Developing the Public Health Observatory for Wales
Datblygu Arsyllfa Iechyd y Cyhoedd i Gymru

Equity in the provision of coronary angiography and revascularisation in Wales

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Acknowledgements:
Thanks to Gareth Davies, Tracy Price, Margaret Webber (NPHS) for providing additional analysis and quality assurance.
The authors are also grateful to Tim Hughes and Gareth John (Health Solutions Wales) for providing extracts of NHSAR and PEDW data.

CONTENTS

Summary

The NPHS has a memorandum of understanding with the Welsh Cardiac Networks, which includes the supply of intelligence on the epidemiology of coronary heart disease (CHD), risk factors and the provision of care. Previous regional profiles (NPHS 2007) raised questions regarding variation across Wales in the provision of angiography and revascularisation.

Therefore, the aim of this report was to investigate rates of angiography and revascularisation in relation to need, across geographical areas and levels of socioeconomic deprivation in Wales, to enable the evaluation of equity in the provision of these procedures.

The setting chosen was all Wales residents aged 35 to 74, with data analysed separately for males and females. The period under study varied according to the indicator: trends by socioeconomic deprivation were based on data from 1992 to 2006, whereas analyses by geographical area of residence were based on data from 2002 to 2006 (for Upper Super Output Areas) and 2004-06 (Local Authority areas).

An ecological study design was employed, analysing premature mortality and hospital activity data at three different levels: Local Authority, Upper Super Output Area and deprivation fifth. To create the deprivation groups, the population of Wales was split into five groups of non-contiguous Lower Super Output Areas according to Census 2001 Townsend deprivation score, ranging from 'least deprived' (group 1) to 'most deprived' (group 5). Age-standardised rates of premature CHD mortality, emergency CHD admissions, angiography and revascularisation were then calculated for each area and deprivation group, with trends over time also examined in the latter. Angiography and revascularisation rates were visually compared with rates of need, using mortality and emergency admissions as proxy measures of the capacity to benefit from these procedures. Finally, age-standardised rates of angiography per 100 emergency admissions were calculated as a more direct measure of horizontal equity of utilisation, with trends over time being examined in the deprivation groups.

The key results were as follows:

- there are stark differences in rates of angiography and revascularisation across the Wales regions, which appear to be due to NHS Trusts providing varying levels of service. For example, there is a threefold difference between the highest and lowest rates of angiography within Local Authority areas;

- the areas with the highest angiography and revascularisation rates are not those areas with the highest levels of need as measured by premature mortality and emergency admissions, indicating geographical and socioeconomic inequity in the provision of these procedures;

- the signs of inequity decreasing over time in the provision of angiography and revascularisation are generally stronger in females than in males;

- rates of premature CHD mortality have fallen over the period in the most and least deprived groups in all regions, but these falls have been fastest in the least deprived. This has resulted in a general widening of the inequality 'gap' between the most and least deprived. In 2004-06, rates in the most deprived males were around twice as

high as in the least deprived across the Wales regions, with up to a threefold difference in the female groups.

The conclusion of the report is that there are strong indications of geographical and socioeconomic inequity in the provision of coronary angiography and revascularisation across Wales, though there are some signs of improvement over time, especially in females. The report also suggests that inequalities in health are persisting and have increased in recent years.

Awareness-raising and further research in both primary and secondary care are required to further understand the results of this report and their implications for the planning and delivery of services at the local level.

1 Introduction and aim

The National Public Health Service for Wales (NPHS) provides resources, information and advice to enable the Welsh Assembly Government, Health Commission Wales, Local Health Boards (LHBs), Local Authorities and NHS Trusts to discharge their statutory public health functions.

The NPHS has signed a memorandum of understanding with the Welsh Cardiac Networks which sets out the framework within which the NPHS will provide support. This includes the provision of intelligence on the epidemiology of coronary heart disease (CHD), risk factors and the provision of care. Examples of previous work include a series of three regional profiles (NPHS 2007), which provide a range of information on determinants of health, morbidity, mortality and hospital activity.

These profiles raise further questions regarding variation across Wales in the provision of coronary procedures, specifically angiography and revascularisation. There is evidence to suggest that the levels of provision may vary according to Local Authority of residence or socioeconomic deprivation, for example.

Therefore, the aim of this report is to investigate equity in rates of angiography and revascularisation in relation to area of residence and socioeconomic deprivation. For the latter variable, this is undertaken over time, using the period 1992 to 2006, to show recent trends in socioeconomic equity. Although the analyses are carried out for males and females separately, the evaluation of equity across genders is not a key aim of this work.

The remainder of this introductory section provides background and definitions, including a brief synopsis of the existing evidence, in order to set the analyses in context.

Section 2 outlines the methods used to produce the analyses, including their limitations, with the results being presented in section 3. This includes, at two different levels of geography and by socioeconomic deprivation, rates of CHD mortality, emergency CHD admissions, angiography and revascularisation.

These rates aim to enable the visual comparison of need (as measured by mortality and admissions) with rates of investigation (angiography) and treatment (revascularisation). The final series of analyses produces a more direct measure of utilisation according to need, calculating a rate of angiography per 100 emergency admissions.

The major findings of these analyses are then discussed in section 4. To aid proper interpretation of the results, section 5 provides details of limitations and caveats associated with the methods used. Finally, section 6 presents the conclusions of the report and makes recommendations for further research.

1.1 Coronary heart disease: aetiology and epidemiology

In the 1920s, the standardised mortality ratio for CHD in the UK was approximately four times higher in social class I than in social classes IV and V (Charlton et al 1997). Yet by the 1960s, the highest mortality rates were found in social classes IV and V (Marmot 1992). Such a pattern caused CHD to be termed in earlier years as a 'disease of affluence' (Marmot 2001), and is consistent with its aetiology. The progressive accumulation of plaques in the arteries supplying blood to the heart leads to coronary atherosclerosis, from which a number of conditions arise and come under the overarching term CHD (or alternatively *ischaemic* heart disease). This process requires a number of years to reach clinically significant levels; therefore, as infectious diseases come under control, as occurred in early twentieth century Britain (Charlton & Murphy 1997), the least deprived sections of the population, which are likely to experience the fastest rise in life expectancy, are also the first to experience a heavy burden of CHD.

The progression of atherosclerosis in the coronary arteries can cause angina and potentially lead to myocardial infarction (MI), an acute event which is often fatal and offers the first sign of CHD in approximately 20% of cases (Rose 1991). Overall, CHD is currently the chief cause of premature death in the UK, accounting for approximately 20% and 12% of deaths before the age of 75 in males and females respectively (British Heart Foundation 2006).

The 2007 profiles show that in Wales, CHD mortality rates in males and females aged 35-74 have fallen steadily since 1978, but remain higher than in England (see section 5.2 of these profiles). Considerable variation is also apparent across Local Authority areas within Wales, with high rates of CHD mortality in the socioeconomically deprived South Wales valleys. This is consistent with the pattern demonstrated by the NPHS report Deprivation and Health (NPHS 2004), in which CHD mortality rates are shown to increase in line with increasing socioeconomic deprivation.

1.2 Coronary procedures: angiography and revascularisation

Coronary artery bypass grafting (CABG) and percutaneous transluminal coronary angioplasty (PTCA), which come under the umbrella term of revascularisation, have been shown to be effective treatments for angina (Petticrew et al 1998). The former procedure grafts in blood vessels from elsewhere in the body, bypassing coronary arteries that have become blocked due to atherosclerosis. PTCA, meanwhile, involves guiding a catheter through the groin or arm to the narrowed coronary artery, where a balloon is inflated before leaving a stent in place to widen the artery and restore blood flow.

Coronary angiography is used to ascertain the level of narrowing present in the coronary arteries. Again using a catheter, dye is injected into the coronary arteries, so that the workings of the heart can be examined using X-ray images.

1.3 The concept of equity in healthcare

Whereas the term 'health inequality' is used to refer simply to variation in health across socioeconomic groups, the concept of equity in healthcare is more specifically concerned with injustice, where such variations may constitute "potentially remediable, systematic differences in one or more aspects of health across socially, economically, demographically, or geographically defined population groups" (Macinko & Starfield 2002 p.1). Yet this concept is subject to considerable confusion (Culyer & Wagstaff 1993), with little agreement to be found in its definition or measurement (Waters 2000). Though it is beyond the scope of this report to fully explore this area, two key points must be asserted.

Firstly, a great deal of research purports to study equity of access but in actuality examines equity of utilisation (Goddard & Smith 2001). Whilst the former is purely an issue of supply, concerning the availability of treatment, the latter is the product of the relationship between need, supply and demand. Although equity of access may be the more relevant policy imperative, routine NHS information systems are built to monitor levels of activity rather than supply of care (Majeed et al 1994); equity of utilisation is the more popular goal simply due to the availability of data (Mooney et al 1991). This report therefore predominantly investigates equity of utilisation, by analysing rates of hospital activity, but also makes reference to the availability of hospital services in different locations.

Secondly, equity in healthcare can be viewed in the vertical perspective, where greater amounts of healthcare are directed towards those in greater need, or in the horizontal, where access to or utilisation of healthcare is equal for those in equal need (Starfield 2001). Since the majority of research concerns itself with horizontal equity (Morris et al 2005b), this definition will be used henceforth.

Finally, need will be taken to constitute the capacity to benefit from treatment (Stevens et al 2004). In this report, need is estimated using the proxy measures of mortality and emergency hospital admissions caused by CHD, due to the unavailability of direct measures for the selected period and populations under study. As discussed in section 2.3, it is recognised that the level of service provision in an area may have some impact on these population-level proxy measures, but this impact is likely to be small compared to the influence of other factors.

1.4 Inequity due to socioeconomic deprivation

There is evidence to suggest socioeconomic inequity in the provision of angiography and revascularisation both internationally (Ancona et al 2000, Haglund et al 2004, Hetemaa et al 2003) and in the UK (Ben-Shlomo & Chaturvedi 1995, Hippisley-Cox & Pringle 2000, MacLeod et al 1999, Manson-Siddle & Robinson 1998, Morris et al 2005a, Payne & Saul 1997), including two unpublished studies (Cosh 2008, Lester 2004) which exclusively use Wales data. These studies suggest that at the same level of need, less deprived populations receive a higher rate of treatment than the more deprived. The UK evidence is somewhat mixed, however,

with two studies presenting no evidence of such a pattern (Britton et al 2004, Kee et al 1993) and one offering conflicting results (Black et al 1995).

However, whilst there are Scandinavian studies investigating trends over time, showing socioeconomic equity in the provision of coronary procedures improving in line with increased funding (Haglund et al 2004, Hetemaa et al 2003), there is currently no such evidence available in the UK. This makes it difficult for those responsible for planning and providing coronary procedures to assess the current magnitude of the problem and evaluate the success of interventions aimed at improving socioeconomic equity.

1.5 Inequity due to geographical area of residence and proximity to treatment centre

It has been shown elsewhere that rates of revascularisation vary according to supply factors such as the distance between patients' residences and regional treatment centres (Black et al 1995, Cosh 2008, Lester 2004). This may be caused by differences in healthcare-seeking behaviour in areas further from treatment centres, where people may be less inclined to utilise primary care service; alternatively, such patterns may be the result of lower referral rates from primary care or less inclination amongst patients to travel long distances for investigation.

2 Methods

2.1 Geographical unit of measurement for analysing socioeconomic equity

In this report, which uses an ecological design, the lower level of the Super Output Area statistical geography (LSOAs, see section 2.8) was chosen to analyse socioeconomic equity in hospital utilisation and inequalities in CHD mortality. The relative social homogeneity of LSOAs enables a more accurate estimate of socioeconomic deprivation to be made than would be the case with electoral divisions (wards), for example, which can vary greatly in internal social characteristics.

Choosing small areas with greater social homogeneity is therefore intended to reduce the effects of the ecological fallacy. This term refers to the misclassification that can occur where individuals are assigned a level of exposure according to their area of residence which does not match their individual circumstances. For example, a resident who would be described individually as less deprived might be classified by the area measure as more deprived than the Wales average.

A further problem with the ecological design is that it takes no account of migration, since an area's level of exposure to socioeconomic deprivation is assigned to outcomes whether the individual has lived in the area for a 30 days or 30 years. The effect of such error on this study is difficult to quantify, though it has been shown that the relationship between socioeconomic deprivation and health may be exaggerated by the prevailing trend of healthy migrants leaving more deprived areas, which then appear more unhealthy, for less deprived areas, which then conversely appear more healthy (Norman et al 2005).

2.2 Measurement of socioeconomic deprivation and creation of deprivation fifths

The Townsend Index of Deprivation (Townsend et al 1988) was chosen to measure exposure. Firstly, this was available at the selected geography, having been recently calculated for LSOAs in Wales using unadjusted 2001 census data (Gartner 2008). Secondly, whilst other measures of socioeconomic deprivation were encountered within the literature, for example the Carstairs index (Carstairs & Morris 1989), the Townsend Index was found to be often used in ecological studies. It has also been shown to correlate well with health outcomes (Morris & Carstairs 1991). The Welsh Index of Multiple Deprivation was considered as a measure of socioeconomic deprivation, but its first iteration was produced in 2005, which is less applicable to the period under study, 1992-2006, than the 2001 census-based Townsend Index.

Four variables from the census are used to calculate the index: overcrowding, car ownership, housing tenure and employment status of economically active residents. The resulting score is on a ratio scale, where zero denotes the average level of deprivation; LSOAs achieving positive scores are judged to be more deprived than

average, with negative scores indicating the reverse. It should be noted that the Townsend Index can only be used to measure relative deprivation; as a result, the term 'less deprived', rather than 'affluent', is used to describe negative scores.

Where the outcome of interest is rare, LSOAs tend not to have sufficient populations for use as individual units of measurement. For example, there are around 6,000 deaths per year in Wales with an underlying cause of coronary heart disease, which are spread across 1,896 LSOAs. As a result the number of deaths in a single LSOA will be small, giving rise to large random variation and wide confidence intervals.

Therefore, in this report, LSOAs were ranked by Townsend score, with four cut-points then being inserted to create five similarly-sized groups ('fifths') at different levels of socioeconomic deprivation. These five groups of non-contiguous LSOAs provide robust populations in which mortality and hospital procedures can be counted. The fifths are labelled from one, the least deprived, to five, the most deprived. A map showing the deprivation fifths is included in section 3.1.

Analyses utilising the five deprivation groups are carried out by region. This acknowledges that the relationship between deprivation and utilisation of services may vary according to geographical factors, for example if there are differences across NHS Trusts in historical commissioning patterns. Each LSOA retains the deprivation grouping assigned on an all-Wales basis, rather than splitting up the LSOAs within each region into five groups. This offers greater comparability of deprived groups within different regions.

The use of a single year's measurement of socioeconomic deprivation from the 2001 census is an acknowledged weakness of this report. It is difficult to estimate the effect on results, since the demographic characteristics of some areas are likely to have changed more than others. However, it seems unlikely that relative deprivation would change rapidly over time; Rowan (2007) used a similar design to study cancer mortality and found that the majority of electoral wards in Wales would have stayed in the same fifth when comparing 1991 and 2001 Carstairs scores.

The Townsend index itself is also known to give systematically different results in urban and rural areas, since car ownership is more likely to be an imperative in the latter regions (Christie & Fone 2003) and multiple occupancy housing similarly so in the former. The precise effect on the results is difficult to quantify without more in-depth research at the individual level.

2.3 Measurement of need for cardiac investigation & treatment

In order to assess equity in the provision of cardiac investigation (angiography) and treatment (revascularisation), it is necessary to estimate the need for such procedures within different populations. This estimation of need can then be compared with the relative rate of investigation and treatment in different populations, to evaluate whether rates exceed or are not commensurate with need.

There are different methods identified within the literature regarding the measurement of need; whilst it is widely acknowledged that direct methods are most effective, for example individual-level surveys, resources do not usually allow such measurement, particularly in population-level studies. Therefore, the most common methods are indirect, using rates of CHD mortality or hospital admissions for CHD as proxy measures of need for cardiac investigation and treatment.

The indirect measurement of need for cardiac investigation and treatment is fraught with difficulty. Across different areas, and across time, there is likely to be variation in the relationship between the prevalence of CHD and outcomes such as mortality or hospital admission. For example, as Charlton et al (1997) comment, it is difficult to distinguish between trends in the incidence of acute CHD events and mortality: are falling mortality rates more attributable to lower incidence or to superior health services and greater longevity?

This report, in using indirect proxy measures of need, therefore makes certain assumptions. Firstly, it is assumed that rates of mortality or hospital admissions reflect the presence of disease in the population, and therefore estimate the population's capacity to benefit from investigation and treatment. Secondly, it is assumed that these proxy measures of need predominantly reflect capacity to benefit *rather than* the outcome of existing levels of investigation and treatment. It may be argued, for example, that an area with low CHD mortality rates is demonstrating the successful outcome of high rates of revascularisation. Whilst this is recognised, it is assumed in this report that i) due to the many factors influencing rates of mortality and emergency admissions, rates of these events are more likely to approximate need for treatment as opposed to the outcome of interventions, and ii) high levels of mortality or emergency admissions alongside low levels of treatment is indicative of inequity, whether or not the low levels of treatment are contributing to the high levels of mortality or admissions. These assumptions are common in the literature concerning similar studies (sections 1.4 and 1.5) but should be noted when interpreting results.

In this report, both premature CHD mortality and emergency admissions with a primary diagnosis of CHD were chosen as proxy measures of need. Admissions on an emergency basis were selected in an attempt to minimise a potential source of bias, where some patients may be more likely to be referred by primary care services for hospital admission than others (MacLeod et al 1999). Furthermore, hospital procedures carried out to investigate and treat CHD would also be categorised most often as an elective admission for CHD, which should not be included in an estimate of need for such procedures. Overall, emergency admissions are thought to "more closely reflect underlying medical need" (Dixon et al 2007).

2.4 Numerator data

It was decided to focus on the resident population of Wales aged under 75, enabling analysis of premature mortality as a proxy measure of need and in acknowledgement of the fact that early coronary interventions are likely to provide the greatest gain in terms of life years. It was also decided to analyse data for males and females separately, due to the variation between genders in inequalities shown by other studies (Ben-Shlomo & Chaturvedi 1995, Romeri et al 2006).

Firstly, deaths within this age group with an underlying cause of CHD were extracted from the ONS Annual District Deaths Extract (see section 2.9), using codes from the International Classification of Diseases version 9 (ICD-9) for years 1992 to 2000, and International Classification of Diseases version 10 (ICD-10) for 2001 to 2006 (see table below).

Codes used to extract mortality and hospital admissions data

Outcome measure	ICD-9	ICD-10	OPCS4
CHD mortality	410 to 414	I20 to I25	n/a
Hospital admissions for CHD*	n/a	I20 to I25	n/a
Angiography†	n/a	n/a	K63-K65
CABG†	n/a	n/a	K40-K48
PTCA†	n/a	n/a	K49-K50, K75

*admission method coded 21 to 28 (emergency)

†where the Finished Consultant Episode linked to the procedure has a primary diagnosis of CHD, ICD-10 codes I20-I25

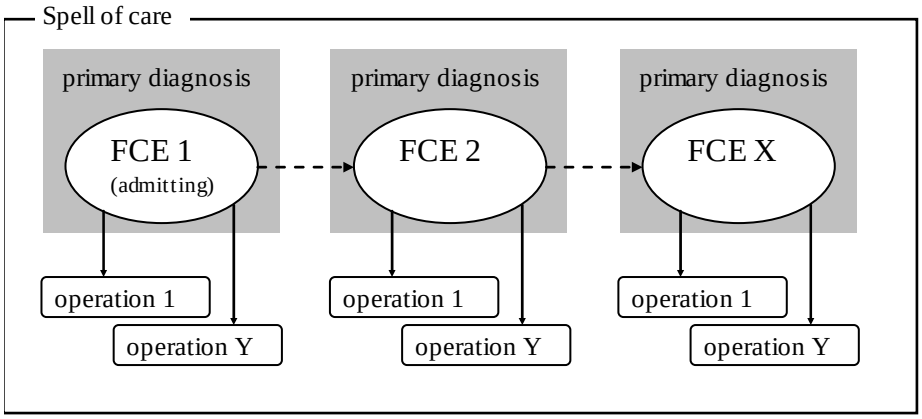
Similarly, hospital activity data were extracted from the Patient Episode Database for Wales (PEDW) (see section 2.9) using the relevant ICD-10 codes (ICD-9 codes had been mapped across in the data extract) and OPCS4 procedure codes. The main units of activity in PEDW are finished consultant episodes (FCEs), which are linked together by HSW to form spells of care; each FCE is allocated a primary diagnosis and may involve associated operations (see figure overleaf).

Emergency hospital admissions for CHD, as a proxy measure of need, were therefore counted as spells of care admitted on an emergency basis with the first FCE having a primary diagnosis of CHD. A weakness of this method is that individual patients may be admitted on multiple occasions within the period. However, the identification of individual patients is only possible for data from 1999 onwards, which does not fully cover the period under study of 1992-2006.

Emergency admission was classified as admission methods 21 to 28. Following investigation, emergency transfers (code 29) were excluded, since it was found that such transfers often took place following emergency admission (codes 21 to 28) and would therefore double-count the proxy measure of need; it was also found that this effect would be greater in some areas of Wales than others.

Angiography and revascularisation were counted as FCEs with a primary diagnosis of CHD in which at least one of the specified procedures took place.

Construction of PEDW



2.5 Denominator data

Two different population denominators were used in rate calculation. Firstly, for 1992-2006 trend analyses by deprivation fifth, the denominator needed to be available at LSOA level, to match the measurement of deprivation at this geography. The Office for National Statistics (ONS) have only produced LSOA population estimates since 2001; therefore, NHS administrative register (NHSAR, section 2.9) data were obtained from Health Solutions Wales (HSW).

For analyses at the level of USOAs and Local Authorities, however, which were for the periods 2002-06 and 2004-06 respectively, ONS mid-year population estimates were utilised (section 2.9).

2.6 Distance to treatment centre

A geographic information system was used to determine the travel time of each LSOA centroid to its closest major provider of angiography and revascularisation. The resulting maps (sections 3.4.2 and 3.5.2) show ‘isochrones’, coloured in varying shades of grey, which signify the groups of LSOAs which fall into different categories of distance to nearest provider.

2.7 Calculation and interpretation of rates and rate ratios

The majority of analyses presented in this report are in the form of rates and rate ratios. It is intended that rates of provision of angiography and revascularisation be compared with rates of outcomes which provide proxies for need, e.g. emergency CHD admissions and premature CHD mortality. In section 3.6, this comparison is made more directly by comparing the rate of angiography per emergency CHD admission in each Local Authority area and deprivation fifth.

It should be noted that these methods can only compare relative need and utilisation (Hanratty et al 2007). It is also recognised that the analysis of trends in rates and rate ratios in this report focusses on the most and least deprived fifths rather than on the pattern across all five groups; this is less effective when there is not a linear relationship between socioeconomic deprivation and the outcome of interest.

This section describes the calculation of rates and rate ratios, providing a guide to interpretation.

2.7.1 Crude rates

A crude rate is simply the total number of events divided by the total number at risk. For example, the crude CHD mortality rate is defined as the number of deaths registered with an underlying cause of CHD in people resident in an area (during a specified time period) divided by the total number of people resident in the same area (during the same specified time period). When taken over a single time period, this is effectively a proportion and hence is a measure of the risk of an event occurring.

Crude rates are given more context by scaling them up to an appropriate population. In the example of CHD mortality, the crude rate is quoted as the number of deaths per 100,000 population. It is therefore possible to calculate the actual number of events in a given population if both the crude event rate and the population at risk are known.

Whereas age-standardised rates have no intrinsic meaning, but are intended to enable the comparison between areas with different age structures, crude rates are used in this report to show the actual level of hospital activity and mortality in Local Authority areas. Such rates cannot be compared across areas, due to the confounding factor of age.

2.7.2 Age standardised rates

Age standardised rates are primarily used to adjust for the potentially confounding factor of age, thus allowing comparisons to be made between areas with different age structures. For example, age-specific rates of death are higher in older people than in younger people; therefore, an area with an older population could be expected to have a higher overall mortality rate than an area with a younger population. This makes it difficult to draw conclusions about their comparative

health status. Directly age standardised rates, however, enable comparisons to be made between areas with different age structures.

An age standardised rate is a comparative statistic which uses the age-specific crude rates of an area, for example a health community, to produce a figure which represents the total number of events that would occur in a standard population if that standard population's age specific crude rates were the same as those of the health community. For example, the European Age Standardised Rate (EASR) for deaths due to CHD in a USOA is the number of deaths that would occur in the standard European population if the age specific crude rates of the European standard population were the same as those of the USOA.

The actual standard population does not matter greatly but rates standardised to different standard populations are in no way comparable. Throughout these analyses the standard European population has been used as this is widely used within Europe and therefore any such analyses here are directly comparable with those produced on an identical basis elsewhere. The standard European population itself is based on the proportion of the total population in the typical European country that fell into each five year age group in around 1970. It no longer reflects the actual proportions in each age group but this is irrelevant as what is of the most importance is its consistent definition and use. It is important to note that the EASR can in no way indicate whether a health community or other geographical entity is better or worse than Europe.

As many health-related events are rare, it is standard practice to present these analyses scaled up to rates per hundred thousand population. This can lead to two problems of misinterpretation.

- Firstly, it is obvious that many areas, particularly at Super Output Area level, have fewer than one hundred thousand residents. This is irrelevant as the scaling to one hundred thousand is performed primarily to present rates for relatively rare events, such as revascularisations, in a more meaningful way.

- Secondly, although the rates are quoted as per hundred thousand it is not possible to calculate the actual number of events in a given population even if both the standardised event rate and the population at risk are known.

In section 3.6 of this report, age-standardised rates of angiography are calculated using emergency CHD admissions as the denominator rather than resident population. This aims to provide a more direct measure of equity. Instead of using the European standard population, this method uses all emergency CHD admissions in Wales over the period 1992-2006 to provide the weightings for standardisation.

2.7.3 Rate ratios

In this report, "rate ratio" refers to the relative measure of the gap between the least and most deprived fifths. This is calculated by dividing the European age-standardised rate of events in the most deprived fifth by that in the least deprived fifth. A ratio of more than one indicates that the event is more common in the most

deprived group. A CHD mortality rate ratio of three, for example, means that the mortality rate is three times higher in the most deprived fifth than in the least deprived fifth.

It should be noted that a relative measure of the inequality gap does not take into account the absolute frequency of the event in question. For example, a rare infectious disease may have an incidence rate of five per million in the most deprived and one per million in the least deprived. Though the rate ratio is five, which is high, the event remains rare and does not necessarily represent an extremely serious concern to public health. Therefore, rate ratios should be interpreted in light of the absolute rates of events over time.

2.7.4 Confidence intervals and statistical significance

Where possible and applicable to do so, rates in sub-Wales areas are compared with the average Wales rate in order to assess whether the difference in the rates is statistically significant. In this context, statistical significance is indicative of whether a difference between the area and Wales is most likely to have been caused by particular (and possibly unknown) factors or is simply a difference that could be reasonably expected due to the play of chance.

Statistical significance has been assigned on the basis of the 95 per cent confidence interval around the standardised relative rate. A standardised relative rate of one signifies no difference, so, where the confidence interval does not include the value of one, it can be said that there is a 95 per cent chance that the difference is statistically significant. Or, put another way, a 95 per cent confidence interval around the standardised relative rate that does not include one would only occur by chance on one occasion in 20.

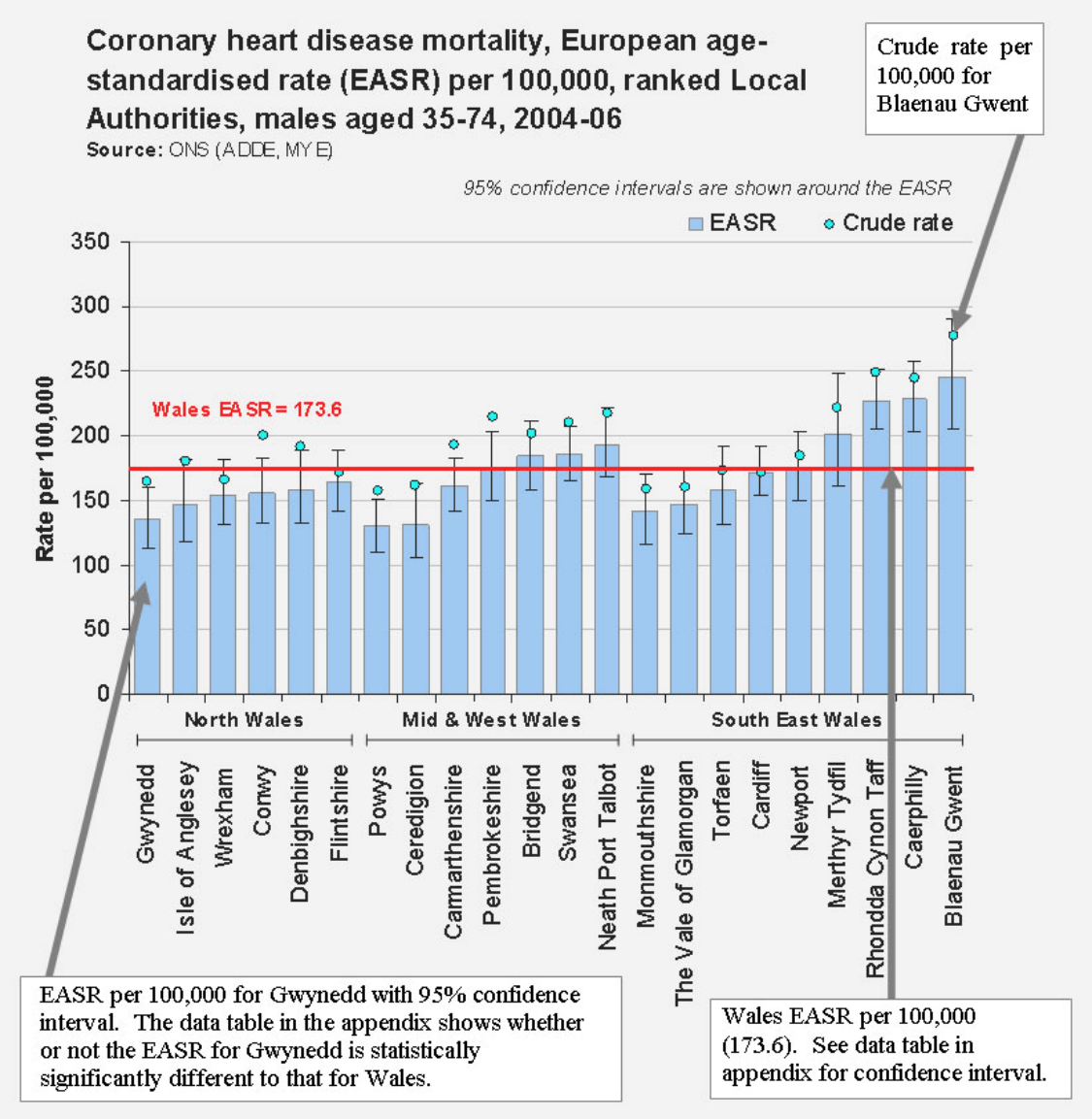
It is important to note that statistical significance should not be confused with clinical significance or, indeed, significance in its wider sense. Not all statistically significant differences are important and, sometimes, differences which are not statistically significant may actually be important. Furthermore, areas with larger populations, such as Cardiff local authority, are more likely to be statistically significantly different from the Wales average than areas with smaller populations, such as Merthyr Tydfil.

2.7.5 Guide to interpretation of charts presenting rates of events

These charts are used throughout the report for to show rates of events, for example deaths or emergency hospital admissions, at the level of Local Authority areas. The figure below is included as a guide to interpretation.

The chart shows three pieces of information:

- the crude rate per 100,000 population for each Local Authority area
- the European age-standardised rate per 100,000 for Wales
- the EASR per 100,000 for each Local Authority area with 95% confidence intervals

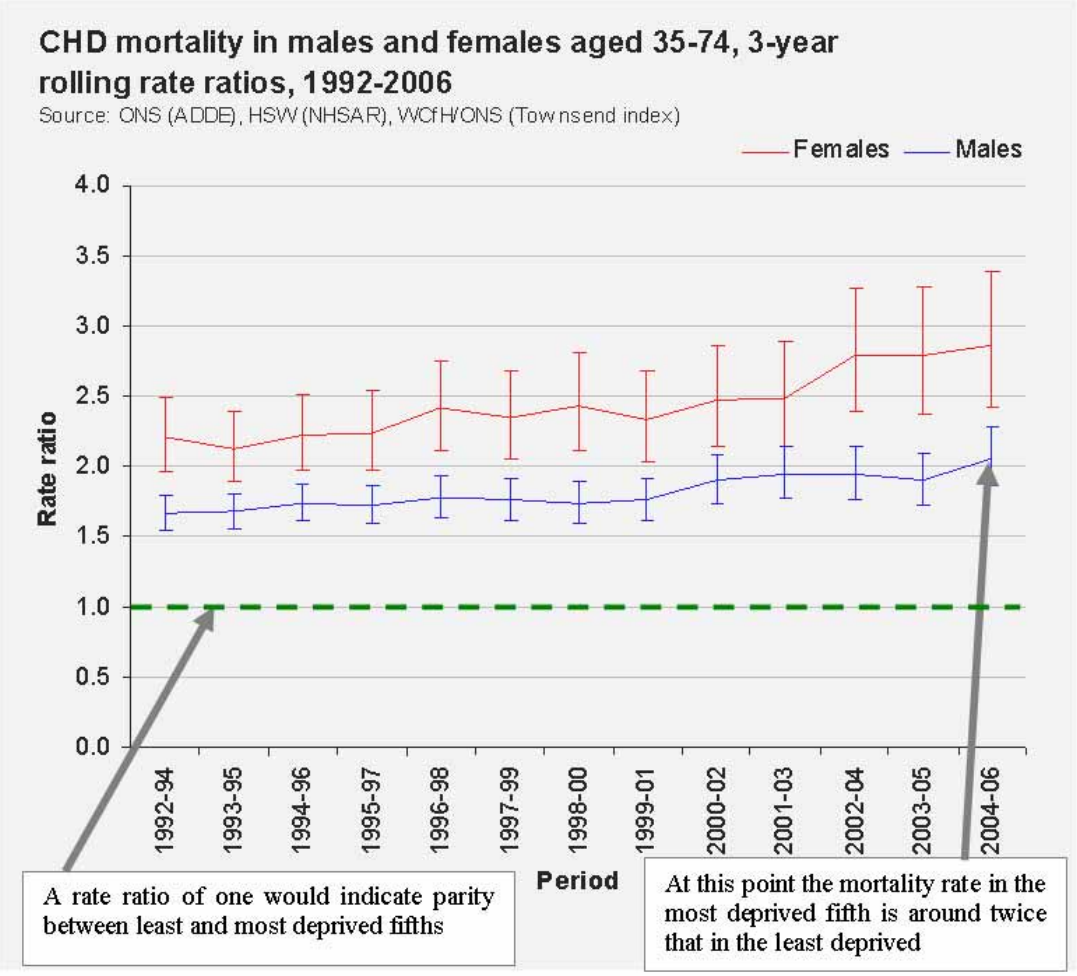


2.7.6 Guide to interpretation of charts presenting rate ratios

The figure below highlights the key information presented by charts showing rate ratios.

All rate ratios in this report refer to the rate in the most deprived fifth expressed as a ratio of the corresponding rate in the least deprived fifth. In order to calculate this ratio, the rate in the most deprived fifth is simply divided by the rate in the least deprived fifth. A rate ratio of one therefore signifies no difference between the two rates; a rate ratio of two means that the rate in the most deprived fifth is twice that of the least deprived fifth; a rate ratio of 0.5 indicates that the rate in the most deprived fifth is half that of the least deprived fifth.

A high rate ratio may or may not be desirable depending upon the context. For example, a rate ratio close to one for CHD mortality would be desirable, indicating a similar mortality rate in the most and least deprived groups (equality). However, if the rate ratio for CHD mortality in a particular group is 2.5, a rate ratio of 1 for angiography would be undesirable as it would suggest, quite strongly, that the relative supply of angiography is not sufficient to match the relative need for this investigation (as defined by the proxy measure of CHD mortality) at the population level, or, in other words, that there is not equity of provision.



2.8 Geographies used in this report

Three different levels of geography have been used in this report: Local Authority (LA), Lower Super Output Area (LSOA) and Upper Super Output Area (USOA). These are described in greater detail within this section.

- **Local authority**

  There are 22 Local Authorities in Wales, which at the time of writing are coterminous with the 22 Local Health Boards (LHBs). NHS reforms are currently underway which will abolish the internal health market in Wales and create seven new Local Health Boards in 2009.

- **LSOA and USOA**

  In order to overcome some of the problems associated with analysing data at the level of electoral divisions, for example changing boundaries and heterogeneity in population size, the Office for National Statistics (ONS) has created a geographic hierarchy for England and Wales called Super Output Areas (SOAs).

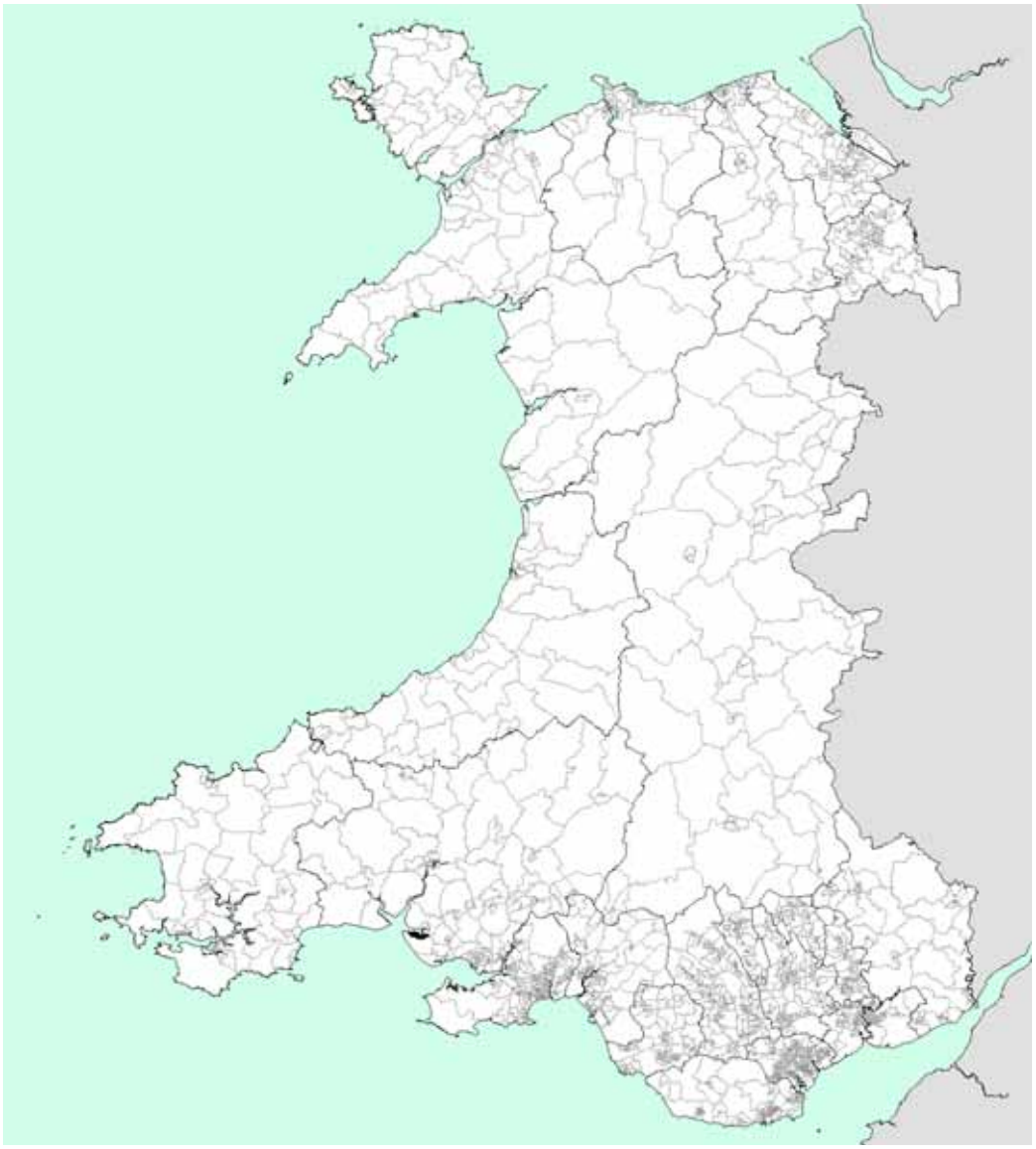
  The base units for the reporting of Census data are output areas, of which there are 9,000 in Wales. These output areas are grouped to form three levels of SOA: lower, middle and upper. The ONS has stated that SOAs will be fixed for at least 10 years. As a result, the advantage of using these new statistical geographies is both stability and homogeneity. However, the main drawback is that they do not relate to local democracy and are less easy to relate to local communities.

  In this report, the lower level of this geography (LSOAs) is used to investigate health inequalities and socioeconomic equity in hospital utilisation using the Townsend Index of Deprivation (see section 2.2). Upper Super Output Areas (USOAs) are also utilised in this report to present rates of events at a sub-Local Authority level.

  Maps showing the boundaries of LSOAs and USOAs, alongside further details of these geographies, are shown on the two following pages.

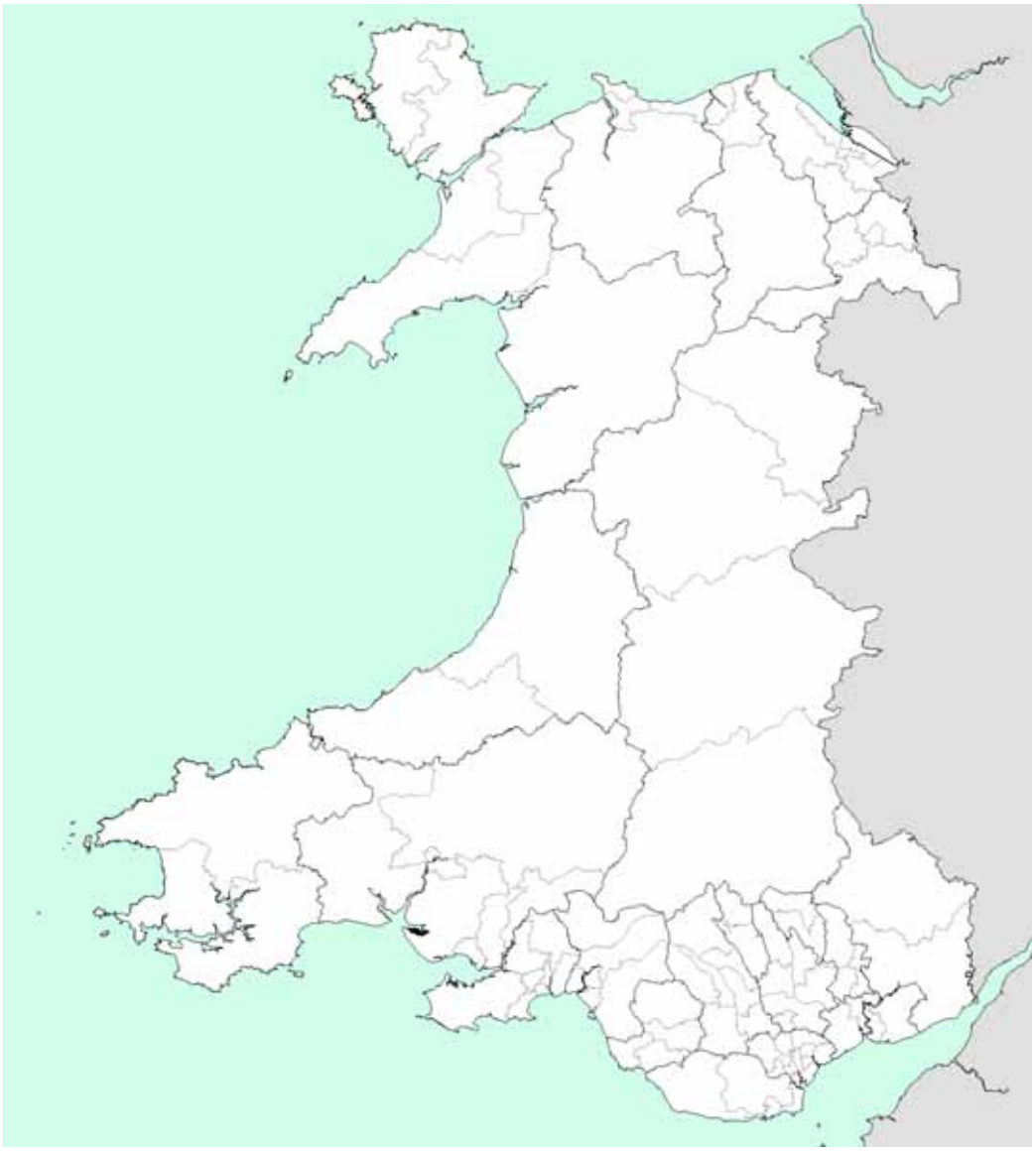
Lower Super Output Areas (LSOAs)

- Released in 2004 by ONS
- Total of 1896 in Wales, mean population 1500, minimum 1000 (approximate figures)
- Constrained by the boundaries of standard table electoral divisions used for 2001 Census outputs
- Take into account social homogeneity



Upper Super Output Areas (USOAs)

- Released in 2008, following development by the Local Government Data Unit in consultation with all Local Authorities in Wales
- Not released as yet in England or Scotland
- Total of 94 in Wales, mean population 30,000, minimum 25,000 (approximate figures)
- Constrained by Local Authority boundaries



2.9 Data sources

Several data sources have been used to produce the analyses within this report:

Census 2001

The Census is a survey of all persons in the UK and is carried out every 10 years. The most recent Census was carried out in April 2001. The Census covers a range of topics and is the most comprehensive source of information on UK citizens. Census data have been used to derive the Townsend index of socioeconomic deprivation (see section 2.2 for details).

Office for National Statistics Annual District Deaths Extract

This report presents data from the Annual District Death Extract (ADDE). The ADDE is supplied to the NPHS by the Office for National Statistics (ONS) on an annual basis, and is based on details from the medical certificate of cause of death and other relevant particulars supplied by informants (usually relatives) to local Registrars. The process of death registration in England and Wales is very complex and governed by a variety of laws.

The analysis of mortality trends can be complicated by the switchover from version 9 to version 10 of the International Classification of Diseases in 2001, which is known to have had more impact on some causes of death than others. To enable the quantification of this impact for a particular cause of death, the ONS has published comparability ratios; for CHD, the ratios are 1.007 for females and 1.005 for males (Office for National Statistics 2002), signifying a negligible difference between ICD-9 and ICD-10 in the number of deaths coded as having an underlying cause of CHD. As a result, comparability ratios have not been applied to the analyses presented in this report.

The registration of deaths is mandatory in the UK, leading to a high level of completeness in the record, though there is known to be variation in the assigning of underlying cause on death certification (Office for National Statistics 2005).

Office for National Statistics mid-year estimates of population

Population denominators for rate calculation at the level of Local Authorities and USOAs were sourced from ONS mid-year estimates (MYEs) of the resident population. These annual estimates are Census-based, taking into account births, deaths and estimated migration.

At the all-Wales and Local Authority level, MYEs are a well-established National Statistics product. At Super Output Area level, however, MYEs are produced by the Small Area Population Estimates (SAPE) project. This project, set up by ONS in 2000, has since produced MYEs for 2001 onwards, which are classed as experimental statistics. This means that the methods used are under evaluation and that the ONS is seeking to involve users in their development on an ongoing basis.

National Health Service Administrative Register

As described above, small area population estimates have only been produced by ONS from 2001 onwards; therefore, in order to examine trends in rates from 1992, an alternative population denominator was required. As a result, the NHSAR was chosen to provide population data at LSOA level for the trend analyses by deprivation fifth, 1992-2006.

The NHSAR is managed by HSW and is a record of all patients registered with a General Practitioner in Wales. Its advantage, therefore, is that it represents a count of actual people rather than an estimate of the population. However, it is vulnerable to error, for example due to delay in the updating of records following death or change of address. For example, patients may either fail to register with a GP during a temporary period of residence, or neglect to inform the GP when leaving the area. These issues are known to affect data particularly in areas with a large proportion of students in higher education, or where the population is more transient for other reasons.

Patient Episode Database for Wales

Hospital activity data presented within this report were extracted from PEDW. This database is managed by HSW and provides an electronic record of all inpatient and daycase activity for Wales residents, whether treated in NHS hospitals in Wales or elsewhere, as well as for all patients treated in NHS Trusts in Wales. Records within PEDW are based on finished episodes of care under a particular consultant in one health care provider (FCEs). Multiple FCEs may occur within one hospital provider spell (or stay in hospital). See section 2.4 for further details.

Epidemiological analysis of PEDW data using either FCEs or provider spells as the currency has, in the past, been problematic. This is because there is variation in the way provider spells and episodes are recorded across NHS trusts. More recently these problems have been overcome with the ability to conduct analysis based either on patients or superspells (continuous periods of hospital care irrespective of the provider of care). Unfortunately these new techniques are only available for hospital activity since 1999. As a result, since this report analyses trends since 1992, FCEs are the currency used to measure the utilisation of coronary procedures (see section 2.4 for further details).

The coding of hospital activity, is known to vary in completeness and accuracy, across both time and NHS Trusts (Campbell et al 2001). However, this should have little effect on this study, since there is no reason to suspect any systematic difference in practice across levels of socioeconomic deprivation.

PEDW does not incorporate data from private healthcare providers. Given that such providers are more likely to be utilised by the least deprived sections of the population, the addition of this data would be likely further to exaggerate any pattern of inequity shown, as stated elsewhere (Ben-Shlomo & Chaturvedi 1995, Payne & Saul 1997). The overall effect, however, is likely to be minimal.

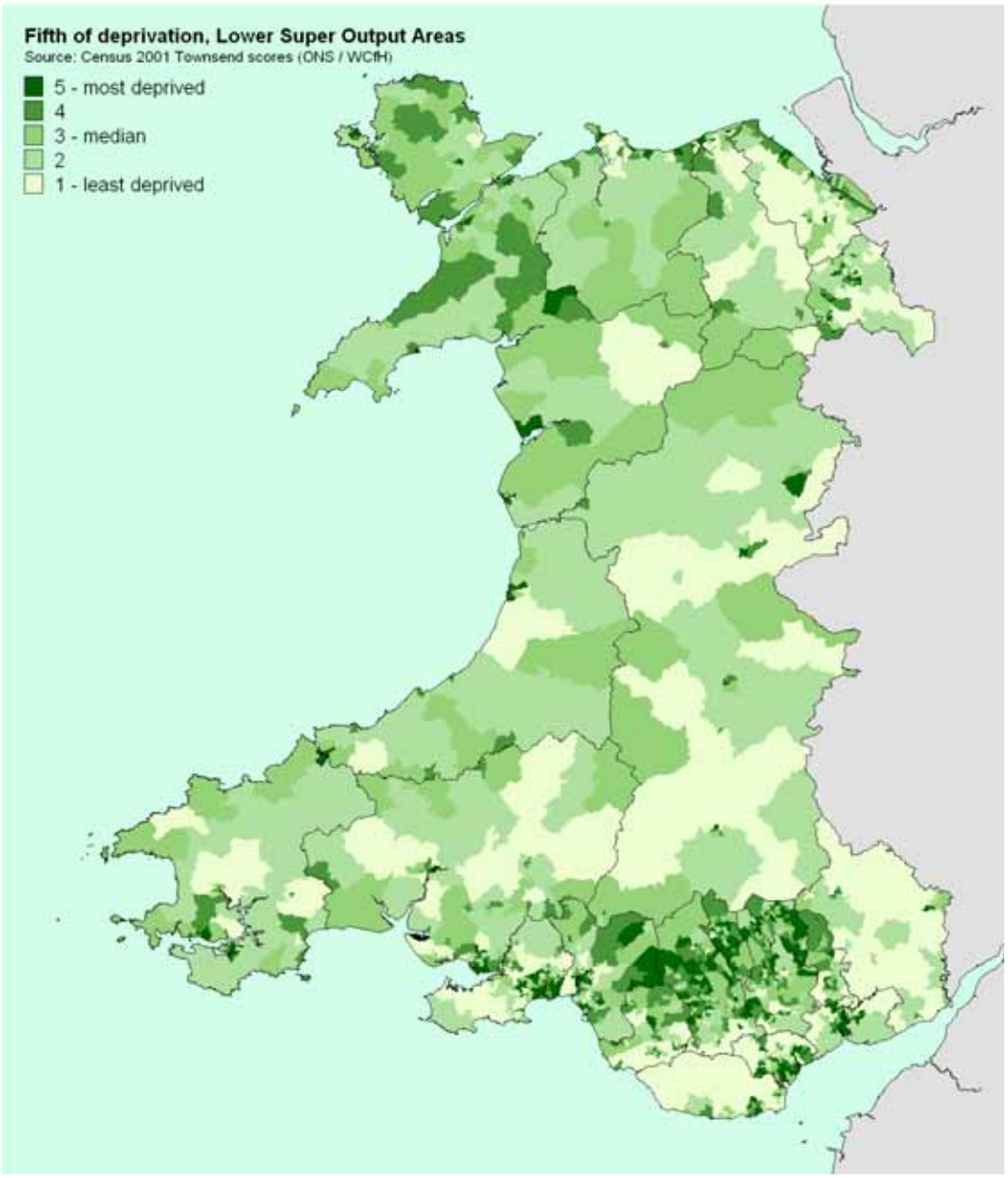
3 Results

The demography of Local Authority areas is described in detail in the profiles previously produced for the Cardiac Networks (NPHS 2007) and is therefore not repeated in this report. Selected characteristics of the deprivation fifths, however, are included in section 3.1, with subsequent sections showing rates of mortality, emergency admissions, angiography and revascularisation for the areas and groups under investigation.

3.1 Demographic characteristics of deprivation fifths

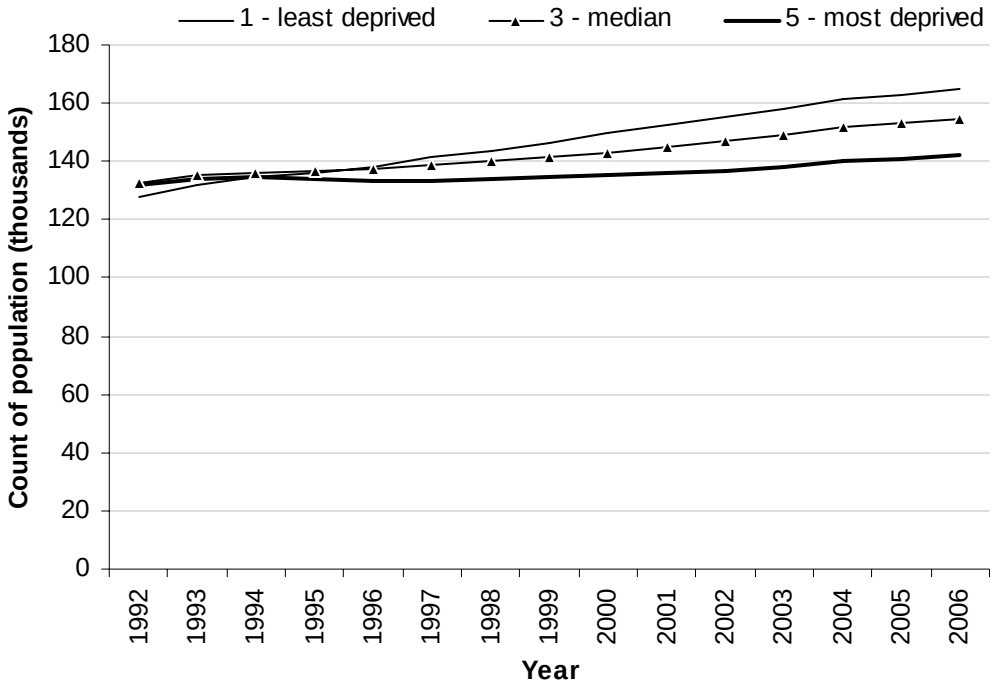
LSOAs falling into the most deprived fifth are concentrated in the South Wales valleys and in the densely-populated urban areas of Wrexham, Cardiff, Swansea and Newport (see map overleaf). Comparatively rural areas of Mid & West Wales, in addition to the Vale of Glamorgan and Monmouthshire, are relatively less deprived.

Within the age range of interest, the population has grown considerably over the time period in the least deprived and median fifths of deprivation, with the most deprived population rising comparatively slowly in males and remaining fairly static in females (see charts on page 29). The population pyramids on page 30 show that this growth in the least deprived group is particularly marked in 50-74 year-olds.



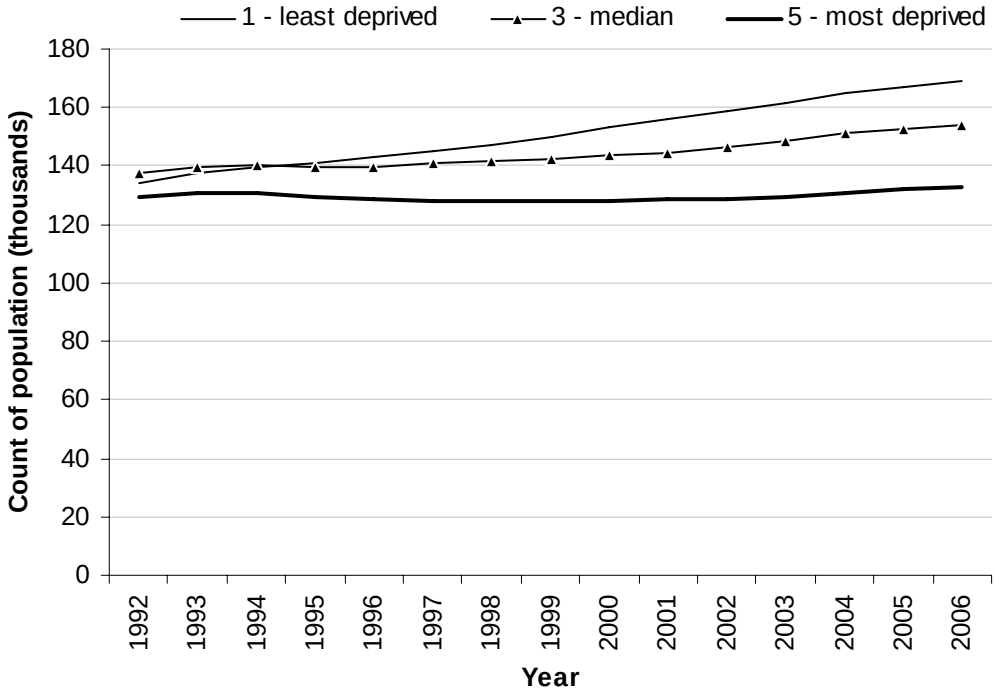
Population trend, males aged 35 -74, 1992-2006, by fifth of deprivation

Source: HSW (NHSAR), WCfH / ONS (Townsend index)



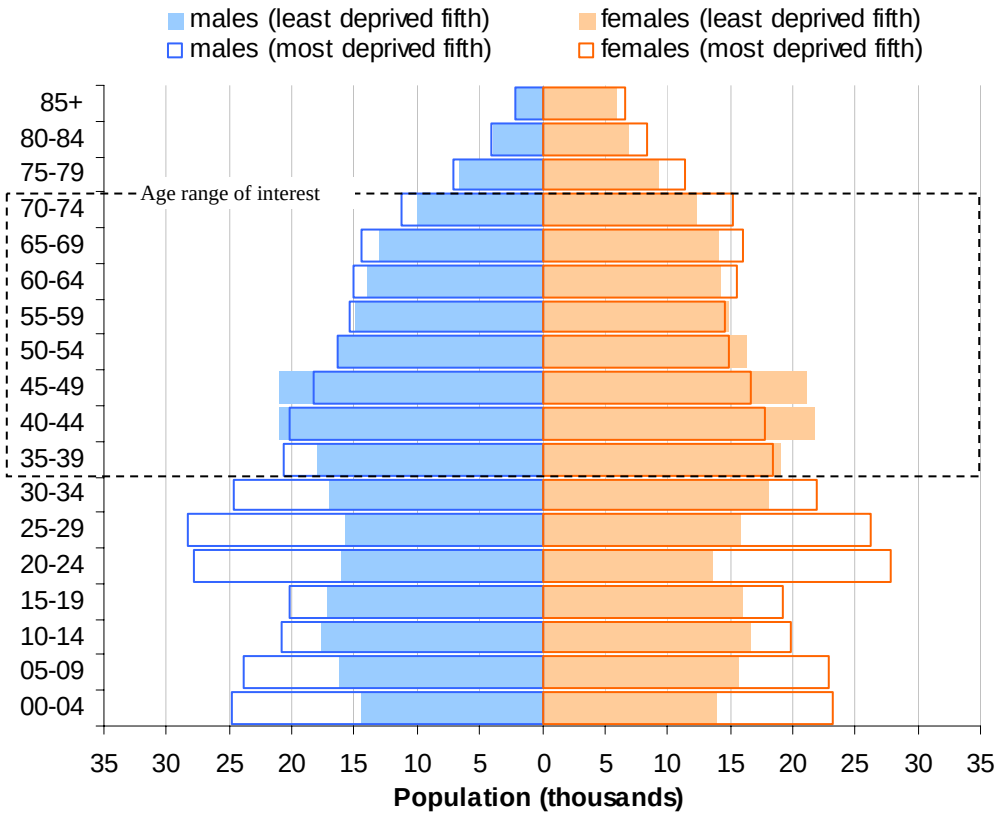
Population trend, females aged 35 -74, 1992-2006, by fifth of deprivation

Source: HSW (NHSAR), WCfH / ONS (Townsend index)



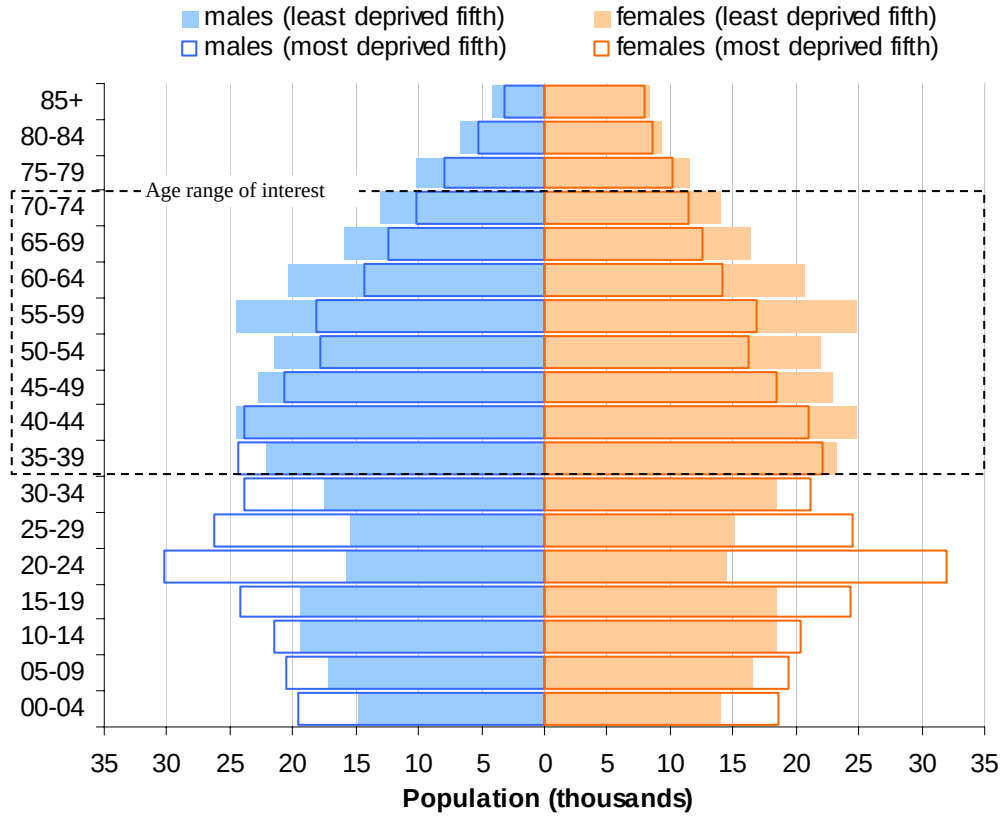
Population in least and most deprived fifth, Wales, 1992

Source: HSW (NHSAR), WCfH/ONS (Townsend index)



Population in least and most deprived fifth, Wales, 2006

Source: HSW (NHSAR), WCfH/ONS (Townsend index)



3.2 Mortality

The mortality rates in this section are to be used as a proxy measure of need, remaining cognisant of the caveats referred to in section 2.3. The relative need shown by Local Authorities, USOAs and deprivation fifths can then be compared to the rates of angiography and revascularisation in these areas (sections 3.4 and 3.5).

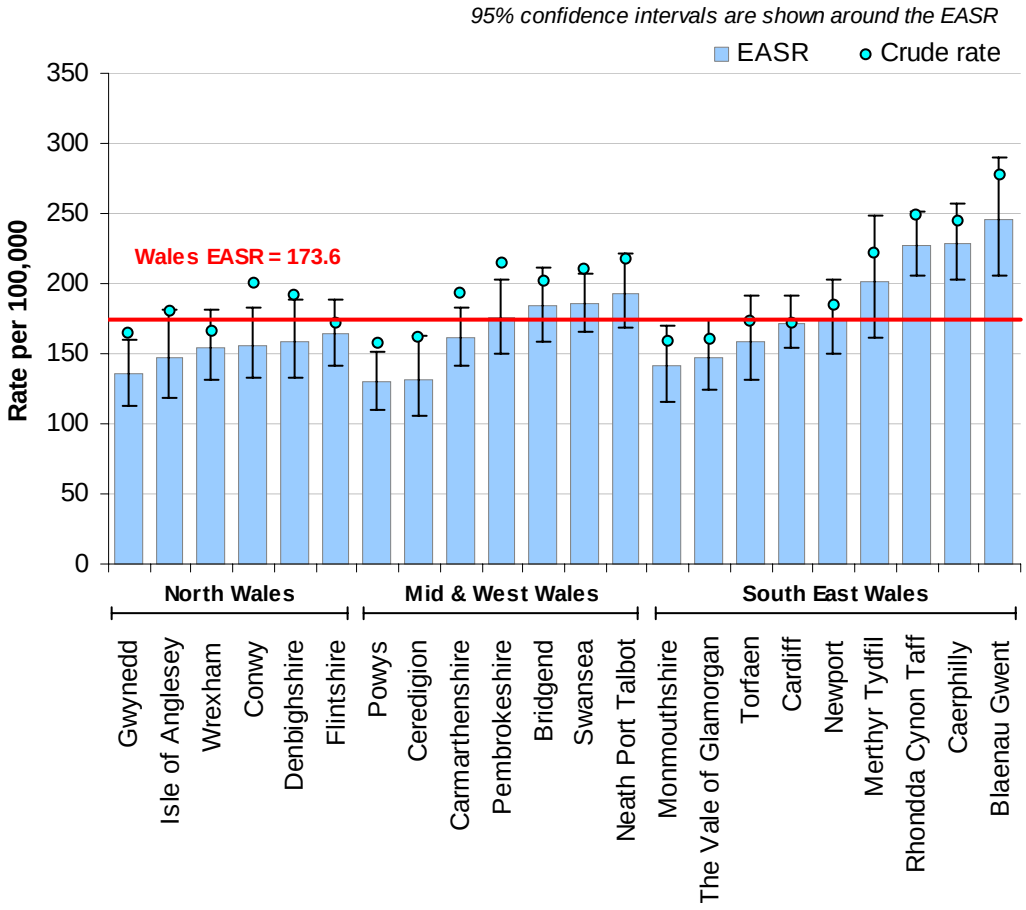
3.2.1 Mortality by Local Authority of residence

3.2.1.1 Males

The chart below shows that the highest rates of premature CHD mortality in males are found in South East Wales, in Blaenau Gwent, Caerphilly and Rhondda Cynon Taff. This region also comprises Monmouthshire and the Vale of Glamorgan, which demonstrate some of the lowest rates in Wales alongside Powys, Ceredigion and a number of areas in North Wales. Supporting data can be found in appendix table 3.2.1.1.

Coronary heart disease mortality, European age-standardised rate (EASR) per 100,000, ranked Local Authorities, males aged 35-74, 2004-06

Source: ONS (ADDE, MYE)

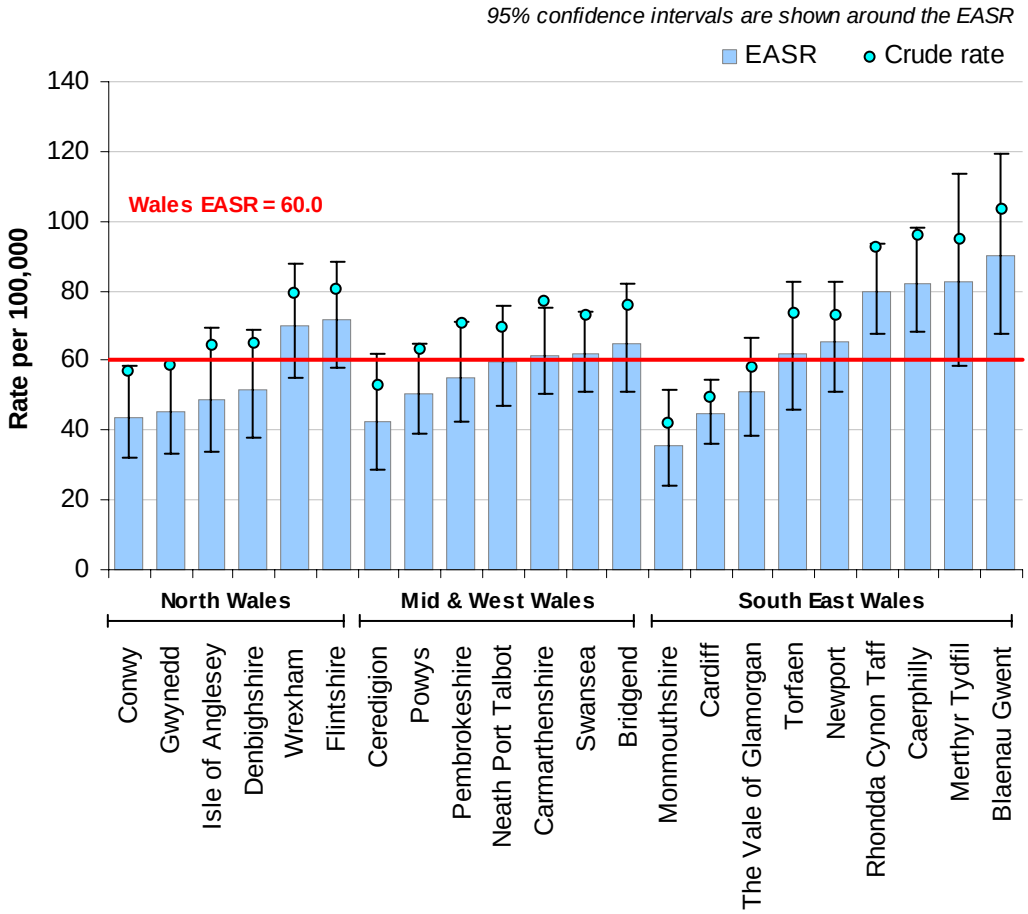


3.2.1.2 Females

The range of premature mortality rates across areas in females is larger than in the case of males, with the highest rate (Blaenau Gwent) being over twice the magnitude of lower rate (Monmouthshire). Whereas rates across North Wales are similar in males, the rates for females in Wrexham and Flintshire demonstrate a marked difference to the other areas in the region. Supporting data can be found in appendix table 3.2.1.2.

Coronary heart disease mortality, European age-standardised rate (EASR) per 100,000, ranked Local Authorities, females aged 35-74, 2004-06

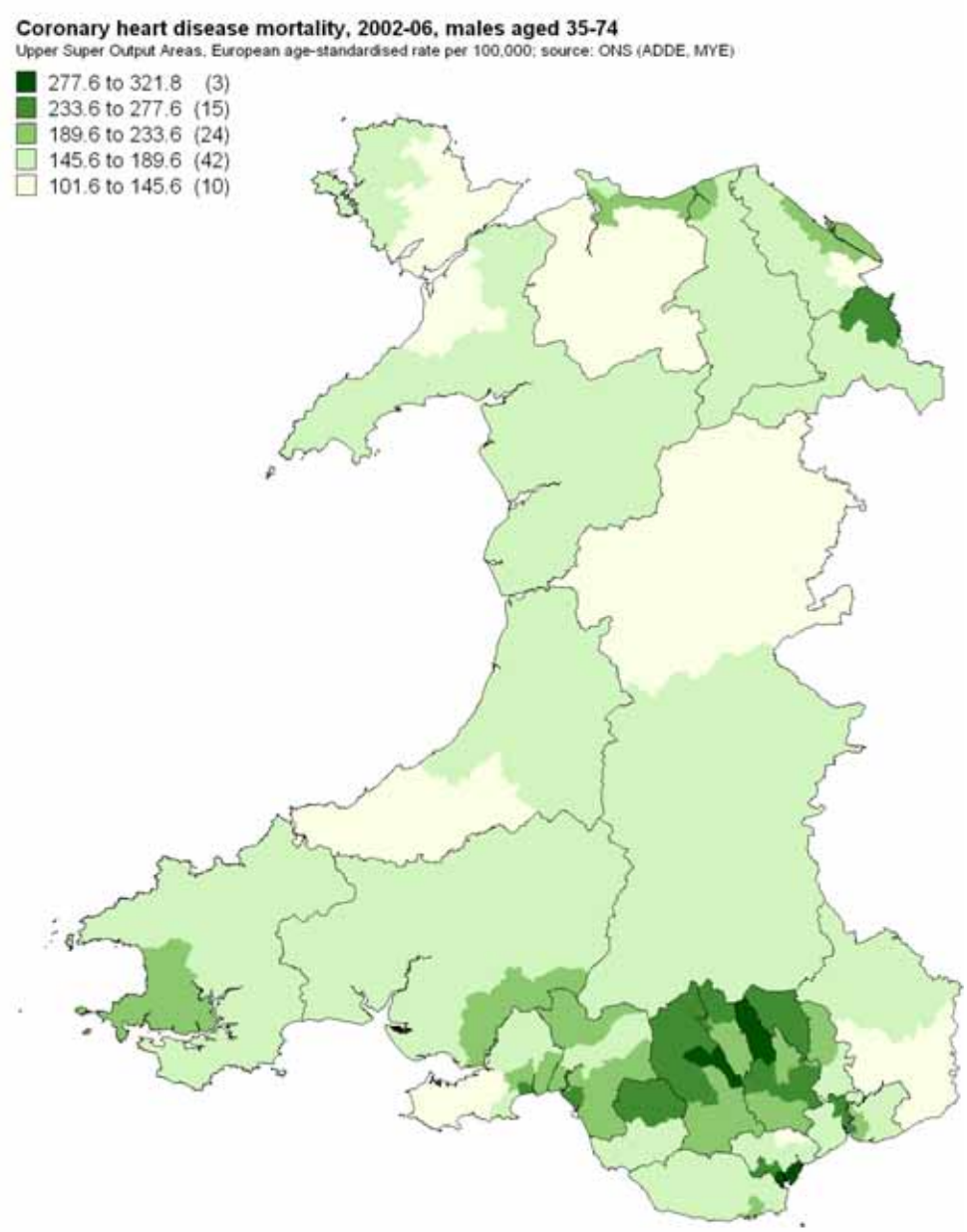
Source: ONS (ADDE, MYE)



3.2.2 Mortality by USOA

3.2.2.1 Males

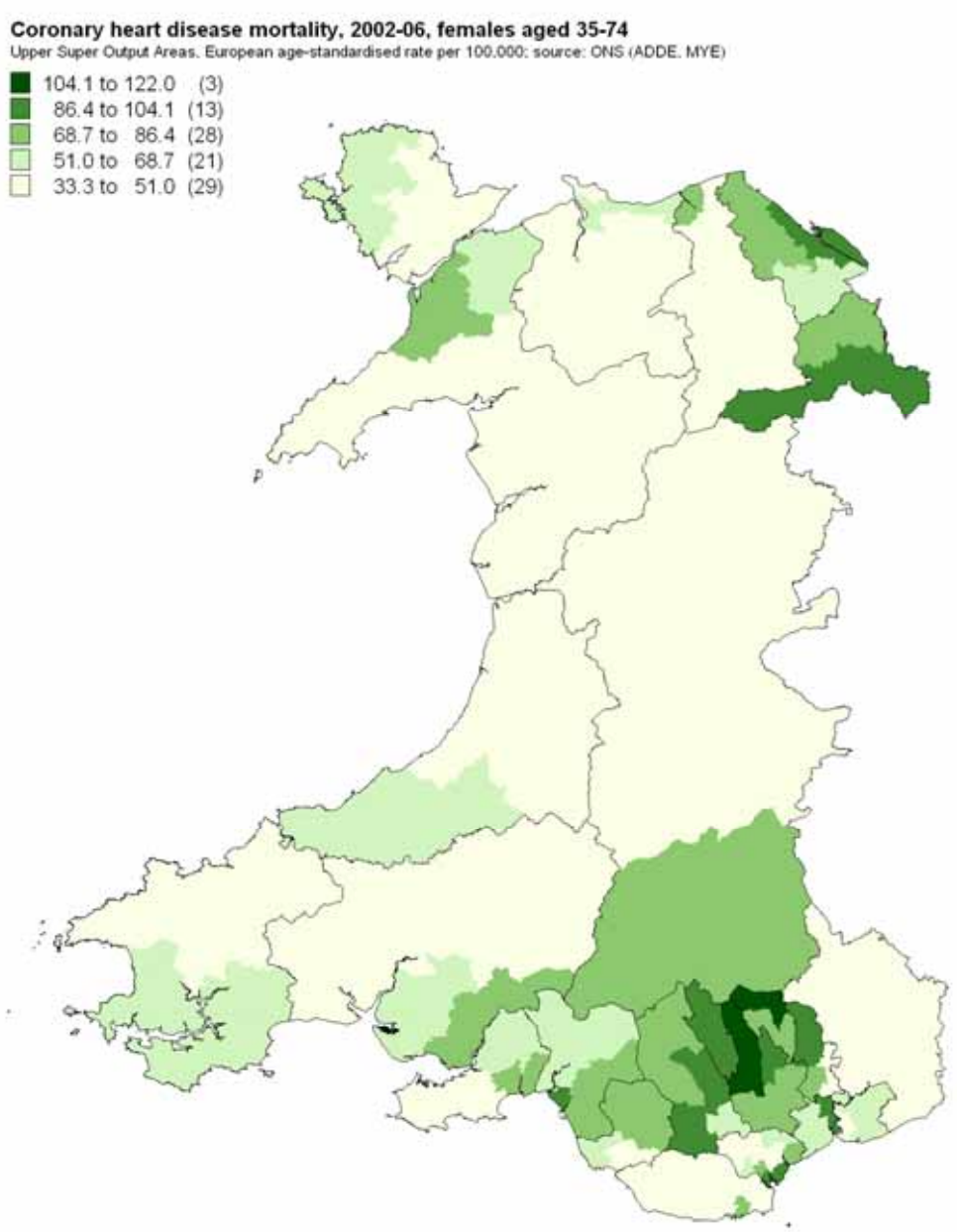
The map below shows high rates of premature CHD mortality in males clustered within South Cardiff and the South Wales valleys. There is greater variation across USOAs than in Local Authorities, with a threefold difference between the highest and lowest rates. This illustrates the greater homogeneity of USOAs and suggests the presence of pockets of greater morbidity (and therefore greater need of treatment) within Local Authority areas.



This map has been created using the equal range method. Ranges are up to and not including the higher value.

3.2.2.2 Females

According to the map below, the USOAs shown to have high levels of premature CHD mortality in females are similar to those demonstrating high rates in males, with the addition of areas in Wrexham and Flintshire. The overall distribution of rates is slightly different to that in males: 29 USOAs (approximately one third) fall into the lowest fifth of the overall range of values, whereas in males this figure is 10 USOAs (approximately one ninth).



This map has been created using the equal range method. Ranges are up to and not including the higher value.

3.2.3 Mortality by region and deprivation fifth: rates and rate ratios

This section is split into three parts to enable separate discussion of trends in each of the Wales regions.

Additional information in the form of counts of deaths by region, fifth and year is available in appendix tables 3.2.3a and 3.2.3b.

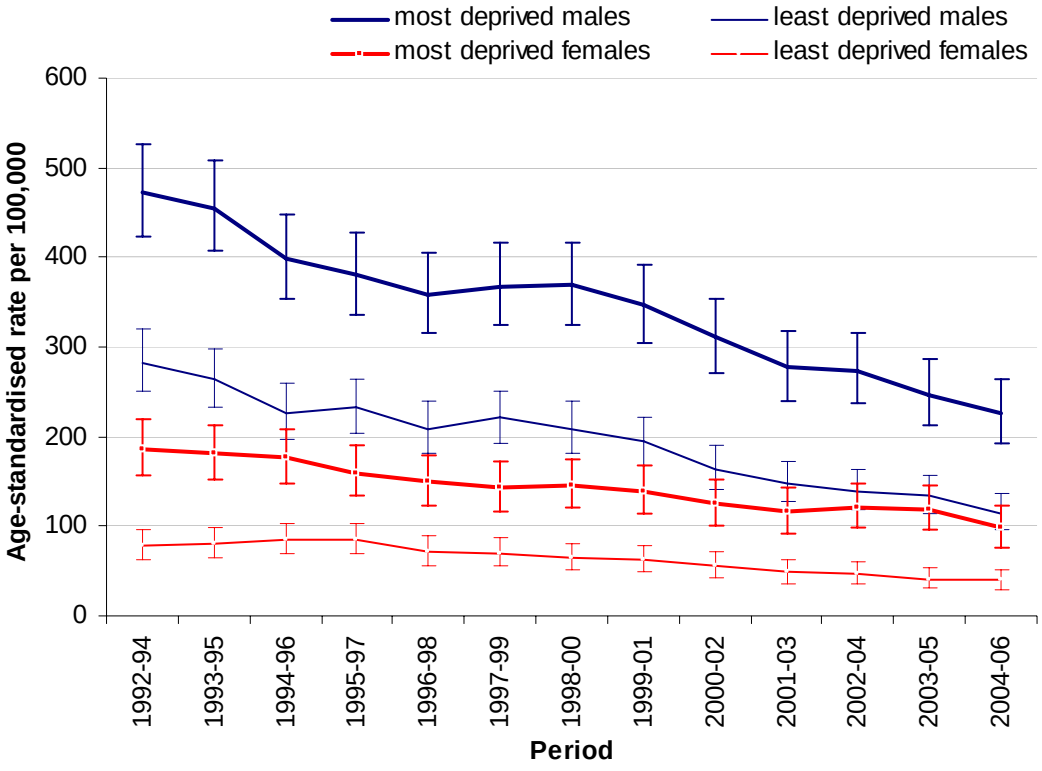
3.2.3.1 North Wales

The charts below and overleaf show that mortality is higher in males than in females, with the most deprived fifth in both sexes showing statistically significantly higher rates than the least deprived fifth. Rate ratios appear higher in females compared to males throughout the period, indicating mortality rates being more than twice as high in the most deprived compared to the least deprived. However, the width of the confidence intervals necessitates caution when comparing rate ratios.

Supporting data for the charts showing rates can be found in appendix tables 3.2.3.1a and 3.2.3.1b, with data for charts showing rate ratios presented in appendix tables 3.2.3.1c and 3.2.3.1d.

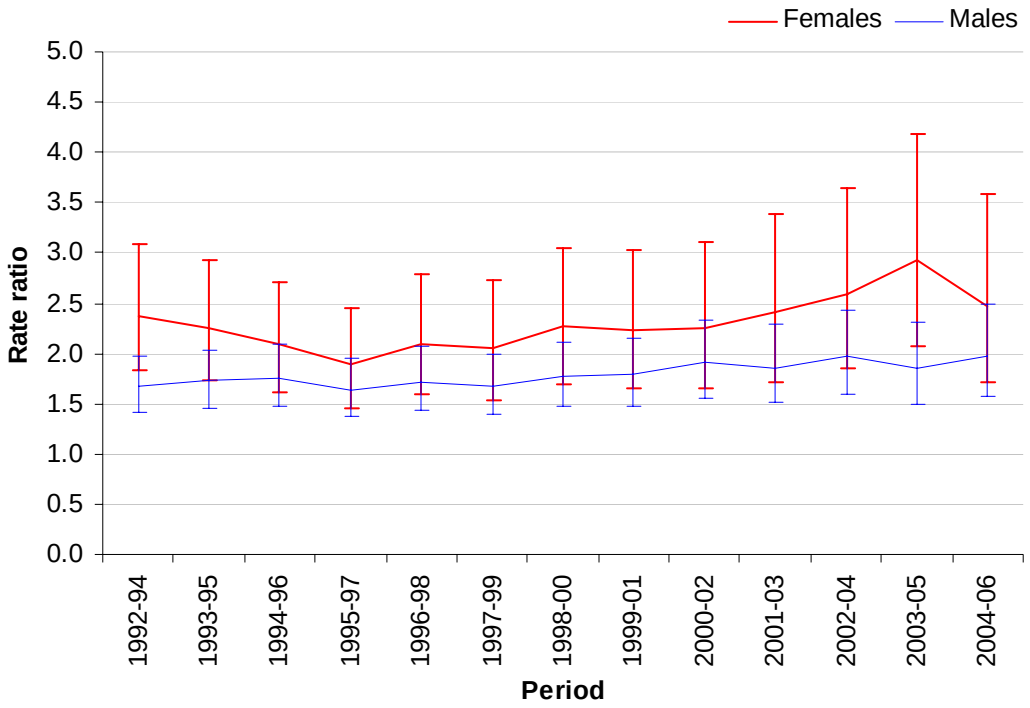
CHD mortality in males & females aged 35-74, North Wales, most & least deprived fifths, 3-year rolling European age-standardised rate per 100,000, 1992-2006

Source: ONS (ADDE), HSW (NHSAR), WCfH/ONS (Townsend index)



CHD mortality in males & females aged 35-74, North Wales, 3-year rolling Wales age-standardised rate ratios, 1992-2006

Source: ONS (ADDE), HSW (NHSAR), WCfH/ONS (Townsend index)



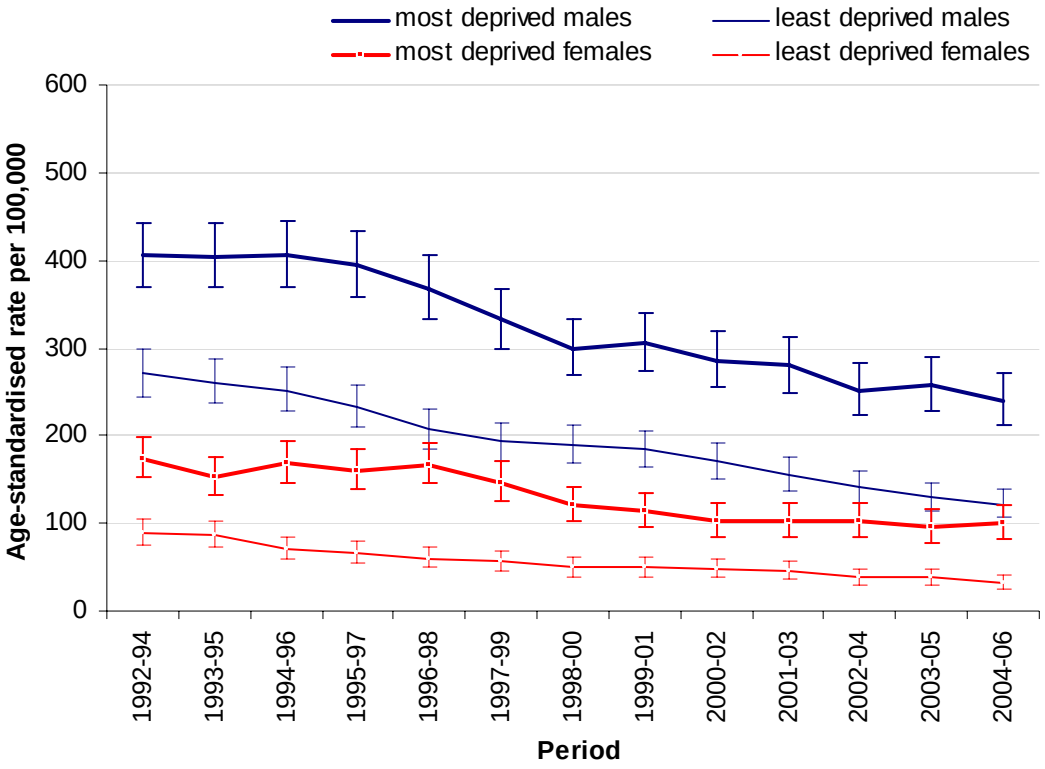
3.2.3.2 Mid & West Wales

The charts overleaf show a similar pattern to that demonstrated for North Wales in section 3.2.3.1. It is perhaps interesting to note, however, that the European age-standardised mortality rate in the most deprived females in Mid & West Wales fell to around 100 in 2002-02, a level which was not reached in the other regions until 2004-06. However, the rate has remained static since 2000-02, during which time the rate in the least deprived females has continued to fall. This causes the rate ratio in females to rise to around three in 2004-06, indicating that CHD mortality rates are around three times higher in the most deprived fifth compared to the least deprived fifth. As is the case in North Wales, the general trend seems to be towards rate ratios in both males and females increasing over time.

Supporting data for the charts showing rates can found in appendix tables 3.2.3.2a and 3.2.3.2b, with data for charts showing rate ratios presented in appendix tables 3.2.3.2c and 3.2.3.2d.

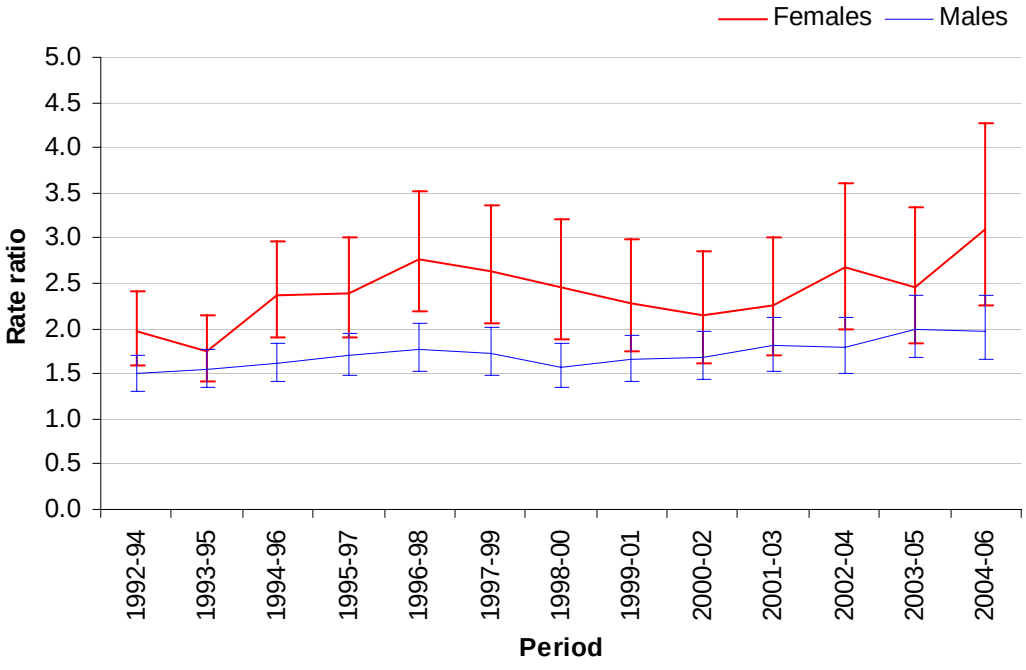
CHD mortality in males & females aged 35-74, Mid & West Wales, most & least deprived fifths, 3-year rolling European age-standardised rate per 100,000, 1992-2006

Source: ONS (ADDE), HSW (NHSAR), WCfH/ONS (Townsend index)



CHD mortality in males & females aged 35-74, Mid & West Wales, 3-year rolling European age-standardised rate ratios, 1992-2006

Source: ONS (ADDE), HSW (NHSAR), WCfH/ONS (Townsend index)



3.2.3.3 South East Wales

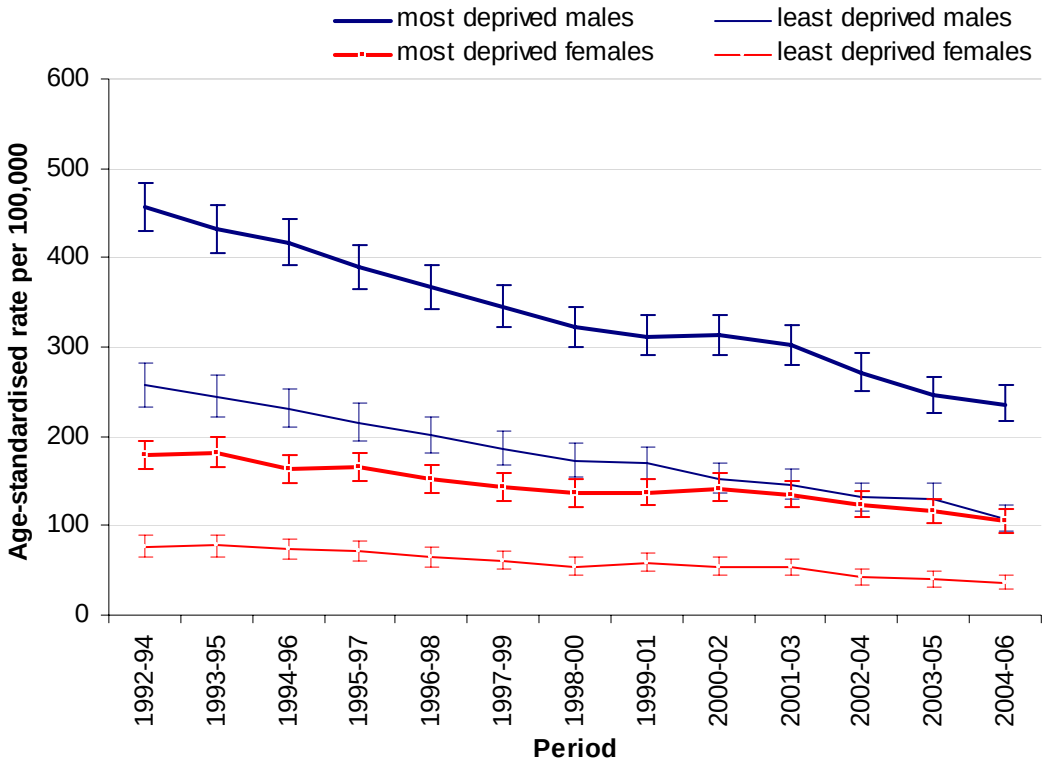
The charts below and overleaf show a similar pattern to those demonstrated for the other Wales regions in sections 3.2.3.1 and 3.2.3.2.

Although the width of the confidence intervals necessitates caution against over-interpretation, rate ratios in the South East indicate that the 'gap' between the most and least deprived groups has grown slightly over the period and is perhaps marginally larger in this region than in the rest of Wales. This would be consistent with the region being known to comprise some of the areas of greatest and least deprivation in Wales, with high levels of deprivation in South Cardiff and in the South Wales valleys, for example, and low levels of deprivation in North Cardiff and Monmouthshire.

Supporting data for the charts showing rates can found in appendix tables 3.2.3.3a and 3.2.3.3b, with data for charts showing rate ratios presented in appendix tables 3.2.3.3c and 3.2.3.3d.

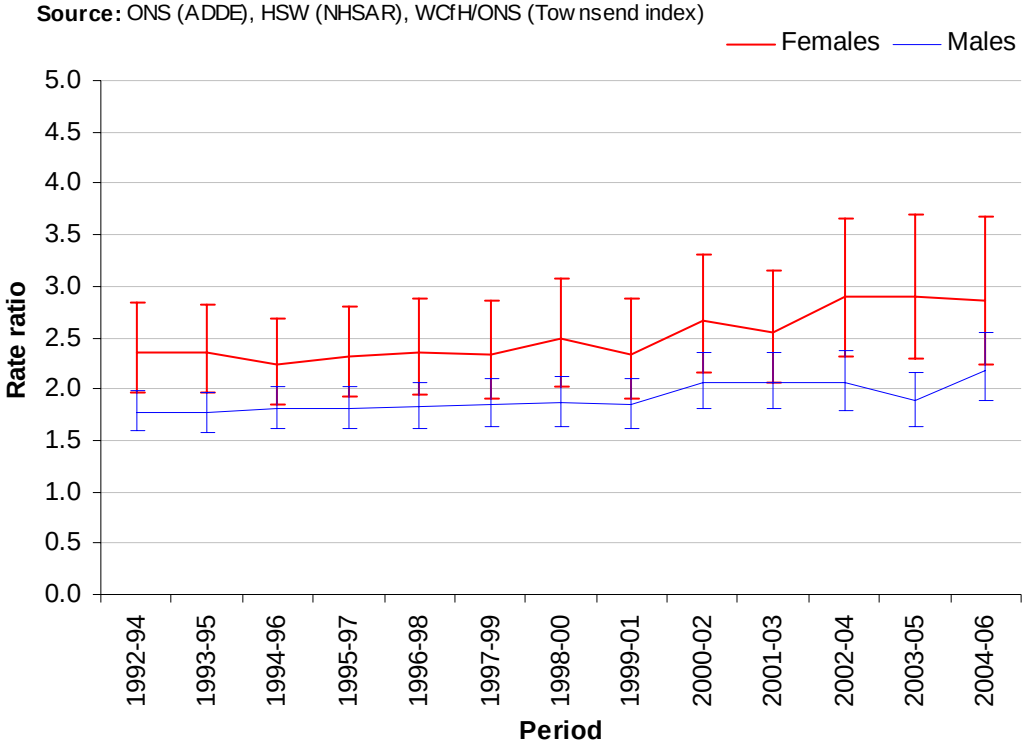
CHD mortality in males & females aged 35-74, South East Wales, most & least deprived fifths, 3-year rolling European age-standardised rate per 100,000, 1992-2006

Source: ONS (ADDE), HSW (NHSAR), WCfH/ONS (Townsend index)



CHD mortality in males & females aged 35-74, South East Wales, 3-year rolling Wales age-standardised rate ratios, 1992-2006

Source: ONS (ADDE), HSW (NHSAR), WCfH/ONS (Townsend index)



3.3 Emergency CHD admissions

3.3.1 Admissions by hospital

The table below and map overleaf show the major centres for emergency CHD admissions for the residents of Wales.

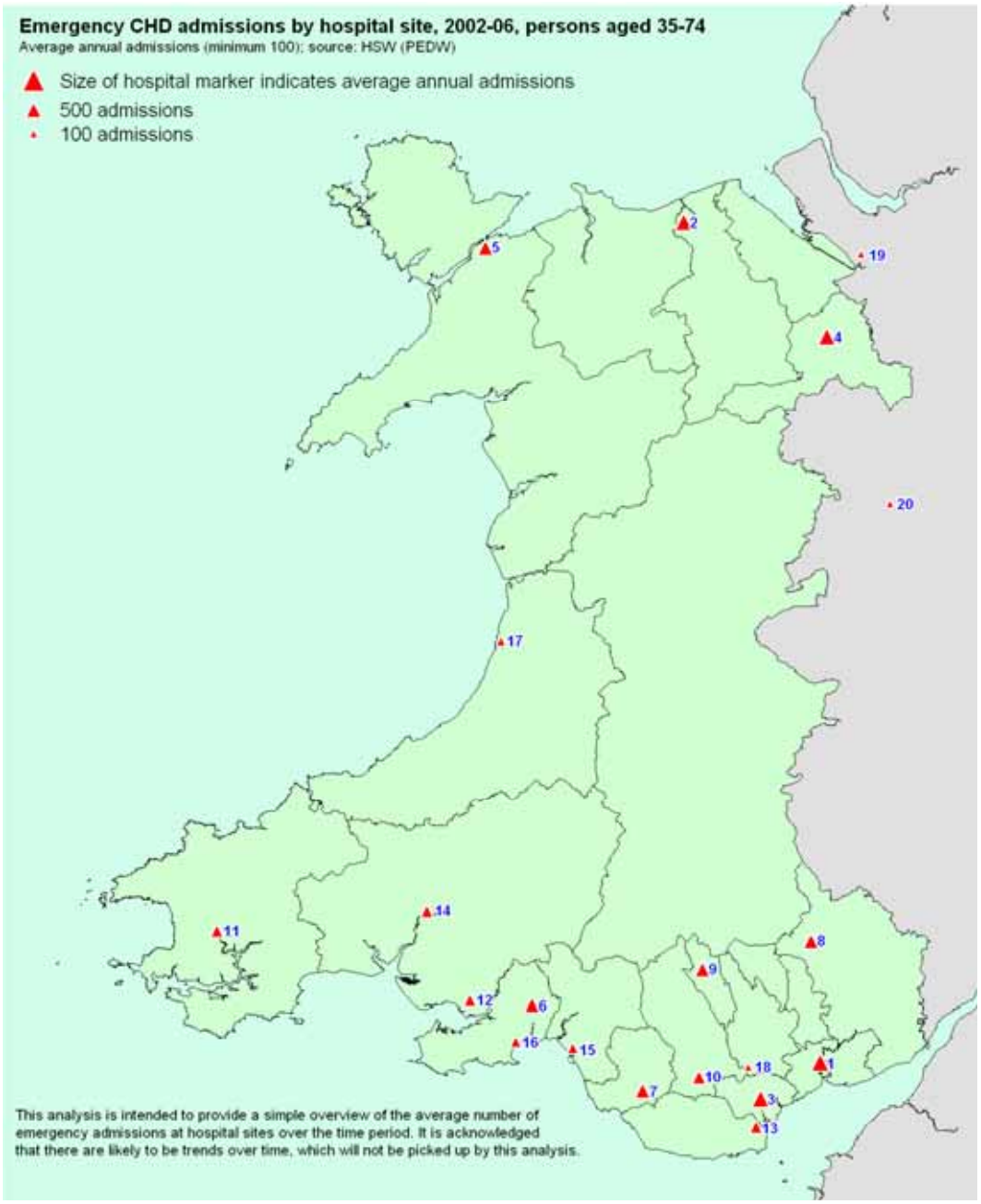
Patients are admitted to most of the major acute hospitals in Wales. In North Wales, the majority of admissions are to Ysbyty Glan Clwyd (No. 2 on map), Wrexham Maelor Hospital (No.4 on map), and Ysbyty Gwynedd (No. 5 on map). University Hospital of Wales in Cardiff (No. 3 on map), Royal Gwent (No. 1 on map) and Morriston Hospital (No. 6 on map) have the highest average annual admissions in the South.

An average of 120 Welsh residents are admitted as emergencies for CHD to the Countess of Chester, and Royal Shrewsbury hospitals in England.

Emergency CHD admissions by hospital site, persons aged 35-74, average annual admissions (minimum 100), 2002-06

Map label	Hospital site	Average annual admissions
1	Royal Gwent Hospital	643
2	Ysbyty Glan Clwyd	567
3	University Hospital of Wales	549
4	Wrexham Maelor Hospital	510
5	Ysbyty Gwynedd	498
6	Morriston Hospital	468
7	Princess of Wales Hospital	450
8	Nevill Hall Hospital	443
9	Prince Charles Hospital	423
10	The Royal Glamorgan Hospital	416
11	Withybush General Hospital	321
12	Prince Philip Hospital	307
13	Llandough Hospital	294
14	West Wales General Hospital	278
15	Neath Port Talbot Hospital	231
16	Singleton Hospital	223
17	Bronglais General Hospital	148
18	Caerphilly District Miners Hospital	124
19	Countess of Chester Hospital	121
20	Royal Shrewsbury Hospital	120

Source: HSW (PEDW)



3.3.2 Admissions by Local Authority of residence

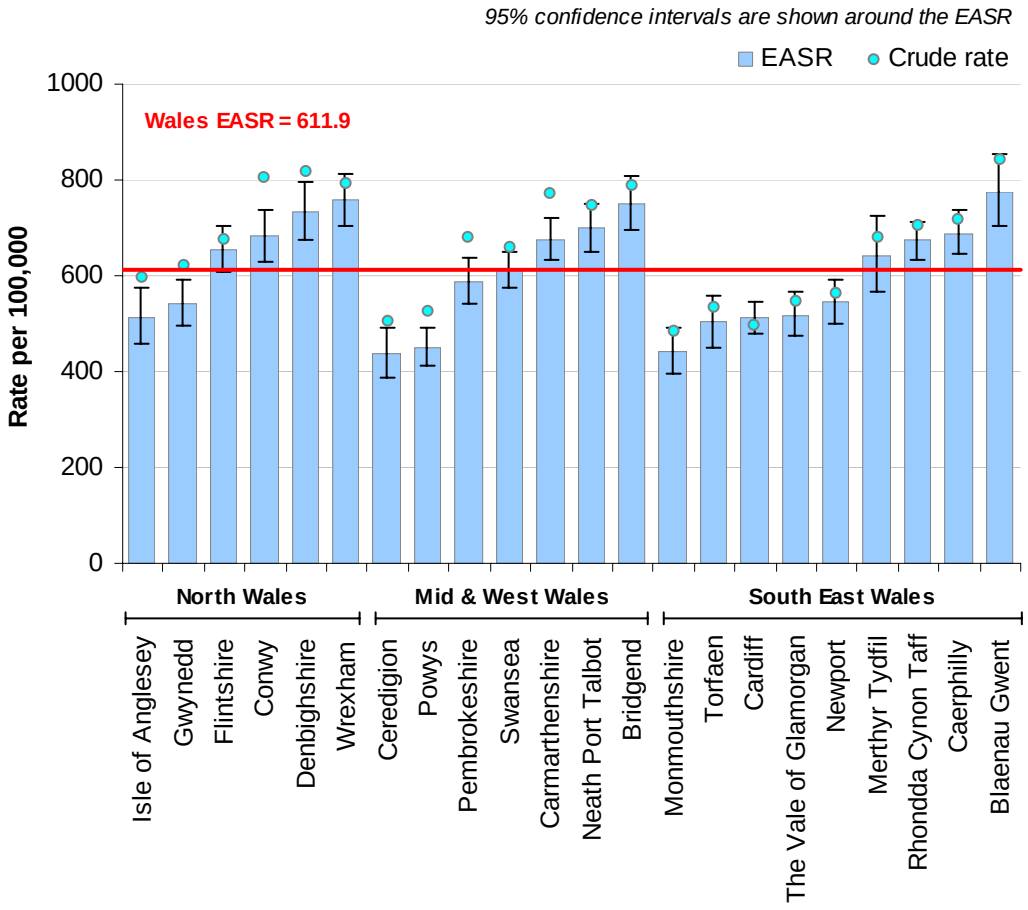
3.3.2.1 Males

The Local Authorities with the highest rates of emergency admissions for CHD in males are Blaenau Gwent, Wrexham and Bridgend. Conversely the lowest rates can be found in Ceredigion and Powys in Mid & West Wales and Monmouthshire in SE Wales.

Data supporting this chart can be found in table 3.3.2.1 within the appendix.

Emergency admissions for CHD, European age-standardised rate (EASR) per 100,000, ranked Local Authorities, males aged 35-74, 2004-06

Source: HSW (PEDW), ONS (MYE)



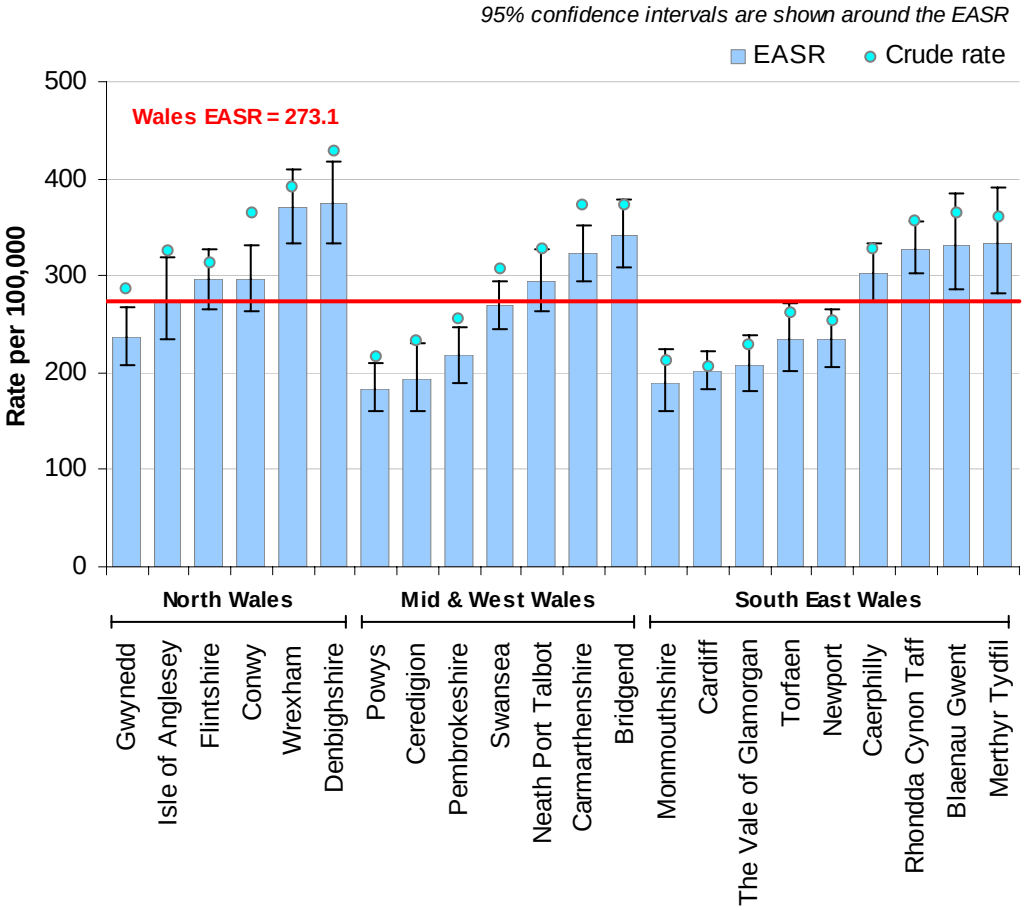
3.3.2.2 Females

Rates of emergency CHD admissions are considerably lower in females compared to males, which is consistent with the lower level of need in terms of mortality (section 3.2). The actual pattern of emergency CHD admissions in females is similar to that shown for males in section 3.3.2.1. The Local Authorities with the highest rates of emergency admissions for CHD for females are Denbighshire and Wrexham in North Wales and Bridgend in Mid & West Wales. The lowest rates can be found in Powys, Ceredigion and Monmouthshire.

Data supporting this chart can be found in table 3.3.2.2 within the appendix.

Emergency admissions for CHD, European age-standardised rate (EASR) per 100,000, ranked Local Authorities, females aged 35-74, 2004-06

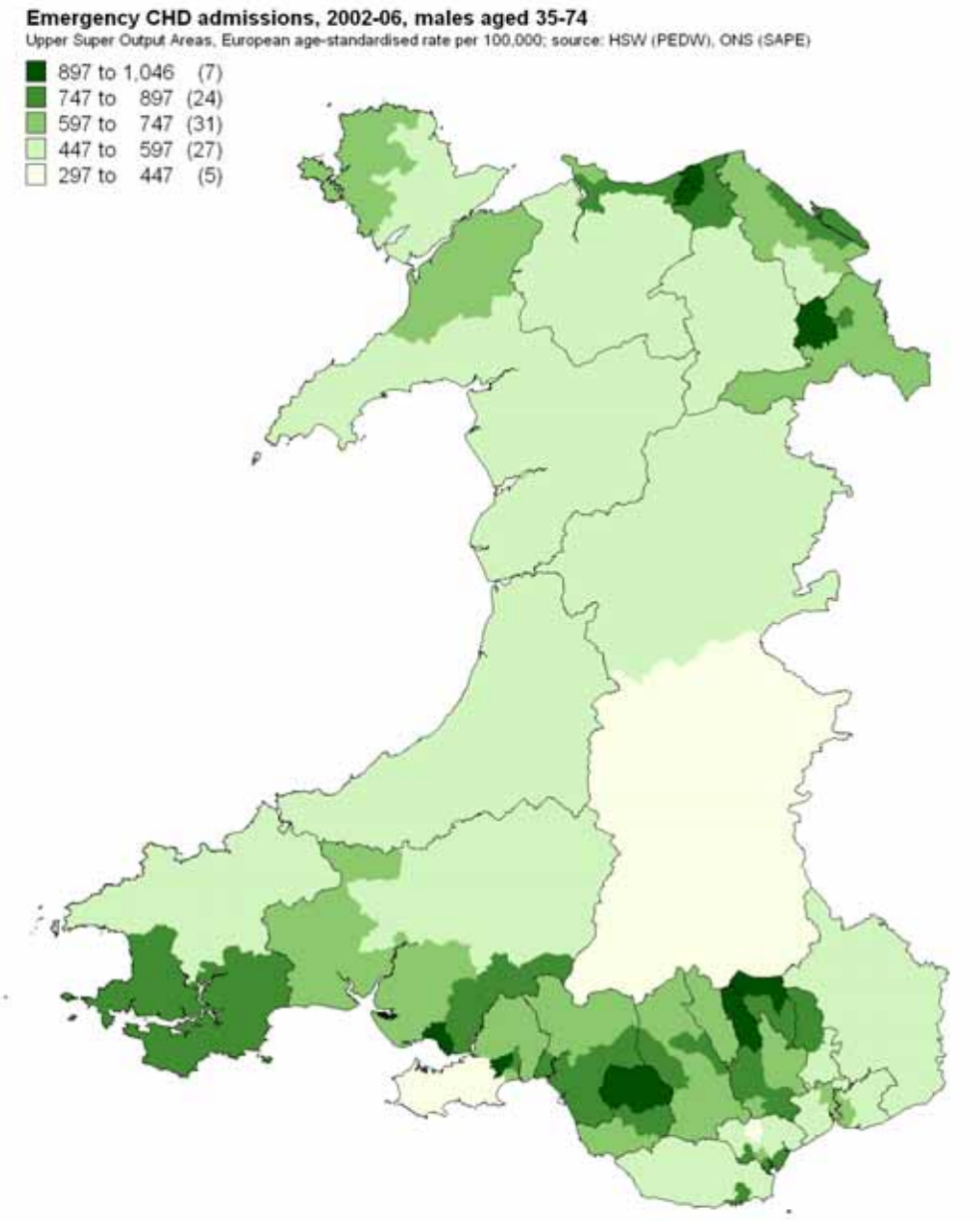
Source: HSW (PEDW), ONS (MYE)



3.3.3 Admissions by USOA

3.3.3.1 Males

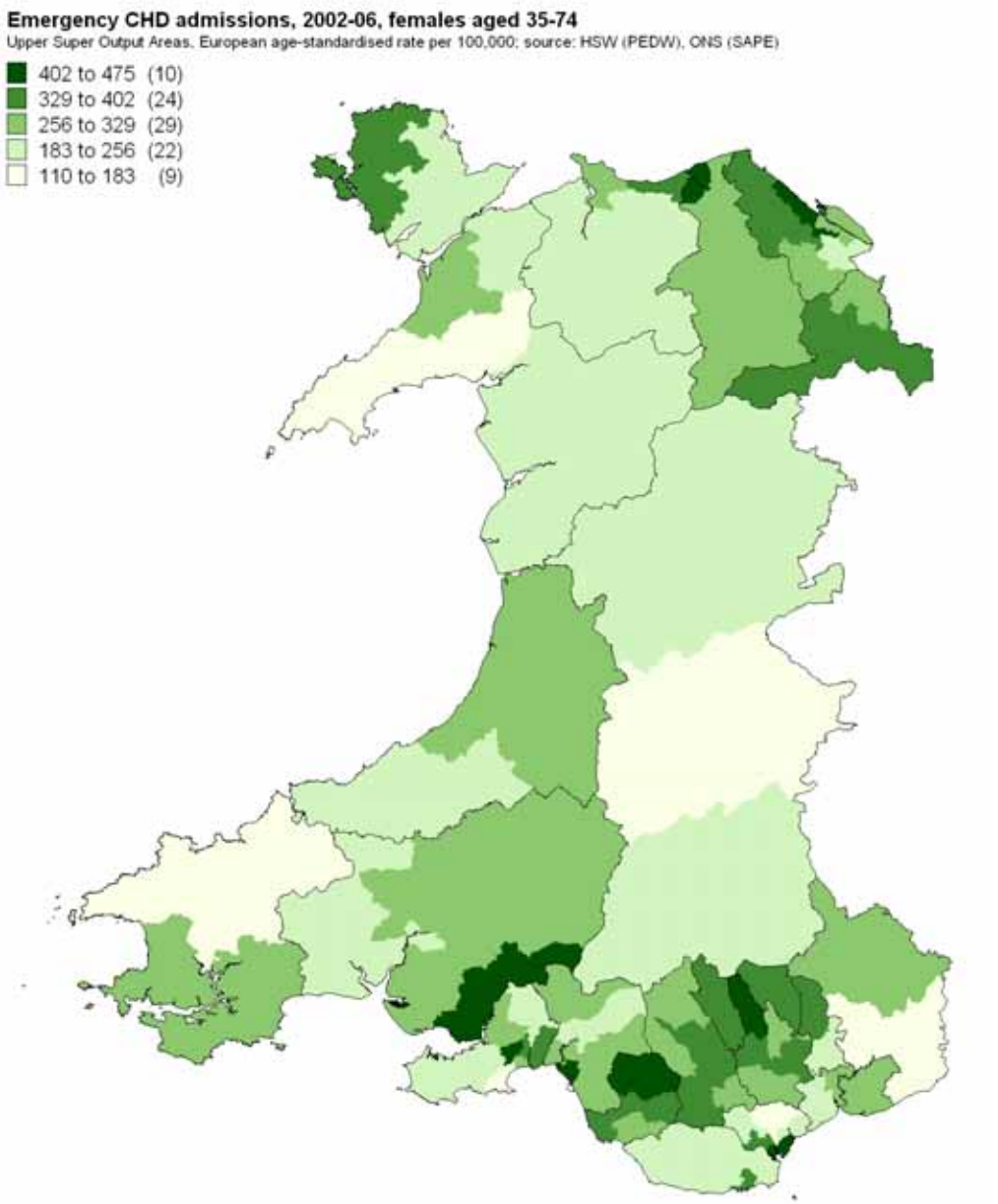
As expected from the chart shown in section 3.3.2.1, the highest rates of emergency CHD admissions for males can be found mostly in USOAs within the local authorities of Bridgend, Blaenau Gwent, Caerphilly, Wrexham and Denbighshire. Higher rates can also be found in parts of Carmarthenshire and Swansea.



This map has been created using the equal range method. Ranges are up to and not including the higher value. Crown copyright material is reproduced with the permission of the Controller of HMSO and the Queen's Printer for Scotland.

3.3.3.2 Females

The map below shows similarly high rates in USOAs within the Local Authorities described in section 3.3.2.2.



This map has been created using the equal range method. Ranges are up to and not including the higher value. Crown copyright material is reproduced with the permission of the Controller of HMSO and the Queen's Printer for Scotland.

3.3.4 Admissions by region and deprivation fifth: rates and rate ratios

This section is split into three parts to enable separate discussion of trends in each of the Wales regions.

Additional information in the form of counts of emergency CHD admissions by region, fifth and year is available in tables 3.3.4a and 3.3.4b within the appendix.

3.3.4.1 North Wales

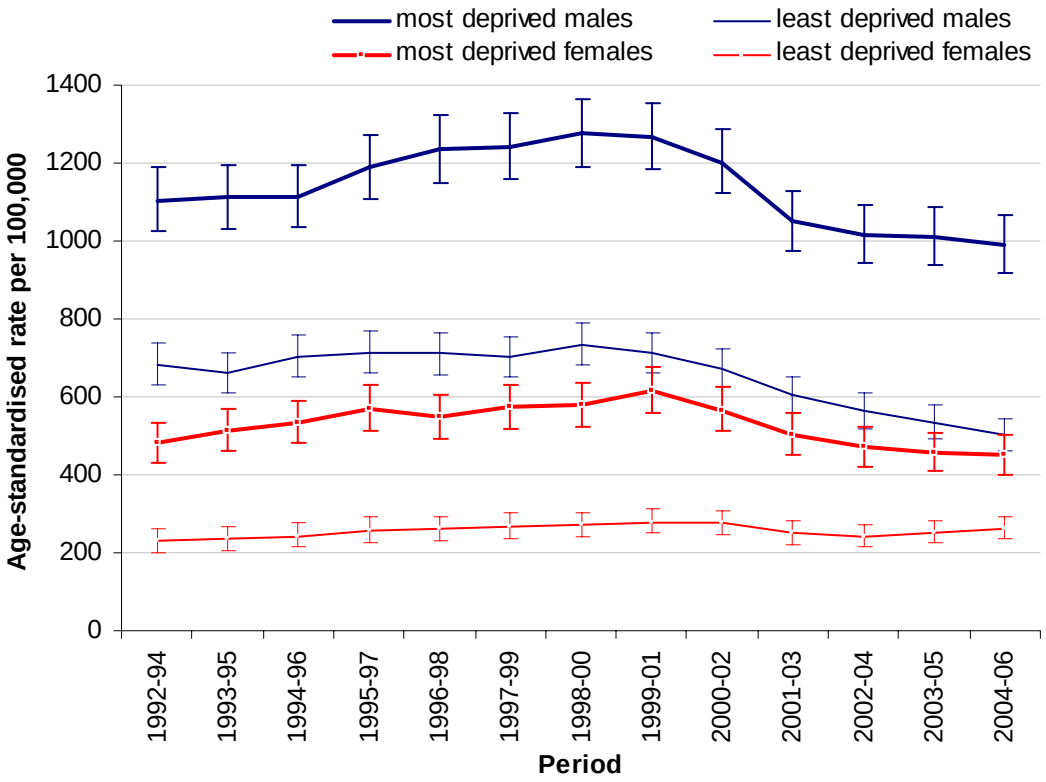
The charts overleaf show that the rate of emergency CHD admissions is higher in males than in females. The most deprived fifth for both sexes show statistically significantly higher rates than the least deprived fifth.

The ratios are higher for females compared to males for much of the period. Ratios for males can be seen to increase over the period whilst ratios for females show a decrease. This indicates that whilst the gap between the least and most deprived fifths has decreased for females it has, over the same period increased for males. By 2004-06 the rate ratio had fallen to 1.7 for females but increased to 2.0 for males suggesting that the rate of emergency CHD admissions for males is twice as high in the most deprived compared to the least deprived fifth.

Additional data for the charts showing rates is available in appendix tables 3.3.4.1.a and 3.3.4.1b. Data for charts showing rate ratios is presented in appendix tables 3.3.4.1c and 3.3.4.1d.

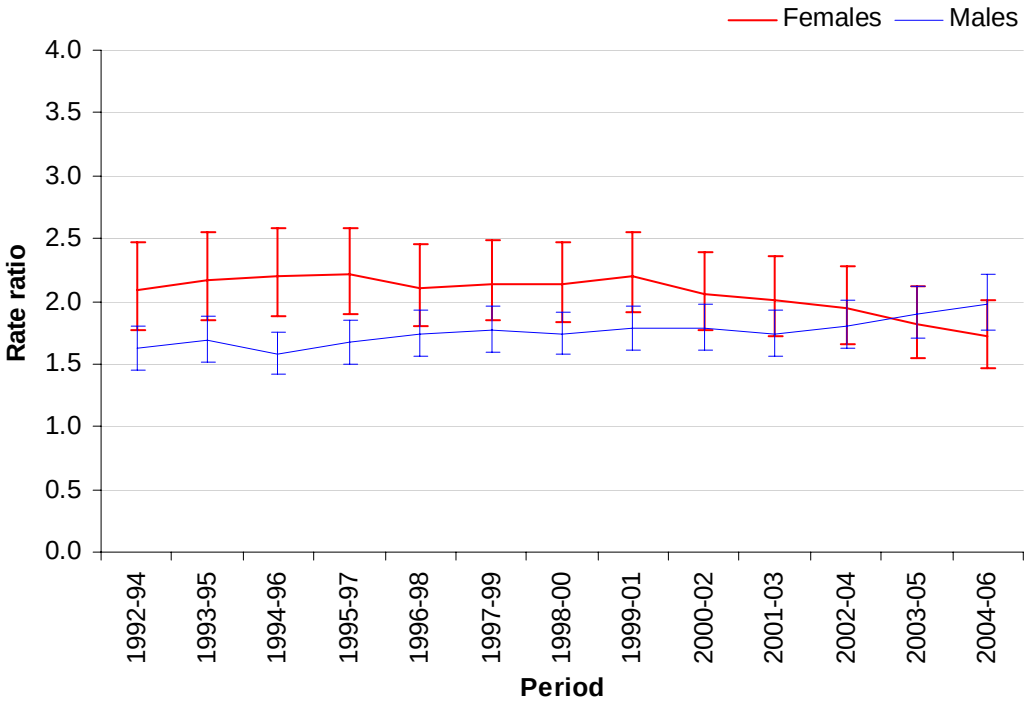
Emergency CHD admissions in males & females aged 35-74, North Wales, most & least deprived fifths, 3-year rolling European age-standardised rate per 100,000, 1992-2006

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)



Emergency CHD admissions in males & females aged 35-74, North Wales, 3-year rolling European age-standardised rate ratios, 1992-2006

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)



3.3.4.2 Mid & West Wales

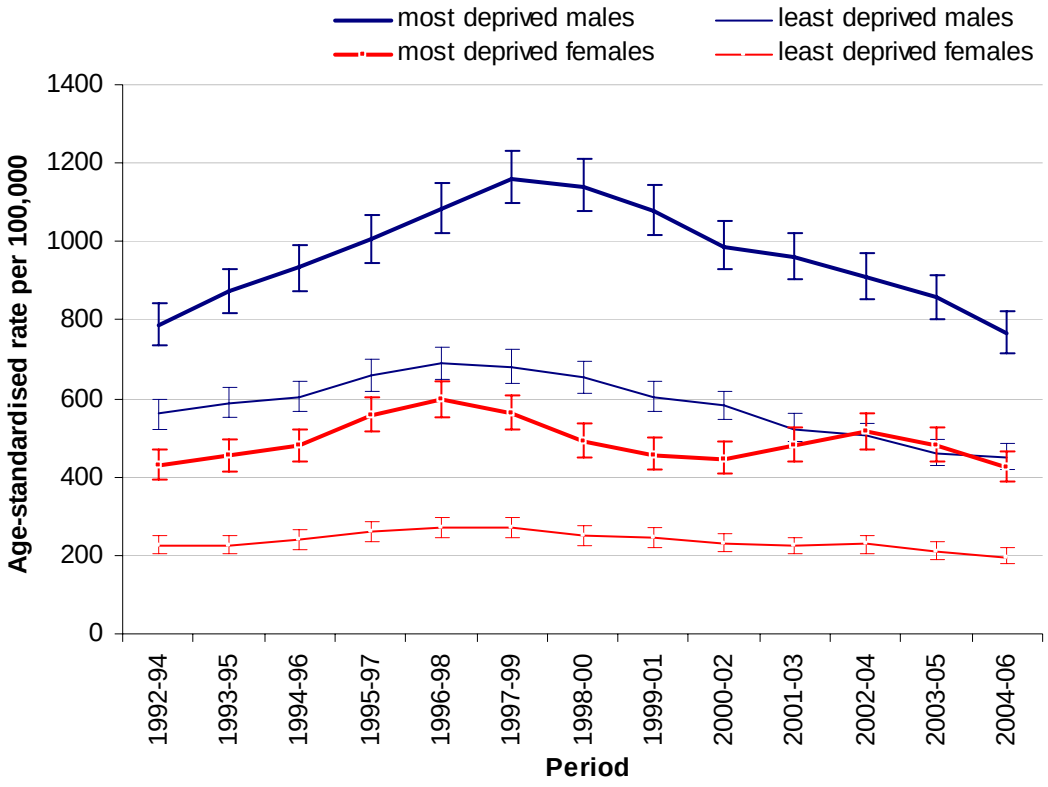
The EASR for emergency CHD admissions for the most deprived fifth in males shows a marked peak in 1997-99. Two smaller peaks are evident in the rate of emergency CHD admissions for females. For both male and female rates are markedly higher in the most deprived compared with the least deprived fifth.

As with North Wales rate ratios are higher in females compared with males. This indicates that CHD emergency admissions are more than twice as high for females, and one and a half times as high for males in the most deprived fifth compared to the least deprived fifth.

Supporting data for the charts showing rates can be found in appendix tables 3.3.4.2a and 3.3.4.2b with data for charts showing rate ratios presented in tables 3.3.4.2c and 3.3.4.2d in the appendix.

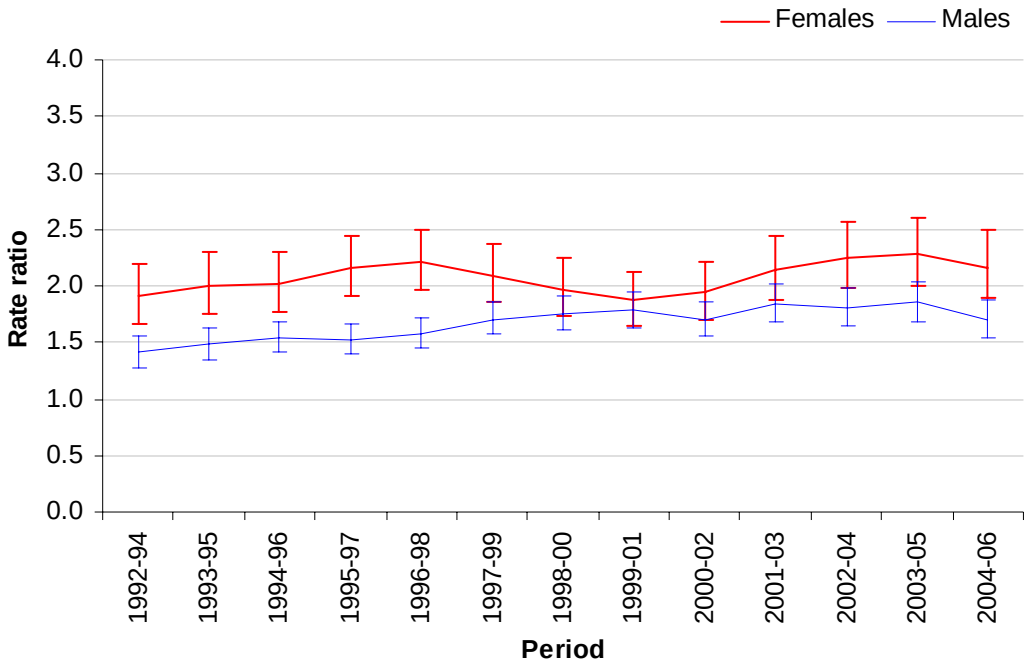
Emergency CHD admissions in males & females aged 35-74, Mid & West Wales, most & least deprived fifths, 3-year rolling European age-standardised rate per 100,000, 1992-2006

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)



Emergency CHD admissions in males & females aged 35-74, Mid & West Wales, 3-year rolling European age-standardised rate ratios, 1992-2006

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)



3.3.4.3 South East Wales

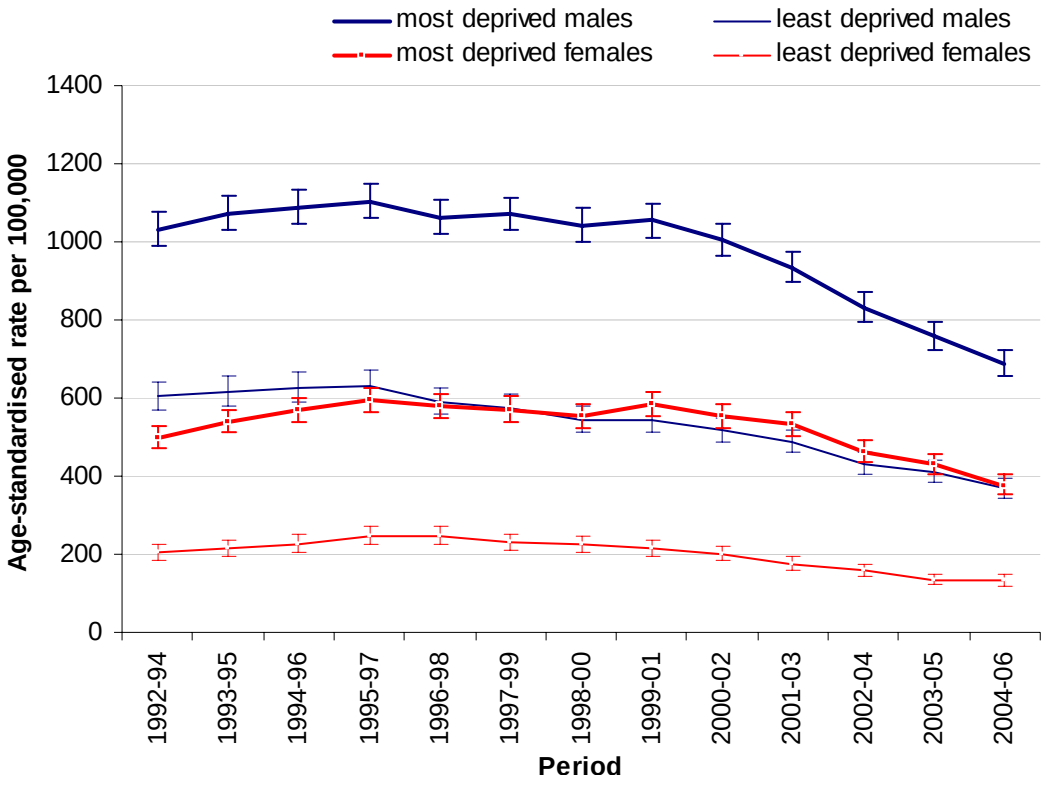
The charts overleaf show a similar pattern to those demonstrated for the other Wales regions in Sections 3.3.4.1 and 3.3.4.2.

As with mortality, the gap between the most and the least deprived fifths appears to be greater in the South East. Indeed, the rate is almost three times as high in the most deprived compared to the least deprived fifth for females.

Supporting data for the charts showing rates can be found in tables 3.3.4.3a and 3.3.4.3b with data for charts showing rate ratios presented in tables 3.3.4.3c and 3.3.4.3d in the appendix.

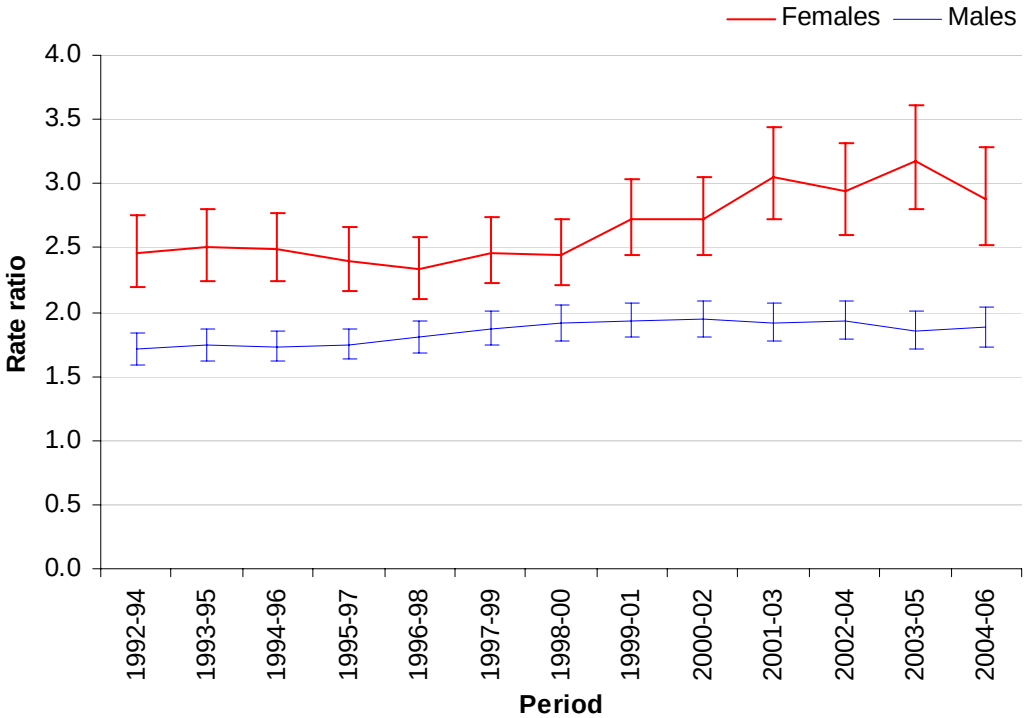
Emergency CHD admissions in males & females aged 35-74, South East Wales, most & least deprived fifths, 3-year rolling European age-standardised rate per 100,000, 1992-2006

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)



Emergency CHD admissions in males & females aged 35-74, South East Wales, 3-year rolling European age-standardised rate ratios, 1992-2006

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)



3.4 Angiography

3.4.1 Angiography by hospital

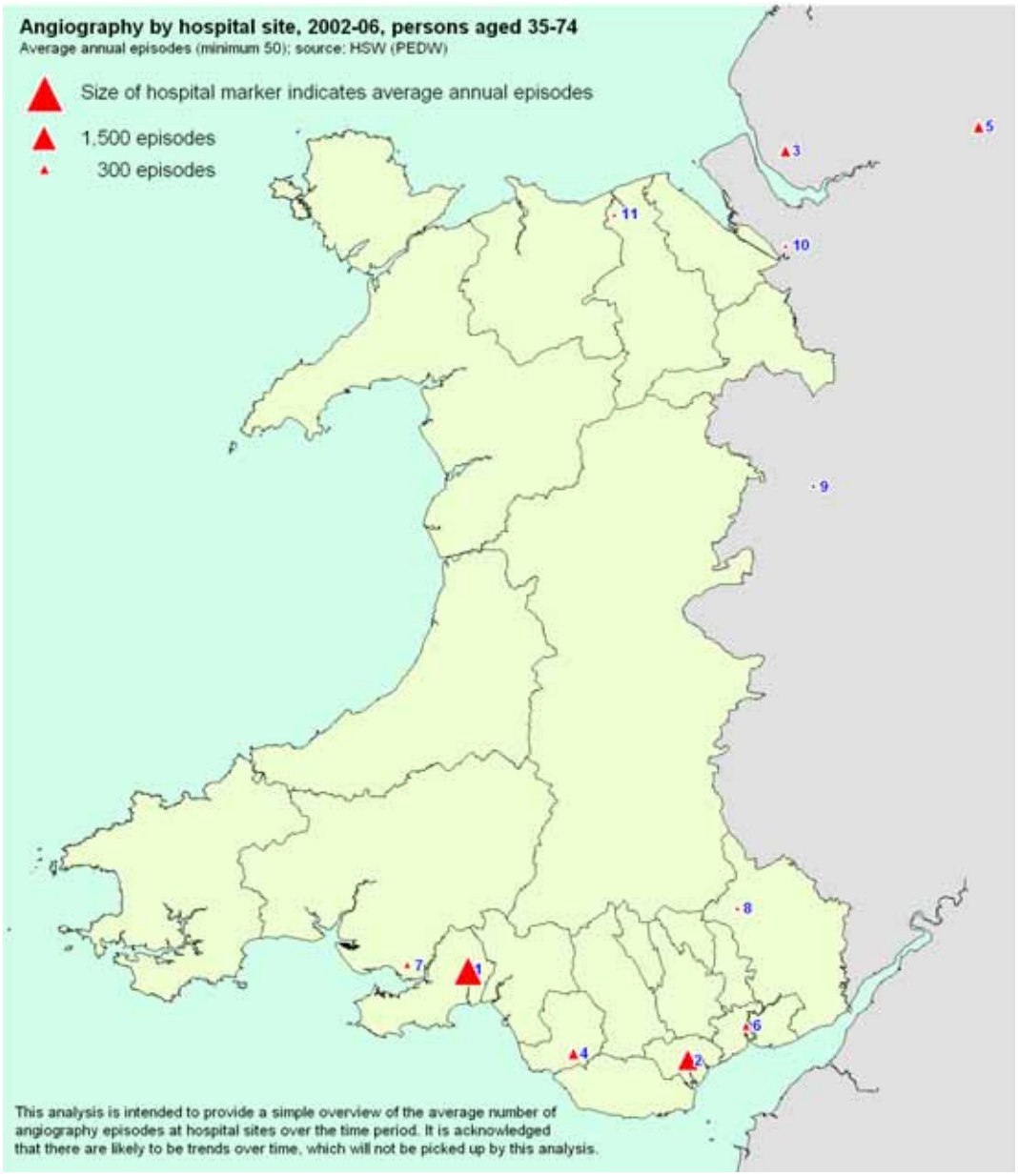
The table below and map overleaf show the major centres for cardiac investigation (angiography) for the residents of Wales. The majority of angiographies carried out within the population of Wales take place in the south at Morriston Hospital and at the University Hospital of Wales. In North Wales the majority of angiographies take place at Liverpool Heart and Chest Hospital and at Manchester Royal Infirmary.

Angiography by hospital site, persons aged 35-74, average annual FCEs (minimum 50), 2002-06

Map label	Hospital site*	Average annual FCEs
1	Morriston Hospital	1749
2	University Hospital of Wales	1199
3	Liverpool Heart and Chest Hospital	377
4	Princess of Wales Hospital	359
5	Manchester Royal Infirmary	327
6	Royal Gwent Hospital	188
7	Prince Philip Hospital	109
8	Nevill Hall Hospital	98
9	Royal Shrewsbury Hospital	76
10	Countess of Chester Hospital	75
11	Ysbyty Glan Clwyd	58

Source: HSW (PEDW)

*Ysbyty Glan Clwyd opened its facility in March 2006, reporting an annual figure closer to 300 for financial year 2006-07. The Royal Glamorgan Hospital started to provide angiographies in late 2006 and does not therefore appear in these figures.



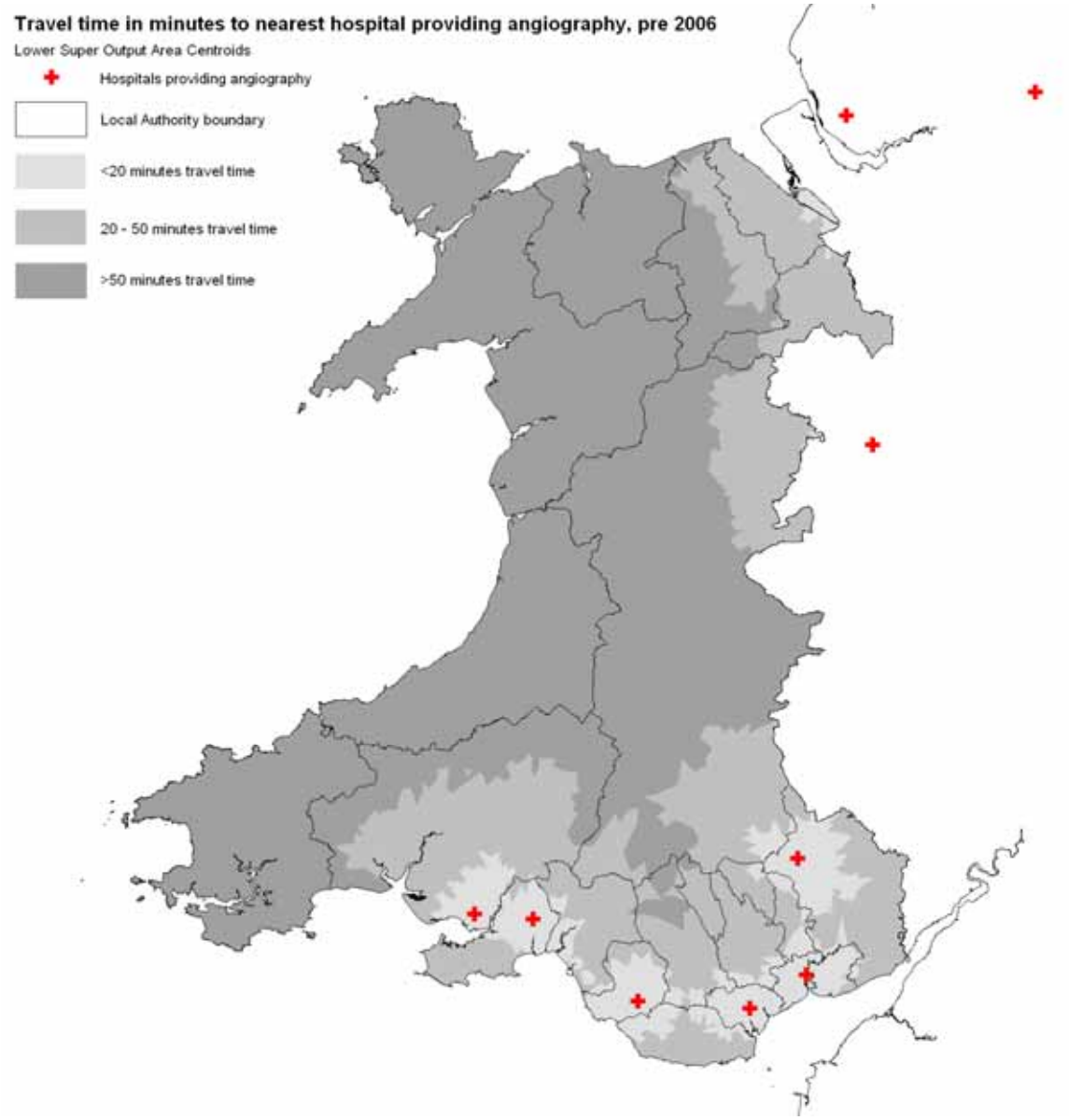
3.4.2 Travel time to nearest provider of angiography

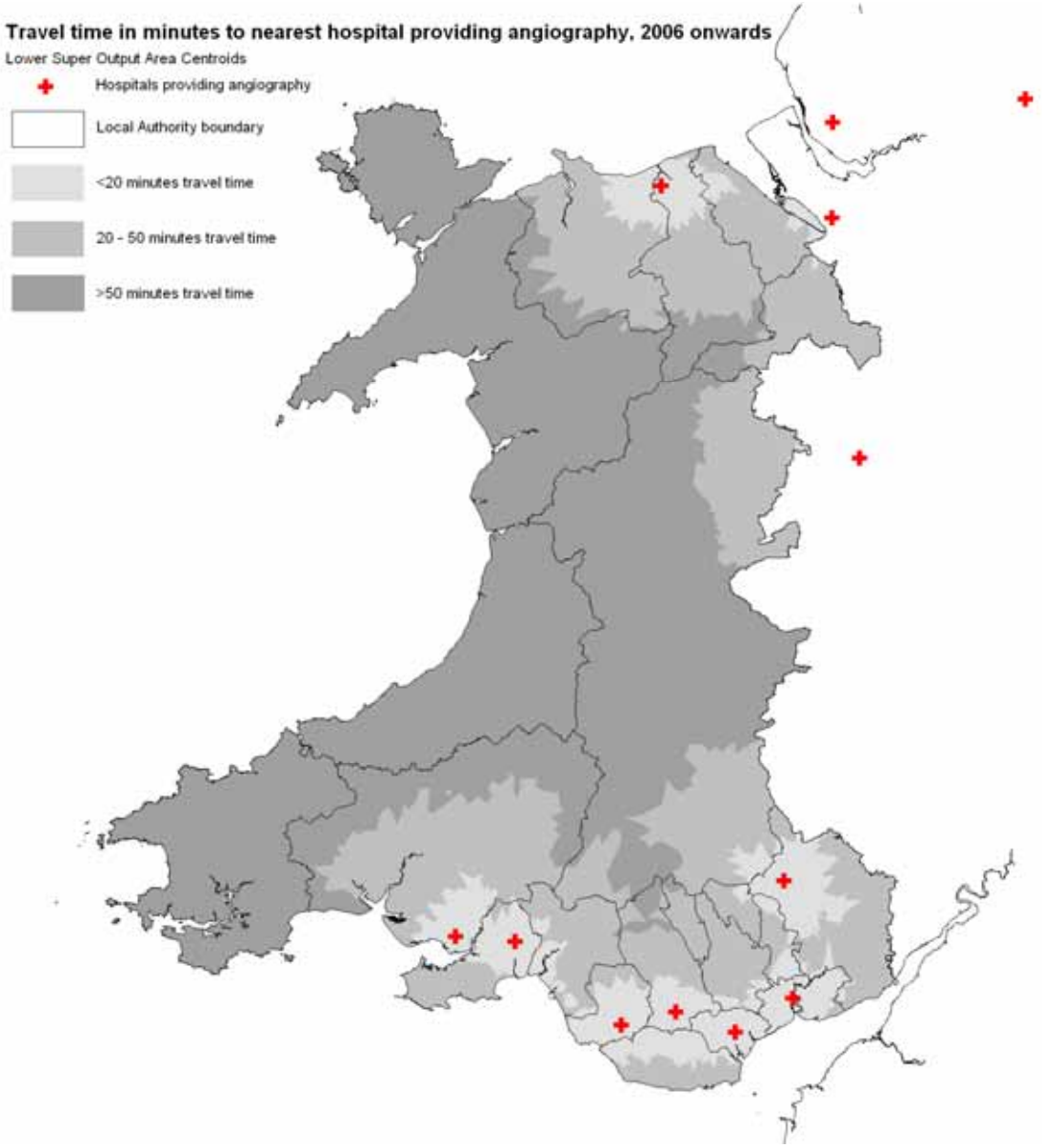
The following maps show the estimated time that it takes the residents of Wales to travel by road to their nearest provider of angiographies, both prior to and after the opening of the new catheterisation labs at Ysbyty Glan Clwyd and Royal Glamorgan hospital. The travel time ranges of under 20, 20 to 50 and more than 50 minutes were chosen in order to create three groups of reasonably equal population size. The hospital locations are those shown on the map in section 3.4.1 (the new units are not included).

The first map shows that residents of Gwynedd, Isle of Anglesey, Conwy, Ceredigion and Pembrokeshire, in addition to residents living in much of Denbighshire and Powys, all have to travel for at least 50 minutes to access this investigation.

The subsequent table also shows that patients do not always undergo investigations at their nearest centre. For example, the residents of the Isle of Anglesey travel mainly to Manchester Royal Infirmary for angiography investigation, although Liverpool Heart and Chest Hospital is nearer.

The second map clearly shows the effect of the opening of the new catheterisation lab at Ysbyty Glan Clwyd in North Wales and Royal Glamorgan hospital, in the South (Rhondda Cynon Taff).





Average annual counts of angiography episodes by hospital provider and Local Authority of residence, persons aged 35-74, 2002-06 (1 of 2)

Average annual counts of episodes of care involving angiography (counts of less than five not shown)

Local Authority	Hospital site					
	Morriston Hospital	University Hospital of Wales	Liverpool Heart and Chest Hospital	Princess of Wales Hospital	Manchester Royal Infirmary	Royal Gwent Hospital
Isle of Anglesey	-	-	-	-	81	-
Gwynedd	10	-	20	-	94	-
Conwy	-	-	32	-	71	-
Denbighshire	-	-	52	-	37	-
Flintshire	-	-	132	-	23	-
Wrexham	-	-	139	-	19	-
Powys	34	20	-	-	-	-
Ceredigion	113	5	-	-	-	-
Pembrokeshire	187	23	-	-	-	-
Carmarthenshire	326	-	-	-	-	-
Swansea	538	-	-	-	-	-
Neath Port Talbot	240	-	-	95	-	-
Bridgend	129	11	-	220	-	-
The Vale of Glamorgan	17	126	-	30	-	-
Cardiff	6	340	-	-	-	-
Rhondda Cynon Taff	125	194	-	9	-	-
Merthyr Tydfil	14	57	-	-	-	-
Caerphilly	9	199	-	-	-	45
Blaenau Gwent	-	43	-	-	-	10
Torfaen	-	46	-	-	-	44
Monmouthshire	-	44	-	-	-	18
Newport	-	83	-	-	-	71
Total*	**1749**	**1199**	**377**	**359**	**327**	**188**

Source: HSW (PEDW)

*Totals may not match the sum of subtotals, as counts less than five are not displayed.

Average annual counts of angiography episodes by hospital provider and Local Authority of residence, persons aged 35-74, 2002-06 (2 of 2)

Average annual counts of episodes of care involving angiography (counts of less than five not shown)

Local Authority	Hospital site						Total*
	Prince Philip Hospital	Nevill Hall Hospital	Royal Shrewsbury Hospital	Countess of Chester Hospital	Ysbyty Glan Clwyd	All other hospitals	
Isle of Anglesey	-	-	-	-	9	-	93
Gwynedd	-	-	-	5	11	-	146
Conwy	-	-	-	-	18	-	126
Denbighshire	-	-	-	-	12	-	105
Flintshire	-	-	-	33	8	-	200
Wrexham	-	-	-	32	-	-	193
Powys	-	13	75	-	-	36	184
Ceredigion	8	-	-	-	-	-	130
Pembrokeshire	-	-	-	-	-	-	217
Carmarthenshire	89	-	-	-	-	-	422
Swansea	-	-	-	-	-	-	547
Neath Port Talbot	-	-	-	-	-	-	346
Bridgend	-	-	-	-	-	-	362
The Vale of Glamorgan	-	-	-	-	-	-	176
Cardiff	-	-	-	-	-	-	350
Rhondda Cynon Taff	-	-	-	-	-	16	345
Merthyr Tydfil	-	-	-	-	-	-	72
Caerphilly	-	-	-	-	-	-	259
Blaenau Gwent	-	44	-	-	-	-	98
Torfaen	-	14	-	-	-	-	107
Monmouthshire	-	24	-	-	-	7	93
Newport	-	-	-	-	-	-	159
Total*	**109**	**98**	**76**	**75**	**58**	**113**	**4730**

Source: HSW (PEDW)

*Totals may not match the sum of subtotals, as counts less than five are not displayed.

3.4.3 Angiography by Local Authority of residence

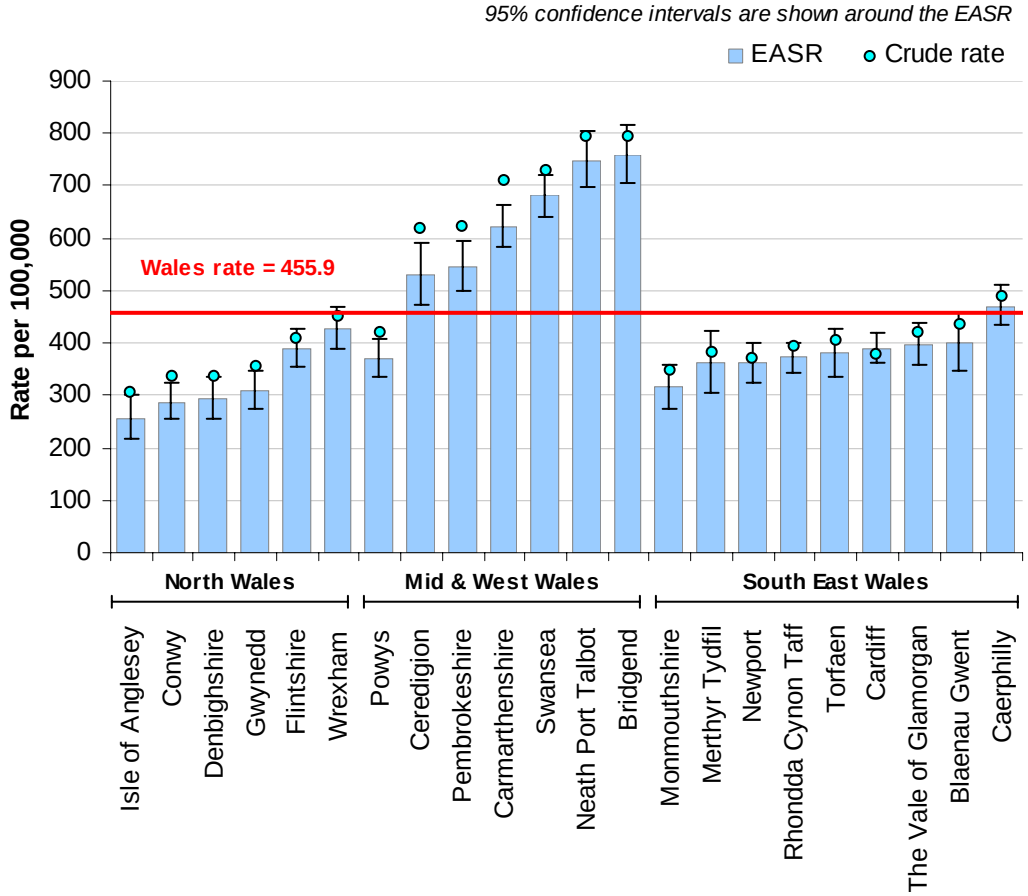
3.4.3.1 Males

The highest rates of angiography in males are located in Mid and West Wales, particularly in the Local Authority areas of Bridgend, Neath Port Talbot and Swansea. However, these areas do not demonstrate the highest rates of mortality (section 3.2.1.1). Whilst emergency admissions are high in Neath Port Talbot and Bridgend (section 3.3.2.1), they are comparable to rates in Local Authorities such as Wrexham, Denbighshire, Blaenau Gwent and Caerphilly, which all demonstrate lower rates of angiography. As with cardiac treatment (sections 3.5.3.1), the areas with the highest rates of angiography show mortality rates which are not statistically significantly different to the Wales average.

Data supporting this chart can be found in table 3.4.3.1 within the appendix.

Angiography, European age-standardised rate (EASR) per 100,000, ranked Local Authorities, males aged 35-74, 2004-06

Source: HSW (PEDW), ONS (MYE)



3.4.3.2 Females

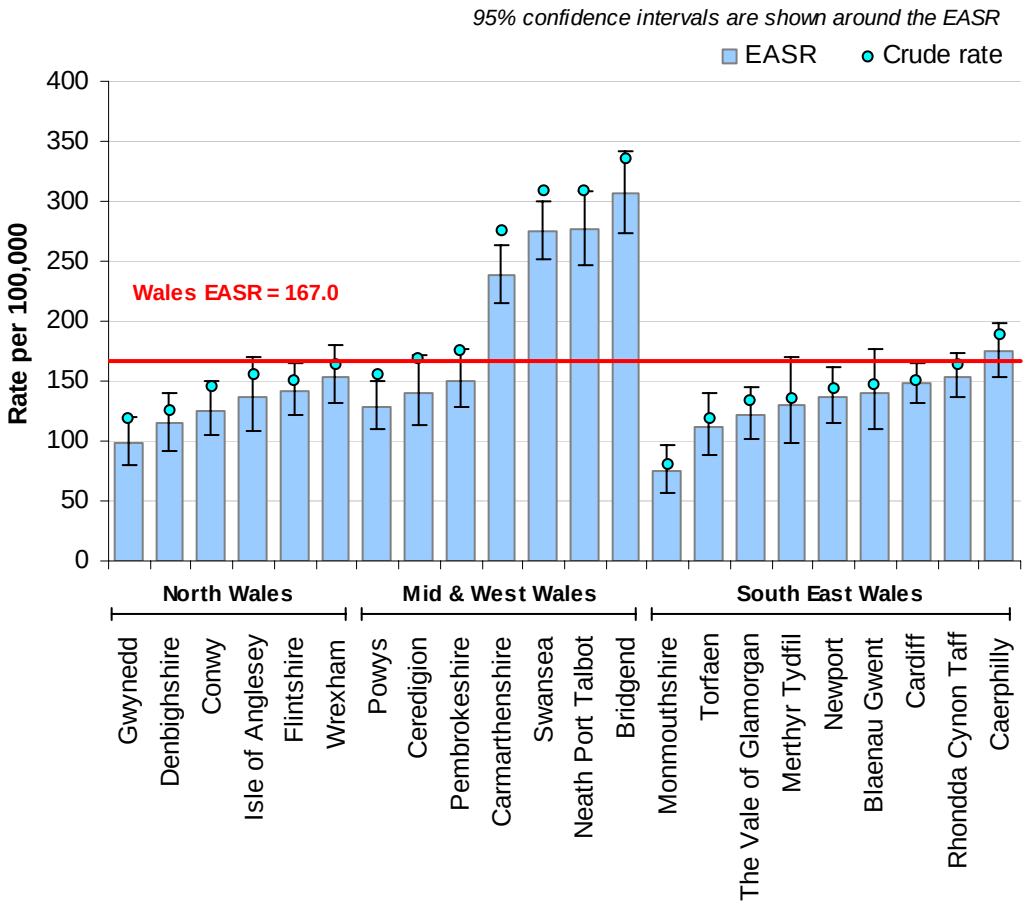
As with emergency admissions (section 3.3.2.2), rates of angiography are considerably lower in females compared to males. This is consistent with the pattern also shown by mortality (section 3.2.1.2). Angiography rates in females show a similar pattern to that demonstrated for males in section 3.4.3.1 with statistically significantly higher rates in some of the same Local Authority areas (Bridgend, Carmarthenshire, Swansea and Neath Port Talbot) within the Mid and West region compared to Wales. As outlined in sections 3.4.3.1, these areas do not have the highest rate of need in terms of either mortality or emergency admissions.

Conversely, as with cardiac treatment (revascularisation), areas with the lowest angiography rates demonstrate some of the highest levels of emergency admissions and mortality.

Data supporting this chart can be found in table 3.4.3.2 within the appendix.

Angiography, European age-standardised rate (EASR) per 100,000, ranked Local Authorities, females aged 35-74, 2004-06

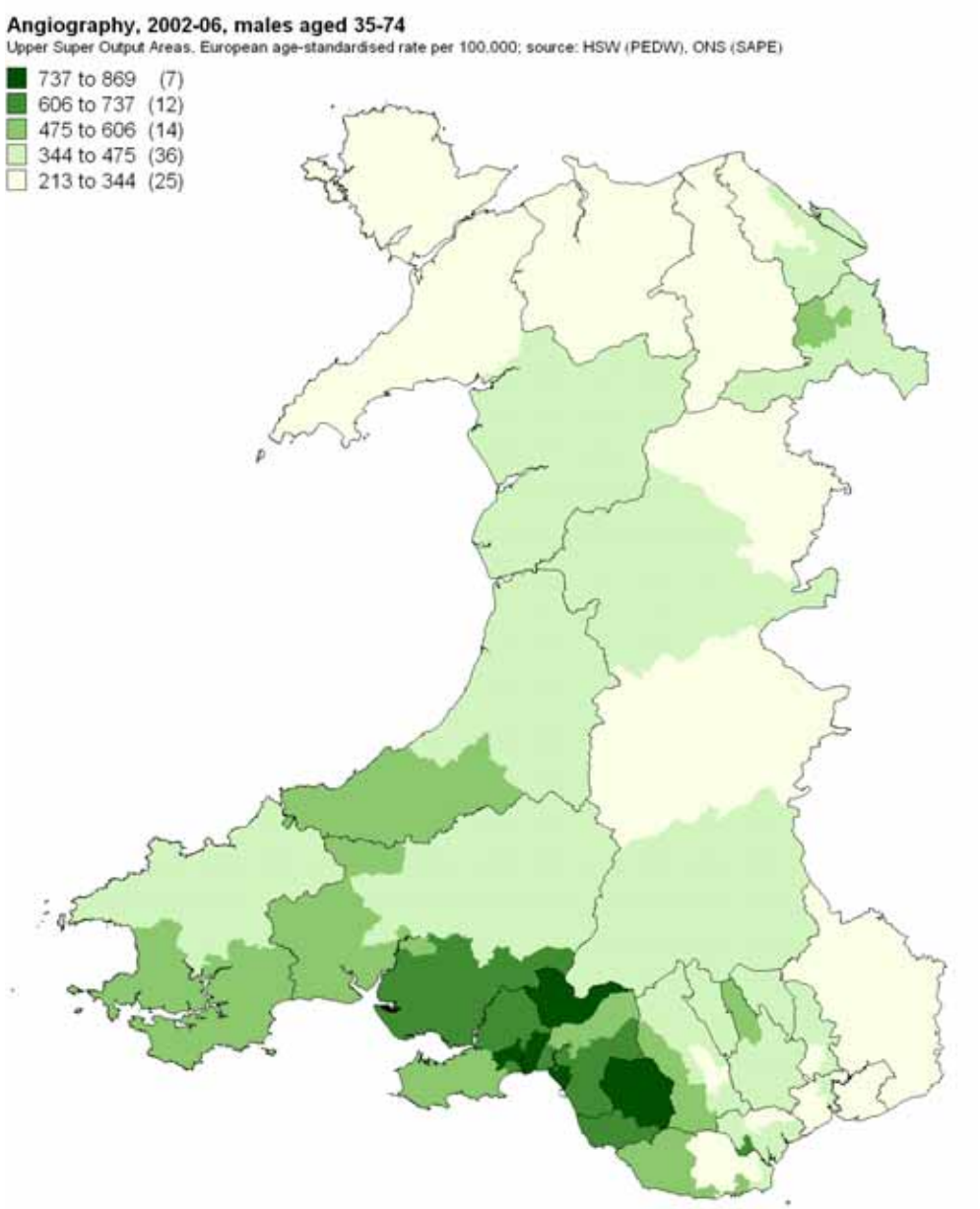
Source: HSW (PEDW), ONS (MYE)



3.4.4 Angiography by USOA

3.4.4.1 Males

The map below shows a similar pattern to the chart in section 3.4.3.1, with the highest angiography rates in males located within the USOAs in Bridgend, Neath Port Talbot and Swansea. As described in section 3.4.3.1 areas with the highest cardiac investigation rates (angiography) do not appear to demonstrate the greatest need in terms of either mortality or emergency CHD admissions.

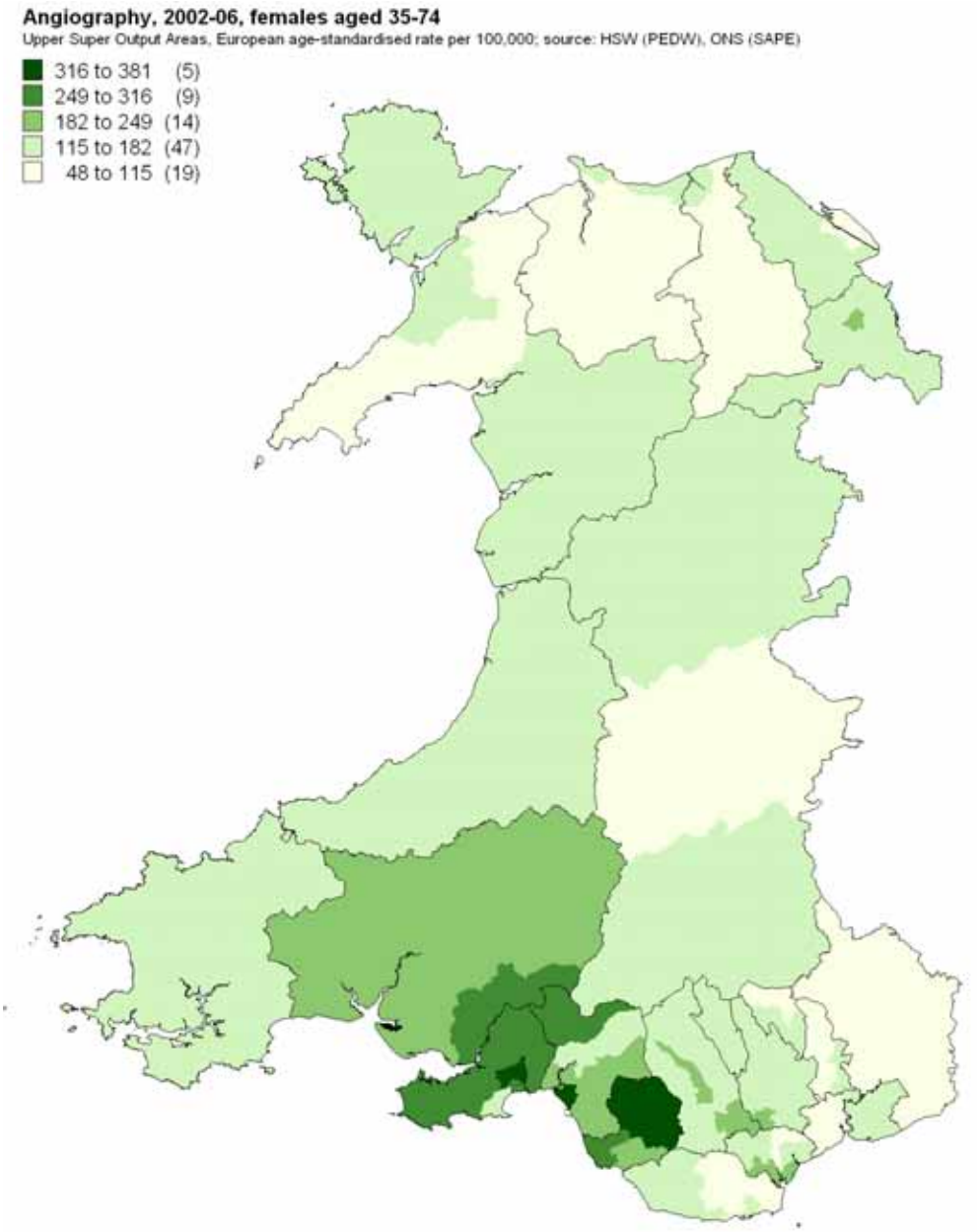


This map has been created using the equal range method. Ranges are up to and not including the higher value.

3.4.4.2 Females

Angiography rates at USOA level are considerably lower for females compared to males. Higher rates are still evident in the same Local Authority areas identified in section 3.4.4.1 for males in Neath Port Talbot, Swansea, Bridgend and Carmarthenshire.

Comparison with the maps in section 3.2.2.2 and section 3.3.3.2 shows that these are not the areas with the highest mortality. Whilst these areas do show higher rates of emergency admissions there are other Local Authority areas displaying similarly high rates of emergency admissions which do not demonstrate high rates of angiography.



This map has been created using the equal range method. Ranges are up to and not including the higher value. Crown copyright material is reproduced with the permission of the Controller of HMSO and the Queen's Printer for Scotland.

3.4.5 Angiography by region and deprivation fifth: rates and rate ratios

This section is split into three parts to enable separate discussion of trends in each of the Wales regions. Additional information in the form of counts of angiographies by region, fifth and year are available in tables 3.4.5a and 3.4.5b.

3.4.5.1 North Wales

The charts overleaf show that, in males, angiography rates have been higher in the most deprived fifth compared to the least deprived for both males and females in North Wales. In Males this is more evident since 1994.

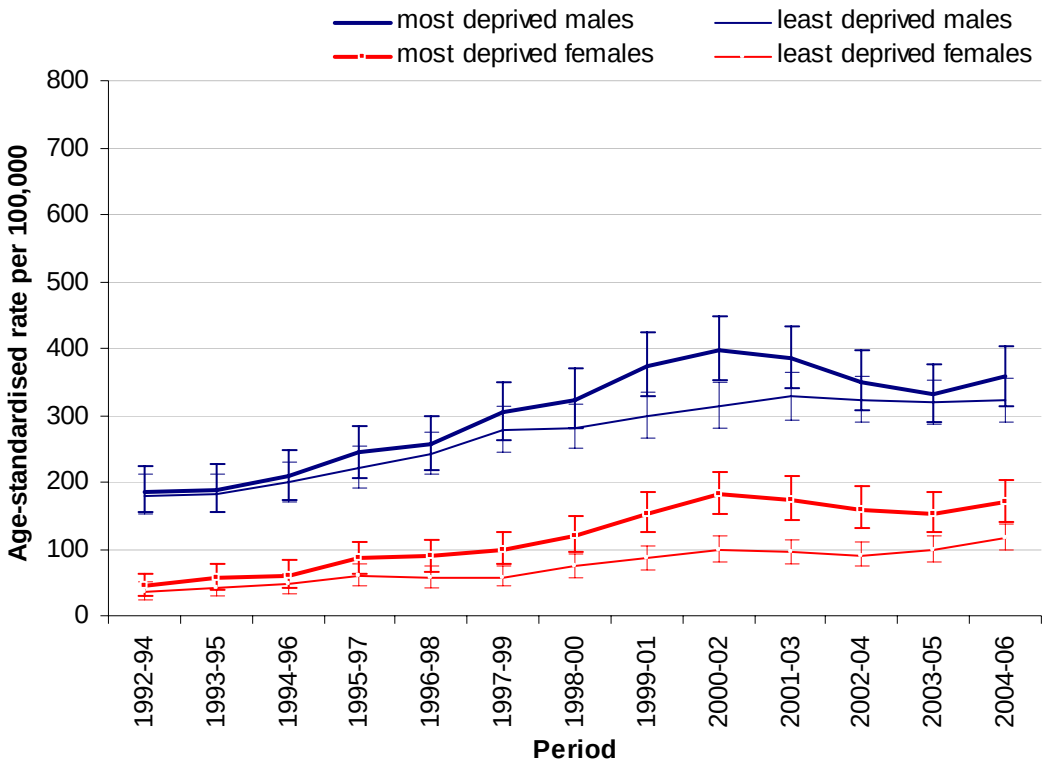
The rate ratios, although difficult to interpret over the period due to wide confidence intervals, show that this difference fluctuates around one-and-three-quarters times in females but is more constant in males at around one.

Sections 3.2.3.1 and 3.3.4.1 identified large differences in mortality and in emergency CHD admissions between the most deprived and the least deprived fifths, however the similarity in their angiography rates is perhaps indicative of inequity.

Supporting data for the charts showing rates can be found in tables 3.4.5.1a and 3.4.5.1b within the appendix, with data for charts showing rate ratios presented in appendix tables 3.4.5.1c and 3.4.5.1d.

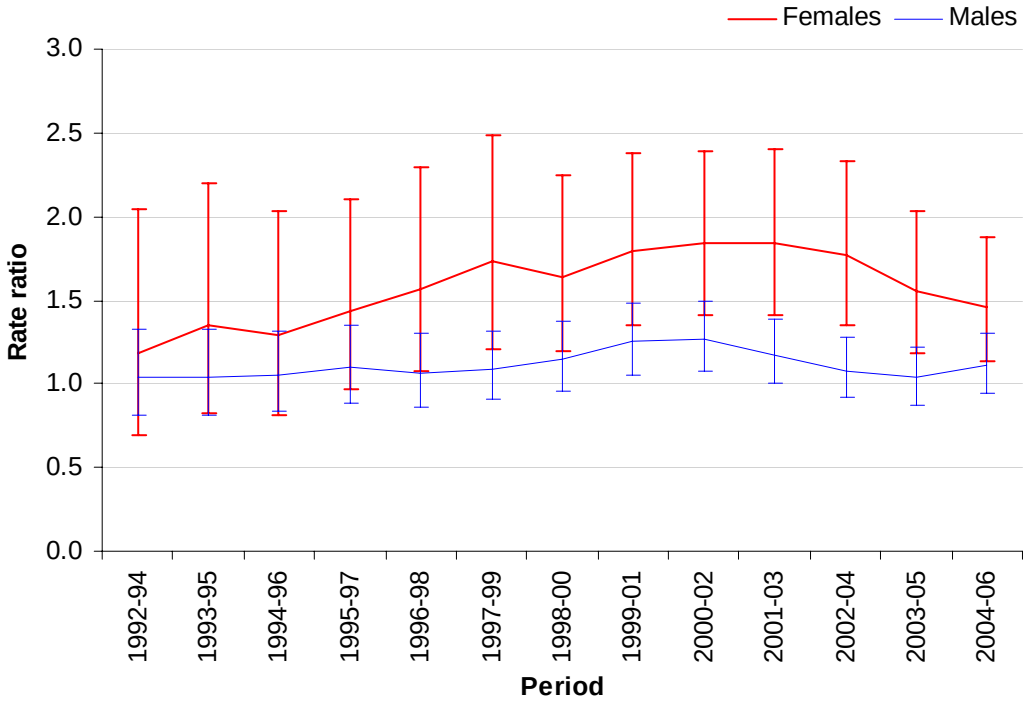
Angiography in males & females aged 35-74, North Wales, most & least deprived fifths, 3-year rolling European age-standardised rate per 100,000, 1992-2006

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)



Angiography in males & females aged 35-74, North Wales, 3-year rolling Wales age-standardised rate ratios, 1992-2006

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)



3.4.5.2 Mid & West Wales

The following charts show the increase in angiography rates for males and females in the most and least deprived fifth in the Mid & West Wales region.

Angiography rates are higher in males with both males and females showing the same pattern; consistently higher angiography rates in the most deprived fifths. Angiography rates show an upward trend over the period for both males and females.

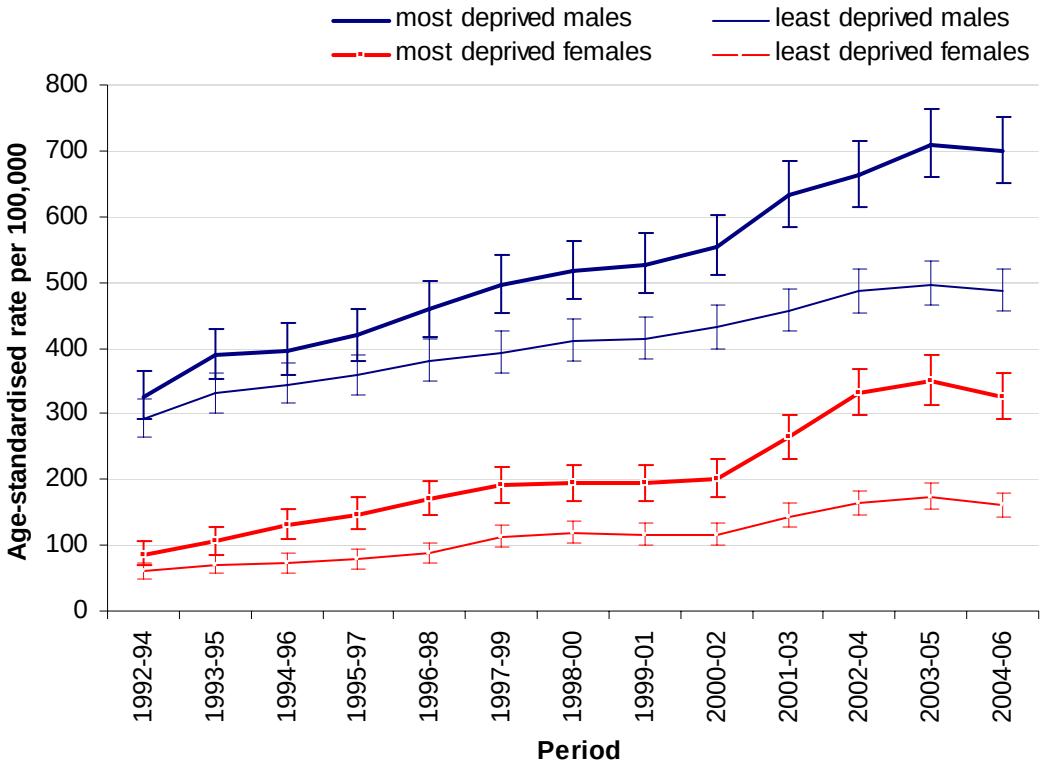
Angiography rates in the most deprived fifth more than doubled over the period shown for both males and females to a rate of 700 per 100,000 for males and a rate of 326 per 100,000 for females.

Rate ratios for cardiac investigation (angiography) are similar to those for emergency CHD admissions (see section 3.3.4.2) but lower than the mortality rate ratios (see section 3.2.3.2). This is perhaps indicative of inequity in rates of cardiac investigation despite recent rises in the rate of angiography within the most deprived fifth.

Additional information for the charts showing rates can be found in appendix tables 3.4.5.2a and 3.4.5.2b. Supporting data for the charts showing rate ratios is presented in tables 3.4.5.2c and 3.4.5.2d.

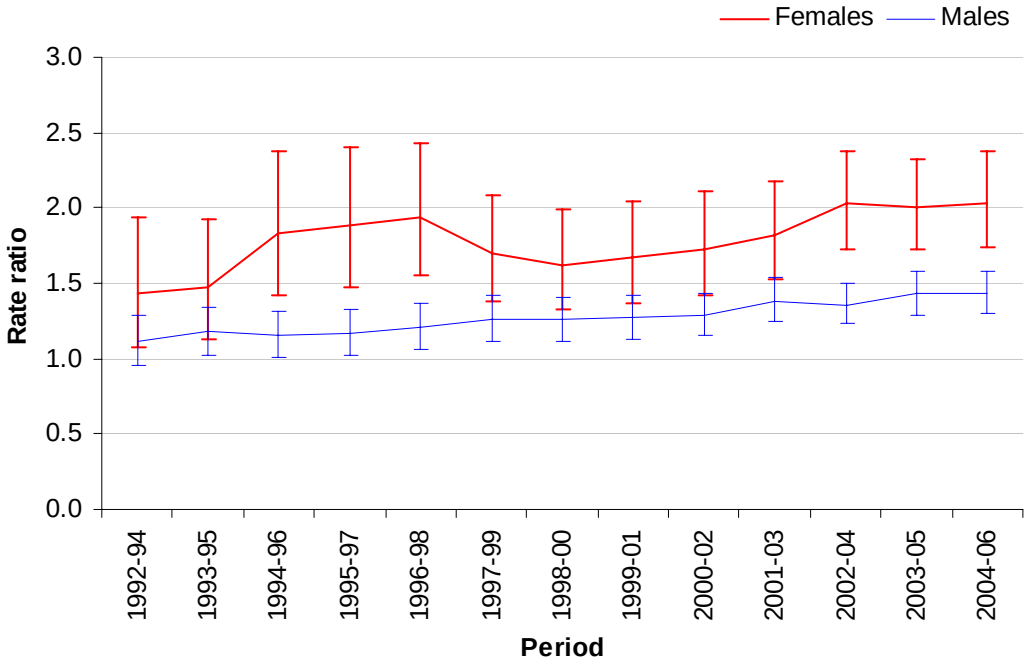
Angiography in males & females aged 35-74, Mid & West Wales, most & least deprived fifths, 3-year rolling European age-standardised rate per 100,000, 1992-2006

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)



Angiography in males & females aged 35-74, Mid & West Wales, 3-year rolling European age-standardised rate ratios, 1992-2006

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)



3.4.5.3 South East Wales

The following charts show angiography rates in the most and least deprived fifths, and rate ratios for both males and females in the South East Wales region.

As in North Wales (section 3.4.5.1), and Mid & West Wales region (section 3.4.5.2), angiography rates are higher in males compared to females.

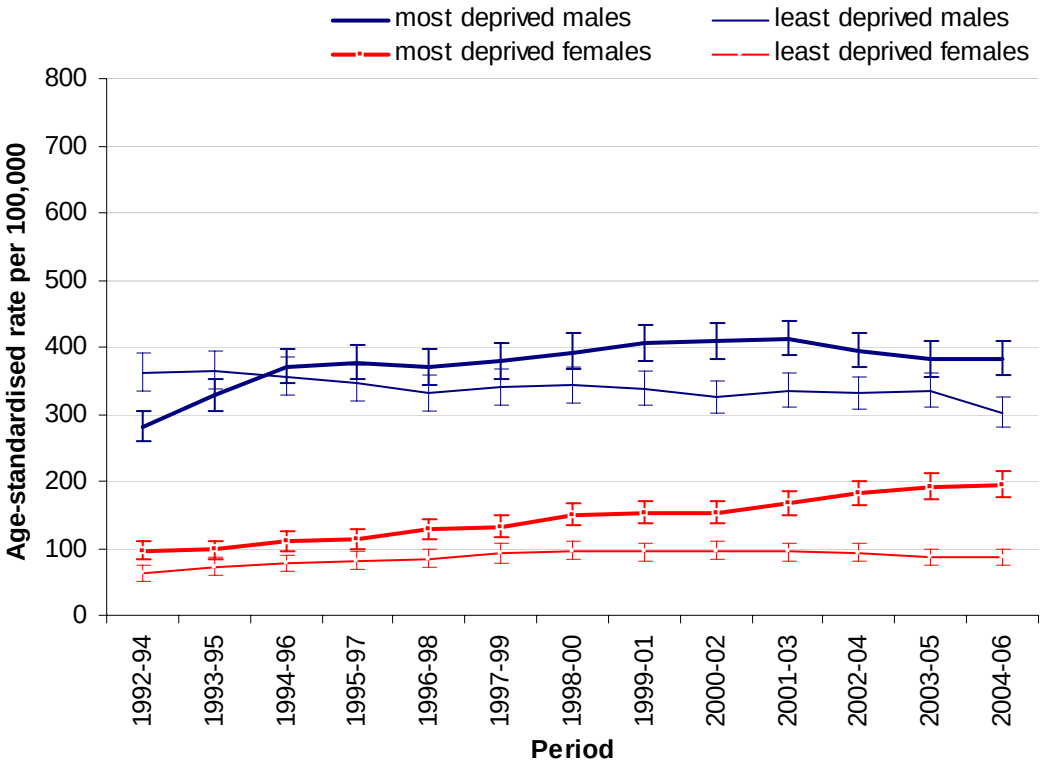
The relative difference between rates of angiography in the least deprived and most deprived groups has increased, with rate ratios increasing from 0.8 to 1.3 in males and from 1.5 to 2.3 in females over the period shown (1992-94 to 2004-06). In females, for example, this is due to the rate rising more quickly over the period in the most deprived group compared to the least deprived group, as would be hoped given their relative levels of need (sections 3.2.3.3 and 3.3.4.3).

However, for males and females, the relative difference between angiography rates in the least deprived and most deprived groups remains smaller than the relative difference between rates of mortality and emergency admissions in these groups (sections 3.2.3.3 and 3.3.4.3). This is perhaps indicative of continuing inequity in the provision of cardiac investigation for both males and females in South East Wales.

Additional information for the following charts can be found in appendix tables 3.4.5.3a and 3.4.5.3b for the charts showing rates, and appendix tables 3.4.5.3c and 3.4.5.3d for the charts showing rate ratios.

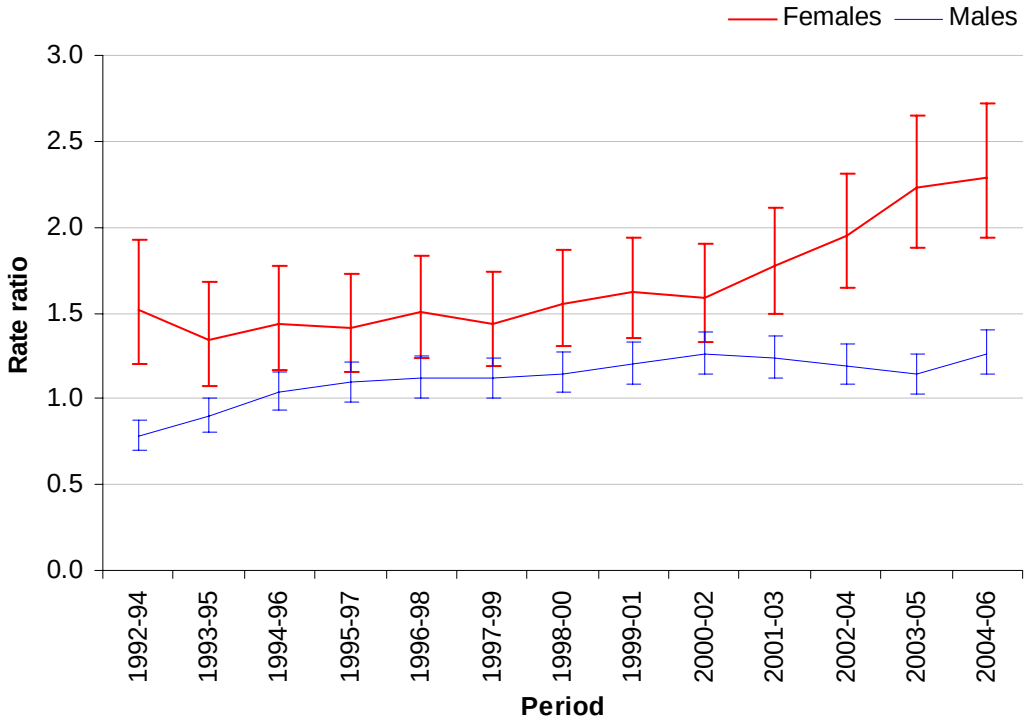
Angiography in males & females aged 35-74, South East Wales, most & least deprived fifths, 3-year rolling European age-standardised rate per 100,000, 1992-2006

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)



Angiography in males & females aged 35-74, South East Wales, 3-year rolling Wales age-standardised rate ratios, 1992-2006

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)



3.5 Revascularisation

3.5.1 Revascularisation by hospital

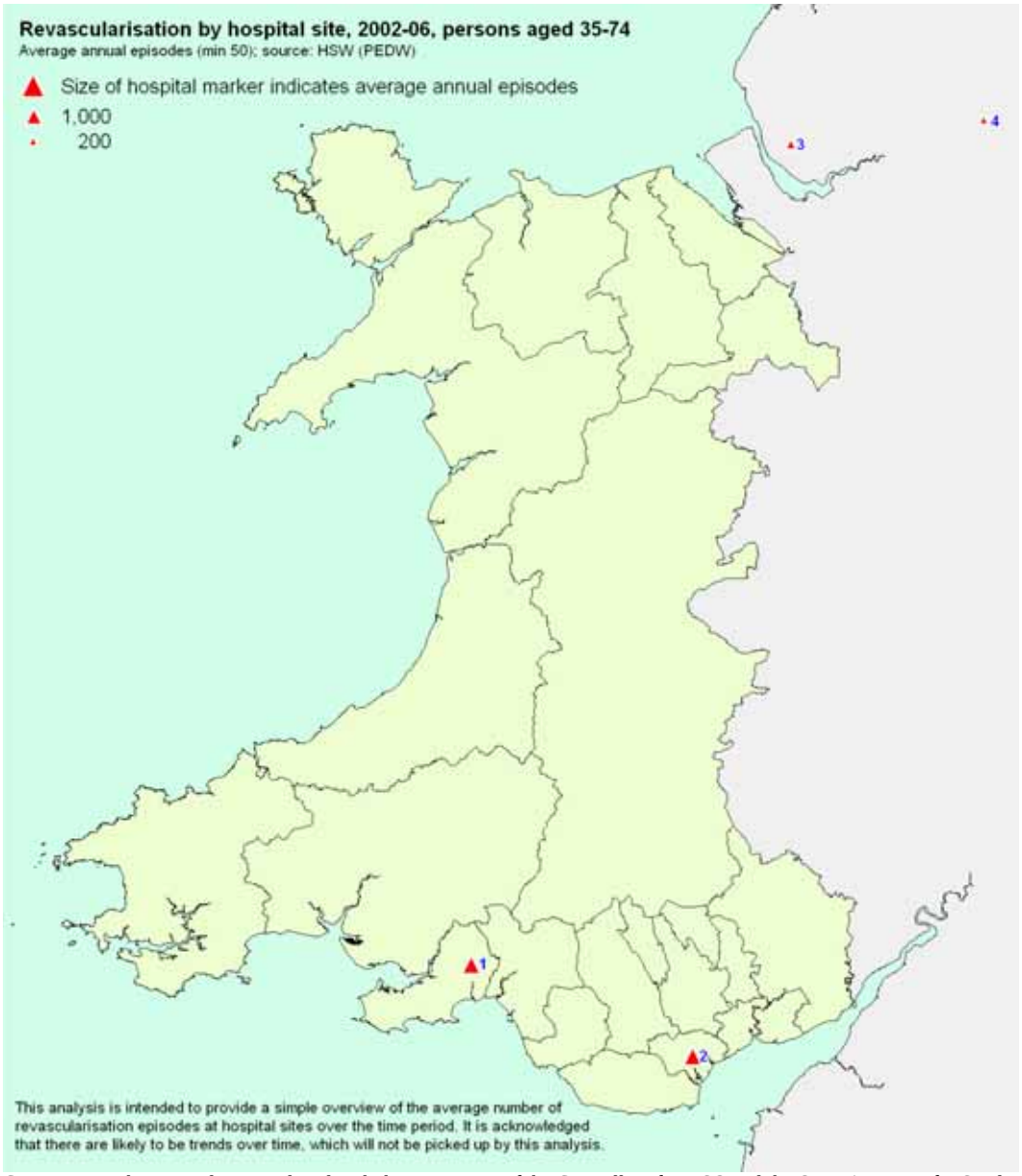
The table below and map overleaf show that there are four major centres supplying revascularisation surgery to residents of Wales.

The majority of revascularisations carried out within the population of Wales take place in the South, at Morrison Hospital and the University Hospital of Wales.

Revascularisation by hospital site, persons aged 35-74, average annual FCEs (minimum 50), 2002-06

Map label	Hospital	Average annual FCEs
1	Morriston Hospital	1151
2	University Hospital of Wales	1079
3	Liverpool Heart and Chest Hospital	356
4	Manchester Royal Infirmary	262

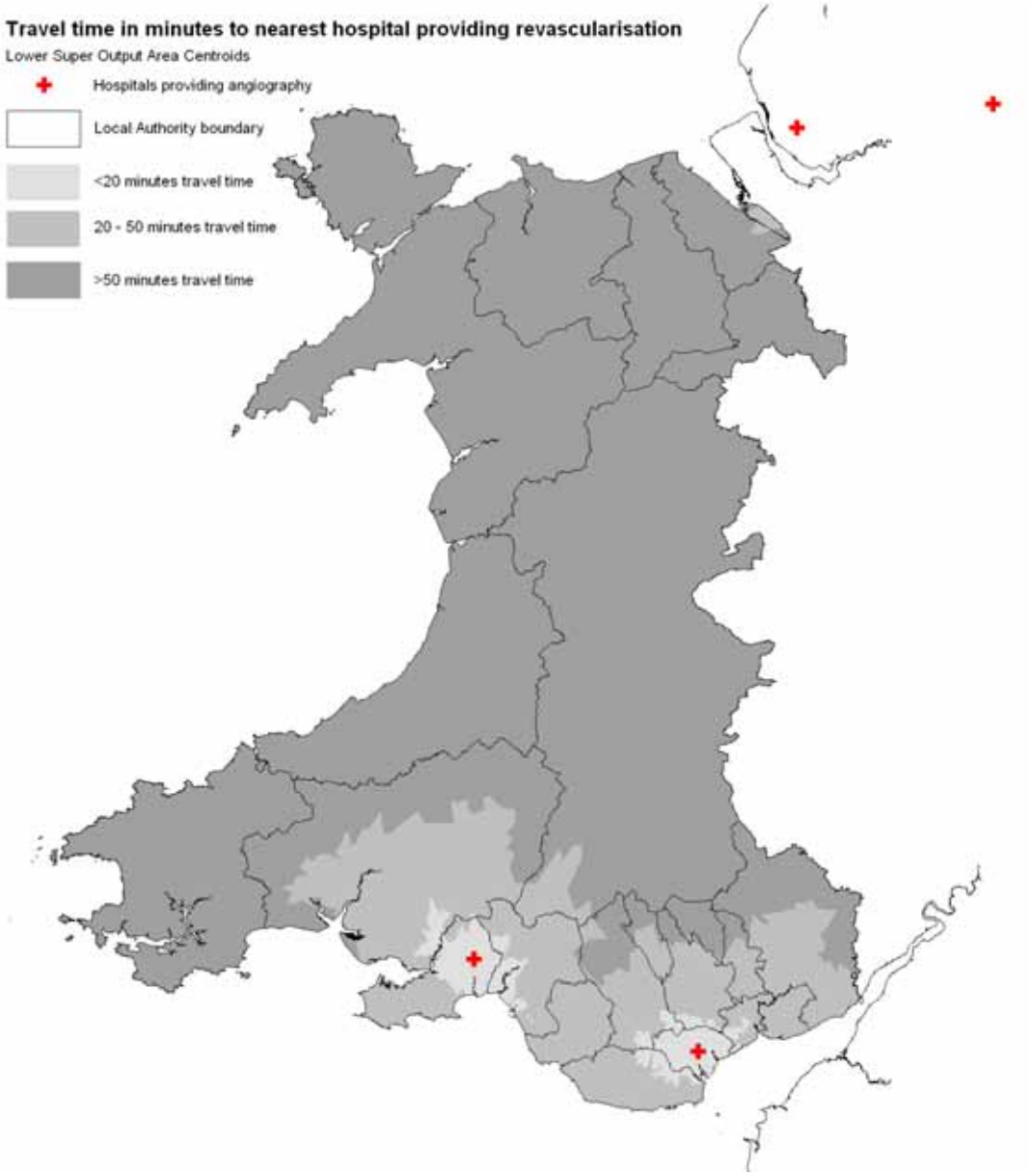
Source: HSW (PEDW)



3.5.2 Travel time to nearest provider of revascularisation

The map below shows the estimated time it takes residents of Wales to travel by road to their nearest provider of revascularisation. The hospital locations are as those shown on the map in section 3.5.1. The travel time ranges of under 20, 20 to 50 and more than 50 minutes were chosen in order to match those used in section 3.4.2 to show travel time to angiography providers.

It is clear from the map below that residents of North Wales, in addition to those who live in Powys, Ceredigion and Pembrokeshire, are likely to have to travel for more than an hour to access this surgical procedure. It should be noted, however, that patients will not always receive treatment at their nearest centre; the table overleaf shows that residents of the Isle of Anglesey, for example, mostly attend Manchester Royal Infirmary for revascularisation, whereas Liverpool Heart and Chest Hospital is closer.



Average annual counts of revascularisation episodes by hospital provider and Local Authority of residence, persons aged 35-74, 2002-06

Average annual counts of episodes of care involving revascularisation (counts of less than five not shown)

Local Authority	Hospital site					Total*
	Morriston Hospital	University Hospital Of Wales	Liverpool Heart And Chest Hospital	Manchester Royal Infirmary	All other hospitals	
Isle of Anglesey	-	-	-	68	-	70
Gwynedd	6	-	19	84	-	112
Conwy	-	-	33	65	-	101
Denbighshire	-	-	51	26	-	77
Flintshire	-	-	132	17	-	152
Wrexham	-	-	118	12	-	134
Powys	19	24	-	-	65	108
Ceredigion	61	-	-	-	-	67
Pembrokeshire	114	14	-	-	6	134
Carmarthenshire	202	-	-	-	10	216
Swansea	309	-	-	-	-	314
Neath Port Talbot	193	-	-	-	7	204
Bridgend	161	12	-	-	6	180
The Vale of Glamorgan	20	98	-	-	-	122
Cardiff	-	279	-	-	-	285
Rhondda Cynon Taff	45	154	-	-	7	206
Merthyr Tydfil	9	49	-	-	-	58
Caerphilly	6	165	-	-	-	175
Blaenau Gwent	-	49	-	-	-	51
Torfaen	-	64	-	-	-	67
Monmouthshire	-	56	-	-	6	62
Newport	-	103	-	-	-	108
Total*	**1151**	**1079**	**356**	**273**	**145**	**3004**

Source: HSW (PEDW)

*Totals may not match the sum of subtotals, as counts less than five are not displayed.

3.5.3 Revascularisation by Local Authority of residence

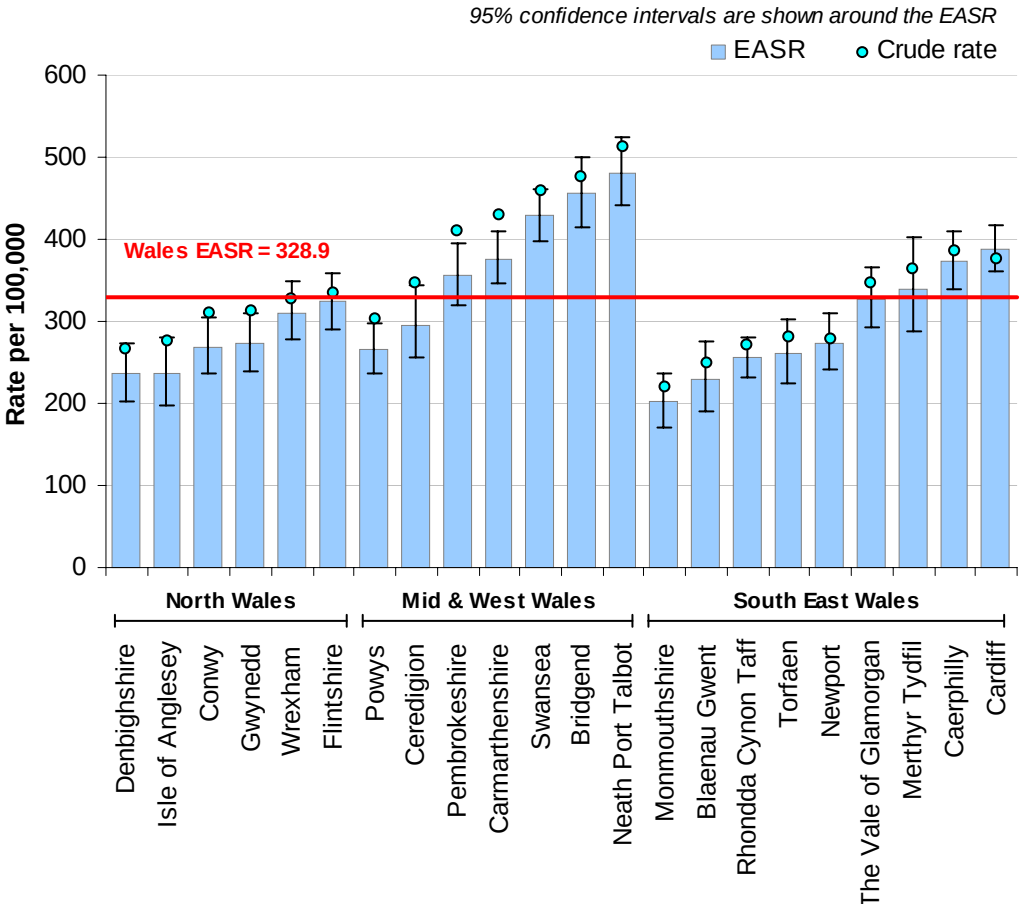
3.5.3.1 Males

Supporting data for the chart overleaf can be found in appendix table 3.5.3.1. As is the case with angiography, the areas with the highest rates of revascularisation in males are located in the Mid & West region, within residents of Swansea, Bridgend, Neath Port Talbot and Carmarthenshire. If utilisation matched need, then it would be expected that these areas would also show the highest rates of mortality (section 3.2.1.1) and emergency admissions (section 3.3.2.1). Although rates of emergency admissions are high in Bridgend and Neath Port Talbot, they are similar to rates in Local Authorities such as Wrexham, Denbighshire, Blaenau Gwent and Caerphilly, which all have considerably lower rates of angiography. It is also apparent that in South East Wales, Cardiff has the highest revascularisation rate, despite having one of the lower mortality rates within the region (section 3.2.1.1); this may be attributable in part to the effect of being close to a major treatment centre.

Using death as a proxy for need, Blaenau Gwent and Rhondda Cynon Taff have amongst the highest mortality rates yet demonstrate amongst the lowest rates of revascularisation in the chart below. The areas with the highest rates of revascularisation, meanwhile, show mortality rates which are not statistically significantly different to the Wales average. This could in part be explained, however, by high revascularisation rates improving patient outcomes, although the overall effect on mortality is likely to be small in the context of other variables such as lifestyle factors.

Revascularisation, European age-standardised rate (EASR) per 100,000, ranked Local Authorities, males aged 35-74, 2004-06

Source: HSW (PEDW), ONS (MYE)



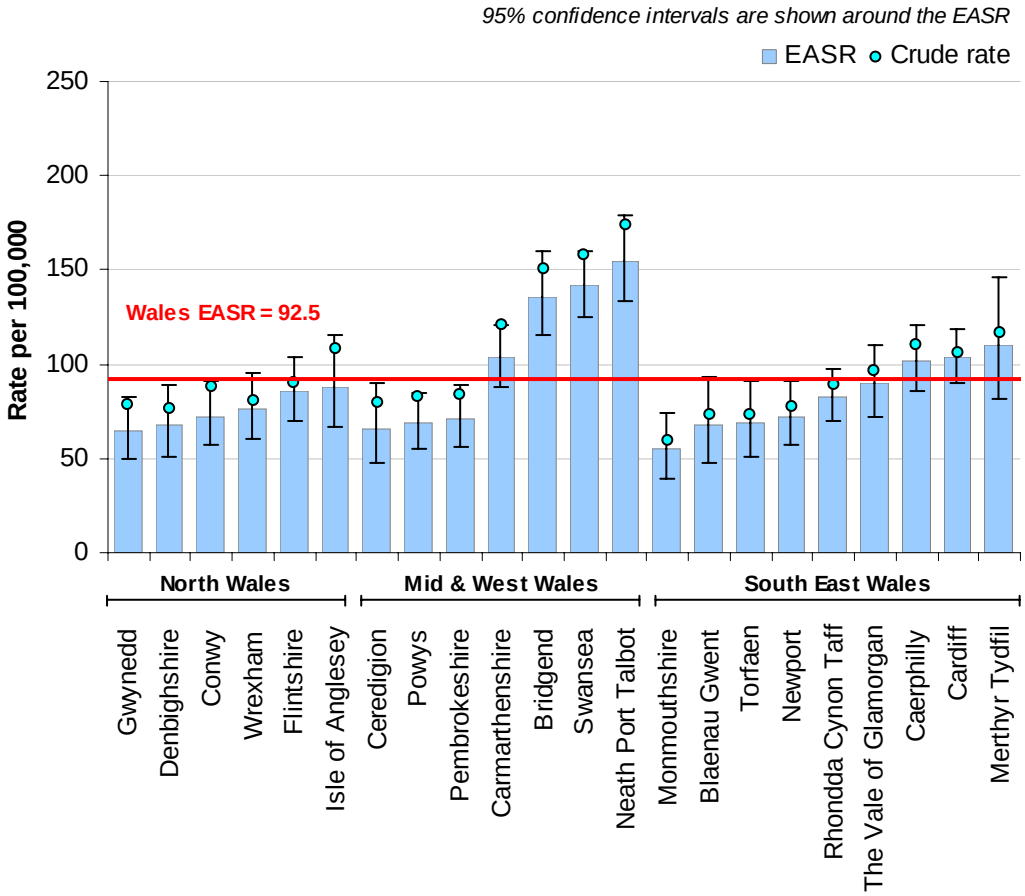
3.5.3.2 Females

Rates of revascularisation are considerably lower in females than in males, which is consistent with the lower level of need displayed by the former group in terms of mortality and emergency CHD admissions. The pattern of revascularisation rates in females, however, is similar to that shown for males in section 3.5.3.1; revascularisation rates in most Local Authority areas are below the Wales average, whilst three areas in Mid & West Wales demonstrate statistically significantly higher rates than the Wales average. Supporting data can be found in appendix table 3.5.3.2.

Similarly to the situation in males, these three areas (Bridgend, Swansea and Neath Port Talbot) with the highest revascularisation rates do not have the highest rates of need as measured by mortality (section 3.2.1.2) and emergency admissions (section 3.3.2.2). Conversely, areas with low revascularisation rates, such as Blaenau Gwent and Rhondda Cynon Taff, demonstrate some of the highest levels of emergency admissions and mortality.

Revascularisation, European age-standardised rate (EASR) per 100,000, ranked Local Authorities, females aged 35-74, 2004-06

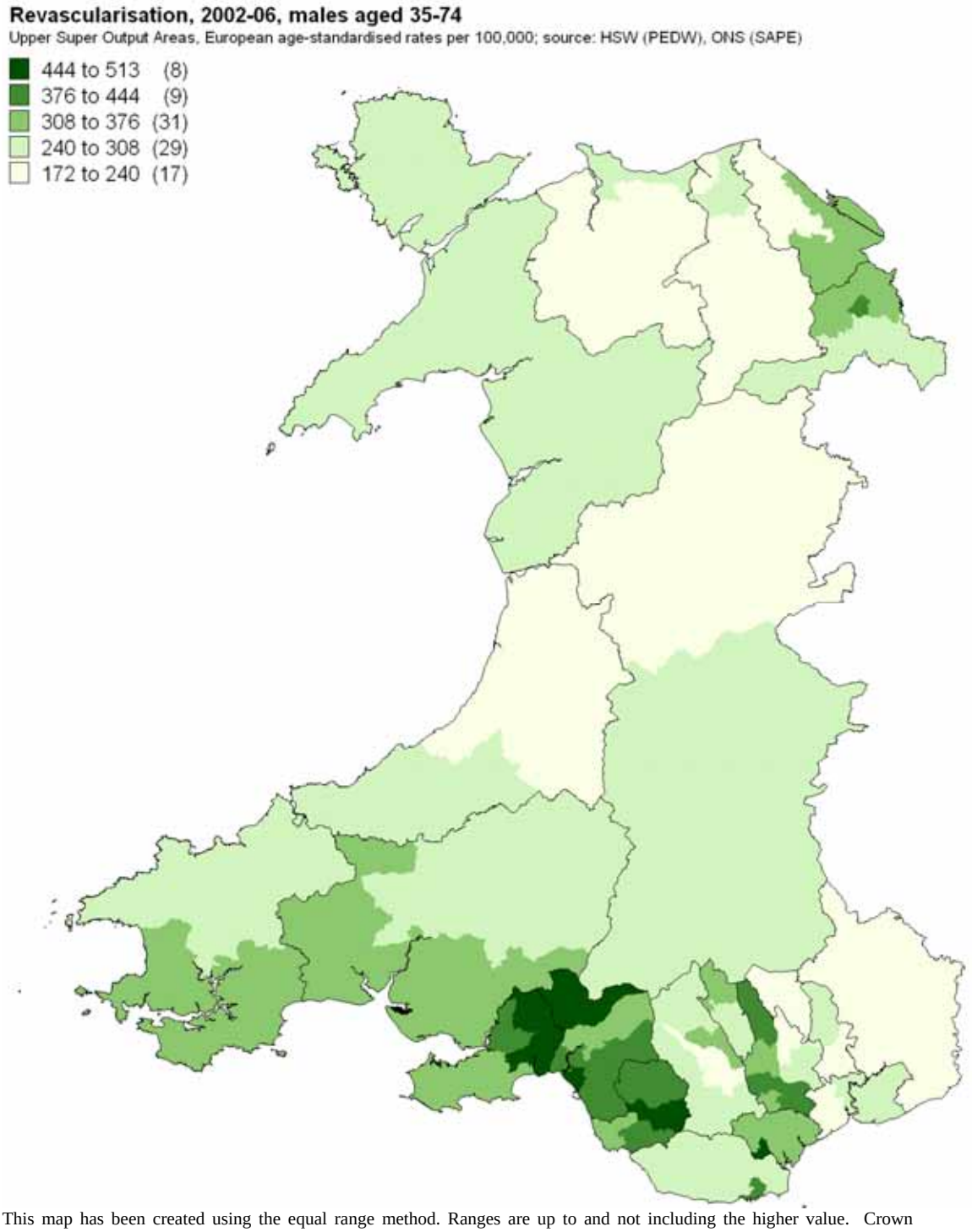
Source: HSW (PEDW), ONS (MYE)



3.5.4 Revascularisation by USOA

3.5.4.1 Males

As would be expected from the chart shown in section 3.5.3.1, the highest rates of revascularisation are mostly found in USOAs within Bridgend, Neath Port Talbot and Swansea. Comparison with the map in section 3.2.2.1 shows that the areas with the highest revascularisation rates do not have the highest mortality rates.



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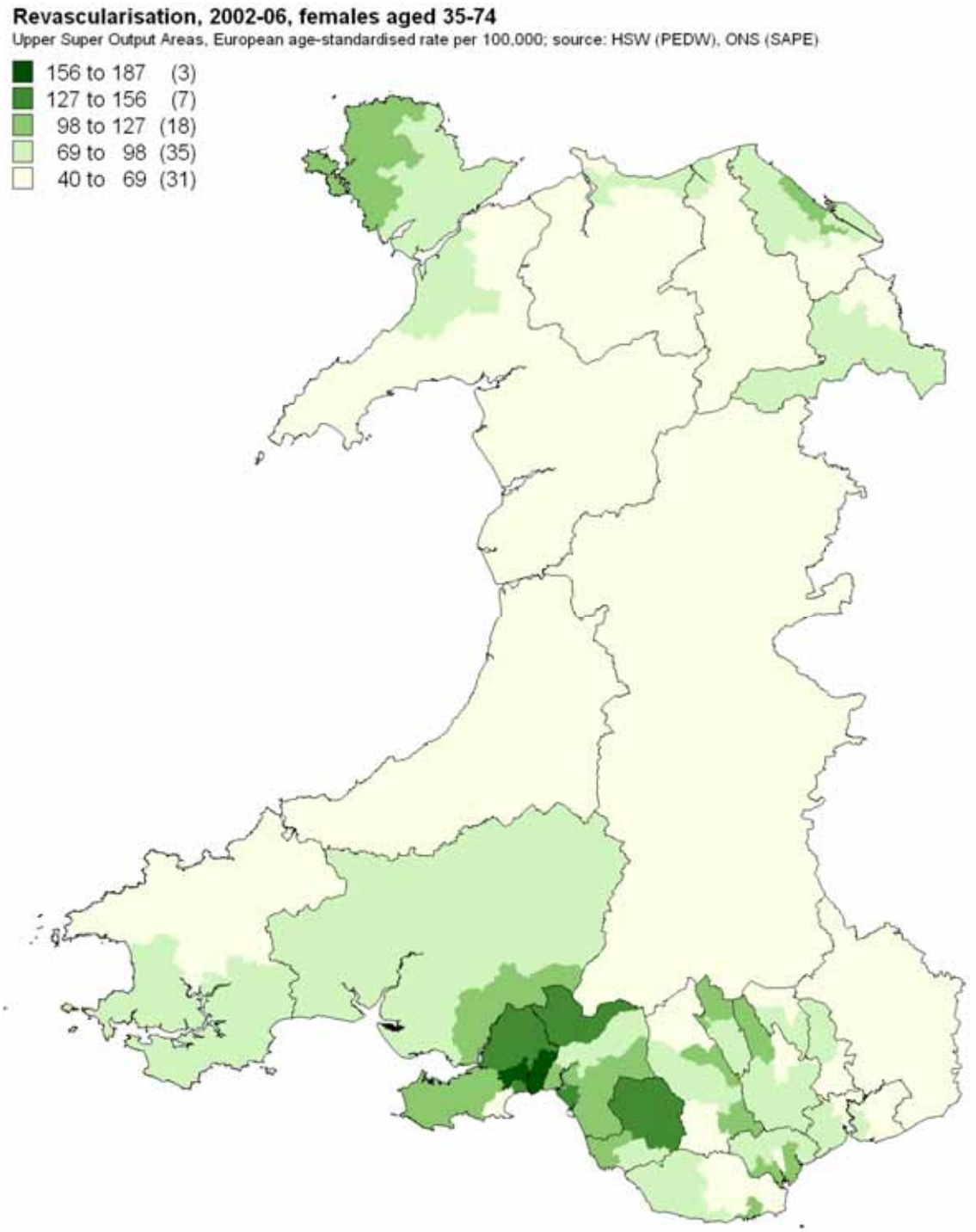
3.5.4.2 Females

The majority of USOAs (66 of 94) demonstrate revascularisation rates in females of between 40 and 98 per 100,000. A small number of areas, however (10 of 94), which are mostly in Bridgend, Swansea and Neath Port Talbot, show rates between three and approximately four times higher of 127 to 187 per 100,000. This illustrates in further detail the pattern shown in section 3.5.3.2. Comparison with the USOA mortality map (section 3.2.2.2) shows that high rates of mortality in the South Wales valleys are not matched by the highest rates of revascularisation.



This map has been created using the equal range method. Ranges are up to and not including the higher value. Crown copyright material is reproduced with the permission of the Controller of HMSO and the Queen's Printer for Scotland.

3.5.5 Revascularisation by region and deprivation fifth: rates and rate ratios

This section is split into three parts, to enable separate discussion of trends in each of the Wales regions.

The vertical axes in the charts showing rates of revascularisation retain the same scale as that used to show rates of angiography in section 3.4.5. This is intended to facilitate comparison between angiography and revascularisation rates, and also comparison between rates of these procedures across regions.

Additional information in the form of counts of revascularisation episodes by region, fifth and year is available in tables 3.5.5a and 3.5.5b.

3.5.5.1 North Wales

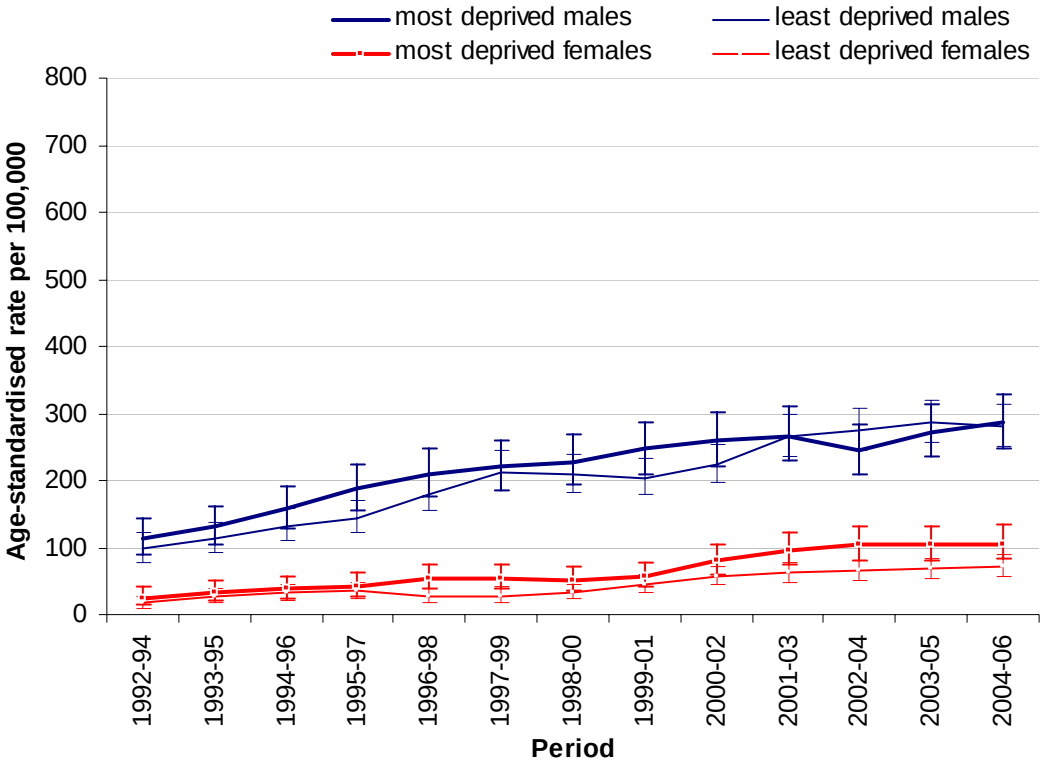
The charts below and overleaf show that revascularisation rates are similar in the least and most deprived sections of the North Wales population. In females, there is some evidence that the most deprived have experienced a higher revascularisation rate than the least deprived, particularly since around 2000. In males, the pattern is more mixed, with there being signs of rates being higher in the least deprived than in the most deprived for some periods. The rate ratios, though difficult to interpret due to the wide confidence intervals, show this difference between males and females: the ratio in males remains around one over the period, compared to around one-and-a-half in females.

In light of the large differences in rates of CHD mortality and emergency admissions between the least and most deprived (sections 3.2.3.1 and 3.3.4.1), the similarity in their revascularisation rates is indicative of inequity in the provision of treatment. Furthermore, rates of revascularisation are relatively low in North Wales compared to Mid & West Wales.

Supporting data for the charts showing rates can found in appendix tables 3.5.5.1a and 3.5.5.1b, with data for charts showing rate ratios presented in appendix tables 3.5.5.1c and 3.5.5.1d.

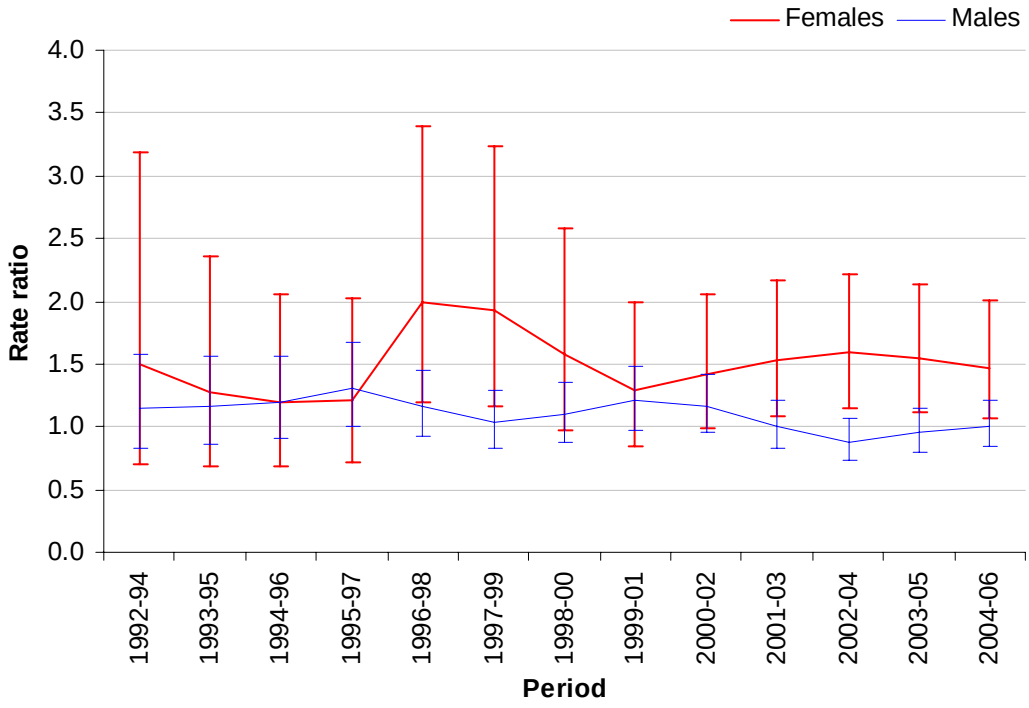
Revascularisation in males & females aged 35-74, North Wales, most & least deprived fifths, 3-year rolling European age-standardised rate per 100,000, 1992-2006

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)



Revascularisation in males & females aged 35-74, North Wales, 3-year rolling Wales age-standardised rate ratios, 1992-2006

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)



3.5.5.2 Mid & West Wales

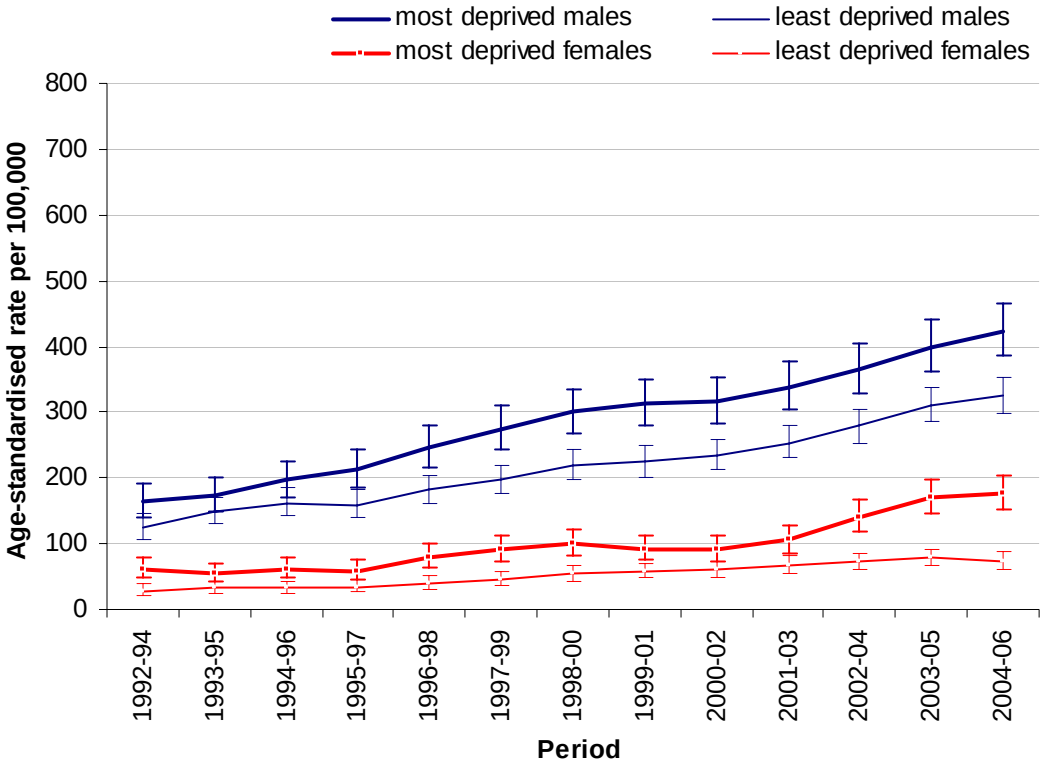
The charts below and overleaf show that revascularisation rates in the least deprived males and females in the Mid & West region are similar to those in the North. Yet rates in the most deprived males and females are considerably higher in the former region, rising over the period to over 400 in males (compared to under 300 in the North) and around 180 in females (compared to approximately 100). There has been a particularly marked rise in the revascularisation rate in the most deprived females since around 2000, which mirrors the rise in angiography rates shown in section 3.4.5.

Towards the end of the period, this leads to a consistent difference in revascularisation rates between the least and most deprived groups of Mid & West Wales. This more closely mirrors the difference in need within the two groups, as displayed by the charts in sections 3.2.3.2 and 3.3.4.2. However, the revascularisation rate ratio in males, which remains fairly stable over the period, is exceeded by the corresponding rate ratios shown for mortality and emergency admissions in sections 3.2.3.2 and 3.3.4.2.

Supporting data for the charts showing rates can found in appendix tables 3.5.5.2a and 3.5.5.2b, with data for charts showing rate ratios presented in appendix tables 3.5.5.2c and 3.5.5.2d.

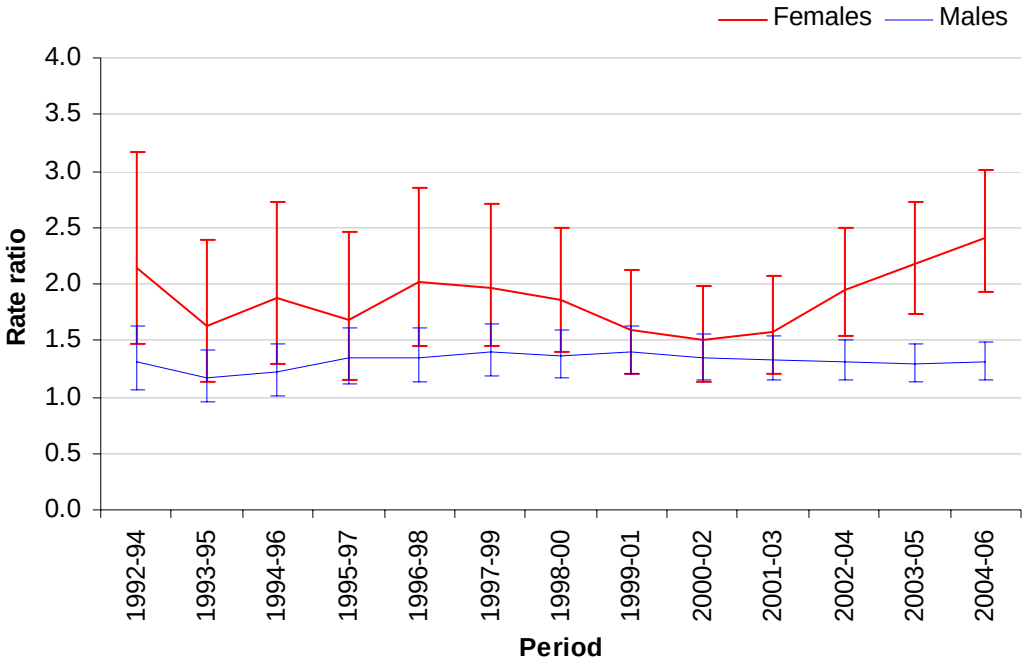
Revascularisation in males & females aged 35-74, Mid & West Wales, most & least deprived fifths, 3-year rolling European age-standardised rate per 100,000, 1992-2006

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)



Revascularisation in males & females aged 35-74, Mid & West Wales, 3-year rolling European age-standardised rate ratios, 1992-2006

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)



3.5.5.3 South East Wales

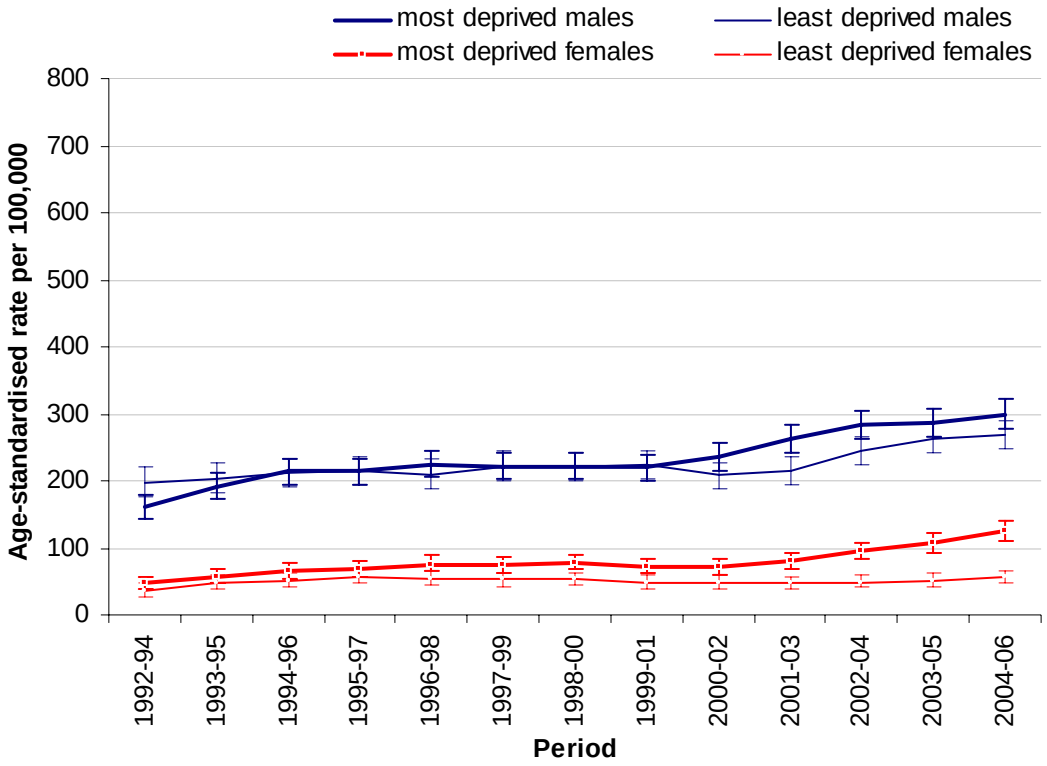
The pattern shown on the first chart overleaf is similar to that evident for North Wales (section 3.5.5.1), with little clear difference between revascularisation rates in the least and most deprived groups. In females, however, rates have risen markedly in the most recent years, showing a similar pattern to Mid & West Wales (section 3.5.5.2.). Rates in both sexes and deprivation groups are comparable to North Wales in 2004-06, but lower than in Mid & West Wales.

The difference in need between the most and least deprived groups, as shown in sections 3.2.3.3 and 3.3.4.3, is not reflected in the revascularisation rate ratios shown by the charts overleaf. However, there appears to be movement towards equitable provision in females over recent years.

Supporting data for the charts showing rates can found in appendix tables 3.5.5.3a and 3.5.5.3b, with data for charts showing rate ratios presented in appendix tables 3.5.5.3c and 3.5.5.3d.

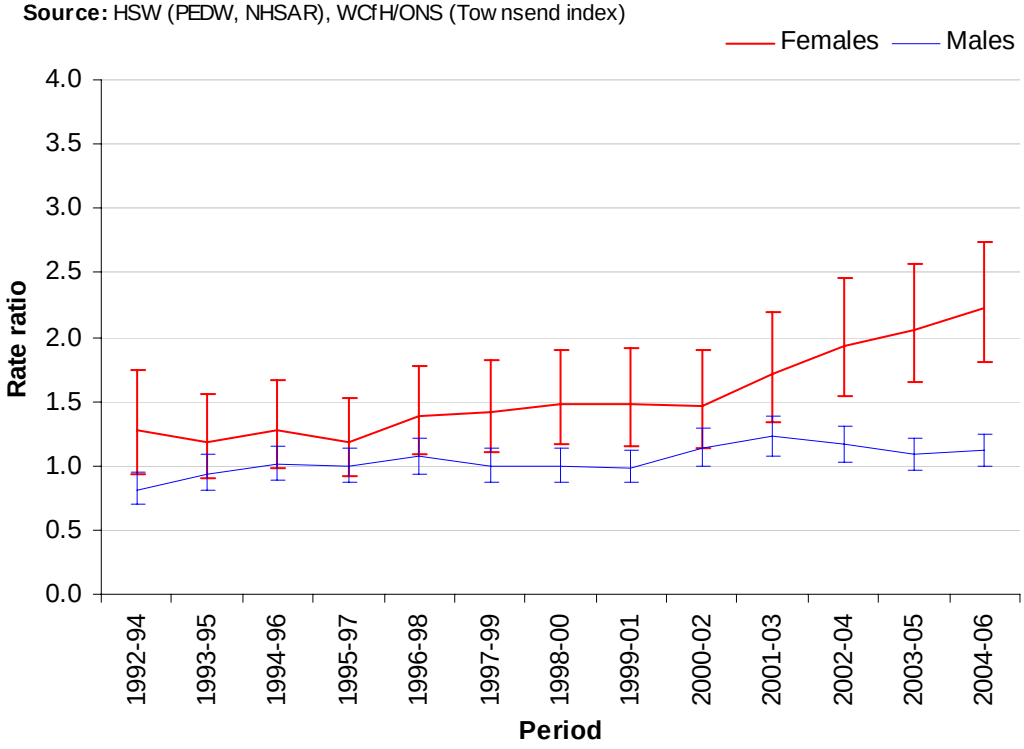
Revascularisation in males & females aged 35-74, South East Wales, most & least deprived fifths, 3-year rolling European age-standardised rate per 100,000, 1992-2006

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)



Revascularisation in males & females aged 35-74, South East Wales, 3-year rolling Wales age-standardised rate ratios, 1992-2006

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)



3.6 Angiographies per 100 emergency CHD admissions

This section provides a more direct measure of treatment against need. Whereas resident population is used as the denominator to calculate rates of angiography in section 3.4, in this section the denominator is emergency CHD admissions. This provides a crude indicator of the provision of angiography relative to the need for the investigation within the population. It is assumed that 100 emergency CHD admissions in Cardiff, for example, indicates the same level of need as 100 emergency CHD admissions in Swansea. The comparative number of angiographies in each area, per 100 admissions, is then taken to provide an estimate of horizontal equity (see section 1.3).

Given these assumptions, a rate ratio of one in the charts that follow in section 3.6.3 is indicative of equity of provision for people living in the most and least deprived areas of Wales.

3.6.1 Angiographies per 100 admissions by Local Authority of residence

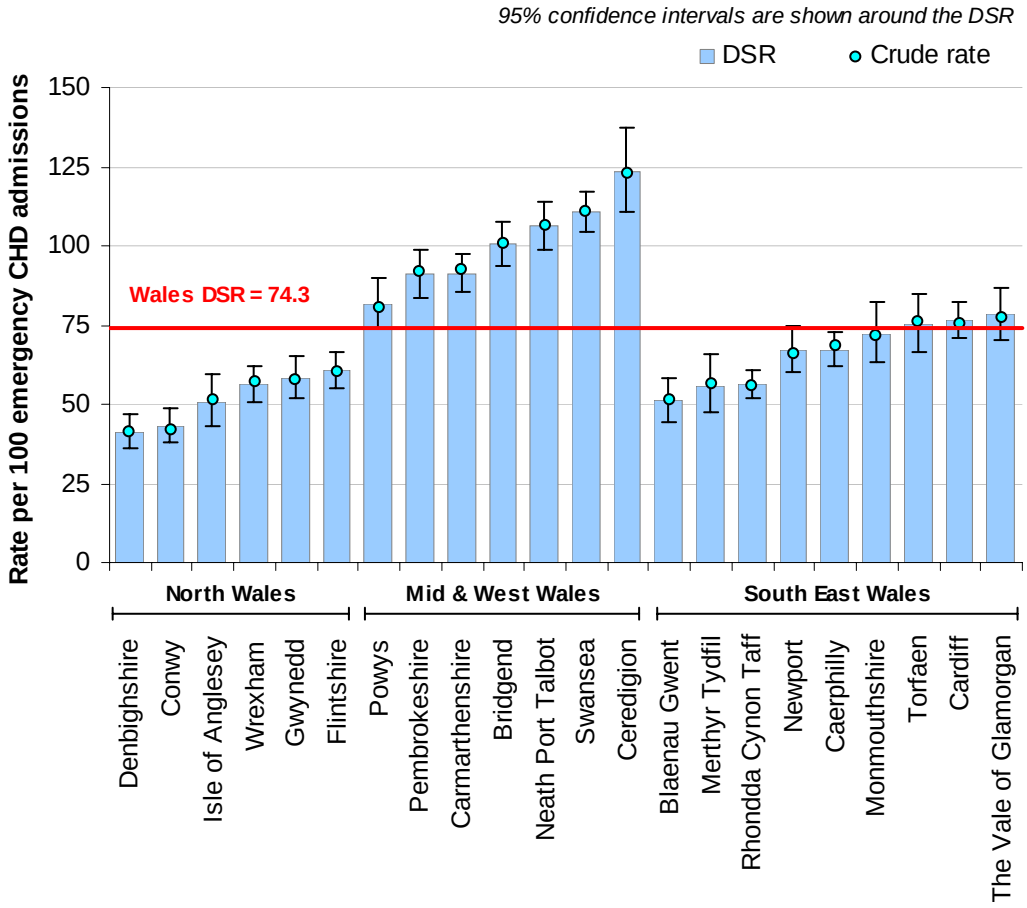
3.6.1.1 Males

The chart overleaf reflects the results of analyses presented in section 3.4. In males, the seven Local Authorities in the Mid & West region show the highest rates across Wales, and are the only areas to demonstrate statistically significantly higher rates than the Wales average. The South Wales valleys areas of Blaenau Gwent, Merthyr Tydfil and Rhondda Cynon Taff, which display high levels of socioeconomic deprivation, have the lowest rates of angiography per 100 emergency CHD admissions in the South East region. Rates in North Wales are generally low; it should be noted that areas such as Conwy and Denbighshire have high rates of emergency CHD admissions (section 3.3.2.1) which may overestimate need and thus deflate the rates shown overleaf.

Supporting data for the chart overleaf can found in appendix table 3.6.1.1.

Angiography, directly age-standardised rate per 100 emergency CHD admissions (DSR), ranked Local Authorities, males aged 35-74, 2004-06

Source: HSW (PEDW)



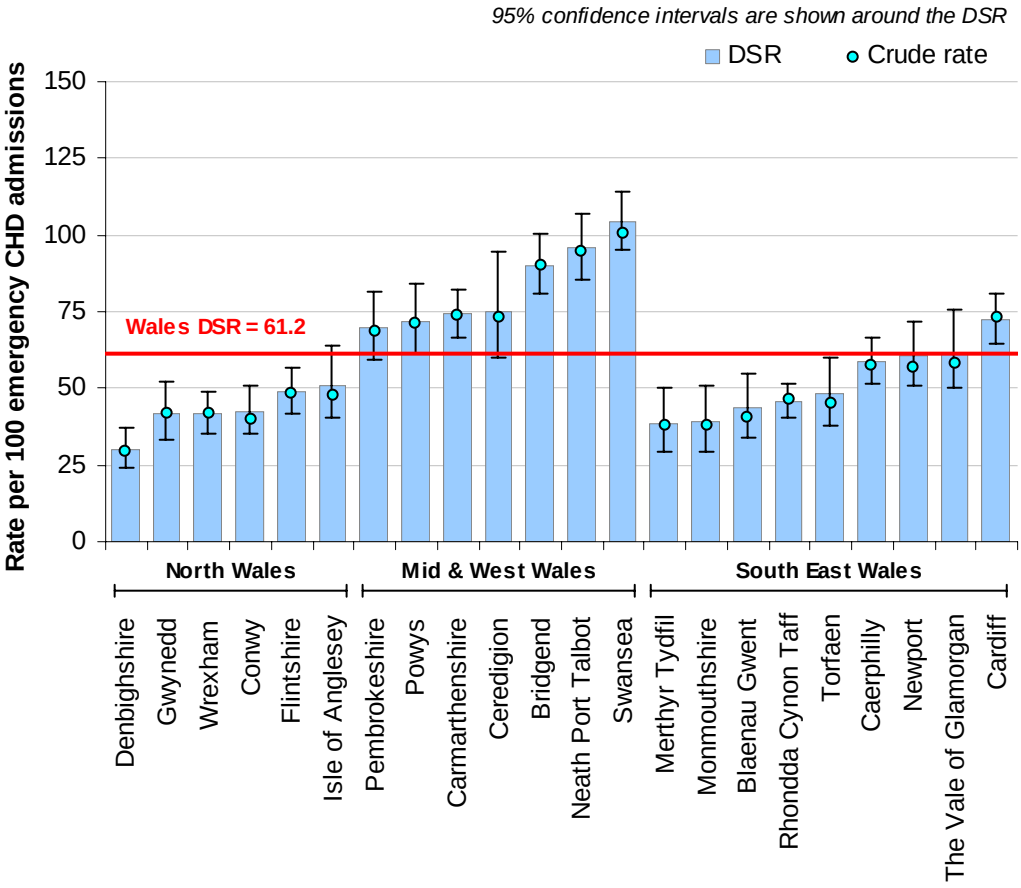
3.6.1.2 Females

The chart overleaf shows a similar pattern to that displayed for males in section 3.6.1.1, with a threefold difference between the highest and lowest rates across Local Authorities. However, in females, the rate in Cardiff is comparable with that shown in some of the regions of Mid & West Wales. Nevertheless, Swansea, Neath Port Talbot and Bridgend continue to demonstrate rates considerably higher than the rest of Wales.

Supporting data for the charts showing rates can found in appendix table 3.6.1.2.

Angiography, directly age-standardised rate per 100 emergency CHD admissions (DSR), ranked Local Authorities, females aged 35-74, 2004-06

Source: HSW (PEDW)

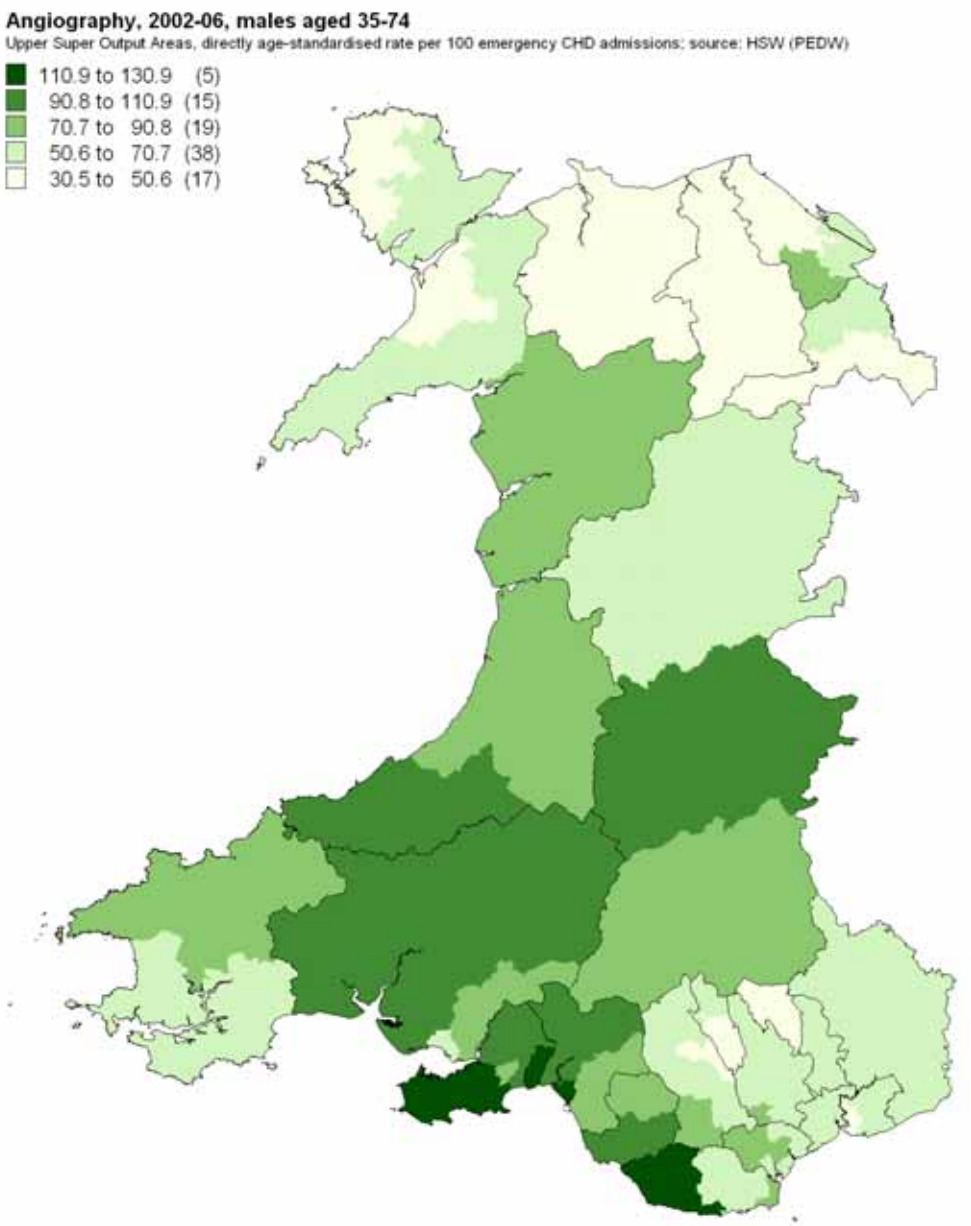


3.6.2 Angiographies per 100 admissions by USOA

3.6.2.1 Males

Wider variation across areas can be seen in the map overleaf than in Local Authorities, with the highest rate of around 130 being over four times higher than the lowest rate of around 30 angiographies per 100 admissions.

Low rates are evident across North Wales and also in Merthyr Tydfil and Blaenau Gwent. As would be expected from the analysis presented in section 3.6.1, most of the USOAs with rates of 90 to 130 are found in the Mid & West region.



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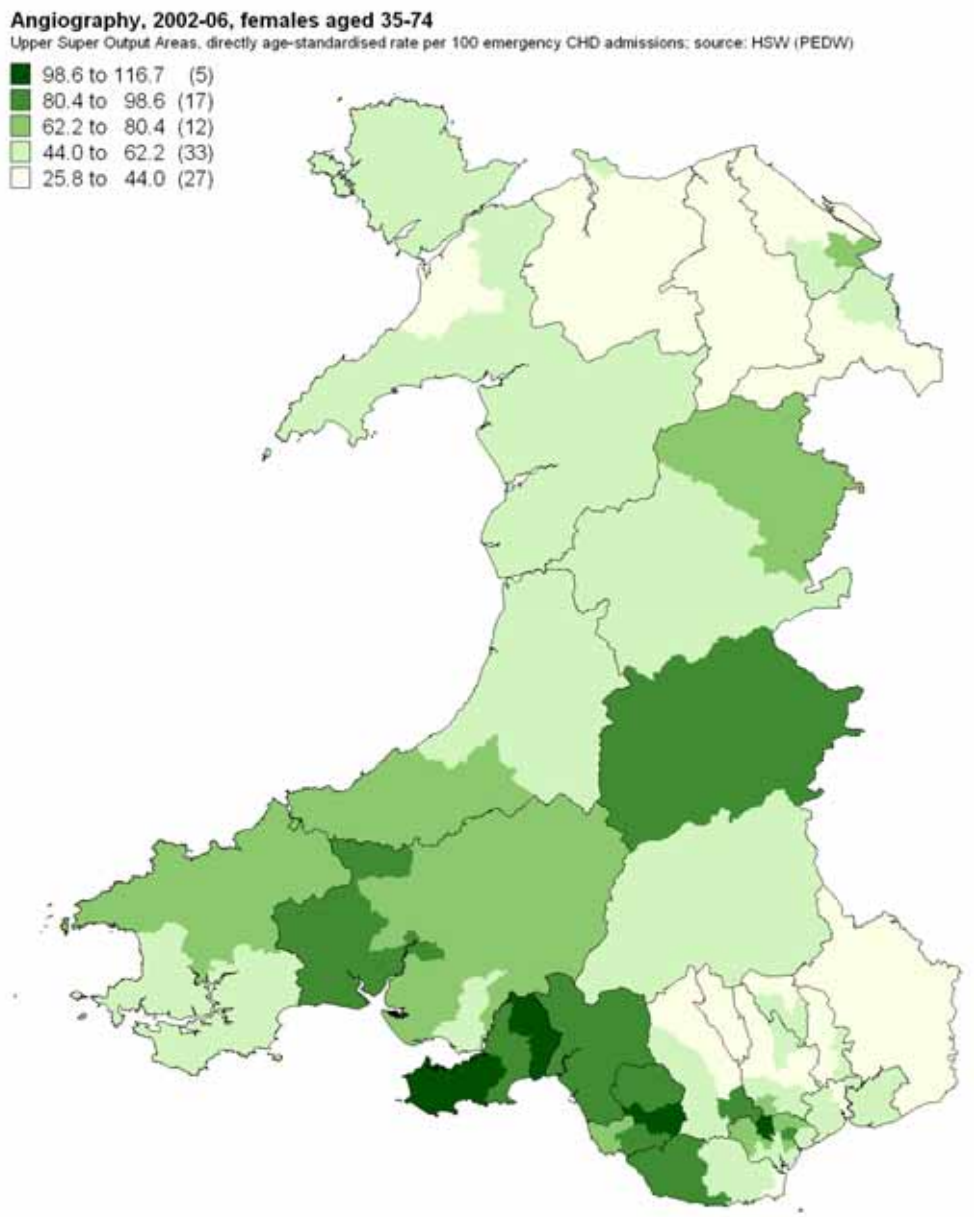
3.6.2.2 Females

In females, there is a stark contrast between USOAs in the Mid & West and South East region, despite both Cardiff and Swansea housing major treatment centres. Rates in the socioeconomically deprived South Wales valleys are low; interestingly, the northerly Cardiff USOAs, which are less deprived, show higher rates than the southern USOAs, which are more deprived.



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3.6.3 Angiographies per 100 admissions by region and deprivation fifth: rates and rate ratios

This section is split into three parts, to enable separate discussion of trends in each of the Wales regions.

For counts of angiographies and emergency CHD admissions by year and fifth of deprivation, see appendix tables 3.3.4a, 3.3.4b, 3.4.5a and 3.4.5b.

3.6.3.1 North Wales

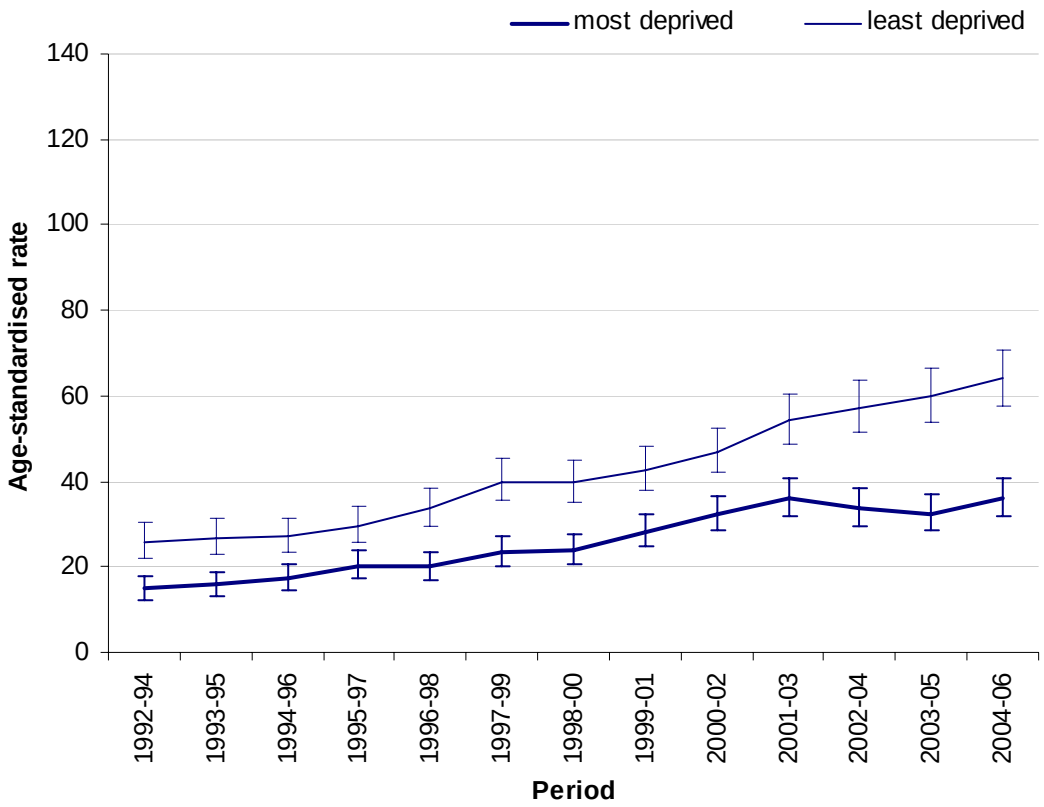
The charts overleaf and on page 90 show a steady rise in the rate of angiography per 100 emergency CHD admissions in the least deprived males resident in North Wales, with the rate in this group remaining statistically significantly higher than the rate in the most deprived males throughout the period. However, though the rate in the most deprived fifth also increases over the period, a levelling off since around 2001 has led to the gap between least and most deprived increasing over this period. The rate ratio at the start and end of the period is around 0.5, indicating that the most deprived males receive around half as many angiographies per 100 emergency CHD admissions compared to the least deprived.

Compared to the pattern in males, there is less apparent inequity in females; though the least deprived group also show higher rates than the most deprived over the period, the differences are smaller than in males. This is further demonstrated by rate ratios being close to one during some sections of the period, though the width of the confidence intervals shown in the chart overleaf make interpretation difficult.

Supporting data for the charts showing rates can found in appendix tables 3.6.3.1a and 3.6.3.1b, with data for charts showing rate ratios presented in appendix tables 3.6.3.1c and 3.6.3.1d.

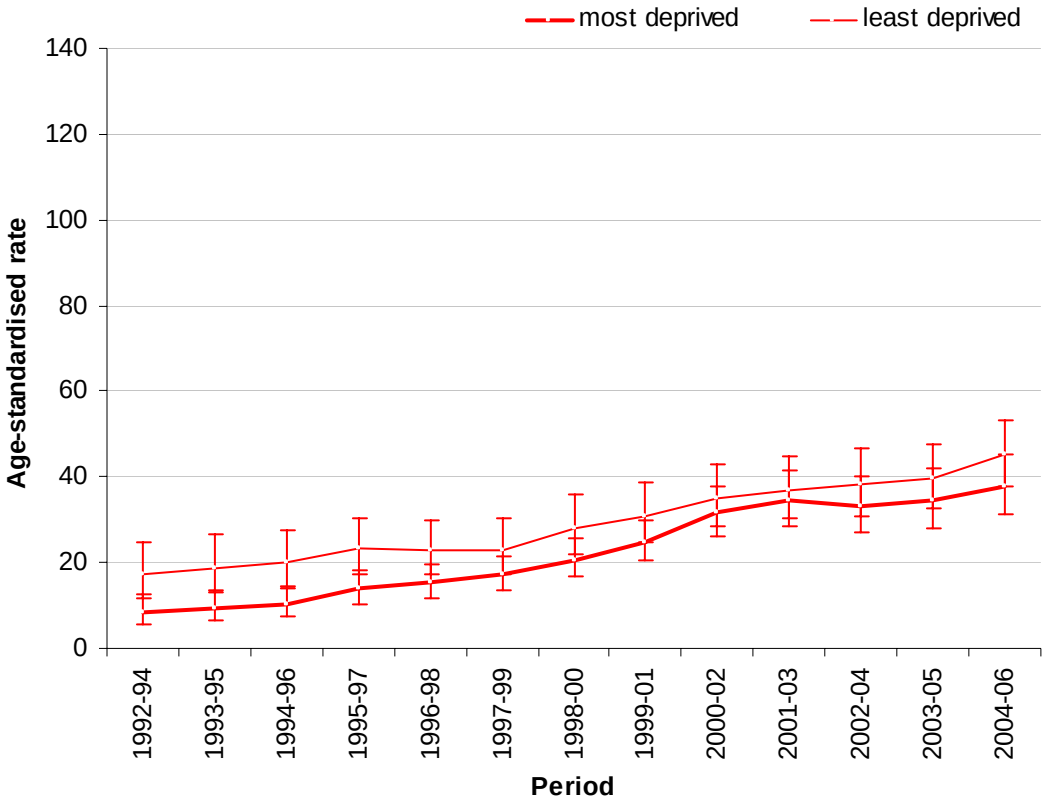
Angiography in males aged 35-74, North Wales, most & least deprived fifths, 3-year rolling age-standardised rate per 100 emergency CHD admissions, 1992-2006

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)



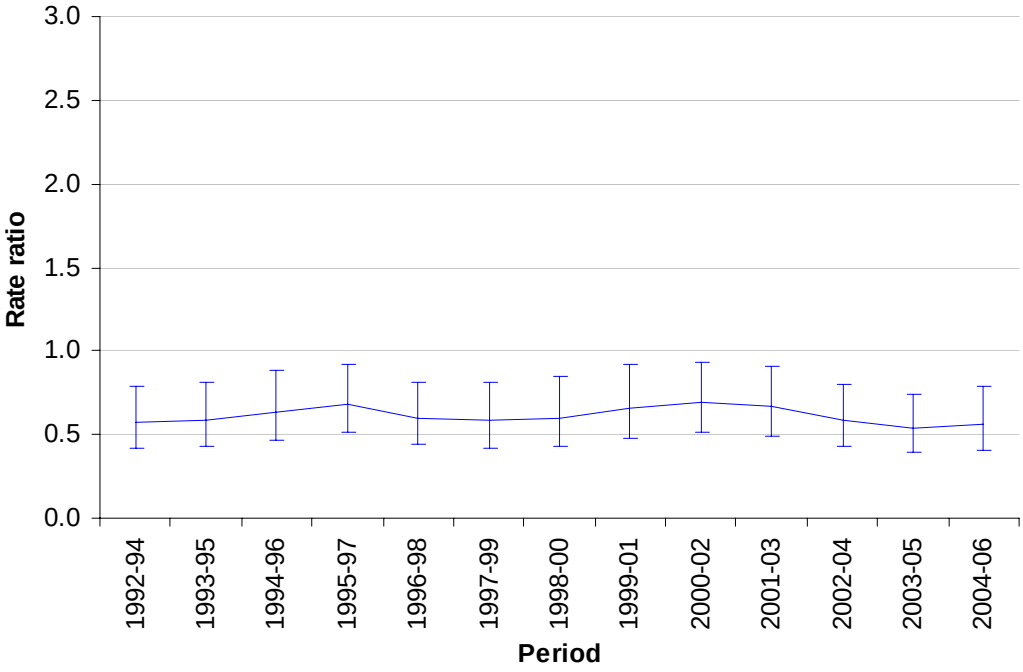
Angiography in females aged 35-74, North Wales, most & least deprived fifths, 3-year rolling age-standardised rate per 100 emergency CHD admissions, 1992-2006

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)



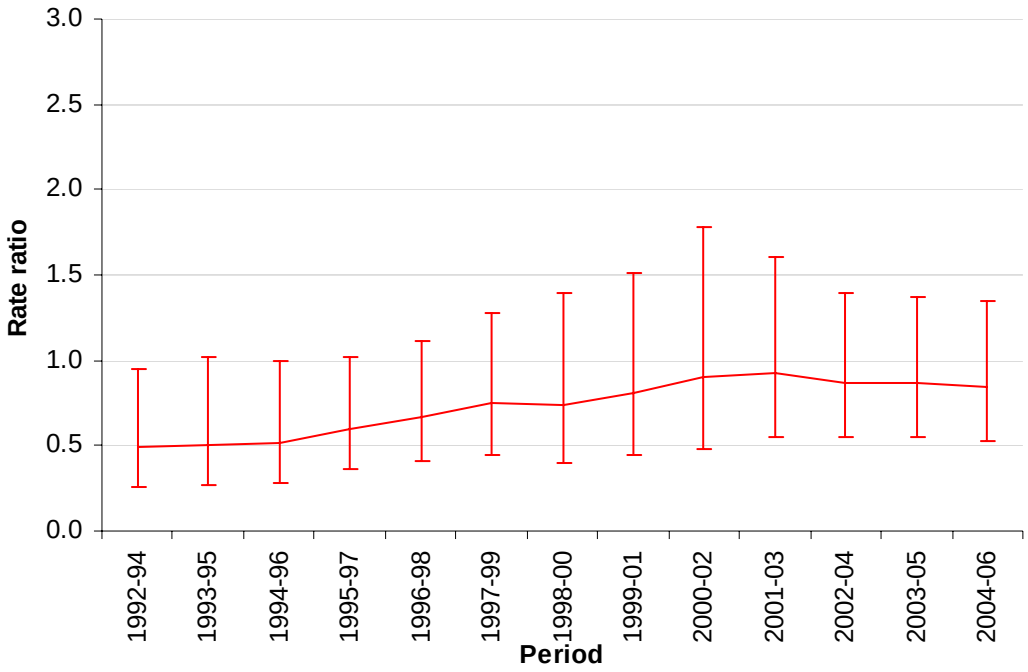
Angiography per 100 emergency CHD admissions in males aged 35-74, North Wales, 3-year rolling age-standardised rate ratios, 1992-2006

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)



Angiography per 100 emergency CHD admissions in females aged 35-74, North Wales, 3-year rolling age-standardised rate ratios, 1992-2006

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)



3.6.3.2 Mid & West Wales

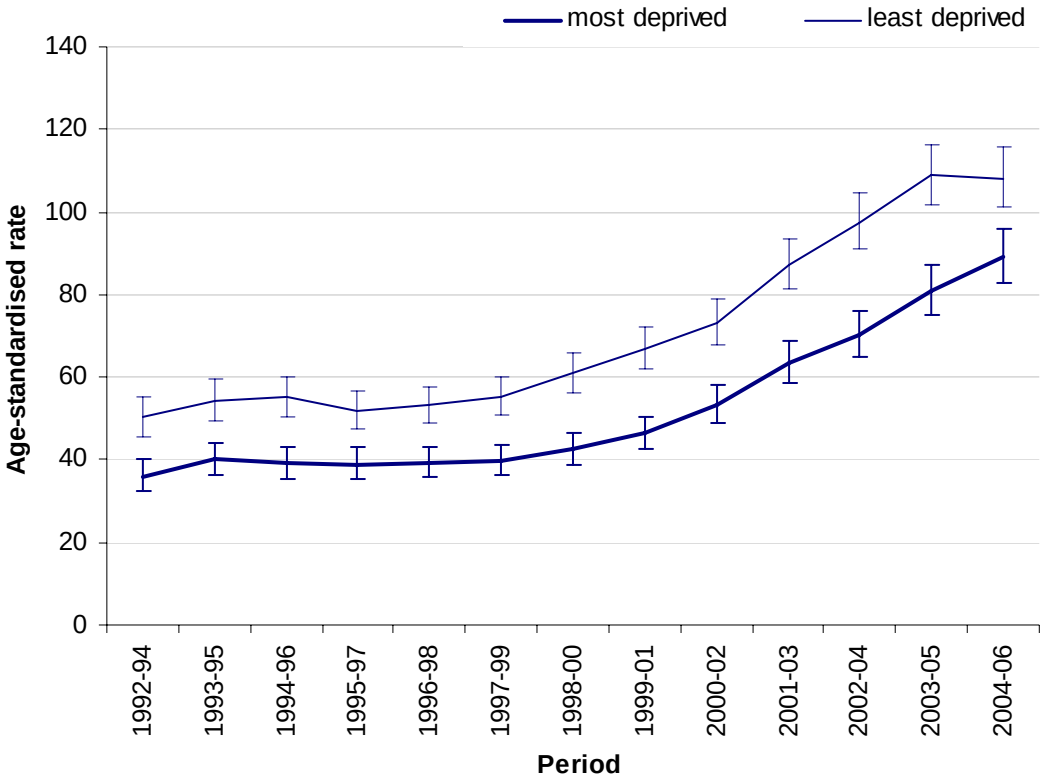
As shown by the charts overleaf and on page 93, the rate in both male groups in Mid & West Wales has risen more steeply over the period than in North Wales. As a result, by 2004-06, the rate in the most deprived group in the Mid & West region is over twice as high as in North Wales. These rises in the Mid & West region are particularly steep since around 2001. In terms of equity, the rate in the least deprived fifth is consistently statistically significantly higher than in the most deprived fifth, with the rate ratio chart overleaf showing that males in the latter group receive around two-thirds as many angiographies per 100 emergency CHD admissions as those in the former group. Finally, the similarity in rates in the least deprived males between 2003-05 and 2004-06 is of interest; further research is merited to examine whether or not rates continue to rise in future years.

In females, as in the case of North Wales, there is less difference between the two groups over time, with the chart on page 94 showing rate ratios close to one by the end of the period. This indicates that horizontal socioeconomic inequity may be more marked in males than in females.

Supporting data for the charts showing rates can found in appendix tables 3.6.3.2a and 3.6.3.2b, with data for charts showing rate ratios presented in appendix tables 3.6.3.2c and 3.6.3.2d.

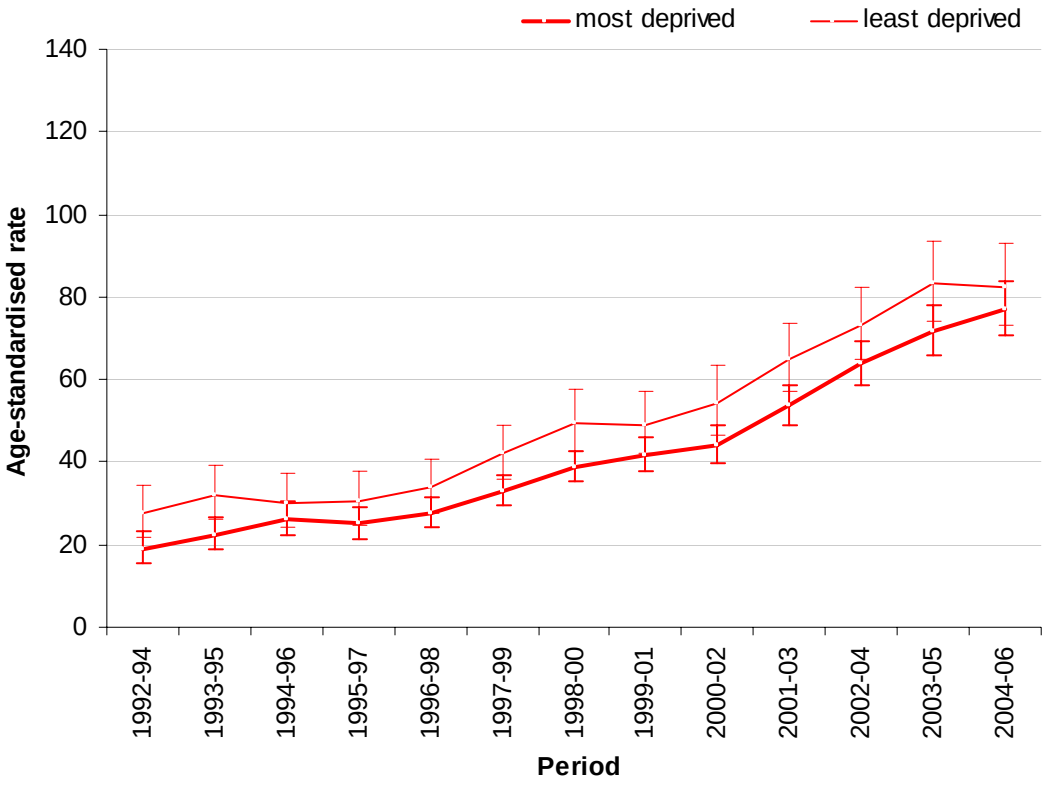
Angiography in males aged 35-74, Mid & West Wales, most & least deprived fifths, 3-year rolling age-standardised rate per 100 emergency CHD admissions, 1992-2006

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)



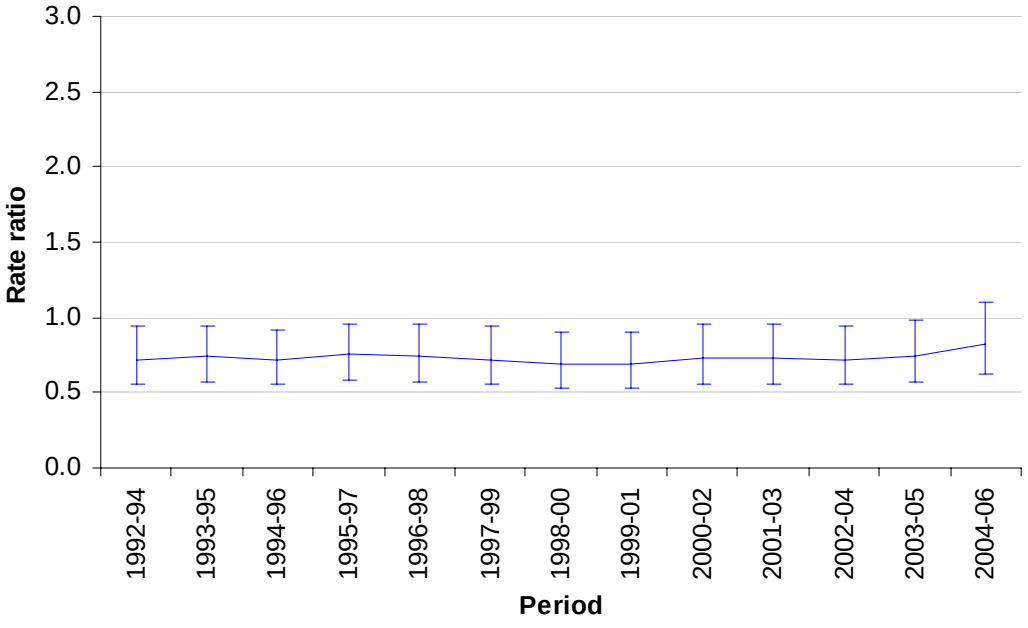
Angiography in females aged 35-74, Mid & West Wales, most & least deprived fifths, 3-year rolling age-standardised rate per 100 emergency CHD admissions, 1992-2006

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)

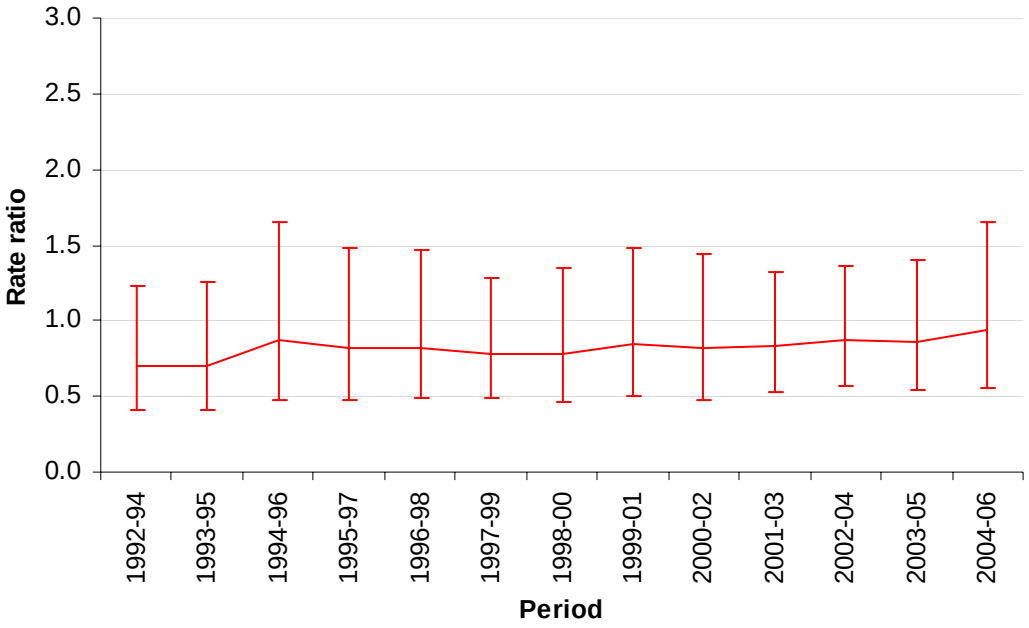


Angiography per 100 emergency CHD admissions in males aged 35-74, Mid & West Wales, 3-year rolling age-standardised rate ratios, 1992-2006

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)



Angiography per 100 emergency CHD admissions in females aged 35-74, Mid & West Wales, 3-year rolling age-standardised rate ratios, 1992-2006
Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)



3.6.3.3 South East Wales

In males, rates of angiography per 100 emergency CHD admissions are higher in the least and most deprived groups of South East Wales than in North Wales, but not as high as rates in the Mid & West region. The level of inequity indicated by the charts overleaf and on page 96 is similar to that in North Wales; however, there appears to be a trend in the rate ratios over time, moving from around 0.4 to 0.7 over the period.

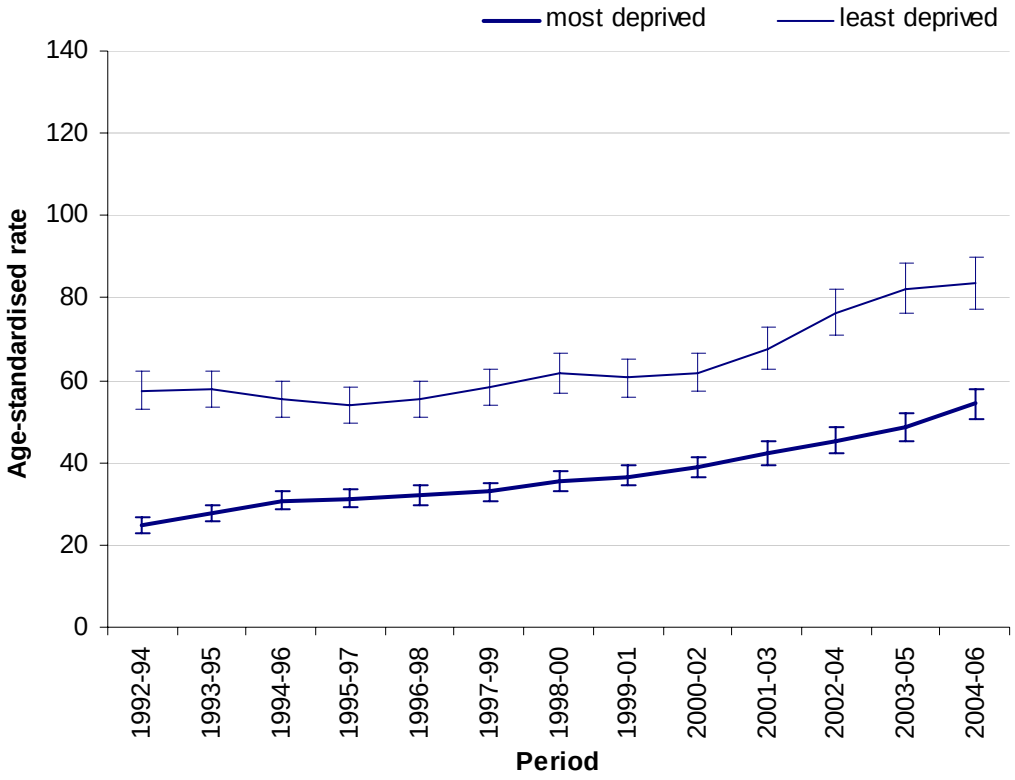
The trend in females also appears to be moving towards equity, though there is a greater difference between rates in the least and most deprived females in the South East than in the other regions of Wales.

The rate in the most deprived fifth of females in South East Wales has risen more sharply since around 2001, as is the case in the Mid & West region.

Supporting data for the charts showing rates can found in appendix tables 3.6.3.3a and 3.6.3.3b, with data for charts showing rate ratios presented in appendix tables 3.6.3.3c and 3.6.3.3d.

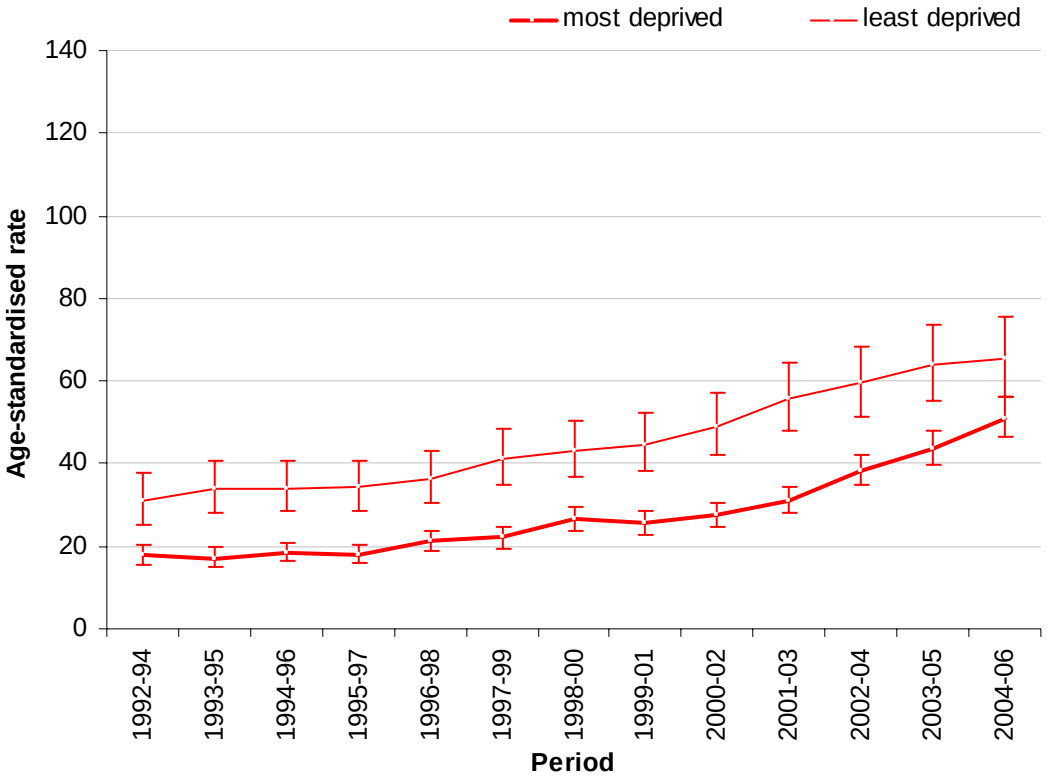
Angiography in males aged 35-74, South East Wales, most & least deprived fifths, 3-year rolling age-standardised rate per 100 emergency CHD admissions, 1992-2006

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)



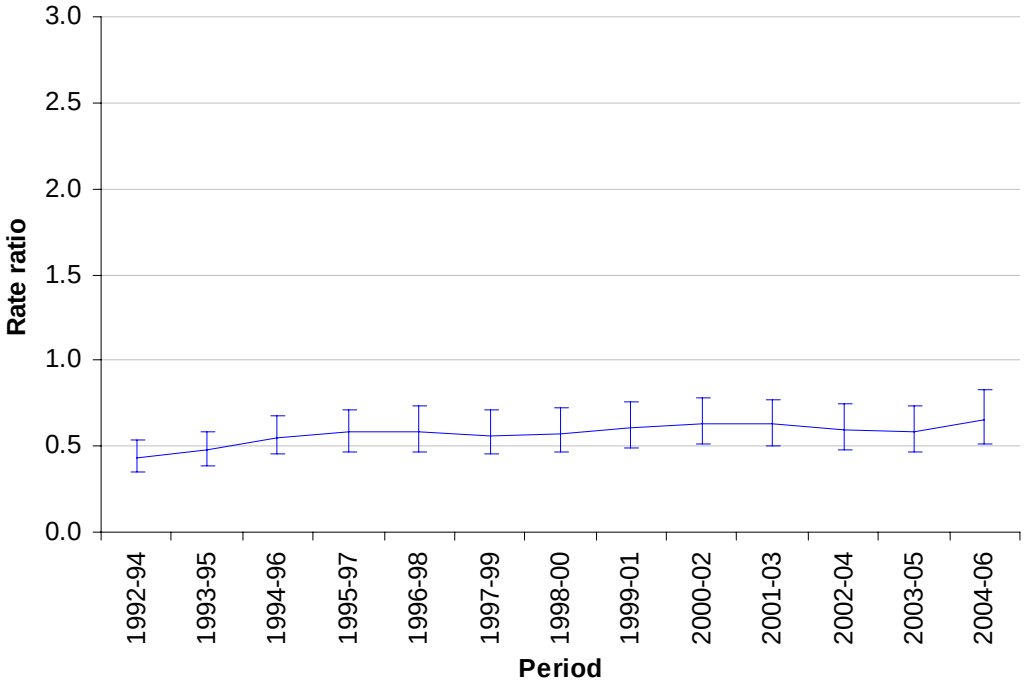
Angiography in females aged 35-74, South East Wales, most & least deprived fifths, 3-year rolling age-standardised rate per 100 emergency CHD admissions, 1992-2006

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)



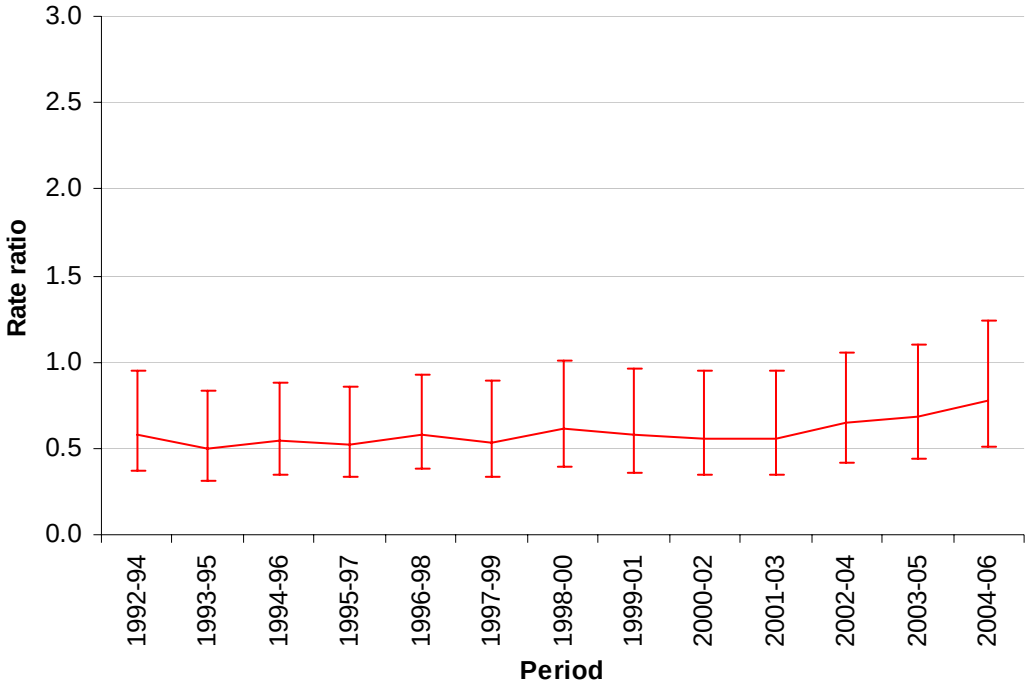
Angiography per 100 emergency CHD admissions in males aged 35-74, South East Wales, 3-year rolling age-standardised rate ratios, 1992-2006

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)



Angiography per 100 emergency CHD admissions in females aged 35-74, South East Wales, 3-year rolling age-standardised rate ratios, 1992-2006

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)



4 Discussion

The findings of this report demonstrate apparent inequities in the provision of specialist investigation and treatment for CHD, which have persisted since the early 1990s. There are also strong indications of continuing geographical and socioeconomic inequalities in health within Wales.

4.1 Inequity in the provision of investigation and treatment

There are indications of unequal (and inequitable) provision of angiography and revascularisation across both geographical areas and socioeconomic groups. For example, rates of emergency CHD admissions and premature CHD mortality in females are higher in Denbighshire than in Bridgend, indicating greater need, yet the rate of angiography in Denbighshire is less than half of that in Bridgend. Similarly, males in Blaenau Gwent display the highest rates in Wales of emergency admissions and premature mortality, yet their revascularisation rate is amongst the lowest in Wales and around half that of males living in Neath Port Talbot. When studying these variations at the small-area level, the disparities are even clearer, with more than a fourfold difference between the Upper Super Output Areas with the highest and lowest rates of angiographies per 100 emergency CHD admissions.

Distance to treatment centre appears to be an important factor in this variation, with rates of investigation and treatment consistently higher in South Wales than in North Wales. This situation should be improved by the provision of angiography at Ysbyty Glan Clwyd since 2006. However, there are also large differences between the South East and Mid & West regions, with particular rises in angiography and revascularisation rates in the latter area since around 2001.

These rises have been pronounced in the most deprived groups, with females in the Mid & West (as well as the other regions) showing perhaps the strongest signs of moving towards socioeconomic equity in provision over time.

However, it remains the case in all regions that rates of angiography and revascularisation are not as high in the most deprived groups as would be expected relative to the least deprived groups, given their higher levels of need indicated by mortality and emergency hospital admissions. To illustrate, in males resident in South East Wales, the most deprived received around 50 angiographies per 100 emergency CHD admissions in 2004-06, compared to around 80 per 100 in the least deprived group. This is an improvement from the situation in this region in 1992-94, when the corresponding figures were 25 (most deprived) compared to 58 (least deprived), though the difference between the two groups remains marked.

These overall results reflect those of a number of UK studies (see section 1.4) in showing signs of socioeconomic inequity in the provision of cardiac procedures; the apparent greater inequity in males than in females also echoes the findings of Ben-Shlomo & Chaturvedi (1995). It should be noted that there are limitations to these types of studies and caveats around their interpretation (see section 5), yet the findings of this report demand further investigation of the apparent inequity in provision and its potential causes.

It may be the case that the patterns displayed within this report show that morbidity arising from CHD is being detected too late in some groups, for example the most deprived, resulting in higher rates of premature mortality and lower rates of investigation and treatment. This perhaps highlights the need for primary care providers to develop more effective ways of identifying patients at risk of developing CHD, in order to increase the possibility of early intervention.

It is also possible that rates of angiography and revascularisation are lower in more deprived areas due to patients' poorer suitability for these procedures. To illustrate, higher rates of co-morbidities or contra-indications in the most deprived patients may lead to a lower rate of angiography and revascularisation than would be expected in less deprived patients with similar levels of morbidity.

Within the literature, some authors (Hanratty et al 2007) make reference to referral patterns in primary care as a potential cause of inequity. For example, a common theory is that the less deprived may make more vociferous demands for specialist treatment than more deprived groups (Coory et al 2002, Dixon et al 2007, Goddard & Smith 2001).

Further research is required to assess the extent to which such theories may apply to the provision of coronary angiography and revascularisation in Wales. The comparative effect of variations in treatment on variations in mortality rates at the population level may be small when compared to broad changes in environment, education, income and lifestyle, but the equal opportunity to benefit from medical services remains a founding principle of the NHS.

4.2 Inequalities in premature CHD mortality

Though not a key aim of the study, the patterns of health inequality shown within this report also demand further consideration.

In terms of geographical health inequalities, females living in Bleanau Gwent, the Local Authority with the highest levels of premature CHD mortality, die at a rate which is around two-and-a-half times higher than in Monmouthshire, the area with the lowest levels. The situation is only slightly better in the case of males, for whom the highest Local Authority rate is just under twice as high as the lowest. Making such comparisons at the small-area level reveals even greater inequality, indicating the existence of considerable variation within Local Authority areas. In Upper Super Output Areas, there is a threefold difference in premature mortality between the areas with the highest and lowest rates in males and nearly a fourfold difference in females. The areas with the highest rates are found in the more northerly parts of the South Wales valleys, in South Cardiff and in parts of Wrexham and Flintshire.

The pattern of socioeconomic inequalities in premature CHD mortality in Wales is similarly bleak. The second component of the health gain target for inequalities in CHD mortality in Wales is "to improve CHD mortality in all groups and at the same time aim for a more rapid improvement in the most deprived groups" (WAG 2004 p3). However, whilst CHD mortality has fallen over time in both the least and most deprived groups, these falls have been most pronounced in the least

deprived. For example, in the Mid & West region, by 2004-06 the rate in the least deprived females had fallen to nearly a third of the 1992-94 rate, whereas in the most deprived females the rate was only half as high in 2004-06 as in 1992-94. These trends lead to an overall picture of a widening gap in mortality between the most and least deprived, with the ratio of rates in these groups generally increasing over the period to around two in males and around three in females. These findings are consistent with those of Romeri et al (2006), which report rate ratios of 2.3 in males and 3.2 in females over the period 1999-2003.

5 Conclusions and recommendations

The findings of this report suggest that inequity exists in the provision of coronary angiography and revascularisation in Wales. The patterns shown appear to indicate that the relationship between utilisation and need of these procedures varies by geographical area of residence and by socioeconomic status. These results are in line with those of other UK studies.

Socioeconomic inequity seems to be reducing over time in some areas, particularly in females. The persisting pattern of socioeconomic inequity, however, is reflected in geographical inequity: the highest rates of these procedures are not generally found in the areas with the highest levels of need, such as the South Wales valleys.

In estimating the need for angiography and revascularisation, it was necessary to examine trends in CHD mortality. The findings of these analyses suggests that the gap between the health of the least and most deprived continues to widen.

Overall, this report presents considerable challenges to those tasked with the planning and delivery of specialist coronary care in Wales, as well as to those seeking to formulate national strategies to reduce health inequalities. The following recommendations are made in respect of the former:

- That local primary care providers carry out medical audits to investigate their referral patterns for angiography in regard to socioeconomic status;

- That local primary care providers in the most deprived parts of Wales, especially in the South Wales valleys, investigate potential systems for targeting the most deprived groups in order to increase referral rates for coronary angiography;

- That the analyses presented in this report be repeated in five years to assess the continuing trends in geographical and socioeconomic equity, particularly to investigate the impact of the catheterisation lab at Ysbyty Glan Clwyd on rates of angiography in North Wales. A logistic regression analysis could be considered in order to adjust for multiple factors such as socioeconomic deprivation, age, sex and distance to treatment centre.

6 References

Ancona, C., Agabiti, N., Forastiere, F. et al (2000) Coronary artery bypass graft surgery: socioeconomic inequalities in access and in 30 day mortality. A population-based study in Rome, Italy. **J.Epidemiol.Community Health** 54(12):930-935.

Ben-Shlomo, Y. & Chaturvedi, N. (1995) Assessing equity in access to health care provision in the UK: does where you live affect your chances of getting a coronary artery bypass graft? **J.Epidemiol.Community Health** 49(2):200-204.

Black, N., Langham, S., & Petticrew, M. (1995) Coronary revascularisation: why do rates vary geographically in the UK? **J.Epidemiol.Community Health** 49(4):408-412.

British Heart Foundation (2006) **Coronary heart disease statistics [online].** Available at http://www.heartstats.org/temp/2006spwholespdocumenths2hs.pdf , accessed 22/1/2008

Britton, A., Shipley, M., Marmot, M. et al (2004) Does access to cardiac investigation and treatment contribute to social and ethnic differences in coronary heart disease? Whitehall II prospective cohort study. **BMJ [online]** 329(7461):318-323. Available at http://www.bmj.com/cgi/reprint/329/7461/318, accessed 22/11/07

Campbell, S. E., Campbell, M. K., Grimshaw, J. M. et al (2001) A systematic review of discharge coding accuracy. **J.Public Health [online]** 23(3):205-211. Available at http://jpubhealth.oxfordjournals.org/cgi/reprint/23/3/205, accessed 19/7/08

Carstairs, V. & Morris, R. (1989) Deprivation, mortality and resource allocation. **Community Med.** 11(4):364-372.

Charlton, J. & Murphy, M. (1997) Monitoring health – data source and methods. In Charlton J. and Murphy M. (eds.) **The health of adult Britain 1841-1994** pp 2 - 16. London: The Stationery Office

Charlton, J., Murphy, M., Khaw, K. et al (1997) Cardiovascular diseases. In Charlton J. and Murphy M. (eds.) **The health of adult Britain 1841-1994** pp 60 - 81. London: The Stationery Office

Christie, S. M. L. & Fone, D. L. (2003) Does car ownership reflect socio-economic disadvantage in rural areas? A cross-sectional geographical study in Wales, UK. **Public Health [online]** 117(2):112-116. Available at http://www.sciencedirect.com/science/article/B73H6-4869SK2-8/2/044368b9a991e5ed2fe17d61f966ec86, accessed 29/2/08

Coory, M., Scott, I. A., & Baade, P. (2002) Differential effect of socioeconomic status on rates of invasive coronary procedures across the public and private sectors in Queensland, Australia. **J.Epidemiol.Community Health [online]** 56(3):233-234. Available at http://jech.bmj.com/cgi/reprint/56/3/233, accessed 22/11/07

Cosh, H. (2008) **Coronary heart disease in Wales: an ecological study of socioeconomic variations in mortality and hospital treatment, 1992-2006.** Unpublished Master of Public Health dissertation, University of Birmingham. Available on request.

Culyer, A. J. & Wagstaff, A. (1993) Equity and equality in health and health care. **J.Health Econ.** 12(4):431-457.

Dixon, A., Le, Grand J., Henderson, J. et al (2007) Is the British National Health Service equitable? The evidence on socioeconomic differences in utilization. **J.Health Serv.Res.Policy [online]** 12(2):104-109. Available at http://docserver.ingentaconnect.com/deliver/connect/rsm/13558196/v12n2/s10.pdf?expires=1198882795&id=41446725&titleid=1275&accname=University+of+Birmingham&checksum=D4032526B4B030EA80FEA9882E4CEC07, accessed 15/1/08

Gartner, A. (2008) **Briefing paper on LSOA Townsend deprivation scores calculated from unadjusted Census data [online].** Available at http://www.wales.nhs.uk/sites3/Documents/568/TownsendBriefing.pdf, accessed 4/3/2008

Goddard, M. & Smith, P. (2001) Equity of access to health care services: theory and evidence from the UK. **Soc.Sci.Med.** 53(9):1149-1162.

Haglund, B., Koster, M., Nilsson, T. et al (2004) Inequality in access to coronary revascularization in Sweden. **Scand.Cardiovasc.J.[online]** 38(6):334-339. Available at http://dx.doi.org/10.1080/14017430410021516, accessed 8/12/07

Hanratty, B., Zhang, T., & Whitehead, M. (2007) How close have universal health systems come to achieving equity in use of curative services? A systematic review. **Int.J.Health Serv.** 37(1):89-109.

Hetemaa, T., Keskimaki, I., Manderbacka, K. et al (2003) How did the recent increase in the supply of coronary operations in Finland affect socioeconomic and gender equity in their use? **J.Epidemiol.Community Health [online]** 57(3):178-185. Available at http://jech.bmj.com/cgi/reprint/57/3/178, accessed 22/11/07

Hippisley-Cox, J. & Pringle, M. (2000) Inequalities in access to coronary angiography and revascularisation: the association of deprivation and location of primary care services. **Br.J.Gen.Pract.[online]** 50(455):449-454. Available at http://www.pubmedcentral.nih.gov/picrender.fcgi?artid=1313721&blobtype=pdf, accessed 29/11/07

Kee, F., Gaffney, B., Currie, S. et al (1993) Access to coronary catheterisation: fair shares for all? **BMJ [online]** 307(6915):1305-1307. Available at http://www.pubmedcentral.nih.gov/picrender.fcgi?artid=1679460&blobtype=pdf, accessed 22/11/07

Lester, N. (2004) **Is there equity of access to coronary angiography and revascularisation according to socio-economic deprivation for people in Wales? A cross-sectional ecological study.** Unpublished Master of Public Health dissertation, University of Wales College of Medicine (now Cardiff University). Held at Duthie library, Heath Park, Cardiff.

Macinko, J. & Starfield, B. (2002) Annotated Bibliography on Equity in Health, 1980-2001. **Int J Equity Health [online]** 1(1):1-20. Available at http://www.equityhealthj.com/content/pdf/1475-9276-1-1.pdf, accessed 17/11/07

MacLeod, M. C. M., Finlayson, A. R., Pell, J. P. et al (1999) Geographic, demographic, and socioeconomic variations in the investigation and management of coronary heart disease in Scotland. **Heart [online]** 81(3):252-256. Available at http://heart.bmj.com/cgi/reprint/81/3/252, accessed 22/11/07

Majeed, F. A., Chaturvedi, N., Reading, R. et al (1994) Equity in the NHS. Monitoring and promoting equity in primary and secondary care. **BMJ [online]** 308(6941):1426-1429. Available at http://www.bmj.com/cgi/content/full/308/6941/1426, accessed 10/11/07

Manson-Siddle, C. J. & Robinson, M. B. (1998) Super Profile analysis of socioeconomic variations in coronary investigation and revascularisation rates. **J.Epidemiol.Community Health [online]** 52(8):507-512. Available at http://jech.bmj.com/cgi/reprint/52/8/507, accessed 28/11/07

Marmot, M. (1992) Coronary heart disease epidemiology. In Marmot, M. and Elliott P. (eds.) **Coronary heart disease: rise and fall of a modern epidemic** pp 3 - 32. Oxford: Oxford University Press

Marmot, M. (2001) From Black to Acheson: two decades of concern with inequalities in health. A celebration of the 90th birthday of Professor Jerry Morris. **Int.J.Epidemiol.[online]** 30(5):1165-1171. Available at http://ije.oxfordjournals.org/cgi/reprint/30/5/1165, accessed 21/1/08

Mooney, G., Hall, J., Donaldson, C. et al (1991) Utilisation as a measure of equity: weighing heat? **J.Health Econ.** 10(4):475-480.

Morris, R. & Carstairs, V. (1991) Which deprivation? A comparison of selected deprivation indexes. **J Public Health** 13(4):318-326.

Morris, R. W., Whincup, P. H., Papacosta, O. et al (2005a) Inequalities in coronary revascularisation during the 1990s: evidence from the British regional heart study. **Heart [online]** 91(5):635-640. Available at http://heart.bmj.com/cgi/reprint/91/5/635, accessed 22/11/07a

Morris, S., Sutton, M., & Gravelle, H. (2005b) Inequity and inequality in the use of health care in England: an empirical investigation. **Soc.Sci.Med.[online]** 60(6):1251-1266. Available at http://www.sciencedirect.com/science/article/B6VBF-4D7CC09-1/2/f84a72bf30fe1d8060c8cfbeb522a092?&zone=raall, accessed 10/11/07b

Norman, P., Boyle, P., & Rees, P. (2005) Selective migration, health and deprivation: a longitudinal analysis. **Soc.Sci.Med.[online]** 60(12):2755-2771. Available at http://www.sciencedirect.com/science?_ob=MImg&_imagekey=B6VBF-4F31PN0-4-1&_cdi=5925&_user=4696635&_orig=search&_coverDate=06%2F30%2F2005&_sk=999399987&view=c&wchp=dGLbVlz-zSkWz&md5=bab14012b3bc6c32f4cd97782b81dc9d&ie=/sdarticle.pdf, accessed 1/11/07

NPHS (2004) **Deprivation and health: a report by the National Public Health Service for Wales.** Available at http://www.wales.nhs.uk/sites3/page.cfm?orgid=719&pid=30696, accessed 3/2/2009

NPHS (2007) **Cardiac Network Profiles.** Available at http://www.wales.nhs.uk/sites3/page.cfm?orgid=719&pid=30696, accessed 9/3/2009

Office for National Statistics (2002) Report: Results of the ICD-10 bridge coding study, England and Wales, 1999. **Health Stat.Q.[online]** Available at http://www.statistics.gov.uk/downloads/theme_health/HSQ14_v4.pdf, accessed 3/7/08

Office for National Statistics (2005) **Series DH1 no.36: Mortality statistics [online].** Available at http://www.statistics.gov.uk/downloads/theme_health/Dh1_36_2003/DH1_2003.pdf, accessed 3/7/2008

Payne, N. & Saul, C. (1997) Variations in use of cardiology services in a health authority: comparison of coronary artery revascularisation rates with prevalence of angina and coronary mortality. **BMJ [online]** 314(7076):257-262. Available at http://www.bmj.com/cgi/content/full/314/7076/257, accessed 22/11/07

Petticrew, M., Sculpher, M., Kelland, J. et al (1998) Effective management of stable angina. **Qual Saf Health Care [online]** 7(2):109-116. Available at http://qshc.bmj.com/cgi/reprint/7/2/109, accessed 8/12/07

Romeri, E., Baker, A., & Griffiths, C. (2006) Mortality by deprivation and cause of death in England and Wales, 1999-2003. **Health Stat.Q.** (32):19-34.

Rose, G. (1991) Cardiovascular diseases. In Holland W., Detels R., and Knox G. (eds.) **Oxford Textbook of Public Health** pp 175 - 188. Oxford: Oxford University Press

Rowan, S. (2007) Trend in cancer incidence by deprivation, England and Wales, 1990-2002. **Health Stat.Q.** (36):24-35.

Starfield, B. (2001) Improving equity in health: a research agenda. **Int.J Health Serv.[online]** 31(3):545-566. Available at http://www.swetswise.com/eAccess/viewFulltext.do?articleID=34664168 , accessed 7/1/08

Stevens, A., Raftery, J., & Mant, J. (2004) An introduction to HCNA: the epidemiological approach to health care needs assessment. In Stevens A., Raftery J., Mant J.et al (eds.) **Health Care Needs Assessment: The Epidemiologically Based Needs Assessment Reviews, Vol.1** pp 1 - 16. Oxford: Radcliffe Publishing Ltd

Townsend, P., Phillimore, P, & Beattie, A. (1988) **Health and deprivation: inequality and the North.** Bristol, UK: Croom Helm

WAG (2004) **Health gain targets: national high-level targets and indicators for Wales [online].** Available at http://new.wales.gov.uk/dphhp/publication/research/health-gain-targets/targeting/health-targets-e.pdf?lang=en

Waters, H. R. (2000) Measuring equity in access to health care. **Soc.Sci.Med.[online]** 51(4):599-612. Available at http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6VBF-4091J83-B&_user=6412095&_rdoc=1&_fmt=&_orig=search&_sort=d&view=c&_acct=C000010083&_version=1&_urlVersion=0&_userid=6412095&md5=38a355c5e928cc166a5e8b28c2185f06, accessed 7/1/08

Appendix

Table 3.2.1.1

Coronary heart disease mortality, European age-standardised rate (EASR) per 100,000 Wales Local Authorities, males aged 35-74, 2004-06

Average annual number, crude and European age-standardised rate per 100,000 population, 95% confidence limits

Local Authority	Average deaths per year	Crude rate per 100,000	EASR per 100,000	95% LCL	95% UCL	Compared to Wales
Isle of Anglesey	31	180.1	147.4	118.8	181.9	Low
Gwynedd	46	164.0	135.2	113.4	160.5	Sig. Low
Conwy	55	200.1	156.1	132.8	183.0	Low
Denbighshire	45	191.5	158.9	133.0	189.0	Low
Flintshire	64	171.3	163.8	141.4	189.1	Low
Wrexham	52	165.1	154.3	131.0	180.9	Low
Powys	54	157.5	129.8	110.4	152.1	Sig. Low
Ceredigion	30	162.0	131.2	105.2	162.6	Sig. Low
Pembrokeshire	63	213.9	175.1	150.6	202.9	High
Carmarthenshire	85	192.9	161.4	142.0	183.0	Low
Swansea	111	209.7	186.1	166.4	207.7	High
Neath Port Talbot	73	216.7	193.2	168.3	221.0	High
Bridgend	65	201.5	183.8	158.8	212.0	High
The Vale of Glamorgan	47	159.3	147.5	124.0	174.5	Low
Cardiff	111	171.4	172.1	154.0	191.8	Low
Rhondda Cynon Taff	136	248.2	227.4	205.8	251.0	Sig. High
Merthyr Tydfil	29	220.7	200.9	161.0	248.6	High
Caerphilly	99	244.3	228.9	203.5	256.7	Sig. High
Blaenau Gwent	47	277.7	245.4	206.2	290.7	Sig. High
Torfaen	38	172.9	159.2	131.1	191.9	Low
Monmouthshire	36	158.2	140.9	115.5	170.7	Sig. Low
Newport	60	183.8	174.6	149.8	202.5	High
Wales	**1378**	**194.7**	**173.6**	**168.3**	**179.0**	

Source: ONS (ADDE, MYE)

Table 3.2.1.2

Coronary heart disease mortality, European age-standardised rate (EASR) per 100,000 Wales Local Authorities, females aged 35-74, 2004-06

Average annual number, crude and European age-standardised rate per 100,000 population, 95% confidence limits

Local Authority	Average deaths per year	Crude rate per 100,000	EASR per 100,000	95% LCL	95% UCL	Compared to Wales
Isle of Anglesey	12	64.0	49.0	34.0	69.5	Low
Gwynedd	17	58.8	45.1	33.5	60.1	Sig. Low
Conwy	17	56.6	43.8	32.3	58.7	Sig. Low
Denbighshire	16	64.8	51.4	37.9	68.9	Low
Flintshire	31	80.6	71.9	58.0	88.3	High
Wrexham	26	79.3	70.0	55.2	87.8	High
Powys	22	63.4	50.4	38.9	64.7	Low
Ceredigion	10	52.8	42.3	28.5	61.9	Low
Pembrokeshire	22	70.3	55.3	42.6	71.2	Low
Carmarthenshire	36	76.9	61.7	50.5	74.9	High
Swansea	41	72.8	61.8	51.1	74.3	High
Neath Port Talbot	25	69.7	59.9	46.9	75.7	Low
Bridgend	26	75.8	65.0	51.2	81.9	High
The Vale of Glamorgan	18	57.9	50.9	38.3	66.7	Low
Cardiff	34	49.5	44.7	36.3	54.6	Sig. Low
Rhondda Cynon Taff	53	92.4	79.6	67.6	93.3	Sig. High
Merthyr Tydfil	13	94.8	82.5	58.8	113.7	High
Caerphilly	41	95.7	82.0	68.0	98.3	Sig. High
Blaenau Gwent	18	103.3	90.3	67.6	119.1	Sig. High
Torfaen	17	73.5	62.0	46.0	82.4	High
Monmouthshire	10	41.7	35.5	23.8	51.4	Sig. Low
Newport	25	73.0	65.3	51.2	82.6	High
Wales	**530**	**71.2**	**60.0**	**57.0**	**63.0**	

Source: ONS (ADDE, MYE)

Table 3.2.3a

Count of CHD deaths in males aged 35-74, by region and fifth of deprivation, 1992-2006

Year	North Fifth*		Mid & West Fifth*		South East Fifth*		Total (all fifths)
	1	5	1	5	1	5	
1992	104	112	143	171	143	392	**2780**
1993	95	131	147	169	162	367	**2894**
1994	76	99	129	168	158	381	**2620**
1995	89	103	136	159	138	337	**2547**
1996	61	88	134	160	146	329	**2397**
1997	86	86	104	145	133	296	**2241**
1998	70	84	101	124	115	267	**2081**
1999	75	92	118	114	123	267	**2074**
2000	78	85	105	107	113	235	**1852**
2001	57	69	95	122	116	242	**1820**
2002	45	68	98	90	92	262	**1739**
2003	66	64	83	98	109	208	**1609**
2004	51	66	76	93	91	171	**1407**
2005	43	51	83	94	100	212	**1430**
2006	44	50	74	80	62	185	**1297**
Total	**1040**	**1248**	**1626**	**1894**	**1801**	**4151**	**30788**

Source: ONS (ADDE), WCfH/ONS (Townsend index)

***Deprivation fifth: 1=least deprived fifth, 5 = most deprived fifth**

Table 3.2.3b

Count of CHD deaths in females aged 35-74, by region and fifth of deprivation, 1992-2006

Year	North Fifth*		Mid & West Fifth*		South East Fifth*		Total (all fifths)
	1	5	1	5	1	5	
1992	36	52	45	94	47	159	**1241**
1993	25	56	60	79	54	200	**1282**
1994	33	58	48	93	55	163	**1182**
1995	39	51	45	60	54	166	**1049**
1996	32	50	32	85	48	136	**1027**
1997	31	40	43	74	53	152	**956**
1998	24	38	34	62	41	122	**862**
1999	29	41	26	56	42	102	**787**
2000	25	45	30	41	39	129	**769**
2001	21	30	36	48	49	117	**741**
2002	22	29	21	38	32	110	**671**
2003	17	33	28	37	41	106	**628**
2004	20	35	25	47	29	89	**598**
2005	15	27	24	30	27	94	**523**
2006	16	16	15	40	34	80	**469**
Total	**385**	**601**	**512**	**884**	**645**	**1925**	**12785**

Source: ONS (ADDE), WCfH/ONS (Townsend index)

*Deprivation fifth: 1=least deprived fifth, 5 = most deprived fifth

Table 3.2.3.1a

CHD mortality in males aged 35-74, North Wales, by fifth of deprivation, 3-year rolling European age-standardised rate, 1992-2006

Period	EASR	LCL	UCL	EASR	LCL	UCL
	Least deprived fifth			*Most deprived fifth*		
1992-94	283	250	319	472	423	526
1993-95	263	232	298	455	407	507
1994-96	227	198	259	398	353	448
1995-97	232	203	264	380	336	428
1996-98	209	182	239	359	316	406
1997-99	221	193	251	368	325	416
1998-00	209	182	239	369	325	417
1999-01	194	168	222	346	304	393
2000-02	163	140	189	311	271	355
2001-03	149	127	173	277	239	318
2002-04	139	119	163	273	236	315
2003-05	133	113	156	247	212	286
2004-06	115	96	136	226	193	264

Source: ONS (ADDE), HSW (NHSAR), WCfH/ONS (Townsend index)

Table 3.2.3.1b

CHD mortality in females aged 35-74, North Wales, by fifth of deprivation, 3-year rolling European age-standardised rate, 1992-2006

Period	EASR	LCL	UCL	EASR	LCL	UCL
	Least deprived fifth			*Most deprived fifth*		
1992-94	78	63	97	186	158	219
1993-95	80	65	99	181	153	213
1994-96	84	69	103	176	149	208
1995-97	85	69	104	159	133	190
1996-98	71	57	89	150	124	179
1997-99	70	55	87	142	117	172
1998-00	64	50	80	145	120	174
1999-01	62	49	78	138	114	167
2000-02	55	43	71	125	101	152
2001-03	48	37	63	116	93	143
2002-04	47	36	61	121	98	149
2003-05	41	30	54	119	96	146
2004-06	40	29	53	98	77	123

Source: ONS (ADDE), HSW (NHSAR), WCfH/ONS (Townsend index)

Table 3.2.3.1c

CHD mortality in males aged 35-74, North Wales, 3-year rolling age-standardised rate ratios, 1992-2006

Period	Rate ratio	LCL	UCL
1992-94	1.7	1.4	2.0
1993-95	1.7	1.5	2.0
1994-96	1.8	1.5	2.1
1995-97	1.6	1.4	2.0
1996-98	1.7	1.4	2.1
1997-99	1.7	1.4	2.0
1998-00	1.8	1.5	2.1
1999-01	1.8	1.5	2.2
2000-02	1.9	1.6	2.3
2001-03	1.9	1.5	2.3
2002-04	2.0	1.6	2.4
2003-05	1.9	1.5	2.3
2004-06	2.0	1.6	2.5

Source: ONS (ADDE), HSW (NHSAR), WCfH/ONS (Townsend index)

Table 3.2.3.1d

CHD mortality in females aged 35-74, North Wales, 3-year rolling age-standardised rate ratios, 1992-2006

Period	Rate ratio	LCL	UCL
1992-94	2.4	1.8	3.1
1993-95	2.2	1.7	2.9
1994-96	2.1	1.6	2.7
1995-97	1.9	1.5	2.5
1996-98	2.1	1.6	2.8
1997-99	2.0	1.5	2.7
1998-00	2.3	1.7	3.0
1999-01	2.2	1.7	3.0
2000-02	2.3	1.6	3.1
2001-03	2.4	1.7	3.4
2002-04	2.6	1.9	3.6
2003-05	2.9	2.1	4.2
2004-06	2.5	1.7	3.6

Source: ONS (ADDE), HSW (NHSAR), WCfH/ONS (Townsend index)

Table 3.2.3.2a

CHD mortality in males aged 35-74, Mid & West Wales, by fifth of deprivation, 3-year rolling European age-standardised rate, 1992-2006

Period	EASR	LCL	UCL	EASR	LCL	UCL
	Least deprived fifth			*Most deprived fifth*		
1992-94	271	245	299	405	370	444
1993-95	261	236	288	404	368	443
1994-96	252	228	278	405	369	444
1995-97	233	210	258	395	359	434
1996-98	207	186	231	368	334	406
1997-99	193	172	215	333	300	368
1998-00	190	169	212	300	269	334
1999-01	184	165	206	305	273	340
2000-02	170	151	191	286	255	320
2001-03	155	137	175	280	249	313
2002-04	140	124	159	252	223	283
2003-05	129	113	147	257	228	289
2004-06	122	106	139	241	212	272

Source: ONS (ADDE), HSW (NHSAR), WCfH/ONS (Townsend index)

Table 3.2.3.2b

CHD mortality in females aged 35-74, Mid & West Wales, by fifth of deprivation, 3-year rolling European age-standardised rate, 1992-2006

Period	EASR	LCL	UCL	EASR	LCL	UCL
	Least deprived fifth			*Most deprived fifth*		
1992-94	89	75	104	174	153	198
1993-95	87	74	103	152	132	175
1994-96	71	59	85	168	147	193
1995-97	67	55	81	160	139	185
1996-98	60	49	73	167	145	192
1997-99	56	46	68	147	126	170
1998-00	49	39	61	121	102	142
1999-01	50	40	61	113	95	134
2000-02	47	38	59	102	85	122
2001-03	45	36	56	102	84	122
2002-04	39	30	49	103	85	124
2003-05	39	31	49	96	79	116
2004-06	32	25	42	101	83	121

Source: ONS (ADDE), HSW (NHSAR), WCfH/ONS (Townsend index)

Table 3.2.3.2c

CHD mortality in males aged 35-74, Mid & West Wales, 3-year rolling age-standardised rate ratios, 1992-2006

Period	Rate ratio	LCL	UCL
1992-94	1.5	1.3	1.7
1993-95	1.5	1.4	1.8
1994-96	1.6	1.4	1.8
1995-97	1.7	1.5	1.9
1996-98	1.8	1.5	2.1
1997-99	1.7	1.5	2.0
1998-00	1.6	1.4	1.8
1999-01	1.7	1.4	1.9
2000-02	1.7	1.4	2.0
2001-03	1.8	1.5	2.1
2002-04	1.8	1.5	2.1
2003-05	2.0	1.7	2.4
2004-06	2.0	1.7	2.4

Source: ONS (ADDE), HSW (NHSAR), WCfH/ONS (Townsend index)

Table 3.2.3.2d

CHD mortality in females aged 35-74, Mid & West Wales, 3-year rolling age-standardised rate ratios, 1992-2006

Period	Rate ratio	LCL	UCL
1992-94	2.0	1.6	2.4
1993-95	1.7	1.4	2.2
1994-96	2.4	1.9	3.0
1995-97	2.4	1.9	3.0
1996-98	2.8	2.2	3.5
1997-99	2.6	2.1	3.4
1998-00	2.5	1.9	3.2
1999-01	2.3	1.7	3.0
2000-02	2.2	1.6	2.9
2001-03	2.3	1.7	3.0
2002-04	2.7	2.0	3.6
2003-05	2.5	1.8	3.3
2004-06	3.1	2.3	4.3

Source: ONS (ADDE), HSW (NHSAR), WCfH/ONS (Townsend index)

Table 3.2.3.3a

CHD mortality in males aged 35-74, South East Wales, by fifth of deprivation, 3-year rolling European age-standardised rate, 1992-2006

Period	EASR	LCL	UCL	EASR	LCL	UCL
	Least deprived fifth			*Most deprived fifth*		
1992-94	257	234	282	456	430	484
1993-95	245	223	268	432	406	459
1994-96	231	210	254	417	392	443
1995-97	216	195	238	389	365	415
1996-98	201	181	222	366	342	392
1997-99	186	168	207	345	322	369
1998-00	173	155	192	321	299	345
1999-01	170	152	188	312	290	336
2000-02	152	136	169	313	291	337
2001-03	146	131	164	301	280	325
2002-04	131	117	147	270	250	292
2003-05	131	117	147	246	227	267
2004-06	108	95	122	236	217	257

Source: ONS (ADDE), HSW (NHSAR), WCfH/ONS (Townsend index)

Table 3.2.3.3b

CHD mortality in females aged 35-74, South East Wales, by fifth of deprivation, 3-year rolling European age-standardised rate, 1992-2006

Period	EASR	LCL	UCL	EASR	LCL	UCL
	Least deprived fifth			*Most deprived fifth*		
1992-94	75	64	89	178	163	195
1993-95	77	66	91	182	166	199
1994-96	73	62	86	163	148	179
1995-97	71	60	84	166	150	182
1996-98	64	54	76	152	137	168
1997-99	61	51	73	142	128	158
1998-00	55	45	66	136	122	151
1999-01	59	49	70	137	123	153
2000-02	53	44	64	142	127	158
2001-03	53	44	63	135	121	151
2002-04	42	35	52	123	110	138
2003-05	40	32	49	116	103	130
2004-06	37	29	45	105	92	118

Source: ONS (ADDE), HSW (NHSAR), WCfH/ONS (Townsend index)

Table 3.2.3.3c

CHD mortality in males aged 35-74, South East Wales, 3-year rolling age-standardised rate ratios, 1992-2006

Period	Rate ratio	LCL	UCL
1992-94	1.8	1.6	2.0
1993-95	1.8	1.6	2.0
1994-96	1.8	1.6	2.0
1995-97	1.8	1.6	2.0
1996-98	1.8	1.6	2.1
1997-99	1.8	1.6	2.1
1998-00	1.9	1.6	2.1
1999-01	1.8	1.6	2.1
2000-02	2.1	1.8	2.4
2001-03	2.1	1.8	2.4
2002-04	2.1	1.8	2.4
2003-05	1.9	1.6	2.2
2004-06	2.2	1.9	2.5

Source: ONS (ADDE), HSW (NHSAR), WCfH/ONS (Townsend index)

Table 3.2.3.3d

CHD mortality in females aged 35-74, South East Wales, 3-year rolling age-standardised rate ratios, 1992-2006

Period	Rate ratio	LCL	UCL
1992-94	2.4	2.0	2.8
1993-95	2.3	2.0	2.8
1994-96	2.2	1.9	2.7
1995-97	2.3	1.9	2.8
1996-98	2.4	1.9	2.9
1997-99	2.3	1.9	2.9
1998-00	2.5	2.0	3.1
1999-01	2.3	1.9	2.9
2000-02	2.7	2.2	3.3
2001-03	2.5	2.1	3.2
2002-04	2.9	2.3	3.7
2003-05	2.9	2.3	3.7
2004-06	2.9	2.2	3.7

Source: ONS (ADDE), HSW (NHSAR), WCfH/ONS (Townsend index)

Table 3.3.2.1

Emergency admissions for CHD, European age-standardised rate (EASR) per 100,000 Wales Local Authorities, males aged 35-74, 2004-06

Average annual number, crude and European age-standardised rate per 100,000 population, 95% confidence limits

Local Authority	Average admissions per year	Crude rate per 100,000	EASR per 100,000	95% LCL	95% UCL	Compared to Wales
Isle of Anglesey	103	594.1	514.0	457.4	576.4	Sig. Low
Gwynedd	175	619.3	542.0	495.8	591.7	Sig. Low
Conwy	223	805.0	682.5	630.5	738.1	Sig. High
Denbighshire	194	818.3	733.2	673.8	796.8	Sig. High
Flintshire	252	675.4	655.0	608.8	703.9	High
Wrexham	249	790.3	757.1	703.5	813.9	Sig. High
Powys	179	523.1	451.8	413.8	492.7	Sig. Low
Ceredigion	94	503.9	436.2	385.9	492.1	Sig. Low
Pembrokeshire	201	678.8	588.8	541.8	639.2	Low
Carmarthenshire	341	770.9	675.5	634.2	719.0	Sig. High
Swansea	348	659.5	611.9	574.9	650.7	Low
Neath Port Talbot	252	747.1	699.5	650.2	751.7	Sig. High
Bridgend	254	788.3	750.5	697.8	806.3	Sig. High
The Vale of Glamorgan	160	545.0	518.7	473.1	567.9	Sig. Low
Cardiff	321	497.2	510.9	479.0	544.4	Sig. Low
Rhondda Cynon Taff	386	705.6	673.4	634.8	713.8	Sig. High
Merthyr Tydfil	90	677.3	642.7	567.9	725.2	High
Caerphilly	291	714.8	689.2	644.0	737.0	Sig. High
Blaenau Gwent	142	843.0	775.1	702.4	853.8	Sig. High
Torfaen	116	534.0	502.6	451.0	558.8	Sig. Low
Monmouthshire	111	483.4	442.6	396.0	493.5	Sig. Low
Newport	182	560.5	543.8	499.0	591.9	Sig. Low
Wales	**4664**	**658.8**	**611.9**	**601.7**	**622.2**	

Source: HSW (PEDW), ONS (MYE)

Table 3.3.2.2

Emergency admissions for CHD, European age-standardised rate (EASR) per 100,000 Wales Local Authorities, females aged 35-74, 2004-06

Average annual number, crude and European age-standardised rate per 100,000 population, 95% confidence limits

Local Authority	Average admissions per year	Crude rate per 100,000	EASR per 100,000	95% LCL	95% UCL	Compared to Wales
Isle of Anglesey	59	325.7	273.9	234.4	318.8	High
Gwynedd	84	285.9	236.2	207.4	268.3	Sig. Low
Conwy	110	365.1	296.5	264.2	332.1	High
Denbighshire	108	427.3	373.7	333.3	418.0	Sig. High
Flintshire	122	312.8	295.6	265.8	328.0	High
Wrexham	128	390.6	370.1	333.7	409.5	Sig. High
Powys	76	216.6	183.1	159.8	209.3	Sig. Low
Ceredigion	44	232.2	193.2	161.3	230.7	Sig. Low
Pembrokeshire	80	254.6	217.3	190.1	247.7	Sig. Low
Carmarthenshire	174	371.5	322.4	294.9	352.0	Sig. High
Swansea	171	306.1	268.5	245.4	293.5	Low
Neath Port Talbot	116	327.6	294.5	264.0	327.7	High
Bridgend	126	372.0	341.6	307.6	378.5	Sig. High
The Vale of Glamorgan	73	229.4	208.4	181.5	238.5	Sig. Low
Cardiff	139	205.0	201.2	182.2	221.8	Sig. Low
Rhondda Cynon Taff	204	356.1	328.1	302.4	355.6	Sig. High
Merthyr Tydfil	51	360.1	333.1	281.7	391.8	Sig. High
Caerphilly	139	327.1	301.6	273.1	332.5	High
Blaenau Gwent	63	363.4	332.0	286.0	384.1	Sig. High
Torfaen	60	260.8	234.2	200.8	271.9	Sig. Low
Monmouthshire	51	212.8	190.3	161.0	223.7	Sig. Low
Newport	87	253.9	234.6	206.7	265.6	Sig. Low
Wales	**2265**	**304.3**	**273.1**	**266.6**	**279.8**	

Source: HSW (PEDW), ONS (MYE)

Table 3.3.4a

Count of emergency CHD admissions in males aged 35-74, by region and fifth of deprivation, 1992-2006

Year	North Fifth*		Mid & West Fifth*		South East Fifth*		Total (all fifths)
	1	5	1	5	1	5	
1992	234	229	245	260	345	769	**5373**
1993	201	279	288	295	328	816	**5815**
1994	198	232	276	331	386	876	**5878**
1995	226	243	304	350	404	881	**6155**
1996	251	277	330	354	368	832	**6309**
1997	217	289	365	387	414	884	**6848**
1998	241	264	368	425	344	760	**6467**
1999	258	283	339	419	364	825	**6449**
2000	268	314	340	365	383	807	**6242**
2001	232	268	313	355	372	784	**6009**
2002	229	251	321	327	327	713	**5729**
2003	204	219	259	336	348	653	**5235**
2004	200	257	296	308	275	562	**4992**
2005	206	250	261	280	303	560	**4670**
2006	182	211	256	241	264	498	**4276**
Total	**3347**	**3866**	**4561**	**5033**	**5225**	**11220**	**86447**

Source: HSW (PEDW), WCfH/ONS (Townsend index)

***Deprivation fifth: 1=least deprived fifth, 5 = most deprived fifth**

Table 3.3.4b

Count of emergency CHD admissions in females aged 35-74, by region and fifth of deprivation, 1992-2006

Year	North Fifth*		Mid & West Fifth*		South East Fifth*		Total (all fifths)
	1	5	1	5	1	5	
1992	76	122	114	152	128	383	**2410**
1993	75	132	135	205	137	438	**2801**
1994	90	131	108	173	129	448	**2873**
1995	89	140	119	185	159	480	**2950**
1996	83	138	157	237	168	478	**3078**
1997	105	145	146	254	176	477	**3325**
1998	94	122	138	218	167	421	**3084**
1999	96	160	161	187	139	449	**3142**
2000	114	150	123	167	168	437	**2962**
2001	104	147	138	167	148	477	**2961**
2002	94	121	144	168	124	373	**2642**
2003	91	99	115	198	122	384	**2512**
2004	103	125	154	200	120	306	**2403**
2005	110	111	126	135	80	298	**2265**
2006	106	97	96	140	117	269	**2106**
Total	**1430**	**1940**	**1974**	**2786**	**2082**	**6118**	**41514**

Source: HSW (PEDW), WCfH/ONS (Townsend index)

***Deprivation fifth: 1=least deprived fifth, 5 = most deprived fifth**

Table 3.3.4.1a

Emergency CHD admissions in males aged 35-74, North Wales, by fifth of deprivation, 3-year rolling European age-standardised rate, 1992-2006

Period	EASR	LCL	UCL	EASR	LCL	UCL
	Least deprived fifth			*Most deprived fifth*		
1992-94	682	629	738	1104	1025	1188
1993-95	660	609	715	1111	1033	1195
1994-96	703	651	759	1112	1033	1196
1995-97	712	660	768	1188	1107	1274
1996-98	710	659	765	1234	1150	1321
1997-99	702	651	756	1243	1160	1331
1998-00	733	682	787	1275	1191	1364
1999-01	712	662	765	1268	1185	1356
2000-02	673	625	724	1201	1121	1287
2001-03	605	560	653	1049	974	1128
2002-04	563	520	609	1017	944	1094
2003-05	533	491	577	1010	937	1087
2004-06	501	461	544	992	920	1068

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)

Table 3.3.4.1b

Emergency CHD admissions in females aged 35-74, North Wales, by fifth of deprivation, 3-year rolling European age-standardised rate, 1992-2006

Period	EASR	LCL	UCL	EASR	LCL	UCL
	Least deprived fifth			*Most deprived fifth*		
1992-94	230	201	262	480	431	534
1993-95	237	208	269	512	461	568
1994-96	242	213	275	535	482	592
1995-97	257	227	291	569	515	629
1996-98	260	230	293	547	494	605
1997-99	268	238	301	574	519	633
1998-00	272	242	304	578	523	637
1999-01	279	249	312	615	559	676
2000-02	275	245	307	566	512	624
2001-03	249	221	280	501	450	556
2002-04	243	215	273	471	422	525
2003-05	252	224	283	457	408	509
2004-06	262	233	293	450	402	502

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)

Table 3.3.4.1c

Emergency CHD admissions in males aged 35-74, North Wales, 3-year rolling age-standardised rate ratios, 1992-2006

Period	Rate ratio	LCL	UCL
1992-94	1.6	1.5	1.8
1993-95	1.7	1.5	1.9
1994-96	1.6	1.4	1.8
1995-97	1.7	1.5	1.8
1996-98	1.7	1.6	1.9
1997-99	1.8	1.6	2.0
1998-00	1.7	1.6	1.9
1999-01	1.8	1.6	2.0
2000-02	1.8	1.6	2.0
2001-03	1.7	1.6	1.9
2002-04	1.8	1.6	2.0
2003-05	1.9	1.7	2.1
2004-06	2.0	1.8	2.2

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)

Table 3.3.4.1d

Emergency CHD admissions in females aged 35-74, North Wales, 3-year rolling age-standardised rate ratios, 1992-2006

Period	Rate ratio	LCL	UCL
1992-94	2.1	1.8	2.5
1993-95	2.2	1.8	2.5
1994-96	2.2	1.9	2.6
1995-97	2.2	1.9	2.6
1996-98	2.1	1.8	2.5
1997-99	2.1	1.8	2.5
1998-00	2.1	1.8	2.5
1999-01	2.2	1.9	2.6
2000-02	2.1	1.8	2.4
2001-03	2.0	1.7	2.4
2002-04	1.9	1.7	2.3
2003-05	1.8	1.5	2.1
2004-06	1.7	1.5	2.0

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)

Table 3.3.4.2a

Emergency CHD admissions in males aged 35-74, Mid & West Wales, by fifth of deprivation, 3-year rolling European age-standardised rate, 1992-2006

Period	EASR	LCL	UCL	EASR	LCL	UCL
	Least deprived fifth			*Most deprived fifth*		
1992-94	560	521	600	788	736	844
1993-95	589	550	630	871	816	930
1994-96	605	566	646	933	876	994
1995-97	658	617	701	1005	945	1068
1996-98	689	648	732	1086	1023	1151
1997-99	681	641	724	1162	1097	1229
1998-00	652	613	693	1142	1077	1209
1999-01	605	568	645	1079	1017	1145
2000-02	581	544	619	988	929	1050
2001-03	524	490	560	961	902	1022
2002-04	504	471	539	909	852	968
2003-05	462	430	495	857	803	915
2004-06	451	420	484	766	714	820

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)

Table 3.3.4.2b

Emergency CHD admissions in females aged 35-74, Mid & West Wales, by fifth of deprivation, 3-year rolling European age-standardised rate, 1992-2006

Period	EASR	LCL	UCL	EASR	LCL	UCL
	Least deprived fifth			*Most deprived fifth*		
1992-94	226	202	251	430	393	471
1993-95	226	203	251	453	414	494
1994-96	239	215	264	480	441	523
1995-97	259	235	286	558	515	604
1996-98	270	245	296	596	551	643
1997-99	269	244	296	563	519	610
1998-00	250	226	275	492	452	536
1999-01	245	222	270	457	418	500
2000-02	230	208	254	446	407	488
2001-03	224	202	248	480	439	524
2002-04	228	206	252	514	472	560
2003-05	211	191	234	482	441	526
2004-06	196	177	218	425	387	466

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)

Table 3.3.4.2c

Emergency CHD admissions in males aged 35-74, Mid & West Wales, 3-year rolling age-standardised rate ratios, 1992-2006

Period	Rate ratio	LCL	UCL
1992-94	1.4	1.3	1.6
1993-95	1.5	1.3	1.6
1994-96	1.5	1.4	1.7
1995-97	1.5	1.4	1.7
1996-98	1.6	1.4	1.7
1997-99	1.7	1.6	1.9
1998-00	1.8	1.6	1.9
1999-01	1.8	1.6	1.9
2000-02	1.7	1.6	1.9
2001-03	1.8	1.7	2.0
2002-04	1.8	1.6	2.0
2003-05	1.9	1.7	2.0
2004-06	1.7	1.5	1.9

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)

Table 3.3.4.2d

Emergency CHD admissions in females aged 35-74, Mid & West Wales, 3-year rolling age-standardised rate ratios, 1992-2006

Period	Rate ratio	LCL	UCL
1992-94	1.9	1.7	2.2
1993-95	2.0	1.8	2.3
1994-96	2.0	1.8	2.3
1995-97	2.2	1.9	2.4
1996-98	2.2	2.0	2.5
1997-99	2.1	1.9	2.4
1998-00	2.0	1.7	2.2
1999-01	1.9	1.6	2.1
2000-02	1.9	1.7	2.2
2001-03	2.1	1.9	2.4
2002-04	2.3	2.0	2.6
2003-05	2.3	2.0	2.6
2004-06	2.2	1.9	2.5

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)

Table 3.3.4.3a

Emergency CHD admissions in males aged 35-74, South East Wales, by fifth of deprivation, 3-year rolling European age-standardised rate, 1992-2006

Period	EASR	LCL	UCL	EASR	LCL	UCL
	Least deprived fifth			*Most deprived fifth*		
1992-94	606	569	644	1032	991	1074
1993-95	618	582	655	1073	1031	1116
1994-96	628	592	665	1088	1046	1131
1995-97	633	597	670	1105	1062	1149
1996-98	591	557	626	1064	1022	1107
1997-99	573	540	608	1071	1029	1115
1998-00	545	513	578	1042	1000	1085
1999-01	546	514	579	1054	1012	1097
2000-02	516	486	548	1003	962	1045
2001-03	488	459	519	935	895	975
2002-04	432	404	460	833	796	871
2003-05	412	386	439	760	725	797
2004-06	367	343	393	689	655	723

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)

Table 3.3.4.3b

Emergency CHD admissions in females aged 35-74, South East Wales, by fifth of deprivation, 3-year rolling European age-standardised rate, 1992-2006

Period	EASR	LCL	UCL	EASR	LCL	UCL
	Least deprived fifth			*Most deprived fifth*		
1992-94	203	184	225	499	471	529
1993-95	215	195	237	540	511	571
1994-96	228	207	250	567	536	599
1995-97	247	226	270	594	562	626
1996-98	248	227	271	578	547	611
1997-99	232	211	254	572	541	604
1998-00	226	206	248	554	524	586
1999-01	214	195	235	584	553	616
2000-02	202	184	222	552	522	584
2001-03	175	158	193	535	505	566
2002-04	157	141	174	462	434	491
2003-05	135	121	151	430	403	458
2004-06	131	117	146	376	352	403

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)

Table 3.3.4.3c

Emergency CHD admissions in males aged 35-74, South East Wales, 3-year rolling age-standardised rate ratios, 1992-2006

Period	Rate ratio	LCL	UCL
1992-94	1.7	1.6	1.8
1993-95	1.7	1.6	1.9
1994-96	1.7	1.6	1.9
1995-97	1.7	1.6	1.9
1996-98	1.8	1.7	1.9
1997-99	1.9	1.7	2.0
1998-00	1.9	1.8	2.1
1999-01	1.9	1.8	2.1
2000-02	1.9	1.8	2.1
2001-03	1.9	1.8	2.1
2002-04	1.9	1.8	2.1
2003-05	1.8	1.7	2.0
2004-06	1.9	1.7	2.0

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)

Table 3.3.4.3d

Emergency CHD admissions in females aged 35-74, South East Wales, 3-year rolling age-standardised rate ratios, 1992-2006

Period	Rate ratio	LCL	UCL
1992-94	2.5	2.2	2.8
1993-95	2.5	2.2	2.8
1994-96	2.5	2.2	2.8
1995-97	2.4	2.2	2.7
1996-98	2.3	2.1	2.6
1997-99	2.5	2.2	2.7
1998-00	2.5	2.2	2.7
1999-01	2.7	2.4	3.0
2000-02	2.7	2.4	3.0
2001-03	3.1	2.7	3.4
2002-04	2.9	2.6	3.3
2003-05	3.2	2.8	3.6
2004-06	2.9	2.5	3.3

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)

Table 3.4.3.1

Angiography, European age-standardised rate (EASR) per 100,000
Wales Local Authorities, males aged 35-74, 2004-06

Average annual number, crude and European age-standardised rate per 100,000 population, 95% confidence limits

Local Authority	Average angiographies per year	Crude rate per 100,000	EASR per 100,000	95% LCL	95% UCL	Compared to Wales
Isle of Anglesey	53	304.7	257.0	218.1	301.8	Sig. Low
Gwynedd	101	356.2	309.3	274.9	347.3	Sig. Low
Conwy	93	335.0	287.7	254.0	325.1	Sig. Low
Denbighshire	80	336.6	293.6	257.1	334.4	Sig. Low
Flintshire	152	407.7	389.5	354.4	427.4	Sig. Low
Wrexham	142	449.7	427.4	387.6	470.5	Low
Powys	144	421.0	368.9	334.4	406.3	Sig. Low
Ceredigion	116	617.9	529.3	474.2	590.0	Sig. High
Pembrokeshire	184	621.4	545.0	499.7	593.8	Sig. High
Carmarthenshire	314	710.6	621.5	581.9	663.2	Sig. High
Swansea	385	729.6	680.8	641.7	721.8	Sig. High
Neath Port Talbot	267	793.6	748.7	697.4	802.8	Sig. High
Bridgend	256	793.5	760.2	707.0	816.6	Sig. High
The Vale of Glamorgan	123	419.9	397.1	357.4	440.2	Sig. Low
Cardiff	243	375.9	389.3	361.4	418.8	Sig. Low
Rhondda Cynon Taff	215	393.3	372.0	343.7	402.2	Sig. Low
Merthyr Tydfil	51	381.3	360.9	305.5	424.0	Sig. Low
Caerphilly	198	486.9	470.8	433.5	510.7	High
Blaenau Gwent	73	434.4	399.5	347.9	457.3	Low
Torfaen	88	404.0	379.8	335.1	429.0	Sig. Low
Monmouthshire	79	345.5	315.1	276.1	358.4	Sig. Low
Newport	120	370.6	361.8	325.3	401.6	Sig. Low
Wales	**3477**	**491.1**	**455.9**	**447.2**	**464.9**	

Source: HSW (PEDW), ONS (MYE)

Table 3.4.3.2

Angiography, European age-standardised rate (EASR) per 100,000
Wales Local Authorities, females aged 35-74, 2004-06

Average annual number, crude and European age-standardised rate per 100,000 population, 95% confidence limits

Local Authority	Average angiographies per year	Crude rate per 100,000	EASR per 100,000	95% LCL	95% UCL	Compared to Wales
Isle of Anglesey	28	155.5	136.2	108.2	169.9	Low
Gwynedd	35	118.6	98.2	80.0	119.8	Sig. Low
Conwy	44	145.4	125.6	104.3	150.3	Sig. Low
Denbighshire	32	125.7	114.3	92.1	140.6	Sig. Low
Flintshire	58	150.0	141.3	121.0	164.3	Sig. Low
Wrexham	53	162.7	153.9	130.9	180.1	Low
Powys	54	154.2	128.7	109.5	150.7	Sig. Low
Ceredigion	32	168.9	139.6	112.7	172.0	Low
Pembrokeshire	55	174.7	150.4	127.9	176.2	Low
Carmarthenshire	129	274.7	238.2	214.7	263.7	Sig. High
Swansea	172	307.8	274.7	251.1	300.1	Sig. High
Neath Port Talbot	109	308.7	276.1	246.8	308.3	Sig. High
Bridgend	113	334.6	306.0	274.0	341.1	Sig. High
The Vale of Glamorgan	42	132.6	121.7	101.3	145.3	Sig. Low
Cardiff	102	149.5	147.8	131.5	165.6	Sig. Low
Rhondda Cynon Taff	94	163.8	153.4	135.8	172.7	Low
Merthyr Tydfil	19	135.0	129.8	98.1	169.2	Low
Caerphilly	80	188.3	174.9	153.3	198.9	High
Blaenau Gwent	26	147.3	139.8	109.9	176.0	Low
Torfaen	27	118.1	112.0	88.9	139.7	Sig. Low
Monmouthshire	19	80.7	74.4	56.3	96.8	Sig. Low
Newport	49	144.0	136.9	115.5	161.5	Sig. Low
Wales	**1373**	**184.4**	**167.0**	**161.9**	**172.3**	

Source: HSW (PEDW), ONS (MYE)

Table 3.4.5a

Count of angiographies in males aged 35-74, by region and fifth of deprivation, 1992-2006

Year	North Fifth*		Mid & West Fifth*		South East Fifth*		Total (all fifths)
	1	5	1	5	1	5	
1992	58	46	101	84	192	196	**1686**
1993	36	31	144	123	201	199	**1841**
1994	64	41	159	127	224	237	**1979**
1995	63	51	166	154	220	300	**2364**
1996	56	42	178	131	198	290	**2248**
1997	87	66	183	148	217	253	**2471**
1998	87	60	209	191	205	283	**2744**
1999	97	73	207	169	233	314	**2855**
2000	100	80	226	171	243	287	**2898**
2001	112	96	229	204	210	315	**2995**
2002	121	92	254	199	224	318	**3194**
2003	124	76	292	258	280	300	**3469**
2004	116	75	301	240	222	280	**3304**
2005	125	83	291	256	254	299	**3538**
2006	139	98	289	251	222	311	**3582**
Total	**1385**	**1010**	**3229**	**2706**	**3345**	**4182**	**41168**

Source: HSW (PEDW), WCfH/ONS (Townsend index)

***Deprivation fifth: 1=least deprived fifth, 5 = most deprived fifth**

Table 3.4.5b

Count of angiographies in females aged 35-74, by region and fifth of deprivation, 1992-2006

Year	North Fifth*		Mid & West Fifth*		South East Fifth*		Total (all fifths)
	1	5	1	5	1	5	
1992	15	11	25	23	30	66	**421**
1993	12	6	31	33	37	72	**450**
1994	6	10	34	44	47	71	**522**
1995	21	18	45	45	52	70	**615**
1996	18	10	31	58	47	106	**641**
1997	19	27	45	57	58	77	**779**
1998	19	23	63	72	65	103	**885**
1999	21	22	72	74	64	111	**935**
2000	39	45	60	62	70	123	**1056**
2001	35	47	63	69	63	111	**1065**
2002	37	38	77	86	72	107	**1110**
2003	37	37	111	122	75	152	**1329**
2004	31	37	108	144	67	142	**1305**
2005	49	36	108	108	63	136	**1337**
2006	62	51	94	104	75	162	**1476**
Total	**421**	**418**	**967**	**1101**	**885**	**1609**	**13926**

Source: HSW (PEDW), WCfH/ONS (Townsend index)

***Deprivation fifth: 1=least deprived fifth, 5 = most deprived fifth**

Table 3.4.5.1a

Angiography in males aged 35-74, North Wales, by fifth of deprivation, 3-year rolling age-standardised rate, 1992-2006

Period	EASR	LCL	UCL	EASR	LCL	UCL
	Least deprived fifth			*Most deprived fifth*		
1992-94	180	153	211	186	154	224
1993-95	181	154	211	189	156	226
1994-96	199	171	230	208	174	247
1995-97	222	193	255	243	207	285
1996-98	242	211	275	257	219	299
1997-99	278	246	313	303	262	349
1998-00	282	250	317	323	281	370
1999-01	299	266	334	374	328	423
2000-02	312	279	348	397	351	448
2001-03	327	294	363	385	339	434
2002-04	323	290	358	349	306	396
2003-05	318	286	353	330	289	375
2004-06	321	290	356	357	315	404

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)

Table 3.4.5.1b

Angiography in females aged 35-74, North Wales, by fifth of deprivation, 3-year rolling age-standardised rate, 1992-2006

Period	EASR	LCL	UCL	EASR	LCL	UCL
	Least deprived fifth			*Most deprived fifth*		
1992-94	37	25	52	43	28	64
1993-95	41	29	56	55	38	78
1994-96	47	34	64	61	43	84
1995-97	60	45	77	85	64	112
1996-98	56	42	73	88	67	115
1997-99	58	44	75	100	77	127
1998-00	73	58	92	120	96	149
1999-01	86	69	105	154	126	186
2000-02	99	81	119	181	151	216
2001-03	95	78	115	174	145	209
2002-04	90	73	109	159	131	193
2003-05	99	81	119	153	126	186
2004-06	116	98	138	170	141	203

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)

Table 3.4.5.1c

Angiography in males aged 35-74, North Wales, 3-year rolling age-standardised rate ratios, 1992-2006

Period	Rate ratio	LCL	UCL
1992-94	1.0	0.8	1.3
1993-95	1.0	0.8	1.3
1994-96	1.0	0.8	1.3
1995-97	1.1	0.9	1.4
1996-98	1.1	0.9	1.3
1997-99	1.1	0.9	1.3
1998-00	1.1	1.0	1.4
1999-01	1.3	1.1	1.5
2000-02	1.3	1.1	1.5
2001-03	1.2	1.0	1.4
2002-04	1.1	0.9	1.3
2003-05	1.0	0.9	1.2
2004-06	1.1	0.9	1.3

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)

Table 3.4.5.1d

Angiography in females aged 35-74, North Wales, 3-year rolling age-standardised rate ratios, 1992-2006

Period	Rate ratio	LCL	UCL
1992-94	1.2	0.7	2.0
1993-95	1.4	0.8	2.2
1994-96	1.3	0.8	2.0
1995-97	1.4	1.0	2.1
1996-98	1.6	1.1	2.3
1997-99	1.7	1.2	2.5
1998-00	1.6	1.2	2.2
1999-01	1.8	1.4	2.4
2000-02	1.8	1.4	2.4
2001-03	1.8	1.4	2.4
2002-04	1.8	1.3	2.3
2003-05	1.6	1.2	2.0
2004-06	1.5	1.1	1.9

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)

Table 3.4.5.2a

Angiography in males aged 35-74, Mid & West Wales, by fifth of deprivation, 3-year rolling age-standardised rate, 1992-2006

Period	EASR	LCL	UCL	EASR	LCL	UCL
	Least deprived fifth			*Most deprived fifth*		
1992-94	293	265	323	326	291	364
1993-95	331	301	363	389	352	430
1994-96	345	315	377	397	359	438
1995-97	357	327	390	418	379	461
1996-98	379	349	412	458	417	502
1997-99	393	362	426	495	452	541
1998-00	411	380	445	517	473	563
1999-01	414	383	448	527	483	574
2000-02	431	400	465	554	510	602
2001-03	457	425	491	633	585	683
2002-04	487	455	522	662	614	714
2003-05	497	465	532	710	660	763
2004-06	488	456	522	700	651	753

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)

Table 3.4.5.2b

Angiography in females aged 35-74, Mid & West Wales, by fifth of deprivation, 3-year rolling age-standardised rate, 1992-2006

Period	EASR	LCL	UCL	EASR	LCL	UCL
	Least deprived fifth			*Most deprived fifth*		
1992-94	59	48	73	85	69	105
1993-95	71	58	86	105	87	127
1994-96	72	59	87	132	110	156
1995-97	78	64	93	146	124	172
1996-98	88	74	105	172	147	199
1997-99	112	96	130	190	164	220
1998-00	119	103	137	193	167	223
1999-01	116	100	134	193	167	222
2000-02	116	101	134	201	175	231
2001-03	144	127	164	263	233	297
2002-04	164	145	184	332	297	369
2003-05	175	156	195	350	315	388
2004-06	160	143	180	326	292	362

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)

Table 3.4.5.2c

Angiography in males aged 35-74, Mid & West Wales, 3-year rolling age-standardised rate ratios, 1992-2006

Period	Rate ratio	LCL	UCL
1992-94	1.1	1.0	1.3
1993-95	1.2	1.0	1.3
1994-96	1.1	1.0	1.3
1995-97	1.2	1.0	1.3
1996-98	1.2	1.1	1.4
1997-99	1.3	1.1	1.4
1998-00	1.3	1.1	1.4
1999-01	1.3	1.1	1.4
2000-02	1.3	1.1	1.4
2001-03	1.4	1.2	1.5
2002-04	1.4	1.2	1.5
2003-05	1.4	1.3	1.6
2004-06	1.4	1.3	1.6

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)

Table 3.4.5.2d

Angiography in females aged 35-74, Mid & West Wales, 3-year rolling age-standardised rate ratios, 1992-2006

Period	Rate ratio	LCL	UCL
1992-94	1.4	1.1	1.9
1993-95	1.5	1.1	1.9
1994-96	1.8	1.4	2.4
1995-97	1.9	1.5	2.4
1996-98	1.9	1.5	2.4
1997-99	1.7	1.4	2.1
1998-00	1.6	1.3	2.0
1999-01	1.7	1.4	2.0
2000-02	1.7	1.4	2.1
2001-03	1.8	1.5	2.2
2002-04	2.0	1.7	2.4
2003-05	2.0	1.7	2.3
2004-06	2.0	1.7	2.4

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)

Table 3.4.5.3a

Angiography in males aged 35-74, South East Wales, by fifth of deprivation, 3-year rolling age-standardised rate, 1992-2006

Period	EASR	LCL	UCL	EASR	LCL	UCL
	Least deprived fifth			*Most deprived fifth*		
1992-94	361	333	391	281	260	305
1993-95	365	337	394	328	304	353
1994-96	355	328	384	370	345	396
1995-97	345	319	374	377	352	404
1996-98	330	305	357	370	345	396
1997-99	339	314	367	378	353	405
1998-00	343	317	370	392	367	419
1999-01	337	312	363	406	380	434
2000-02	324	300	350	409	383	436
2001-03	335	311	360	413	387	440
2002-04	331	307	356	395	369	422
2003-05	335	311	360	382	357	408
2004-06	303	281	326	383	359	410

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)

Table 3.4.5.3b

Angiography in females aged 35-74, South East Wales, by fifth of deprivation, 3-year rolling age-standardised rate, 1992-2006

Period	EASR	LCL	UCL	EASR	LCL	UCL
	Least deprived fifth			*Most deprived fifth*		
1992-94	63	52	76	95	82	110
1993-95	72	61	86	97	84	112
1994-96	76	64	90	109	96	125
1995-97	81	68	95	114	100	129
1996-98	85	73	99	128	113	144
1997-99	92	79	106	132	117	148
1998-00	96	83	110	149	134	167
1999-01	94	81	108	152	136	170
2000-02	95	83	109	152	136	169
2001-03	94	82	108	167	150	185
2002-04	93	81	106	181	163	200
2003-05	86	75	99	192	174	212
2004-06	85	74	98	195	177	215

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)

Table 3.4.5.3c

Angiography in males aged 35-74, South East Wales, 3-year rolling age-standardised rate ratios, 1992-2006

Period	Rate ratio	LCL	UCL
1992-94	0.8	0.7	0.9
1993-95	0.9	0.8	1.0
1994-96	1.0	0.9	1.2
1995-97	1.1	1.0	1.2
1996-98	1.1	1.0	1.2
1997-99	1.1	1.0	1.2
1998-00	1.1	1.0	1.3
1999-01	1.2	1.1	1.3
2000-02	1.3	1.1	1.4
2001-03	1.2	1.1	1.4
2002-04	1.2	1.1	1.3
2003-05	1.1	1.0	1.3
2004-06	1.3	1.1	1.4

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)

Table 3.4.5.3d

Angiography in females aged 35-74, South East Wales, 3-year rolling age-standardised rate ratios, 1992-2006

Period	Rate ratio	LCL	UCL
1992-94	1.5	1.2	1.9
1993-95	1.3	1.1	1.7
1994-96	1.4	1.2	1.8
1995-97	1.4	1.2	1.7
1996-98	1.5	1.2	1.8
1997-99	1.4	1.2	1.7
1998-00	1.6	1.3	1.9
1999-01	1.6	1.4	1.9
2000-02	1.6	1.3	1.9
2001-03	1.8	1.5	2.1
2002-04	1.9	1.6	2.3
2003-05	2.2	1.9	2.6
2004-06	2.3	1.9	2.7

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)

Table 3.5.3.1

Revascularisation, European age-standardised rate (EASR) per 100,000
Wales Local Authorities, males aged 35-74, 2004-06

Average annual number, crude and European age-standardised rate per 100,000 population, 95% confidence limits

Local Authority	Average revascularisations per year	Crude rate per 100,000	EASR per 100,000	95% LCL	95% UCL	Compared to Wales
Isle of Anglesey	48	276.0	236.2	198.6	279.7	Sig. Low
Gwynedd	88	311.4	272.6	240.1	308.6	Sig. Low
Conwy	86	309.7	268.4	235.8	304.7	Sig. Low
Denbighshire	63	264.8	236.1	203.1	273.5	Sig. Low
Flintshire	125	334.6	323.3	291.1	358.2	Low
Wrexham	103	326.9	310.9	277.1	348.0	Low
Powys	104	302.4	266.3	237.1	298.4	Sig. Low
Ceredigion	65	345.4	296.2	255.3	342.8	Low
Pembrokeshire	121	408.6	356.4	320.0	396.3	High
Carmarthenshire	190	430.3	375.8	345.2	408.6	Sig. High
Swansea	242	459.3	429.3	398.3	462.1	Sig. High
Neath Port Talbot	173	512.6	481.6	440.8	525.4	Sig. High
Bridgend	154	476.3	456.0	415.1	500.2	Sig. High
The Vale of Glamorgan	101	345.9	327.5	291.6	366.9	Low
Cardiff	242	374.9	388.3	360.5	417.8	Sig. High
Rhondda Cynon Taff	147	269.5	256.1	232.6	281.5	Sig. Low
Merthyr Tydfil	48	363.7	340.2	286.8	401.3	High
Caerphilly	157	385.2	373.3	340.1	409.0	Sig. High
Blaenau Gwent	42	247.9	229.3	190.5	274.4	Sig. Low
Torfaen	61	280.0	261.5	224.9	302.8	Sig. Low
Monmouthshire	51	220.6	201.6	170.6	236.9	Sig. Low
Newport	90	278.2	274.4	242.5	309.5	Sig. Low
Wales	**2500**	**353.2**	**328.9**	**321.4**	**336.5**	

Source: HSW (PEDW), ONS (MYE)

Table 3.5.3.2

Revascularisation, European age-standardised rate (EASR) per 100,000
Wales Local Authorities, females aged 35-74, 2004-06

Average annual number, crude and European age-standardised rate per 100,000 population, 95% confidence limits

Local Authority	Average revascularisations per year	Crude rate per 100,000	EASR per 100,000	95% LCL	95% UCL	Compared to Wales
Isle of Anglesey	20	108.0	88.2	66.9	115.1	Low
Gwynedd	23	78.0	64.3	49.8	82.2	Sig. Low
Conwy	26	87.7	72.3	56.8	91.3	Sig. Low
Denbighshire	19	76.7	67.8	51.3	88.6	Sig. Low
Flintshire	35	90.0	85.3	69.7	103.6	Low
Wrexham	26	80.4	76.0	60.1	95.1	Low
Powys	29	82.3	68.4	54.7	85.0	Sig. Low
Ceredigion	15	79.2	65.9	47.9	89.7	Sig. Low
Pembrokeshire	26	84.1	70.9	55.8	89.3	Sig. Low
Carmarthenshire	56	120.3	103.7	88.4	121.0	High
Swansea	88	157.5	141.4	124.6	160.1	Sig. High
Neath Port Talbot	62	174.1	154.9	133.2	179.5	Sig. High
Bridgend	51	150.6	135.8	115.0	159.8	Sig. High
The Vale of Glamorgan	31	96.8	89.6	72.2	110.4	Low
Cardiff	72	105.4	103.7	90.2	118.8	High
Rhondda Cynon Taff	51	89.4	82.9	70.2	97.3	Low
Merthyr Tydfil	16	116.1	110.2	81.4	146.6	High
Caerphilly	47	110.6	101.8	85.6	120.4	High
Blaenau Gwent	13	72.7	67.3	47.4	93.5	Low
Torfaen	17	73.5	68.3	50.6	90.6	Sig. Low
Monmouthshire	14	59.8	54.8	39.5	74.5	Sig. Low
Newport	26	76.9	72.4	57.1	90.8	Sig. Low
Wales	**764**	**102.7**	**92.5**	**88.7**	**96.4**	

Source: HSW (PEDW), ONS (MYE)

Table 3.5.5a

Count of revascularisations in males aged 35-74, by region and fifth of deprivation, 1992-2006

Year	North Fifth*		Mid & West Fifth*		South East Fifth*		Total (all fifths)
	1	5	1	5	1	5	
1992	27	26	39	64	98	91	**852**
1993	16	21	60	50	105	119	**933**
1994	45	26	78	60	136	154	**1207**
1995	43	39	79	73	124	162	**1231**
1996	35	37	81	72	126	169	**1343**
1997	58	47	77	76	148	154	**1447**
1998	79	53	118	105	122	182	**1672**
1999	71	47	110	104	159	164	**1670**
2000	60	52	119	100	160	153	**1708**
2001	82	66	131	120	134	181	**1875**
2002	96	57	136	109	140	198	**1885**
2003	111	60	163	127	185	217	**2224**
2004	100	53	188	151	211	232	**2403**
2005	116	80	203	148	195	214	**2501**
2006	114	72	199	155	208	250	**2593**
Total	**1053**	**736**	**1781**	**1514**	**2251**	**2640**	**25544**

Source: HSW (PEDW), WCfH/ONS (Townsend index)

***Deprivation fifth: 1=least deprived fifth, 5 = most deprived fifth**

Table 3.5.5b

Count of revascularisations in females aged 35-74, by region and fifth of deprivation, 1992-2006

Year	North Fifth*		Mid & West Fifth*		South East Fifth*		Total (all fifths)
	1	5	1	5	1	5	
1992	8	4	12	22	16	26	**215**
1993	2	3	16	19	28	40	**258**
1994	6	9	18	32	25	44	**308**
1995	17	10	20	15	39	45	**341**
1996	9	8	15	24	39	59	**360**
1997	9	12	19	25	36	45	**412**
1998	10	17	28	37	36	66	**498**
1999	10	9	27	37	35	60	**451**
2000	16	10	34	34	39	56	**504**
2001	23	24	38	32	29	54	**516**
2002	26	25	33	34	36	50	**508**
2003	23	20	44	46	40	78	**610**
2004	29	29	53	70	38	85	**730**
2005	30	25	48	66	45	78	**755**
2006	30	22	42	57	53	120	**808**
Total	**248**	**227**	**447**	**550**	**534**	**906**	**7274**

Source: HSW (PEDW), WCfH/ONS (Townsend index)

***Deprivation fifth: 1=least deprived fifth, 5 = most deprived fifth**

Table 3.5.5.1a

Revascularisation in males aged 35-74, North Wales, by fifth of deprivation, 3-year rolling age-standardised rate, 1992-2006

Period	EASR	LCL	UCL	EASR	LCL	UCL
	Least deprived fifth			*Most deprived fifth*		
1992-94	98	79	122	113	88	143
1993-95	113	92	137	131	105	162
1994-96	132	110	158	157	128	191
1995-97	145	121	171	188	156	225
1996-98	180	154	209	208	175	247
1997-99	212	184	243	220	186	259
1998-00	209	181	239	228	193	268
1999-01	204	178	234	247	210	288
2000-02	223	196	254	259	222	300
2001-03	265	235	298	267	230	309
2002-04	276	245	309	243	208	283
2003-05	286	256	319	272	235	314
2004-06	282	252	315	285	247	328

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)

Table 3.5.5.1b

Revascularisation in females aged 35-74, North Wales, by fifth of deprivation, 3-year rolling age-standardised rate, 1992-2006

Period	EASR	LCL	UCL	EASR	LCL	UCL
	Least deprived fifth			*Most deprived fifth*		
1992-94	17	10	28	25	14	42
1993-95	26	17	39	33	20	51
1994-96	32	22	46	38	25	57
1995-97	35	24	49	42	28	61
1996-98	27	18	39	54	38	75
1997-99	28	19	40	54	38	75
1998-00	33	23	46	52	36	73
1999-01	44	33	59	57	41	78
2000-02	57	44	73	81	61	105
2001-03	62	48	78	95	73	121
2002-04	65	51	82	104	81	131
2003-05	68	54	84	104	82	132
2004-06	72	58	89	106	83	133

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)

Table 3.5.5.1c

Revascularisation in males aged 35-74, North Wales, 3-year rolling age-standardised rate ratios, 1992-2006

Period	Rate ratio	LCL	UCL
1992-94	1.1	0.8	1.6
1993-95	1.2	0.9	1.6
1994-96	1.2	0.9	1.6
1995-97	1.3	1.0	1.7
1996-98	1.2	0.9	1.5
1997-99	1.0	0.8	1.3
1998-00	1.1	0.9	1.4
1999-01	1.2	1.0	1.5
2000-02	1.2	0.9	1.4
2001-03	1.0	0.8	1.2
2002-04	0.9	0.7	1.1
2003-05	1.0	0.8	1.1
2004-06	1.0	0.8	1.2

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)

Table 3.5.5.1d

Revascularisation in females aged 35-74, North Wales, 3-year rolling age-standardised rate ratios, 1992-2006

Period	Rate ratio	LCL	UCL
1992-94	1.5	0.7	3.2
1993-95	1.3	0.7	2.4
1994-96	1.2	0.7	2.0
1995-97	1.2	0.7	2.0
1996-98	2.0	1.2	3.4
1997-99	1.9	1.2	3.2
1998-00	1.6	1.0	2.6
1999-01	1.3	0.8	2.0
2000-02	1.4	1.0	2.1
2001-03	1.5	1.1	2.2
2002-04	1.6	1.1	2.2
2003-05	1.5	1.1	2.1
2004-06	1.5	1.1	2.0

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)

Table 3.5.5.2a

Revascularisation in males aged 35-74, Mid & West Wales, by fifth of deprivation, 3-year rolling age-standardised rate, 1992-2006

Period	EASR	LCL	UCL	EASR	LCL	UCL
	Least deprived fifth			*Most deprived fifth*		
1992-94	126	108	146	165	141	192
1993-95	149	130	171	174	149	201
1994-96	162	142	185	197	170	226
1995-97	159	139	181	213	186	244
1996-98	182	161	205	246	216	279
1997-99	197	175	220	275	244	310
1998-00	220	197	244	300	267	336
1999-01	224	201	249	313	280	349
2000-02	235	212	260	316	282	352
2001-03	254	230	279	338	304	376
2002-04	278	254	305	365	329	404
2003-05	310	285	338	399	362	440
2004-06	325	299	353	424	386	466

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)

Table 3.5.5.2b

Revascularisation in females aged 35-74, Mid & West Wales, by fifth of deprivation, 3-year rolling age-standardised rate, 1992-2006

Period	EASR	LCL	UCL	EASR	LCL	UCL
	Least deprived fifth			*Most deprived fifth*		
1992-94	28	21	38	61	47	78
1993-95	33	25	44	54	41	70
1994-96	33	24	43	62	47	79
1995-97	35	26	46	58	44	75
1996-98	40	30	51	80	64	100
1997-99	47	36	59	92	74	113
1998-00	54	43	66	100	81	121
1999-01	58	47	71	93	75	113
2000-02	61	50	74	91	74	112
2001-03	67	55	81	105	86	128
2002-04	72	60	86	141	119	166
2003-05	78	66	92	169	145	196
2004-06	74	62	87	177	152	204

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)

Table 3.5.5.2c

Revascularisation in males aged 35-74, Mid & West Wales, 3-year rolling age-standardised rate ratios, 1992-2006

Period	Rate ratio	LCL	UCL
1992-94	1.3	1.1	1.6
1993-95	1.2	0.9	1.4
1994-96	1.2	1.0	1.5
1995-97	1.3	1.1	1.6
1996-98	1.4	1.1	1.6
1997-99	1.4	1.2	1.6
1998-00	1.4	1.2	1.6
1999-01	1.4	1.2	1.6
2000-02	1.3	1.2	1.6
2001-03	1.3	1.2	1.5
2002-04	1.3	1.1	1.5
2003-05	1.3	1.1	1.5
2004-06	1.3	1.2	1.5

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)

Table 3.5.5.2d

Revascularisation in females aged 35-74, Mid & West Wales, 3-year rolling age-standardised rate ratios, 1992-2006

Period	Rate ratio	LCL	UCL
1992-94	2.1	1.5	3.2
1993-95	1.6	1.1	2.4
1994-96	1.9	1.3	2.7
1995-97	1.7	1.1	2.5
1996-98	2.0	1.4	2.9
1997-99	2.0	1.4	2.7
1998-00	1.9	1.4	2.5
1999-01	1.6	1.2	2.1
2000-02	1.5	1.1	2.0
2001-03	1.6	1.2	2.1
2002-04	2.0	1.5	2.5
2003-05	2.2	1.7	2.7
2004-06	2.4	1.9	3.0

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)

Table 3.5.5.3a

Revascularisation in males aged 35-74, South East Wales, by fifth of deprivation, 3-year rolling age-standardised rate, 1992-2006

Period	EASR	LCL	UCL	EASR	LCL	UCL
	Least deprived fifth			*Most deprived fifth*		
1992-94	197	177	220	161	144	178
1993-95	204	183	226	192	174	211
1994-96	212	191	234	214	195	234
1995-97	215	194	237	214	195	234
1996-98	210	189	231	224	205	244
1997-99	221	201	243	221	202	242
1998-00	221	201	243	221	202	241
1999-01	222	202	244	219	201	240
2000-02	208	189	228	235	216	256
2001-03	215	196	235	263	242	285
2002-04	244	223	265	283	261	306
2003-05	263	242	285	286	265	309
2004-06	267	247	289	298	276	321

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)

Table 3.5.5.3b

Revascularisation in females aged 35-74, South East Wales, by fifth of deprivation, 3-year rolling age-standardised rate, 1992-2006

Period	EASR	LCL	UCL	EASR	LCL	UCL
	Least deprived fifth			*Most deprived fifth*		
1992-94	37	28	47	47	38	57
1993-95	48	38	59	56	47	67
1994-96	51	42	63	66	55	77
1995-97	57	47	69	68	57	80
1996-98	55	45	66	76	65	89
1997-99	53	43	64	75	64	87
1998-00	53	43	64	78	67	91
1999-01	49	40	60	73	62	85
2000-02	48	39	58	70	60	82
2001-03	47	38	57	80	69	93
2002-04	49	40	59	95	82	109
2003-05	52	43	62	106	93	121
2004-06	56	47	67	125	111	141

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)

Table 3.5.5.3c

Revascularisation in males aged 35-74, South East Wales, 3-year rolling age-standardised rate ratios, 1992-2006

Period	Rate ratio	LCL	UCL
1992-94	0.8	0.7	0.9
1993-95	0.9	0.8	1.1
1994-96	1.0	0.9	1.2
1995-97	1.0	0.9	1.1
1996-98	1.1	0.9	1.2
1997-99	1.0	0.9	1.1
1998-00	1.0	0.9	1.1
1999-01	1.0	0.9	1.1
2000-02	1.1	1.0	1.3
2001-03	1.2	1.1	1.4
2002-04	1.2	1.0	1.3
2003-05	1.1	1.0	1.2
2004-06	1.1	1.0	1.2

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)

Table 3.5.5.3d

Revascularisation in females aged 35-74, South East Wales, 3-year rolling age-standardised rate ratios, 1992-2006

Period	Rate ratio	LCL	UCL
1992-94	1.3	0.9	1.8
1993-95	1.2	0.9	1.6
1994-96	1.3	1.0	1.7
1995-97	1.2	0.9	1.5
1996-98	1.4	1.1	1.8
1997-99	1.4	1.1	1.8
1998-00	1.5	1.2	1.9
1999-01	1.5	1.2	1.9
2000-02	1.5	1.1	1.9
2001-03	1.7	1.3	2.2
2002-04	1.9	1.5	2.5
2003-05	2.1	1.6	2.6
2004-06	2.2	1.8	2.7

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)

Table 3.6.1.1

Angiography, directly age-standardised rate (DSR) per 100 emergency CHD admissions Wales Local Authorities, males aged 35-74, 2004-06

Average annual number, crude and directly age-standardised rate per 100,000 population, 95% confidence limits

Local Authority	Average angiographies per year	Crude rate per 100	DSR per 100	95% LCL	95% UCL	Compared to Wales
Isle of Anglesey	53	51.3	50.8	43.2	59.5	Sig. Low
Gwynedd	101	57.5	58.2	51.7	65.3	Sig. Low
Conwy	93	41.6	43.0	38.0	48.6	Sig. Low
Denbighshire	80	41.1	41.3	36.1	47.0	Sig. Low
Flintshire	152	60.4	60.7	55.2	66.7	Sig. Low
Wrexham	142	56.9	56.2	50.9	62.0	Sig. Low
Powys	144	80.5	81.6	74.0	89.8	High
Ceredigion	116	122.6	123.7	110.9	137.6	Sig. High
Pembrokeshire	184	91.5	91.1	83.6	99.0	Sig. High
Carmarthenshire	314	92.2	91.3	85.5	97.4	Sig. High
Swansea	385	110.6	110.6	104.3	117.2	Sig. High
Neath Port Talbot	267	106.2	106.0	98.8	113.7	Sig. High
Bridgend	256	100.7	100.4	93.4	107.8	Sig. High
The Vale of Glamorgan	123	77.0	78.3	70.4	86.9	High
Cardiff	243	75.6	76.3	70.8	82.2	High
Rhondda Cynon Taff	215	55.7	56.4	52.1	61.0	Sig. Low
Merthyr Tydfil	51	56.3	55.7	47.2	65.6	Sig. Low
Caerphilly	198	68.1	67.3	61.9	73.1	Sig. Low
Blaenau Gwent	73	51.5	51.1	44.5	58.5	Sig. Low
Torfaen	88	75.6	75.2	66.2	85.1	High
Monmouthshire	79	71.5	72.2	63.2	82.4	Low
Newport	120	66.1	67.2	60.3	74.6	Low
Wales	**3477**	**74.5**	**74.3**	**72.9**	**75.7**	

Source: HSW (PEDW)

Table 3.6.1.2

Angiography, directly age-standardised rate (DSR) per 100 emergency CHD admissions Wales Local Authorities, females aged 35-74, 2004-06

Average annual number, crude and directly age-standardised rate per 100,000 population, 95% confidence limits

Local Authority	Average angiographies per year	Crude rate per 100	DSR per 100	95% LCL	95% UCL	Compared to Wales
Isle of Anglesey	28	47.8	50.8	40.3	63.7	Low
Gwynedd	35	41.5	41.6	33.5	52.0	Sig. Low
Conwy	44	39.8	42.6	35.4	51.0	Sig. Low
Denbighshire	32	29.4	30.1	24.2	37.1	Sig. Low
Flintshire	58	47.9	48.9	41.8	56.8	Sig. Low
Wrexham	53	41.7	41.8	35.5	49.0	Sig. Low
Powys	54	71.2	71.8	61.0	84.2	High
Ceredigion	32	72.7	75.3	59.9	94.7	High
Pembrokeshire	55	68.6	69.5	59.1	81.2	High
Carmarthenshire	129	73.9	74.1	66.8	82.1	Sig. High
Swansea	172	100.6	104.4	95.3	114.1	Sig. High
Neath Port Talbot	109	94.3	95.8	85.5	107.2	Sig. High
Bridgend	113	89.9	90.1	80.7	100.4	Sig. High
The Vale of Glamorgan	42	57.8	61.4	50.2	75.4	High
Cardiff	102	73.0	72.4	64.4	81.1	Sig. High
Rhondda Cynon Taff	94	46.0	46.0	40.7	51.7	Sig. Low
Merthyr Tydfil	19	37.5	38.6	29.1	50.4	Sig. Low
Caerphilly	80	57.6	58.8	51.5	66.8	Low
Blaenau Gwent	26	40.5	43.4	34.0	55.0	Sig. Low
Torfaen	27	45.3	48.0	38.0	60.2	Sig. Low
Monmouthshire	19	37.9	38.9	29.4	50.8	Sig. Low
Newport	49	56.7	60.3	50.6	71.6	Low
Wales	**1373**	**60.6**	**61.2**	**59.3**	**63.1**	

Source: HSW (PEDW)

Table 3.6.3.1a

Angiography per 100 emergency CHD admissions in males aged 35-74, North Wales, by fifth of deprivation, 3-year rolling age-standardised rate, 1992-2006

Period	DSR	LCL	UCL	DSR	LCL	UCL
	Least deprived fifth			*Most deprived fifth*		
1992-94	25.9	22.0	30.4	14.8	12.2	17.8
1993-95	26.8	22.8	31.4	15.7	13.0	18.9
1994-96	27.2	23.3	31.5	17.3	14.5	20.7
1995-97	29.7	25.8	34.0	20.2	17.1	23.8
1996-98	33.5	29.3	38.2	20.1	17.1	23.5
1997-99	40.0	35.4	45.2	23.4	20.2	27.0
1998-00	39.8	35.2	45.0	23.8	20.7	27.4
1999-01	42.8	38.1	48.0	28.2	24.8	32.1
2000-02	47.0	42.0	52.4	32.3	28.5	36.5
2001-03	54.3	48.8	60.4	36.1	31.8	40.8
2002-04	57.3	51.5	63.6	33.8	29.6	38.5
2003-05	59.8	53.8	66.3	32.5	28.4	37.1
2004-06	64.0	57.7	70.8	36.1	31.7	41.0

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)

Table 3.6.3.1b

Angiography per 100 emergency CHD admissions in females aged 35-74, North Wales, by fifth of deprivation, 3-year rolling age-standardised rate, 1992-2006

Period	DSR	LCL	UCL	DSR	LCL	UCL
	Least deprived fifth			*Most deprived fifth*		
1992-94	17.3	11.7	24.8	8.5	5.5	12.4
1993-95	18.8	13.0	26.6	9.5	6.5	13.4
1994-96	20.0	14.3	27.5	10.2	7.2	14.1
1995-97	23.2	17.5	30.3	13.9	10.4	18.2
1996-98	22.8	17.1	30.0	15.2	11.6	19.8
1997-99	22.9	17.2	30.2	17.1	13.3	21.6
1998-00	28.2	22.0	35.9	20.8	16.6	25.8
1999-01	30.9	24.7	38.5	24.8	20.4	30.0
2000-02	34.8	28.4	42.8	31.5	26.3	37.6
2001-03	37.0	30.4	45.0	34.5	28.5	41.4
2002-04	38.1	31.0	46.6	33.2	27.2	40.2
2003-05	39.7	32.7	47.8	34.3	27.9	42.0
2004-06	45.0	37.9	53.2	37.8	31.3	45.4

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)

Table 3.6.3.1c

Angiography per 100 emergency CHD admissions in males aged 35-74, North Wales, 3-year rolling age-standardised rate ratios, 1992-2006

Period	Rate ratio	LCL	UCL
1992-94	0.6	0.4	0.8
1993-95	0.6	0.4	0.8
1994-96	0.6	0.5	0.9
1995-97	0.7	0.5	0.9
1996-98	0.6	0.4	0.8
1997-99	0.6	0.4	0.8
1998-00	0.6	0.4	0.8
1999-01	0.7	0.5	0.9
2000-02	0.7	0.5	0.9
2001-03	0.7	0.5	0.9
2002-04	0.6	0.4	0.8
2003-05	0.5	0.4	0.7
2004-06	0.6	0.4	0.8

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)

Table 3.6.3.1d

Angiography per 100 emergency CHD admissions in females aged 35-74, North Wales, 3-year rolling age-standardised rate ratios, 1992-2006

Period	Rate ratio	LCL	UCL
1992-94	0.5	0.3	0.9
1993-95	0.5	0.3	1.0
1994-96	0.5	0.3	1.0
1995-97	0.6	0.4	1.0
1996-98	0.7	0.4	1.1
1997-99	0.7	0.4	1.3
1998-00	0.7	0.4	1.4
1999-01	0.8	0.4	1.5
2000-02	0.9	0.5	1.8
2001-03	0.9	0.6	1.6
2002-04	0.9	0.6	1.4
2003-05	0.9	0.6	1.4
2004-06	0.8	0.5	1.4

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)

Table 3.6.3.2a

Angiography per 100 emergency CHD admissions in males aged 35-74, Mid & West Wales, by fifth of deprivation, 3-year rolling age-standardised rate, 1992-2006

Period	DSR	LCL	UCL	DSR	LCL	UCL
	Least deprived fifth			*Most deprived fifth*		
1992-94	50.1	45.4	55.3	36.1	32.3	40.2
1993-95	54.2	49.3	59.4	40.0	36.1	44.2
1994-96	55.2	50.4	60.3	39.2	35.5	43.3
1995-97	51.9	47.5	56.6	38.9	35.3	42.9
1996-98	53.2	48.9	57.8	39.4	35.8	43.2
1997-99	55.2	50.9	59.9	39.9	36.4	43.6
1998-00	61.0	56.4	66.0	42.5	38.9	46.3
1999-01	66.9	61.9	72.3	46.3	42.4	50.4
2000-02	73.3	68.0	79.0	53.4	49.1	58.1
2001-03	87.3	81.2	93.7	63.5	58.7	68.6
2002-04	97.6	91.1	104.5	70.3	65.1	75.8
2003-05	108.8	101.7	116.3	81.0	75.2	87.1
2004-06	108.2	101.1	115.7	89.1	82.8	95.9

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)

Table 3.6.3.2b

Angiography per 100 emergency CHD admissions in females aged 35-74, Mid & West Wales, by fifth of deprivation, 3-year rolling age-standardised rate, 1992-2006

Period	DSR	LCL	UCL	DSR	LCL	UCL
	Least deprived fifth			*Most deprived fifth*		
1992-94	27.4	21.7	34.4	19.1	15.5	23.4
1993-95	32.0	26.0	39.3	22.5	18.6	27.1
1994-96	30.1	24.3	37.5	26.2	22.0	31.1
1995-97	30.6	24.8	37.8	25.1	21.3	29.5
1996-98	33.7	27.8	40.8	27.7	23.8	32.2
1997-99	41.9	35.8	48.9	32.9	28.4	37.8
1998-00	49.4	42.4	57.6	38.8	33.6	44.6
1999-01	49.1	42.1	57.3	41.7	36.1	47.9
2000-02	54.3	46.5	63.5	44.3	38.5	50.6
2001-03	64.9	57.0	73.8	53.7	47.4	60.5
2002-04	73.2	64.9	82.4	63.7	57.2	70.9
2003-05	83.3	74.2	93.3	71.8	64.6	79.6
2004-06	82.4	73.1	93.1	77.1	69.2	85.7

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)

Table 3.6.3.2c

Angiography per 100 emergency CHD admissions in males aged 35-74, Mid & West Wales, 3-year rolling age-standardised rate ratios, 1992-2006

Period	Rate ratio	LCL	UCL
1992-94	0.7	0.6	0.9
1993-95	0.7	0.6	0.9
1994-96	0.7	0.6	0.9
1995-97	0.8	0.6	1.0
1996-98	0.7	0.6	1.0
1997-99	0.7	0.6	0.9
1998-00	0.7	0.5	0.9
1999-01	0.7	0.5	0.9
2000-02	0.7	0.6	1.0
2001-03	0.7	0.6	1.0
2002-04	0.7	0.6	0.9
2003-05	0.7	0.6	1.0
2004-06	0.8	0.6	1.1

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)

Table 3.6.3.2d

Angiography per 100 emergency CHD admissions in females aged 35-74, Mid & West Wales, 3-year rolling age-standardised rate ratios, 1992-2006

Period	Rate ratio	LCL	UCL
1992-94	0.7	0.4	1.2
1993-95	0.7	0.4	1.3
1994-96	0.9	0.5	1.7
1995-97	0.8	0.5	1.5
1996-98	0.8	0.5	1.5
1997-99	0.8	0.5	1.3
1998-00	0.8	0.5	1.3
1999-01	0.8	0.5	1.5
2000-02	0.8	0.5	1.4
2001-03	0.8	0.5	1.3
2002-04	0.9	0.6	1.4
2003-05	0.9	0.5	1.4
2004-06	0.9	0.6	1.7

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)

Table 3.6.3.3a

Angiography per 100 emergency CHD admissions in males aged 35-74, South East Wales, by fifth of deprivation, 3-year rolling age-standardised rate, 1992-2006

Period	DSR	LCL	UCL	DSR	LCL	UCL
	Least deprived fifth			*Most deprived fifth*		
1992-94	57.6	53.1	62.3	24.6	22.7	26.6
1993-95	57.7	53.3	62.4	27.6	25.6	29.6
1994-96	55.4	51.2	59.9	30.7	28.7	32.9
1995-97	53.8	49.7	58.2	31.1	29.0	33.3
1996-98	55.2	50.9	59.8	32.0	29.9	34.3
1997-99	58.1	53.7	62.8	32.9	30.7	35.2
1998-00	61.5	57.0	66.4	35.4	33.1	37.9
1999-01	60.6	56.1	65.3	36.7	34.3	39.2
2000-02	61.7	57.2	66.6	38.7	36.2	41.4
2001-03	67.6	62.7	72.8	42.2	39.5	45.1
2002-04	76.3	70.9	82.1	45.3	42.4	48.5
2003-05	82.2	76.5	88.3	48.4	45.2	51.8
2004-06	83.4	77.3	89.8	54.3	50.7	58.0

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)

Table 3.6.3.3b

Angiography per 100 emergency CHD admissions in females aged 35-74, South East Wales, by fifth of deprivation, 3-year rolling age-standardised rate, 1992-2006

Period	DSR	LCL	UCL	DSR	LCL	UCL
	Least deprived fifth			*Most deprived fifth*		
1992-94	30.9	25.3	37.7	17.9	15.5	20.5
1993-95	34.0	28.3	40.9	17.1	14.9	19.6
1994-96	34.0	28.5	40.6	18.5	16.3	21.0
1995-97	34.2	28.7	40.8	18.0	15.8	20.4
1996-98	36.4	30.7	43.1	21.1	18.7	23.7
1997-99	41.1	34.9	48.5	22.1	19.6	24.8
1998-00	43.0	36.9	50.2	26.5	23.7	29.5
1999-01	44.6	38.2	52.2	25.7	23.0	28.5
2000-02	49.1	42.1	57.4	27.4	24.5	30.5
2001-03	55.6	47.8	64.6	31.1	28.0	34.5
2002-04	59.4	51.4	68.5	38.4	34.7	42.4
2003-05	63.8	55.0	73.7	43.8	39.7	48.2
2004-06	65.2	56.2	75.5	50.9	46.3	56.0

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)

Table 3.6.3.3c

Angiography per 100 emergency CHD admissions in males aged 35-74, South East Wales, 3-year rolling age-standardised rate ratios, 1992-2006

Period	Rate ratio	LCL	UCL
1992-94	0.4	0.3	0.5
1993-95	0.5	0.4	0.6
1994-96	0.6	0.5	0.7
1995-97	0.6	0.5	0.7
1996-98	0.6	0.5	0.7
1997-99	0.6	0.5	0.7
1998-00	0.6	0.5	0.7
1999-01	0.6	0.5	0.8
2000-02	0.6	0.5	0.8
2001-03	0.6	0.5	0.8
2002-04	0.6	0.5	0.7
2003-05	0.6	0.5	0.7
2004-06	0.7	0.5	0.8

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)

Table 3.6.3.3d

Angiography per 100 emergency CHD admissions in females aged 35-74, South East Wales, 3-year rolling age-standardised rate ratios, 1992-2006

Period	Rate ratio	LCL	UCL
1992-94	0.6	0.4	0.9
1993-95	0.5	0.3	0.8
1994-96	0.5	0.4	0.9
1995-97	0.5	0.3	0.9
1996-98	0.6	0.4	0.9
1997-99	0.5	0.3	0.9
1998-00	0.6	0.4	1.0
1999-01	0.6	0.4	1.0
2000-02	0.6	0.3	1.0
2001-03	0.6	0.3	1.0
2002-04	0.6	0.4	1.1
2003-05	0.7	0.4	1.1
2004-06	0.8	0.5	1.2

Source: HSW (PEDW, NHSAR), WCfH/ONS (Townsend index)