Morbidities Among Older Workers And Work Exit:The Heaf Cohort

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ABSTRACT

Background: Governments need people to work to older ages but the prevalence of chronic disease and comorbidity increases with age and impacts work ability.

Aims: To investigate the effects of objective health diagnoses on exit from paid work amongst older workers.

Methods: Health and Employment After Fifty (HEAF) is a population cohort of adults aged 50-64 years recruited from English GP practices which contribute to the Clinical Practice Research Datalink (CPRD). Participants have completed questionnaires about health and work at baseline and annually for 2-years: their responses were linked with their objective health diagnoses from the CPRD and data analysed using Cox regression.

Results: Of 4888 HEAF participants ever in paid work, 580 (25%) men and 642(25%) women exited employment, 277 of them mainly or partly for a health reason (HRJL). Amongst HEAF participants who remained in work (n=3666) or who exited work but not for health reasons (n=945), there was a similar prevalence of background health conditions. In men and women, HRJL was associated with inflammatory arthritis, sleep disorders, common mental health conditions and musculoskeletal pain. There were however gender differences: widespread pain and lower limb osteoarthritis were associated with HRJL in women but hypertension and cardiovascular disease in men.

Conclusions: Improved diagnosis and management of common conditions might be expected to increase working lives. Workplace wellbeing interventions targeting obesity and increasing mobility might contribute to extended working lives. Employers of predominantly female, as compared with male workforces may need different strategies to retain older workers.

Key words: longer working lives; musculoskeletal disorders; work ability; common mental health conditions; hypertension; cardiovascular disease

INTRODUCTION

United Nations data show that 8% of the world's population was aged >65 years in 1950, which increased to 19.1% by 2020 and is projected to reach 28.1% by 2050 (1). Given this, the proportion of elderly, economically inactive people relative to those who are economically active is declining. Many governments have responded with policy changes to encourage longer working lives.

In parallel, a growing number of people live with at least one long-term condition e.g. diabetes. In the US, an estimated 50% of adults aged 45-65 years have two or more long-term conditions (2). As treatments improve and lengthen lives, and the prevalence of risk factors for long-term conditions e.g. obesity increases, and alongside population ageing, rates of people living with multimorbidity are projected to continue increasing (3-5).

Having one or more chronic conditions may be associated with: lost earnings; impaired career prospects and early exit or prolonged absence from the workforce (6). Moreover, long-term conditions are more common and severe amongst people from the most deprived backgrounds. This is important in relation to work as people from deprived backgrounds are less likely to attain educational qualifications and therefore more likely to be employed in physically-demanding occupations. According to one study, 52% of those in unskilled occupations had at least one long-term condition, compared with 33% of those in professional occupations (7).

Another important social change is the rapid expansion in employment rates among women, with fastest growth amongst those aged >50 years (accounting for 72% of

the growth between 1992-2012) (8). However, women are more likely to work in some sectors e.g. administration, education, healthcare or retail. Consequently, although the aspiration is for working lives to lengthen, the growing burden of long-term conditions, and their distribution by socio-economic factors and gender, may impact differentially in some workforces. Therefore, we investigated the burden of health conditions in a cohort of older working adults and the impact of those conditions on risk of exit over two years of follow-up.

METHODS

HEAF is an English population cohort incepted in 2013-14. The detailed methodology is published elsewhere (9). In brief, a population sample was identified from general practices all across England by asking GPs to send study details and the baseline questionnaire to everybody registered at the practice aged 50-64 years, excluding only those who they felt unsuitable (e.g. because of bereavement). The practices were selected from among those who contribute data to the Clinical Practice Research Datalink (CPRD), which is a national database of de-identified patient information about consultations, diagnoses and medications. In total, 39,359 questionnaires were posted from 24 practices. Willing participants returned their completed questionnaire direct to the study team, along with a signed consent form separately consenting to (a) us sending follow-up questionnaires annually and/or (b) for linkage with their CPRD records[10].

At baseline, we collected information about: age; proximity to retirement; marital status; education; financial circumstances; housing tenure;; physical activity (hours/week); body mass index derived from self-reported height and weight; alcohol

consumption (weekly units categorised as: ‘non-drinker or ≤1 unit’; ‘2-14 units’; ‘≥15 units’); smoking status (never/ex/current); social network; type of employment contract; years in the job; physical and psychosocial work demands; job satisfaction and coping with the mental/physical aspects of the job.

At each annual follow-up, participants were asked about marital status, financial circumstances, self-reported health, and changes in employment. When employment status changed, respondents were asked to report the dates of leaving and/or starting a job, and whether a health condition was mainly/partly responsible for leaving each job (coded as a health-related job loss (HRJL)).

The CPRD is a real-world research database sponsored by the Medicines and Healthcare Products Regulatory Agency, and the National Institute for Healthcare Research. Participating general practices provide anonymised data, uploaded regularly and checked for completeness and validity, providing a log of all primary care and hospital consultations associated with significant events, illnesses, or medical activity (coded using Read codes) and prescriptions (coded using the British National Formulary BNF codes). Information is linked at the individual level via a unique identifying code number. To obtain all the relevant information, we provided CPRD with a list of 10,825 BNF codes and 11,316 Read codes and if any of these were found in the CPRD record of HEAF participants, data were returned.

From the CPRD codes, HEAF participants were classified as ever having the following conditions: neurological (epilepsy; stroke; dementia or cognitive disorder); major psychiatric condition; sleep disorder; hypertension; cardiovascular disease

(coronary syndromes; cardiac failure or valve disease); diabetes; respiratory disease (asthma; COPD); inflammatory arthritis; osteoarthritis (OA) (at any site); OA only in lower limb; crystal arthritis (gout; pseudogout); connective tissue disease; widespread pain. Additionally, common mental health conditions (anxiety; depression; somatoform; factitious; eating; adjustment; personality; psychological distress; dissociative disorders; impulse-control disorders) and regional musculoskeletal pain diagnosed or treated within the 12 months preceding the baseline questionnaire were extracted.

Characteristics of participants were described according to change in work status during follow-up. Frequency and percentage distributions were used for categorical variables, while means and standard deviations were used for continuous, normally distributed variables and medians and interquartile ranges (IQR) for continuous non-normally distributed variables. The number (%) of people diagnosed with each health condition was summarised by change in work status during follow-up. We used a multiple-record Cox proportional hazards model to analyse the contribution of individual health conditions to HRJL over two years of follow-up. Other work outcomes (remaining in employment, or job exits for other or unknown reasons) were regarded as censoring events. Effect estimates were expressed as hazard ratios (HRs) and 95% confidence intervals (95%CIs). Tests of the proportional hazards assumption in the final models were based on Schoenfeld residuals and implemented using the estat phtest command in Stata. We computed Population Attributable Fractions (PAFs) for specific health conditions. The PAF estimates what proportion of cases might be eliminated if no participant experienced that health

condition. All analyses were performed for men and women separately and were carried out with Stata software v15.1.

Ethical approval was obtained from the National Health Service Research Ethics Committee North West-Liverpool East (Reference 12/NW/0500) and all participants gave written informed consent.

RESULTS

In total, 8134 participants were recruited at baseline. Of those, 7560 participants consented for linkage with CPRD records (7% declined) (see Figure 1). 6944 (92%) participants responded to at least one of the two annual follow-up questionnaires, amongst whom 4888 (70%) were ever employed. During follow-up, 406 men (17%) and 417 women (17%) reported that they stopped working for non-health reasons, another 63 men and 59 women reported stopping working without providing a reason, 3666 (75%) remained in work and 277 (111 men (5%) and 166 women (7%)) reported HRJL. Supplementary Tables 1a and b summarise the characteristics of men and women by transition in work status. Compared with men still working or exited not for health reasons, men reporting HRJL were more likely to be: single/widowed or divorced; having difficulty managing financially; renting rather than owning/ mortgaging their home; doing limited leisure-time physical activity; socialising less with friends; ever-smokers; dissatisfied with work; struggling with work's physical and mental demands; and doing physically-demanding jobs. Similar findings were seen for women with HRJL who were also more likely to be overweight/obese or current smokers (Suppl Tables 1a and b).

Tables 1a and b summarise the prevalence of CPRD health conditions by change in work status during follow-up. Background health conditions were common: e.g. amongst those who remained in work, hypertension had been diagnosed in 24% men and 16% women. Comparisons between the prevalence of background morbidities amongst those who remained in work and those who left/exited work for reasons other than health-related, showed very similar rates, apart from those for recently diagnosed and treated common mental health conditions which were higher in the first group.

As expected, a much higher prevalence of conditions was found amongst those subsequently reporting HRJL. Amongst men with HRJL: 37% had hypertension; 25% and 24% had been diagnosed or treated for a common mental health condition or regional musculoskeletal pain respectively in the past year; 23% cardiovascular disease; 16% diabetes; and 15% OA. Amongst women with HRJL, diagnosis or treatment for a common mental health condition (34 %) or regional musculoskeletal pain (25%) in the past year were common, as was OA (25%). Hypertension was diagnosed in 24% and sleep disorders in 16%..

Table 2 shows the crude and adjusted hazards ratios (and estimated PAFs) for HRJL for each diagnosis amongst men. Hazard ratios of more than 2.0 were seen in the most adjusted models for: connective tissue disease, inflammatory arthritis, cardiovascular disease, hypertension, sleep disorders and common mental health conditions. The estimated PAFs show that common mental health conditions and regional musculoskeletal pain diagnosed and treated in the 12 months prior made considerable contributions to HRJL (17.3% (95% CI 13.2-21.2%) and 11.5% (95% CI

4.2-18.3%) respectively). Hypertension and cardiovascular disease were also important (PAF 19.4% and 11.4% respectively).

Table 3 shows the equivalent analyses for women. Several conditions increased the risk of HRJL but the hazard ratios were less than doubled by most diagnoses except for inflammatory arthritis and lower limb OA (HR 3.7 95%CI 2.1-6.4 and HR 2.6, 95% CI 1.5-4.3 respectively). As in men, common mental health conditions and regional pain diagnosed or treated in the past 12 months contributed importantly to the risk of HRJL. The other important diagnoses amongst women were: sleep disorders (PAF 5.9%, 95% CI 1.9-9.8%); and widespread pain (PAF 5.4%, 95% CI 1.4-9.2%).

Figure 2 compares the risks of HRJL by diagnoses among men and women, showing the important role of common metnal health conditions and regional musculoskeletal pain, sleep disorders and inflammatory arthritis.

DISCUSSION

This study has looked for evidence of associations between a range of background health diagnoses in older workers and their exit from paid employment. It is part of a wider project on health and employment using data from a population cohort of 8000 adults aged over 50, linked with their consent to their GP records (9,10). Amongst workers aged 50-64 years, diagnoses were common, particularly hypertension (24% men and 16% women), common mental health conditions (10% men and 20% women), regional musculoskeletal pain (16% of men and 20% women) and OA (14% men and 17% of women). Over two years of follow-up, 642 women and 580 men exited work, the majority of whom (n=945, 77%) exited not for health reasons (retired). However, HRJL was reported by 111 (4.7%) men and 166 (6.6%) women.

Generally, those who remained working had a similar prevalence of each diagnosis as that found in those who left employment not for health reasons, although common mental health conditions were more prevalent among persistent workers than retirees. Common mental health conditions, regional musculoskeletal pain, sleep disorders and inflammatory arthritis contributed substantially to the risk of HRJL. However, in men but not women, hypertension and cardiovascular disease also contributed important PAFs but in women not men, OA of the lower limb and widespread pain were important.

Our findings need to be considered alongside some limitations. HEAF is a population-based cohort involving >8000 older adults. However, only 21% of those eligible to participate at baseline actually did so. Encouragingly, participants were from all geographic locations of England and all 10 deprivation deciles (9), but we cannot rule out participation bias. However, the analyses presented here rely upon internal comparisons between participants and are therefore unaffected by responder bias and importantly HEAF has excellent retention rates (83% after two years) (9,10). CPRD is a fantastic resource, containing the records of 15 million patients and all participating practices must reach and maintain a level of accuracy of their data which is subject to audit. However, it is well-recognised that some conditions are more reliably coded than others. To account for this, we chose highly specific codes, or in the case of musculoskeletal pain and common mental health conditions only those diagnosed or treated in the preceding 12 months, deliberately accepting lower sensitivity for higher specificity. Consequently, we suggest that our estimates of the impact of some conditions are likely to be conservative. Importantly, unlike other large-scale surveys of health and work, our study benefits from having

objective health information, rather than relying upon self-reported diagnoses. Also, it should be borne in mind that when sample sizes are small, Cox models have lower power and therefore, this may have affected our findings when diagnoses were uncommon.

That hypertension was such an important risk factor for HRJL amongst men requires further consideration. Hypertension has been reported independently associated with declining functional capability or disability (11) with a “dose-related” association (12-13). Postulated mechanisms include: increased cerebral white matter hyper-intensities, reduced cerebrovascular function, diminished overall lean muscle mass, inflammation, changes in the renin-angiotensin system or declining cognitive function (12). It has been shown previously that symptomatic people with hypertension take more sick leave than asymptomatic people (14). Alternatively, hypertension could be a “marker” of other relevant factors for HRJL (e.g. poorquality diet, smoking, restricted leisure-time physical activity and/or obesity). These factors are also associated with deprivation, another recognised risk factor for HRJL. Our analyses were adjusted for reporting not managing financially and low levels of leisure-time physical activity but it is feasible that there is a cumulative negative effect of early environment, poorer educational attainment, working in physically-demanding jobs with exposure to inclement environments (dust, noise, cold etc.) and that this increases both the risk of hypertension and the likelihood of a mismatch between physical capability and job demands, thus precipitating HRJL (15-16). This finding justifies more research however because none of the countries legislating to encourage longer working lives have differentiated between workers doing desk-based work and those doing more physically-demanding unskilled jobs. Longer

working lives might therefore widen the socio-economic divide, with those who most need to work (because of lack of home ownership or pension provision) least likely to be able to, with consequent reliance upon state welfare payments.

It is well known that mental ill-health substantially impacts ability to find and retain paid work (indeed up to 95% of people with severe mental health conditions are unemployed) (17). However, our findings emphasise that common mental health conditions are not only prevalent in the age group 50-64 years but also impact work retention (18). Our results suggest a role for earlier detection and better treatment of mental health conditions to prevent HRJL, amongst older workers.

It has been previously shown that inflammatory arthritis (rheumatoid arthritis (19) and axial spondyloarthritis (19,20)) restrict working lives. However, HEAF participants are relatively "healthy workers" (survived in paid work until aged 50-64 years and subsequently reported HRJL). This suggests that optimised rheumatology care might play an important role in supporting people with inflammatory arthritis to retain work. Pilot studies amongst people with inflammatory arthritis suggest that vocational rehabilitation interventions are effective (21-24). If work became a health outcome, it would encourage healthcare professionals to offer more support for patients to work. Unfortunately, people with inflammatory arthritis often perceive their healthcare team as disinterested in their work (25).

That lower limb OA impacts importantly on older working women is perhaps unsurprising, particularly as women more commonly develop disabling lower limb OA than men. For example, one study of 40,000 workers aged >20 years, found that

12.2% reported doctor-diagnosed OA and it was associated with significantly higher rates of absenteeism, presenteeism, and overall work impairment ($p<0.001$) (26). In a primary care study involving 1000 working adults aged 50-65 years, around one in four of those who consulted with OA suffered premature work loss (27). Although this rate of job loss was similar to those who consulted for other reasons, OA consulters were older, more likely off sick, male and reporting poor social support at work. Therefore, our results: add to the growing body of evidence that OA causes significant work disability amongst older adults; highlight the relative importance of OA alongside other conditions as a risk factor for HRJL; and suggest a sizeable population attributable impact of OA on HRJL. Also, it is thought that CPRD data generally under-represent the true prevalence of OA. For these analyses, we defined OA cases based on a single record of a relevant code within CPRD ever, as has been done by others. Unlike some studies (28), we chose not to classify OA when adults aged >45 years had consulted with pain at any musculoskeletal site (closer to the definition of regional musculoskeletal pain employed here). Our case definition will therefore be more specific and less sensitive suggesting that we are under-estimating the true size of the burden. However, the fact that these consultations were coded as OA implies that there was an opportunity to recognise the impact of the condition on work and put in place active management to prevent job loss.

The relatively greater impact of OA among female than male workers is, we believe, a novel finding. Unfortunately, OA is often poorly managed in practice and women are apparently less likely to be offered lower limb arthroplasty than men (29) and have often progressed to a more advanced stage when operated on (30). Gender differences in work disability could cause differential impacts in some workforces e.g.

nursing, social care, teaching and retail where women commonly work and rely on mobility and good physical function. Although these findings require replication, they indicate a potentially major impact of OA on work ability amongst female workers in key sectors including health and social care.

Many countries need to prolong working lives. Our study showed that common mental health conditions, regional musculoskeletal pain and inflammatory arthritis are associated with HRJL, as are hypertension and cardiovascular disease in men, and lower limb OA and widespread pain in women. Our findings highlight the need for improved detection and management of these common conditions to reduce the risk of HRJL. Moreover, our results suggest that workforces with mostly male workers may need to focus on prevention of or accommodation of workers with cardiovascular conditions, whilst those with predominantly female workers may need to consider the impact of OA and pain.

KEY LEARNING POINTS

What is already known on this subject?

- There is an economic imperative for people to work to older ages but age is associated with an increasing risk of one or more long-term conditions.
- Workability is affected by health but some conditions are likely to cause more impact than others

What this study adds?

- Inflammatory arthritis, sleep disorders, common mental health conditions and musculoskeletal pain presenting in primary care are importantly associated with health-related job loss
- Some health diagnoses affect work ability of older male and female workers differently

What is the impact on policy/practice?

- Improved recognition of the role of common mental health conditions, regional musculoskeletal pain and hypertension presenting in primary care could facilitate early intervention and better treatment to prevent work loss
- Optimised treatment of inflammatory arthritis and sleep disorders as well as osteoarthritis and widespread pain could reduce work disability and promote healthy retirement
- Employers and policy-makers may need different strategies for accommodating older workers, depending upon the gender of their workforce but psychosocial factors are important for all.

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Competing interests:

KWB, SD, CHL, GN, MJS, HES have no conflicts of interest to declare. Unrelated to the current work, CC reports personal fees from Alliance for Better Bone Health, Amgen, Eli Lilly, GSK, Medtronic, Merck, Novartis, Pfizer, Roche, Servier, Takeda and UCB. NA reports grants and/or personal fees from Merck, Flexion, Regeneron and Pfizer/Lily.

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Protection of participants:

This study complies with the Declaration of Helsinki. Ethical approval was obtained from the National Health Service (NHS) Research Ethics Committee North West-Liverpool East, UK (REC reference 12/NW/0500).

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Table1a: prevalence of CPRD health diagnoses in men by change in work status over two years of follow-up

	Men (n=2,364)				
	Overall (n=2,364)	No job exits (n=1,784)	HRJL (n=111)	Non-health exits (n=406)	Unknown exits (n=63)
	N(%)				
Neurological	54 (2)	36 (2)	5 (5)	12 (3)	1 (2)
Common mental health condition	233 (10)	167 (9)	28 (25.)	27 (7)	11 (18)
Major psychiatric	79 (3.)	56 (3)	10 (9)	10 (3)	3 (5)
Sleep disorder	108 (5)	76 (4)	11 (10)	20 (5)	1 (2)
Hypertension	570 (24)	407 (23)	41 (37)	103 (25)	19 (30)
Cardiovascular disease	249 (11)	177 (10)	25 (23)	36 (9)	11 (18)
Diabetes	240 (10)	165 (9)	18 (16)	47 (12)	10 (16)
Respiratory disease	207 (9)	151 (9)	12 (11)	35 (9)	9 (14)
Inflammatory arthritis	37 (2)	28 (2)	5 (5)	4 (1)	-
OA any	323 (14)	235 (13)	17 (15)	63 (16)	8 (13)
OA lower limb	87 (4)	65 (4)	3 (3)	15 (4)	4 (6)
Crystal arthritis	141 (6)	100 (6)	9 (8)	29 (7)	3 (5)
CTDs	12 (1)	5 (0)	2 (2)	5 (1)	-
Widespread pain	80 (3)	62 (4)	7 (6)	9 (2)	2 (3)
Regional pain	385 (16)	280 (16)	27 (24)	67 (17)	11 (18)

OA: Osteoarthritis; CTD: Connective tissue disease

Table 1b: prevalence of CPRD health diagnoses in women by change in work status over two years of follow-up

	Women (n=2,524)				
	Overall (n=2,524)	No job exits (n=1,882)	HRJL (n=166)	Non-health exits (n=417)	Unknown exits (n=59)
	N(%)				
Neurological	32 (1)	21 (1)	3 (2)	6 (1)	2 (3)
Common mental health condition	518 (21)	374 (20)	57 (34)	69 (17)	18 (31)
Major psychiatric	137 (5)	96 (5)	14 (8)	20 (5)	7 (12)
Sleep disorder	226 (9)	164 (9)	26 (16)	31 (7)	5 (9)

Hypertension	403 (16)	273 (15)	40 (24)	79 (19)	11 (19)
Cardiovascular disease	86 (3)	63 (3)	10 (6)	12 (3)	1 (2)
Diabetes	154 (6)	107 (6)	15 (9)	25 (6)	7 (12)
Respiratory disease	236 (9)	160 (9)	22 (13)	43 (10)	11 (19)
Inflammatory arthritis	69 (3)	47 (3)	15 (9)	4 (1)	3 (5)
OA any	434 (17)	317 (17)	42 (25)	60 (14)	15 (25)
OA lower limb	124 (5)	86 (5)	19 (12)	16 (4)	3 (5)
Crystal arthritis	24 (1)	19 (1)	2 (1)	3 (1)	-
CTDs	33 (1)	24 (1)	2 (1)	7 (2)	-
Widespread pain	207 (8)	151 (8)	24 (15)	28 (7)	4 (7)
Regional pain	495 (20)	349 (19)	42 (25)	88 (21)	16 (27)

OA: Osteoarthritis; CTD: Connective tissue disease

Table 2: Hazard ratios and population attributable fractions for each health condition, to risk of HRJL over two years of follow-up amongst MEN

	Crude	Fully adjusted[⊥]	Fully adjusted[⊥]
	HR (95%CI)		**PAF (95% CI)**
Neurological	2.4 (1.0,6.0)	2.5 (1.0,6.1)	3.2 (1.2,5.1)
Common mental health condition	3.3 (2.1,5.1)	3.0 (1.9,4.9)	17.3 (13.2,21.2)
Major psychiatric	2.6 (1.3,5.4)	1.6 (0.7,3.7)	2.5 (-0.9,5.7)
Sleep disorder	2.4 (1.2,4.5)	2.4 (1.3,4.7)	6.3 (3.4,9.2)
Hypertension	2.0 (1.4,3.0)	2.0 (1.3,3.0)	19.4 (10.3,27.6)
Cardiovascular disease	2.5 (1.6,4.0)	2.1 (1.3,3.5)	11.4 (6.1,16.3)
Diabetes	2.0 (1.2,3.3)	1.6 (0.9,2.8)	6.7 (0.7,12.2)
Respiratory disease	1.4 (0.7,2.5)	1.1 (0.6,2.0)	0.9 (-6.4,7.6)
Inflammatory arthritis	3.1 (1.3,7.7)	4.6 (1.8,11.3)	4.2 (3.1,5.3)
OA any	1.0 (0.6,1.7)	0.9 (0.5,1.7)	-1.2 (-10.5,7.4)
OA lower limb	0.8 (0.3,2.5)	0.8 (0.2,2.4)	-1.0 (-6.0,3.8)
Crystal arthritis	1.4 (0.7,2.8)	1.5 (0.7,3.2)	3.0 (-1.1,7.0)
CTDs	4.6 (1.1,18.8)	5.4 (1.3,22.1)	1.8 (1.2,2.3)
Widespread pain	1.7 (0.8,4.0)	1.8 (0.8,4.1)	2.9 (-0.2,5.8)
Regional pain	1.7 (1.1,2.7)	1.8 (1.1,2.8)	11.5 (4.2,18.3)

OA: Osteoarthritis; CTD: Connective tissue disease

[⊥] adjusted for age, proximity to retirement, not managing financially and lack of leisure time physical activity

Table 3: Hazard ratios and population attributable fractions for each health condition, to risk of HRJL over two years of follow-up amongst WOMEN

	Crude	Fully adjusted[⊥]	Fully adjusted[⊥]
	HR (95%CI)		**PAF (95% CI)**
Neurological	1.7 (0.5,5.3)	1.2 (0.3,5.0)	0.3 (-1.4,1.9)
Common mental health condition	1.9 (1.4,2.7)	1.6 (1.1,2.4)	12.5 (5.1,19.3)
Major psychiatric	1.7 (1.1,3.0)	1.6 (0.9,2.9)	3.3 (-0.0,6.5)
Sleep disorder	1.9 (1.2,2.9)	1.7 (1.1,2.8)	5.9 (1.9,9.8)
Hypertension	1.6 (1.1,2.3)	1.4 (0.9,2.2)	7.2 (0.2,13.7)
Cardiovascular disease	1.9 (1.0,3.7)	1.5 (0.7,3.1)	1.6 (-1.1,4.3)
Diabetes	1.5 (0.9,2.6)	1.3 (0.7,2.3)	2.0 (-2.5,6.4)
Respiratory disease	1.5 (0.9,2.4)	1.2 (0.7,2.0)	1.9 (-3.4,6.9)
Inflammatory arthritis	3.9 (2.3,6.6)	3.7 (2.1,6.4)	7.5 (5.9,9.0)
OA any	1.7 (1.2,2.5)	1.5 (1.0,2.1)	8.2 (0.9,15.1)
OA lower limb	2.6 (1.6,4.3)	2.6 (1.5,4.3)	7.6 (5.1,10.1)
Crystal arthritis	1.3 (0.3,5.1)	1.2 (0.3,5.0)	0.3 (-1.4,1.9)
CTDs	1.3 (0.3,4.1)	1.1 (0.3,4.6)	0.2 (-1.7,2.0)
Widespread pain	2.0 (1.3,3.0)	1.7 (1.0,2.8)	5.4 (1.4,9.2)
Regional pain	1.4 (1.0,2.1)	1.5 (1.0,2.2)	8.2 (1.2,14.8)

OA: Osteoarthritis; CTD: Connective tissue disease

[⊥] adjusted for age, proximity to retirement, not managing financially, level of education, smoking and BMI

Figure 1: Flow-chart of HEAF participants with CPRD data and at least one follow-up questionnaire showing work status and health-related job loss

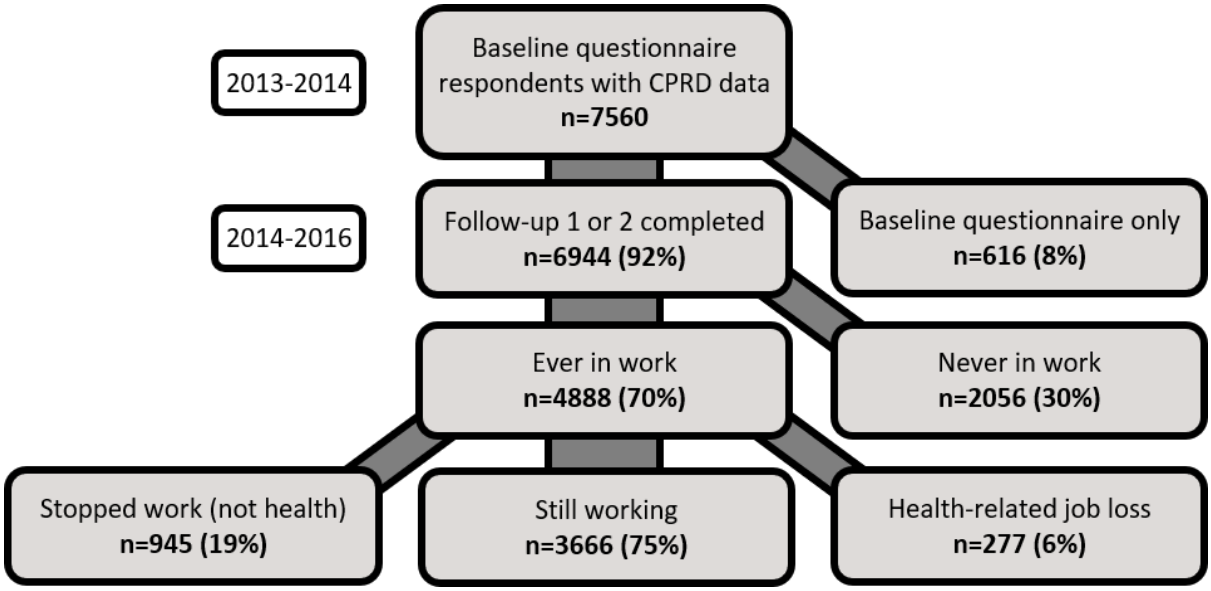

Figure 2 Hazard ratios and 95% confidence Interval for the risk of health-related job loss over 2 years of follow-up for each condition amongst men and women