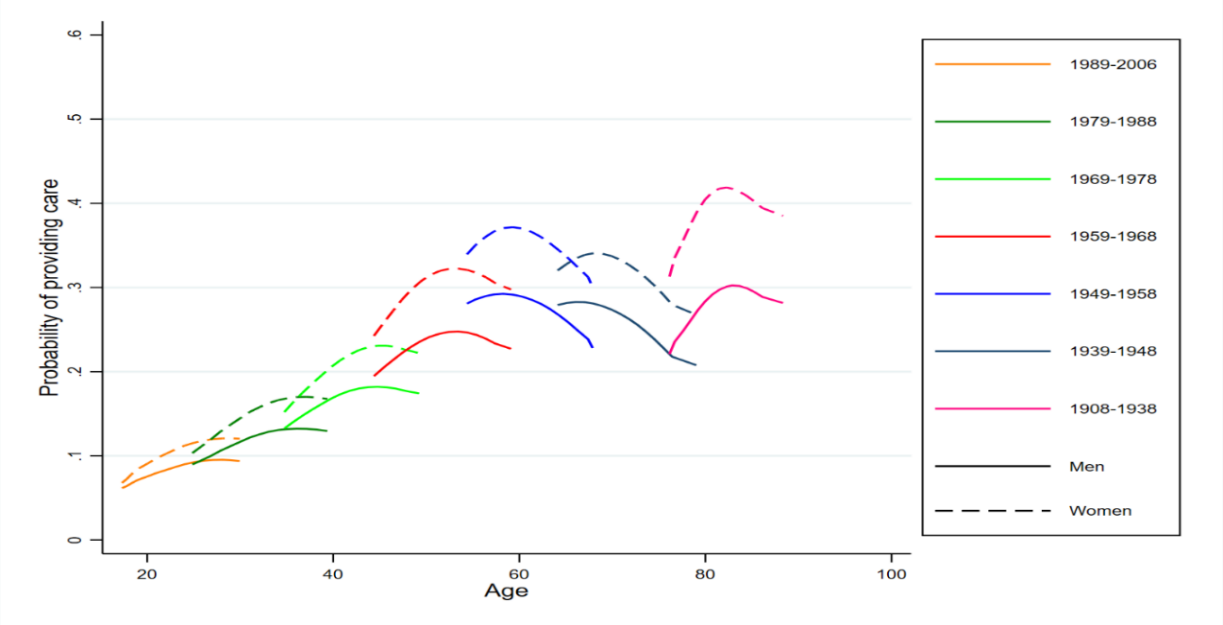

Figure 2: Probability of providing informal care, by cohort and sex, adjusted.
Note: Adjusted mixed-effect logistic regression model. Variables considered: sex, cohort, time, and their interactions. The model also accounts for ethnicity, long-standing illness or impairment, partner, highest education achieved, and employment. For more details on the variables, please refer to Table S.2 (Supplementary Information). Source: UKHLS data, 2009- 2020, England.

	Coefficient	*95% CI (Lower)*	*95% CI (Upper)*
Gender difference in the probability of providing care for each cohort (female - male)			
Cohort 1989-2006	*0.014***	*0.005*	*0.024*
Cohort 1979-1988	*0.024****	*0.013*	*0.035*
Cohort 1969-1978	*0.037****	*0.024*	*0.050*
Cohort 1959-1968	*0.065****	*0.050*	*0.079*
Cohort 1949-1958	*0.073****	*0.054*	*0.092*
Cohort 1939-1948	*0.060****	*0.037*	*0.082*
Cohort 1908-1938	*0.113****	*0.077*	*0.149*
Gender difference in the probability of providing care between consecutive cohorts			
1979-1988 vs 1989-2006	*0.010*	*-0.004*	*0.024*
1969-1978 vs 1979-1988	*0.013*	*-0.003*	*0.029*
1959-1968 vs 1969-1978	*0.028***	*0.009*	*0.046*
1949-1958 vs 1959-1968	*0.009*	*-0.014*	*0.032*
1939-1948 vs 1949-1958	*-0.014*	*-0.042*	*0.015*
1908-1938 vs 1939-1948	*0.053***	*0.011*	*0.095*

Table 2: Cohort-specific average marginal effects for women and men in informal caregiving provision
Note: Adjusted mixed-effect logistic regression model. Variables considered: sex, cohort, time, and their interactions. The model also accounts for ethnicity, long-standing illness or impairment, partner, highest education achieved, and employment. For more details on the variables, please refer to Table S.2 (Supplementary Information). Source: UKHLS data, 2009- 2020, England.

Gender Care Gap and Poverty

Figure 3 and Table 3 present the probability of providing care across different cohorts and age groups, with the top panel of Figure 3 showing individuals below the poverty line (hence, in relative poverty) and the bottom panel of Figure 3 showing those above the poverty line[12].

[12] More details provided in Table S.5, S.6, S.7 and S.8.

The probability of providing informal care for individuals above the poverty line tends to be lower than for those below the poverty line at corresponding ages. This confirms the hypothesised positive association between poverty and caregiving (H2). The decline after the peak (age 50-60) is less sharp among those above the poverty line than their richer counterpart. For women, cohort effects appear relatively consistent, with later-born cohorts less likely to provide informal care. For men, cohort effects are similar; however, these effects are more noticeable among those below the poverty line up to age 40, and above the poverty line between ages 55 and 80.

Once again, across both income groups, women consistently have a higher probability of providing care compared to men, reinforcing earlier findings on the gender care gap. However, this gap is more pronounced and statistically significant among individuals above the poverty line (Table 3), except for later-born cohorts, contradicting our hypothesis (H4a).

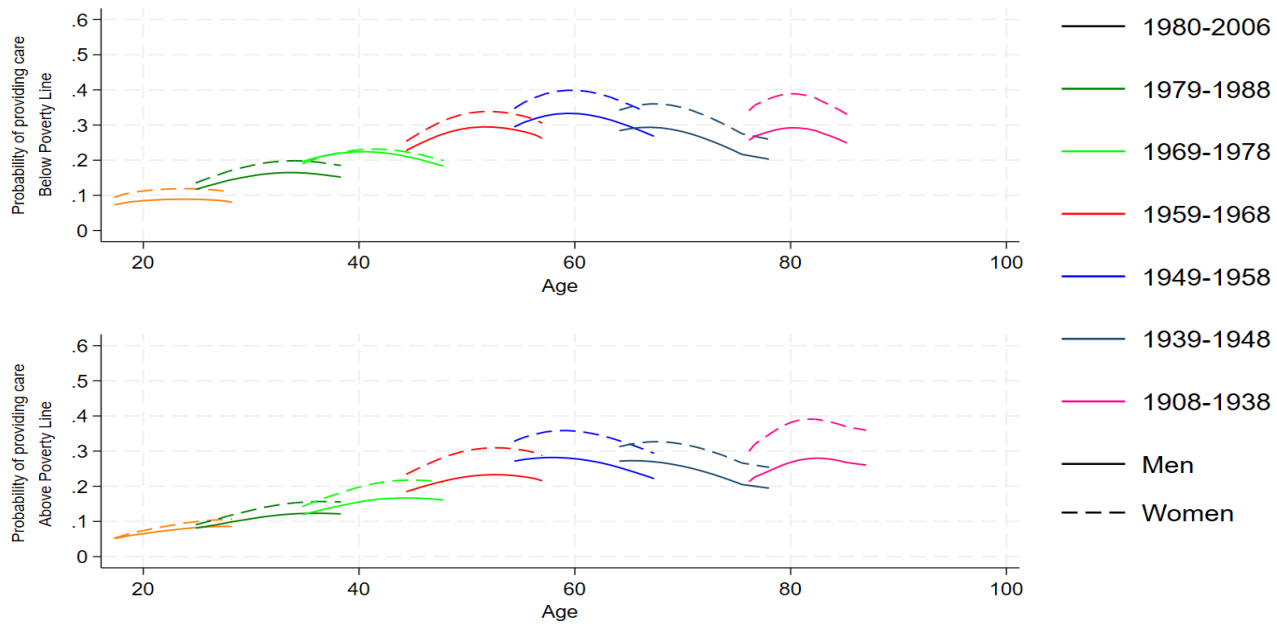

Figure 3: Gender care gap and poverty.

Note: Adjusted mixed-effect logistic regression model. Variables considered: sex, cohort, time, and their interactions. The model also accounts for ethnicity, long-standing illness or impairment, partner, highest education achieved, and employment. For more details on the variables, please refer to Table S.2 (Supplementary Information). Source: UKHLS data, 2009- 2020, England.

	Below the Poverty line	***Above the Poverty line***	***Deprived LADs***	***Not LADs***
Gender difference in the probability of providing care for each cohort				
Cohort 1989-2006	***0.026****	***0.011****	*0.007*	***0.014****
Cohort 1979-1988	***0.027****	***0.023*****	*0.018*	***0.028*****
Cohort 1969-1978	*0.002*	***0.041*****	***0.043****	***0.035*****
Cohort 1959-1968	***0.037****	***0.069*****	***0.073*****	***0.070*****
Cohort 1949-1958	***0.061****	***0.074*****	***0.084****	***0.073*****
Cohort 1939-1948	***0.065****	***0.058*****	*0.046*	***0.066*****
Cohort 1908-1938	***0.091****	***0.106*****	*0.039*	***0.119*****
Gender difference in the probability of providing care between consecutive cohorts				
1979-1988 vs 1989-2006	*0.000*	*0.013*	*0.011*	*0.014*
1969-1978 vs 1979-1988	*-0.024*	***0.017****	*0.025*	*0.007*
1959-1968 vs 1969-1978	*0.034*	***0.028****	*0.030*	***0.035****
1949-1958 vs 1959-1968	*0.025*	*0.005*	*0.010*	*0.004*
1939-1948 vs 1949-1958	*0.003*	*-0.015*	*-0.038*	*-0.007*
1908-1938 vs 1939-1948	*0.027*	***0.048****	*-0.007*	***0.053****

Table 3: Average marginal effect for women and men in a state of poverty for providing informal care across cohorts for overlapping ages, 2009-2021- meso-level deprivation and individual-level poverty

Note: Adjusted mixed-effect logistic regression model. Variables considered: sex, cohort, time, and their interactions. The model also accounts for ethnicity, long-standing illness or impairment, partner, highest education achieved, and employment. For more details on the variables, please refer to Table S.2 (Supplementary Information). Deprived LADs: above the median value of the Index of Multiple Deprivation. Not Deprived LADs: below the median value of the Index of Multiple Deprivation. *Source: UKHLS data, 2009- 2020, England.*

Gender Care Gap and meso-level Deprivation

The variance component analysis of the baseline multilevel mixed-effects model reveals statistically significant variation in the probability of providing informal care across different Local Authority districts in England[13]. Building on this finding, the relationship between meso-level deprivation and the provision of informal care is further explored in Figure 4 and Table 3, which present the probability of providing care across different cohorts and age groups[14]. The top panel of Figure 4 depicts individuals living in deprived local authorities, while the bottom panel of Figure 4 represents those in less deprived areas. The figure reports a higher prevalence of care provision in more deprived LADs among both genders (confirming H3). Across all cohorts and age groups, women consistently exhibit a higher probability of providing care than men, regardless of deprivation status. Men and women exhibit similar cohort effects, with the exception of 1949-1958 and 1958 and 1968 cohorts, where cohort effects are stronger for men in both more and less deprived LADs , with later-born cohorts less likely to provide informal care. Finally, the gender care gap is most pronounced among middle-born cohorts (1969–1978, 1959–1968, and 1949–1958) in deprived LADs . In contrast, for both earlier-born and later-born cohorts, the gender gap appears smaller and is not statistically significant in deprived LADs. This partially confirms our hypothesis (H4b).

[13] Please refer to Table S.3- Supplementary Information.

[14] For more details please refer to the Supplementary Information Table S.9, S.10, S.11 and S.12.

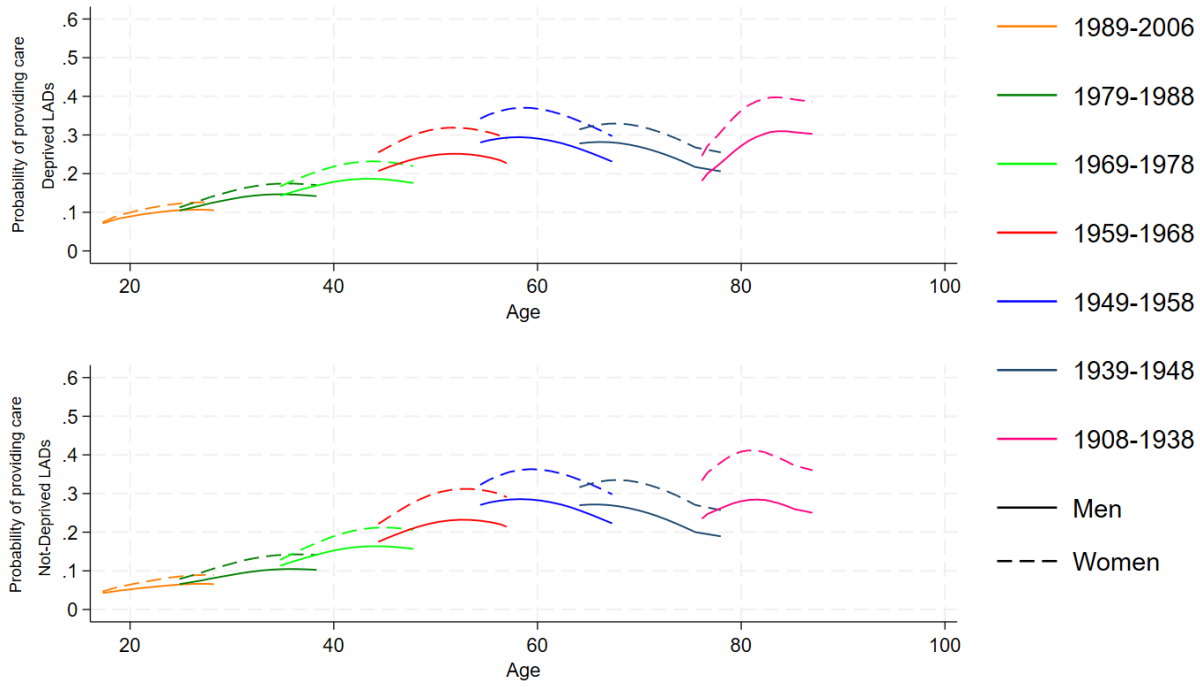

Figure 4: Gender care gap and meso-level deprivation

Note: Adjusted mixed-effect logistic regression model. Variables considered: sex, cohort, time, and their interactions. The model also accounts for ethnicity, long-standing illness or impairment, partner, highest education achieved, and employment. For more details on the variables, please refer to Table S.2 (Supplementary Information). Deprived LADs: above the median value of the Index of Multiple Deprivation. Not Deprived LADs: below the median value of the Index of Multiple Deprivation. *Source: UKHLS data, 2009- 2020, England.*

(ii) Multilevel Analysis of Individual Heterogeneity and Discriminatory Accuracy.

Results of the MAIHDA estimation based on Wave 1[15] are presented in Table 4. Model 1 is a Null Model, with no fixed effect included at level 2, that captures differences in the probability of informal caregiving provision across the intersectional social strata. It is key for assessing overall inequity, as it provides stratum-specific predictions and quantifies outcome variation within and between strata. In Model 1, stratum-level differences explain 7.5% of the variance (Variance Partition Coefficient, VPC), suggesting that caregiving probability varies across intersectional strata, indicating structural disparities in caregiving likelihood beyond individual characteristics and confirming the presence of both additive and potential multiplicative effects of cohort, gender, individual level poverty and meso-level deprivation. Model 2 adjusts for the strata-defining variables, thereby accounting for the additive contributions of cohort, gender, poverty, and meso-level deprivation, which leads to a substantial reduction of the VPC to 0.2%.[16] This substantial reduction suggests that much of the observed variance in caregiving probability is primarily driven by the independent contributions of cohort-related caregiving trends, gendered caregiving expectations, and the structural constraints of individual-level poverty and meso-level deprivation (Please refer to Table S.13, Supplementary Information). However, the remaining variance indicates that interactions between these dimensions still play a role in shaping caregiving probabilities. Model 3 further includes additional covariates – relationship status, education, ethnicity and employment -- to better capture individual-level variation. The model registers a further shrinking of the unexplained variance to zero. The PCV reveals a 100% reduction in the stratum-level variance from Model 1 to Model 3, suggesting that individual characteristics absorb most of the differences across strata.[17] Thus, we reject H5.

[15] Wave 1 was selected for primary analysis due to its larger sample size (N=34,555), but findings are consistent across waves. Please refer to Tables S.13, S.14,S.15, S.16 and S.17.

[16] This is also shown by the Proportional Change in Variance (PCV), which captures how much variance is explained at the stratum level relative to Model 1.

[17] Robustness checks using Waves 5 and 12 confirm these patterns, with VPC values in Model 1 ranging between 7.1% and 7.5%, and variance reducing to near-zero in fully adjusted models. Please see Supplementary Information Tables S.13, S.14,S.15, S.16 and S.17.

	Model 1	95% CI	Model 2	95% CI	Model 3	95% CI
Random Effect: Variances						
Stratum-Level	0.26	[0.18, 0.40]	0.06	[0.002, 0.02]	0.00	-
Summary Statistics						
Variance Partition Coefficient (VPC)	7.5%		0.2%		0%	
Proportional Change in Variance (PCV)			97.8%		100%	
Area Under Receiver Operating Characteristic Curve (AUC)	0.64		0.64		0.68	

Table 4: Multilevel Analysis of Individual Heterogeneity and Discriminatory Accuracy: Variance Decomposition.

Notes: MAIHDA.Maximum likelihood estimation was used for all models shown. 95% CIs shown in parentheses. VPC for logistic models are *calculated using the latent response approach. Model 1 is a Null Model, Model 2 controls for gender, cohort, individual-level poverty and meso-level deprivation. Model 3 also accounts for covariates including ethnicity, long-standing illness or impairment, partner, highest education achieved, and employment. For more details on the variables, please refer to Table S.2 (Supplementary Information). Source: UKHLS data, wave 1, England.*

Figure 5 visualises the predicted probability of providing care across intersectional strata, computed by implementing Model 3, with 95% confidence intervals. The predicted values for the 56 strata are ranked from low to high. Men (represented by triangles) show a 24% lower odds of providing care than women(represented by dots) with an OR equal to 0.76. Cohort demonstrates a strong positive association with caregiving, indicating that individuals in older birth cohorts are significantly more likely to provide care: individuals born in 1949–1958 have more than six times higher odds of caregiving (OR = 6.48), and those in the oldest cohort (1908–1938) have odds more than five times higher (OR = 5.17). Poverty status is not statistically associated with caregiving after full adjustment, whereas living in less deprived LADs is associated with 13% lower odds of caregiving (OR = 0.87).[18] Figure S.4 illustrates the difference in predicted probabilities of caregiving between the total predicted probability in each stratum and the probability based solely on additive main effects (from Model 3). All differences cluster around zero, with the intervals including zero, suggesting limited evidence of substantial multiplicative interaction effects across strata. This implies that the additive model captures all of the variability in caregiving probabilities.

[18] Table S13,presents the full estimation results. Consistent with existing literature, the findings indicate that individuals with higher levels of education, no disabilities, and those who are employed have significantly lower odds of providing care. There are also significant differences in the odds of providing care across different ethnic groups.These patterns are consistent across Waves 5 and 12, confirming the robustness of findings.

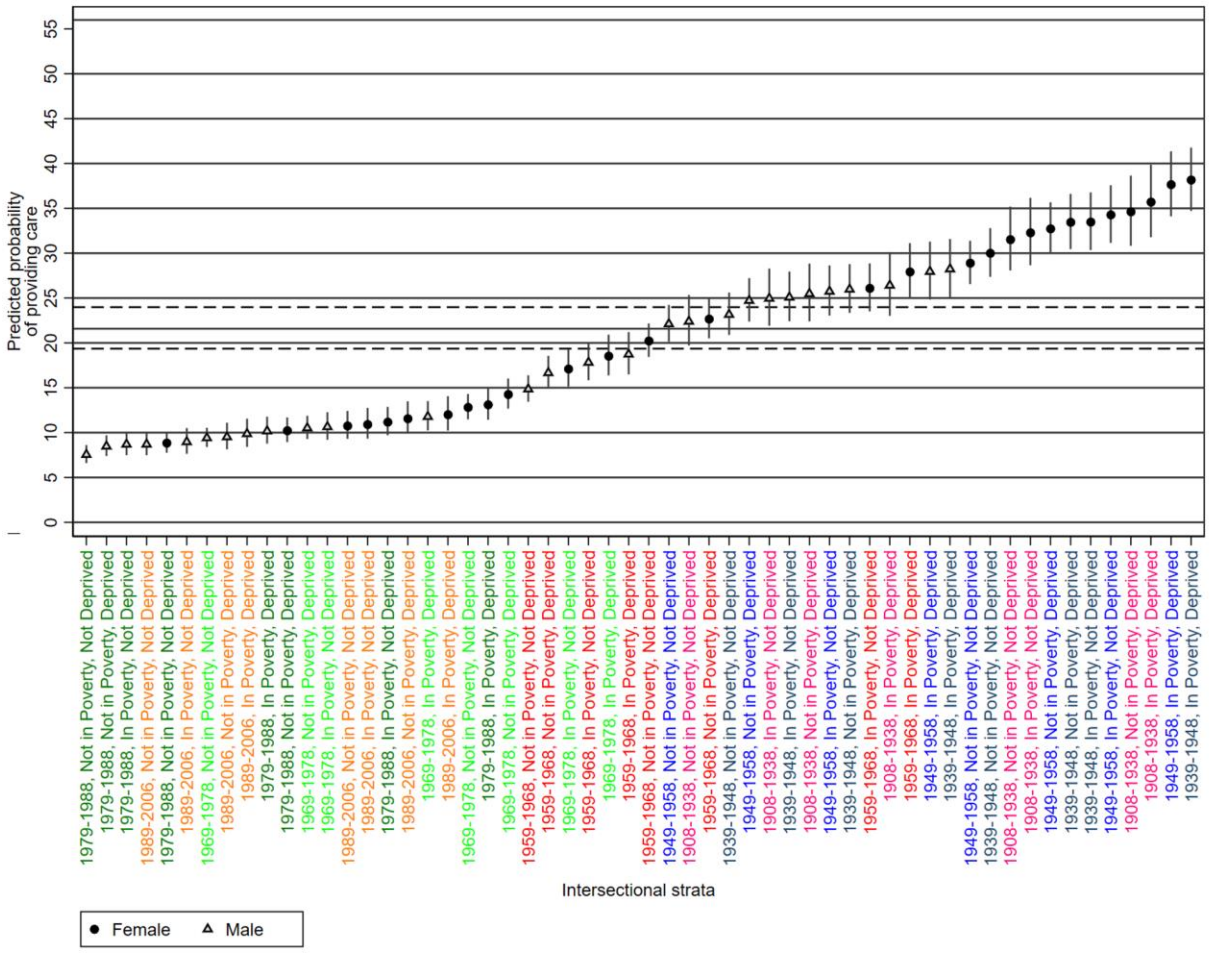

Figure 5: Predicted probability of providing care by gender, cohort, individual-level poverty, and meso-level deprivation

Notes: Based on MAIHDA estimation. Predicted stratum interaction effects, ranked low to high. Markers indicate the predicted value for each stratum. Spikes indicate 95% Confidence Intervals (Model 3). Source: UKHLS data, wave 1, England.

Discussion and Conclusion

This study makes a novel contribution to the literature on informal caregiving by integrating an intersectional, cohort-sensitive perspective into the analysis of gendered care inequalities. Using nationally representative longitudinal data from over 300,000 individuals across 308 local authorities in England (2009–2021), we are the first to apply both multilevel mixed-effect logistic regression and MAIHDA to explore how gender, age cohort, individual-level poverty, and meso-level deprivation intersect

to shape caregiving patterns. While prior research has examined gendered caregiving patterns, our approach highlights how structural disadvantage and individual socioeconomic status influence the gender care gap. We offer the first England-based evidence that caregiving responsibilities, disproportionately shouldered by women, are compounded by both individual-level poverty and meso-level deprivation in ways that the previous literature has often overlooked.

First, the multilevel mixed-effect logistic regression model reveals that caregiving follows a strong age pattern, peaking between ages 60–70 before declining. This trend suggests that as people age, their probability of taking on caregiving responsibilities often changes due to various life-stage factors. Beyond age, cohort effects are evident, with earlier-born cohorts showing a higher likelihood of caregiving at the same age compared to later-born cohorts. This effect could reflect generational differences in attitudes, behaviours, and life experiences that can affect caregiving patterns. For instance, individuals born in earlier cohorts may have different expectations regarding family roles and caregiving compared to those born in later cohorts, possibly due to changes in social norms, healthcare systems, and economic conditions across decades. The gender care gap is most pronounced in middle-born cohorts (1969–1978, 1959–1968, and 1949–1958), particularly between ages 50 and 60, supporting H1.

Second, the study examines the role of individual-level poverty in shaping gendered caregiving inequalities. Individuals above the poverty line generally have a lower probability of providing informal care than those below it (confirming H2), with a less sharp decline after age 50-60 suggesting that those with fewer resources may be unable to sustain caregiving responsibilities longer (for example, due to faster declining health) or may have different dynamics in caregiving due to worse health or less support. Poverty's role in shaping cohort effects is evident: cohort effects are more pronounced for men below the poverty line up to age 40, and for those above the poverty line between ages 55 and 80, while they are more consistent for women. This pattern may reflect improvements in the health of older parents, delaying the need for care from younger generations, or better access to care services for economically disadvantaged individuals. The gender care gap is wider and more statistically significant among those above the poverty line; thus, we reject H4a. This discrepancy may arise because women in higher income brackets have more economic flexibility, allowing them to take on caregiving roles without the immediate financial pressure to work long hours or multiple jobs to cover basic needs. This economic buffer enables women to assume a larger share of caregiving responsibilities, thereby widening the gender care gap.

Third, the impact of meso-level deprivation on the gender care gap is explored. The results show that caregiving is more prevalent in deprived LADs, with women having a higher probability of providing care

than men, confirming H3. Cohort effects are stronger for both women and men in deprived LADs, particularly before retirement. The gender care gap is most pronounced in middle-born cohorts in deprived LADs, partially confirming H4b.

Finally, the study applies MAIHDA to explore the intersectional social profile of care and how social characteristics interact as predictors of caregiving. We focus on Wave 1, given its larger sample size, while noting that the findings are consistent across other waves. This approach assesses both multiplicative and additive effects of the key social characteristics — gender, cohort, individual-level poverty, and meso-level deprivation—and how they explain differences in the likelihood of becoming a caregiver. This is crucial for a deeper understanding of the heterogeneity of caregiving inequalities. The findings suggest that caregiving likelihood is driven by the independent effects of cohort, gender and poverty; thus, we reject H5.

This paper demonstrates that whilst caregiving affects people from all walks of life, the likelihood of caregiving is not experienced equally among them. The study confirms the reduced informal caregiving among later-born cohorts of women, which is not being compensated by higher involvement of later-born cohorts of men. While this may be partially driven by improvements in the health of cared-for older persons, it does raise concerns regarding the future availability of informal care as the population ages and the need for further investment in long-term care for older people in the UK.

Moreover, the heterogeneity in caregiving trajectories along socioeconomic lines underscores the need for targeted policies that address the unique experiences and challenges faced by caregivers. Our findings heighten the case for policies to reduce the gendered pattern of informal caregiving by expanding paid Carer's Leave, workplace flexibility, and pension credits for caregivers, particularly for midlife women. Financial support for caregivers in poverty could be strengthened either through higher Carer's Allowances, or by introducing policies that help carers continue in paid employment. The latter could include accessible formal care services, to prevent informal caregiving from being a financial necessity and allow for the conciliation of care and paid work, or tax credits to low-income carers who take up paid work. Results also confirm that the currently observed geographic disparities in economic development across the UK are entwined with caregiving and poverty. These findings strengthen the case for targeted funding for community-based care services and carer support programs for more deprived LADs, ensuring equitable resource distribution based on regional caregiving needs.

This study has limitations. First, it does not separately examine the variation in age, cohort, and period. However, due to exact collinearity between the three (age = period – birth year), it is not possible to freely estimate all three effects in regression models. Attempts to solve the age, period, cohort identification problem have not worked without introducing biased assumptions (Bell, 2020; Bell & Jones, 2018). Therefore, we assume that the trend over time, net of age and cohort effects, is flat, with age and cohort being the key drivers of long-run change (Bell et al., 2024). The overlap of age ranges between cohorts is only partial, as with other similar cohort studies in the past (Marshall et al., 2015; Rodrigues et al., 2023). This limits the ability to draw stronger conclusions as to some of the cohort effects, which future studies using longer follow-up periods of the UKHLS may address.

Additionally, limitations arise from the reliance on self-reported caregiving status within the UKHLS data, which may affect the reliability and consistency of responses over time. In some instances, especially for the earlier-born cohort subgroup, the analytical sample size is relatively small, limiting the statistical power of our estimation. Furthermore, while our study provides important descriptive and multilevel evidence on caregiving inequalities, both approaches are limited in establishing causality.

Note that our analyses are not conditioned on the presence of someone needing care, implicitly assuming that care needs are not systematically distributed across cohorts, genders, or other social groups. In reality, care needs are likely unevenly distributed, so our estimates describe patterns of caregiving across the population, rather than conditional on actual care demand.

Finally, while the MAIHDA approach explores intersectional inequalities, ethnicity is not included as a stratum in this analysis. This reflects the paper's scope, centered on age–cohort patterns, and acknowledges that ethnicity deserves a more in-depth, focused treatment than this paper can accommodate. Future work should incorporate ethnicity more fully to understand its intersection with other social determinants of caregiving. We also acknowledge that, although we are limited by data availability, the measure used to create the main explanatory variable — gender — may mask its multidimensionality. Gender intersects with multiple axes of structural disempowerment, such as sexual orientation, which we could not incorporate here.

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Supplementary Information

S.1 Provision of Care and Care Intensity

Respondents are defined as informal caregivers if they answer 'yes' to any of the following two questions:

"Is there anyone living with you who is sick, disabled or elderly whom you look after or give special help to (for example, a sick, disabled or elderly relative, husband, wife or friend etc.)?"

"Do you provide some regular service or help for any sick, disabled or elderly person not living with you?

S.2 Index of Multiple Deprivation

The Index of Multiple Deprivation (IMD) is an overall relative measure of deprivation constructed by combining seven domains of deprivation according to their respective weights. The seven domains of deprivation are as follows:

- The Income Deprivation Domain measures the proportion of the population experiencing deprivation relating to low income. The definition of low income used includes both those people that are out-of-work, and those that are in work but who have low earnings (and who satisfy the respective means tests).

- The Employment Deprivation Domain measures the proportion of the working-age population in an area involuntarily excluded from the labour market. This includes people who would like to work but are unable to do so due to unemployment, sickness or disability, or caring responsibilities.

- The Education, Skills and Training Deprivation Domain measures the lack of attainment and skills in the local population. The indicators fall into two sub-domains: one relating to children and young people and one relating to adult skills.

- The Health Deprivation and Disability Domain measures the risk of premature death and the impairment of quality of life through poor physical or mental health. The domain measures morbidity, disability and premature mortality but not aspects of behaviour or environment that may be predictive of future health deprivation.

- The Crime Domain measures the risk of personal and material victimisation at local level.

- The Barriers to Housing and Services Domain measures the physical and financial accessibility of housing and local services. The indicators fall into two sub-domains: 'geographical barriers', which relate

to the physical proximity of local services, and 'wider barriers' which includes issues relating to access to housing such as affordability.

- The Living Environment Deprivation Domain measures the quality of the local environment. The indicators fall into two sub-domains. The 'indoors' living environment measures the quality of housing; while the 'outdoors' living environment contains measures of air quality and road traffic accidents.

S.3 Intensity of care and relationship between caregiver and care recipient

Intensity of care provided and spousal care

Recognizing that extensive research highlights an inverse relationship between the intensity and likelihood of providing care for adults (Albertini et al., 2007; Schmid et al., 2012), we also construct a variable to measure caregiving intensity. The UKHLS offers a unique advantage by allowing us to quantify informal caregiving responsibilities on a weekly basis. Based on this, we categorize informal carers into two distinct groups: high-intensity carers, who provide more than 20 hours of care per week, and low-intensity carers, who provide up to 19 hours of care per week.

The intensity of care provided has been identified with the following question:

Now thinking about everyone who you look after or provide help for, both those living with you and not living with you - in total, how many hours do you spend each week looking after or helping them?"

1.0-4 hours per week, 2. 5-9 hours per week, 3. 10-19 hours per week, 4. 20-34 hours per week, 5. 35-49 hours per week, 6. 50-99 hours per week, 7. 100 or more hours per week/continuous care, 8. Varies under 20 hours, 9. Varies 20 hours or more, 10. Other.

Relationship between caregiver and care recipient

The relationship between respondents and their coresident care recipient is categorized into 30 classifications. However, the data only provide six categories for the relationships between the respondents and their care recipients who live separately. The data do not reveal if the care recipient who lives outside the household is the caregiver's spouse, child, or "other relative." In particular:

1. Extra household care

Who is the person that you look after if you care for someone who lives outside the household? (What is his/her relationship to you?)

1 parent/parent-in-law, 2 grandparent, 3 aunt/uncle, 4 other relatives, 5 friend or neighbour, 6 clients of voluntary organisation, 97 Other.

2. Provide care to someone live in the same household

What is the relationship between you and the person that you look after for if you care for someone lives within the household?

1 husband/wife, 2 partner/cohabitee, 3 civil partner, 4 natural son/daughter, 5 adopted son/daughter, 6 foster child, 7 stepson/stepdaughter, 8 son-in-law/daughter-in-law, 9 natural parent, 10 adoptive parent, 11 foster parent, 12 step-parent, 13 parent-in-law, 14 natural brother/sister, 15 half-brother/sister, 16 step-brother/sister, 17 adopted brother/sister, 18 foster brother/sister, 19 brother/sister-in-law, 20 grand-child, 21 grand-parent, 22 cousin, 23 aunt/uncle, 24 niece/nephew, 25 other relative, 26 employee, 27 employer, 28 lodger/boarder/tenant, 29 landlord/landlady, 30 other non-relative

To differentiate the caregivers and care recipients' relationship, caregivers were divided in two groups: the subsample of people who care for a spouse, and the group of people who look after anyone else.

Supplementary analysis on the intensity of care provided and spousal care:

Figure S.2 depicts the probability of providing high-intensity care. The latter increases slightly with age, particularly from the early 20s to around 50-60 years, but the overall increase is modest across all cohorts. After age 60, the probability of providing high-intensity care remains relatively stable for men and slightly declines for women with a consequent reduction of the gender care gap after age 70. The probability of providing high-intensity care appears to be quite similar across cohorts with overlapping ages, indicating a weaker cohort effect. All cohorts, regardless of the time period they were born in, show a similar pattern, with no significant cohort showing a marked increase or decrease in the likelihood of providing high-intensity care. The relative flatness of the lines suggests that high-intensity caregiving is not strongly influenced by generational changes; rather, it seems to be more of a constant demand across different cohorts. Once again, a statistically significant gender care gap persists across all cohorts, except for the earliest-born cohort. This exception may be due to reduced statistical power stemming from the small sample size in this oldest group.

Figure S.3 illustrates the probability of providing spousal care. For both men and women, the probability of providing spousal care increases with age, especially after the age of 60. This is consistent with the life course perspective, where the need for spousal care typically rises in older age due to health declines and increased dependency. For the younger cohorts - 1989-2006, 1979-1988, and 1959-168 - the probability of providing spousal care remains low up to age 60, with only a slight increase thereafter. This suggests that younger generations may engage less in spousal caregiving at earlier stages of life, possibly due to differing marital patterns, life expectancy, or social support systems. For the overlapping age ranges of the 1939-1948 and 1949-1958 cohorts, it is notable that the 1939-1948 cohort shows a lower probability of providing spousal care compared to the 1949-1958 cohort, for both women and men. Finally, the gender care gap appears to widen with age, particularly in the oldest cohorts (1939-1948 and 1908-1938), where women's probability of providing spousal care increases sharply after age 70, much more so than for men. In younger cohorts, this gap is less pronounced and not statistically significant.

Tables – Supplementary Information

Table S.1: Descriptive statistics of the Analytical Sample – weighted estimations.

	wave											
Cohort	1	2	3	4	5	6	7	8	9	10	11	12
1989-2006												
Men(n)	971	1,341	1,420	1,232	1,034	824	701	643	526	491	437	388
Carers(n)												
No	866	1,195	1,250	1,116	907	732	644	585	473	441	391	358
Yes	105	146	170	116	127	92	57	58	53	50	46	30
Carers(%)												
No	89.19	89.11	88.03	90.58	87.72	88.83	91.87	90.98	89.92	89.82	89.47	92.27
Yes	10.81	10.89	11.97	9.42	12.28	11.17	8.13	9.02	10.08	10.18	10.53	7.73
Women(n)	1,110	1,528	1,609	1,366	1,209	1,001	857	791	666	623	585	518
Carers(n)												
No	979	1,357	1,423	1,216	1,056	862	772	711	594	543	519	457
Yes	131	171	186	150	153	139	85	80	72	80	66	61
Carers(%)												
No	88.20	88.81	88.44	89.02	87.34	86.11	90.08	89.89	89.19	87.16	88.72	88.22
Yes	11.80	11.19	11.56	10.98	12.66	13.89	9.92	10.11	10.81	12.84	11.28	11.78
1979-1988												
Men(n)	1,616	1,862	1,717	1,517	1,364	1,180	1,103	995	924	862	784	712
Carers(n)												
No	1,449	1,677	1,511	1,341	1,187	1,000	983	883	819	750	685	628
Yes	167	185	206	176	177	180	120	112	105	112	99	84
Carers(%)												
No	89.67	90.06	88.00	88.40	87.02	84.75	89.12	88.74	88.64	87.01	87.37	88.20
Yes	10.33	9.94	12.00	11.60	12.98	15.25	10.88	11.26	11.36	12.99	12.63	11.80
Women(n)	2,514	2,836	2,596	2,324	2,080	1,806	1,696	1,597	1,444	1,372	1,260	1,171
Carers(n)												
No	2,189	2,497	2,246	2,026	1,751	1,511	1,456	1,364	1,220	1,155	1,073	1,009
Yes	325	339	350	298	329	295	240	233	224	217	187	162
Carers(%)												
No	87.07	88.05	86.52	87.18	84.18	83.67	85.85	85.41	84.49	84.18	85.16	86.17
Yes	12.93	11.95	13.48	12.82	15.82	16.33	14.15	14.59	15.51	15.82	14.84	13.83
1969- 1978												
Men(n)	2,211	2,563	2,332	2,118	1,961	1,711	1,628	1,557	1,399	1,308	1,250	1,144
Carers(n)												
No	1,963	2,248	2,032	1,870	1,711	1,444	1,419	1,348	1,199	1,139	1,072	991
Yes	248	315	300	248	250	267	209	209	200	169	178	153
Carers(%)												
No	88.78	87.71	87.14	88.29	87.25	84.40	87.16	86.58	85.70	87.08	85.76	86.63
Yes	11.22	12.29	12.86	11.71	12.75	15.60	12.84	13.42	14.30	12.92	14.24	13.37
Women(n)	3,351	3,715	3,383	3,059	2,861	2,532	2,443	2,277	2,033	1,968	1,814	1,656
Carers(n)												
No	2,834	3,137	2,815	2,533	2,355	1,999	1,998	1,839	1,632	1,576	1,440	1,266
Yes	517	578	568	526	506	533	445	438	401	392	374	390
Carers(%)												
No	84.57	84.44	83.21	82.80	82.31	78.95	81.78	80.76	80.28	80.08	79.38	76.45
Yes	15.43	15.56	16.79	17.20	17.69	21.05	18.22	19.24	19.72	19.92	20.62	23.55
1959-1968												
Men(n)	2,273	2,653	2,467	2,212	2,095	1,859	1,758	1,684	1,548	1,498	1,412	1,311
Carers(n)												
No	1,873	2,176	1,976	1,811	1,692	1,453	1,438	1,346	1,259	1,192	1,141	1,037
Yes	400	477	491	401	403	406	320	338	289	306	271	274
Carers(%)												

No	82.40	82.02	80.10	81.87	80.76	78.16	81.80	79.93	81.33	79.57	80.81	79.10
Yes	17.60	17.98	19.90	18.13	19.24	21.84	18.20	20.07	18.67	20.43	19.19	20.90
Women(n)	3,311	3,705	3,447	3,171	2,937	2,629	2,496	2,303	2,093	2,019	1,932	1,767
Carers(n)												
No	2,528	2,743	2,437	2,324	2,146	1,854	1,824	1,629	1,447	1,406	1,353	1,238
Yes	783	962	1,010	847	791	775	672	674	646	613	579	529
Carers(%)												
No	76.35	74.04	70.70	73.29	73.07	70.52	73.08	70.73	69.14	69.64	70.03	70.06
Yes	23.65	25.96	29.30	26.71	26.93	29.48	26.92	29.27	30.86	30.36	29.97	29.94
1049-1958												
Men(n)	1,862	2,173	2,013	1,866	1,770	1,600	1,514	1,469	1,367	1,298	1,245	1,160
Carers(n)												
No	1,400	1,653	1,478	1,374	1,312	1,138	1,156	1,114	1,044	989	970	940
Yes	462	520	535	492	458	462	358	355	323	309	275	220
Carers(%)												
No	75.19	76.07	73.42	73.63	74.12	71.12	76.35	75.83	76.37	76.19	77.91	81.03
Yes	24.81	23.93	26.58	26.37	25.88	28.88	23.65	24.17	23.63	23.81	22.09	18.97
Women(n)	2,424	2,727	2,495	2,330	2,185	1,945	1,852	1,765	1,626	1,531	1,478	1,396
Carers(n)												
No	1,661	1,826	1,615	1,510	1,427	1,240	1,241	1,187	1,114	1,068	1,064	992
Yes	763	901	880	820	758	705	611	578	512	463	414	404
Carers(%)												
No	68.52	66.96	64.73	64.81	65.31	63.75	67.01	67.25	68.51	69.76	71.99	71.06
Yes	31.48	33.04	35.27	35.19	34.69	36.25	32.99	32.75	31.49	30.24	28.01	28.94
1939- 1948												
Men(n)	1,740	2,029	1,874	1,726	1,634	1,463	1,369	1,296	1,198	1,144	1,067	980
Carers(n)												
No	1,340	1,532	1,359	1,325	1,229	1,099	1,049	1,013	932	925	866	807
Yes	400	497	515	401	405	364	320	283	266	219	201	173
Carers(%)												
No	77.01	75.51	72.52	76.77	75.21	75.12	76.63	78.16	77.80	80.86	81.16	82.35
Yes	22.99	24.49	27.48	23.23	24.79	24.88	23.37	21.84	22.20	19.14	18.84	17.65
Women(n)	1,852	2,184	2,015	1,795	1,668	1,478	1,397	1,285	1,164	1,122	1,016	893
Carers(n)												
No	1,303	1,506	1,365	1,259	1,191	1,021	994	909	846	852	782	695
Yes	549	678	650	536	477	457	403	376	318	270	234	198
Carers(%)												
No	70.36	68.96	67.74	70.14	71.40	69.08	71.15	70.74	72.68	75.94	76.97	77.83
Yes	29.64	31.04	32.26	29.86	28.60	30.92	28.85	29.26	27.32	24.06	23.03	22.17
1908-1938												
Men(n)	1,207	1,398	1,245	1,050	917	787	672	567	461	395	312	232
Carers(n)												
No	934	1,043	912	775	674	584	500	404	348	302	247	181
Yes	273	355	333	275	243	203	172	163	113	93	65	51
Carers(%)												
No	77.38	74.61	73.25	73.81	73.50	74.21	74.40	71.25	75.49	76.46	79.17	78.02
Yes	22.62	25.39	26.75	26.19	26.50	25.79	25.60	28.75	24.51	23.54	20.83	21.98
Women(n)	1,012	1,196	1,039	870	745	629	522	446	358	305	232	177
Carers(n)												
No	733	828	704	559	489	418	362	300	253	203	167	125
Yes	279	368	335	311	256	211	160	146	105	102	65	52
Carers(%)												
No	72.43	69.23	67.76	64.25	65.64	66.45	69.35	67.26	70.67	66.56	71.98	70.62
Yes	27.57	30.77	32.24	35.75	34.36	33.55	30.65	32.74	29.33	33.44	28.02	29.38

Table S.2: Variables Description

Variables	Description
informal carer	The variable has been created by combining the variables (aidhh - care for sick/ handicapped/elderly in the household- and aidxhh - non-resident cared for).
Highest educational level achieved:	3 dummy variables were generated from qfhigh_dv: low_education (including values: GCSE/O level, CSE, Standard/o/lower, Other school cert) intermediate_edu (including values: Diploma in he, Teaching qualification not pgce, Nursing/other med qualification, A level, Welsh baccalaureate, AS level, Highers(Scotland), Cert 6th year studies) and advanced_edu (including values: Higher degree, 1st degree or equivalent, other higher degree).
Employment status	Dummy variable generated from the variable jbstat, taking value of one if the individual is employed (self-employed, paid employment (ft/pt), on maternity leave, govt training scheme, on apprenticeship) and zero if unemployed (unemployment, retired, family care or home, full-time student, LT sick or disabled, unpaid-family business, on furlough, temporarily laid off, doing something else).
Ethnicity	Five dummy variables derived from ethn_dv (white, black, asian, mixed, other)
Partner	Dummy variable derived from mastat_dv taking value of one if the individual has a partner (married, in a registered same-sex civil partnership, living as a couple) and value of zero if single (single and never married/civil partnership, separated but legally married, divorced, widowed, separated from civil partner, a surviving civil partner)
Disability	Dummy variable generated from health. It takes value zero if the individual has no long-standing illness/impairment and one otherwise.
Female	dummy variable derived from sex, taking value of 1 if the individual is female, zero otherwise.
Age	continuous variable generated from age_dv
Nation	Categorical variable generated from gor_dv, taking value 1 for England, 2 for Wales, 3 for Scotland and 4 for Norther Ireland
Weight_year	Variable generated from indscus_xw, indinus_lw, indinub_lw and indinui_lw
Care_intensity	Dummy variable generated from aidhres. It takes value of zero if no care is provided, 1 if care is provided for 0 to 19 hours, 2 if provided for more than 20 hours.
Cohort_5y	Categorical variable equal to 0 if the individual is part of the cohort is 1989-2006, 1 if the cohort is 1979-1988, 2 if the cohort is 1969-1978, 3 if the cohort is 1959-1968, 4 if the cohort is 1949-1958, 5 if the cohort is 1939-1948, 6 if the cohort is 1929-1938 and 7 if the cohort is 1908-1928
Time	Variable derived from istrdaty - 2009 (starting year of the survey)

Table S.3: Mixed effects logistic regression for informal caregiving (underlying model for Figure 2). Pooled sample (LCI, lower confidence interval; UCI, upper confidence interval).

Variable	Coeff	Standard Error	P-Value	LCI	UCI
Female	0.136	0.137	0.323	0.133	0.405
Cohort (ref=1989-2006)					
1979-1988	0.753	0.151	0.0	0.457	1.049
1969-1978	1.523	0.150	0.0	1.229	1.817
1959-1968	2.457	0.146	0.0	2.17	2.743
1949-1958	3.468	0.154	0.0	3.166	3.769
1939-1948	3.47	0.163	0.0	3.15	3.789
1908-1938	2.794	0.201	0.0	2.401	3.188
Time	0.061	0.020	0.002	0.022	0.101
Cohort*time (ref=1989-2006)					
1979-1988	0.033	0.020	0.104	0.007	0.072
1969-1978	0.059	0.019	0.002	0.021	0.096
1959-1968	0.079	0.019	0.0	0.042	0.116
1949-1958	0.013	0.020	0.517	-0.026	0.052
1939-1948	-0.029	0.022	0.173	-0.072	0.013
1908-1938	0.127	0.030	0.0	0.069	0.185
Female*Time	0.053	0.009	0.0	0.034	0.071
Cohort*Female (ref=1989-2006)					
1979-1988	0.095	0.172	0.582	-0.243	0.433
1969-1978	0.179	0.167	0.284	-0.148	0.507
1959-1968	0.423	0.163	0.009	0.104	0.742
1949-1958	0.456	0.173	0.008	0.117	0.795
1939-1948	0.319	0.190	0.094	-0.054	0.693
1908-1938	0.906	0.250	0.0	0.417	1.395
Time*Time	-0.019	0.001	0.0	-0.021	-0.017
Education (ref=Advanced)					
Low Education	0.623	0.053	0.0	0.519	0.728
Intermediate Education	0.375	0.055	0.0	0.267	0.483
Disability	0.312	0.027	0.0	0.26	0.364
Married	-1.174	0.045	0.0	-1.263	-1.086
Employed	-0.356	0.034	0.0	-0.422	-0.29
Ethnicity (ref=Other)					
White	0.338	0.196	0.084	-0.045	0.722
Mixed	0.27	0.243	0.267	-0.207	0.747
Asian	0.546	0.204	0.007	0.147	0.945
Black	-0.153	0.217	0.479	-0.578	0.272
Intercept	-5.191	0.234	0.0	-5.65	-4.733
LAD-level variance	0.183	0.028		0.135	0.248
Individual-level time slope variance	0.124	0.004		0.116	0.133
Individual-level variance	8.418	0.219		7.999	8.858
No. of observations: 190,113					
No. of individuals: 32,39					
No. of LAD: 308					

Table S.4: Predicted probabilities for informal caregiving (all types) by cohort and sex. Pooled sample, adjusted for control variables (PP, predicted probability; LCI, lower confidence interval; UCI, upper confidence interval). Weighted values.

Variable	Odds-Ratio	P value	LCI	UCI
Male*1989-2006	0.072	0.000	0.065	0.079
Male*1979-1988	0.108	0.000	0.100	0.117
Male*1969-1978	0.155	0.000	0.145	0.165
Male*1959-1968	0.225	0.000	0.213	0.237
Male*1049-1958	0.279	0.000	0.265	0.294
Male*1939-1948	0.263	0.000	0.246	0.280
Male*1908-1938	0.270	0.000	0.244	0.295
Female*1989-2006	0.087	0.000	0.079	0.094
Female*1979-1988	0.132	0.000	0.124	0.141
Female*1969-1978	0.192	0.000	0.183	0.202
Female*1959-1968	0.289	0.000	0.278	0.300
Female*1049-1958	0.353	0.000	0.338	0.367
Female*1939-1948	0.323	0.000	0.305	0.341
Female*1908-1938	0.383	0.000	0.352	0.413

Table S.5: Mixed effects logistic regression for informal caregiving – **above the poverty line** (underlying model for Figure 3). Pooled sample (LCI, lower confidence interval; UCI, upper confidence interval).

Variable	Coefficient	Standard Error	P-Value	LCI	UCI
Female	0.037	0.154	0.811	-0.264	0.338
Cohort (ref=1989-2006)					
1979-1988	0.820	0.170	0.000	0.487	1.153
1969-1978	1.571	0.168	0.000	1.241	1.902
1959-1968	2.537	0.164	0.000	2.216	2.857
1949-1958	3.576	0.171	0.000	3.242	3.911
1939-1948	3.579	0.179	0.000	3.228	3.931
1908-1938	2.901	0.220	0.000	2.470	3.332
Time	0.072	0.023	0.002	0.027	0.116
Cohort*time (ref=1989-2006)					
1979-1988	0.028	0.022	0.215	-0.016	0.071
1969-1978	0.049	0.021	0.022	0.007	0.090
1959-1968	0.062	0.021	0.003	0.021	0.102
1949-1958	-0.009	0.022	0.676	-0.052	0.033
1939-1948	-0.050	0.023	0.032	-0.096	-0.004
1908-1938	0.097	0.032	0.002	0.034	0.159
Female*Time	0.052	0.010	0.000	0.033	0.072
Cohort*Female (ref=1989-2006)					
1979-1988	0.176	0.190	0.354	-0.196	0.548
1969-1978	0.336	0.184	0.067	-0.024	0.696
1959-1968	0.579	0.178	0.001	0.230	0.929
1949-1958	0.560	0.188	0.003	0.191	0.928
1939-1948	0.400	0.205	0.051	-0.002	0.802
1908-1938	0.941	0.268	0.000	0.416	1.465
Time*Time	-0.018	0.001	0.000	-0.020	-0.016
Education (ref=Advanced)					
Low Education	0.630	0.056	0.000	0.519	0.741
Intermediate Education	0.388	0.058	0.000	0.274	0.502
Disability	0.300	0.029	0.000	0.243	0.356
Married	-1.242	0.050	0.000	-1.340	-1.144
Employed	-0.406	0.038	0.000	-0.481	-0.331
Ethnicity (ref=Other)					
White	0.280	0.218	0.200	-0.148	0.707
Mixed	0.182	0.269	0.498	-0.345	0.709
Asian	0.556	0.227	0.014	0.111	1.002
Black	-0.227	0.242	0.348	-0.701	0.247
Intercept	-5.148	0.262	0.000	-5.662	-4.635
LAD-level variance	0.198	0.031		0.145	0.270
Individual-level time slope variance	0.121	0.004		0.113	0.130
Individual-level variance	8.398	0.239		7.942	8.880
No observation: 164,859					
No individuals: 30,598					
No. LAD: 308					

Table S.6: Predicted probabilities for informal caregiving (all types) by cohort and sex **above the poverty line**. Pooled sample, adjusted for control variables (PP, predicted probability; LCI, lower confidence interval; UCI, upper confidence interval). Weighted values.

Variable	Odds-Ratio	P-value	LCI	UCI
Male*1989-2006	0.070	0.000	0.062	0.077
Male*1979-1988	0.107	0.000	0.098	0.115
Male*1969-1978	0.151	0.000	0.140	0.161
Male*1959-1968	0.218	0.000	0.206	0.230
Male*1049-1958	0.271	0.000	0.256	0.286
Male*1939-1948	0.255	0.000	0.238	0.273
Male*1908-1938	0.260	0.000	0.234	0.286
Female*1989-2006	0.081	0.000	0.073	0.088
Female*1979-1988	0.130	0.000	0.121	0.139
Female*1969-1978	0.191	0.000	0.181	0.201
Female*1959-1968	0.287	0.000	0.276	0.299
Female*1049-1958	0.345	0.000	0.330	0.360
Female*1939-1948	0.313	0.000	0.295	0.332
Female*1908-1938	0.366	0.000	0.334	0.398

Table S.7: Mixed effects logistic regression for informal caregiving – **below the poverty line** (underlying model for Figure 3). Pooled sample (LCI, lower confidence interval; UCI, upper confidence interval).

Variable	Coefficient	Std. Error	P-Value	LCI	UCI
Female	0.480	0.224	0.032	0.041	0.919
Cohort (ref=1989-2006)					
1979-1988	0.909	0.269	0.001	0.382	1.435
1969-1978	2.078	0.271	0.000	1.547	2.609
1959-1968	2.464	0.271	0.000	1.934	2.995
1949-1958	3.199	0.302	0.000	2.607	3.792
1939-1948	3.091	0.333	0.000	2.439	3.743
1908-1938	2.796	0.389	0.000	2.034	3.558
Time	0.078	0.047	0.102	-0.015	0.171
Cohort*time (ref=1989-2006)					
1979-1988	0.083	0.043	0.056	-0.002	0.167
1969-1978	0.042	0.041	0.309	-0.039	0.123
1959-1968	0.117	0.043	0.006	0.033	0.200
1949-1958	0.067	0.048	0.162	-0.027	0.162
1939-1948	-0.008	0.056	0.888	-0.118	0.103
1908-1938	0.060	0.074	0.417	-0.085	0.205
Female*Time	0.028	0.024	0.235	-0.018	0.075
Cohort*Female (ref=1989-2006)					
1979-1988	-0174	0.295	0.554	-0.752	0.403
1969-1978	-0.558	0.284	0.049	-1.115	-0.001
1959-1968	-0.181	0.283	0.522	-0.735	0.373
1949-1958	0.039	0.317	0.901	-0.582	0.661
1939-1948	0.103	0.380	0.786	-0.641	0.847
1908-1938	0.382	0.472	0.418	-0.543	1.307
Time*Time	-0.019	0.003	0.000	-0.025	-0.013
Education (ref=Advanced)					
Low Education	0.495	0.113	0.000	0.274	0.715
Intermediate Education	0.455	0.120	0.000	0.220	0.690
Disability	0.509	0.072	0.000	0.367	0.651
Married	-1.396	0.094	0.000	-1.580	-1.213
Employed	-0.544	0.078	0.000	-0.696	-0.392
Ethnicity (ref=Other)					
White	0.927	0.316	0.003	0.307	1.548
Mixed	0.594	0.396	0.134	-0.183	1.370
Asian	0.848	0.324	0.009	0.212	1.483
Black	0.158	0.347	0.648	-0.521	0.837
Intercept	-5.342	0.399	0.000	-6.124	-4.560
LAD-level variance	0.253	0.066		0.151	0.423
Individual-level time slope variance	0.087	0.013		0.064	0.118
Individual-level variance	7.998	0.556		6.980	9.166
No. Observation: 25,100					
No. Individuals: 11,297					
No. LAD: 308					

Table S.8: Predicted probabilities for informal caregiving (all types) by cohort and sex (Figure X) **below the poverty line**. Pooled sample, adjusted for control variables (PP, predicted probability; LCI, lower confidence interval; UCI, upper confidence interval). Weighted values.

Variable	Odds-Ratio	P-value	LCI	UCI
Male*1989-2006	0.082	0.000	0.068	0.096
Male*1979-1988	0.144	0.000	0.123	0.164
Male*1969-1978	0.213	0.000	0.190	0.237
Male*1959-1968	0.269	0.000	0.243	0.295
Male*1049-1958	0.318	0.000	0.284	0.352
Male*1939-1948	0.282	0.000	0.241	0.323
Male*1908-1938	0.279	0.000	0.226	0.332
Female*1989-2006	0.109	0.000	0.094	0.124
Female*1979-1988	0.170	0.000	0.153	0.188
Female*1969-1978	0.216	0.000	0.198	0.234
Female*1959-1968	0.305	0.000	0.283	0.327
Female*1049-1958	0.380	0.000	0.348	0.411
Female*1939-1948	0.347	0.000	0.302	0.392
Female*1908-1938	0.371	0.000	0.306	0.435

Table S.9: Mixed effects logistic regression for informal caregiving – **not deprived area** (underlying model for Figure 4). Pooled sample (LCI, lower confidence interval; UCI, upper confidence interval).

Variable	Coefficient	Std. Err.	P-Value	LCI	UCI
Female	0.160	0.216	0.460	-0.264	0.584
Cohort (ref=1989-2006)					
1979-1988	0.763	0.245	0.002	0.283	1.244
1969-1978	1.804	0.235	0.000	1.344	2.263
1959-1968	2.748	0.226	0.000	2.304	3.191
1949-1958	3.911	0.232	0.000	3.456	4.367
1939-1948	3.903	0.240	0.000	3.434	4.373
1908-1938	3.502	0.277	0.000	2.959	4.044
Time	0.045	0.032	0.150	-0.016	0.107
Cohort*time (ref=1989-2006)					
1979-1988	0.052	0.032	0.107	-0.011	0.116
1969-1978	0.091	0.030	0.003	0.031	0.150
1959-1968	0.113	0.030	0.000	0.055	0.171
1949-1958	0.036	0.031	0.239	-0.024	0.096
1939-1948	-0.015	0.032	0.644	-0.078	0.048
1908-1938	0.108	0.041	0.008	0.028	0.187
Female*Time	0.062	0.013	0.000	0.037	0.088
Cohort*Female (ref=1989-2006)					
1979-1988	0.177	0.276	0.521	-0.364	0.717
1969-1978	0.095	0.258	0.712	-0.410	0.600
1959-1968	0.432	0.248	0.082	-0.054	0.917
1949-1958	0.396	0.257	0.122	-0.106	0.899
1939-1948	0.341	0.273	0.212	-0.194	0.876
1908-1938	0.917	0.335	0.006	0.260	1.573
Time*Time	-0.020	0.001	0.000	-0.023	-0.017
Education (ref=Advanced)					
Low Education	0.568	0.075	0.000	0.421	0.715
Intermediate Education	0.183	0.078	0.019	0.030	0.337
Disability	0.298	0.037	0.000	0.226	0.369
Married	-1.395	0.068	0.000	-1.527	-1.262
Employed	-0.335	0.048	0.000	-0.430	-0.240
Ethnicity (ref=Other)					
White	0.354	0.312	0.257	-0.258	0.966
Mixed	0.410	0.396	0.301	-0.367	1.187
Asian	0.309	0.335	0.355	-0.347	0.966
Black	-0.432	0.372	0.245	-1.161	0.297
Intercept	-5.406	0.371	0.000	-6.134	-4.679
LAD-level variance	0.124	0.033		0.073	0.210
Individual-level time slope variance	0.129	0.006		0.117	0.141
Individual-level variance	8.634	0.313		8.041	9.271
No observation: 99,884					
No individuals: 17,211					
No LAD: 205					

Table S.10: Predicted probabilities for informal caregiving (all types) by cohort and sex (Figure X) – **not deprived area**. Pooled sample, adjusted for control variables (PP, predicted probability; LCI, lower confidence interval; UCI, upper confidence interval). Weighted values.

Variable	Odds Ratio	P-Value	LCI	UCI
Male*1989-2006	0.055	0.000	0.046	0.064
Male*1979-1988	0.088	0.000	0.077	0.099
Male*1969-1978	0.146	0.000	0.133	0.160
Male*1959-1968	0.214	0.000	0.199	0.230
Male*1049-1958	0.275	0.000	0.256	0.293
Male*1939-1948	0.255	0.000	0.234	0.275
Male*1908-1938	0.270	0.000	0.239	0.301
Female*1989-2006	0.069	0.000	0.060	0.079
Female*1979-1988	0.116	0.000	0.105	0.127
Female*1969-1978	0.181	0.000	0.168	0.194
Female*1959-1968	0.284	0.000	0.269	0.298
Female*1049-1958	0.348	0.000	0.330	0.366
Female*1939-1948	0.321	0.000	0.299	0.343
Female*1908-1938	0.389	0.000	0.352	0.427

Table S.11: Mixed effects logistic regression for informal caregiving – **deprived area** (underlying model for Figure X). Pooled sample (LCI, lower confidence interval; UCI, upper confidence interval).

Variable	Coefficient	Std. Error	P-Value	LCI	UCI
Female	0.072	0.176	0.683	-0.273	0.417
Cohort (ref=1989-2006)					
1979-1988	0.709	0.191	0.000	0.336	1.083
1969-1978	1.344	0.195	0.000	0.962	1.725
1959-1968	2.213	0.192	0.000	1.836	2.590
1949-1958	3.061	0.210	0.000	2.648	3.473
1939-1948	3.031	0.231	0.000	2.578	3.485
1908-1938	1.882	0.317	0.000	1.260	2.504
Time	0.083	0.027	0.002	0.030	0.136
Cohort*time (ref=1989-2006)					
1979-1988	0.025	0.025	0.316	-0.024	0.075
1969-1978	0.037	0.025	0.134	-0.011	0.085
1959-1968	0.048	0.025	0.051	-0.000	0.096
1949-1958	-0.012	0.027	0.660	-0.064	0.040
1939-1948	-0.046	0.031	0.135	-0.106	0.014
1908-1938	0.175	0.047	0.000	0.083	0.266
Female*Time	0.040	0.013	0.003	0.014	0.066
Cohort*Female (ref=1989-2006)					
1979-1988	0.076	0.218	0.728	-0.352	0.504
1969-1978	0.277	0.217	0.203	-0.149	0.703
1959-1968	0.492	0.216	0.023	0.069	0.914
1949-1958	0.552	0.238	0.020	0.086	1.019
1939-1948	0.307	0.276	0.267	-0.235	0.849
1908-1938	0.718	0.399	0.072	-0.064	1.500
Time*Time	-0.018	0.001	0.000	-0.021	-0.016
Education (ref=Advanced)					
Low Education	0.676	0.075	0.000	0.528	0.823
Intermediate Education	0.558	0.077	0.000	0.407	0.708
Disability	0.345	0.039	0.000	0.268	0.421
Married	-1.014	0.061	0.000	-1.133	-0.896
Employed	-0.374	0.047	0.000	-0.466	-0.281
Ethnicity (ref=Other)					
White	0.405	0.249	0.103	-0.082	0.892
Mixed	0.246	0.304	0.418	-0.350	0.842
Asian	0.609	0.255	0.017	0.110	1.109
Black	-0.037	0.267	0.890	-0.561	0.487
Intercept	-5.012	0.300	0.000	-5.601	-4.424
LAD-level variance	0.213	0.046		0.139	0.325
Individual-level time slope variance	0.117	0.006		0.106	0.129
Individual-level variance	8.176	0.305		7.510	8.796
No observation: 90,229					
No individuals: 16,099					
No LAD: 128					

Table S.12: Predicted probabilities for informal caregiving (all types) by cohort and sex (Figure X)- **deprived area**. Pooled sample, adjusted for control variables (PP, predicted probability; LCI, lower confidence interval; UCI, upper confidence interval). Weighted values.

Variable	Odds Ratio	Std. Err.	P-Value	LCI	UCI
Male*1989-2006	0.092	0.006	0.000	0.081	0.103
Male*1979-1988	0.131	0.007	0.000	0.118	0.144
Male*1969-1978	0.172	0.008	0.000	0.157	0.187
Male*1959-1968	0.238	0.009	0.000	0.221	0.255
Male*1049-1958	0.284	0.012	0.000	0.261	0.307
Male*1939-1948	0.268	0.014	0.000	0.240	0.295
Male*1908-1938	0.261	0.022	0.000	0.219	0.304
Female*1989-2006	0.104	0.006	0.000	0.092	0.115
Female*1979-1988	0.151	0.006	0.000	0.139	0.163
Female*1969-1978	0.210	0.007	0.000	0.196	0.224
Female*1959-1968	0.300	0.009	0.000	0.283	0.317
Female*1049-1958	0.356	0.011	0.000	0.334	0.378
Female*1939-1948	0.317	0.015	0.000	0.287	0.346
Female*1908-1938	0.346	0.026	0.000	0.295	0.396

Table S.13: Multilevel Analysis of Individual Heterogeneity and Discriminatory Accuracy. MLE estimation is used for all models shown. Wave 1.

Variable	Category	Model 1	Model 2	Model 3
Intercept		0.23***	0.15***	0.09***
Sex	Female (Ref)	-	-	-
	Male	-	0.74***	0.76***
Cohort (5-year groups)	1989-2006 (Ref)	-	-	-
	1979-1988	-	1.01	1.47***
	1969-1978	-	1.35***	2.59***
	1959-1968	-	2.21***	4.17***
	1949-1958	-	3.32***	6.48***
	1939-1948	-	3.13***	5.90***
	1908-1938	-	3.17***	5.17***
Poverty Status	In Poverty (Ref)	-	-	-
	Not in Poverty	-	0.89**	0.98
Deprivation Status	Deprived (Ref)	-	-	-
	Not Deprived	-	0.91*	0.87***
Marital Status	Married (Ref)	-	-	-
	Single	-	-	2.02***
Employment Status	Employed (Ref)	-	-	-
	Unemployed	-	-	1.26***
Ethnicity	White (Ref)	-	-	-
	Mixed	-	-	0.86
	Asian	-	-	1.02
	Black	-	-	0.57***
	Other	-	-	0.53***
Disability Status	Yes (Ref)	-	-	-
	No	-	-	0.69***
Education Level	Low Education (Ref)	-	-	-
	Intermediate Education	-	-	0.89**
	Advanced Education	-	-	0.73***
N. observation:		34,555	34,555	26,110
N. of groups: 56				

Table S.14: Multilevel Analysis of Individual Heterogeneity and Discriminatory Accuracy. MLE estimation is used for all models shown. Wave 12.

Variable	Category	Model 1	Model 2	Model 3
Intercept		0.23***	0.15***	0.08***
Sex	Female (Ref)	-	-	-
	Male	-	0.64***	0.66***
Cohort (5-year groups)	1989-2006 (Ref)	-	-	-
	1979-1988	-	1.49***	2.79***
	1969-1978	-	2.27***	4.23***
	1959-1968	-	3.55***	6.48***
	1949-1958	-	3.42***	5.43***
	1939-1948	-	2.71***	3.70***
	1908-1938	-	3.53***	4.24***
Poverty Status	In Poverty (Ref)	-	-	-
	Not in Poverty	-	0.81**	0.96
Deprivation Status	Deprived (Ref)	-	-	-
	Not Deprived	-	0.89**	0.89**
Marital Status	Married (Ref)	-	-	-
	Single	-	-	2.30***
Employment Status	Employed (Ref)	-	-	-
	Unemployed	-	-	1.35***
Ethnicity	White (Ref)	-	-	-
	Mixed	-	-	0.88
	Asian	-	-	0.89
	Black	-	-	0.77*
	Other	-	-	0.53
Disability Status	Yes (Ref)	-	-	-
	No	-	-	0.70***
Education Level	Low Education (Ref)	-	-	-
	Intermediate Education	-	-	1.05
	Advanced Education	-	-	0.90*
N. observation:		19,115	19,115	14,408
N. of groups: 56				

Table S.15: Multilevel Analysis of Individual Heterogeneity and Discriminatory Accuracy: Variance Decomposition. Wave 12.

	Model 1	**95% CI**	**Model 2**	**95% CI**	**Model 3**	**95% CI**
Random Effect: Variances						
Stratum-Level	0.25	[0.16, 0.40]	0.001	[0.00, 0.02]	0.00	-
Summary Statistics						
Variance Partition Coefficient (VPC)	7.1%		0.1%		0%	
Proportional Change in Variance (PCV)			98.9%		100%	
Area Under Receiver Operating Characteristic Curve (AUC)	0.64		0.64		0.68	

Table S.16: Multilevel Analysis of Individual Heterogeneity and Discriminatory Accuracy. MLE estimation is used for all models shown. Wave 5.

Variable	Category	Model 1	Model 2	Model 3
Intercept		0.27***	0.18***	0.09***
Sex	Female (Ref)	-	-	-
	Male	-	0.74***	0.80***
Cohort (5-year groups)	1989-2006 (Ref)	-	-	-
	1979-1988	-	1.25**	2.08***
	1969-1978	-	1.48***	2.93***
	1959-1968	-	2.50***	4.91***
	1949-1958	-	3.56***	6.87***
	1939-1948	-	3.02***	4.66***
	1908-1938	-	3.63***	5.07***
Poverty Status	In Poverty (Ref)	-	-	-
	Not in Poverty	-	0.82**	0.97
Deprivation Status	Deprived (Ref)	-	-	-
	Not Deprived	-	0.87*	0.87**
Marital Status	Married (Ref)	-	-	-
	Single	-	-	2.02***
Employment Status	Employed (Ref)	-	-	-
	Unemployed	-	-	1.32***
Ethnicity	White (Ref)	-	-	-
	Mixed	-	-	0.98
	Asian	-	-	1.27***
	Black	-	-	0.67***
	Other	-	-	0.81
Disability Status	Yes (Ref)	-	-	-
	No	-	-	0.73***
Education Level	Low Education (Ref)	-	-	-
	Intermediate Education	-	-	0.94
	Advanced Education	-	-	0.73***
N. observation:		27,511	34,555	19,408
N. of groups: 56				

Table S.17: Multilevel Analysis of Individual Heterogeneity and Discriminatory Accuracy: Variance Decomposition. Wave 5.

	Model 1	95% CI	Model 2	95% CI	Model 3	95% CI
Random Effect: Variances						
Stratum-Level	0.26	[0.18, 0.40]	0.005	[0.00, 0.02]	0.00	[0.00, 0.04]
Summary Statistics						
Variance Partition Coefficient (VPC)	7.5%		0.1%		0.1%	
Proportional Change in Variance (PCV)			98.3%		98.1%	
Area Under Receiver Operating Characteristic Curve (AUC)	0.64		0.64		0.68	

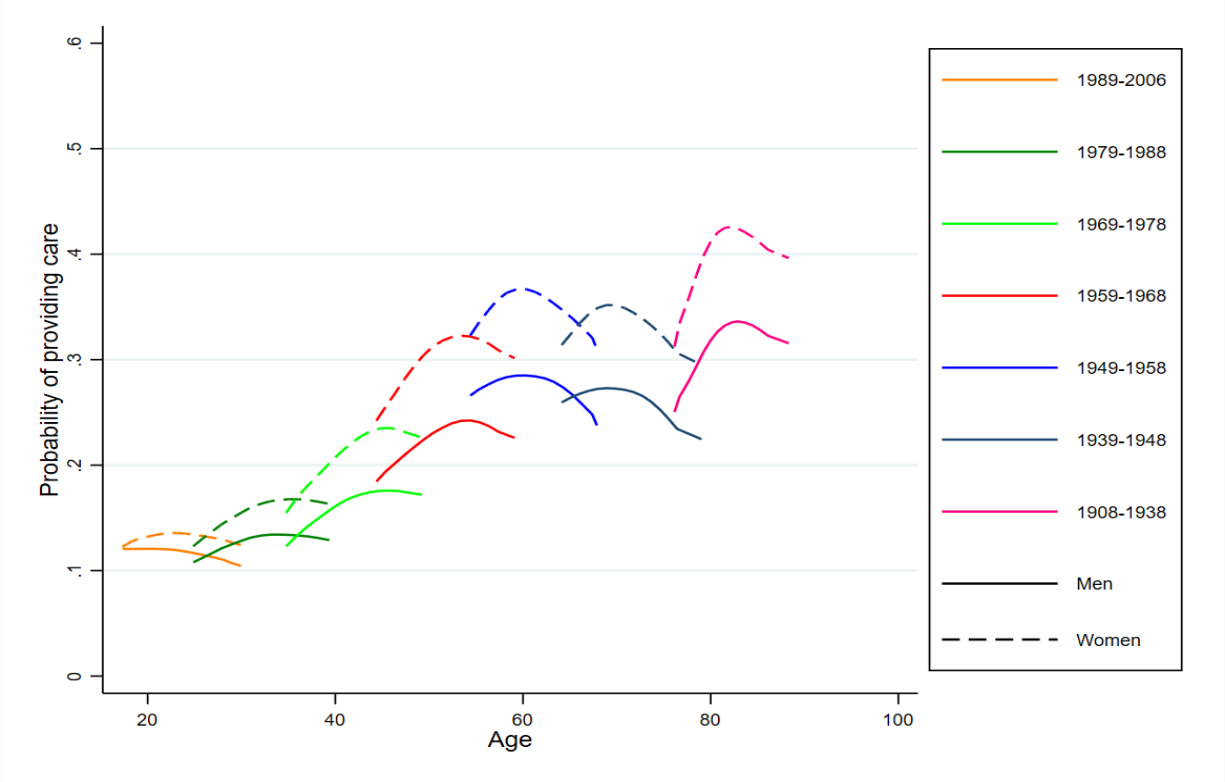

Figure S.1: Gender care gap, unadjusted.

Notes: Probability of giving care, adjusted mixed-effect logistic regression.
Source: UKHLS data, 2009- 2020, England.

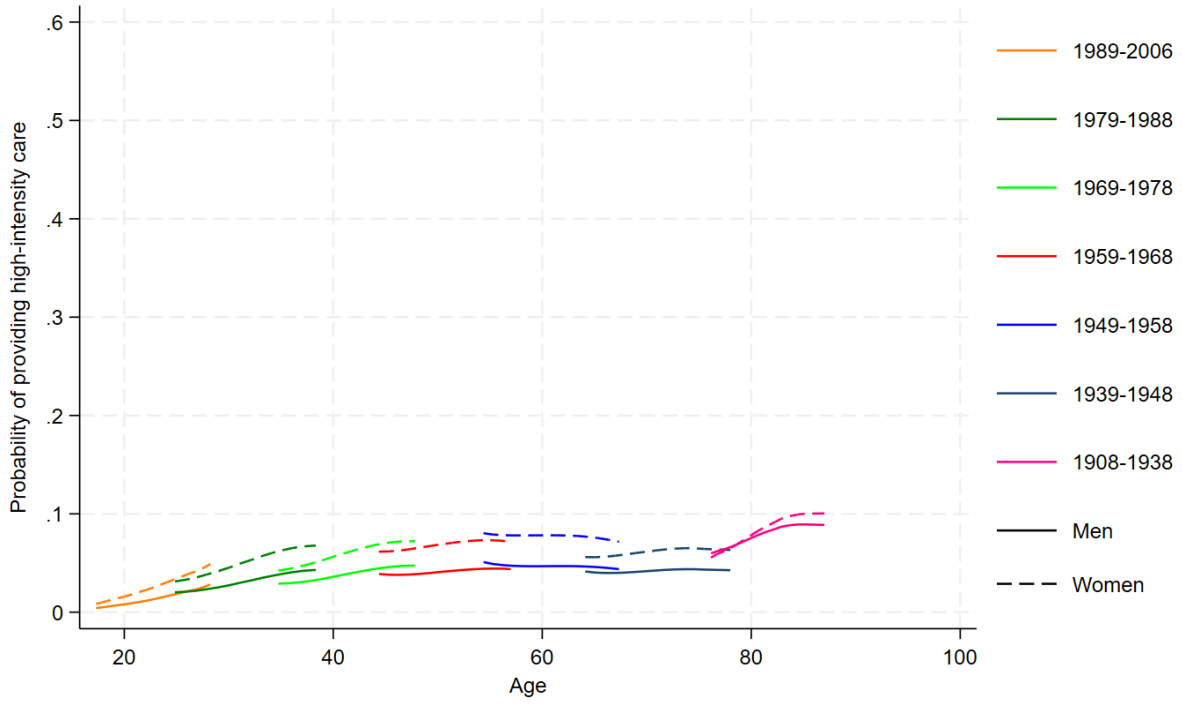

Figure S.2: Gender care gap: high-intensity care *Notes: Probability of giving care, adjusted mixed-effect logistic regression. Model adjusted for ethnicity, long-standing illness or impairment, partner, highest education achieved, and employment.. High intensity: Takes value one if the individual provides more than 20 hours per week of care. Providing no spousal care: Takes value one if the individual is providing no spousal care.*
Source: UKHLS data, 2009- 2020, England.

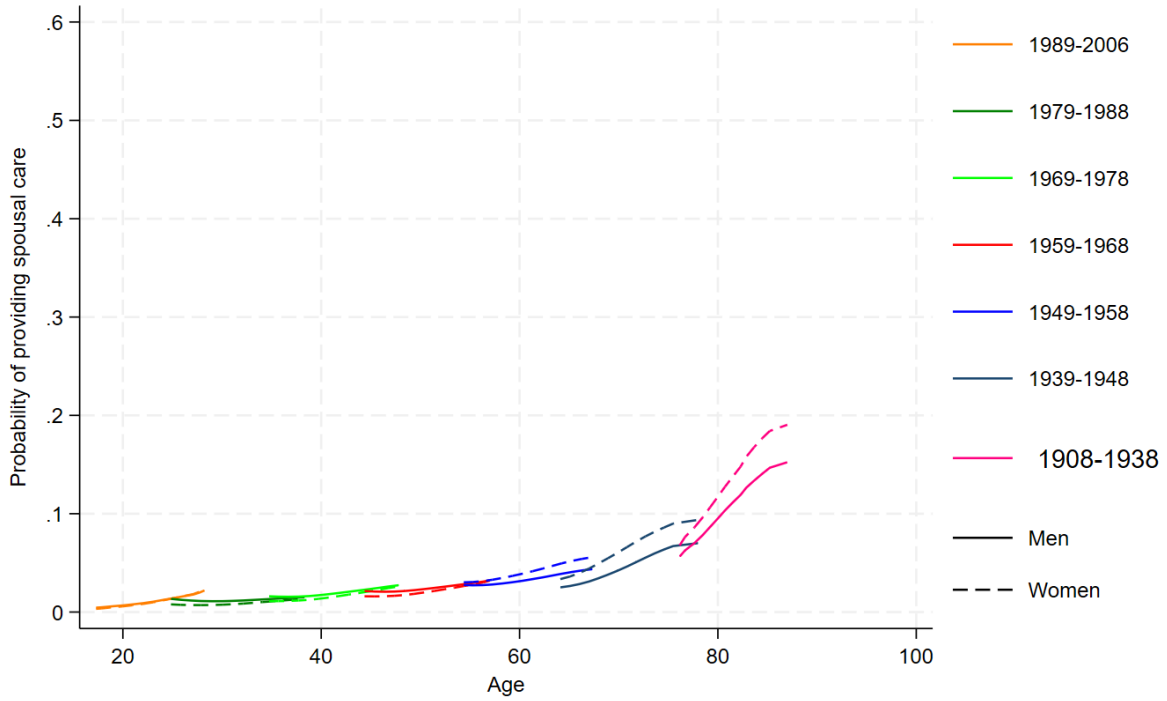

Figure S.3: Gender care gap: spousal care *Notes: Probability of giving care, adjusted mixed-effect logistic regression. Model adjusted for ethnicity, long-standing illness or impairment, partner, highest education achieved, and employment. High intensity: Takes value one if the individual provides more than 20 hours per week of care. Providing no spousal care: Takes value one if the individual is providing no spousal care.*
Source: UKHLS data, 2009- 2020, England.

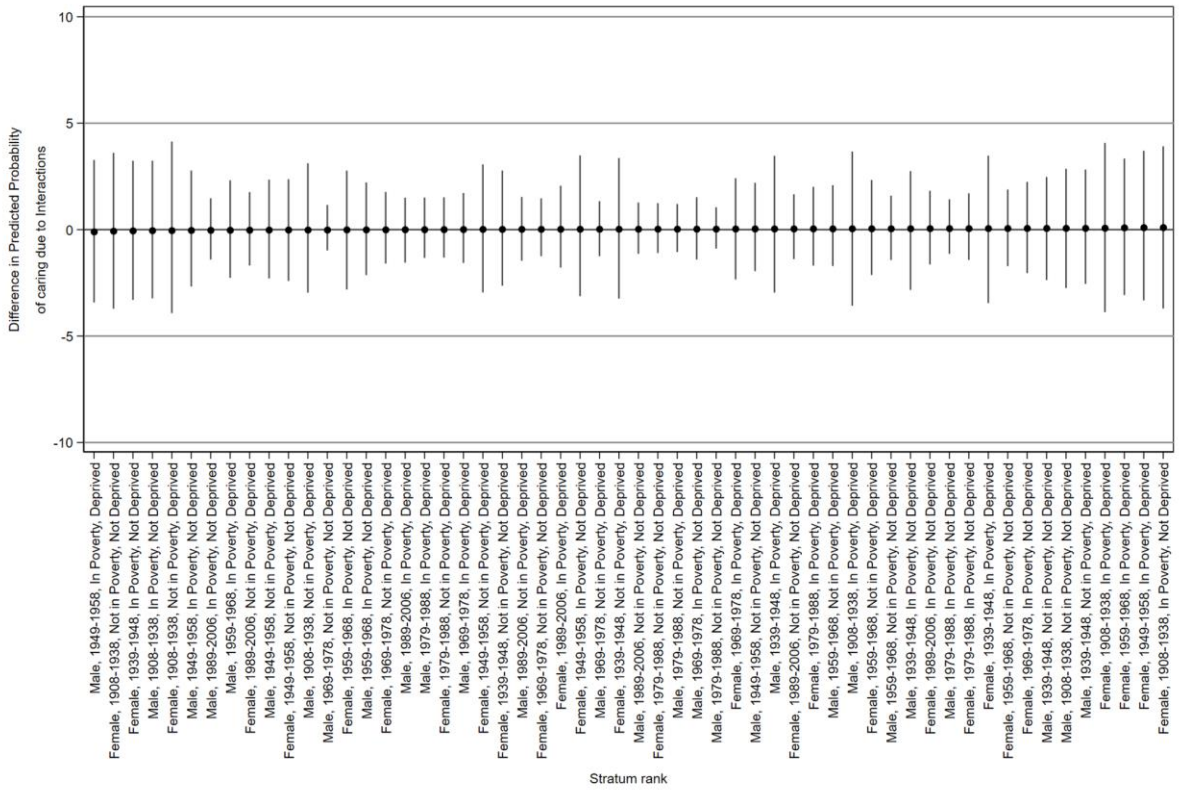

Figure S.4: Difference in the predicted probability of providing care due to interaction effect.

Note: Difference between the total predicted probability in each stratum and the probability based on additive main effects.

Source: UKHLS data, wave 1, England.

The UKHLS is a comprehensive nationally-representative household panel survey designed to follow the same individuals and households over time. Building upon the British Household Panel Survey (BHPS), the UKHLS aims to represent the population residing in UK households. With an initial sample size of approximately 40,000 households, it stands as the largest household panel survey of its kind.