Public Health Dorset

Cardiac Health Needs Assessment for Dorset

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Executive summary

This Cardiac Health Needs Assessment (HNA) for Dorset identifies significant inequities in cardiovascular disease (CVD) outcomes and access to prevention and treatment services. With Dorset's aging population, CVD remains the leading cause of mortality, particularly impacting residents in deprived areas. The report includes a literature review of CVD prevention approaches, an overview of risk factors and CVD case finding approaches in Dorset and a new in-depth analysis of cardiac intervention rates and mortality rates across Dorset.

This report highlights the following key findings:

Risk factors:

- Residents in more deprived areas face higher exposure to risk factors such as smoking and air pollution. Smoking rates are highest in those in routine and manual job roles.
- Primary care data indicates under-ascertainment of hypertension and cholesterol management in deprived populations.

Cardiac interventions:

- Dorset has historically high rates of elective cardiac interventions compared to national and regional averages. Although these rates have declined, they remain higher than comparator regions and do not appear to be effectively targeted to those most in need.
- Inequities in CVD outcomes are evident, with higher emergency intervention rates in deprived areas.

Mortality rates:

- Overall, CVD mortality in Dorset is lower than the national average, but disparities between deprived and affluent areas are stark and widening.
- Premature mortality rates (under age 75) in Dorset are much higher in the most deprived areas than the more affluent areas, with premature CVD mortality rates increasing in the most deprived 20% of areas.

Recommendations:

1) Improve targeting, coverage and quality of NHS Health Checks:
   a) Improved targeting of NHS Health Checks towards those living in more deprived areas
   b) Expand coverage of GP-delivered NHS Health Checks so that every eligible patient in Dorset can access them.
   c) Ensure quality of GP-delivered NHS Health Checks.
2) Increase community engagement supported by health literacy training for clinical staff and decision makers to address barriers to care.
3) Implement library-lent blood pressure cuffs.
4) Target smoking cessation efforts towards those in routine and manual job roles.
5) Address wider determinants of CVD, including air quality and socioeconomic factors.
6) Further investigations into high rate of elective interventions to ensure resource efficiency and equity.

A toolkit of relevant resources will follow this HNA. This HNA highlights the need for collaborative efforts across healthcare providers, local authorities, and community organisations to tackle the root causes of CVD disparities in Dorset. By implementing these evidence-based recommendations, significant strides can be made in reducing health inequities and improving cardiovascular outcomes for all residents.

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Introduction

Dorset has the oldest population of any county in the UK. As risk of cardiovascular disease (CVD) increases with age, CVD is now the single largest cause of death in the Dorset ICB area (1). Tackling this issue has the potential to avoid substantial personal suffering and loss, as well as save significant resources at a time when health and care systems are highly stretched.

This Health Needs Assessment (HNA) was prompted by two separate issues. First, Dorset ICB was identified by CVDPREVENT (2) data as performing poorly in hypertension case finding and management, which has prompted significant efforts to improve these numbers. Good progress has already been made in this, and overall rates are rising. Second, a report was carried out 10 years ago which identified Dorset as having unusually high levels of cardiac procedures, especially stenting. Work was carried out at the time to understand the reasons behind the high levels and attempts were made to lower those rates, but it was not known how successful those attempts had been and if rates are still high.

The combination of these issues defined the scope of the analysis within this HNA, which focuses on cardiac interventions which could be avoided with improved prevention and early treatment of cardiac risk factors such as hypertension. It is hoped it will both answer the question of what has happened to overall rates of stenting in Dorset over the last 10 years, and use a detailed analysis of this to identify specific areas and groups where further improved risk factor identification and management could prevent later illness.

This report contains a literature review on CVD including risk factors, prevention and cost effectiveness of prevention, and improving equity in service access for CVD. There is then a short summery of common cardiac interventions and relevant NICE guidelines. Next, a summary of risk factors in Dorset, and CVD case finding pathways in Dorset. The methodology for the new analyses in this report is then described, followed by the results of these analyses. Finally, there is a detailed discussion of the findings and a list of recommendations arising from this work.

Literature on Cardiovascular Disease (CVD) prevention

Cardiovascular diseases include coronary artery disease (also known as ischaemic heart disease (IHD)), heart failure and stroke. This needs assessment will focus on the treatments risk factors relevant to coronary artery disease, but will also refer to CVD in general as many of the risk factors and prevention strategies are common across all of CVD.

Cardiovascular disease risk factors

IHD remains a leading cause of mortality in the UK, with proximal risk factors including high cholesterol, smoking, hypertension (high blood pressure), diabetes, and obesity (3). These traditional risk factors have been extensively studied in cohort studies, which have also explored genetic determinants, and intermediate factors such as nutritional status, physical activity and psychological factors (4). However, attention is now shifting towards wider determinants in the built, natural, and social environments (5). There is evidence linking environmental factors such as air pollution and noise pollution with increased cardiovascular disease (5). The occurrence and severity of heart attacks seems to be influenced by season, time of day and weather: both cold snaps and heatwaves seem to trigger increased numbers of cardiac events, meaning the climate emergency may lead to more cardiac ill health (6). Access to greenspace or even just increased urban vegetation seems to reduce risk of all cardiovascular ill-health (7).

Social and economic factors also significantly influence CVD risk, morbidity, mortality, and treatment outcomes (8,9). Lower socioeconomic status, education and social support, and exposure to

structural racism and adverse childhood events all lead to an increased risk of CVD (10). The impact of these social and economic factors on CVD is complex, involving biological mechanisms such as stress hormones, inflammation, and cellular aging (8), as well as increased exposure to CVD-promoting environmental factors such as air and noise pollution (5). All of these factors interact in complex ways, potentially enhancing one another's detrimental effects.

Prevention of CVD

This wide array of risk factors provides a wide range of targets for prevention. Many evidence-based approaches for cardiovascular disease (CVD) prevention focus on targeting those at highest risk with individualised approaches to tackle proximal risk factors. Dietary interventions, including the Mediterranean diet, DASH diet, and vegetarian diets, have substantial evidence supporting their effectiveness in CVD prevention (11). Reducing cholesterol through diet or statins, smoking cessation, and increased physical activity all also have substantial evidence supporting their effectiveness (12). Improved use of already tried and tested approaches in primary care also has the potential to prevent a lot of ill-health. The Size of the Prize analyses show that if 80% of adults with high blood pressure were treated to target levels, 107 strokes, 159 heart attacks and 85 deaths could be prevented in Dorset alone in 3 years (13).

Population-level approaches to CVD prevention are also essential, as most CVD events occur in individuals with low to moderate risk (14). This might include reducing air pollution, improving the built environment to encourage active travel, community empowerment approaches or efforts to tackle structural racism (15). In addition, individualised prevention strategies such as improving diet and activity must be applied with a social equity lens, given the social and economic patterns of CVD burden. This means making extra efforts to target those population groups that may otherwise be unable to engage with these strategies, and changing delivery methods to cater for these groups (15).

Secondary prevention of CVD involves strategies to reduce recurrent events and mortality in patients with pre-existing CVD. Key approaches include pharmacological interventions such as antiplatelets, statins, beta-blockers, and renin-angiotensin-aldosterone system inhibitors. Lifestyle changes, including smoking cessation, physical activity, and diet management, are also crucial, and cardiac rehabilitation programs have shown significant benefits (16). However, implementing these strategies can face challenges, including difficulties in accessing healthcare, lack of primary care resource, and built environments that do not encourage physical activity (16).

The CVDPREVENT audit gathers data from across primary care in England to enable clinicians and decision makers to assess how well CVD prevention strategies are being applied for their local population (2). Data is available from a regional level down to practice level, and for some specific characteristics associated with health inequality. This data can be used to help target areas where practices, PCNs or ICBs are falling behind national prevention rates or where health inequities are emerging. Dorset ICB was until recently the lowest in the South West for hypertension case finding and management, which has prompted significant local efforts to improve this figure. These efforts have resulted in Dorset increasing its case finding rate, and it is no longer the lowest ranked ICB in the South West, now ranking 5th out of 7 ICBs.

Cost-Effectiveness of Prevention

In addition to the human impact of untreated high blood pressure and high cholesterol progressing to more serious CVD, there is a significant economic argument for prevention. Currently, 66% of adults with high blood pressure are treated to target levels. Size of the Prize analyses for Dorset suggest that if this were to increase to 80%, £3M could be saved in Dorset alone (13). Recent

research from Wales has demonstrated that the most expensive activity for the NHS in relation to cardiac health are emergency admissions, and that proactive patient management through elective interventions reduces later costs post-intervention (17). A recent systematic review into targeted prevention approaches has shown that they are effective and also cost effective as later expensive admissions can be avoided (18). Population-wide approaches to CVD prevention such as increased regulation of the food industry are likely to be even more cost-effective, with even small reductions in population risk translating to large savings for the NHS because of the large numbers of people involved (19).

Service access in CVD prevention

If clinical services available for the prevention and treatment of CVD are to be effective, they must be accessible to those most likely to need them. Research into factors that prevent those experiencing high deprivation from accessing diagnostic services identified a number of potential barriers. These include practical barriers such as having work or caring responsibilities at all possible appointment times and inability to access transport to appointments, as well as social or emotional barriers such as concern about facing stigma from healthcare workers and an inability to trust the healthcare system (20).

Local research into those who do not attend appointments in Dorset found similar reasons, with seven themes emerging:

- Communication challenges
- Discrimination and inequity of access
- Differing expectations
- Difficulties in appointment booking
- Obstacles related to online healthcare
- Issues with public transport
- The importance of continuity of care. (21)

Patients from more deprived areas and those from underserved groups are more likely to encounter these barriers and are therefore more likely to miss opportunities for CVD prevention or early treatment.

Improving service access

Equitable service access is vital, and much research has been carried out on how to improve this. Evidence-based approaches to improving equitable healthcare access in the UK include the use of toolkits developed through action research (22), implementing locally-sensitive interventions, and addressing specific barriers faced by underserved groups (23). Each of these involves co-production, or at least consultation with the communities that are currently disproportionately missing from healthcare to identify the specific barriers they face. Solutions can include changes in communication styles such as improving Health Literacy of appointment invitations, or structural changes to how services are delivered.

Health Literacy is "…the personal characteristics and social resources needed for individuals and communities to access, understand, appraise and use information and services to make decisions about health." (24). The concept includes both the ability of individuals to understand and use health information, and also the accessibility of healthcare services and information for a wide range of users (25). Dorset ICS has an ongoing Health Literacy training programme (26) and ongoing community of practice, with participants from across the health and care sector learning how to address low health literacy in their services in order to increase equity of access.

Structural changes to improve service access could be changes to how appointments are booked, or the times they are offered, or changes to the types of services on offer. One successful example from Dorset is the introduction of Blood Pressure @Home (27). There is substantial evidence supporting home blood pressure monitoring as a reliable, convenient and less costly alternative to ambulatory monitoring, and provides better prognostic information than office BP. It also improves treatment adherence by removing barriers to accessing GP appointments for BP monitoring (28). However, there is some evidence that home monitoring of blood pressure can initially introduce health inequalities because of differing access to monitors, which reduces as access to monitors increases (29).

Use of at home blood pressure monitoring requires access to a monitor, which may present a cost barrier. Research providing home blood pressure monitors free of charge to underserved patients demonstrates improved access, decreased blood pressure and increased patient engagement in these patients (30). Improved access to BP monitors negates the initial effect of home blood pressure monitoring of increasing health inequalities (29). Neighbouring county Somerset has gone one step further than Dorset in increasing access to blood pressure monitoring by stocking libraries with blood pressure cuffs that can be loaned for up to two weeks at a time (31). An evaluation of this scheme found that in the first year 680 different people borrowed cuffs. Borrowers were twice as likely to come from the most deprived decile than any other areas, and were more likely to come from minority ethnic groups that would be expected from the local population (32). This is a low-cost approach that is successful in increasing high blood pressure case-finding in the groups least well served by traditional approaches.

Risk factors in Dorset

Air Quality

Dorset ICB footprint as a whole has a relatively low level of air pollution compared to national levels, however this average hides pockets of higher levels in the more urbanised areas, as shown in figure 1. The BCP area in particular, as well as Weymouth and Portland show levels of PM2.5 (particulate matter 2.5µm or less in diameter) well above the WHO limits for health (35), and higher levels are also seen in every town compared to the rural areas surrounding them. Councils are required to monitor air quality, however UK air quality limits are higher than the WHO limits, and councils are only required to declare an Air Quality Management Area (AQMA) if mean levels of any pollutant exceed the UK limits (36). There are currently no AQMAs in the BCP area (37) and two in the Dorset Council area, both for high levels of NO_2 which has more of an impact on respiratory health (38). Any exceedance of the WHO or especially UK air quality standards is likely to result in increased levels of CVD in that area, with PM2.5 particularly associated with increased rates of CVD (39). People in more deprived neighbourhoods tend to be exposed to higher levels of air pollution (40), and this seems to be the case in Dorset ICB, with areas such as Boscombe, North Bournemouth, Weymouth and Portland experiencing some of the highest rates of PM2.5.

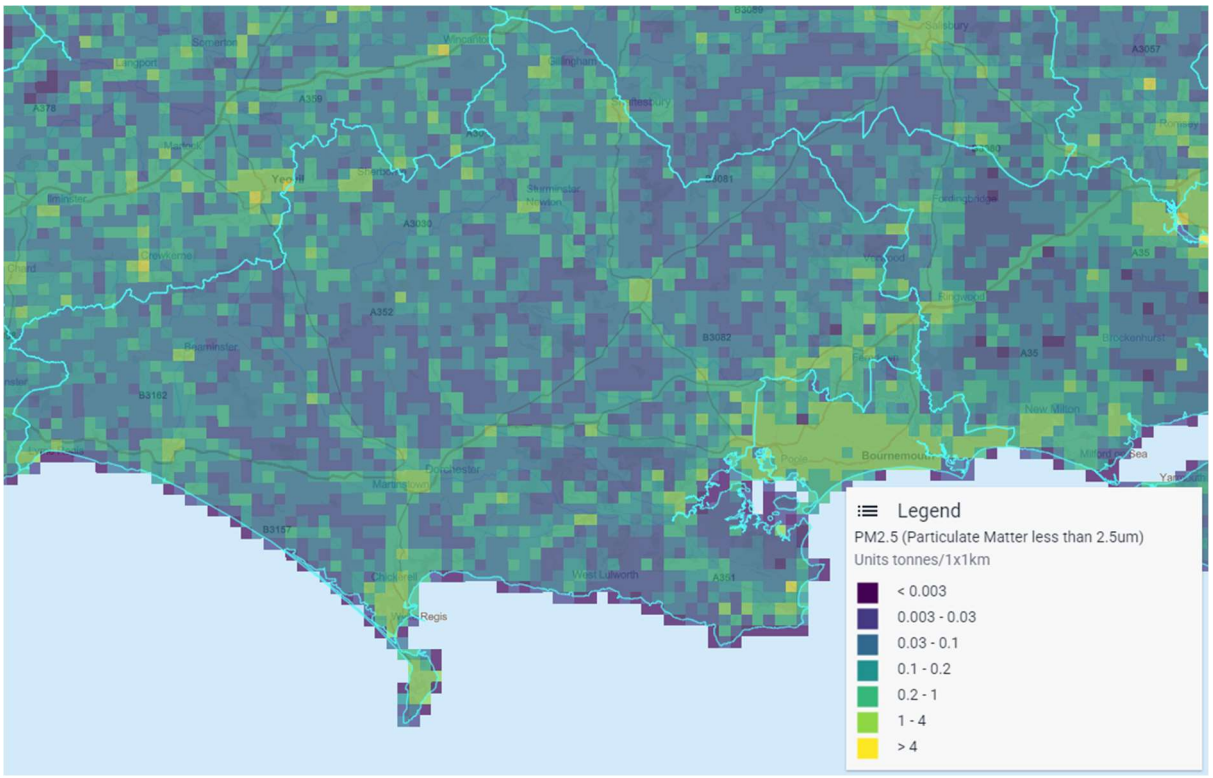

Figure 1: Map of UK National Atmospheric Emissions Inventory of levels of PM2.5 for Dorset and BCP Council areas (41)

Smoking

Smoking prevalence in Dorset has been reducing in recent years in line with the national numbers, although consistently below the national rate. However, according to the Annual Population Survey (APS) data shown in figure 2, this trend altered in 2023, with smoking rates returning to 2021 levels, and rising to close to the national rate. APS data in 2023 has been criticised as being based on small sample sizes (42), so it will be necessary to check the following year's data to see if this is a real trend or random variation from small numbers. Additionally, in 2024 Public Health Dorset's smoking cessation work expanded to include Swap 2 Stop: a government-supported scheme whereby smokers can receive free vaping kits as a harm reduction approach to aid in their attempt to quit smoking (43). The 2023 data will not include the effect of this programme.

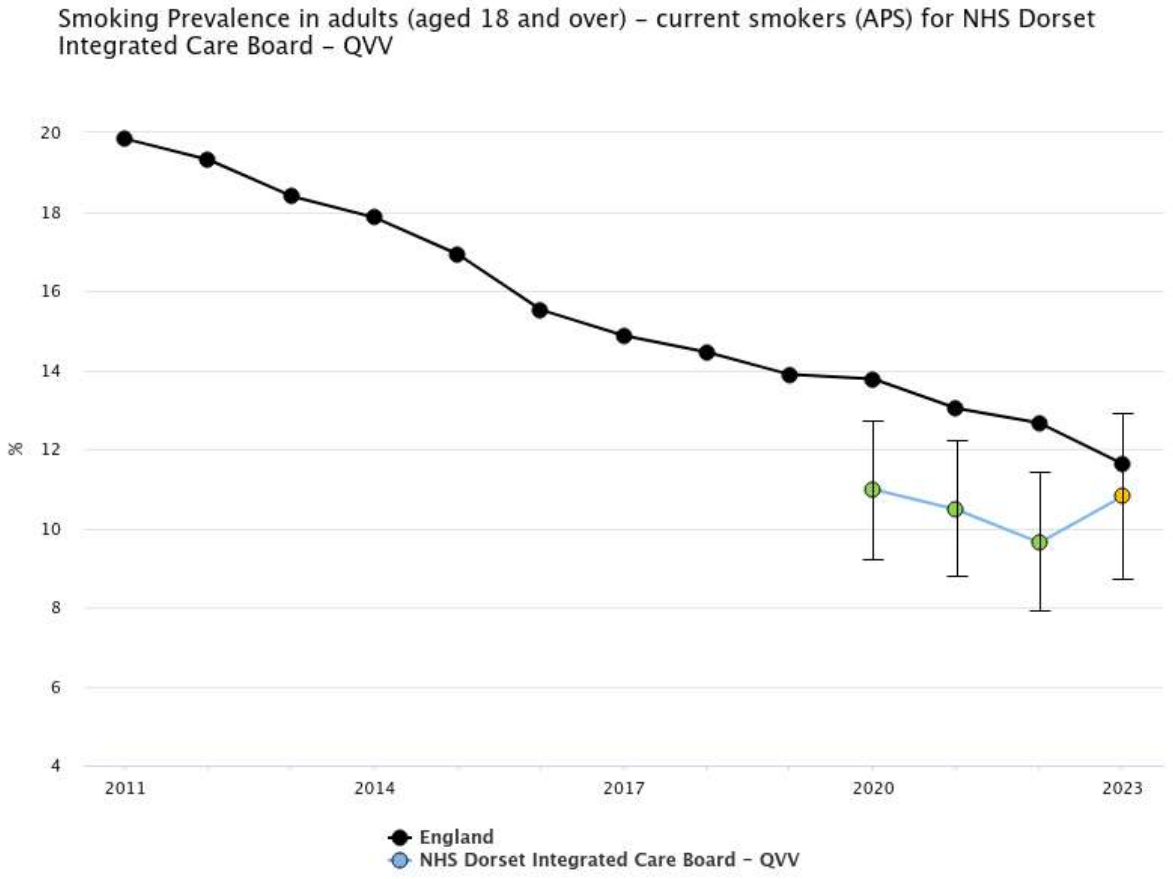

Figure 2: Smoking rates in Dorset ICB compared with national rates, data from the Annual Population Survey. Source: OHID Fingertips

Figure 3 below shows the population group in which this trend of increased smoking rates is likely occurring- the routine and manual working population, while other groups show reduced or roughly stable rates. Although the increase in this group is not statistically significant, 2023 was the first year where smoking rates are significantly higher than both unemployed and managerial and professional employment groups. Dorset's smoking cessation services have shown willingness to work in new ways, for example bringing in Swap 2 Stop (43), however interventions more targeted towards those in more deprived areas, and those working in routine and manual occupations will almost certainly still be required. Innovative solutions such as placing smoking cessation services in community venues have been shown to be effective in improving quit rates in more deprived groups (44).

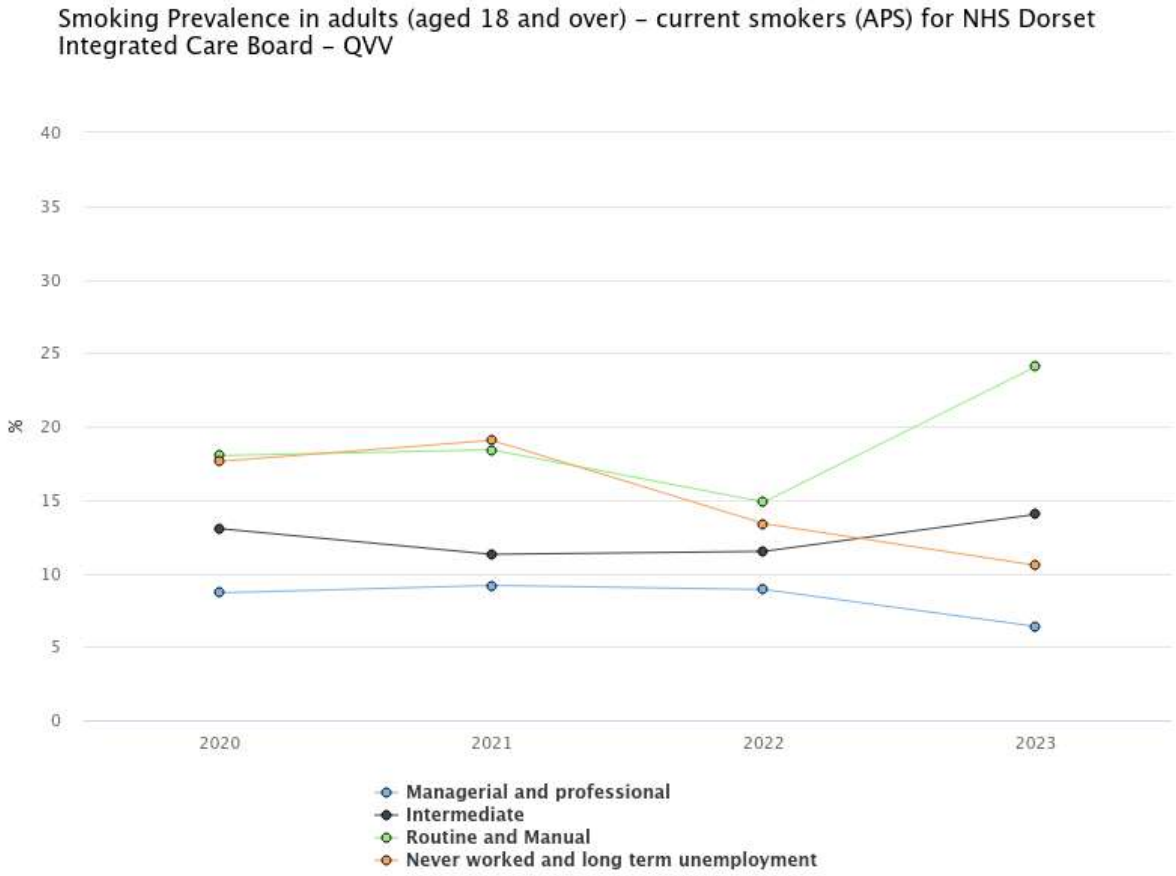

Figure 3: Smoking rates in Dorset ICB by employment type, data from the Annual Population Survey. Source: OHID Fingertips

Physical activity

Figures 4 and 5 show the levels of physical activity for BCP and Dorset Council areas respectively. They show that although levels of physical activity in adults have varied over time in both BCP and Dorset Council areas, levels have tended to be in line with or above national rates, especially in Dorset Council area where rates tend to be higher.

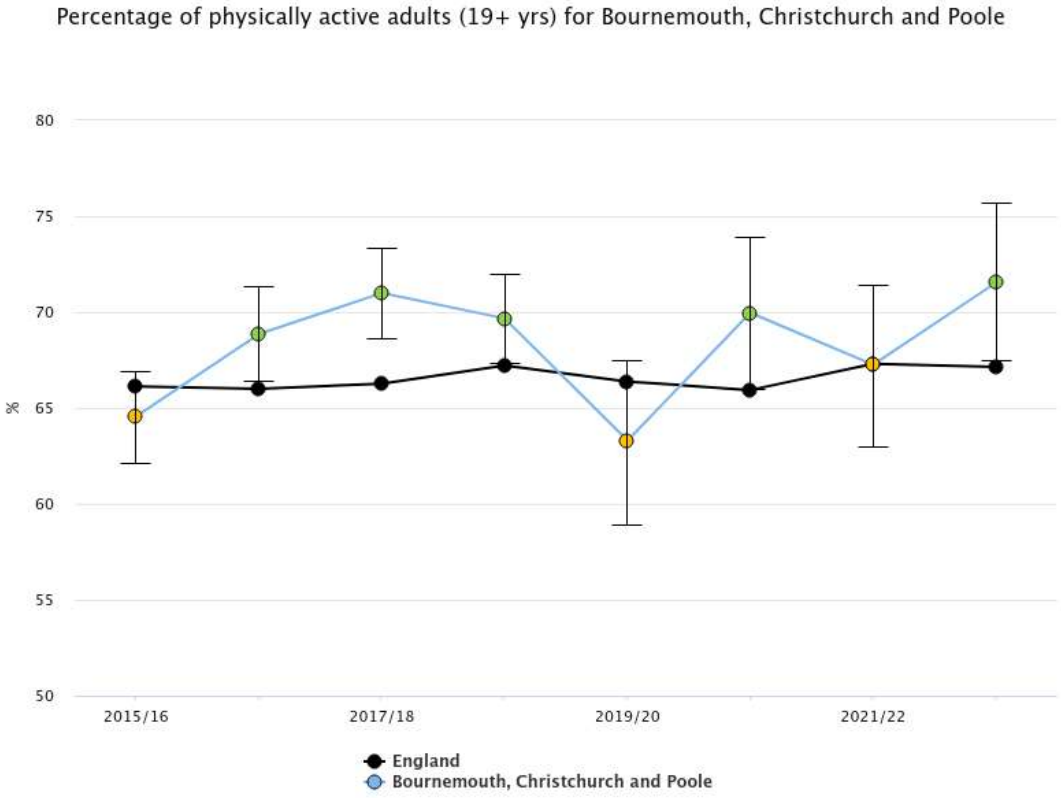

Figure 4: Physical activity rates in BCP compared with national rates. Source: OHID Fingertips

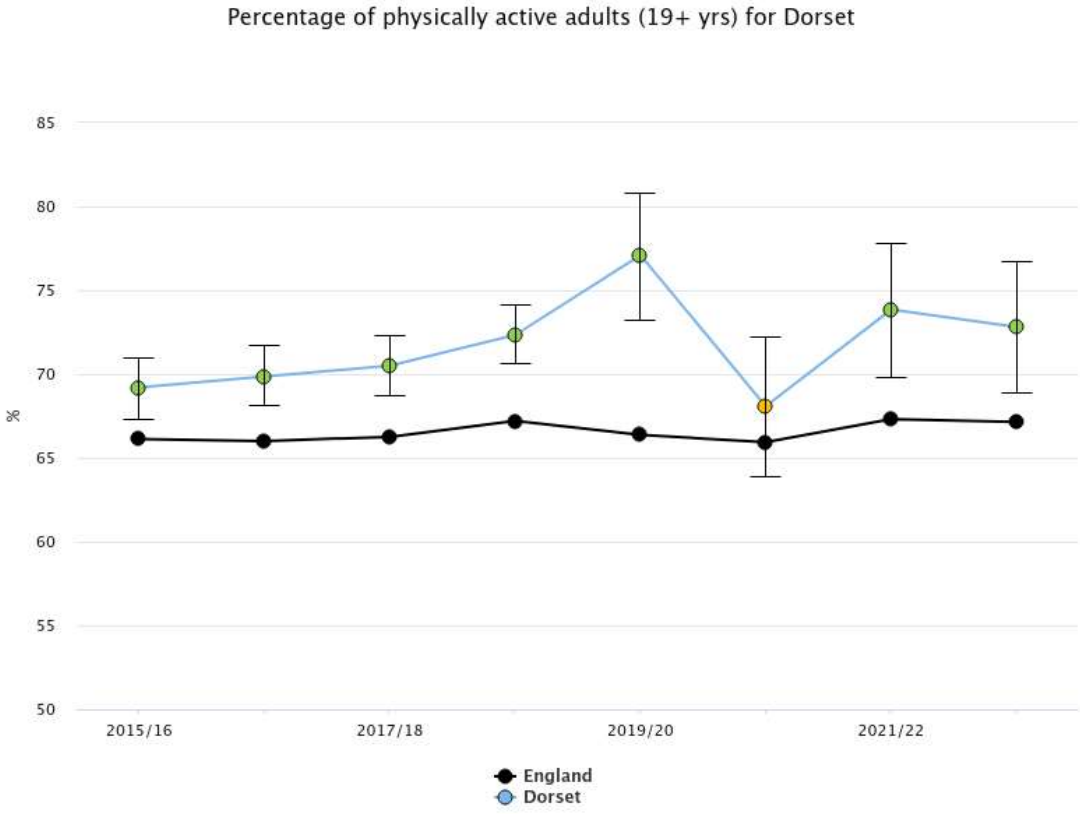

Figure 5: Physical activity rates in BCP compared with national rates. Source: OHID Fingertips

CVD case-finding in Dorset

Dorset has three main pathways through which patients with CVD or who are at risk of CVD can be identified in the community.

Usual primary care appointments

The first pathway is through usual primary care appointments, where patients might seek assistance with CVD-related symptoms which lead to their diagnosis. Alternatively, blood pressure or cholesterol measurements may be taken opportunistically when individuals who might be at risk come into the surgery for unrelated complaints. Patients may also make an appointment with their GP after identifying their own high blood pressure through monitors they have at home. They can alert their GP to their blood pressure measurements carried out at home through Blood Pressure @ Home (27), which has now been rolled out across Dorset.

NHS Health Checks carried out in primary care

All adults aged 40 to 74 who do not have a pre-existing health condition, are eligible to be invited to an NHS Health Check every 5 years (45). In an NHS Health Check measurements are taken of BMI, waist circumference, cholesterol and blood pressure, and lifestyle-related questions are asked covering activity levels, alcohol and smoking. Ideally point of care cholesterol testing should be used so the Health Check can be completed in just one appointment. The session should end with a communication of current risk level and recommendations of how to proceed. NHS Health Checks are funded by the public health grant, and GPs are paid for invitations and NHS Health Checks carried out. Not all GP surgeries are signed up to deliver NHS Health Checks, and although there is now at least one GP surgery delivering NHS Health Checks in each Primary Care Network, patients can only access them through their GP if their own practice is signed up to deliver them. There are also two pharmacies in Dorset, who carry out NHS Health Checks, both in the BCP area. Primary care organisations are currently paid extra for carrying out NHS Health Checks on members of the following target groups:

- Those living in deprivation quintiles 1 and 2 – the most deprived areas
- Smokers
- Those that have already had a one-off high blood pressure reading but no ongoing care
- 40-49 year olds (this group are not at higher risk of CVD but are less likely to attend checks)
- People of Black ethnicity

NHS Health Checks carried out by LiveWell Dorset

LiveWell Dorset is Public Health Dorset's in-house health improvement organisation. Around a fifth of the NHS Health Checks budgeted for in Dorset are carried out by LiveWell Dorset (46). In addition to the measurements, questions and risk communication as described above, LiveWell Dorset staff are trained to carry out brief interventions in relation to lifestyle risk factors during the Health Check appointment. LiveWell Dorset do not invite individuals, but instead go out into the community and offer targeted NHS Health Checks. They target all the same groups as GPs above, but in the past year have been specifically focusing on Black communities and people living in deprived areas, with the aim of carrying out NHS Health Checks on those who would not otherwise be in contact with health services. They have been doing this by offering NHS Health Checks in community spaces in deprived areas, at workplaces, and in businesses frequented by target groups such as restaurants and hairdressers. LiveWell Dorset staff have been building relationships with target communities to find out how best to improve their offer.

Dorset NHS Health Check data

Data on how well NHS Health Checks in Dorset identify high blood pressure indicates that they are generally successful in this (figure 6). The majority of people who receive an NHS Health Check have elevated BP or stage 1 or 2 hypertension. 60 people were identified as being in hypertensive crisis through receiving an NHS Health Check.

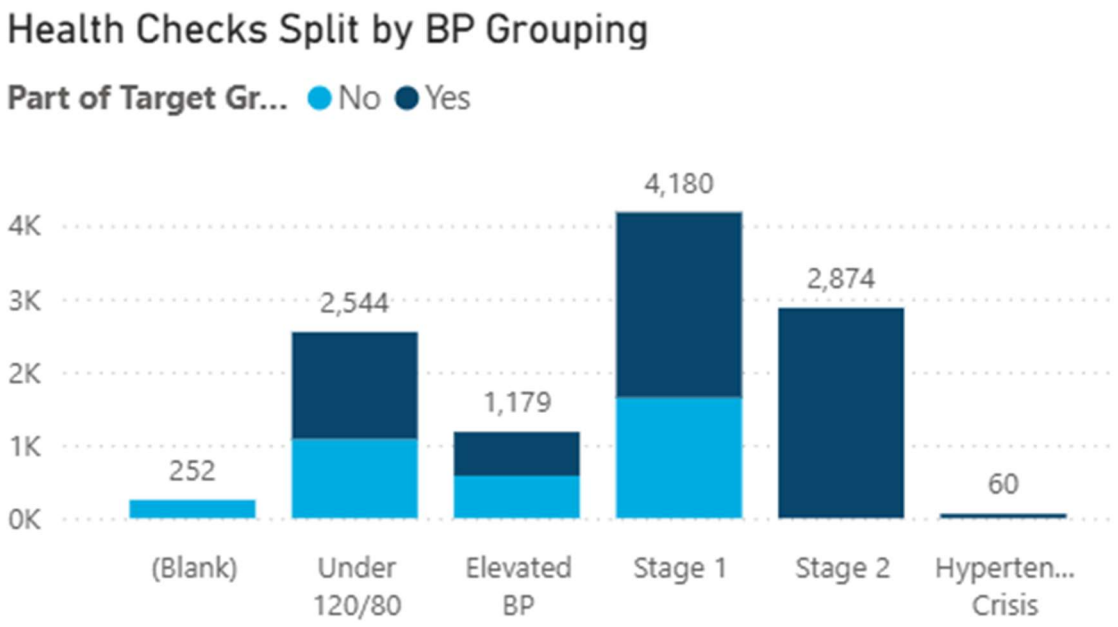

Figure 6: NHS Health Checks carried out in Dorset between 19th December 2023 and 19th December 2024 by blood pressure measurement during Health Check. Note: people with stage 2 hypertension or above are automatically part of a target group. Source: Public Health Dorset NHS Health Checks Dashboard.

Although NHS Health Checks are already identifying people in need of treatment, figure 7 reveals that numbers of people undergoing checks are far higher in the more affluent areas of Dorset than the more deprived ones. This pattern is evident when looking at both GP-only and LiveWell Dorset-only data. NHS Health Checks carried out in pharmacies, although far smaller in number (118 in total compared with around 8,700 delivered by GPs in 2024), seem to be carried out more evenly across deprivation categories. Charts on the differing rates of NHS Health Checks by area deprivation for GP surgeries, LiveWell Dorset and pharmacies separately are available in appendix 2.

Figure 7 below also contains percentages of the Dorset ICB footprint population as a whole, which shows that there are more people from quintiles 3, 4 and 5 than the more deprived quintiles 1 and 2. However, those from quintiles 1, 2 and 3 are underrepresented in NHS Health Check numbers compared to the population as a whole, while the more affluent areas are overrepresented. A useful future analysis would be to age-standardise this data, as this trend might be influenced by differing age structures in the different IMD quintiles. However, as hypertension rates tend to increase with increasing area deprivation, improving targeting of NHS Health Checks is likely to further increase hypertension case finding (as well as identifying other CVD risk factors).

There is an additional risk to NHS Health Checks that are not appropriately targeted: a widening of health inequalities. People living in more deprived areas tend to already have worse health, while those in less deprived areas tend to already have better health. If the more affluent attend NHS Health Checks at a higher rate than those in more deprived areas, they have a greater opportunity to further improve their health through lifestyle changes or treatment. Through this mechanism NHS Health Checks have the potential to widen inequalities if not properly targeted (47).

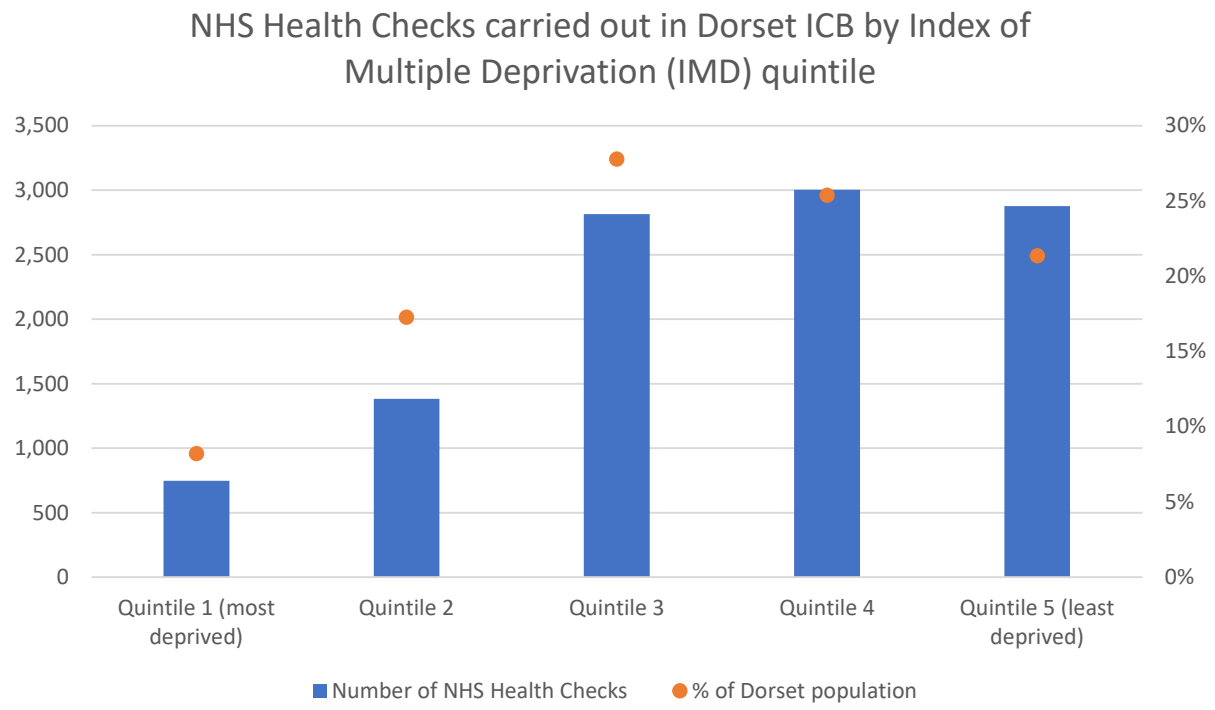

Figure 7: NHS Health Checks carried out in Dorset between 19th December 2023 and 19th December 2024 by area deprivation level of recipient. Quintile 1 is the most deprived, and 5 is the least deprived. Source: Data from Public Health Dorset NHS Health Checks Dashboard.

CVD Interventions

If opportunities for primary prevention or early treatment are missed, patients with CVD may go on to need more invasive and expensive interventions. The most common cardiac interventions targeted at coronary artery disease in use today are angioplasty, stenting and coronary artery bypass grafting (CABG). Angioplasty, also known as percutaneous transluminal angioplasty (PTA), is a minimally invasive medical procedure used to restore blood flow in narrowed or blocked blood vessels. A catheter (a thin, flexible tube) is inserted into a blood vessel, guided to the site of the blockage using real-time imaging, and a small balloon at the tip of the catheter is inflated at the site of the narrowing. This compresses the fatty plaque against the artery walls, widening the vessel and restoring blood flow. In many cases, a stent (a small metal mesh tube) is placed to keep the artery open.

Stents can be bare-metal or drug-eluting. Modern stents tend to be drug-eluting, meaning they slowly release a drug designed to prevent the re-narrowing of the artery. These drug-eluting stents tend to have better outcomes than bare-metal stents (33). In Dorset ICB all of the stents used appear to be drug eluting stents (figure 25 in appendix 4).

CABG procedures are carried out under general anaesthetic and involve the opening of the thoracic cavity in order to graft a blood vessel from another part of the body onto the coronary artery to create a new pathway for oxygen-rich blood to reach the heart muscle. CABG tends to be used in cases of more extensive or complex ischaemic heart disease, or where comorbidities such as diabetes are present, where long term outcomes of CABG are better than that of PTA and stenting (34). There are no facilities for carrying out CABG procedures in Dorset. Most Dorset residents in need of a CABG procedure go to Southampton for this.

Clinical Approach to Cardiovascular Health from NICE Guidelines

The NICE guidelines NG185, NG238, NG136, TA152, and TA71 collectively provide a framework for the prevention, diagnosis, and management of cardiovascular disease (CVD) and related conditions. These guidelines address hypertension, lipid management, acute coronary syndromes, and the use of stents in coronary interventions, offering evidence-based recommendations for clinicians and healthcare systems. These guidelines are summarised in appendix 5.

Together, these guidelines highlight the importance of early diagnosis, targeted treatment, and lifestyle interventions to prevent and manage cardiovascular diseases. The use of evidence-based pharmacological therapies, including antiplatelets, statins, antihypertensives, and lipid-lowering agents, as well as interventions such as stenting are central to improving patient outcomes. By combining systematic risk assessment, individualised care plans, and cost-conscious decision-making, these guidelines provide a framework for reducing the burden of CVD in populations. However, as these guidelines are focussed on clinical decision-making, they do not address approaches to increased case finding in underserved populations in primary care, or wider societal efforts in primary prevention. Rather they focus on how to identify and treat a patient with suspected hypertension or CVD once they are already in contact with a healthcare provider.

Methodology of analyses

Data Sources

Hospital episode statistics (HES) data was used for the main analysis of cardiac interventions. Dorset ICB data was accessed via Public Health Dorset intelligence team. National, regional and CIPFA nearest neighbours comparator data was provided in aggregate form via the Local Knowledge and Intelligence Service (LKIS) of the Office for Health Improvement and Disparities (OHID). Mortality data was sourced from the Primary Care Mortality Dataset held within Public Health Dorset.

National and local population denominators were sourced from the Office of National Statistics (ONS) NOMIS website using 2021 census data and ONS Population Estimates/Projections. Ethnicity denominators were sourced from ONS 2021 census ethnicity data. Primary Care Network-level denominators were sourced from NHS England data.

Analysis

Counts of interventions are based on numbers of admissions, defined as finished consultant episodes. The full list of OPCS-4 procedure codes used to extract the data is included as appendix 1. If more than one relevant procedure was recorded in one admission, these are separated and counted individually for the counts by type of procedure (figures 19 and 20 only in appendix 4), and counted as one admission in all other analyses.

Where Index of Multiple Deprivation (IMD) is used, these are always referring to national quintiles throughout this report.

Analyses of cardiac interventions were carried out by hospital of procedure, type of procedure, age, sex, ethnicity, area of residence and primary care network of patient from the period of 2015 – 2023. Analyses of mortality were carried out by Index of Multiple Deprivation quintile for the period 2015-2024.

Standardised rates were calculated to account for differences in population age structure between areas. Directly standardised rates (DSRs) were calculated for analyses where population sizes were large enough to perform the calculations (10 or more total events within a group). Direct age standardisation involves calculating age-specific rates by dividing the number of cases by the population in each age group. These rates are then weighted according to the corresponding age group populations in a standard population. The expected cases for each age group are summed, and the total is divided by the overall standard population to obtain the age-standardised rate. This method adjusts for differences in age distribution, allowing fair comparisons between populations. DSRs were calculated using the R function phe_dsr from the package PHEindicatormethods using European Standard Population weightings. Confidence intervals for DSRs were calculated using the Dobson method.

Analysis was carried out in R and RStudio. The full code used is available on GitHub: https://github.com/annagoulding/PHD_Cardiac_HNA.git.

Overall rates of cardiac interventions

Historically, rates of cardiac procedures have been high in residents of the Dorset ICB footprint, especially in those living in the Bournemouth, Christchurch and Poole (BCP) Council area. These have reduced in recent years with Dorset Council rates now beginning to converge with the regional rate. The Dorset ICB overall rate of cardiac interventions remains higher than the England and South West rates, and the CIPFA nearest neighbours (48) of Dorset and BCP council areas. Figure 8 below shows this trend, with blue dashed lines representing the nearest neighbours of BCP Council and red dashed lines the nearest neighbours of Dorset Council.

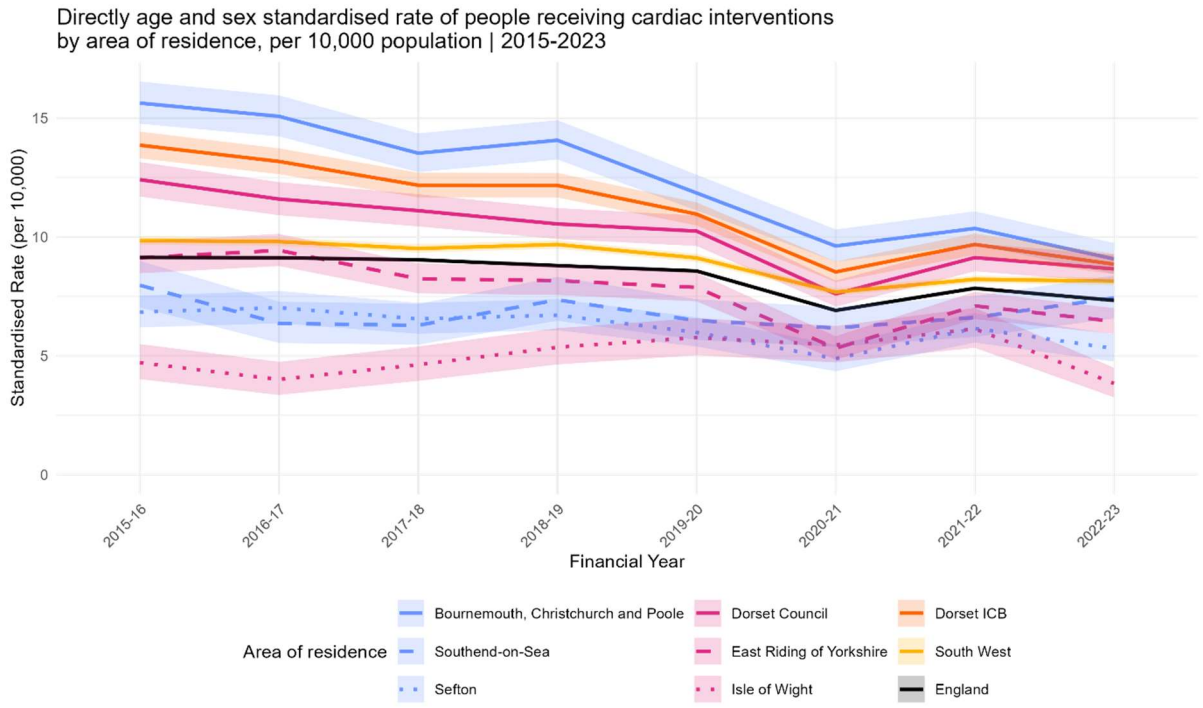

Figure 8: Standardised rates of cardiac interventions by area of residence. Comparator areas for BCP appear in blue and comparator areas for Dorset appear in red.

Figure 9, which splits these standardised rates out by elective and emergency procedure types demonstrates that trends in elective procedures are responsible for these high rates, while emergency rates are in line with the regional rate, although above the national rate in some years.

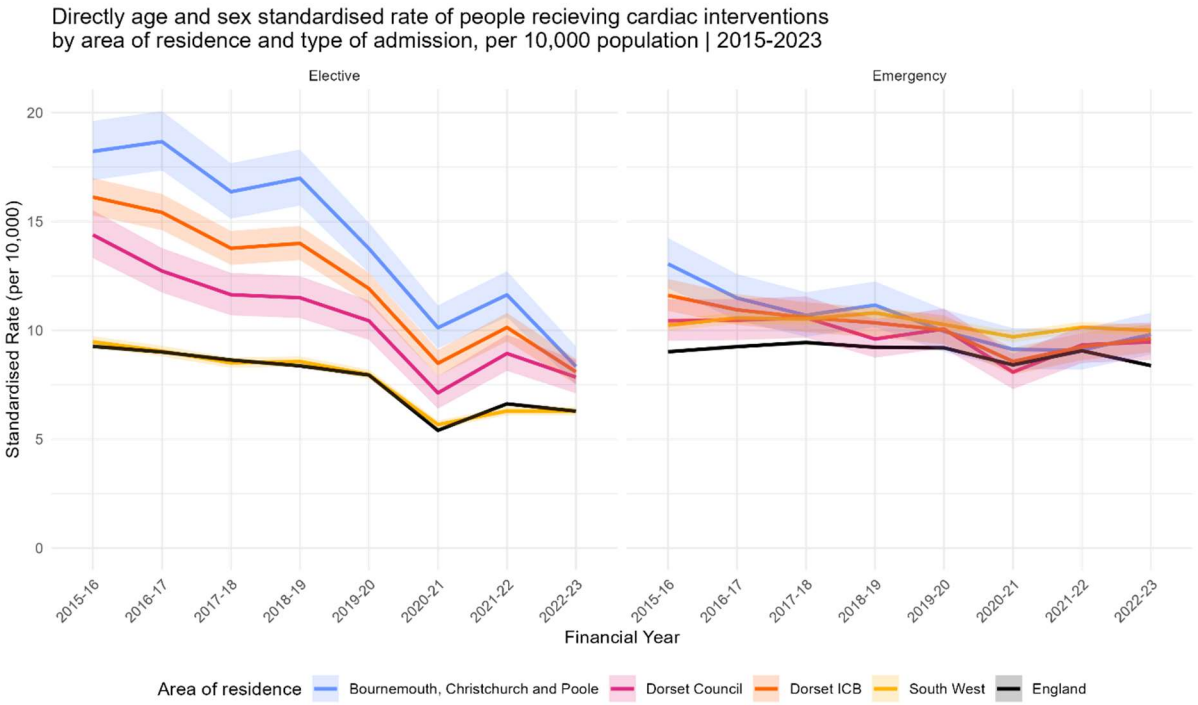

Figure 9: Standardised rates of cardiac interventions by area of residence and type of intervention.

Figure 10 showing overall numbers of elective and emergency procedures by hospital details where in the Dorset system these patterns are occurring. The majority of both elective and emergency procedures carried out on residents of the Dorset ICB footprint occur in Royal Bournemouth Hospital (RBH). This is unsurprising as RBH has the only out-of-hours catheter lab service and a larger in-hours capacity than other Dorset hospitals. The chart also makes clear that the pattern in reducing numbers of mainly elective but also emergency procedures is an RBH pattern. Dorset County Hospital carried out the second-highest number of procedures, followed by Southampton General, who primarily carry out elective coronary artery bypass graft (CABG) procedures for Dorset residents, as facilities for CABG are not available at any Dorset Hospitals.

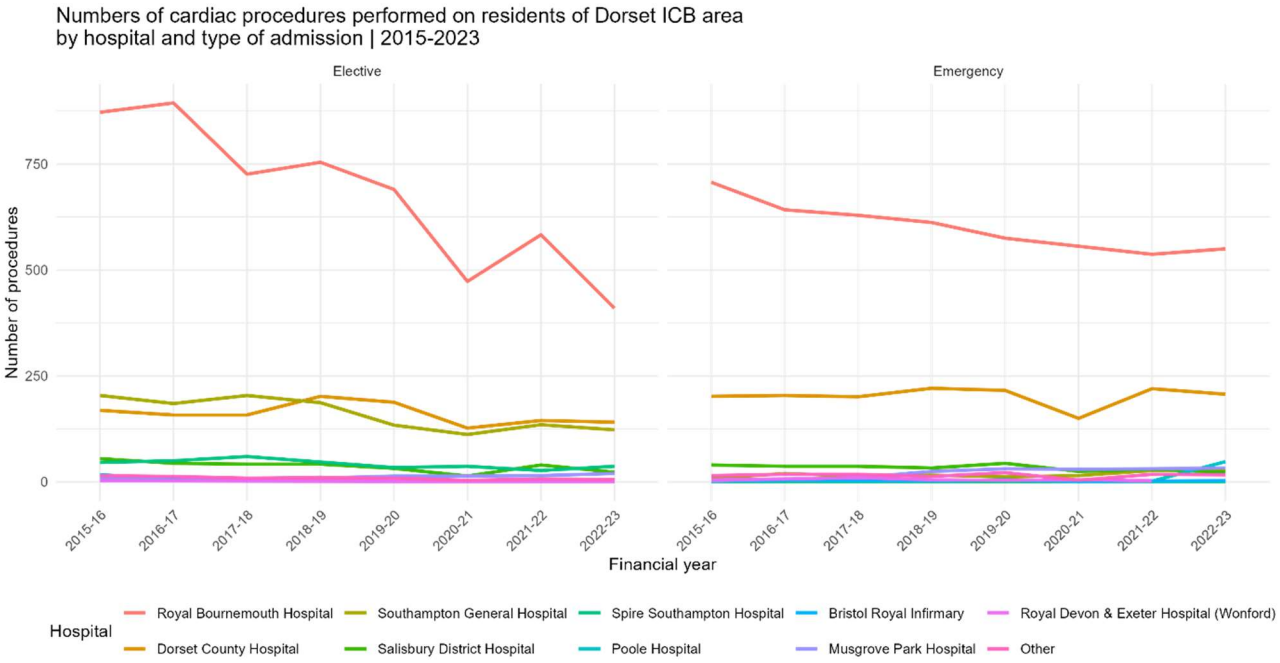

Figure 10: Numbers of interventions performed on residents of Dorset ICB by hospital of procedure.

Variations in cardiac intervention rates by demographic characteristics

By age

CVD has increasing incidence with increasing age, making it unsurprising that the rate of cardiac interventions increases with increasing age too, as shown in figure 11. The difference between elective and emergency procedures only reaches significance in the age band 85+ when there is a large drop in the numbers of elective procedures in particular. This may be due to concerns about conducting invasive procedures in older people, or reduced demand for elective procedures because of lower activity levels and therefore less exertion-related angina.

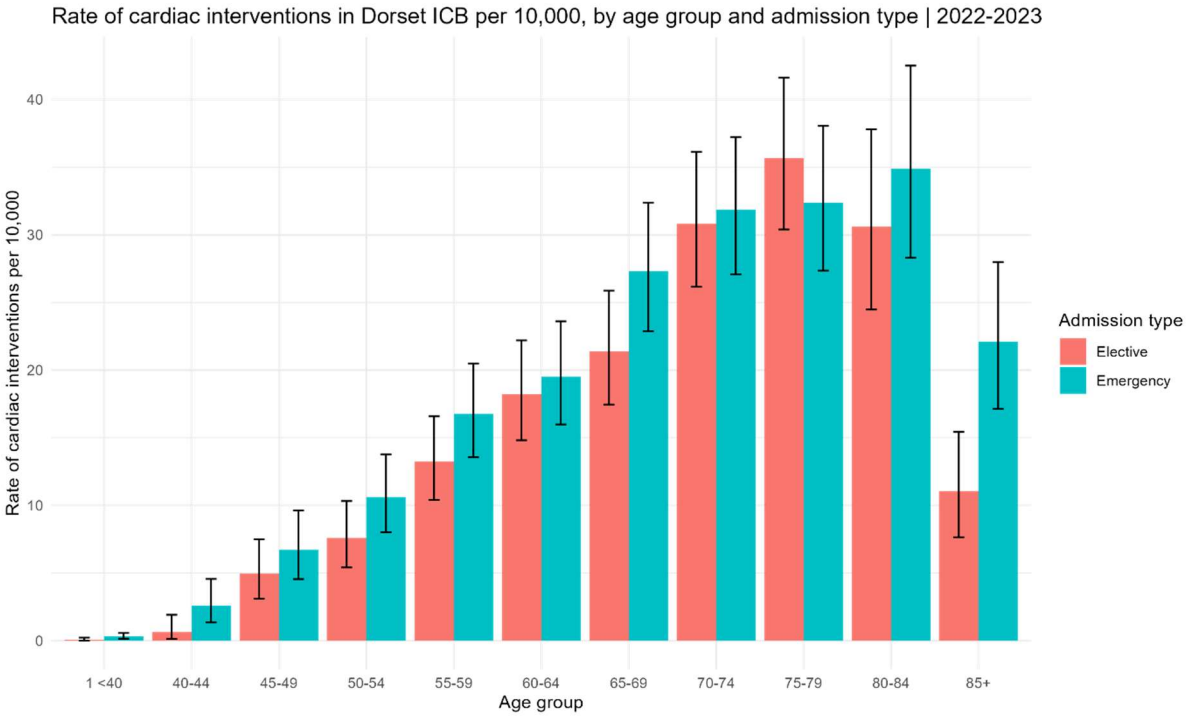

Figure 11: Rate of cardiac interventions in Dorset ICB residents by age and admission type

By sex

There are differences in rates of cardiac interventions by sex in residents of Dorset ICB area, and in historical patterns of elective vs emergency interventions between male and female patients (figure 12). The historically high rates of elective stenting seem to have mainly occurred in men, and this has reduced to a point where emergency procedures now outnumber elective procedures. Women have historically had similar rates of emergency and elective procedures and have both at a little less than half the rate of men.

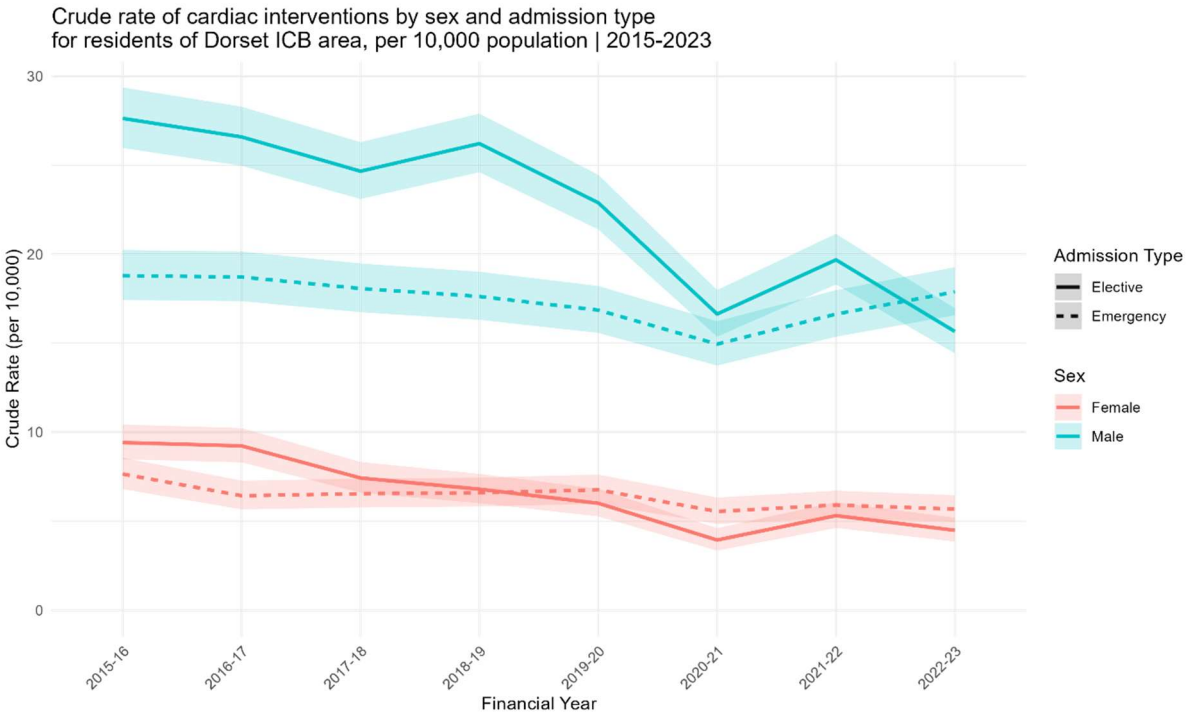

Figure 12: Rate of cardiac interventions in Dorset ICB residents by sex and admission type

These lower rates of intervention in women also map on to lower mortality rates in women, as seen in figure 13. However, it should be noted that the CVDPREVENT audit has found consistent inequalities in cholesterol management between men and women with CVD, with women less likely to be on appropriate lipid-lowering therapy (49).

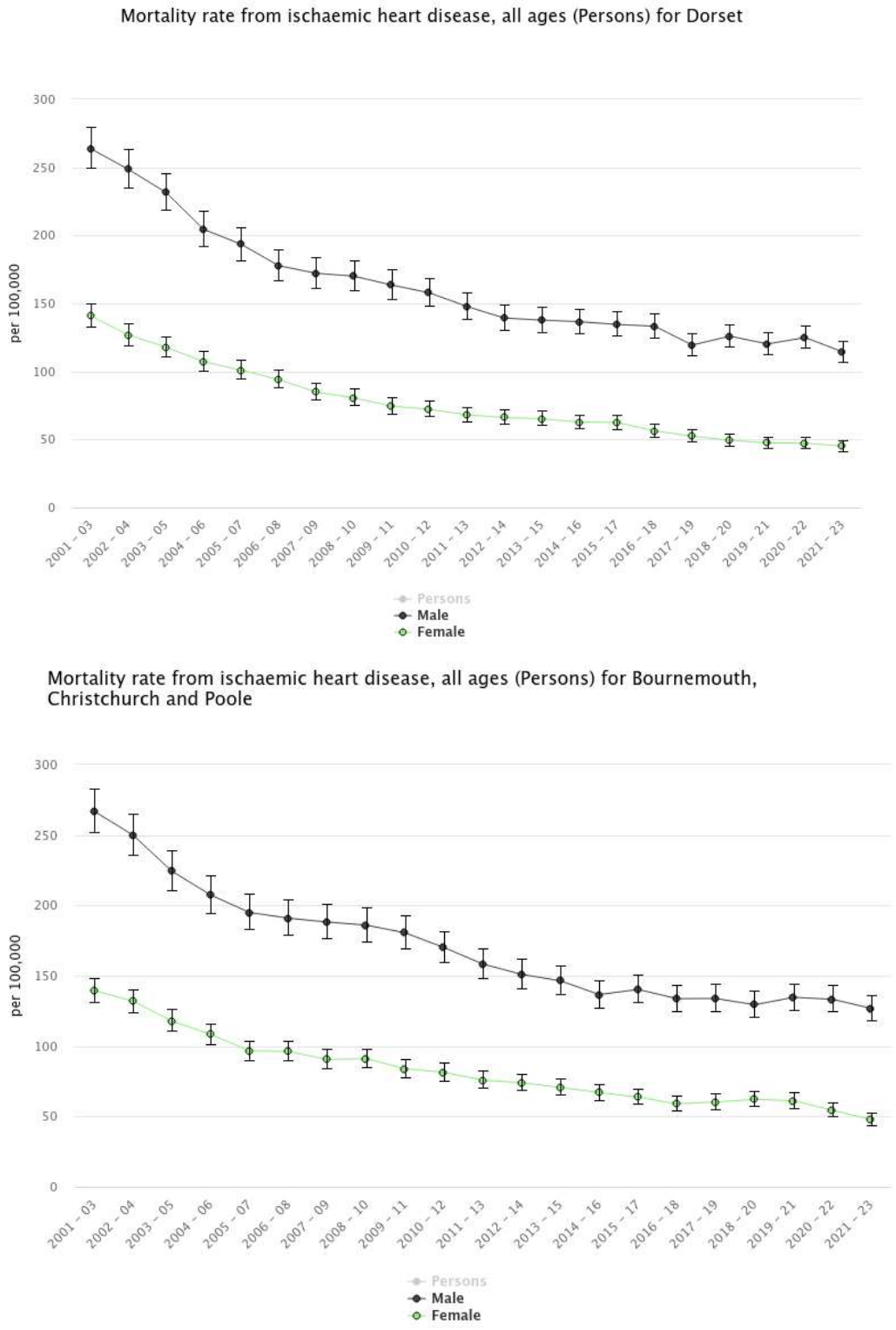

Figure 13: Mortality rate from ischaemic heart disease by sex, 2021-22, residents of Dorset Council (top image) and BCP (lower image). Source: [OHID Fingertips]

By ethnicity

An analysis of cardiac intervention data was attempted by ethnicity, however due to low patient numbers and small population denominators of some ethnicities, a meaningful analysis couldn't be carried out. However, national research suggests that Black and South Asian people tend to have higher rates of CVD compared to White people (50). Additionally, the findings from the CVDPREVENT audit suggest that black and mixed ethnic groups were the least likely to be prescribed appropriate drug therapy, receive regular monitoring or be treated appropriately (51). Local data on how well hypertension treatment targets are being met in different ethnicities (figure 14) also suggests that Black, Asian, Mixed/multiple ethnicities and Other White patients are less likely to be treated to target than White British patients.

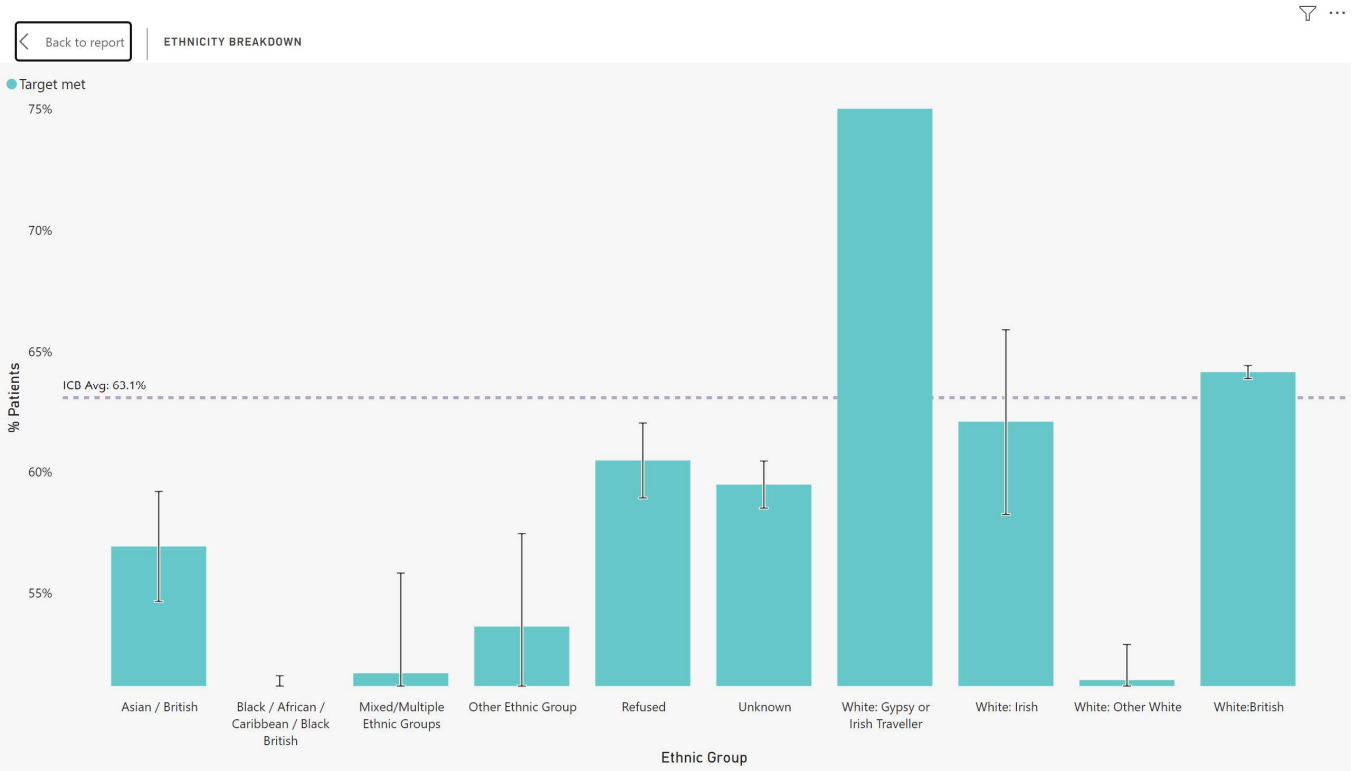

Figure 14: Proportion of patients in Dorset ICB aged 18+ with GP recorded hypertension whose last blood pressure reading in last 12 months was under 140/90 for those aged 79 & under and under 150/90 for those aged 80+, by ethnicity of patient. Source: DiiS Hypertension Dashboard, January 2025.

Health inequalities in cardiac care by deprivation in Dorset

The starkest inequalities identified by this analysis were by deprivation. These differences are inequities as well as inequalities because unlike differences by sex which may be in part biologically unavoidable, variation by area deprivation is both unfair and avoidable. These inequities are present throughout the entire cardiac pathway.

Inequalities by deprivation in primary care

Figures 15 and 16 show the relative lack of access for deprived communities to CVD-related primary care. In figure 15, the rate of GP-recorded hypertension is lowest in the most deprived communities, when it is likely that the true population prevalence is higher with increasing deprivation. This pattern of under ascertainment (or recording) in deprived communities is common throughout the South West and the UK as shown by the yellow and green reference values on the chart. However, the under ascertainment appears to be particularly evident in Dorset.

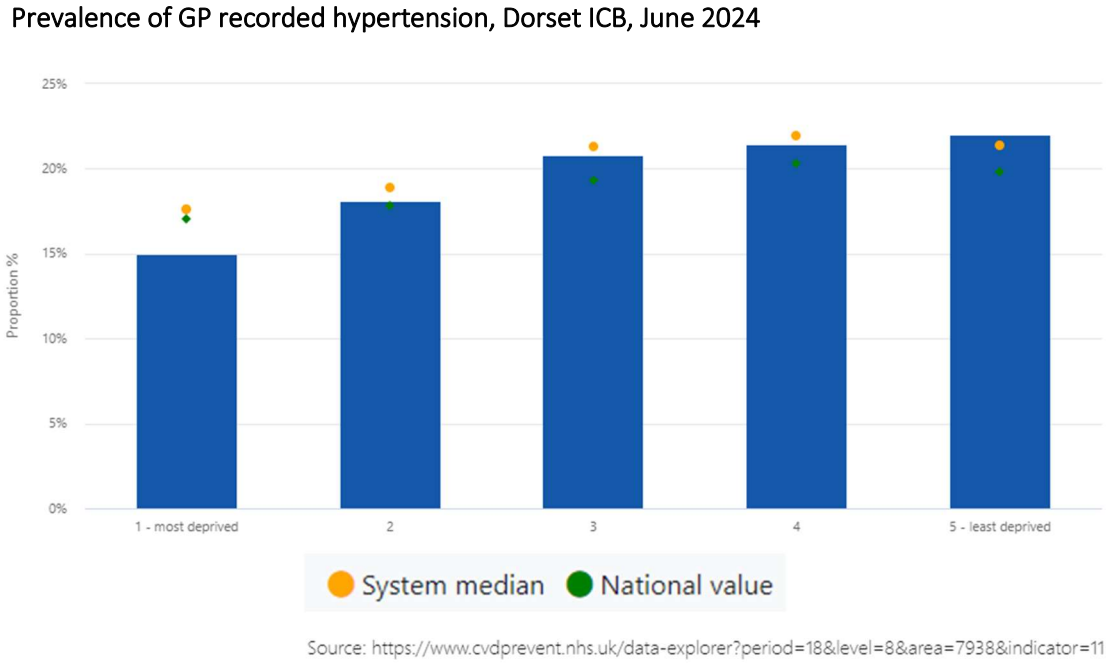

Figure 15: Prevalence of GP recorded hypertension in Dorset ICB compared to South West (labelled system median) and national values. Source: CVDPREVENT (2).

A similar although less marked pattern is also visible in lipid control as primary prevention for CVD, as seen in figure 16. Here, although there are fractionally increased rates of lipid lowering therapy with increasing deprivation, this is far below the system and national rates which likely align more closely to need.

Patients at risk of CVD who are currently treated with lipid lowering therapy, by deprivation, Dorset ICB, as of June 2024

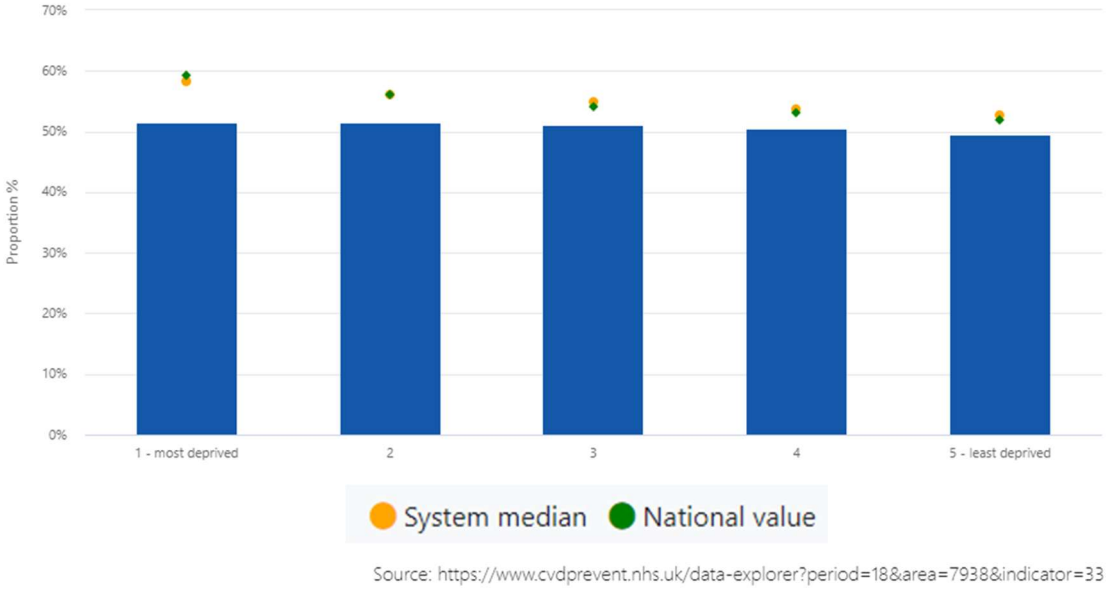

Figure 16: Primary prevention of CVD using lipid lowering therapy in Dorset ICB compared to South West (labelled system median) and national values. Source: CVDPREVENT (2).

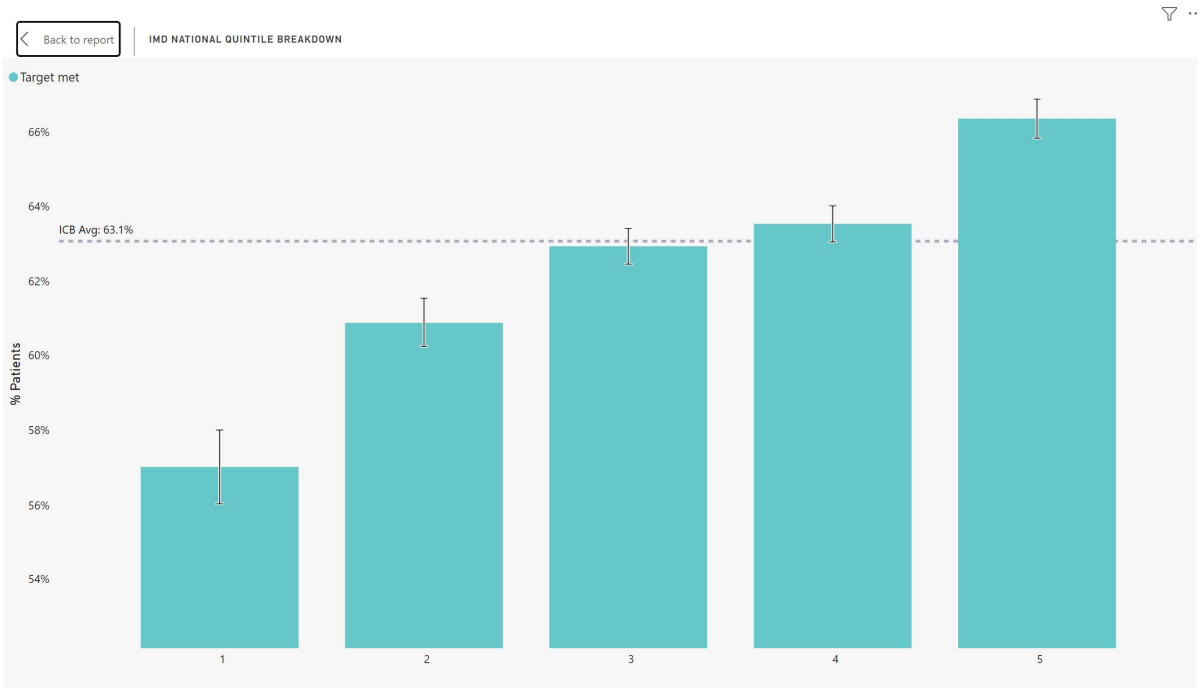

Figure 17: Proportion of patients in Dorset ICB aged 18+ with GP recorded hypertension whose last blood pressure reading in last 12 months was under 140/90 for those aged 79 & under and under 150/90 for those aged 80+, by National IMD quintile. Source: DiiS Hypertension Dashboard, January 2025.

Variation by deprivation in secondary care

Figure 18 below shows the rates of cardiac interventions by area deprivation and type of intervention. Elective surgeries show no particular pattern by deprivation, except in the most recent year available, where the most deprived group might be emerging with slightly higher rates. However, rates of emergency interventions have been consistently highest in residents of the most deprived areas, while rates in the least deprived areas are consistently the lowest. As residents of more deprived areas are accessing less primary CVD prevention from primary care, while likely being exposed to greater risk factors for cardiovascular illness, this data suggests that for many people in more deprived areas their first contact with medical services in relation to CVD is after a heart attack, when they are in need of emergency surgery.

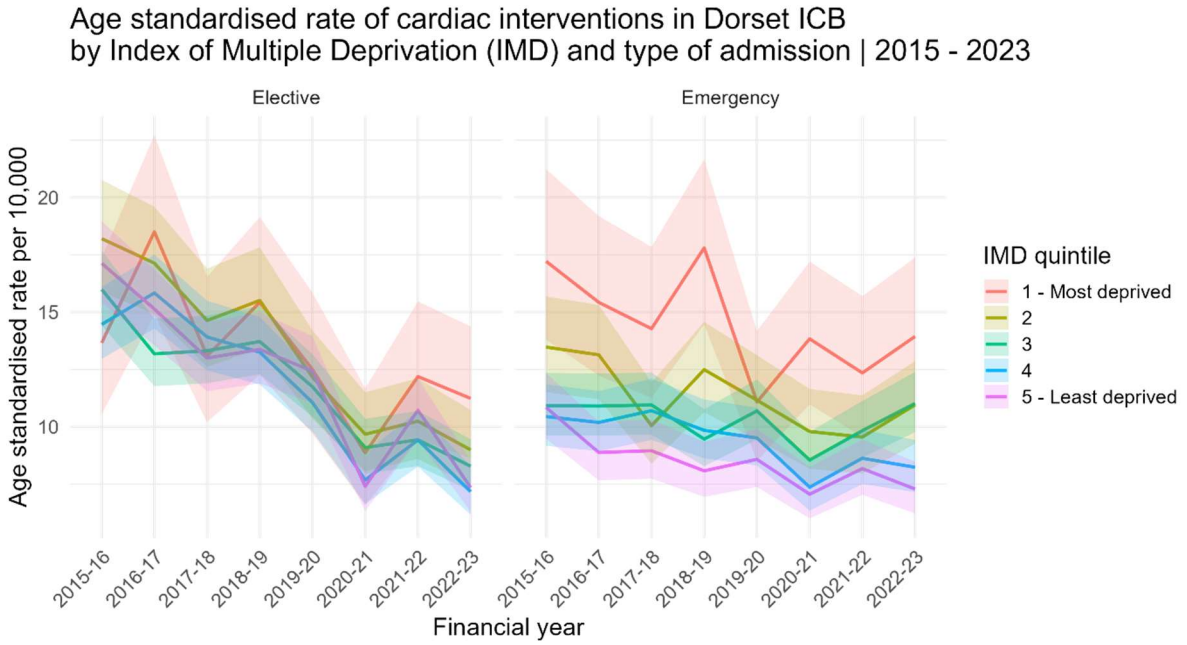

Figure 18: Standardised rate of cardiac interventions in residents of Dorset ICB by deprivation level of area of residence and type of admission.

Inequalities by deprivation in CVD mortality

Unfortunately, this pattern is even stronger for mortality, as seen in figure 19 below. Although overall CVD mortality in Dorset is less than the national average (see figure 24 in appendix 3), CVD mortality rates are consistently higher in those living in the most deprived areas of the Dorset ICB footprint. The most deprived group are the only ones who experienced a spike in CVD mortality during the Covid-19 pandemic. Although rates have reduced since then, the gap between the increased death rate in the most deprived area and the less deprived areas has widened in the past two years.

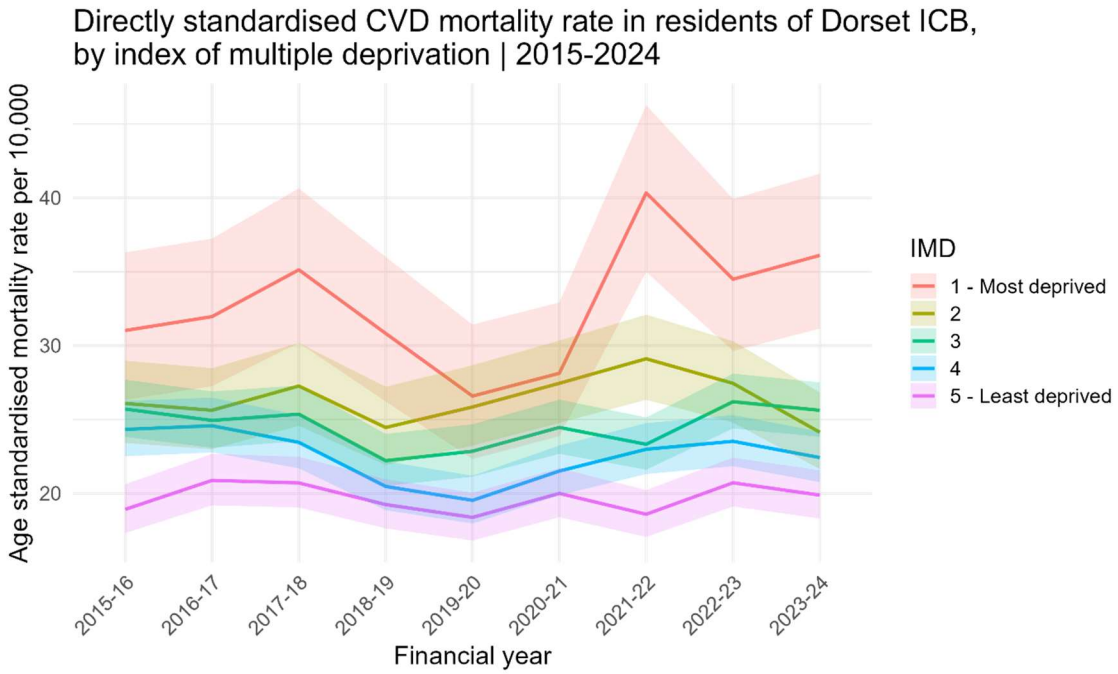

Figure 19: Standardised CVD mortality rate in residents of Dorset ICB, by deprivation level of area of residence.

Figure 20 shows CVD mortality rates by deprivation in under 75s. This data reveals that in 2023-24 mortality rates in younger people in the most deprived areas were higher than they have been in at least the last 9 years, and appear to be rising. These mortality rates lower with each increase in area affluence.

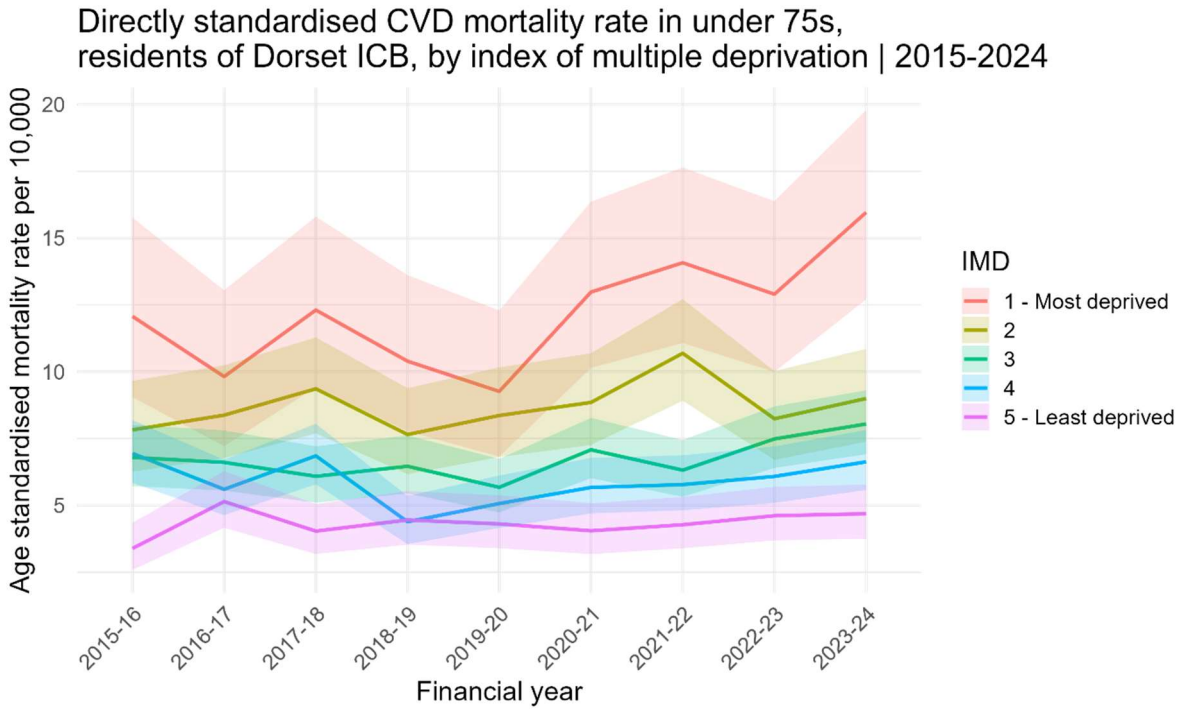

Figure 20: Standardised CVD mortality rate in residents of Dorset ICB aged under 75, by deprivation level of area of residence.

Discussion

This needs assessment has drawn together research on the prevention and treatment of CVD along with data on risk factors in Dorset and new analyses on the impact of CVD on cardiac intervention rates and mortality. The most important finding from this analysis is the differential impact that CVD is having on people living in the more deprived areas of Dorset. This difference is evident in primary care, secondary care and in mortality rates, and especially for premature deaths.

Those living in the most deprived areas of the Dorset ICB area are exposed to higher levels of PM2.5 air pollution, which increases rates of CVD. Those working in routine and manual jobs in Dorset have high and seemingly increasing smoking rates. Those living in the most deprived areas of Dorset ICB are the least likely to be identified by their GPs as having high blood pressure, and are also the least likely to be treated for high cholesterol despite likely having higher need for these. These primary care inequities are more stark in Dorset ICB than regional and national patterns.

These inequities then flow through into secondary care. As patients in more deprived areas in need of CVD prevention and care are less likely to be identified by their GP, they will also be less likely to receive elective CVD interventions that could prevent worsening health. Rates of elective interventions show no deprivation pattern although the need is likely greatest in the more deprived areas. This is evidenced by the rates of emergency cardiac interventions, which show a clear deprivation gradient. Those from more deprived areas in Dorset ICB are more likely to receive emergency interventions than those living in less deprived areas, with the rates decreasing with each increase in area affluence.

Sadly, these inequities show themselves most strongly in the CVD mortality statistics. People living in the most deprived areas of Dorset ICB have been consistently more likely to die of CVD than those in other areas, and the most recent year's data shows that this mortality gap is only increasing. Most alarmingly, the pattern of increased CVD mortality is strongest in those under 75 years old, where the death rate in the most deprived areas seems to have taken a sharp uptick in the most recent year's data.

This is set against a background of Dorset ICB carrying out more elective cardiac interventions than national and regional rates and statistical comparator areas, even when accounting for differences in population age structure. This rate has decreased from 2015-16 levels, where the rate of cardiac interventions in residents of BCP Council area was nearly twice the national and regional rates, but is still significantly higher than expected. Overall mortality from CVD in Dorset ICB is actually lower than the national average, and is the lowest in the South West. This data could prompt more in-depth work to assess whether the high intervention rate is a cause of the lower mortality rate, or whether this high intervention and low mortality rate indicates that criteria for elective cardiac interventions could be tightened without a loss to population health.

The lack of a deprivation gradient in the recipients of elective cardiac interventions is notable when there is a clear deprivation gradient in rates of emergency procedures, with more being carried out in residents of the more deprived areas. This suggests that although overall elective intervention rates are high, they are not being effectively targeted to those with the greatest need. This may be because those from more deprived areas are more likely to have comorbidities which mean elective interventions are not recommended. However, given the evidence that many at risk of CVD from deprived areas are not known about or treated in primary care it seems more likely that in many cases their GPs are simply not aware of their need and are therefore not referring them.

In addition to the human argument for better targeted prevention and early treatment, this data points to an economic argument. The most expensive outcomes of coronary artery disease for the NHS are emergency interventions. In comparison, treatment in primary care requires far fewer resources. This analysis demonstrates that in more deprived areas significant improvements in risk factor management and earlier treatment are possible, and that this is likely to free up significant resources for Dorset ICB through avoided emergency care (13).

Those living in more deprived areas are also more likely to be a part of an underserved group or subject to oppression based on, for example, race or class. Living in a deprived area may also magnify the impact of being a part of an underserved or oppressed group. Although analysis of cardiac interventions by ethnicity in this report was prevented due to small numbers, evidence of poorer hypertension treatment in most non-White ethnic groups suggests that the effects seen here by deprivation may in part be a proxy for the effects of other systems of oppression too.

Tackling the issue of CVD in Dorset requires tackling risk factors, and barriers to accessing primary and secondary care. As such, it will require a multi-agency approach, with many organisations able make changes that will benefit this area. Continuing support for smoking cessation, especially targeted to routine and manual workers will be key to avert negative outcomes from what appears to be an uptick in smoking in this group. In addition, continued work to reduce air pollution such as investing in electric car charging infrastructure and improved public transportation is likely to have an impact on CVD rates.

Identification of CVD risk factors in those not already known to services is also key, as this is an aspect in which Dorset ICB is falling behind other areas. NHS Health Checks potentially provide an ideal opportunity for improved case finding, as they are designed to identify potential risk factors and early signs of CVD in individuals otherwise thought to be healthy. Although there is evidence that NHS Health Checks delivered in a traditional manner tend to be better attended by those in more affluent areas (52), if the barriers to uptake for those in more deprived areas could be removed, NHS Health Checks could identify many more people who could benefit from earlier intervention. Work on this would be in line with regional priorities: improving access to NHS Health Checks is the South West Regional Director of Public Health's priority area for 2025-26.

Dorset could also benefit from learning from other areas in their attempts to solve this same issue – Somerset's proof of concept for lending blood pressure cuffs from libraries (31,32) could be rolled out in Dorset as a low-cost approach to empower those in deprived communities to monitor and report their own blood pressure without needing to use a GP appointment or NHS Health Check. Without this, there is a risk that Dorset's current offer of Blood Pressure @Home may increase health inequalities.

Finally, there is a need for engagement with members of communities who are not attending NHS Health Checks when invited, or are otherwise less likely to engage with local health services. Genuine listening to these communities, and coproduction of communications and systems that are more accessible to them is likely to increase trust in services, service access, and ultimately cardiovascular health in these underserved groups. Further health literacy training for clinicians and those involved in service planning is also likely to improve accessibility of these services and confidence in carrying out coproduction work.

The most notable limitation in this analysis is an inability to calculate reliable rates by ethnic group due to small numbers. The resulting lack of evidence in this report should not be mistaken for evidence that there is no issue of increased CVD risk or reduced access to health services for

minoritised ethnic groups. National evidence does suggest increased rates for South Asian and Black communities (50), and therefore continued efforts to target these groups are likely to be beneficial in reducing health inequalities.

Recommendations

1. Improve targeting, coverage and quality of NHS Health Checks

1a. Improved targeting of NHS Health Checks towards those living in more deprived areas

NHS Health Checks have the potential to widen health inequalities if not properly targeted to those in the most deprived areas. All providers of NHS Health Checks need to actively target their checks at those living in the most deprived areas. Community engagement and health literacy to improve accessibility of services will be key to achieving this (see recommendation 2 and the resource toolkit accompanying this HNA). In order to check achievement against this goal, it would be valuable if deprivation charts on the Dorset NHS Health Checks dashboard were age standardised.

Insights on how to improve uptake in those less likely to attend could also be gained from looking at lists of non-responders. Sarah Long, who is responsible for NHS Health Checks in Public Health Dorset is willing to work with GP surgeries or PCNs who would like to improve their uptake by looking at non-attender lists (sarah.long@dorsetcouncil.gov.uk).

Suggested actions:

- Dorset ICB to increase health literacy training for clinicians and decision makers
- PCNs and Dorset ICB to increase co-production work to identify barriers to access, and enact learnings from previous work to understand barriers to access
- PCNs or practices wishing to understand non-responders to contact Sarah Long
- Public Health Dorset or Dorset ICB to age standardise health checks data by IMD to provide a better understanding of success at targeting more deprived areas

1b. Increased coverage of GP provided NHS Health Checks

NHS Health Checks should be accessible to everyone in the Dorset ICB population who is eligible for one. Dorset should aim for every GP surgery to be signed up to offer NHS Health Checks. Dorset PCNs, Dorset ICB and Public Health Dorset will need to work with practices to address the barriers they face in this.

Suggested actions:

- Dorset ICB and Public Health Dorset to work together to identify and address barriers to GP NHS Health Check delivery, which could include improved incentives

1c. Ensuring quality of NHS Health Checks

In order to maximise benefit from the NHS Health Checks that are carried out, GP practices should ensure they are carrying them out using best practice. This includes:

- Use of the locally recommended invitation letters which have been written with health literacy in mind, which are sent out with the NHS Health Checks Service Specification.
- Use of point of care cholesterol testing that enables the whole NHS Health Check to be completed in one appointment rather than needing a follow-up appointment.
- Including a clear communication of risk to the patient during the appointment based on measurements and questionnaire answers.
- Ensuring measurements that indicate increased risk are followed up appropriately.

For more resources on clinical management of CVD risk factors, see the resource toolkit accompanying this HNA.

Suggested actions:

- GP practices to ensure they are delivering NHS health checks using best practice
- Public Health Dorset to provide assurance on this

2. Community engagement and health literacy training

To remove the specific barriers that underserved communities face when accessing our services in Dorset, including NHS Health Checks, clinicians and decision makers need to speak to individuals from these communities to find out what these barriers are.

Health literacy training can build skills and confidence in engaging with communities and enacting change. Dorset has an active health literacy training community with an ongoing community of practice (25). Training in Health Literacy gives clinicians and decision-makers skills in how to design systems and communication that are most likely to be accessible for the public. Paul Iggulden can be contacted for information on planned and bespoke health literacy training (paul.iggulden@dorsetcouncil.gov.uk). For more resources on community engagement and co-production, see the resource toolkit accompanying this HNA.

Suggested actions:

- PCNs and Dorset ICB to increase health literacy training for clinicians and decision makers
- Public Health Dorset to actively reach out to offer health literacy training to clinicians

3. Implement library-lent blood pressure cuffs.

A low cost and effective intervention to empower those from more deprived areas to monitor their own blood pressure would be to stock libraries with BP cuffs for lending. Without this, Dorset's current Blood Pressure @Home scheme has the potential to increase health inequalities. Somerset Council has already demonstrated that BP cuff lending is effective in reaching more deprived communities (32). Monitors could be lent alongside a leaflet about Blood Pressure @Home, to enable borrowers to directly report their measurements to their GP. LiveWell Dorset already has contact with libraries across Dorset and could lead on the implementation of this. For more information on how this was implemented in Somerset, see the resource toolkit accompanying this HNA.

Suggested actions:

- LiveWell Dorset to scope out implementation of library lent BP cuffs, integrated with the existing LiveWell Dorset offer

4. Targeting smoking cessation efforts towards routine and manual workers

This group appears to show an uptick in smoking rates. Pre-existing smoking cessation efforts coordinated by Public Health Dorset and LiveWell Dorset need to actively target individuals in working in routine and manual roles to reverse this trend. This may involve innovative solutions, such as running smoking cessation events in community hubs frequented by target groups such as cafes, restaurants, pubs, hairdressers/barbers, etc.

Suggested actions:

- LiveWell Dorset to scope out new approaches for targeting deprived areas and routine and manual workers, which might include applying for new funding for innovative approaches

5. Tackling wider determinants of CVD

All local system partners have a role in tackling the wider determinants of CVD. Approaches to this will be varied and will depend on the roles of the organisation involved. For example, efforts to improve air quality, community nutrition programmes such as the Friendly Food Club, antiracism strategies and housing improvements are all likely to improve CVD outcomes for our local communities.

Suggested actions:

- All system partners to consider what role they might have to play in reducing CVD, and to implement activities that improve inequities relating to CVD

6. Further investigations into high local rate of elective interventions

Although much reduced from earlier rates, Dorset ICB might wish to further investigate the reasons behind the continuing high rates of elective cardiac interventions to ensure best use of resources.

Suggested actions:

- Dorset ICB to consider investigating continuing relatively high rates of cardiac intervantions

Note: Public Health Dorset is currently disaggregating into two public health teams within Dorset Council and BCP Council respectively, effective from 1st April 2025. Recommendations referencing Public Health Dorset should be considered by each new public health team post-disaggregation. LiveWell Dorset will remain a shared service between both councils post-disaggregation.

Conclusion

People living in the most deprived areas of Dorset are having their lives cut short by cardiovascular disease. CVD disproportionately impacts residents in the most deprived areas of Dorset, as evidenced by higher rates of emergency interventions and mortality. These inequities stem from a combination of increased exposure to risk factors and reduced access to early detection and treatment in primary care. While overall CVD mortality rates in Dorset are low, the growing disparity in health outcomes demands immediate action.

A comprehensive strategy is essential, integrating prevention, early detection, and treatment services with targeted efforts to address health inequities. Improving the reach and quality of GP NHS Health Checks while engaging with communities to improve the health literacy of these checks could amplify the health benefit of this pre-existing approach for target communities. Innovations such library-lent blood pressure monitors demonstrate the potential for low-cost, high-impact solutions. Concurrently, tackling wider social determinants of health, including smoking cessation and air pollution reduction, will create sustainable improvements in CVD outcomes. By prioritising these initiatives, Dorset can achieve more equitable and effective cardiovascular care, reducing preventable morbidity and mortality across the region.

Acknowledgements

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References

1. Global Burden of Disease. GBD Compare 2021 [Available from: https://vizhub.healthdata.org/gbd-compare/. Date accessed: 16/01/2025]
2. CVDPREVENT. Data & Improvement Tool [Available from: https://www.cvdprevent.nhs.uk/. Date accessed: 16/01/2025]
3. Poulter N. Global risk of cardiovascular disease. *Heart*. 2003;89 Suppl 2(Suppl 2):ii2-5; discussion ii35-7. 10.1136/heart.89.suppl_2.ii2
4. Critchley JA, Capewell S. Prospective Cohort Studies of Coronary Heart Disease in the UK: A Systematic Review of Past, Present and Planned Studies. *European journal of cardiovascular prevention and rehabilitation*. 2003;10(2):111-9. 10.1177/174182670301000206
5. Montone RA, Camilli M, Calvieri C*, et al.* Exposome in ischaemic heart disease: beyond traditional risk factors. *European Heart Journal*. 2024;45(6):419-38. 10.1093/eurheartj/ehae001
6. Bhatnagar A. Environmental Determinants of Cardiovascular Disease. *Circulation Research*. 2017;121(2):162-80. 10.1161/CIRCRESAHA.117.306458
7. Liu X-X, Ma X-L, Huang W-Z*, et al.* Green space and cardiovascular disease: A systematic review with meta-analysis. *Environmental Pollution*. 2022;301:118990. https://doi.org/10.1016/j.envpol.2022.118990
8. Powell-Wiley TM, Baumer Y, Baah FO*, et al.* Social Determinants of Cardiovascular Disease. *Circ Res*. 2022;130(5):782-99. 10.1161/circresaha.121.319811
9. Padda I, Fabian D, Farid M*, et al.* Social determinants of health and its impact on cardiovascular disease in underserved populations: A critical review. *Current Problems in Cardiology*. 2024;49(3):102373. https://doi.org/10.1016/j.cpcardiol.2024.102373
10. Mannoh I, Hussien M, Commodore-Mensah Y, Michos ED. Impact of social determinants of health on cardiovascular disease prevention. *Current Opinion in Cardiology*. 2021;36(5).
11. Garcia-Rios A, Ordovas JM, Lopez-Miranda J, Perez-Martinez P. New diet trials and cardiovascular risk. *Curr Opin Cardiol*. 2018;33(4):423-8. 10.1097/hco.0000000000000523
12. Arps K, Pallazola VA, Cardoso R*, et al.* Clinician's Guide to the Updated ABCs of Cardiovascular Disease Prevention: A Review Part 2. *Am J Med*. 2019;132(7):e599-e609. 10.1016/j.amjmed.2019.01.031
13. UCLPartners. Size of the Prize – Helping the NHS to Prevent Heart Attacks and Strokes at Scale [Available from: https://uclpartners.com/project/size-of-the-prize-for-preventing-heart-attacks-and-strokes-at-scale/. Date accessed: 16/01/2025]
14. Feigin VL, Norrving B, Wiebers DO. Approaches to Prevention of Cardiovascular Disease. *JAMA*. 2015;314(21):2306-. 10.1001/jama.2015.13088
15. Chaturvedi A, Zhu A, Gadela NV, Prabhakaran D, Jafar TH. Social Determinants of Health and Disparities in Hypertension and Cardiovascular Diseases. *Hypertension*. 2024;81(3):387-99. 10.1161/hypertensionaha.123.21354
16. Laranjo L, Lanas F, Sun MC*, et al.* World Heart Federation Roadmap for Secondary Prevention of Cardiovascular Disease: 2023 Update. *Glob Heart*. 2024;19(1):8. 10.5334/gh.1278
17. Davies G, Akbari A, Bailey R*, et al.* Cardiac interventions in Wales: A comparison of benefits between NHS Wales specialties. *PLOS ONE*. 2024;19(2):e0297049. 10.1371/journal.pone.0297049
18. Mistry H, Enderby J, Court R*, et al.* Determining optimal strategies for primary prevention of cardiovascular disease: systematic review of cost-effectiveness analyses in the United Kingdom. *Health Technol Assess*. 2022. 10.3310/qovk6659
19. Barton P, Andronis L, Briggs A, McPherson K, Capewell S. Effectiveness and cost effectiveness of cardiovascular disease prevention in whole populations: modelling study. *BMJ*. 2011;343:d4044. 10.1136/bmj.d4044
20. Vincent C, Fenge L-A, Porter S, Holland S. Exploring Whether and How People Experiencing High Deprivation Access Diagnostic Services: A Qualitative Systematic Review. *Health Expectations*. 2024;27(4):e14142. https://doi.org/10.1111/hex.14142

21. OurDorset. We did not ask, but we are now! 2024 [Available from: https://ourdorset.org.uk/inequalities/did-not-attend/. Date accessed: 15/01/2024]
22. Goyder EC, Blank L, Ellis E*, et al.* Reducing inequalities in access to health care: developing a toolkit through action research. *Quality and Safety in Health Care*. 2005;14(5):336. 10.1136/qshc.2005.013821
23. Goddard M. Access to health care services--an English policy perspective. *Health Econ Policy Law*. 2009;4(Pt 2):195-208. 10.1017/s174413310900485x
24. NHS England. Enabling people to make informed health decisions [Available from: https://www.england.nhs.uk/personalisedcare/health-literacy/. Date accessed: 16/01/2025]
25. OurDorset. Introducing health literacy in Dorset [Available from: https://ourdorset.org.uk/inequalities/health-literacy/. Date accessed: 16/01/2025]
26. OurDorset. An overview of our health literacy training programme in Public Health Dorset. [Available from: https://ourdorset.org.uk/inequalities/health-literacy/hl-programme/. Date accessed: 16/01/2025]
27. NHS England. Home blood pressure monitoring [Available from: https://www.england.nhs.uk/ourwork/clinical-policy/cvd/home-blood-pressure-monitoring/. Date accessed: 15/01/2025]
28. Kario K. Home Blood Pressure Monitoring: Current Status and New Developments. *Am J Hypertens*. 2021;34(8):783-94. 10.1093/ajh/hpab017
29. Rydland HT. Monitoring the social gradient: Inequalities in use of blood pressure monitors in the HUNT study. *Technology in Society*. 2020;63:101336. https://doi.org/10.1016/j.techsoc.2020.101336
30. Deshpande I, Kanwar A, Swyers K, Garza A, Litten K. Improving Access to Home Blood Pressure Monitors at a Federally Qualified Health Center. *J Pharm Technol*. 2023;39(2):75-81. 10.1177/87551225231156741
31. Somerset Council. Blood Pressure Monitoring Kit – free loans [Available from: https://www.somerset.gov.uk/libraries/blood-pressure-monitoring-kit-free-loans/#:~:text=longer%2C%20healthier%20lives.-,The%20blood%20pressure%20monitor%20kits,at%20home%20over%20this%20period. Date accessed: 16/01/2025]
32. Dr Orla Dunn Consultant in Public Health Somerset Council. Somerset Blood Pressure Monitoring Kit Loan Scheme Evaluation. 2023.
33. Suh HS, Song HJ, Choi JE*, et al.* Drug-eluting stents versus bare-metal stents in acute myocardial infarction: A systematic review and meta-analysis. *International Journal of Technology Assessment in Health Care*. 2011;27(1):11-22. 10.1017/S0266462310001340
34. Spadaccio C, Benedetto U. Coronary artery bypass grafting (CABG) vs. percutaneous coronary intervention (PCI) in the treatment of multivessel coronary disease: quo vadis? -a review of the evidences on coronary artery disease. *Ann Cardiothorac Surg*. 2018;7(4):506-15. 10.21037/acs.2018.05.17
35. World Health Organisation. What are the WHO Air quality guidelines? 2021 [Available from: https://www.who.int/news-room/feature-stories/detail/what-are-the-who-air-quality-guidelines. Date accessed: 18/08/2023]
36. UK AIR D. UK Air Quality Limits [Available from: https://uk-air.defra.gov.uk/air-pollution/uk-limits. Date accessed: 17/01/2025]
37. BCP Council. Air quality in Bournemouth, Christchurch and Poole [Available from: https://www.bcpcouncil.gov.uk/environment/air-quality/air-quality-in-bournemouth-christchurch-and-poole. Date accessed: 17/01/2025]
38. Dorset Council. Air quality [Available from: https://www.dorsetcouncil.gov.uk/w/air-quality. Date accessed: 17/01/2025]

39. Yang Y, Ruan Z, Wang X*, et al.* Short-term and long-term exposures to fine particulate matter constituents and health: A systematic review and meta-analysis. *Environmental Pollution*. 2019;247:874-82. https://doi.org/10.1016/j.envpol.2018.12.060
40. Fairburn J, Schüle SA, Dreger S, Karla Hilz L, Bolte G. Social Inequalities in Exposure to Ambient Air Pollution: A Systematic Review in the WHO European Region. *International Journal of Environmental Research and Public Health*. 2019;16(17):3127.
41. UK National Atmospheric Emissions Inventory. UK Emissions Interactive Map [Available from: https://naei.energysecurity.gov.uk/emissionsapp/. Date accessed: 17/01/2025]
42. Office for National Statistics (ONS). ONS letter to the Office for Statistics Regulation about the Annual Population Survey: 9 October 2024 2024 [Available from: https://www.ons.gov.uk/news/statementsandletters/onslettertotheofficeforstatisticsregulationabouttheannualpopulationsurvey9october2024. Date accessed: 23/01/2025]
43. LiveWell Dorset. Swap 2 Stop; Stop smoking, start vaping 2024 [Available from: https://www.livewelldorset.co.uk/swap-2-stop/.
44. Sheikhattari P, Apata J, Kamangar F*, et al.* Examining Smoking Cessation in a Community-Based Versus Clinic-Based Intervention Using Community-Based Participatory Research. *Journal of Community Health*. 2016;41(6):1146-52. 10.1007/s10900-016-0264-9
45. NHS England. NHS Health Check [Available from: https://www.nhs.uk/conditions/nhs-health-check/. Date accessed: 15/01/2025]
46. LiveWell Dorset. FREE NHS HEALTH CHECKS IN YOUR COMMUNITY [Available from: https://www.livewelldorset.co.uk/healthcare-professionals/nhs-health-checks/. Date accessed: 15/01/2025]
47. Capewell S, Graham H. Will cardiovascular disease prevention widen health inequalities? *PLoS medicine*. 2010;7(8):e1000320.
48. CIPFA. Nearest Neighbours Model (England) 2025 [Available from: https://www.cipfa.org/services/cipfastats/nearest-neighbour-model. Date accessed: 09/01/2025]
49. CVDPREVENT. CVDPREVENT Deep Dive: inequalities in cholesterol management by sex for patients with CVD. 2024.
50. Ho FK, Gray SR, Welsh P*, et al.* Ethnic differences in cardiovascular risk: examining differential exposure and susceptibility to risk factors. *BMC Medicine*. 2022;20(1):149. 10.1186/s12916-022-02337-w
51. CVDPREVENT. CVDPREVENT ANNUAL AUDIT REPORT 2024. 2024.
52. Robson J, Garriga C, Coupland C, Hippisley-Cox J. NHS Health Checks: an observational study of equity and outcomes 2009–2017. *British Journal of General Practice*. 2021;71(710):e701. 10.3399/BJGP.2020.1021
53. NICE. NICE guideline [NG136]: Hypertension in adults: diagnosis and management 2023 [Available from: https://www.nice.org.uk/guidance/ng136/chapter/Recommendations. Date accessed: 20/12/2024]
54. NICE. NICE guideline [NG238]: Cardiovascular disease: risk assessment and reduction, including lipid modification 2023 [Available from: https://www.nice.org.uk/guidance/ng238. Date accessed: 20/12/2024]
55. NICE. NICE guideline [NG185]: Acute coronary syndromes 2020 [Available from: https://www.nice.org.uk/guidance/ng185. Date accessed: 20/12/2024]
56. NICE. Drug-eluting stents for the treatment of coronary artery disease: Technology appraisal guidance TA152 2020 [Available from: https://www.nice.org.uk/guidance/ta152. Date accessed: 20/12/2024]
57. NICE. Guidance on the use of coronary artery stents: Technology appraisal guidance TA71 2020 [Available from: https://www.nice.org.uk/guidance/ta71. Date accessed: 20/12/2024]

Appendix 1: Full list of OPCS-4 codes

Code	Description
K40	Saphenous vein graft replacement of coronary artery
K41	Other autograft replacement of coronary artery
K42	Allograft replacement of coronary artery
K43	Prosthetic replacement of coronary artery
K44	Other replacement of coronary artery
K45	Connection of thoracic artery to coronary artery
K46	Other bypass of coronary artery
K471	Endarterectomy of coronary artery
K483	Open angioplasty of coronary artery
K49	Transluminal balloon angioplasty of coronary artery
K50	Other therapeutic transluminal operations on coronary artery
K75	Percutaneous transluminal balloon angioplasty and insertion of stent into coronary artery

Appendix 2: Detailed NHS Health Check data for Dorset

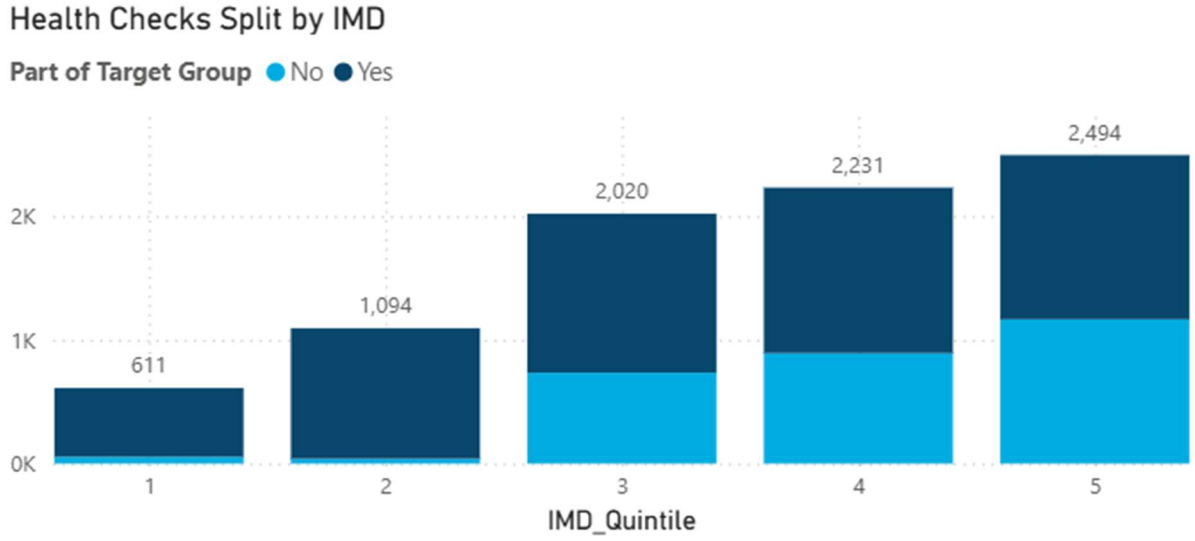

*Figure 21: NHS Health Checks carried out by **GPs** in Dorset between 19th December 2023 and 19th December 2024 by area deprivation level of recipient. Quintile 1 is the most deprived, and 5 is the least deprived. Source: Public Health Dorset NHS Health Checks Dashboard.*

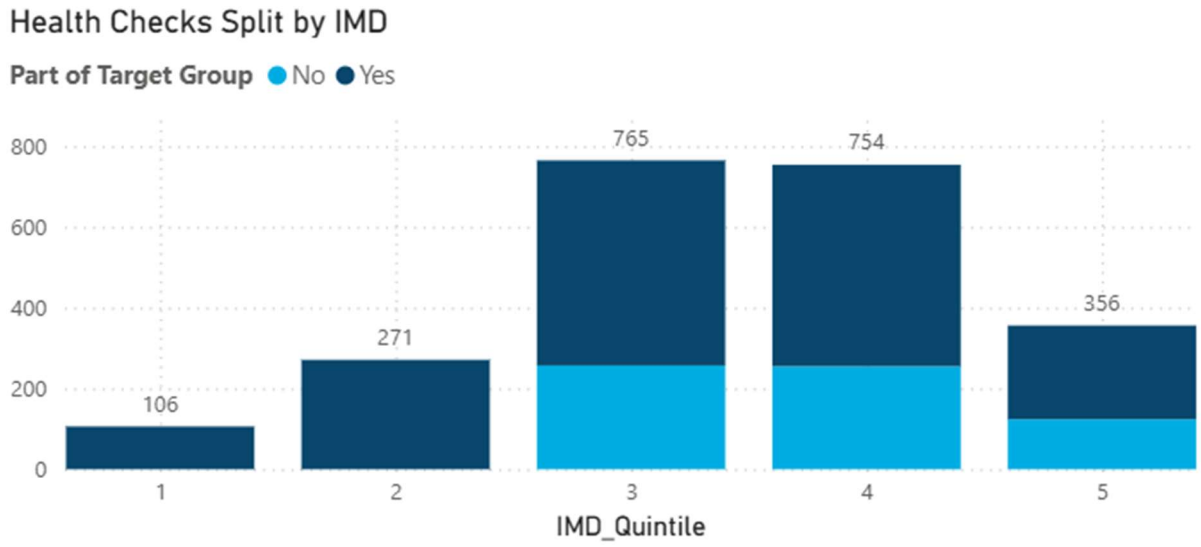

*Figure 22: NHS Health Checks carried out by **LiveWell Dorset** between 19th December 2023 and 19th December 2024 by area deprivation level of recipient. Quintile 1 is the most deprived, and 5 is the least deprived. Source: Public Health Dorset NHS Health Checks Dashboard.*

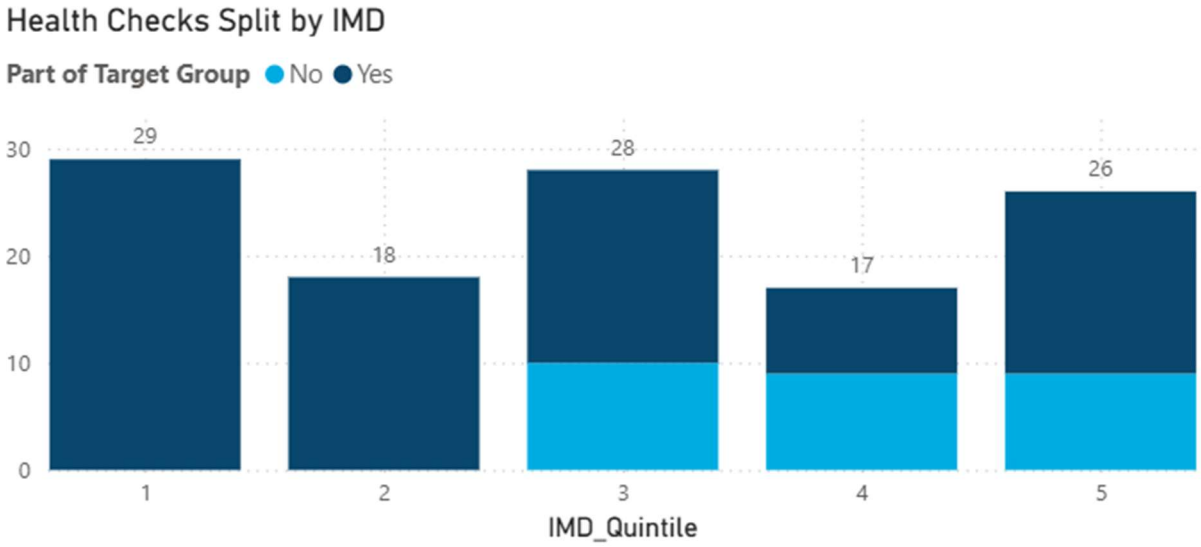

*Figure 23: NHS Health Checks carried out by **pharmacies** between 19th December 2023 and 19th December 2024 by area deprivation level of recipient. Quintile 1 is the most deprived, and 5 is the least deprived. Source: Public Health Dorset NHS Health Checks Dashboard.*

Appendix 3: Overall CVD mortality rates in Dorset

Mortality rate from cardiovascular disease, all ages (Persons) 2022

Directly standardised rate - per 100,000

Area	Recent Trend	Count	Value	95% Lower CI	95% Upper CI
England	–	131,278	236.2	235.0	237.5
South West NHS Region	–	15,190	221.4	217.9	225.0
NHS Cornwall and the Isles of Scilly Integrated Care Board - QT6	–	1,823	246.1	234.9	257.7
NHS Somerset Integrated Care Board - QSL	–	1,702	224.8	214.2	235.9
NHS Bath and North East Somerset, Swindon and Wiltshire Integrated Care Board - QOX	–	2,254	221.9	212.8	231.2
NHS Gloucestershire Integrated Care Board - QR1	–	1,635	217.6	207.2	228.4
NHS Devon Integrated Care Board - QJK	–	3,432	217.6	210.3	225.0
NHS Bristol, North Somerset and South Gloucestershire Integrated Care Board - QUY	–	1,978	217.2	207.7	227.0
NHS Dorset Integrated Care Board - QVV	–	2,366	212.6	204.0	221.4

Figure 24: Overall CVD mortality rates in Dorset. Source: OHID Fingertips.

Appendix 4: Supplementary charts on cardiac interventions in residents of Dorset ICB

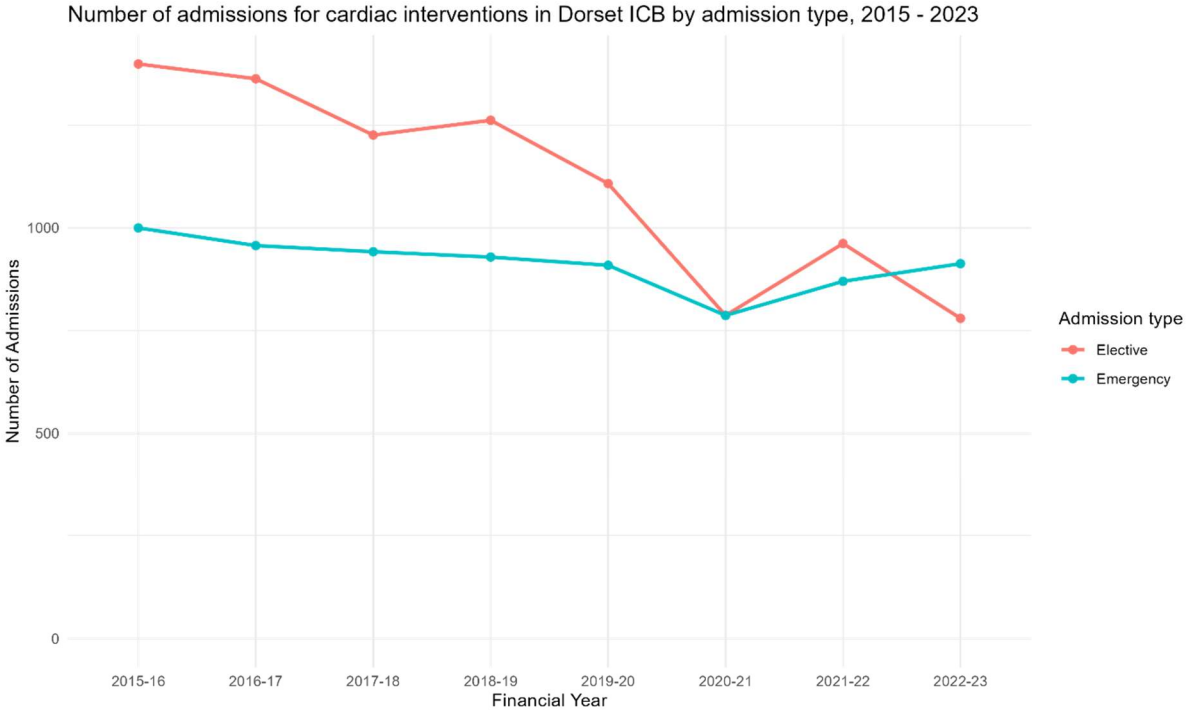

Figure 25: Raw numbers of admissions for cardiac interventions in residents of Dorset ICB footprint by admission type.

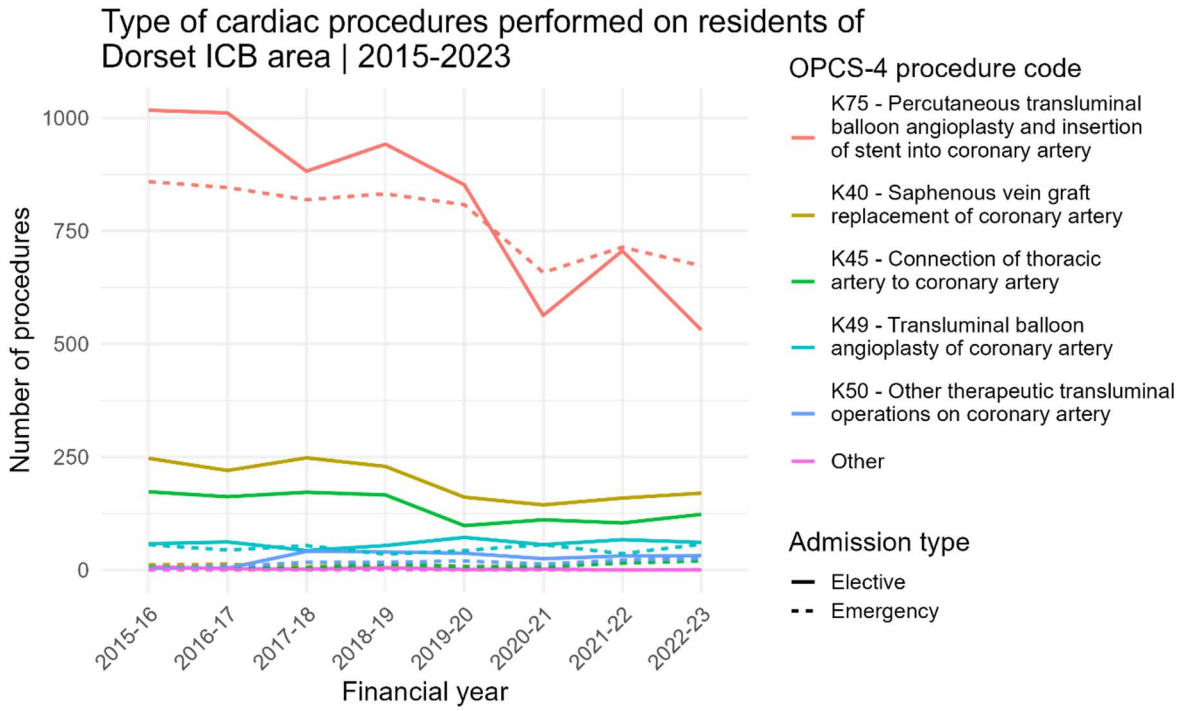

Figure 26: Numbers of admissions for cardiac interventions in residents of Dorset ICB footprint by admission type and procedure code.

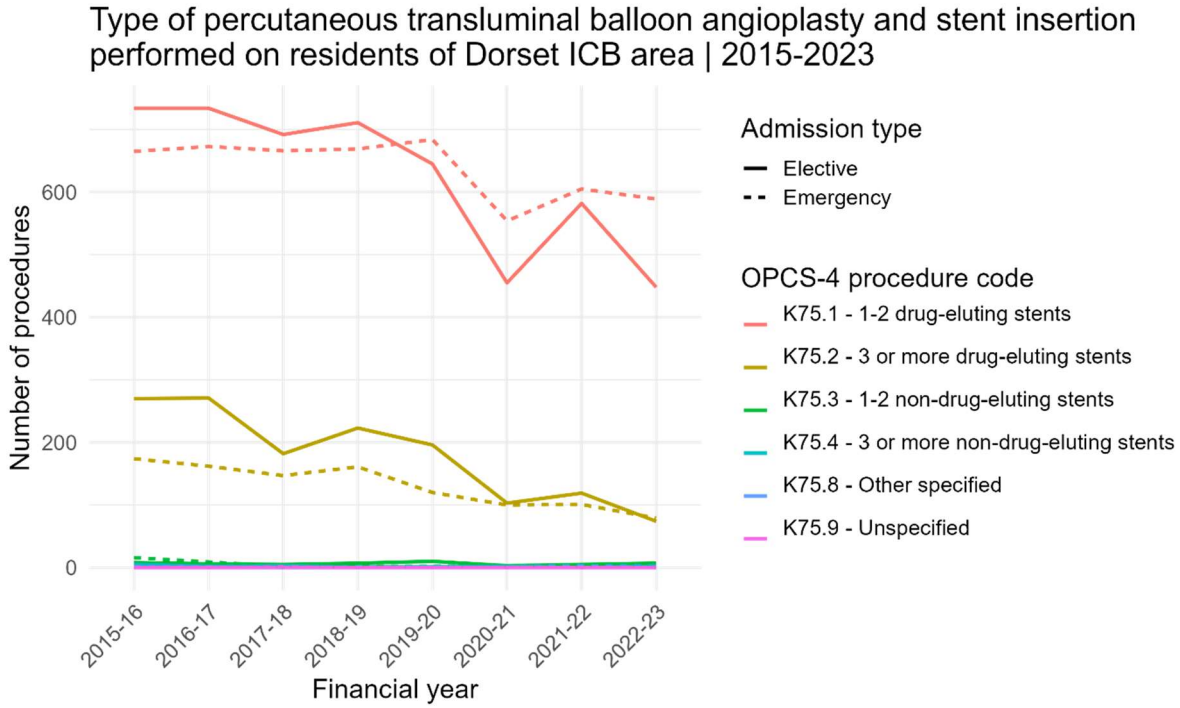

Figure 27: Numbers of admissions for balloon angioplasty and stent in residents of Dorset ICB footprint by admission type and specific procedure code.

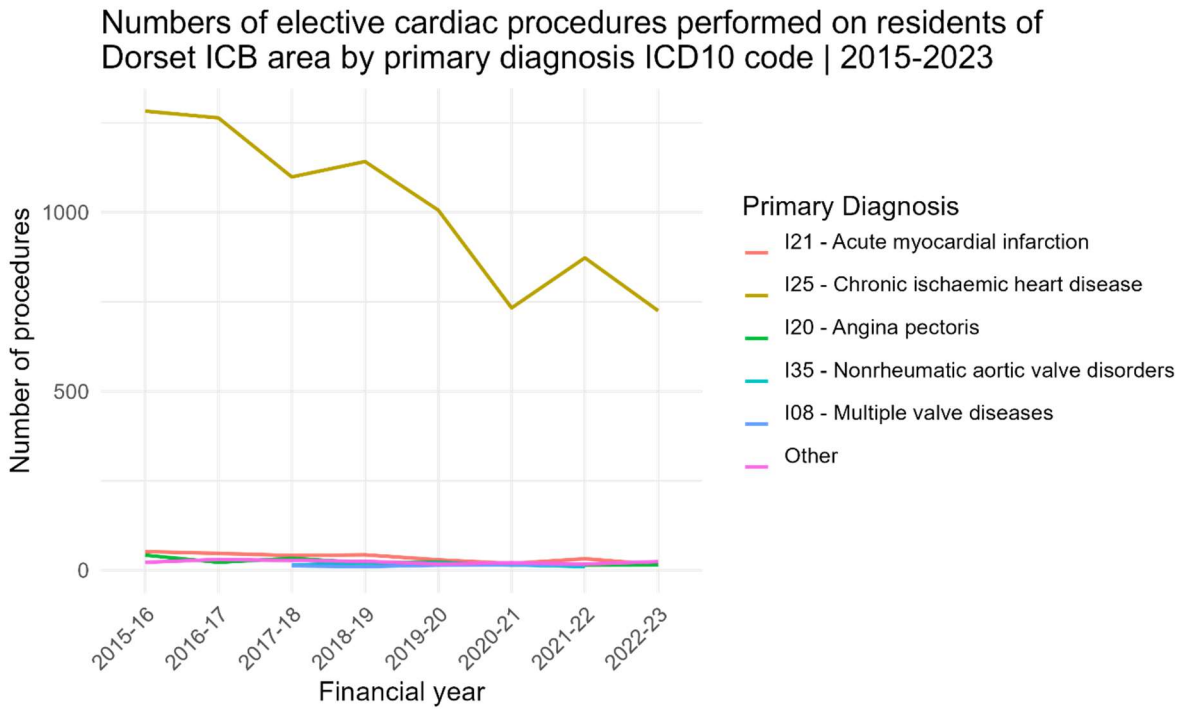

Figure 28: Numbers of admissions for elective procedures performed on residents of Dorset ICB footprint by primary diagnosis code.

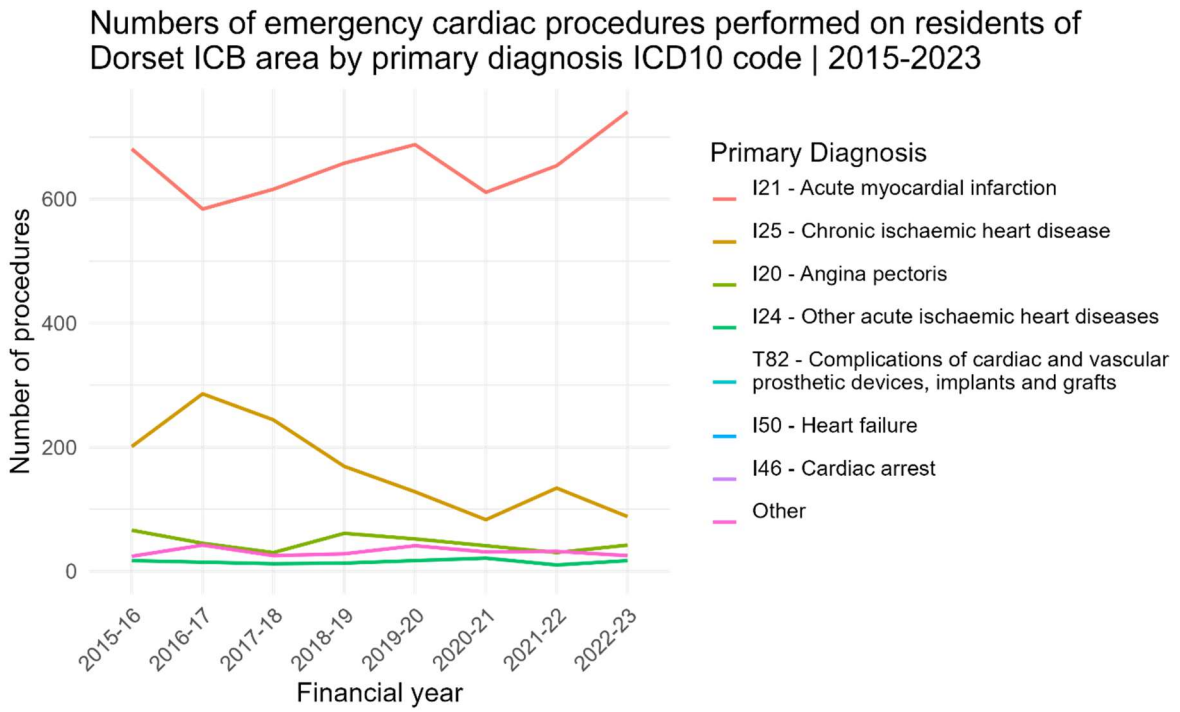

Figure 29: Numbers of admissions for emergency procedures performed on residents of Dorset ICB footprint by primary diagnosis code.

Figure 30: Rate of cardiac interventions by PCN of patient and admission type

Appendix 5: NICE Guidelines on Cardiovascular Disease Prevention and Management

Hypertension Diagnosis and Management (NG136) (53)

NICE NG136 focuses on the detection and management of hypertension. Accurate blood pressure measurement forms the foundation of these recommendations. As this guideline is focussed on clinical decision-making, if does not address approaches to increased case finding in underserved populations in primary care, but rather focuses on how to identify and treat a patient with suspected hypertension once they are in the surgery. NICE recommends accurate blood pressure measurement using ambulatory (ABPM) or home monitoring (HBPM) to confirm diagnoses. Hypertension is defined as clinic readings of 140/90 mmHg or higher, corroborated by ABPM or HBPM averages of 135/85 mmHg or more. Patients with stage 1 hypertension and a 10-year cardiovascular risk of 10% or more are offered antihypertensive therapy. First-line treatments include ACE inhibitors or ARBs for younger individuals and calcium-channel blockers for older adults or those of African or Caribbean descent. Lifestyle interventions, including salt reduction, weight management, and physical activity, complement pharmacological treatments. Target blood pressures vary by age but aim for optimal control to reduce cardiovascular risk.

Cardiovascular Risk Assessment and Lipid Management (NG238) (54)

To prevent CVD in individuals without prior diagnoses, NG238 emphasises systematic risk assessment using tools like QRISK3. Patients with a 10-year CVD risk of 10% or more are prioritised for intervention. Lifestyle modifications, including dietary changes, regular exercise, smoking cessation, and alcohol reduction, are foundational in risk reduction. Statin therapy is recommended for primary prevention, with atorvastatin 20 mg daily for high-risk individuals and higher doses for those with established CVD. Monitoring involves assessing adherence to therapy and targeting a reduction in non-HDL cholesterol of over 40%. The guideline also advises against routine aspirin use for primary prevention due to bleeding risks.

Acute Coronary Syndromes (NG185) (55)

For managing acute coronary syndromes, including ST-elevation myocardial infarction (STEMI) and non-ST-elevation myocardial infarction (NSTEMI), early intervention is emphasised. Patients with suspected STEMI should be promptly assessed for reperfusion therapy, with primary percutaneous coronary intervention (PCI) preferred if achievable within 120 minutes. For NSTEMI, dual antiplatelet therapy, such as aspirin with a P2Y12 inhibitor, is recommended alongside risk stratification and early coronary angiography. Secondary prevention strategies involve antiplatelet therapy, beta-blockers, ACE inhibitors, and statins. Lifestyle advice and cardiac rehabilitation are essential components of recovery, focusing on dietary changes, physical activity, and smoking cessation.

Use of Coronary Stents (TA152 and TA71) (56,57)

Guidance on coronary artery stents addresses both bare-metal stents (BMS) and drug-eluting stents (DES). NICE TA152 recommends DES for PCI in patients with arteries smaller than 3 mm in diameter or lesions longer than 15 mm, provided the cost difference does not exceed £300. This ensures that clinical benefits are achieved without compromising economic efficiency. For unstable angina and acute myocardial infarction, DES use aligns with broader guidelines on acute coronary syndromes. TA71 supports the use of coronary stents in appropriately selected patients, highlighting their role in reducing restenosis rates and improving outcomes in individuals undergoing PCI.