

Exploring veterans physical and mental health needs in the UK: *the use of the Clinical Practice Research Datalink*

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April 2026



Foreword



The King's Centre for Military Health Research is one of the foremost centres in Military and Veteran Health research globally. In this new report, the authors have used innovative methods to develop, for the first time, a nationwide picture of the health of military veterans across the UK. After leaving military service, almost all veterans will receive healthcare through the National Health Service (NHS) and the gatekeepers for those services are General Practitioners (GPs). Consequently, almost every veteran in the UK will be registered with a GP. The CPRD is the most comprehensive database of primary care health information available in the UK, and by drawing data from both its key sources (Aurum and Gold), data were obtainable from across England, Scotland, Wales and Northern Ireland.

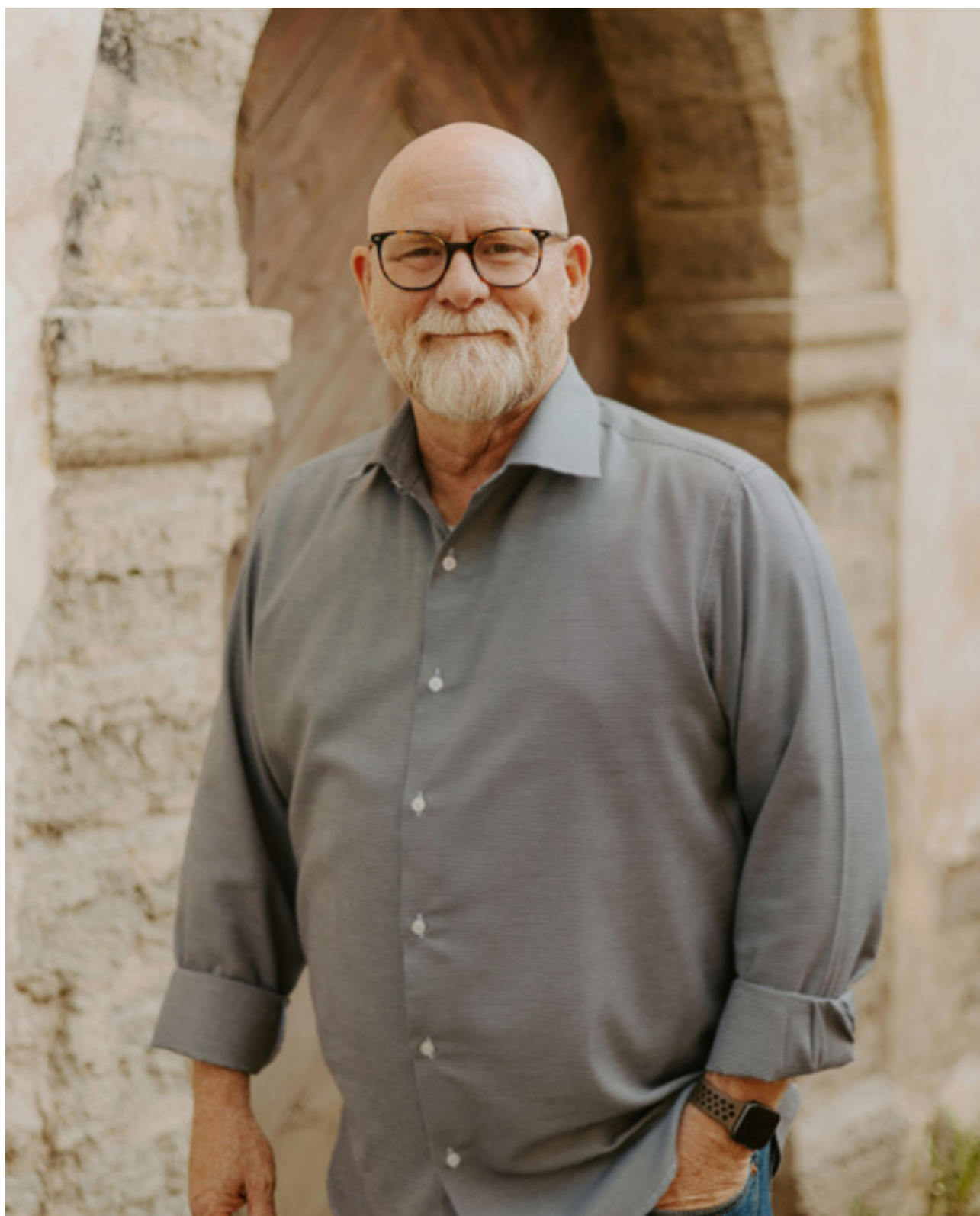
Since recent initiatives to improve coding of former military service in primary care, this report could identify records for more than 130,000 veterans. Therefore, this report provides

unique and important nationwide data about the health of UK veterans with comparisons by nation. Comparisons have been made for important health risk factors and several common chronic conditions, including lung disease, heart disease, and arthritis. These data can be used to identify patterns and trends in the health of veterans, focus research endeavour, and improve preventive strategies during service.

It was a privilege to be part of the Project Advisory Group for this important work, and I commend this report as an authoritative and informative snapshot of UK veteran health, which will undoubtedly provide the foundation for future health improvements for veterans.

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King's Centre for Military Health Research

The King's Centre for Military Health Research (KCMHR), known previously as the Gulf War Illness Research Unit, was launched in 2004 as a joint initiative between the Institute of Psychiatry, Psychology and Neuroscience and the Department of War Studies, King's College London. KCMHR is currently led by Professor Sir Simon Wessely. The centre draws upon the experience of a multi-disciplinary team to undertake research studying military life by using quantitative and qualitative methods. Its flagship study is an ongoing epidemiological multiphase investigation of the health and well-being of approximately 20,000 UK Armed Forces personnel. The study, funded by the UK Ministry of Defence (MoD) and most recently the Office for Veterans' Affairs (OVA), has been running since 2003. Data from the studies conducted at KCMHR have been used to analyse various military issues, and high-impact papers have been published in peer reviewed scientific journals. The findings are regularly reported in the press and have informed military policies.

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Acknowledgements

We are grateful to Forces in Mind Trust for funding this research and for their support and continued engagement throughout the project, in particular Kirsteen Waller and Tom McBarnet for their thoughtful guidance.

We thank the Clinical Practice Research Datalink (CPRD) for granting access to the data that made this study possible (ID: 22_001829).

We would also like to thank the members of our Project Advisory Board, whose expertise and insights greatly enriched the study. Members included Dr Phil Moore and Dr Frank O’Kelly, both experienced NHS GPs with a long-standing interest in veterans’ health, and with perspectives shaped in part by service in the Armed Forces; Ann Griffiths from the Royal British Legion, who brought expertise in policy and service provision; Dr Catherine Kinane formally based at Combat Stress, who contributed knowledge of specialist mental health care for veterans; Professor Karen Walker-Bone, an expert in occupational medicine; and Ms Susie Schofield, a medical statistician who provided advice and input into the project’s analyses. We are grateful for their time, commitment, and the depth of expertise they brought to the project.

This report honours the memory of Professor Nicola T Fear CBE, one of the report authors. Her legacy will continue to advance the health and well-being of the Armed Forces community for many years to come. She is deeply missed by all who knew and worked with her.

Terminology

COPD	Chronic obstructive pulmonary disease.
CPRD	The Clinical Practice Research Datalink is a large, anonymised database of UK primary care records used for research.
Devolved Nation	The devolved nations of the UK are Scotland, Wales, and Northern Ireland. They have their own legislature and government, with authority over certain matters such as health and education, while the UK Parliament remains the overall authority. England differs in that it does not have its own devolved legislature; its policies are managed directly by the UK Parliament.
EHRs	Electronic Health Records.
GP	General practice. The community-based healthcare setting where general practitioners deliver primary care services.
MICE	Multiple imputation by chained equations is a method for handling missing data by creating several complete datasets. The estimated values are generated through a series of regression models. The results are then combined to produce estimates that account for uncertainty due to missingness.
National	National Service was compulsory military service in the UK, introduced in January 1949. It required all physically fit men aged 18 to 21 years to serve in the Armed Forces for at least 18 months (later extended to two years in 1950), followed by four years on the reserve list. The policy formally ended in 1960, with the last National Service personnel discharged in 1963.
NHS	National Health Service.
PAB	Project Advisory Board.
PTSD	Post-Traumatic Stress Disorder.
PR	A prevalence ratio compares how common a condition or outcome is in one group relative to another. A PR of 1 indicates that the outcome is equally common in both groups. A PR greater than 1 indicates that the outcome is more common in the exposed or comparison group, while a PR less than 1 indicates that it is less common.
READ codes	A clinical coding system historically used in UK primary care to record patient information in electronic health records, including diagnoses, symptoms, and procedures.
SNOMED CT	Systematized Nomenclature of Medicine - Clinical Terms is a comprehensive and internationally recognised clinical vocabulary designed for recording and exchanging patient information in electronic health records.
Veteran	In the UK, a veteran is officially defined as anyone who has served for at least one day in His Majesty's Armed Forces, either as a regular or reservist.

Executive Summary



Why is this research important?

Most veterans transition successfully to civilian life after leaving military service; however, some may experience multiple physical and mental health needs, which are predominantly diagnosed and managed in primary care settings. However, there is limited UK-wide comparative evidence on veterans' health across the life-course, particularly in the devolved nations (Scotland, Wales, and Northern Ireland). This knowledge is essential to ensure that healthcare services are equitable and responsive to the needs of a diverse sample of veterans across all UK countries.

What was this research about?

This study evaluated the characteristics, healthcare use, and physical and mental health of veterans who access primary care across the UK. It examined how they use primary care services and estimated how commonly different physical and mental health conditions were recorded, overall and by specific groups (age, gender, ethnicity). It also explored whether these patterns differed across the four UK countries.

How did this work?

The research used anonymised electronic health records from the Clinical Practice Research Datalink (CPRD), a large UK primary care database. Veterans were identified using clinical codes recorded by general practitioners. The study included over 130,000 veterans from across England (n=122,363), Wales (n=5,072), Scotland (n=4,364), and Northern Ireland

(n=287). Descriptive statistics and regression analyses were employed to compare recorded demographic characteristics, healthcare use, and health conditions across the four countries, while accounting for differences such as age, gender, ethnicity and other health risk factors.

What did we find?

Across England, Wales, and Scotland, veterans identified in CPRD had similar demographic profiles, with majority being male and around 50 years old. In contrast, the Northern Ireland veteran sample was younger and more gender balanced.

Commonly recorded health conditions included musculoskeletal (such as lower back pain), chronic respiratory, and depressive conditions. There was some variation between countries. For example, compared with England, chronic obstructive pulmonary disease appeared more commonly recorded in the devolved nations; osteoarthritis and post-traumatic stress disorder were highest in Wales; lower back pain was highest in Northern Ireland; and depression appeared lower in Scotland. Veterans in Wales also had more GP consultations, suggesting possible differences in healthcare use or perceived need for care.

Missing data varied by UK country and measure, with especially high levels for some health risk factors in the devolved nations. Ethnicity and alcohol use were most often missing in Northern Ireland, while Scotland had consistently high missing data across all assessed factors.

What does this mean?

The findings suggest that veterans' healthcare needs vary across the UK. Differences in healthcare systems, data recording practices, and local veteran populations may contribute to unequal access to healthcare and unequal health outcomes.

The study also demonstrates the potential of CPRD to provide a national picture of key priorities for addressing inequalities in health outcomes among a diverse and changing

population of veterans within the UK. However, this work represents an initial investigation and therefore, the findings should be interpreted within the context of ongoing research. We plan additional analyses to understand drivers and pathways to health inequalities in the UK veteran population within the linked primary and secondary care data sources.

Recommendations

Improving the identification of veterans in primary care records is essential to ensure robust evaluation of the health needs of UK veterans accessing care services. Enhancing data completeness and granularity (e.g., branch, grade/role, combat participation) of military veterans in the CPRD, would enable more robust analyses and personalised recommendations. CPRD data can help identify veterans' health needs, patterns of service use, and potential barriers to care. These insights can support more targeted planning and delivery of services such as Op COURAGE, Op RESTORE, VALOUR, and the GP Veteran Friendly Accreditation scheme. They can also inform national policy, guide resource allocation, strengthen post-service support, and help charities advocate for appropriate healthcare interventions and funding.

Continued investment in UK-wide research is needed to strengthen understanding of veterans' health outcomes and healthcare pathways at a local, regional, and national level. **Future work should prioritise under-represented groups, including women and ethnic minority veterans, to address existing evidence gaps.** Together, these efforts can help build the evidence needed to ensure that healthcare provision is appropriately tailored to the needs of veterans across the UK.

Report



1. Introduction

Veterans often present with complex and interrelated sociodemographic, mental, and physical health needs^{1,2}. As a result, their engagement with primary healthcare services is a critical component of understanding and addressing these needs. The previous FiMT-funded project *Exploring veterans physical and mental health outcomes: the use of the Clinical Practice Research Datalink*³ demonstrated the value of using general practice (GP) records within the Clinical Practice Research Datalink (CPRD) to deepen our understanding of the physical and mental health profiles of UK veterans. However, this prior work did not include veterans identified in CPRD living in Wales (n=5,072), Scotland (n=4,364), or Northern Ireland (n=287). The current project aims to address this evidence gap.

Existing research has explored mental health diagnoses of veterans accessing secondary mental health care services in South London and Maudsley NHS Foundation Trust (SLaM), representing a relatively small geographical area of England⁴. Expanding this beyond England, research led by Bergman and colleagues has examined the use of secondary care services by veterans in Scotland, focusing on various health outcomes including cardiovascular and

respiratory diseases, cancer, diabetes, osteoarthritis, mental health, and substance misuse⁵. However, comparable work is limited across the wider UK (i.e., Wales, Northern Ireland, and England – beyond the SLaM study), and recommendations have been made to address this gap⁶.

Alongside research into secondary care, only a small number of studies have explored veterans' health in primary care⁷. A recent study used primary healthcare records to identify the prevalence of common physical and mental health disorders among UK veterans. This analysis was limited to 13 GP practices in the Northwest of England, thus, representing a narrow geographical area^{7,8}.

Effective policy development and service provision continue to be hindered by the scarcity of comprehensive, high-quality data on veterans' health profiles. Understanding differences by UK country is essential, as the organisation, delivery, and resourcing of health services vary across the devolved nations. This means that veterans' access to care, pathways through services, and health outcomes may differ across the UK, particularly in the context of cross-national health inequalities, where healthy life expectancy has been shown to vary across the UK's general population⁹.

1.1 Project aim

The current project aimed to examine the sociodemographic, mental, and physical health profiles of veterans accessing primary healthcare across the UK (England, Wales, Scotland, and Northern Ireland) and to explore geographical variation in these profiles.

1.2 Research questions (RQ)

RQ1. What are the country-specific sociodemographic and administrative characteristics of veterans accessing primary care in the UK, and how do these differ across England, Scotland, Wales, and Northern Ireland?

RQ2. What are the country-specific health profiles among veterans in primary care across the UK, and how do these differ across England, Scotland, Wales, and Northern Ireland?



2. Methods

2.1 Data sources

Clinical Practice Research Datalink (CPRD)

The NHS is one of the largest publicly funded healthcare systems in the world. In 2024, around 64 million people in England were registered with a GP¹⁰. When people visit their GP or receive hospital care, information about their symptoms, test results, diagnoses, and prescriptions is recorded in electronic health records (EHRs). CPRD is a trusted research service that collects anonymised EHRs from 2,400 GP practices across the UK¹¹. It holds historical records on 65 million patients, including around 19 million patients (28% of UK population) who are currently registered with a GP¹¹.

Previous studies have shown that CPRD data is reliable and accurate for researching a wide range of health conditions^{12–15}. For this project, we used data from the September 2024 release of CPRD Aurum and CPRD Gold.

CPRD Aurum

CPRD Aurum contains anonymised health records primarily from GP practices in England and a few in Northern Ireland using EMIS Web software. Observations are coded using SNOMED CT², Read, and local EMIS codes. It includes data from over 51 million historical patients, with around 17 million (approximately 30% of England's population) currently registered across 1,600

CPRD Aurum vs CPRD Gold: Data differences and analytical implications

CPRD Aurum and CPRD Gold differ in their structure, coding systems, data coverage, and launch dates, which influences the types of analyses that can be conducted with each dataset. CPRD Aurum is the larger but more recently launched database. It was introduced in 2017, although historical records are available for a subset of patients dating back to 1987. It primarily covers GPs in England and supports linkage to external datasets, such as hospital records. This made it suitable for the previous FiMT-funded project, *Exploring veterans' physical and mental health outcomes: the use of the Clinical Practice Research Datalink*³, which required linked data.

In contrast, CPRD Gold is the older dataset, launched in 1987. It primarily includes GPs in Scotland (207 contributing practices), Wales (110), and Northern Ireland (40), with data available only for 7 practices in England¹⁷, with limited availability of linkage data. As such, in combination with CPRD Aurum data, CPRD Gold offers valuable opportunities for cross-national comparisons across the UK's devolved nations which was the primary aim of the present project.

¹Data is collected by practices daily and monthly builds of the dataset are generated and made available for researchers³⁵.

²SNOMED CT and Read Codes are standardised clinical coding systems used in UK primary care to record information such as diagnoses, symptoms, and treatments in patients EHRs. Read Codes were developed for the NHS while SNOMED CT (Systematised Nomenclature of Medicine – Clinical Terms) is the newer, internationally recognised terminology.

practices¹⁶. The database captures key information such as symptoms, diagnoses, prescriptions, test results, and hospital referrals.

CPRD Gold

CPRD Gold contains anonymised health records from GP practices using Vision software. Observations are coded using Read v2 codes. CPRD Gold covers all four UK constituent countries¹⁷. It includes historical data from over 22 million patients, with about 2.3 million patients (4% of the UK population) currently registered at 291 practices from Scotland (72%), Wales (19%), and Northern Ireland (9%)¹⁸. The database holds information on symptoms, diagnoses, prescriptions, test results, and hospital referrals.

Ethical approval

This project was covered within CPRD's legal and ethical framework (protocol ID is 22_001829).

2.2 Sample

Veterans

Veterans were identified in CPRD using SNOMED and Read medical codes recorded in primary care records, which indicate a history of military service. As coding practices vary across clinicians and time, a comprehensive list of relevant codes was developed. This list was informed by veteran health experts, a review of commonly used terms in the literature, and complemented with searches of CPRD medical dictionaries for military-related terminology. In total, 121 codes were used to identify veterans in CPRD Aurum (England and Northern Ireland) and 35 codes in CPRD Gold (Scotland, Wales, and Northern Ireland). The process used to derive veteran status has been described in detail elsewhere³.

Where possible, additional information was derived on branch of service (Royal Navy/ Royal Marines, British Army, or Royal Air Force)

and veterans eligible for National Service-era conscription. National service in the UK was introduced in January 1949, requiring all physically fit men aged 18-21 years to undertake military service. The final national service personnel were discharged in 1963.

For each veteran, the date we used as reference point – referred to in this report as the “index date” – was defined as the date on which a veteran-related term first appeared in the patient's record. Follow-up began at the ‘start date’, defined in this report as the latest of their GP registration date, index date, or study start date (01 January 1987, which marked the start of the study observation period). Follow-up ended at the ‘end date’, defined as the earliest of their registration end date (e.g., moved to a different GP practice), last CPRD collection date for their practice, their date of death, or the study end date (30 September 2024, which marked the end of the study observation period). Because it is unlikely that younger individuals are veterans, only those aged 18 and older were included in the analysis.

Demographic characteristics

The study looked at key demographic information, including age (18 and over), gender (men or women), and ethnicity (Asian, Black, Mixed, Other, or White).

Follow-up characteristics

Yearly consultations

Consultations in primary care were summarised as the average number of consultations per patient per year. Consultation rates were created to compare consultations between veterans across the UK.

Mortality

Date of death was extracted from CPRD to explore differences in veteran mortality across the UK.

Physical and mental health diagnoses

The study's main outcomes were selected based on previous evidence^{1,5,8} and were informed by discussions with the Project Advisory Board (see Acknowledgments section). A set of common physical and mental disorders were selected reflective of key health burden in this population, including chronic obstructive pulmonary disease (COPD), depression, lower back pain, myocardial infarction, osteoarthritis and post-traumatic stress disorder (PTSD). These were derived from medical codes recorded in the EHR by GPs, using SNOMED codes developed previously, as reported in previous research^{14,15}. For each condition, patients with at least one relevant medical code recorded at any time during their observation period were classified as 'cases', while those without the code were classified as 'non-cases', ensuring each patient contributed only once per condition. The record closest to the patients' start date was taken as the date of occurrence.

Health risk factors

Using primary care data, several health risk factors were identified. These included alcohol consumption severity (low risk, hazardous, harmful, and dependence), smoking status (never, ex-smoker, and smoker), body mass index (underweight, normal weight, overweight, moderate obesity, and severe obesity), and blood pressure (normal blood pressure, pre-hypertension³, and hypertension).

2.3 Statistical analysis

Descriptive statistics were used to compare the sociodemographic, administrative, mental and physical health characteristics of veterans accessing primary healthcare across the UK. We assessed the distribution of recorded age, gender, ethnicity, health risk factors, and medical history. We also evaluated completeness of these data. To assess the burden of recorded diagnoses within the study over the follow-up period, prevalence estimates were calculated as the proportion of individuals with a recorded diagnosis of each condition at any time during the observation period.

Subsequently, we ran adjusted regression models⁴ to examine the association between UK country (exposure) and each recorded health condition (outcome). Given that health conditions considered in this project are relatively common and patients were followed up for different times, Poisson regressions with robust standard errors were used to estimate prevalence ratios⁵. These models also account for the clustering of patients within GPs. To account for potential biases in estimates due to missing data in ethnicity and health risk factors (smoking status and BMI), we used multiple imputation by chained equations (MICE)⁶. The imputation model included relevant military, demographic, and outcome variables¹⁹. A total of 20 imputed datasets were generated.

³Pre-hypertensive, also known as high normal blood pressure and borderline hypertensive, is a medical classification indicating higher than normal blood pressure but not yet meeting the threshold for hypertension.

⁴A regression model is a statistical approach to assess the impact of a risk factor on a health outcome (for example, how having served in the Armed Forces might affect physical health), while also considering other factors, such as age and sex, that could play a role.

⁵Poisson regression with robust standard errors is a type of statistical data modelling approach that can be used to compare the relative risk or prevalence for common health conditions between two or more groups.

⁶Multiple imputation is a method used to handle missing data by creating several complete versions of the dataset, where missing values are filled using statistical models.



3. Findings

RQ1: Sociodemographic and administrative characteristics of veterans accessing primary care across the UK

What are the country-specific sociodemographic and administrative characteristics of the identified veterans accessing primary care in the UK, and how do these differ across England, Scotland, Wales, and Northern Ireland?

Veterans identified across the UK

A considerable number of veterans were identified in CPRD across England, Wales, Scotland, and Northern Ireland (see Appendix Table 1 for full table of sociodemographic and administrative characteristics of veterans across the UK). The number of veterans identified can be observed in Table 1. The majority resided in England, whilst a small minority resided in Northern Ireland.

Demographic characteristics

Age

The mean age of veterans in primary care was 52.54 (standard deviation [SD]=20.99) in England,

51.40 (SD=19.25) in Wales, 50.83 (SD=18.39) in Scotland, and 45.72 (SD=18.91) in Northern Ireland. Age distribution was relatively even among veterans across England, Wales, and Scotland (Figure 1). In contrast, veterans in Northern Ireland tended to be younger than those in the other countries, with a higher proportion in the 18-25 age category (16.38%) and a smaller proportion of veterans in the 56-65 (11.85%) and 66-75 (6.97%) age categories compared to the other UK countries.

Gender

Figure 2 shows the distribution of the gender of veterans by country. Across England, Wales, and Scotland, the identified veterans were predominantly male, with men comprising between 80% and 90% of veterans. In contrast, Northern Ireland showed a more balanced gender distribution, with similar proportions of male and female veterans (55.75% vs 44.25%). Except for Scotland, women appeared to be overrepresented among identified veterans across the UK^{20, 21}.

Table 1. Number of veterans identified across UK countries

CPRD database	UK country	Number of veterans identified	% of sample
Aurum	England	122,363	92.64
Gold	Wales	5,072	3.84
Gold	Scotland	4,364	3.30
Aurum & Gold	N. Ireland	287	0.22

Figure 1. Age of veterans by UK country

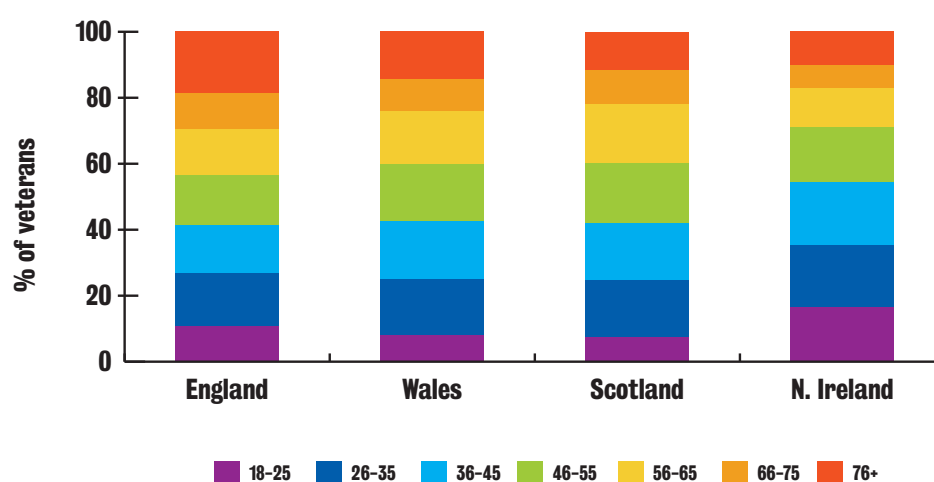
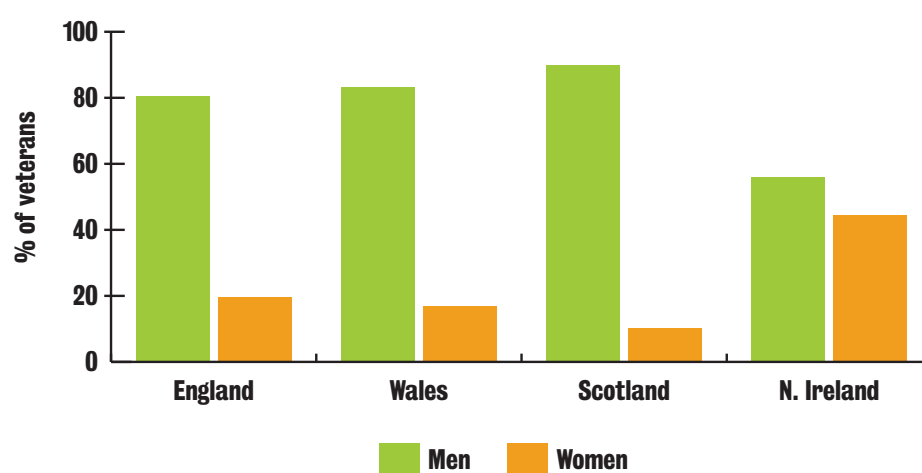


Figure 2. Gender of veterans by UK country

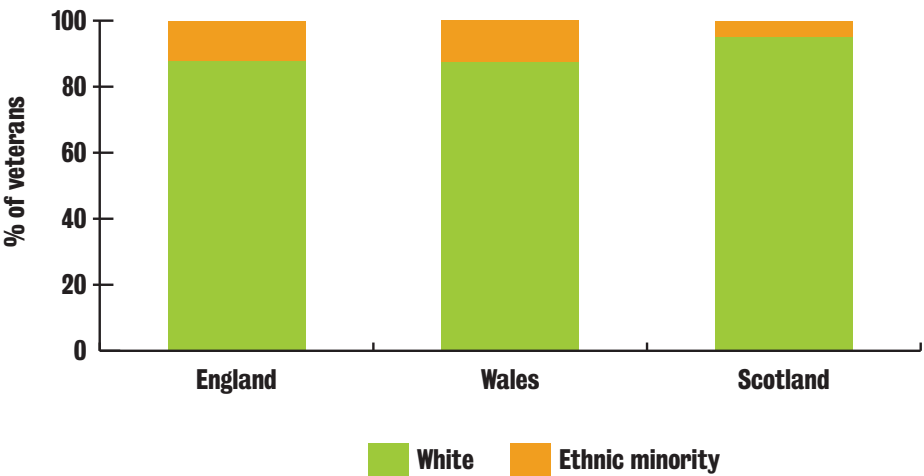


Ethnicity

The majority of veterans across England, Wales, and Scotland were White (Figure 3). A small proportion identified as an ethnic minority. The proportion of missing ethnicity data was much lower among veterans living in England (7.35%)

compared to the devolved nations (48.44% Wales, and 33.02% Scotland). In Northern Ireland, most of the sample with data available were White, and 55% had missing data. The findings for this variable are not presented for Northern Ireland due to the risk of disclosure.

Figure 3. Ethnicity of veterans by UK country



Administrative characteristics

Year of index

The year of index refers to the year on which a veteran-related term first appeared in the patient’s EHR (1987 to 2024). In England, Wales, Scotland, and Northern Ireland, most veterans were identified from 2011 onwards (Figure 4). This uplift aligns with the UK Department of Health’s 2011 directive to apply a code to identify veterans, which likely began to improve recording practices²². In Northern Ireland, while the majority were recorded between 2011 and 2020, a large proportion were also recorded earlier between 2001 and 2010, though absolute numbers remain small.²⁰

Follow-up times

Follow-up time refers to the length of time (years) individuals contributed to data to CPRD based on their start and end dates (see section 2.2). Veterans in Northern Ireland had the longest median follow-up time (Table 2).

Note that follow-up durations are calculated within the study period (1987–2024). Additionally, the follow-up observed in CPRD Aurum may partly reflect its later launch in 2017, compared with CPRD Gold (1987), which limits the length of retrospectively available data in Aurum^{17,23}.

Figure 4. Year of index for veterans by UK country

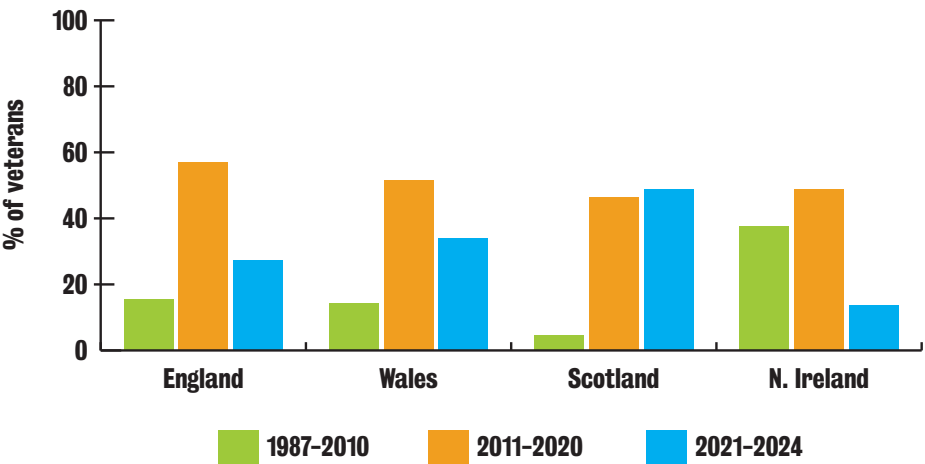


Table 2. Follow-up time of veterans by UK country

CPRD database	UK country	Follow-up in years Median (IQR)
Aurum	England	2.90 (1.24 – 5.56)
Gold	Wales	3.33 (1.24 – 6.85)
Gold	Scotland	2.20 (0.95 – 5.32)
Aurum & Gold	N. Ireland	5.41 (2.84 – 10.33)

Number of primary care consultations

Consultations in primary care were summarised as the median number of consultations per patient per year. When the complete study period is considered (1987-2024), veterans in Wales had the highest number of consultations, while veterans in England, Scotland, and Northern Ireland had similar numbers (Table 3). This may reflect differences in underlying health needs, help-seeking behaviours, and access to primary care, including variation in appointment availability and waiting times.

To ensure comparability in observation periods across countries and given that most veterans were identified after 2011 in England (84%), Wales (85%), Scotland (95%), and Northern Ireland (62%), analyses were repeated restricting the observation period to 2011–2024. Findings were broadly consistent with those from the full study period, except in Northern Ireland, where the median number of consultations decreased from 11 to 9 per year.

Table 3. Number of consultations among veterans by UK country

CPRD database	UK country	Number of consultations between 1987 to 2024 Median (IQR)	Number of consultations between 2011 to 2024 Median (IQR)
Aurum	England	10.12 (6.00 – 16.71)	10.13 (6.00 – 16.54)
Gold	Wales	14.75 (7.09 – 25.26)	14.30 (7.00 – 25.31)
Gold	Scotland	11.75 (6.00 – 21.39)	12.00 (6.00 – 21.59)
Aurum & Gold	N. Ireland	11.17 (6.46 – 21.26)	9.07 (5.89 – 14.71)

Mortality

Between 1987 and 2024, the total number of deceased veterans identified in CPRD data across the UK was 13,594. After 2011, substantially more veterans were identified within the system, as a result, the absolute number of deaths captured among veterans would also be expected to increase (Table 4).

Due to potential identification bias, these findings should be interpreted with caution. Individuals with greater health needs may be

more likely to disclose or have their veteran status recorded, either because their conditions are linked to their military service or because more frequent healthcare contact increases their opportunities for identification. This may be especially relevant in Northern Ireland, where disclosure of military service history can be politically and socially sensitive, influencing patterns of disclosure and recording.

Table 4. Year of death among veterans by UK country

Year of death	England n (%)	Wales n (%)	Scotland n (%)	N. Ireland n (%)
1987-2000	61 (0.48)	*	*	*
2001-2010	939 (7.34)	*	*	*
2011-2020	5672 (44.32)	242 (49.79)	101 (38.11)	29 (65.91)
2021-2024	6127 (47.87)	181 (37.24)	157 (59.25)	*

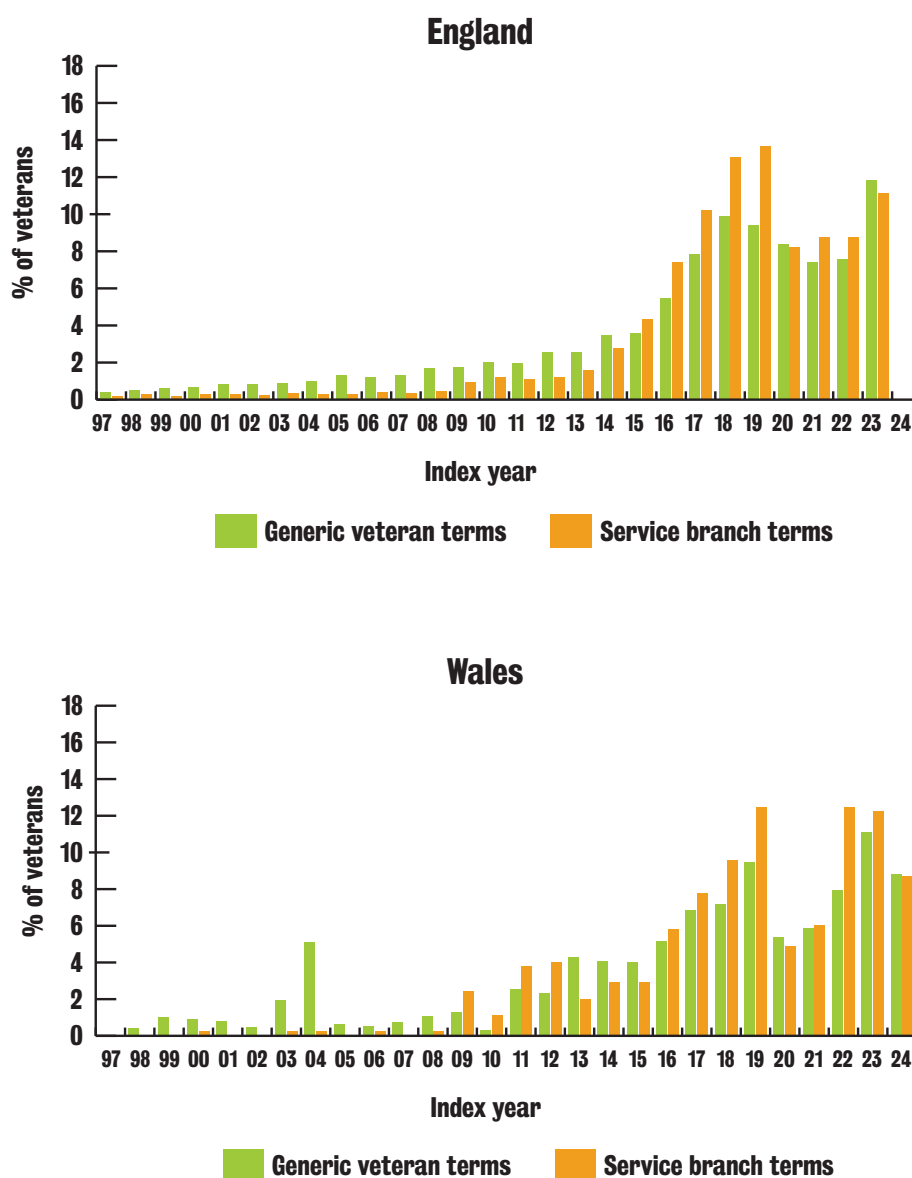
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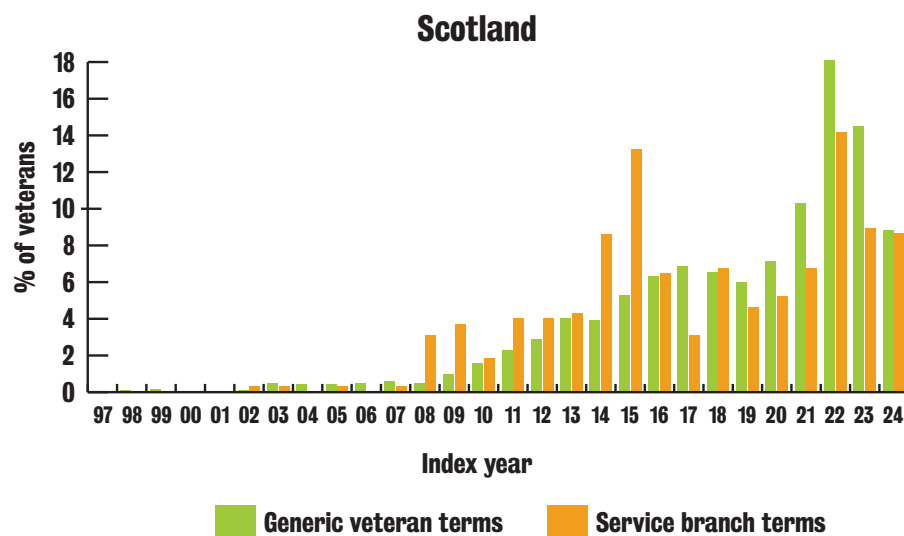
Service branch

Across the UK, most veterans (~60%) had served in the British Army (see Appendix Table 1). However, the proportion of missing data on service branch was particularly high for the devolved nations (91% to 98%) compared to England (68%). The findings for this variable are not presented for Northern Ireland due to the risk of disclosure.

Although few generic veteran terms (e.g., “served in the armed forces”) are recorded before 2016, this pattern is even more pronounced for branch-specific terms (e.g., “Royal Navy”), which only begin to appear from 2000 onwards – particularly in the devolved nations. Most branch-specific terms are identified in more recent years, suggesting that veteran records have become more complete over time (see Figure 5).

Figure 5. Identification of generic veteran terms and service branch terms by UK country



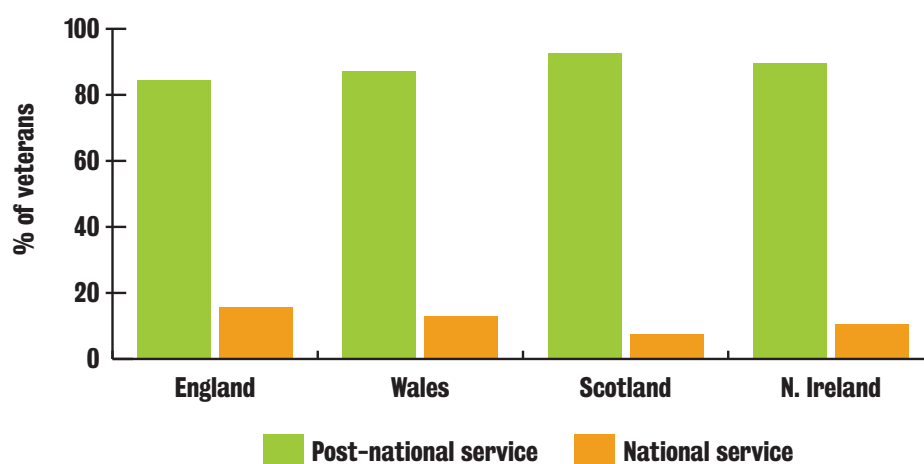


Veterans eligible for National Service-era conscription

Across the four UK countries, most veterans identified in the dataset were in the post-National

Service category (Figure 6). However, close to 10% across the UK were classified as eligible for National Service-era conscription, based on age eligibility during the period of compulsory service.

Figure 6. National service among veterans by UK countries



RQ2: Health conditions diagnosed among veterans in primary care and differences across the UK

What are the country-specific health profiles among veterans in primary care across the UK, and how do these differ across England, Scotland, Wales, and Northern Ireland?

Health risk factors

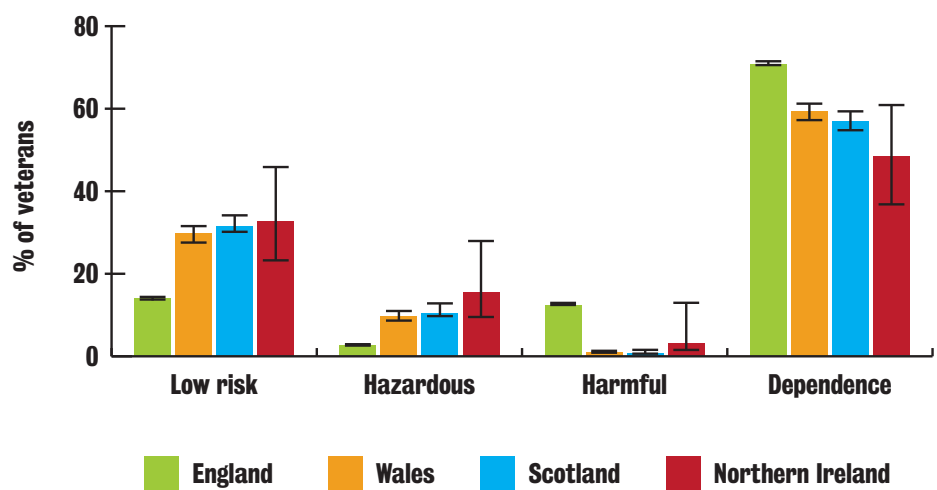
Alcohol consumption severity

Among veterans with alcohol consumption data, analysis of data across England, Wales, Scotland and Northern Ireland indicated that most veterans were classified as having alcohol dependence

(48.44-70.86%) (Figure 7). However, this high predominance of alcohol dependence was also found among non-veterans in primary care in our previous report³ and likely reflects selection and recording biases. Alcohol assessments are usually conducted when there are clinical concerns and those with more severe alcohol issues are more likely to seek help and be screened in primary care.

After dependence, the most common classification was low-risk alcohol use (13.98-32.81%). Other categories, including hazardous and harmful drinking, were observed less frequently in comparison.

Figure 7. Veteran recorded alcohol consumption severity by UK country

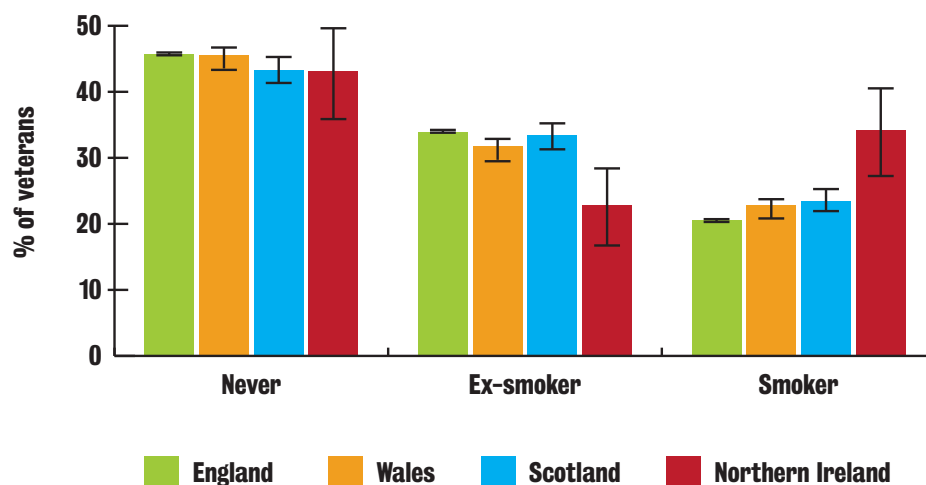


Smoking status

For veterans with smoking data, smoking patterns were broadly similar for veterans across England, Wales, and Scotland. In these UK countries, the majority of veterans reported that they had never smoked (43.27-45.66%), followed by those who were ex-smokers (31.77-33.89%), and then current smokers (20.45-23.40%), who represented the smallest proportion.

In Northern Ireland, while the largest group also consisted of veterans who had never smoked (43.13%), the distribution of the remaining categories differed slightly. Current smokers represented the second largest group (34.12%), followed by ex-smokers (22.75%).

Figure 8. Veteran recorded smoking status by UK country



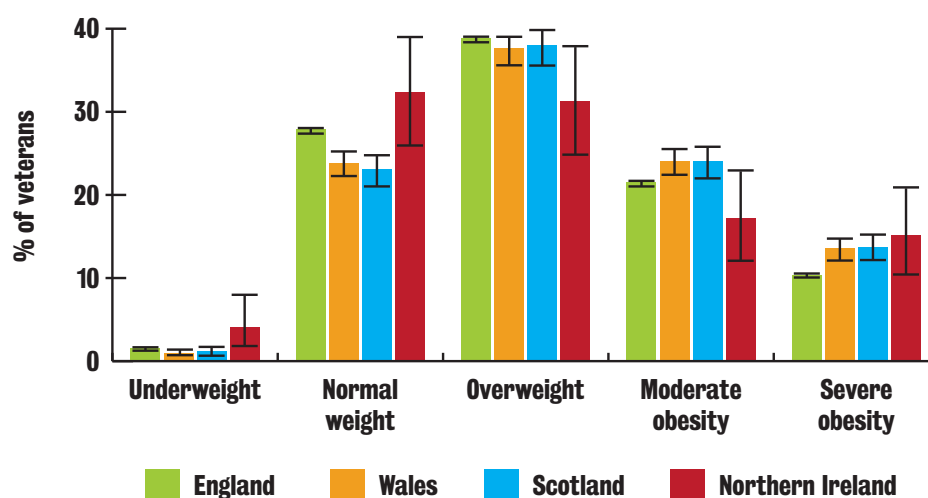
Body mass index

For veterans with body mass index (BMI) data, BMI distributions were similar across England, Wales, and Scotland (Figure 9). In these UK countries, most veterans were classified as overweight (37.62-38.87%), followed by those in the normal weight category (23.07-27.83%), with

very few individuals identified as underweight (0.96-1.48%).

In Northern Ireland, the pattern differed slightly, with similar proportions of veterans classified as normal weight (32.32%) and overweight (31.31%). As in the other UK countries, the underweight category represented only a small minority.

Figure 9. Veteran recorded body mass index by UK country



Blood pressure

For veterans with blood pressure data, the distribution was similar across England, Wales, and Scotland, with most classified as having pre-hypertension (44.81-48.22%), followed by hypertension (33.73%-40.87%), and normal blood pressure (14.32-18.05%). However, in Northern Ireland, the pattern differed slightly, most veterans had pre-hypertension (47.14%), followed by normal blood pressure (30.4%), while hypertension was the least common category (22.47%).

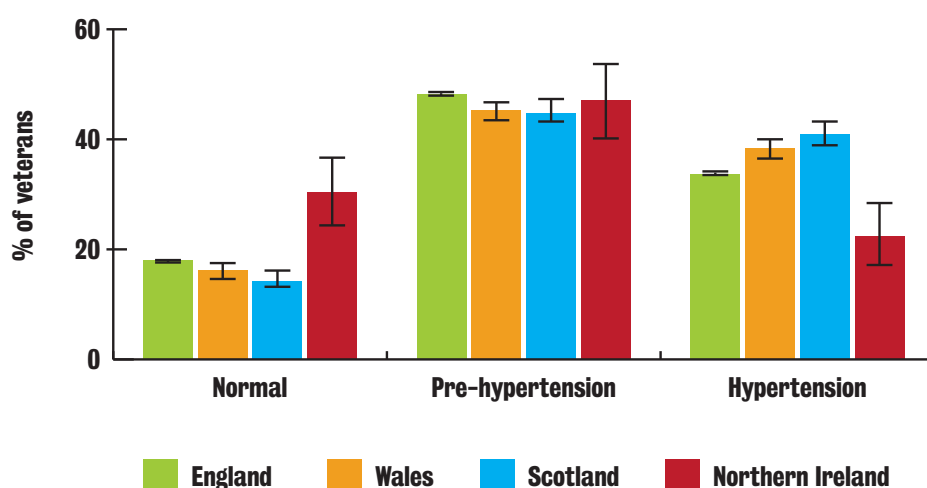
Missing data

There was missing data across all four health risk factors for veterans in each of the four nations. Alcohol consumption had the highest levels of missing information: 53% in England, 44% in

Wales, 56% in Scotland, and 78% in Northern Ireland. Missing data for smoking were lower but still notable, at 21% in England, 29% in Wales, 42% in Scotland, and 27% in Northern Ireland. For blood pressure, 27% of data were missing in England, 33% in Wales, 43% in Scotland, and 21% in Northern Ireland. For BMI, missing data were 33% in England, 38% in Wales, 50% in Scotland, and 31% in Northern Ireland.

Missing data can affect how accurate and reliable the results are. When a large amount of information is missing, it becomes harder to make fair comparisons between nations or draw firm conclusions. The very high level of missing data for alcohol consumption, especially in Northern Ireland, means these findings should be treated with caution. Overall, these gaps highlight the importance of improving data collection.

Figure 10. Veteran recorded blood pressure by UK country





Recorded prevalence of mental and physical health conditions in veterans across the UK

Physical health conditions

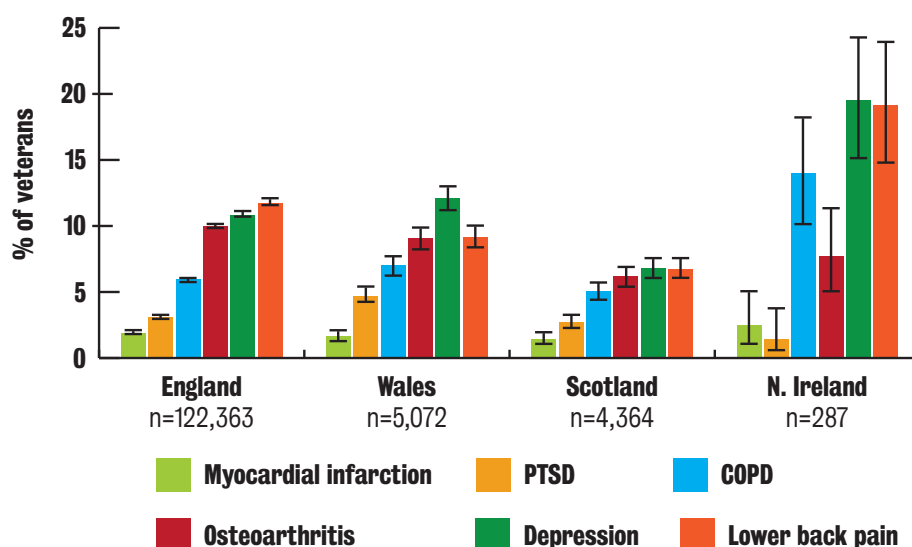
Figure 11 presents the recorded prevalence (unadjusted) of several physical and mental health conditions among veterans across the four UK countries. Lower back pain was the most recorded physical health condition among veterans in all countries, affecting 11.72% in England, 9.15% in Wales, 6.67% in Scotland, and 19.16% in Northern Ireland; notably, recorded prevalence in Northern Ireland was almost double than that observed elsewhere – although wide confidence intervals indicate low precision in this estimate. In contrast, myocardial infarction was the least recorded physical health condition among veterans

across all four countries. COPD had markedly higher recording in Northern Ireland (13.94%) compared with England (5.92%), Wales (7.04%), and Scotland (5.06%).

Mental health conditions

Recording of depression appeared more common than PTSD among veterans across the four countries, although rates varied geographically (Figure 11). Recorded prevalence of depression was highest in Northern Ireland (19.51%), followed by Wales (12.07%) and England (10.78%), and lowest in Scotland (6.78%). In contrast, recorded prevalence of PTSD was highest in Wales (4.69%), followed by England (3.07%) and Scotland (2.68%), and lowest in Northern Ireland (1.39%).

Figure 11. Recorded prevalence (unadjusted) of recorded physical and mental health among veterans by UK country.



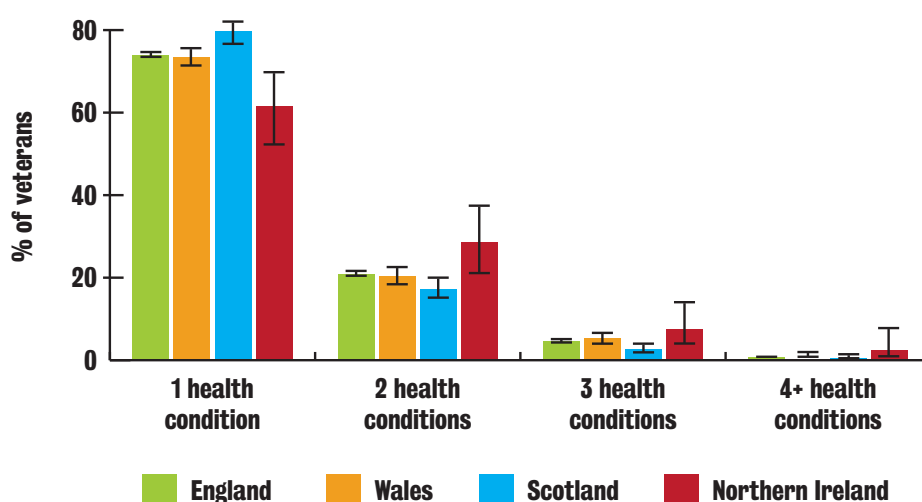
PTSD: Post-traumatic stress disorder; COPD: Chronic Obstructive Pulmonary Disease.

Multimorbidity

Having at least one recorded mental or physical health condition was the most prevalent outcome among veterans across all four countries (Figure 12). Although multimorbidity appeared greater

among veterans in Northern Ireland, these estimates are quite imprecise. Considering the lower bound of the confidence interval, the recorded prevalence of multimorbidity may be similar across all four countries.

Figure 12. Recorded prevalence of multimorbidity (unadjusted) among veterans by UK country.



Association between veterans in the four UK countries and recorded health outcomes: adjusted regression analysis

Poisson regressions with robust standard errors were used to estimate prevalence ratios (PR) across the imputed datasets. As presented in Table 5 (overleaf), compared with veterans in England, higher recorded prevalence was observed among veterans across several health outcomes in Wales, Scotland, and Northern Ireland.

For veterans in Wales, the recorded prevalence of COPD was higher than in England (PR 1.85, 95% CI 1.33-2.56). Veterans in Wales also showed elevated recorded prevalence of osteoarthritis (PR 1.36, 95% CI 1.03-1.79) and post-traumatic stress disorder (PR 1.83, 95% CI 1.08-3.12).

For veterans in Scotland, recorded prevalence of COPD was higher compared with England (PR 1.62, 95% CI 1.16-2.27) but depression was lower (PR 0.67, 95% CI 0.52-0.86).

Veterans in Northern Ireland demonstrated consistently higher recorded prevalence across multiple conditions compared with veterans in England: recorded prevalence of COPD was substantially elevated (PR 2.88, 95% CI 2.13-3.91) and increased recorded prevalence was observed for depression (PR 1.32, 95% CI 1.02-1.70), lower back pain (PR 1.78, 95% CI 1.38-2.30), and myocardial infarction (PR 2.21, 95% CI 1.01-4.87). However, estimates for veterans in Northern Ireland were imprecise (see CI) due to small sample size and should be interpreted with caution.

Table 5. Poisson regressions for the association between veterans in each UK country and recorded health conditions, using MICE (N=132,086)

Recorded health condition		N	Model 1		
			PR	95% CI	
Chronic obstructive pulmonary disease	England	122,363	[Reference]		
	Wales	5,072	1.19	1.07	1.31
	Scotland	4,364	0.85	0.75	0.98
	N. Ireland	287	2.36	1.77	3.14
Depression	England	122,363	[Reference]		
	Wales	5,072	1.12	1.04	1.21
	Scotland	4,364	0.63	0.56	0.70
	N. Ireland	287	1.81	1.43	2.29
Lower back pain	England	122,363	[Reference]		
	Wales	5,072	0.78	0.72	0.85
	Scotland	4,364	0.57	0.51	0.64
	N. Ireland	287	1.64	1.29	2.08
Myocardial Infarction	England	122,363	[Reference]		
	Wales	5,072	0.90	0.72	1.11
	Scotland	4,364	0.77	0.60	0.99
	N. Ireland	287	1.32	0.63	2.75
Osteoarthritis	England	122,363	[Reference]		
	Wales	5,072	0.91	0.83	0.99
	Scotland	4,364	0.62	0.55	0.70
	N. Ireland	287	0.77	0.52	1.15
Post-traumatic stress disorder	England	122,363	[Reference]		
	Wales	5,072	1.53	1.35	1.74
	Scotland	4,364	0.87	0.73	1.05
	N. Ireland	287	0.45	0.17	1.20

	Model 2			Model 3			Model 4		
	aPR	95%	CI	aPR	95%	CI	aPR	95%	CI
England	[Reference]								
Wales	1.88	1.36	2.59	1.88	1.37	2.60	1.85	1.33	2.56
Scotland	1.69	1.22	2.35	1.69	1.22	2.35	1.62	1.16	2.27
N. Ireland	3.65	2.73	4.88	3.64	2.72	4.86	2.88	2.13	3.91
England	[Reference]								
Wales	1.15	0.90	1.47	1.16	0.91	1.48	1.08	0.84	1.38
Scotland	0.71	0.55	0.92	0.72	0.55	0.93	0.67	0.52	0.86
N. Ireland	1.42	1.10	1.82	1.42	1.11	1.82	1.32	1.02	1.70
England	[Reference]								
Wales	1.25	0.98	1.59	1.24	0.97	1.58	1.21	0.95	1.54
Scotland	1.06	0.82	1.37	1.06	0.82	1.36	1.03	0.80	1.32
N. Ireland	1.82	1.41	2.34	1.82	1.41	2.34	1.78	1.38	2.30
England	[Reference]								
Wales	1.55	0.80	3.00	1.55	0.80	3.02	1.57	0.81	3.05
Scotland	1.76	0.90	3.44	1.76	0.90	3.45	1.77	0.90	3.46
N. Ireland	2.30	1.04	5.07	2.30	1.04	5.06	2.21	1.01	4.87
England	[Reference]								
Wales	1.39	1.05	1.84	1.38	1.04	1.82	1.36	1.03	1.79
Scotland	1.27	0.95	1.70	1.27	0.95	1.69	1.24	0.93	1.66
N. Ireland	0.92	0.62	1.38	0.92	0.62	1.38	0.95	0.64	1.42
England	[Reference]								
Wales	2.00	1.17	3.40	2.04	1.20	3.48	1.83	1.08	3.12
Scotland	1.07	0.62	1.85	1.08	0.62	1.87	0.98	0.57	1.69
N. Ireland	0.56	0.21	1.50	0.56	0.21	1.50	0.52	0.19	1.40

MICE: Multiple imputation by chained equations; PR: Prevalence rate; aPR: adjusted prevalence rate; CI: confidence interval.

Model 1: unadjusted; Model 2: adjusted for gender, age, index date, and practice; Model 3: Model 2 + ethnicity; Model 4: Model 3 + smoking and BMI

Summary

The findings from this study provide, for the first time, a comparable primary care health profile of veterans across the UK. Using CPRD Aurum and Gold data, we identified large veteran samples in England, Wales, and Scotland, however, in Northern Ireland the sample was much smaller (n=287). The smaller sample might partly reflect the regional coverage of CPRD (only 11% of CPRD contributing practices are in Northern Ireland)¹⁷, but might also reflect the legacy of the Troubles (1960-1998), where concerns about personal and family safety, as well as potential discrimination, may discourage disclosure of their veteran status to healthcare professionals²⁴.

The study found that the age and gender distribution of veterans in primary care across England, Wales, and Scotland is similar with the vast majority being male (80%-90%) and approximately 50 years old on average. However, Northern Ireland showed important differences with the gender distribution being more even (56% male) and the sample being slightly younger. In terms of ethnicity, across the UK most veterans accessing primary care identify as White with under 12% identifying as belonging to ethnic minority groups.

Furthermore, follow-up times differed across the UK. Veterans in Scotland had the shortest median follow-up (2 years), whereas those in Northern Ireland had the longest (5 years). Follow-up durations may differ in part due to data availability, as CPRD Aurum launched in 2017 and has a shorter retrospective coverage compared to Gold, which dates to 1987 (although historical records are available for a subset of Aurum patients dating back to 1987)^{17,23}. In terms of consultations, England had the lowest median number of consultations per patient per year (10 consultations) compared to Wales which had the highest (15 consultations). These differences may reflect variation in follow-up periods, health needs and ease of access to primary care across the UK. As health services are devolved, meaning each one of the four constituent countries is responsible for healthcare within their

borders, each country operates under distinct policies and funding models, which can influence the frequency of GP contact^{25,26}.

Although apparent missingness in demographic and lifestyle factors is common in primary care data²⁷, this often reflects information that was not recorded rather than truly missing information. This is because, in primary care datasets, information is usually documented when it is clinically relevant (e.g., if there are concerns) or when incentivised through schemes such as the Quality and Outcomes Framework (QOF). The proportion of missing data varied substantially by UK country and demographic or health risk factor assessed, with particularly high levels observed for health risk factors in some devolved nations. For example, ethnicity was missing for up to 50% of veterans in Northern Ireland, compared with 7% in England. Similarly, alcohol consumption was more frequently missing in Northern Ireland (78%) than in other countries (approximately 50%), although smoking status and blood pressure had comparatively higher recording completeness. In contrast, Scotland showed consistently high levels of missing data across all assessed risk factors (around 50%). These differences may reflect variation in data recording practices and differences in the participation in QOF – Scotland stopped participating in during 2016²⁸.

How the findings compare to those of the Exploring veterans' physical and mental health outcomes report

The England sample for this study was extracted from the CPRD Aurum dataset and is therefore nearly identical to that reported in *Exploring veterans' physical and mental health outcomes: the use of the Clinical Practice Research Datalink*³. The only difference is that the 121 Northern Ireland patients included in that earlier report have been re-categorised under their own country in the present analysis. Several observations were found to be of interest when comparing veterans in England with those in the devolved nations in this latest study.



In the previous report we noted that among veterans, most deaths have occurred more recently (92% between 2011 to 2024). This study found that this observation is consistent across the UK, with 66% to 97% of mortalities being registered after 2011. This could reflect the more recent identification of veterans in primary care (approximately 50% identified after 2011) or selection bias but could also contribute to the evidence suggesting a recent erosion of the healthy soldier effect^{29–31}. Future research should investigate the underlying reasons for this observation and determine whether it reflects a genuine trend or an artefact of the data.

Similar to what was found in the previous report, across England, Wales and Scotland veteran identification has increased from 2011 onwards. However, this trend appears to have started earlier for Northern Ireland with 37% of the sample being identified before 2010 (compared to 5% to 15% in the other countries). The timing of veteran identification may be influenced by differences in coding practices across the devolved nations, for example, if practices in Northern Ireland adopted relevant Read codes earlier and did so more

consistently. In addition, the CPRD sample in Northern Ireland is relatively small and therefore trends may be disproportionately driven by a limited number of practices. Finally, variation in healthcare utilisation, potentially linked to differing morbidity profiles, may have also increased an earlier documentation of veteran status.

Recording of service branch was more complete in England, where 68% of records were missing this information, compared with over 90% in the devolved nations. This difference may reflect the presence of the Veteran Friendly GP Accreditation scheme in England (launched in June 2019), which encourages general practitioners to ask patients about prior service in the Armed Forces^{32,33}. Such enquiries may prompt disclosure of service branch, allowing this information to be recorded in patients' EHRs.

Compared with the previous report³, the current findings show similar patterns among veterans with recorded data. Alcohol dependence remained the most common recorded alcohol category, supporting the earlier finding that alcohol severity data likely capture a clinically selected subgroup rather than the wider veteran population.

Smoking, BMI and blood pressure patterns were also consistent. Most veterans had never smoked, overweight was the most common BMI category, and pre-hypertension was the most frequent blood pressure category. These patterns were generally similar across England, Wales and Scotland, with some differences observed in Northern Ireland. However, interpretation should remain cautious, as the results likely reflect selection and recording biases in primary care, where lifestyle factors are more often recorded when there are clinical concerns and individuals with more severe health issues are more likely to seek help and undergo assessment. Furthermore, the previous report³ showed that recording was more complete for veterans than non-veterans, while the current analysis shows substantial missingness among veterans across the devolved nations. Thus, these findings may reflect differences in recording, screening and help-seeking behaviour as well as true differences in health.

Consistent with the findings from the regression analyses in the previous report, which compared veterans primarily in England with non-veterans³, our results suggest that musculoskeletal conditions are the most recorded conditions among veterans across the UK. COPD was also highly prevalent, particularly in the devolved nations compared with England. In line with this pattern, Northern Ireland had the highest recorded prevalence of both smoking and COPD compared with the other UK nations. Recorded prevalence of depression was particularly high among veterans in Wales and Northern Ireland, while recorded prevalence of PTSD was highest in Wales. Furthermore, although the sample size for Northern Ireland was small, the results suggest that, compared with England, veterans in Northern Ireland may have a

higher recorded prevalence of COPD, lower back pain, myocardial infarction, and depression. And in terms of multimorbidity, the prevalence was similar across the UK, with approximately 20% of veterans reporting two or more chronic conditions.

Research potential of CPRD for veterans' health research

The findings highlight several priorities for strengthening the use of CPRD to support veteran health research and policy across the UK. However, this represents an early-stage application of this methodology and caution is warranted when interpreting findings of recorded prevalence in veterans; further validation work is needed to establish the reliability of this approach. Improving the identification of veterans in primary care records is critical, as consistent recording of military service would ensure veterans can be appropriately recognised, referred to specialised services, and included in research datasets such as CPRD.

From a research perspective, CPRD provides a valuable platform for studying veteran health at scale. Importantly, using both CPRD Aurum and Gold enables the inclusion of veterans from across all four UK countries, supporting cross-national comparisons and helping to identify potential differences in health profiles and service needs between England, Wales, Scotland, and Northern Ireland. Future research would benefit from improved veteran identification and should continue to expand these UK-wide analyses, improve data linkage (particularly for CPRD Gold) and representativeness, and focus on under-researched groups such as women and ethnic minority veterans.

4. Study strengths & limitations

The work presented here builds on the analyses described in the previous report by extending the study to include veterans from across all four UK countries. The clinical and research potential of CPRD, as well as the challenges in data quality and management for veteran identification and characterisation for both CPRD Aurum and Gold are discussed at length in the report *Exploring veterans' physical and mental health outcomes: the use of the Clinical Practice Research Datalink*³.

To our knowledge, this is the first study to examine and compare the demographic characteristics, health risk factors, and physical and mental health outcomes of veterans in England, Wales, Scotland, and Northern Ireland using primary care data. This study enabled cross-country comparisons and provided new insights into similarities and potential variations in veterans' health profiles and healthcare needs between countries.

However, several limitations should be considered when interpreting the findings of this report. First CPRD Aurum and Gold use different clinical coding systems, which required the development of separate code lists to define the population (veterans), outcomes, and risk factors for each dataset. Although efforts were made to ensure comparable specificity across the two, differences in coding structures may still affect the consistency of the variables.

Furthermore, CPRD coverage varies across the UK countries. The sample was derived from 2,169 practices across the UK, of which 83% were in England, 6% in Wales, 9% in Scotland, and only 2% in Northern Ireland. As a result, the size and representativeness of the samples differ substantially between countries. The sample size for Northern Ireland was extremely small (approximately 0.02% of the total sample), resulting in unprecise estimates, limiting statistical power, and the granularity of analyses that could be conducted for this country. Moreover, estimates for Northern Ireland may be less stable and should be interpreted with caution, not only due to the smaller number of contributing practices, but also because political and social sensitivities surrounding the disclosure of military service²⁴ may contribute to increased selection bias⁷.

Finally, recording bias⁸ should be considered, as the likelihood of veteran status being recorded may vary depending on health needs and clinical context. As noted above, individuals with greater health needs may be more likely to disclose or have their veteran status recorded, either because their conditions are linked to military service or because more frequent healthcare contact increases opportunities for identification. In addition, if practices do not routinely ask all patients if they have served in the Armed Forces, as recommended under the Veteran Friendly Accreditation scheme

⁷Selection bias occurs when people included in a study differ in important ways from those not included, which can affect how representative the findings are.

⁸Recording bias occurs when information is more likely to be recorded for some people than others, which can affect comparisons between groups.

currently implemented in NHS England, veteran status may only be recorded when it is considered clinically relevant. In the devolved nations, where this accreditation scheme is not currently in place or a similar scheme has been only recently implemented (e.g., The General Practice Armed Forces and Veterans Recognition Scheme in

Scotland)³⁴, veterans presenting with certain health conditions may be more likely to disclose their service history if they believe their condition is related to their time in the Armed Forces. This could inflate observed associations between veteran status and certain health outcomes, such as COPD, musculoskeletal disorders, or depression.



5. Conclusion

This project demonstrates the potential value of using CPRD (Aurum and Gold) data to generate a UK-wide profile of veterans' sociodemographic characteristics and health outcomes across England and the devolved nations. Overall, veterans in England, Wales, and Scotland showed broadly similar demographic patterns and health profiles, with musculoskeletal conditions and depression among the most recorded conditions. Notable differences emerged for Northern Ireland, including a younger and more gender-balanced population, as well as indications of higher recorded prevalence of smoking and certain conditions such as COPD and depression. However, these findings should be interpreted with caution due to potential differences in recording practices across the devolved nations, and additionally, specific to Northern Ireland, due to the small sample.

The study highlights cross-national variation in healthcare utilisation, data completeness, and coding practices, which likely reflect differences in health system organisation. This work represents an initial step in the development and application of these methods for veteran research. Specifically, further validation is needed to establish the reliability and comparability of the prevalence measures between veterans across the UK. The project also underscores both the potential and current limitations of CPRD for veteran health research, emphasising the need for improved and consistent recording of veteran status across the UK and better data completeness to inform policy, service provision, and future research.

Appendix

Appendix Table 1. Descriptive characteristics of veterans in CPRD (Aurum and Gold) by UK country (N=132,086)

	England n=122,363		Wales n=5,072	
	N	% or Mean (SD) or Median [IQR]	N	% or Mean (SD) or Median [IQR]
Gender				
Men	98,351	80.38	4,219	83.18
Women	24,012	19.62	853	16.82
Age at index (years)		52.54 (20.99)		51.40 (19.25)
18-25	13,173	10.77	400	7.89
26-35	19,756	16.15	876	17.27
36-45	17,687	14.45	889	17.53
46-55	18,473	15.10	861	16.98
56-65	16,997	13.89	830	16.36
66-75	13,487	11.02	491	9.68
76+	22,790	18.62	725	14.29
Ethnicity				
White	99,310	87.60	2,287	87.46
Ethnic minority	14,062	12.40	328	12.54
Missing	8,991	7.35	2,457	48.44
Year of index				
1987-2010	19,104	15.61	720	14.20
2011-2020	69,912	57.13	2,619	51.64
2021-2024	33,347	27.25	1,733	34.17
Follow-up time (years)[†]		2.90 [1.24-5.56]		3.33 [1.24-6.85]

Category percentages are based on complete cases; missing percentages are based on the full sample.

*Suppressed to prevent disclosure of small cell counts (<10) and secondary suppression applied where necessary to prevent back-calculation.

SD: Standard deviation; IQR: Interquartile Range.

[†]Start date calculated as maximum value between registration date, index date, and protocol start date (01 of January 1987) and end date calculated as minimum value between registration end date, last CPRD collection date for the practice, date of death, or protocol end date (30 September 2024).

[‡]Defined as Post-National Service if veterans were aged 25 or over in 1963 when the last National Service person was discharged.

	Scotland n=4,364		N. Ireland n=287	
	N	% or Mean (SD) or Median [IQR]	N	% or Mean (SD) or Median [IQR]
Gender				
Men	3,918	89.78	160	55.75
Women	446	10.22	127	44.25
Age at index (years)		50.83 (18.39)		45.72 (18.91)
18-25	318	7.29	47	16.38
26-35	766	17.55	54	18.82
36-45	752	17.23	55	19.16
46-55	793	18.17	48	16.72
56-65	769	17.62	34	11.85
66-75	452	10.36	20	6.97
76+	514	11.78	29	10.10
Ethnicity				
White	2,775	94.94	*	-
Ethnic minority	148	5.06	*	-
Missing	1,441	33.02	157	54.70
Year of index				
1987-2010	200	4.58	108	37.63
2011-2020	2,031	46.54	140	48.78
2021-2024	2,133	48.88	39	13.59
Follow-up time (years)[†]		2.20 [0.95-5.32]		5.41 [2.84-10.33]

Category percentages are based on complete cases; missing percentages are based on the full sample.

*Suppressed to prevent disclosure of small cell counts (<10) and secondary suppression applied where necessary to prevent back-calculation.

SD: Standard deviation; IQR: Interquartile Range.

[†]Start date calculated as maximum value between registration date, index date, and protocol start date (01 of January 1987) and end date calculated as minimum value between registration end date, last CPRD collection date for the practice, date of death, or protocol end date (30 September 2024).

[‡]Defined as Post-National Service if veterans were aged 25 or over in 1963 when the last National Service person was discharged.

	England n=122,363		Wales n=5,072	
	N	% or Mean (SD) or Median [IQR]	N	% or Mean (SD) or Median [IQR]
Consultations		10.12 [6.00-16.71]		14.75 [7.09-25.26]
Mortality				
Deceased	12,799	10.46	486	9.58
Year of death				
1987-2000	61	0.48	*	-
2001-2010	939	7.34	*	-
2011-2020	5,672	44.32	242	49.79
2021-2024	6,127	47.87	181	37.24
Service branch				
Navy (including Marines)	5,723	14.76	52	11.95
British Army	28,013	72.23	322	74.02
Royal Air Force	4,170	10.75	61	14.02
Multiple mentioned	876	2.26	-	-
Missing	83,581	68.31	4,637	91.42
National Service				
Post-national service‡	103,188	84.33	4,422	87.18
National Service	19,175	15.67	650	12.82

Category percentages are based on complete cases; missing percentages are based on the full sample.

*Suppressed to prevent disclosure of small cell counts (<10) and secondary suppression applied where necessary to prevent back-calculation.

SD: Standard deviation; IQR: Interquartile Range.

†Start date calculated as maximum value between registration date, index date, and protocol start date (01 of January 1987) and end date calculated as minimum value between registration end date, last CPRD collection date for the practice, date of death, or protocol end date (30 September 2024).

‡Defined as Post-National Service if veterans were aged 25 or over in 1963 when the last National Service person was discharged.

	England n=122,363		Wales n=5,072	
	N	% or Mean (SD) or Median [IQR]	N	% or Mean (SD) or Median [IQR]
Consultations		11.75 [6.00-21.39]		11.17 [6.46-21.26]
Mortality				
Deceased	265	6.07	44	15.33
Year of death				
1987-2000	*	-	*	-
2001-2010	*	-	*	-
2011-2020	101	38.11	29	65.91
2021-2024	157	59.25	*	-
Service branch				
Navy (including Marines)	54	16.56	*	-
British Army	218	66.87	*	-
Royal Air Force	51	15.64	*	-
Multiple mentioned	-	-	*	-
Missing	4,041	92.53	281	97.91
National Service				
Post-national service‡	4,045	92.69	257	89.55
National Service	319	7.31	30	10.45

Category percentages are based on complete cases; missing percentages are based on the full sample.

*Suppressed to prevent disclosure of small cell counts (<10) and secondary suppression applied where necessary to prevent back-calculation.

SD: Standard deviation; IQR: Interquartile Range.

†Start date calculated as maximum value between registration date, index date, and protocol start date (01 of January 1987) and end date calculated as minimum value between registration end date, last CPRD collection date for the practice, date of death, or protocol end date (30 September 2024).

‡Defined as Post-National Service if veterans were aged 25 or over in 1963 when the last National Service person was discharged.

We ran regression models to examine the association between each country and the health conditions. These analyses included only individuals with complete outcome and covariate data. See Appendix Table 2 (N=119,040; missing ethnicity only) and Appendix Table 3 (N=77,414; missing ethnicity, smoking, and BMI).

Consistent with the MICE models presented in the main analysis of this report, complete-case analyses showed that recording COPD was more prevalent in the devolved nations than in England. Recording of depression was lower in Scotland, and lower back pain was higher in Northern Ireland, compared to England.

Appendix Table 2. Poisson regressions for the association between veterans in each UK country and recording of health conditions, complete case analysis (N=119,040)

Recorded health condition		N	Model 1		
			PR	95% CI	
Chronic obstructive pulmonary disease	England	113,372	[Reference]		
	Wales	2,615	1.02	0.88	1.19
	Scotland	2,923	0.83	0.71	0.97
	N. Ireland	130	2.04	1.29	3.23
Depression	England	113,372	[Reference]		
	Wales	2,615	1.08	0.97	1.20
	Scotland	2,923	0.68	0.60	0.77
	N. Ireland	130	1.63	1.12	2.36
Lower back pain	England	113,372	[Reference]		
	Wales	2,615	0.72	0.63	0.81
	Scotland	2,923	0.54	0.47	0.62
	N. Ireland	130	1.54	1.07	2.21
Myocardial Infarction	England	113,372	[Reference]		
	Wales	2,615	0.81	0.59	1.11
	Scotland	2,923	0.87	0.66	1.16
	N. Ireland	130	0.84	0.21	3.31
Osteoarthritis	England	113,372	[Reference]		
	Wales	2,615	0.67	0.58	0.77
	Scotland	2,923	0.58	0.50	0.67
	N. Ireland	130	0.53	0.26	1.09
Post-traumatic stress disorder	England	113,372	[Reference]		
	Wales	2,615	1.55	1.31	1.84
	Scotland	2,923	0.85	0.68	1.06
	N. Ireland	130	0.24	0.03	1.72

PR: Prevalence rate; aPR: adjusted prevalence rate; CI: confidence interval.

Model 1: unadjusted; Model 2: adjusted for gender, age, index date, and practice; Model 3: Model 2+ethnicity

	Model 2			Model 3		
	aPR	95%	CI	aPR	95%	CI
England	[Reference]					
Wales	1.96	1.30	2.95	1.97	1.31	2.97
Scotland	1.78	1.18	2.70	1.79	1.18	2.71
N. Ireland	2.97	1.91	4.63	2.96	1.90	4.60
England	[Reference]					
Wales	1.29	0.97	1.73	1.31	0.98	1.75
Scotland	0.85	0.63	1.14	0.86	0.64	1.15
N. Ireland	1.36	0.94	1.96	1.36	0.94	1.96
England	[Reference]					
Wales	1.25	0.95	1.66	1.24	0.94	1.64
Scotland	1.02	0.76	1.35	1.01	0.76	1.34
N. Ireland	1.64	1.14	2.36	1.64	1.14	2.36
England	[Reference]					
Wales	1.70	0.77	3.74	1.71	0.78	3.77
Scotland 1.76	2.08	0.95	4.56	2.09	0.95	4.59
N. Ireland	1.42	0.36	5.58	1.42	0.36	5.56
England	[Reference]					
Wales	1.35	0.98	1.87	1.34	0.97	1.86
Scotland	1.35	0.98	1.88	1.35	0.97	1.87
N. Ireland	0.63	0.30	1.30	0.63	0.30	1.30
England	[Reference]					
Wales	1.72	0.97	3.03	1.77	1.00	3.13
Scotland	0.92	0.51	1.66	0.93	0.52	1.67
N. Ireland	0.27	0.04	1.84	0.27	0.04	1.83

PR: Prevalence rate; aPR: adjusted prevalence rate; CI: confidence interval.

Model 1: unadjusted; Model 2: adjusted for gender, age, index date, and practice; Model 3: Model 2+ethnicity

Appendix Table 3. Poisson regressions for the association between veterans in each UK country and recording of health conditions, complete case analysis (N=77,414)

Recorded health condition		N	Model 1		
			PR	95% CI	
Chronic obstructive pulmonary disease	England	74,422	[Reference]		
	Wales	1,562	1.07	0.91	1.25
	Scotland	1,346	1.07	0.90	1.27
	N. Ireland	84	1.88	1.14	3.11
Depression	England	74,422	[Reference]		
	Wales	1,562	0.95	0.83	1.09
	Scotland	1,346	0.78	0.66	0.92
	N. Ireland	84	1.87	1.26	2.78
Lower back pain	England	74,422	[Reference]		
	Wales	1,562	0.69	0.60	0.80
	Scotland	1,346	0.56	0.47	0.67
	N. Ireland	84	1.77	1.24	2.54
Myocardial Infarction	England	74,422	[Reference]		
	Wales	1,562	0.82	0.58	1.16
	Scotland	1,346	1.04	0.75	1.44
	N. Ireland	84	0.95	0.24	3.74
Osteoarthritis	England	74,422	[Reference]		
	Wales	1,562	0.72	0.62	0.84
	Scotland	1,346	0.65	0.55	0.78
	N. Ireland	84	0.62	0.31	1.27
Post-traumatic stress disorder	England	74,422	[Reference]		
	Wales	1,562	1.47	1.17	1.86
	Scotland	1,346	1.01	0.75	1.37
	N. Ireland	84	0.39	0.06	2.71

PR: Prevalence rate; aPR: adjusted prevalence rate; CI: confidence interval.

Model 1: unadjusted; Model 2: adjusted for gender, age, index date, and practice; Model 3: Model 2+ethnicity; Model 4: Model 3 + smoking and BMI

	Model 2			Model 3			Model 4		
	aPR	95%	CI	aPR	95%	CI	aPR	95%	CI
England	[Reference]								
Wales	1.66	1.09	2.52	1.67	1.09	2.54	1.74	1.16	2.61
Scotland	1.73	1.13	2.65	1.74	1.14	2.66	1.78	1.18	2.69
N. Ireland	2.85	1.81	4.49	2.84	1.80	4.48	1.86	1.16	2.97
England	[Reference]								
Wales	0.87	0.62	1.21	0.87	0.62	1.21	0.79	0.57	1.10
Scotland	0.77	0.54	1.08	0.77	0.54	1.09	0.70	0.49	0.98
N. Ireland	1.30	0.88	1.93	1.30	0.88	1.93	1.20	0.80	1.79
England	[Reference]								
Wales	1.02	0.75	1.39	1.01	0.74	1.38	0.98	0.72	1.34
Scotland	0.88	0.64	1.22	0.88	0.64	1.22	0.85	0.62	1.18
N. Ireland	1.74	1.21	2.50	1.74	1.21	2.50	1.69	1.17	2.42
England	[Reference]								
Wales	1.45	0.63	3.32	1.45	0.63	3.34	1.49	0.65	3.43
Scotland	1.91	0.83	4.39	1.92	0.84	4.41	1.95	0.85	4.50
N. Ireland	1.62	0.41	6.32	1.62	0.41	6.32	1.49	0.38	5.80
England	[Reference]								
Wales	1.04	0.74	1.46	1.02	0.72	1.44	1.01	0.72	1.43
Scotland	1.05	0.74	1.50	1.03	0.73	1.47	1.01	0.71	1.44
N. Ireland	0.72	0.35	1.48	0.72	0.35	1.48	0.71	0.35	1.45
England	[Reference]								
Wales	1.93	0.94	3.94	2.02	0.98	4.14	1.71	0.83	3.49
Scotland	1.33	0.63	2.80	1.37	0.65	2.88	1.17	0.56	2.47
N. Ireland	0.44	0.06	2.95	0.44	0.06	2.96	0.40	0.06	2.74

PR: Prevalence rate; aPR: adjusted prevalence rate; CI: confidence interval.

Model 1: unadjusted; Model 2: adjusted for gender, age, index date, and practice; Model 3: Model 2+ethnicity; Model 4: Model 3 + smoking and BMI

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