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Healthcare Resource Utilisation Before and After Cardiovascular Disease Diagnosis in the NHS: A Descriptive Cohort Study

Jonathan Wray[1], Robert Willans[1], Helen Chamberlain[1], Alfredo Mariani[1]

[1] National Institute for Health and Care Excellence, UK

Background

Cardiovascular disease (CVD) remains a leading cause of morbidity and healthcare burden in the UK, placing sustained pressure on NHS resources[1]. Reducing the incidence of CVD through preventative strategies is expected to deliver system benefits by lowering long-term demand for NHS services. However, evidence quantifying these potential benefits remains limited. To address this gap, we first need to characterise healthcare resource utilisation (HCRU) before and after diagnosis across a range of cardiovascular diseases including heart failure, atrial fibrillation and stroke. This foundational analysis enables estimation of potential HCRU savings associated with prevention strategies, supporting further collaborative projects that model the impact of reducing CVD incidence.

Methods

We conducted a retrospective cohort study using linked UK primary and secondary care data from Clinical Practice Research Datalink (CPRD) Aurum and Hospital Episode Statistics (HES). CPRD Aurum is a longitudinal primary care database covering approximately 24% of the UK population.

The study cohort comprised of individuals with a first recorded diagnosis of CVD between 1 Jan 2001 and 1 Sep 2024. Conditions included: coronary heart disease (CHD), myocardial infarction (MI), atrial fibrillation (AF), ischaemic stroke, transient ischaemic attack (TIA), unstable angina (Ang) or heart failure (HF). Eligible patients were required to have a research-quality (acceptable) record, be eligible for HES linkages, be aged ≥ 18 years at diagnosis, and have ≥12 months of registration prior to diagnosis.

For each condition, the index date was defined as the date of first recorded diagnosis. HCRU was measured annually over the 5 years prior to, and 10 years following diagnosis. This included primary care consultations, inpatient admissions (elective and non-elective), outpatient appointments, and A&E attendances. HCRU was analysed separately for each condition.

Results

A total of 3,060,514 individuals had a first diagnosis of CVD during the study period. Of these, 48% had coronary heart disease, 25% had a myocardial infarction, 42% had atrial fibrillation, 21% had an ischaemic stroke, 14% had a transient ischaemic attack, 5% had unstable angina, and 33% had heart failure.

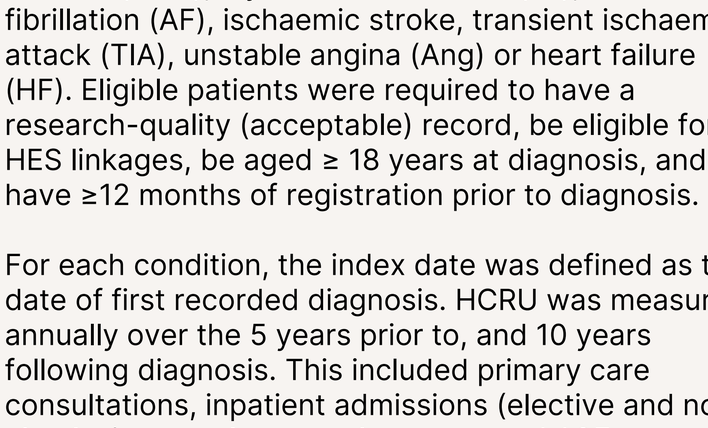

Figure 1: Primary care consultations
Annual number of primary care consultations per person year (PPY) for individuals with cardiovascular disease. Dotted line represents the index date.

We observed a gradual increase in the number of primary care consultations (figure 1) and outpatient appointments (figure 2) in the years preceding CVD diagnosis. This trend accelerated in the year immediately prior to diagnosis, and peaked sharply in the year following, before declining but remaining elevated compared to the pre-diagnosis period.

HCRU for heart failure was consistently higher than other CVD conditions, potentially reflecting the older age at diagnosis for these individuals. Individuals with atrial fibrillation showed a faster rate of HCRU increase post-diagnosis compared to other CVD subtypes.

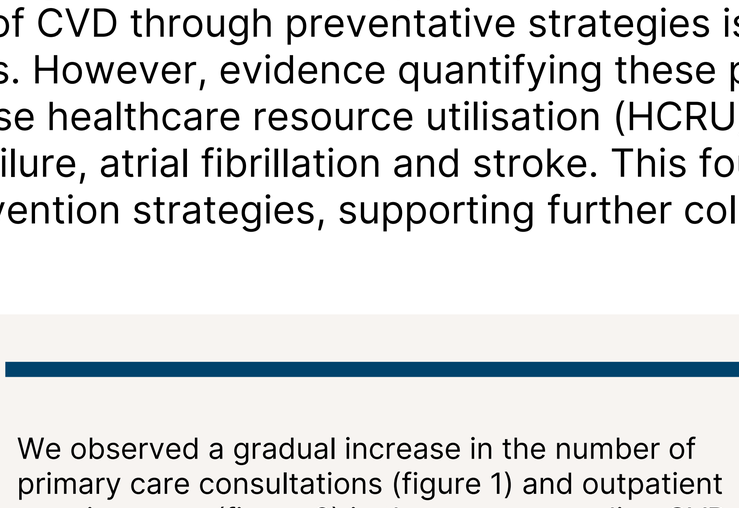

Figure 2: Outpatient appointments
Annual number of outpatient appointments per person year (PPY) for individuals with cardiovascular disease. Dotted line represents the index date.

A&E attendances (figure 3) showed a gradual increase in the years preceding diagnosis, with a modest peak in the year following diagnosis.

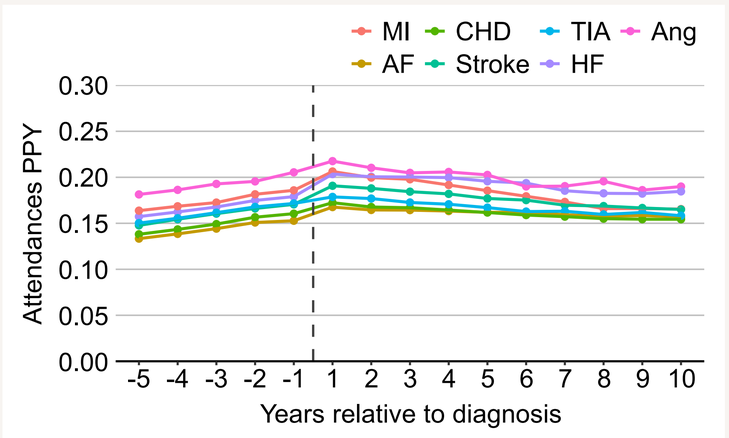

Figure 3: A&E attendances
Annual number of A&E attendances per person year (PPY) for individuals with cardiovascular disease. Dotted line represents the index date.

Elective (figure 4a) and non-elective (figure 4b) admissions both increased in the year preceding diagnosis, with a peak observed in the year following diagnosis. This peak was more pronounced in non-elective admissions, potentially reflecting acute care needs around the time of diagnosis.

Elective admissions for heart failure remained elevated in the post-diagnosis period. Stroke and TIA showed only a modest increase in elective admissions post-diagnosis, consistent with their management in primary and outpatient settings.

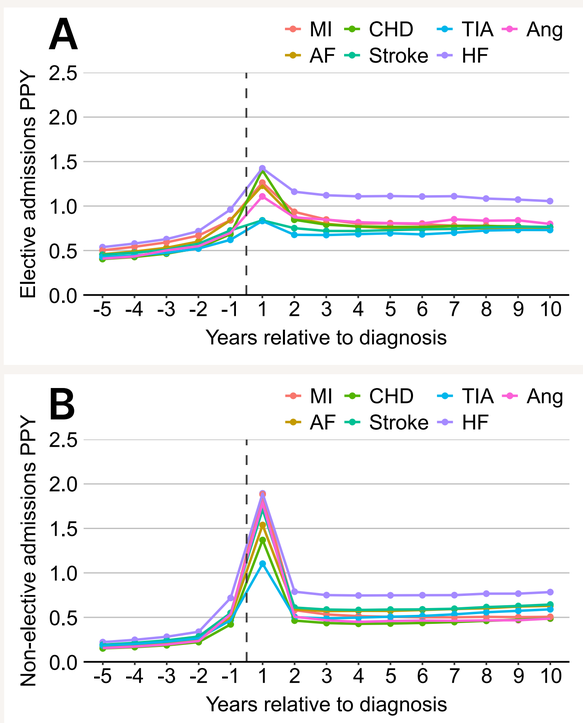

Figure 4: Secondary care admissions.
Annual number of elective (A) and non-elective (B) hospital admissions per person year (PPY) for individuals with cardiovascular disease. Dotted line represents the index date.

Discussion

HCRU increased over the 15-year observation period across all conditions, highlighting sustained healthcare needs and the long-term burden of CVD.

There is a substantial increase in HCRU following a diagnosis of CVD, particularly in the first year, underscoring the resource intensity of early disease management.

HCRU rises in the year before diagnosis, likely due to accumulating symptoms and comorbidities that increase healthcare interactions prior to diagnosis.

Findings from this study have informed modelling efforts used to support the NHS 10 Year Plan, allowing evaluations of the impact and cost-effectiveness of CVD prevention policies.

References

1. Kingsley Shih, Naomi Herz, Aziz Sheikh, Ciaran O'Neill, Paul Carter, Michael Anderson, Economic burden of cardiovascular disease in the United Kingdom, *European Heart Journal - Quality of Care and Clinical Outcomes*, Volume 11, Issue 5, August 2025, Pages 678–690, https://doi.org/10.1093/ehjqcco/qcaf011

Dr Jonathan Wray
Senior Analyst
National Institute for Health and Care Excellence

Email:
jonathan.wray@nice.org.uk