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Unpaid carers in Wales:

The creation of an e-cohort to understand long-term health conditions amongst unpaid carers in Wales

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Background

- It has been estimated by Carers Wales that the informal and unpaid care provided by family, friends and neighbours is worth more than £8.1 billion a year to the economy of Wales. However, the health needs of unpaid carers are often overlooked due to the focus on the health of those being cared for. Understanding the health and wellbeing needs of unpaid carers themselves is of key importance, to ensure support is in place to maintain their own good health whilst they also care for others. Barriers in identifying unpaid carers, and the lack of data availability on caring status and how health amongst unpaid carers differs to non-carers, are significant challenges to evidence informed action to better support unpaid carers.
- **This is the first study in Wales providing a comprehensive assessment of the prevalence of physical and mental long-term health conditions and multimorbidity as managed in primary care amongst unpaid carers, and compared to a matched comparison group of non-carers in Wales.**

Findings

- Routinely collected primary care data and National Survey for Wales data were used to identify 62,942 unpaid carers in Wales since 2011; this electronic-cohort of unpaid carers were more likely to be female, of older age and live in deprived areas, compared to the general population in Wales.
- Thirty-six out of thirty-seven physical and mental long-term health conditions recorded in primary care were more prevalent among unpaid carers than non-carers. The most prevalent condition for both unpaid carers and non-carers was anxiety and/or depression, with standardised rates of 248 and 137 per 1,000 population respectively.
- The largest differences in prevalence between unpaid carers and non-carers were seen for cancer (carers had 2.7 the rate of non-carers), constipation (rate ratio = 1.9), anxiety and/or depression (rate ratio = 1.8), irritable bowel syndrome (rate ratio = 1.7) and musculoskeletal disorders (rate ratio = 1.6).
- For some conditions, there was evidence to suggest onset at a younger age amongst unpaid carers such as anxiety and/or depression, irritable bowel syndrome and musculoskeletal disorders. The findings also reported higher prevalence of epilepsy, specifically amongst young unpaid carers compared to non-carers, although there possible issues with data quality meaning this should be interpreted cautiously.
- Unpaid carers were more likely to be living with multiple long-term health conditions (308 per 1,000 population amongst unpaid carers compared to 187 per 1,000 population amongst non-carers), and the difference in prevalence was greater at a younger age (e.g. for those aged 25-34yrs, 205 per 1,000 population amongst unpaid carers compared to 79 per 1,000 population amongst non-carers). In older age, the proportion of unpaid carers managing multiple long-term conditions exceeded 550 per 1,000 by the age of 65 years and above, whereas amongst non-carers this proportion was only exceeded at 75 years and above.

- In both unpaid carers and non-carers, poorer health was associated with higher levels of deprivation. However, the association between caring and poor health was evident irrespective of area level deprivation. In the most deprived communities, unpaid carers were 1.6 times more likely to report poor health compared to non-carers; in the least deprived communities this was 1.8 times more likely amongst unpaid carers compared to non-carers.

Implications

- Our findings highlight that unpaid carers not only experience poorer physical and mental health, but also at a younger age than non-carers, and whilst those living in the most deprived communities are particularly affected, the association between caring and poor health is evident across all levels of deprivation. To overcome the particular challenges that unpaid carers may face **local authorities and healthcare providers need to provide a range of flexible services to unpaid carers, to support the prevention and early identification of poor health amongst unpaid carers themselves, and accessible healthcare within the community.**

- To ensure this support reaches the unpaid carers who need it most, work on identifying unpaid carers is a critical first step. Anyone can become an unpaid carer at any point of time. Given the known barriers to self-identification, **health and social care professionals are often well-placed to identify unpaid carers. With *A Healthier Wales: Our Workforce Strategy for Health and Social Care*, Welsh Government needs to ensure that specific training is provided and implemented, and reliable and standardised information is collected to identify unpaid carers.**

- Once identified, health and social care professionals have an important opportunity to inquire about the unpaid carers' own health, provide information on manual handling, promote healthy lifestyles and signpost them to other support services if needed. Programmes such as the Making Every Contact Count (MECC) approach encourage healthcare staff to use the opportunities arising from routine practice when interacting with patients to promote healthier lifestyle changes; highlighting the needs of unpaid carers within this approach can also help ensure unpaid carers receive support.

- In this cross sectional study, it was not possible to explore the relationship between caring responsibilities and health, and how that may change over time. Evidence from other studies suggests that poor health may be linked to caring responsibilities. To help guide further efforts to most effectively support unpaid carers, **further research to gather insight into potential drivers of poor health among unpaid carers is of value, and may consider factors such as the length of time as an unpaid carer, caring intensity, care recipients' illness and needs, employment, education and the availability of other support.**

- The health and social care system in the UK relies heavily on unpaid carers but they often suffer from poor health. Our findings urge all services working together as a holistic approach to prioritise unpaid carers' health needs, provide additional support to those younger and in the most deprived communities who are most likely to benefit most from a tailored approach, to stop widening inequalities in health, ensure their caring responsibility is sustainable, and have healthy and fulfilled life alongside caring.

Why does this matter?

With an ageing population, many people with multiple long-term health conditions and complex needs are cared for informally by family, friends, and neighbours, referred to as 'unpaid carers'[1]. Anyone can become an unpaid carer at any time in their life, and sometimes for more than one person at a time. Unpaid carers can be any age from young children to elderly people. It has been estimated by Carers Wales that the informal and unpaid care provided by family, friends and neighbours is worth more than £8.1 billion a year to the economy of Wales.

… informal and unpaid care provided by family, friends and neighbours is worth more than £8.1 billion a year to the economy of Wales

Due to the lack of a systematic data collection on unpaid carers, it is difficult to obtain the true number of unpaid carers in Wales. In 2019, it was estimated that there were over 400,000 unpaid carers in Wales and this increased to nearly 700,000 at the peak of the COVID-19 pandemic [2]. Our understanding of unpaid carers' health is largely informed by research using surveys and interviews, examining one aspect of health and focusing on those caring for specific conditions. These studies suggest unpaid carers often experience worse health outcomes than non-carers, and are more likely to report having a long-term condition, disability or illness [3, 4]. Unpaid carers' health needs are often overlooked due to the focus on the health of those cared for, and evidence on the prevalence of long-term health conditions and multimorbidity among unpaid carers in Wales is limited. A recent qualitative study highlighted the urgency of large quantitative analysis using routine data to understand the health and wellbeing needs of those who were providing unpaid care before and during the COVID-19 pandemic [5].

Aims of this study:

- To create an electronic cohort of unpaid carers in Wales through routine data to enable robust research and evaluation to support unpaid carers in Wales.
- To understand the prevalence of long-term health conditions and multimorbidity in unpaid carers in Wales, and how the patterns change by unpaid carers' subgroups.

What do we know?

The impact of providing care on unpaid carers' own health can be a direct consequence of the physical demands of the tasks they are required to perform, a response to mental and emotional strain, or due to unpaid carers prioritising the health of those cared for and neglecting their own health needs [6]. Thirty-one percent of unpaid carers reported that their day-to-day activities were limited by a long-term health problem or disability and 9% of unpaid carers experienced bad or very bad self-reported general health in Wales, while it was 21% and 7% respectively for non-carers [7]. Research suggested that spousal carers (particularly those who are female) were more likely to experience mental, physical and social morbidity [8]. In the Scottish Government's official statistical report summarised from the Scottish Health Survey, 41% of unpaid carers had a long-term condition or illness, compared to 29% of non-carers [9]. The report suggests that this may be partially explained by the fact that unpaid carers tend to be older and the likelihood of developing a long-term illness or disability increases with age.

Thirty-one percent of unpaid carers reported that their day-to-day activities were limited by a long-term health problem or disability …

For specific health conditions amongst unpaid carers, a large number of unpaid carers reported that their mental health has been affected by providing care and they are more likely to experience anxiety and depression [10]. A meta-analysis including UK and international studies estimated overall poorer anxiety and depression prevalence to be 32.1% and 31.2% respectively amongst dementia carers [11]. Physical health of unpaid carers is a less often studied area than mental health. Unpaid carers often report multiple physical problems, including fatigue, musculoskeletal disorders, and sleep disturbance [3, 10]. For those who provide hands-on care, higher levels of arthritis, high blood pressure and long-term back problems are common [3]. Other studies recognised physical health impacts among unpaid carers including increased risk of cardiovascular diseases, high blood pressure, diabetes and decreased immune system [12]. A US study from a national unpaid carer survey suggested that half of unpaid carers reported taking more medications as a result of providing care (51%) and 10% reported more frequently misusing alcohol or prescription drugs [13].

… they are more likely to experience anxiety and depression …

What did we do?

To ascertain the health needs of unpaid carers in Wales we needed to first bring together different datasets to generate an electronic-cohort of unpaid carers in Wales in routine health data, and then use that cohort to explore health needs of unpaid carers.

Generating an electronic–cohort of unpaid carers

We started with reviewing existing clinical Read codes used in primary care services to identify unpaid carers, and then worked with practitioners to validate the use of these codes within Welsh general practice settings. A list of 36 Read codes was validated and used to indicate unpaid caring status in primary care settings (see Table A1 in Appendix). We utilised the routinely collected primary care data stored in the Secure Anonymised Information Linkage (SAIL) Databank. SAIL Databank is a resource of anonymised secure privacy-protecting person-based linkable data from health and public settings to support research. An anonymised linkage field was generated by the trusted third party for each individual, which can be used to link across datasets in SAIL Databank at person-level [14, 15]. The study period covers the period from 28th March 2011 (the day after the 2011 Census data collection was completed) to 10th October 2020 (which was the last date when primary care data was available for the analysis). A total of 58,776 unpaid carers with 79,239 records were found within the study period. Another resource used to identify unpaid carers is the National Survey for Wales (NSW). The NSW is a large-scale population-level survey of people aged 16+ years in Wales and covers a wide range of topics, i.e. health, art and culture. The NSW from years 2016/2017, 2017/2018 and 2018/2019 were available to our study within SAIL Databank and a survey question was used to identify unpaid carers[1]. A total 5,007 unpaid carers responded to the survey over three years.

We combined the unpaid carers identified through the primary care database and NSW datasets, and ended up with an e-cohort of 62,942 unpaid carers (for flow diagram see Exhibit A1 in Appendix). We then linked the e-cohort with the Welsh Demographic Service Database (WDSD) in SAIL Databank to obtain the unpaid carers' demographic information (sex and week of birth) and geographic residence at the point of being recorded as an unpaid carer, either in primary care settings or when responding to the NSW. Geographic residence was marked at lower layer super output (LSOA) area level, which has approximately 1,500 individuals per area level [16]. Quintiles of the Welsh Index of Multiple Deprivation (WIMD) 2014 scores were used as a measure of area deprivation [17]. Due to the inconsistency in routinely recording unpaid caring status, we used the earliest date where unpaid caring status was recorded for each individual as the index date as an unpaid carer.

We assessed the differences in sociodemographic characteristics for unpaid carers identified in primary care settings and those self-reported as unpaid carers in the NSW through the summary statistics of both cohorts. We found a slightly higher proportion of women and those over the age of 75 and a lower proportion of those aged 65-74 amongst unpaid carers identified from primary care database, compared to unpaid carers identified in the NSW (see Table A3 in Appendix). Distribution by deprivation quintile was similar.

1 Survey question to identify unpaid carers: *Look after, or give any help or support to family members, friends, neighbours or others.*

A matched non-carer comparison group

We generated a matched non-carer comparison group to reflect the age, sex and WIMD distribution of the e-cohort. Welsh residents who were alive on the index date and not identified as unpaid carers in the e-cohort were matched to unpaid carers on age, sex and WIMD on the index date (the earliest date of unpaid caring status identified in either primary care database or NSW). We randomly selected one non-carer as the comparison per unpaid carer to form a comparison group of 62,942 non-carers.

Long-term health conditions and multimorbidity

Using the unpaid carer index date we retrospectively followed up with their electronic health records to ascertain long-term health conditions and multimorbidity. We used the Cambridge Multimorbidity Score (CMS) and corresponding clinical codes to identify 37 long-term health conditions recorded in primary care records [18, 19]. The CMS is a new method developed for measuring multiple long-term health conditions amongst primary care patients. Multimorbidity is defined as the presence of two or more of the 37 long-term health conditions identified within the CMS. Due to the absence of available Read codes to capture prescription information in the CMS, we searched Read codes as the replacement of product codes for conditions including asthma, constipation, irritable bowel syndrome, migraine, psoriasis or eczema, and schizophrenia. We used existing developed Read code lists to capture prescriptions for anxiety, depression and epilepsy [20-22]. We did not include one item from CMS, painful conditions, due to the absence of a read code list. We added musculoskeletal disorders due to their high prevalence among unpaid carers and used an existing diagnosis code list to identify musculoskeletal disorders [3, 23]. A full list of long-term health conditions and their corresponding follow-up periods is available in Table A2 in Appendix.

Statistical analysis

We produced descriptive statistics in the form of frequencies, percentages, cross tabulations and graphical figures. Associations between prevalence and deprivation were assessed using Spearman rank correlations. T-tests and one-way ANOVA tests were used to analyse differences in prevalence of individual conditions across age groups and deprivation quintiles (least and most deprived quintiles). $p<0.05$ was considered to be statistically significant. All analysis was conducted using Stata (Version 16.1 SE).

What did we find?

Unpaid carers are more likely to be female, older and live in deprived areas

Women accounted for nearly two thirds of those identified as unpaid carers (34.9% male and 65.1% female; see Figure 1 and Table A3 in Appendix), and a higher proportion of women provided care within all age groups. 16.2% of unpaid carers were female in 55-64 years group (compared to 7.7% for male), followed by female unpaid carers in 45-54 years group (12.7% vs 5.9% in male) and 75 year and over group (10.4% vs 7.8% in male). Approximately a quarter (23.8%) of unpaid carers were aged 55-64 years, and approximately a fifth were aged 45-54 years (18.6%) and 75 years and over (18.1%). Overall, 20.4% of unpaid carers were living in the most deprived communities, while 19.2% were from the least deprived communities (see Figure 2 and Table A3 in Appendix).

Compared to the mid-2018 Welsh population estimate (Figure 1 and Figure 2) [24], unpaid carers were more likely to be:

- female (65.1% vs 50.7% in general population, p<0.001),
- older (55-64 years: 23.8% vs 12.8%, 65-74 years: 14.9% vs 11.5%, 75 and over: 18.1% vs 9.3%, p<0.001
- living in more deprived communities (most deprived quintile: 20.4% vs 19.6% , Q2: 20.4% vs 19.9%, Q3: 21.3% vs 20.6%, p<0.001) [24].

Figure 1: Distribution of the unpaid carers by age group, compared to the general population in Wales

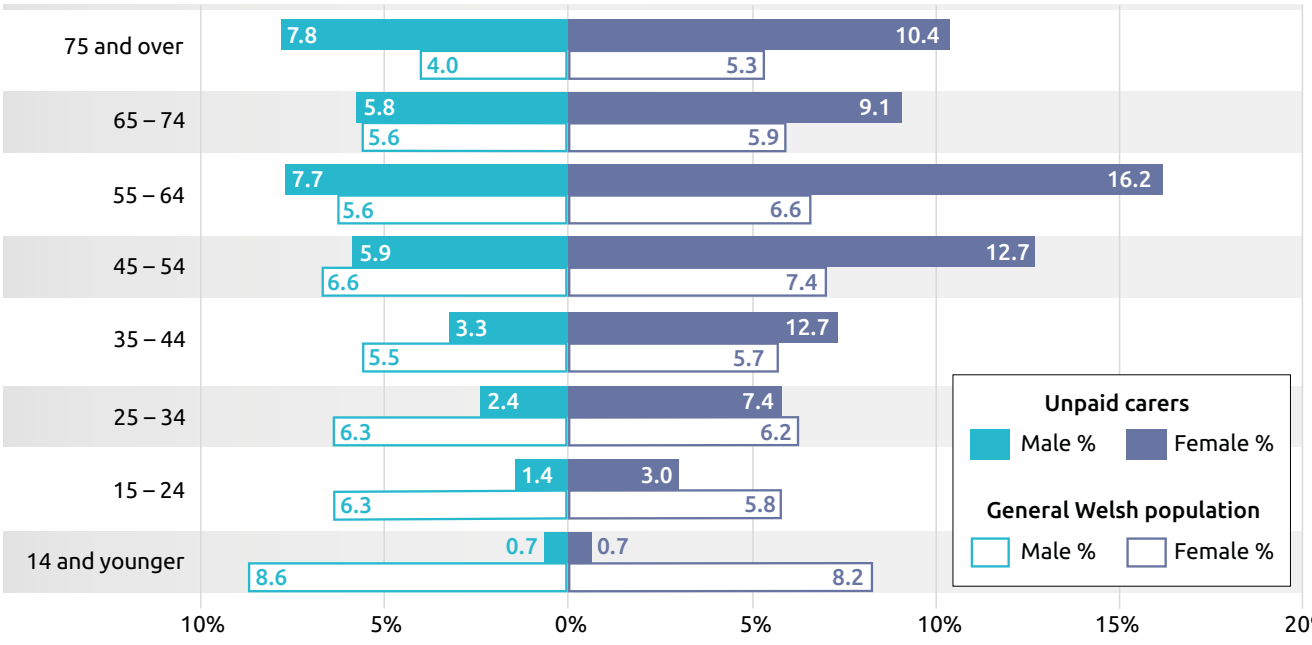
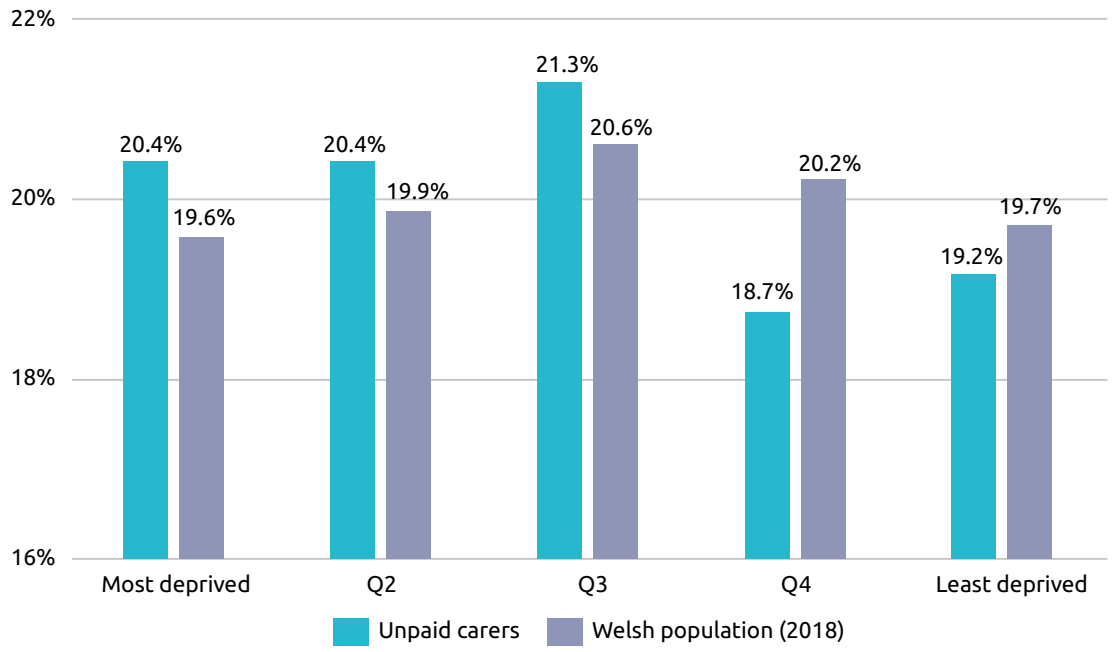


Figure 2: Distribution of unpaid carers and the Welsh population (2018) by deprivation quintile in Wales



Higher prevalence of long-term health conditions among unpaid carers

Overall, the standardised prevalence rate of the 37 long-term conditions was higher amongst unpaid carers compared to the non-carer cohort. The difference in prevalence between unpaid carers and non-carers reached statistical significance for 36 out of 37 conditions, with the exception of multiple sclerosis. The ten most common conditions amongst unpaid carers were anxiety or depression (age-sex standardised rate: 247.9 per 1,000 population[2]), hypertension (89.2), hearing loss (78.6), chronic kidney disease (74.6), asthma (59.6), musculoskeletal disorders (59.5), diabetes (59.1), irritable bowel syndrome (49.3), constipation (42.8), and cancer (36.8, see Figure 3). These ten most common conditions were similar for non-carers, albeit with lower prevalence rates, with the exception of cancer, which was replaced by thyroid disorders (crude rates and age-sex standardised rates shown in Table A4 in Appendix).

The ten most common conditions amongst unpaid carers:

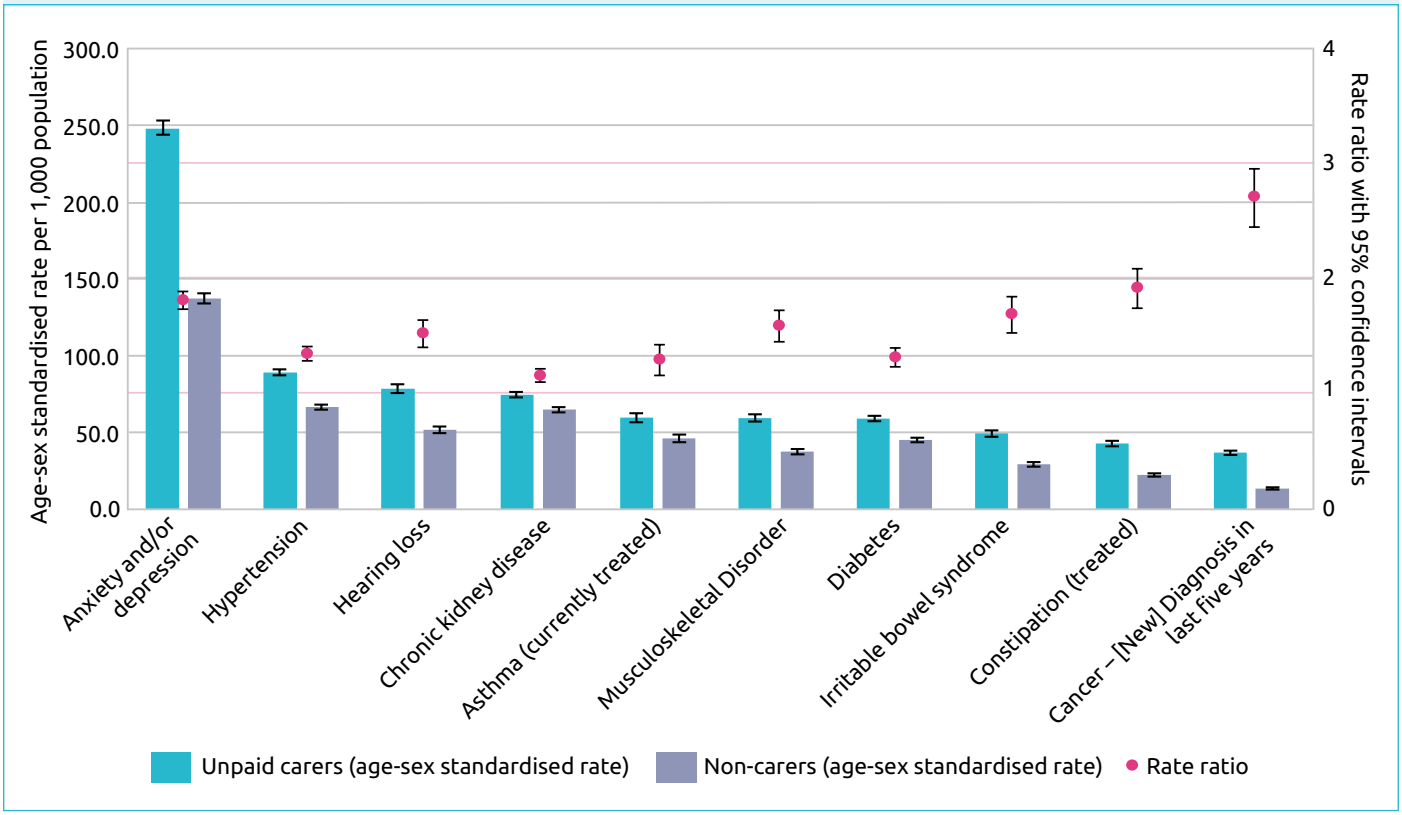
- anxiety or depression
- hypertension
- hearing loss
- chronic kidney disease
- asthma
- musculoskeletal disorders
- diabetes
- irritable bowel syndrome
- constipation
- cancer

Among the 10 most prevalent conditions, the greatest difference between unpaid carers and non-carers were cancer, constipation, anxiety and/or depression, irritable bowel syndrome and musculoskeletal disorders. The standardised prevalence rate amongst unpaid carers was 2.7 times higher for cancer compared to non-carers (rate ratio[3] 2.7, 95% confidence interval 2.5-3.0), 1.9 times higher for constipation (1.9, 1.8-2.1), 1.8 times higher for anxiety and/or depression (1.8, 1.7-1.9), 1.7 times higher for irritable bowel syndrome (1.7, 1.5-1.9), and 1.6 times higher for musculoskeletal disorders (1.6, 1.5-1.7; see Figure 3 and Table A4 in Appendix).

2 Age-sex standardised rate using mid-2018 Welsh population.

3 A rate ratio compares the standardised rate of unpaid carers and non-cares and was calculated as rate of unpaid carers divided by rate of non-carers.

Figure 3: Ten most common long-term health conditions among unpaid carers compared to non-carers using age-sex standardised prevalence (per 1,000 population) and rate ratio



Differences by age groups

The most common conditions among young unpaid carers under 25 years were anxiety and/or depression (sex-standardised rate 174.8 per 1,000 population), asthma (69.4), musculoskeletal disorders (33.5), and irritable bowel syndrome (28.3). Compared to non-carers of the same age, conditions with the greatest differences between them were constipation (4.6, 2.1-14.7), thyroid disorders (3.5, 1.5-11.9), anxiety and/or depression (2.3, 1.9-2.7), irritable bowel syndrome (2.3, 1.5-3.6) and musculoskeletal disorders (2.2, 1.4-3.6, see Table A5 in Appendix). Epilepsy also showed a higher prevalence among unpaid carers compared to non-carers (rate ratio 5.3, 95% CI 2.8-12.4) which is unexpected. This may reflect data issues within primary care datasets – where read codes for recording caring status have been used to document of the caring needs of these individuals, rather than their caring responsibilities.

For 25-34 year olds, other conditions with a prevalence rate ratio over two included additionally eczema and rheumatoid arthritis. For example, the sex- standardised rate of eczema among young unpaid carers between 25 and 34 years was 12.8 per 1,000 population, and the standardised prevalence rate ratio was 2.4 compared to non-carers at same age (see Table A6 in Appendix).

Among unpaid carers over the age of 65 years, anxiety and/or depression, chronic kidney disease and hypertension became the most prevalent conditions. Unpaid carers had over two times the rate of cancer than non-carers at similar age (standardised prevalence rate ratio, 95% CI 65-74 years: 2.9, 2.5-3.5; over 75 years: 2.6, 2.2-2.9).

The higher prevalence of anxiety and/or depression, epilepsy, irritable bowel syndrome and musculoskeletal disorders was higher at all age groups amongst unpaid carers compared to non-carers (see Figure 4a-d and Table A7 in Appendix). The difference between unpaid carers and non-carers decreased with increasing age. For anxiety and/or depression, rate ratio between unpaid carers and non-carers was 2.3 (95% CI 1.9-2.7) for under 25 year olds and reduced to 1.6 (1.4-1.7) for over 75 year olds (Figure 4a). Young unpaid carers aged 25-34 years had 2.3 times (1.5-3.6) the rate of irritable bowel syndrome than non-carers, but this rate reduced to 1.5 (1.3-1.8) and 1.3 (1.2-1.7) among 65-74 year olds and over 75 year olds respectively (see 4c).

Figure 4a: Standardised prevalence rate ratio between unpaid carers and non-carers for anxiety and/or depression at all ages

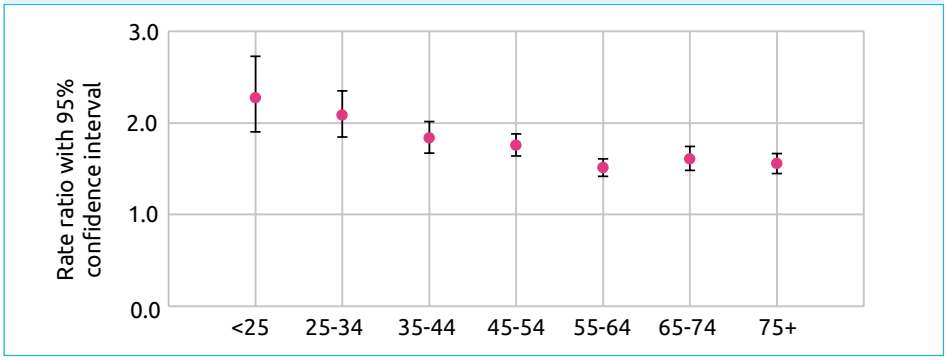


Figure 4b: Standardised prevalence rate ratio between unpaid carers and non-carers for epilepsy at all ages

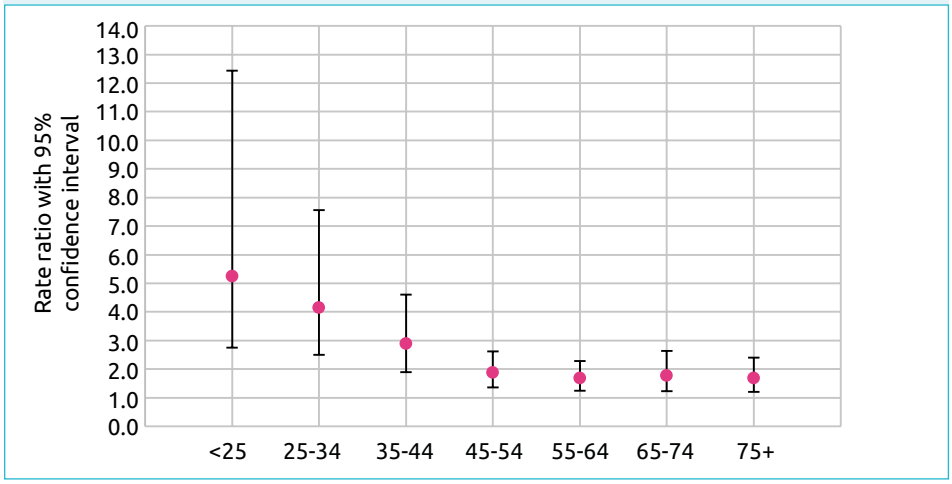


Figure 4c: Standardised prevalence rate ratio between unpaid carers and non-carers for irritable bowel syndrome at all ages

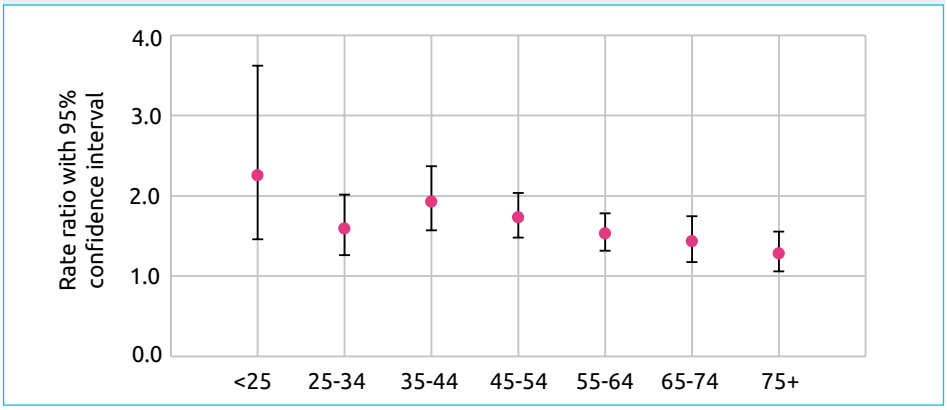
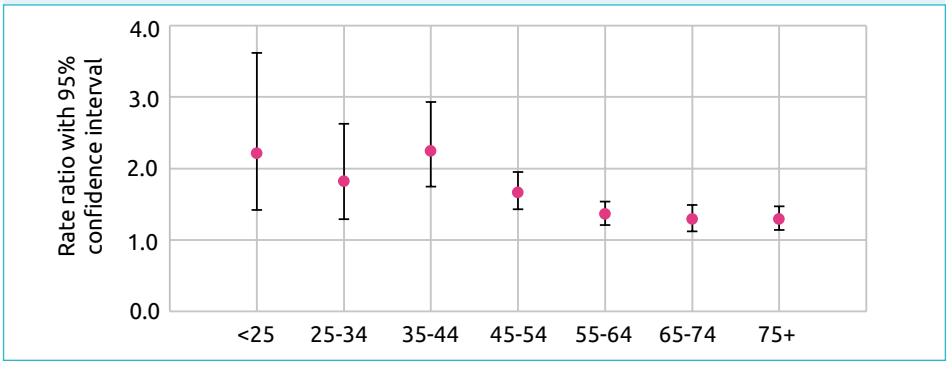


Figure 4d: Standardised prevalence rate ratio between unpaid carers and non-carers for musculoskeletal at all ages

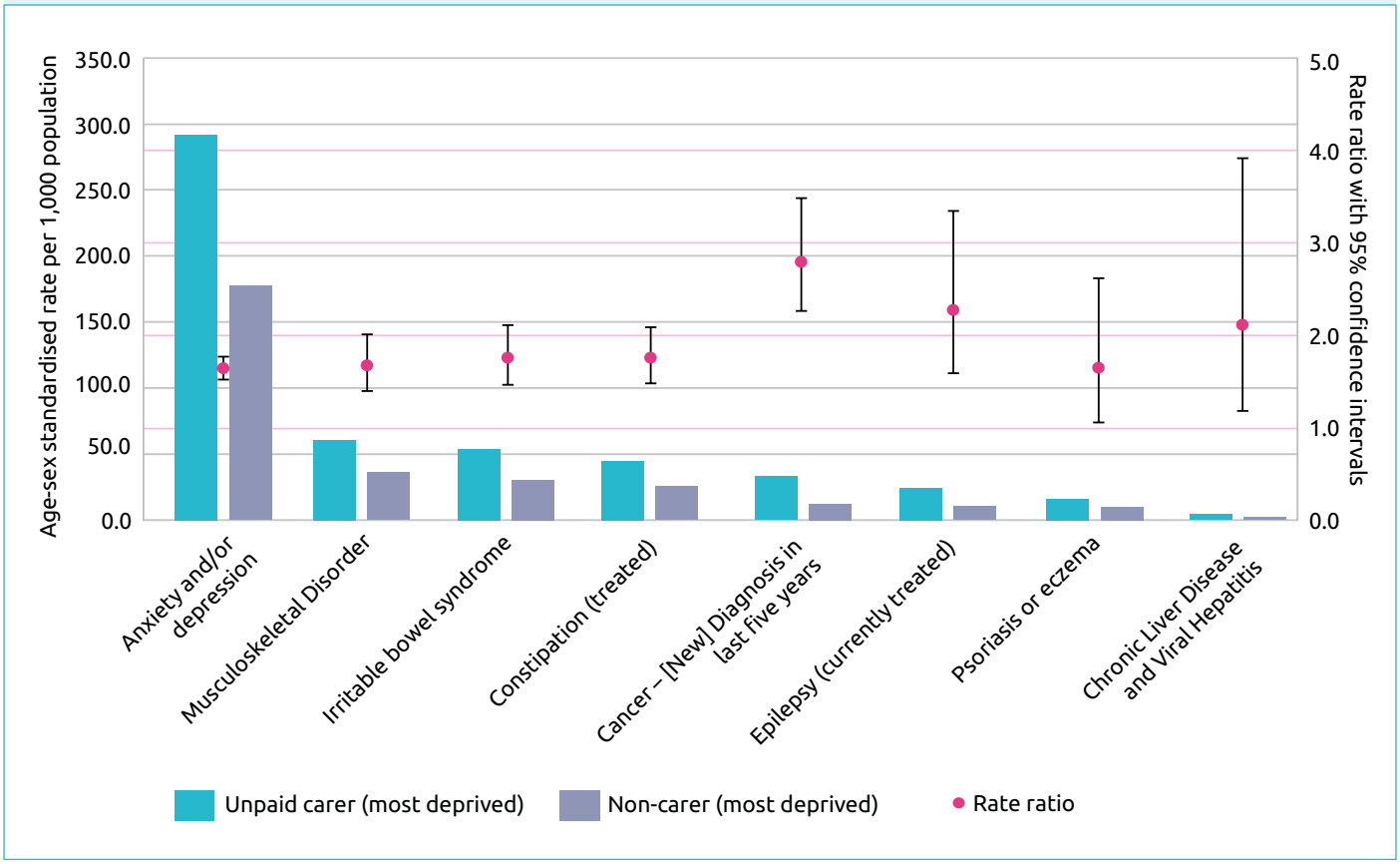


Differences by deprivation

The prevalence of a number of common long-term health conditions was similar for unpaid carers living in the most and least deprived areas in Wales (age-sex standardised rates in Table A8 in Appendix). But some conditions were more common among unpaid carers in the most deprived areas than unpaid carers in the least deprived areas; chronic obstructive pulmonary disease (COPD) (rate ratio 2.0, 95% CI 1.7-2.4), anxiety and/or depression (1.4, 1.3-1.5), and asthma (1.4, 1.2-1.8) saw the biggest differences.

Amongst those living in the most deprived areas, the standardised rate of most long-term health conditions were higher amongst unpaid carers compared to non-carers. The greatest differences were in cancer, epilepsy, chronic liver disease, constipation, irritable bowel syndrome, musculoskeletal disorder, eczema and anxiety and/or depression (see Figure 5 and Table A9 in Appendix). For example, amongst those living in the most deprived areas of Wales, unpaid carers had 2.8 times (95% CI 2.3-3.5) the rate of cancer and 1.7 times (95% CI 1.4-2.0) the rate of musculoskeletal disorders compared to non-carers. We observed similar patterns amongst those living in the least deprived areas.

Figure 5: Long-term health conditions among unpaid carers from most deprived communities compared to non-carers using age-sex standardised prevalence rate (per 1,000 population) and prevalence rate ratio



Unpaid carers were more likely to be living with multiple long-term conditions from a younger age

Prevalence of multimorbidity was higher in unpaid carers compared to non-carers (percentage living with multiple long-term conditions 40.4% and 27.7% respectively ($p<0.001$); age-sex standardised rates 307.9 and 187.3 per 1,000 population respectively).

The difference in multimorbidity between unpaid carers and non-carers was greater amongst men (age-standardised rate: 303.4 per 1,000 population in unpaid carers compared to 163.9 in non-carers, $p<0.001$) than women (312.3 and 210.1, respectively, $p<0.001$).

Multimorbidity increased with age amongst both unpaid carers and non-carers, but was higher amongst unpaid carers at all ages (see Figure 6 and Table A10 in Appendix). The difference in multimorbidity between unpaid carers and non-carers was greatest amongst the younger population and declined with increasing age. The prevalence rate ratio for multimorbidity decreased from 3.0 (95% CI 2.3-3.8) in the under 25 year age group, to 2.1 (1.9-2.3) for 35-44 year olds, 1.3 (1.3-1.4) for 55-64 year olds and 1.3 (1.3-1.4) for over 75 year olds (see Figure 6 and Table A10 in Appendix).

Amongst unpaid carers, by the age of 65 years the rate of living with multimorbidity (541.2 per 1,000 population) exceeded those with single or no long-term conditions. While for non-carers, it was from the age of 75 years (537.2 per 1,000 population; see Figure 7 and Table A11 in Appendix).

Figure 6: Sex standardised prevalence rate of multimorbidity and prevalence rate ratio at all ages among unpaid carers and non-carers

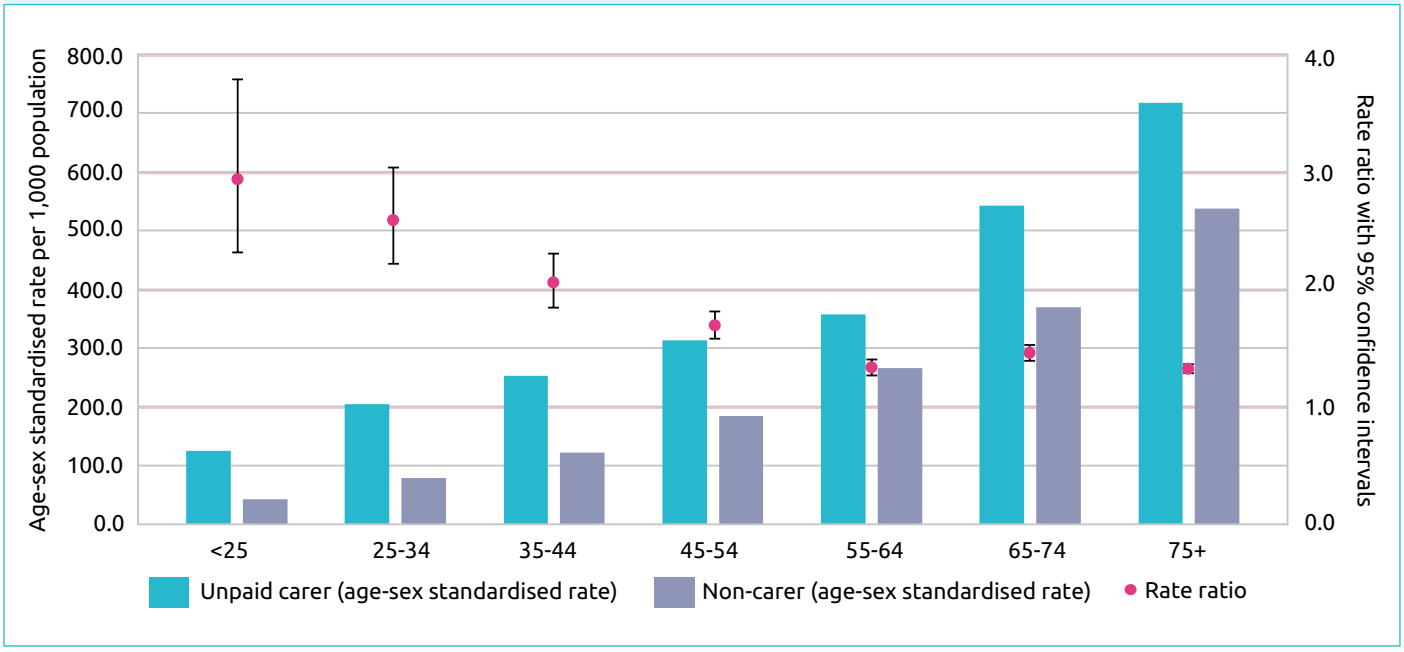
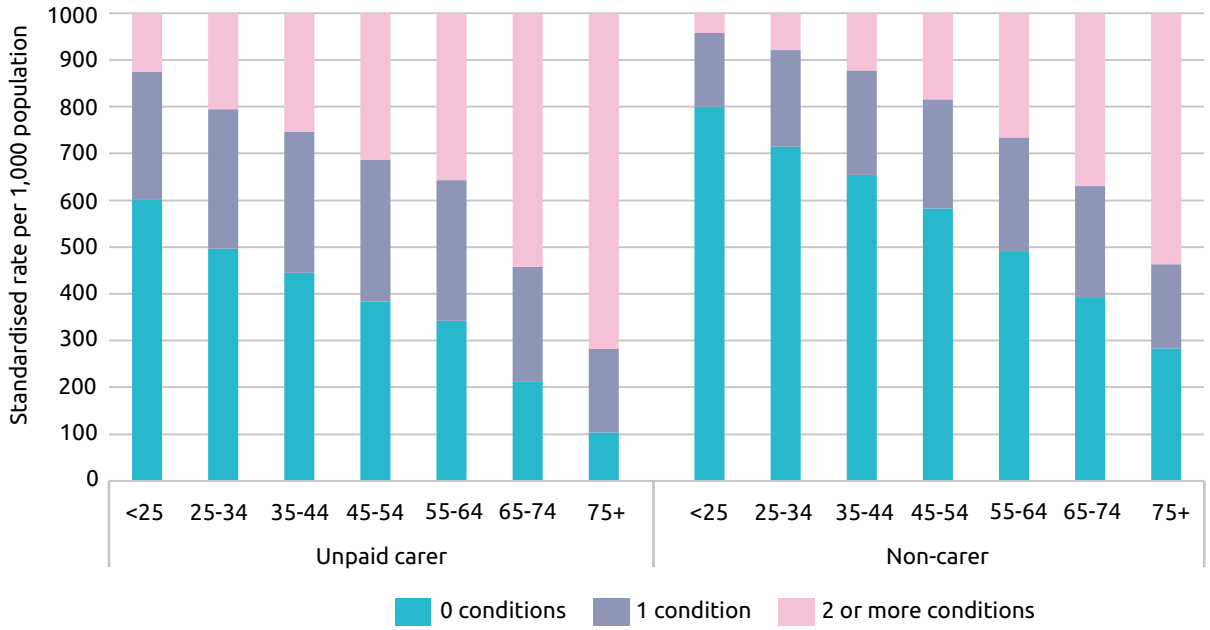


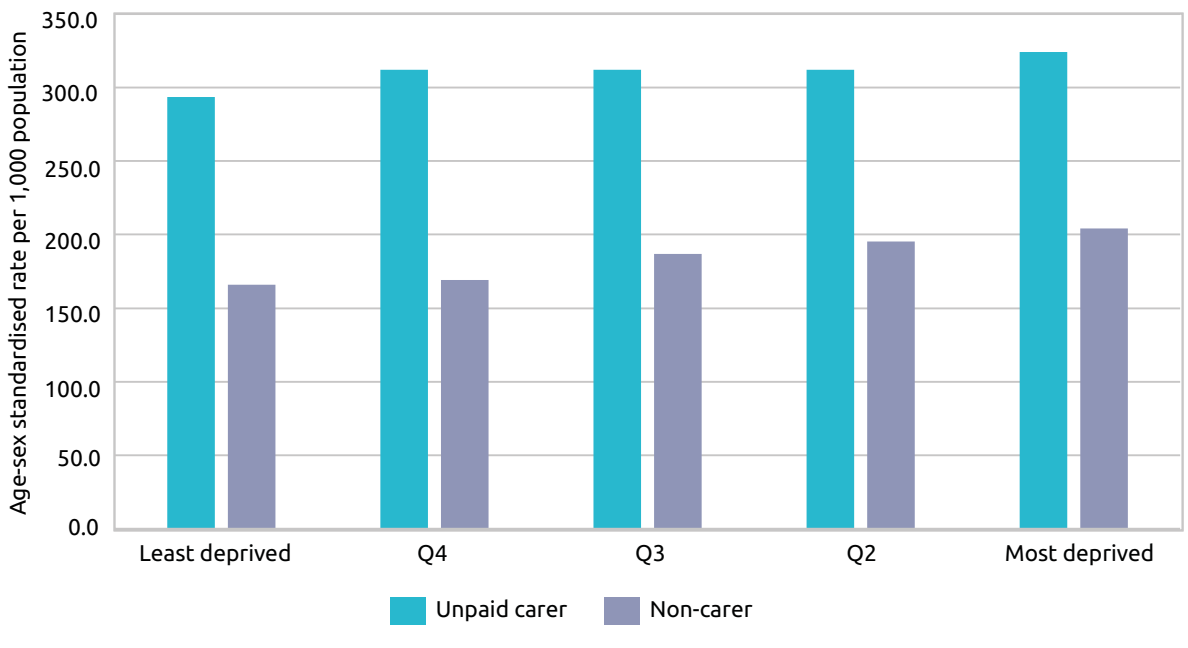
Figure 7: Sex standardised prevalence rate per 1,000 population for unpaid carers and non-carers



Unpaid carers across deprivation groups were more likely to be living with multiple long-term conditions

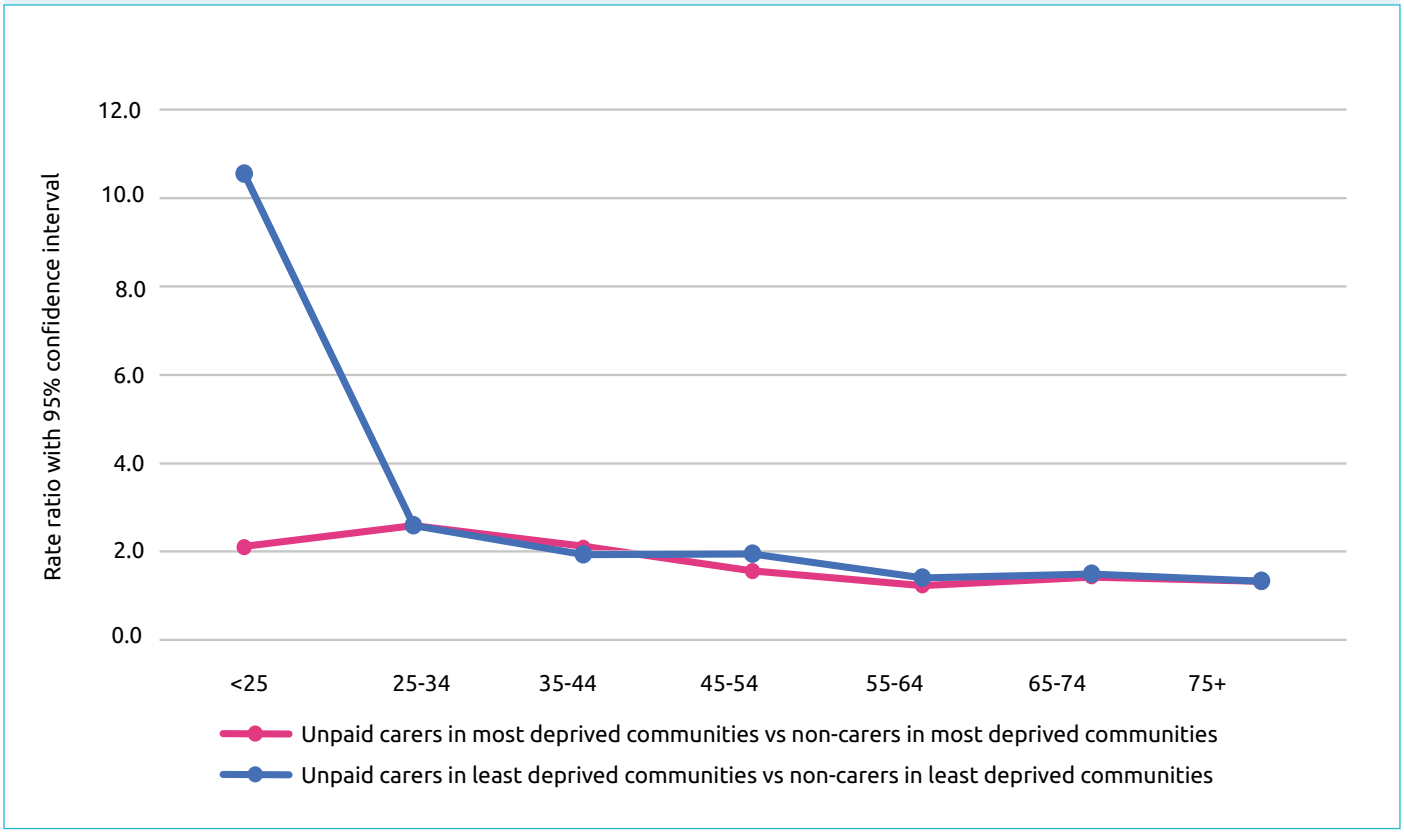
The pattern of a higher prevalence of multimorbidity in more deprived areas was evident amongst unpaid carers and non-carers. The age-sex standardised rate of multimorbidity was higher amongst unpaid carers within each deprivation quintile but stayed similar across quintiles (p=0.67; see Figure 8). For example, in the least deprived areas, 293.7 per 1,000 unpaid carers were managing multimorbidity compared to 166.0 for non-carers, a rate ratio of 1.8 (95% CI 1.6-1.9). In the most deprived areas, 324.0 per 1,000 unpaid carers were managing multimorbidity compared to 204.3 amongst non-carers, a rate ratio of 1.6 (1.5-1.7; see Table A12 in Appendix).

Figure 8: Age-sex standardised prevalence rate of multimorbidity among unpaid carers and non-carers across deprivation quintiles



We further examined the pattern of multimorbidity amongst unpaid carers and non-carers living in the most and least deprived communities by age group. For all ages, there was an association between unpaid caring and poor health, irrespective of deprivation level. From the age of 25, the rate ratio for multimorbidity among unpaid carers compared to non-carers were similar in both the most and least deprived areas, ranging between 1.2-2.6 (see Figure 9 and Table A13 in Appendix). However, for under 25 year olds, the rate ratio for multimorbidity was 10.5 times higher for unpaid carers as compared to non-carers in the least deprived communities, but this rate ratio was 2.1 in the most deprived communities.

Figure 9: Standardised prevalence rate ratio of multimorbidity amongst unpaid carers and non-carers in most and least deprived communities at all ages



What are the implications?

This is the first study in Wales providing a comprehensive assessment on the prevalence of both physical and mental long-term health conditions and multimorbidity of unpaid carers, and examining the health in this population compared to a matched comparison group of non-carers. It is a contribution to the evidence as a base to design and offer tailored support for unpaid carers in Wales and beyond, making sure they are able to maintain their own health alongside caring.

This study offers a base to design and offer tailored support for unpaid carers in Wales and beyond, to make sure they are able to maintain their own health alongside caring.

Using primary care data from 2011 to 2020, alongside the National Survey for Wales, we identified over 62,000 unpaid carers in Wales. By linking with primary care data, our findings suggested unpaid carers experience poorer general health than non-carers, with significantly higher rates in 36 out of 37 long-term health conditions amongst unpaid carers. Anxiety and/or depression was the most common long-term condition for both unpaid carers and non-carer, but the prevalence was found to be 1.8 times higher amongst unpaid carers compared to non-carers. Poorer mental health amongst unpaid carers has been reported elsewhere, and many contributing factors have been considered, including the psychological impacts of providing care, the lack of respite care, challenging behaviour of the cared for, higher health needs, the lack of information on available support and financial challenges [3, 25].

This study adds much needed insights into the physical health of unpaid carers. The results from this study found higher rates of many physical conditions recorded in primary care amongst unpaid carers including cancer, constipation, irritable bowel syndrome and musculoskeletal disorders; alongside some evidence to suggest that unpaid carers may be experiencing poorer health at a younger age, with earlier onset of anxiety and/or depression, irritable bowel syndrome and musculoskeletal disorders.

The results from this study found higher rates of many physical conditions recorded in primary care amongst unpaid carers.

The results from this study also found that multimorbidity was more common in unpaid carers. Over three in ten unpaid carers in Wales were managing multiple long-term conditions, and the prevalence of multimorbidity was 1.6 times higher in unpaid carers compared to non-carers. This was much greater for those under 25 years of age (where the rate of multimorbidity among unpaid carers is 3 times that of non-carers), and whilst the difference between unpaid carers and non-carers decreased with increasing age, it remained evident into older age.

Differences by deprivation were also examined. Overall, those living in more deprived areas are more likely to have multiple long-term conditions, but patterns suggest the increase rate of multimorbidity among unpaid carers is similar irrespective of area level deprivation. Looking at these findings by age, within the most deprived areas, the rate ratio for multimorbidity was similar across all ages, ranging from 1.2 to 2.1 times higher for unpaid carers compared to non-carers. Within the least deprived areas, from the age of 25, the rate ratio for multimorbidity ranged from 1.3 to 2.6 times higher for unpaid carers compared to non-carers, although for under 25s, this rate ratio was 10.5.

We also note that some of the less common long-term conditions showed large differences in prevalence between unpaid carers and non-carers, including learning disability (1.4% compared to 0.1%, respectively), dementia (4.0% compared to 1.0%) and schizophrenia (2.2% compared to 0.8%). These differences should be interpreted cautiously and may be driven by errors in entering caring status in the care recipient's rather than care giver's records, or biases in when caring status is recorded within the electronic health record. This warrants further investigation.

In this cross sectional study, it was not possible to explore the drivers of the relationship between caring responsibilities and health, and how that may change over time. Evidence from other studies suggests that poor health may be linked to caring responsibilities through, for example musculoskeletal health and maintaining a healthy lifestyle [3, 12]. However, further studies are needed to better understand the potential causal drivers of poorer health and multimorbidity amongst unpaid carers, and to evaluate interventions which aim to better support the health and wellbeing needs of this population.

Further studies are needed to better understand the potential causal drivers of poorer health and multimorbidity amongst unpaid carers, and to evaluate interventions which aim to better support the health and wellbeing needs of this population.

Strengths and limitations

A key strength of this unique study has been to bring together self-reported unpaid caring status (identified through the National Survey for Wales) alongside unpaid caring status as identified and recorded in primary care, to develop a comprehensive electronic-cohort of unpaid carers for Wales. Yet this approach also has some limitations. Firstly, it relies on individuals to self-identify as unpaid carers, or to seek primary health care and disclose their caring status, and for that to be recorded in the primary care database. There are recognised barriers to disclosure of caring status in practice, for example NHS England suggested that of the 70% of unpaid carers who come into contact with health professionals, only around 10% are identified as unpaid carers [26]. The importance of identifying unpaid carers to better support their needs has led to some countries, such as Scotland, putting in place legislation and other measures to ensure unpaid carers are identified in routine care [4]. Secondly, relying on clinically diagnosed and managed conditions in primary care may result in an underestimation of prevalence of long-term health conditions and multimorbidity that only recorded in secondary care or other sources of care. Complete historical primary care data are not always available for all individuals included in the e-cohort of unpaid carers and the comparison group, especially for those who moved in and out of Wales. Primary care data coverage stands at 80% in SAIL Databank. Thirdly, multimorbidity is defined as a count of coexisting conditions and does not take into account different combinations of conditions or their severity. Finally, how different caring intensities impact on unpaid carers' health remains to be explored in future studies.

Despite the noted limitations, this e-cohort allows for efficient, retrospective privacy-protected follow-up of individuals in healthcare systems, and has the potential to be further refined and used to support the evaluation of future initiatives to support unpaid carers.

Wider implications

Our findings highlight that unpaid carers not only experience poorer physical and mental health than non-carers, but also at a younger age, and whilst those living in the most deprived communities are particularly affected, the association between unpaid caring and poor health is evident across all levels of deprivation. To overcome the particular challenges that unpaid carers may face in managing their health, **local authorities and healthcare providers need to provide a range of flexible services to unpaid carers, to support the prevention and early identification of poor health amongst unpaid carers themselves, and accessible healthcare within the community**.

Understanding the impact of initiatives, such as encouraging general practices to provide 'double appointments' to enable GP consultation with both the unpaid carer and the person they provide care for when they visit [27, 28], is needed, alongside the co-production of other approaches with unpaid carers themselves. The Strategy for Unpaid Carers in Wales has prioritised work on improving carer's assessments from local authorities [29]; the evidence presented in this report emphasises the need to consider unpaid carers' health needs alongside the support they need to provide care.

To ensure support reaches the unpaid carers who need it most, work on identifying unpaid carers is a critical first step. Anyone can become an unpaid carer at any point of time. Given known barriers to self-identification [30], **health and social care professionals are often well-placed to identify unpaid carers. With *A Healthier Wales: Our Workforce Strategy for Health and Social Care*** [31]**, Welsh Government needs to ensure that specific training is provided and implemented, and reliable and standardised information is collected to identify unpaid carers.**

Once identified, health and social care professionals have an important opportunity to inquire about the unpaid carers' own health, provide information on manual handling, promote healthy lifestyles and signpost them to other support services if needed. The Making Every Contact Count (MECC) approach [32] encourages healthcare staff to use the opportunities arising from routine practise when interacting with patients to promote healthier lifestyle changes; highlighting the needs of unpaid carers within this approach can also help ensure unpaid carers receive support.

To help guide further efforts to most effectively support unpaid carers, **further research to gather insight into potential drivers of poor health among unpaid carers is of value, and may consider factors such as the length of time as an unpaid carer, caring intensity, care recipients' illness and needs, employment and education opportunities** [33], **and the availability of other support.**

The health and social care system in Wales and across the UK relies heavily on unpaid carers but they often suffer from poor health. Our findings urge all services working together as a holistic approach to prioritise unpaid carers' health needs, provide additional support to those younger and in the most deprived communities who are most likely to benefit most from a tailored approach, to stop widening inequalities in health, ensure their unpaid caring responsibility is sustainable, and have healthy and fulfilled life alongside caring.

Ethics statement

This study is based on anonymised routinely collected electronic health records. All routinely collected anonymised data held in the SAIL Databank are exempt from consent due to the anonymised nature of the databank (under section 251, National Research Ethics Committee (NREC)). We have applied to and been granted approval by the independent Information Governance Review Panel (IGRP) for permission to conduct this study (project number 1213). The IGRP contains independent members from the NREC and the British Medical Association (BMA), as well as lay members. The review process has checked that the study is useful, not a service evaluation, and will not break anonymisation standards.

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Appendix

Exhibit A1 Data linkage flow chart

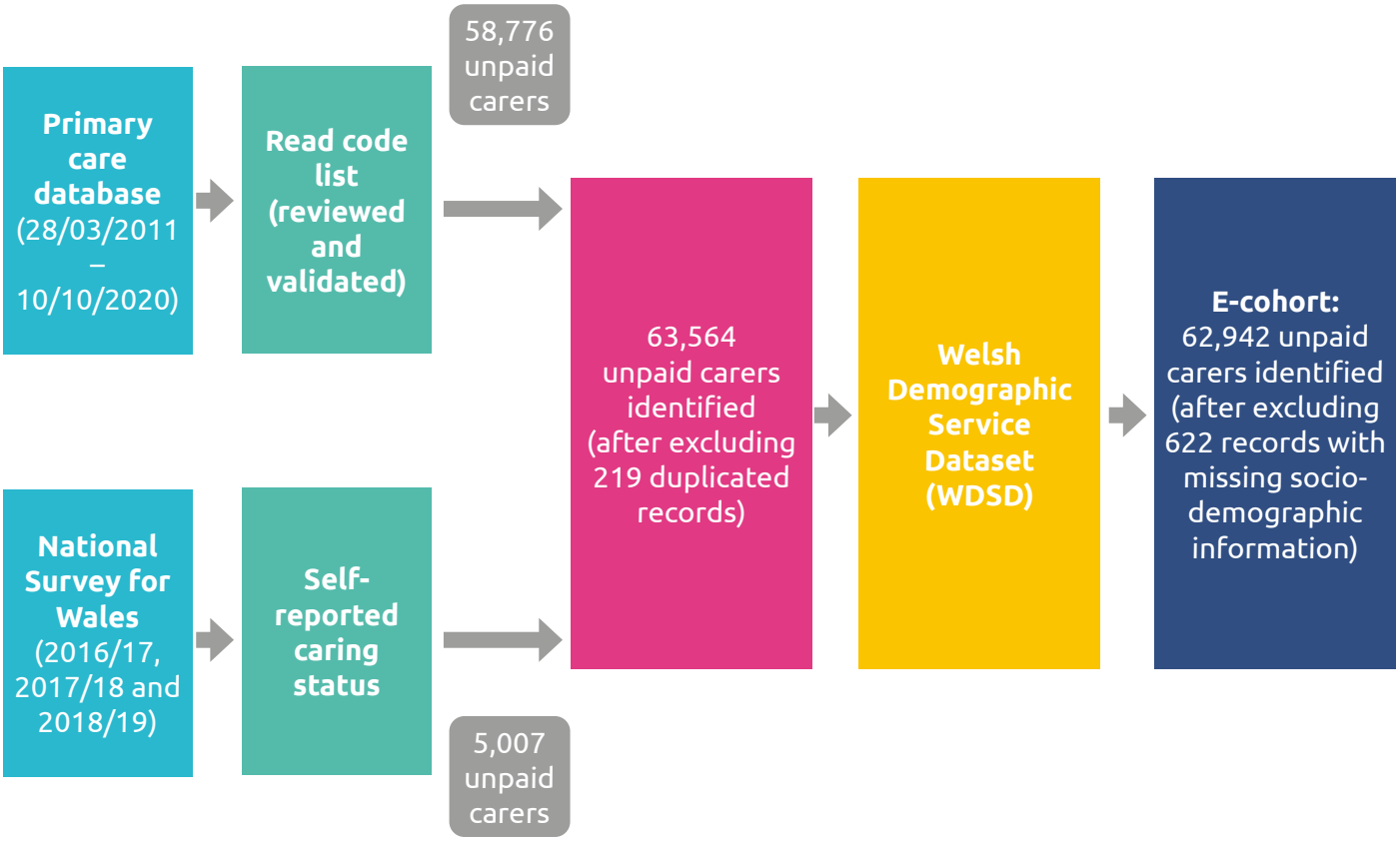

Table A1: Read code list to identify unpaid caring status in primary care

918A.	Carer
918A0	Cares for a friend
918A1	Cares for a neighbour
918A2	Cares for a relative
918G.	Is a carer
918H.	Primary carer
918W.	Carer of a person with learning disability
918a.	Carer of a person with substance misuse
918d.	Carer of a person with mental health problem
918m.	Carer of a person with a terminal illness
918t.00	Carer from Black and minority ethnic group
918Y.	Carer of a person with sensory impairment
8IHE.	Carer health check declined
8O7..	Carer support
918b.	Carer of a person with alcohol misuse
8IEP.	Carer annual health check declined
8BAr.	Carer health check completed
13Wb.	Carer has sole parental responsibility
9NSS.	Carer health check offered
918J.	Carer - home telephone number
9Ngw.	Carer does not understand care plan
918W.	Carer of a person with learning disability
918y.	Carer of person with dementia
9Ngv.	Carer understands care plan
918X.	Carer of a person with physical disability
13VN.	Carer able to cope
69DC.	Carer annual health check
918M.	Carer - email address
9180.	Carer's details
69DE.	Carer health check
918L.	Carer - mobile telephone number
918K.	Carer - work telephone number
388Q.	Carer strain index score
9d46.	Carer
918c.	Carer of a person with chronic disease
8HkA.	Ref for GP carer's assessment

Table A2: Thirty-seven long-term health conditions included in Cambridge Multimorbidity Score

Long-term health condition	Usage in primary care searchable database
Alcohol problems	Read code ever recorded
Anorexia or bulimia	Read code ever recorded
Anxiety & other neurotic, stress related & somatoform disorders	Read code in last 12 months OR 4 or more anxiolytic/hypnotic prescriptions in last 12 months
Asthma (currently treated)	Read code ever recorded AND Any prescription in the last 12 months
Atrial fibrillation	Read code ever recorded
Blindness and low vision	Read code ever recorded
Bronchiectasis	Read code ever recorded
Cancer - [New] Diagnosis in last five years	Read code [first] recorded in last 5 years
Chronic kidney disease	The best (highest value) of the last 2 eGFR readings is < 60 mL/min
Chronic Liver Disease and Viral Hepatitis	Read code ever recorded
Chronic sinusitis	Read code ever recorded
Constipation (Treated)	4 or more laxative prescriptions in last year
COPD	Read code ever recorded
Coronary heart disease	Read code ever recorded
Dementia	Read code ever recorded
Depression	Read code recorded in last 12 months OR 4 or more anti-depressant prescriptions (excluding low dose tricyclics) in last 12 months
Diabetes	Read code ever recorded
Diverticular disease of intestine	Read code ever recorded
Epilepsy (currently treated)	Read code ever recorded AND Any antiepileptic prescription in last 12 months
Hearing loss	Read code ever recorded
Heart failure	Read code ever recorded
Hypertension	Read code ever recorded
Inflammatory bowel disease	Read code ever recorded
Irritable bowel syndrome	Read code ever recorded OR 4 or more antispasmodic prescription only in the last 12 months
Learning disability	Read code ever recorded
Migraine	4 or more prescription only medicine anti-migraine prescriptions in last year
Multiple sclerosis	Read code ever recorded
Musculoskeletal disorders	Read code recorded in last 12 months
Parkinson's disease	Read code ever recorded
Peptic Ulcer Disease	Read code ever recorded
Peripheral vascular disease	Read code ever recorded
Prostate disorders	Read code ever recorded
Psoriasis or eczema	Read code ever recorded AND 4 or more related prescriptions in last 12 months (excluding simple emollients)
Psychoactive substance misuse (NOT ALCOHOL)	Read code ever recorded
Rheumatoid arthritis, other inflammatory polyarthropathies & systematic connective tissue disorders	Read code ever recorded
Schizophrenia (and related non-organic psychosis) or bipolar disorder	Read code ever recorded OR Lithium ever recorded
Stroke & transient ischaemic attack	Read code ever recorded
Thyroid disorders	Read code ever recorded

Table A3: Summary statistics of e-cohort unpaid carers

	GP	NSW (National survey for Wales)	Total
	(N = 57935)	(N = 5007)	(N = 62942)
Sex			
Male	19887 (34.3%)	2066 (41.3%)	21953 (34.9%)
Female	38048 (65.7%)	2941 (58.7%)	40989 (65.1%)
Age group			
14 years or younger	825 (1.4%)	0 (0.0%)	825 (1.3%)
15-24 years	2523 (4.4%)	251 (5.0%)	2774 (4.4%)
25-34 years	4673 (8.1%)	487 (9.7%)	5160 (8.2%)
35-44 years	6104 (10.5%)	575 (11.5%)	6679 (10.6%)
45-54 years	10732 (18.5%)	978 (19.5%)	11710 (18.6%)
55-64 years	13811 (23.8%)	1200 (24.0%)	15011 (23.8%)
65-74 years	8308 (14.3%)	1053 (21.0%)	9361 (14.9%)
75+ years	10959 (18.9%)	463 (9.2%)	11422 (18.1%)
Welsh Index of Multiple Deprivation			
Most deprived	12013 (20.7%)	825 (16.5%)	12838 (20.4%)
Q2	11883 (20.5%)	950 (19.0%)	12833 (20.4%)
Q3	12322 (21.3%)	1079 (21.5%)	13401 (21.3%)
Q4	10655 (18.4%)	1145 (22.9%)	11800 (18.7%)
Least deprived	11062 (19.1%)	1008 (20.1%)	12070 (19.2%)

Table A4: Crude rate, age-sex standardised rates and rate ratios for long-term health conditions among unpaid carers and non-carers

	Unpaid carers				Non-carers				Unpaid carers vs non-carers			
	Crude rate	Standardised rate	95% CI low	95% CI high	Crude rate	Standardised rate	95% CI low	95% CI high	Rate ratio	95% CI low	95% CI high	P value (crude rate difference)
Anxiety or depression	281.1	247.9	243.3	252.6	173.6	137.4	134.0	140.7	1.8	1.7	1.9	<0.001
Hypertension	133.1	89.2	87.3	91.1	103.4	66.5	64.9	68.2	1.3	1.3	1.4	<0.001
Chronic kidney disease	121.3	74.6	72.9	76.4	106.0	64.8	63.1	66.5	1.2	1.1	1.2	<0.001
Hearing loss	94.2	78.6	75.7	81.4	68.3	51.8	49.6	53.9	1.5	1.4	1.6	<0.001
Diabetes	82.8	59.1	57.4	60.9	67.4	45.1	43.7	46.6	1.3	1.2	1.4	<0.001
Musculoskeletal disorders	75.5	59.5	57.1	61.9	51.7	37.5	35.8	39.3	1.6	1.5	1.7	<0.001
Constipation (Treated)	62.1	42.8	41.0	44.6	36.3	22.4	21.3	23.4	1.9	1.8	2.1	<0.001
Irritable bowel syndrome	59.1	49.3	47.2	51.4	37.8	29.3	27.8	30.8	1.7	1.5	1.9	<0.001
Asthma (currently treated)	57.3	59.6	56.7	62.6	48.6	46.2	43.7	48.7	1.3	1.2	1.4	<0.001
Cancer - [New] Diagnosis in last five years	54.5	36.8	35.4	38.2	22.5	13.6	12.8	14.3	2.7	2.5	3.0	<0.001
Thyroid disorders	47.5	32.1	30.6	33.5	34.7	21.7	20.7	22.8	1.5	1.3	1.6	<0.001
Diverticular disease of intestine	43.5	26.0	25.0	27.1	30.8	18.6	17.7	19.4	1.4	1.3	1.5	<0.001
Coronary heart disease	40.8	26.2	25.2	27.2	31.9	20.4	19.5	21.3	1.3	1.2	1.4	<0.001
Dementia	40.4	22.7	21.8	23.5	10.1	5.5	5.1	5.9	4.1	3.7	4.7	<0.001
COPD	38.8	24.8	23.8	25.8	31.7	19.8	18.9	20.7	1.3	1.2	1.4	<0.001
Atrial fibrillation	31.6	19.4	18.5	20.2	26.5	15.9	15.1	16.7	1.2	1.1	1.3	<0.001
Stroke & transient ischaemic attack	29.9	18.6	17.7	19.4	22.2	13.7	12.9	14.4	1.4	1.2	1.5	<0.001
Rheumatoid arthritis, other inflammatory polyarthropathies & systematic connective tissue disorders	25.4	16.0	15.1	16.9	19.2	11.7	11.0	12.5	1.4	1.2	1.5	<0.001
Prostate disorders	24.1	17.4	16.5	18.3	17.0	12.2	11.5	12.9	1.4	1.3	1.6	<0.001
Chronic sinusitis	22.7	17.8	16.5	19.0	15.7	12.0	11.0	13.0	1.5	1.3	1.7	<0.001
Schizophrenia (and related non-organic psychosis) or bipolar disorder	22.2	21.9	20.3	23.6	8.4	6.9	6.1	7.7	3.2	2.6	3.9	<0.001
Epilepsy (currently treated)	18.1	22.4	20.4	24.3	9.2	8.0	7.1	8.9	2.8	2.3	3.4	<0.001
Alcohol problems	15.1	18.2	16.7	19.8	11.8	12.8	11.5	14.0	1.4	1.2	1.7	<0.001
Heart failure	14.7	9.1	8.4	9.7	11.6	6.9	6.4	7.5	1.3	1.1	1.5	<0.001
Learning disability	13.6	28.3	25.8	30.9	1.4	1.9	1.4	2.5	14.6	10.2	22.5	<0.001
Psoriasis or eczema	13.6	14.0	12.5	15.4	9.0	8.8	7.6	10.0	1.6	1.3	2.0	<0.001
Migraine	10.6	7.0	6.4	7.6	7.4	5.0	4.4	5.6	1.4	1.1	1.7	<0.001
Psychoactive substance misuse (not alcohol)	9.4	15.6	13.9	17.2	6.8	9.7	8.5	10.9	1.6	1.3	2.0	<0.001
Peripheral vascular disease	8.0	5.2	4.7	5.7	6.7	4.3	3.9	4.8	1.2	1.0	1.5	0.007
Peptic Ulcer Disease	6.6	4.4	3.9	4.9	4.6	3.1	2.7	3.5	1.4	1.1	1.8	<0.001
Inflammatory bowel disease	5.1	4.4	3.7	5.0	4.3	3.7	3.1	4.3	1.2	0.9	1.6	0.036
Chronic Liver Disease and Viral Hepatitis	4.9	4.4	3.7	5.1	3.1	2.2	1.8	2.5	2.0	1.5	2.8	<0.001
Blindness and low vision	4.8	3.9	3.2	4.5	3.7	2.4	2.0	2.8	1.6	1.2	2.3	0.001
Bronchiectasis	4.2	2.6	2.3	2.9	3.2	2.0	1.7	2.3	1.3	1.0	1.7	0.007
Parkinson's disease	3.7	2.3	2.0	2.6	2.7	1.6	1.3	1.8	1.5	1.1	2.0	0.002
Anorexia or bulimia	1.8	2.5	1.9	3.1	1.1	1.4	1.0	1.9	1.7	1.0	3.2	0.001
Multiple sclerosis	1.7	1.2	1.0	1.5	1.5	1.1	0.8	1.3	1.2	0.7	1.8	0.573

Table A5: Crude and sex adjusted rates for unpaid carers and non-carers under 25 years

	Unpaid carers (per 1,000 population)		Non-carers (per 1,000 population)		Unpaid carers vs non-carers			
	Crude rate (prevalence)	Sex standardised rate	Crude rate (prevalence)	Sex standardised rate	Rate ratio	95% CI low	95% CI high	P value (crude rate difference)
Epilepsy (currently treated)	22.5	25.7	5.0	4.9	5.3	2.8	12.4	<0.001
Constipation (Treated)	14.2	15.2	3.3	3.3	4.6	2.1	14.7	<0.001
Thyroid disorders	11.7	10.0	3.1	2.9	3.5	1.5	11.9	<0.001
Anxiety and/or depression	190.3	174.8	89.5	77.0	2.3	1.9	2.7	<0.001
Irritable bowel syndrome	33.6	28.3	15.6	12.6	2.3	1.5	3.6	<0.001
Musculoskeletal disorders	33.9	33.5	15.3	15.1	2.2	1.4	3.6	<0.001

Table A6: Crude and sex standardised rates for unpaid carers and non-carers between 25 and 34 years

	Unpaid carers (per 1,000 population)		Non-carers (per 1,000 population)		Unpaid carers vs non-carers			
	Prevalence	Sex standardised rate	Prevalence	Sex standardised rate	Rate ratio	95% CI low	95% CI high	P value (crude rate difference)
Epilepsy (currently treated)	24.6	29.7	7.4	7.2	4.1	2.5	7.6	<0.001
Constipation (Treated)	17.8	17.9	6.6	5.6	3.2	1.8	6.1	<0.001
Psoriasis or eczema	12.0	12.8	5.6	5.3	2.4	1.2	5.1	0.001
Rheumatoid arthritis, other inflammatory polyarthropathies & systematic connective tissue disorders	8.9	8.0	4.1	3.4	2.3	1.1	5.7	0.002
Anxiety or depression	285.1	271.2	150.0	130.4	2.1	1.8	2.4	<0.001
Hearing loss	46.9	48.0	26.4	25.3	1.9	1.4	2.6	<0.001
Musculoskeletal disorders	40.1	40.7	21.3	22.3	1.8	1.3	2.6	<0.001

Table A7: Standardised prevalence rate ratio for unpaid carers and non-carers at all ages

	Anxiety and/or depression			Epilepsy (currently treated)			Irritable bowel syndrome			Musculoskeletal Disorder		
	Rate ratio	95% CI low	95% CI high	Rate ratio	95% CI low	95% CI high	Rate ratio	95% CI low	95% CI high	Rate ratio	95% CI low	95% CI high
<25	2.3	1.9	2.7	5.3	2.75	12.43	2.3	1.5	3.6	2.2	1.4	3.6
25-34	2.1	1.8	2.4	4.1	2.50	7.56	1.6	1.3	2.0	1.8	1.3	2.6
35-44	1.8	1.7	2.0	2.9	1.89	4.60	1.9	1.6	2.4	2.2	1.7	2.9
45-54	1.8	1.6	1.9	1.9	1.36	2.62	1.7	1.5	2.0	1.7	1.4	2.0
55-64	1.5	1.4	1.6	1.7	1.24	2.28	1.5	1.3	1.8	1.4	1.2	1.5
65-74	1.6	1.5	1.7	1.8	1.23	2.64	1.4	1.2	1.7	1.3	1.1	1.5
75+	1.6	1.4	1.7	1.7	1.20	2.40	1.3	1.1	1.6	1.3	1.1	1.5

Table A8: Age-sex standardised rates per 1,000 and rate ratio for unpaid carers living in most and least deprived communities

	Unpaid carers – Most deprived			Unpaid carers – least deprived			Most deprived vs Least deprived		
	Age-sex standardised rate	95% CI low	95% CI high	Age-sex standardised rate	95% CI low	95% CI high	Rate ratio	95% CI low	95% CI high
Anxiety and/or depression	291.9	282.3	301.5	212.2	201.0	223.3	1.4	1.3	1.5
Hypertension	89.7	85.5	93.8	82.8	78.5	87.1	1.1	1.0	1.2
Hearing loss	74.1	68.5	79.7	74.8	68.2	81.4	1.0	0.8	1.2
Asthma (currently treated)	70.4	64.2	76.6	48.8	41.8	55.7	1.4	1.2	1.8
Diabetes	63.6	60.0	67.2	47.8	43.9	51.8	1.3	1.2	1.5
Chronic kidney disease	62.1	58.7	65.5	71.2	67.0	75.5	0.9	0.8	1.0
Musculoskeletal disorders	60.2	55.4	65.1	53.2	47.4	59.0	1.1	0.9	1.4
Irritable bowel syndrome	54.0	49.8	58.3	51.0	45.0	56.9	1.1	0.9	1.3
Constipation (Treated)	44.7	41.3	48.1	40.7	35.7	45.7	1.1	0.9	1.3
Cancer - [New] Diagnosis in last five years	33.1	30.4	35.8	41.1	37.1	45.1	0.8	0.7	1.0
COPD	32.1	29.7	34.5	16.2	14.3	18.0	2.0	1.6	2.4

Table A9: Age-sex standardised rates per 1,000 for unpaid carers living in most deprived communities compared to non-carers

	Unpaid carers (most deprived)	Non-carers (most deprived)	Unpaid carers (most deprived) vs non-carers (most deprived)		
	Age-sex standardised rate	Age-sex standardised rate	Rate ratio	95% CI low	95% CI high
Cancer - [New] Diagnosis in last five years	33.1	11.8	2.8	2.3	3.5
Epilepsy (currently treated)	24.2	10.6	2.3	1.6	3.3
Chronic Liver Disease and Viral Hepatitis	4.4	2.1	2.1	1.2	3.9
Constipation (Treated)	44.7	25.4	1.8	1.5	2.1
Irritable bowel syndrome	54.0	30.7	1.8	1.5	2.1
Musculoskeletal disorders	60.2	35.9	1.7	1.4	2.0
Psoriasis or eczema	15.8	9.6	1.6	1.1	2.6
Anxiety and/or depression	291.9	177.4	1.6	1.5	1.8

Table A10: Sex standardised rate and rate ratio of multimorbidity for unpaid carers and non-carers at all ages

Age group	Unpaid carers	Non-carers	Unpaid carers vs non-carers		
	Sex standardised rate	Sex standardised rate	Rate ratio	95% CI low	95% CI high
<25	125.0	42.3	3.0	2.3	3.8
25-34	204.9	78.7	2.6	2.2	3.1
35-44	252.9	122.0	2.1	1.9	2.3
45-54	313.4	183.9	1.7	1.6	1.8
55-64	357.5	265.9	1.3	1.3	1.4
65-74	542.1	369.0	1.5	1.4	1.5
75+	717.4	537.2	1.3	1.3	1.4

Table A11: Sex standardised rate (per 1,000) for unpaid carers and non-carers experienced 0, 1 or 2/+ long-term health conditions

	Age group	0 conditions	1 condition	2 or more conditions (multimorbidity)
Unpaid carer	<25	602.1	273.0	125.0
	25-34	497.6	297.5	204.9
	35-44	444.5	302.6	252.9
	45-54	383.7	302.8	313.4
	55-64	342.7	299.8	357.5
	65-74	211.6	246.4	542.1
	75+	103.4	179.2	717.4
Non-carer	<25	800.4	157.3	42.3
	25-34	714.4	206.9	78.7
	35-44	654.5	223.5	122.0
	45-54	582.5	233.6	183.9
	55-64	490.9	243.2	265.9
	65-74	392.8	238.3	369.0
	75+	283.3	179.5	537.2

Table A12: Age-sex standardised rate (per 1,000 population) and rate ratio of multimorbidity amongst unpaid carers and non-carers for deprivation quintiles

	Unpaid carers	Non-carers	Unpaid carers vs non-carers		
	Age-sex standardised rate	Age-sex standardised rate	Rate ratio	95% CI low	95% CI high
Least deprived	293.7	166.0	1.8	1.6	1.9
Q4	312.1	169.2	1.8	1.7	2.0
Q3	312.1	187.0	1.7	1.6	1.8
Q2	312.3	195.3	1.6	1.5	1.7
Most deprived	324.0	204.3	1.6	1.5	1.7

Table A13: Age-sex standardised rate (per 1,000 population) and rate ratio of multimorbidity across all age groups

	Most deprived		Least deprived		Unpaid carers vs non-carers in most deprived communities			Unpaid carers vs non-carers in the least deprived communities		
Age group	Unpaid carers	Non-carers	Unpaid carers	Non-carers	Rate ratio	95% CI low	95% CI high	Rate ratio	95% CI low	95% CI high
<25	126.5	60.5	160.1	15.2	2.1	1.4	3.1	10.5	4.7	51.9
25-34	234.4	90.3	161.7	62.5	2.6	2.0	3.4	2.6	1.6	4.5
35-44	311.0	149.4	179.7	92.9	2.1	1.7	2.5	1.9	1.4	2.8
45-54	387.8	250.4	266.4	136.6	1.5	1.4	1.8	2.0	1.6	2.4
55-64	442.9	359.5	285.1	202.4	1.2	1.1	1.4	1.4	1.2	1.6
65-74	643.2	448.9	476.0	319.0	1.4	1.3	1.6	1.5	1.3	1.7
75+	776.1	593.6	688.2	518.4	1.3	1.2	1.4	1.3	1.3	1.4

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