Key Health Data for the West Midlands – 2009/10

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NOTES

PREFACE

This is the Twelfth edition in the Key Health Data for the West Midlands series. The report is compiled by the Public Health, Epidemiology and Biostatistics Unit at the University of Birmingham. This year the report is a collaborative project between the Council of Disabled People, Health Protection Agency -West Midlands, Heart of Birmingham teaching PCT, NHS West Midlands, West Midlands Cancer Intelligence Unit, West Midlands Fire Service, West Midlands Perinatal Institute and the West Midlands Public Health Observatory.

Contemporary Public Health employs a wide definition of health. Key Health Data reflects this spectrum, we try not only to report measurable mortality and morbidity but also the social and economic impacts that affect a person's well being.

Our philosophy remains to signpost reliable health, health care, environmental and social information and highlight the variation across the West Midlands. Its purpose is not to determine the cause or to provide 'league tables' of ill health but rather to promote the widest possible debate and to encourage active collaboration.

The content this year builds on previous Key Health Data reports.
The CD-ROM enclosed includes past Key Health Data reports, associated data as well as extra material we were not able to include in the reports.

The report along with signposted additional data and chapters can also be downloaded from the Key Health Data website:

http://www.bham.ac.uk/keyhealthdata

We thank those who have contributed and helped with its production, and trust that it provides valuable information for those concerned with health and health care in the West Midlands. We welcome any comments you may have.

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LIST OF ACRONYMS AND ABBREVIATIONS

A+E	Accident and Emergency
ASR	Age Standardised Rate
CC	County Council
CDI	Clostridium *difficile* Infection
CfI	Centre for Infections
CLD	Chronic Liver Disease
CJS	Criminal Justice System
DDA	Disability Discrimination Act
DMA	Digital Mapping Agreement
DMIT	Disease Management Information Toolkit
DSM 4	Diagnostic and Statistical Manual version 4
DSR	Directly Standardised
DWP	Department of Work and Pensions
FHS	Finished Hospital Stays
FRIS	Fire Research and Investigation Section
GIS	Geographical Information System
GPS	Global Positioning System
HCAI	Healthcare Associated Infection
HCC	Hepatocellular Carcinoma
HCS	Healthcare Commissioning Services
HES	Hospital Episodes Statistics
HRG	Healthcare Resource Group
HoBtPCT	Heart Of Birmingham teaching PCT
ICD	International Classification of Diseases
ID	Indices of Deprivation
IMD	Index of Multiple Deprivation
ITN	Integrated Transport Network
LA	Local Authority
LAPE	Local Alcohol Profiles for England
LOS	Length of Stay
LOS	Life Opportunities Survey
LSOA	Lower Super Output Area
MD	Metropolitan District
MMR	Measles Mumps and Rubella
MSOA	Middle Super Output Area
NCHOD	National Centre for Health Outcomes Development
NHS	National Health Service
NI39	National Indicator 39
NOIDS	Notification of Infectious Diseases
NWPHO	North West Public Health Observatory
ODI	Office of Disability Issues
ONS	Office for National Statistics
OS	Ordnance Survey
OSM	OpenStreetMap
PANSI	Projecting Adult Needs and Service Information
PbR	Payment by Results
POPPI	Projecting Older People Population System
PPI	Proton Pump Inhibitors
PCT	Primary Care Trust
QOF	Quality Outcomes Framework
REU	Regional Epidemiology Unit
RGC	Register of Geographic Codes
RMP	Registered Medical Practitioner
RNF	Relative Needs Formula
SEH	Survey of English Housing
SEN	Special Educational Needs
SHA	Strategic Health Authority
SOA	Super Output Area
tPCT	Teaching PCT
UA	Unitary Authority
UK	United Kingdom

UV	Ultraviolet
VGI	Volunteered Geographical Information
WHO	World Health Organisation
WMCBSA	West Midlands Commissioning Business Support Agency (now known as Healthcare Commissioning services)
WMCIU	West Midlands Cancer Intelligence Unit
WMFS	West Midlands Fire Ser vice
WMPHO	West Midlands Public Health Observatory
YLL	Years of Life Lost

CHAPTER ONE: HEALTH GEOGRAPHY

1.1 Introduction

This chapter draws together a number of changes in organisational arrangements and changes in data provision that might impact on the way public health information is provided for the future. These include NHS West Midlands' agreement to develop 5 PCT Commissioning Clusters in the region and the start of a consultation process to unite the three Birmingham PCTs into one Birmingham PCT coterminous with its local authority. The recent parliamentary election saw the introduction of new parliamentary constituency boundaries for the UK.

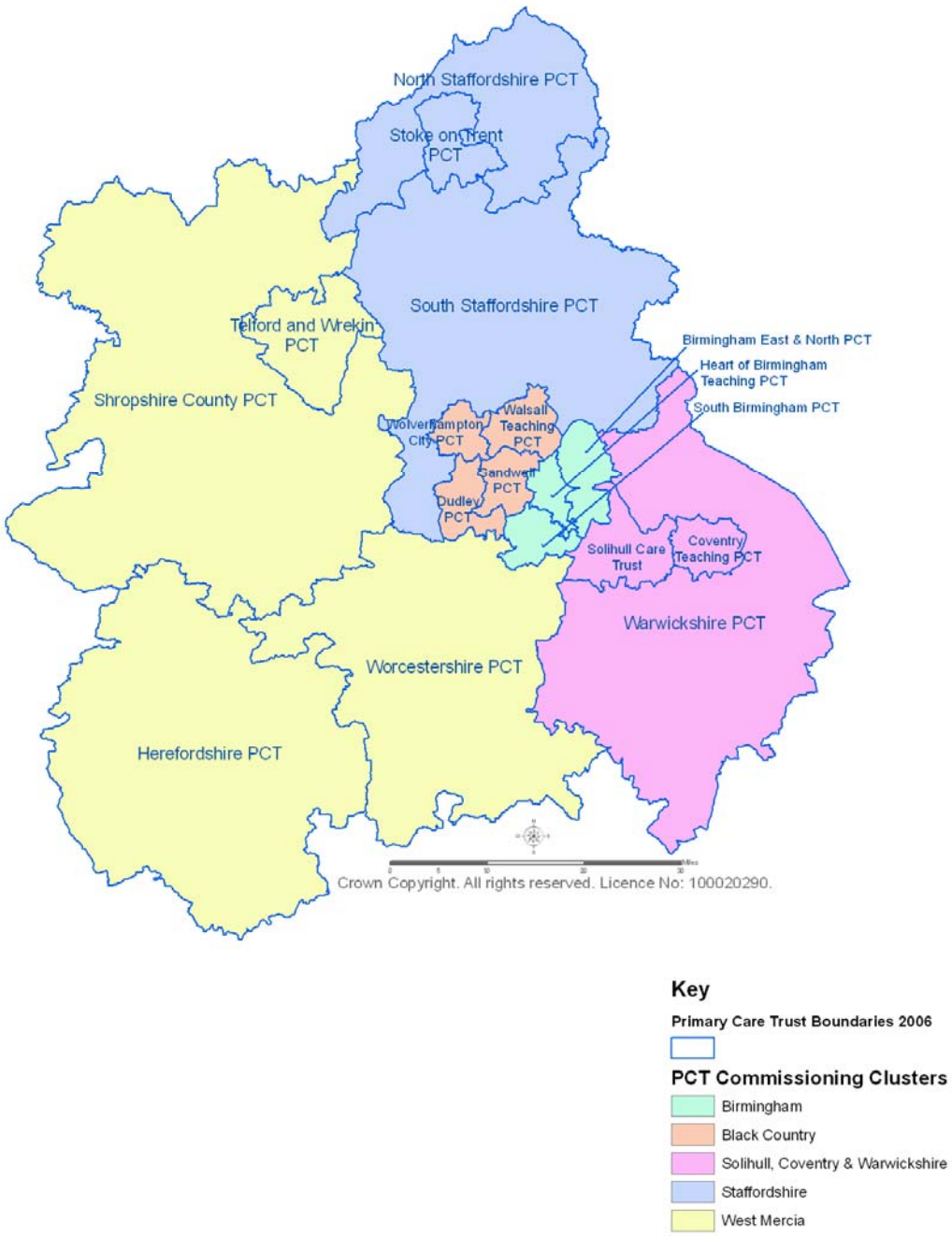
Government initiatives in the name of 'Making Public Data Public' resulted in a new web portal (www.data.gov.uk) for access to public sector datasets and a few months later the Ordnance Survey (OS) provided some of its digital mapping data free of charge at OS OpenData. The Office for National Statistics (ONS) has overhauled its coding systems for geographical areas which will form the basis for the future release of area based statistics and it has concluded work to improve its methods for estimating migration in the annual mid-year population estimates.

1.2 New Boundaries

1.2.1 Sub-regional Commissioning Clusters

NHS West Midlands announced plans to create 5 sub-regional PCT commissioning clusters in March 2010. The Strategic Health Authority was the first to cite a reduction in management costs as a primary reason for doing so but it also expects the move to strengthen joint working on quality and productivity. NHS West Midlands expects this to deliver 30% reduction in management costs by 2014.

Map 1.1: Sub-regional Commissioning Clusters



1.2.2 Birmingham PCTs

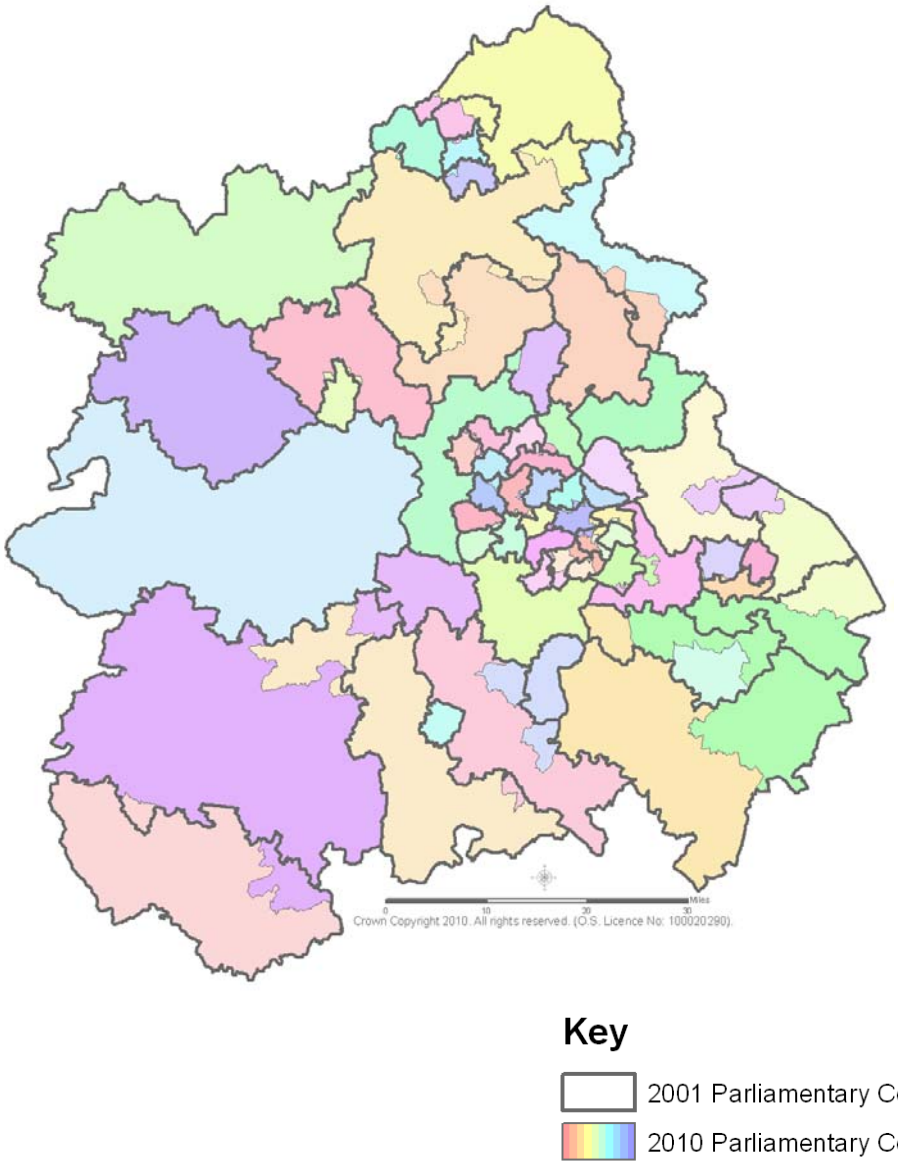
A Transition Steering Group has been established with authority from the boards of the Heart of Birmingham tPCT, the Birmingham East and North PCT and the South Birmingham PCT to ensure the transition to a single commissioning organisation for Birmingham. NHS West Midlands will be responsible for ensuring appropriate consultation is carried out and ensuring that any new organisation is ready to assume its role in April 2011. The aims of the reorganisation are to improve the financial stability of commissioning for Birmingham, lead the NHS in developing for future health needs, shape the local health economy and ensure patient engagement in the planning and commissioning of health services.

The PCTs have since decided to await the outcome of the White Paper ' Equity and Excellence: Liberating the NHS' before they agree a way ahead.

1.2.3 Parliamentary Constituencies

New Parliamentary Constituency boundaries became effective at the date of the General Election - 6th May 2010. The constituency boundaries are described by the ONS in terms of whole Lower Super Output Areas (LSOAs) and lookup tables were published on the Neighbourhood Statistics website - 26th March. There are 650 seats in parliament; 573 seats for England & Wales; 59 for West Midlands, each MP representing approximately 70,000 voters. Although there is no change to the number of seats representing West Midlands between 2001and 2010 the boundaries of the constituencies have changed.

Map 1.2: Parliamentary Constituencies in West Midlands 2001 and 2010



1.3 'Making Public Data Public' [1]

In November 2009 the then Prime Minister Gordon Brown set out his vision for 'Making Public Data Public'. As a result a new data portal was established under the direction of Sir Tim Berners-Lee and Professor Nigel Shadbolt at www.data.gov.uk. The portal signposts more than 2,500 government datasets that are available for public scrutiny. This resource is expected to be grown by the new coalition government as part of its Big Society[2] pledge.

As a further development of opening up public data the UK National Mapping Agency, OS went out to consultation 15th December 2009[3] to determine views on whether OS data should be provided free of charge, how the data might be funded and the impact this would have on existing licence holders and competitor markets. This consultation closed 17th March 2010 with a government response[4] on 31st March. The consultation and government response to it advocated the provision of OS data free of charge. The first data were made available at OS OpenData[5] on 1st April 2010.

OS OpenData mapping can be downloaded under licence conditions similar to creative commons and used to disseminate information as long as no financial gain is made from the use of the data. Initially 4 raster datasets, 4 vector datasets and 3 point datasets were supplied. The datasets are provided in a mixture of formats, raster data as tiff files, point data files as comma separated values and vector data in GIS ready formats. Most datasets are available as full Great Britain coverage except the new OS VectorMap District which can be downloaded as individual National Grid Reference squares.

The full list of OS OpenData products can be found at:
https://www.ordnancesurvey.co.uk/opendatadownload/products.html

Many of the OS OpenData products were previously available for one-off purchase or by annual licence for user specified areas and formed a substantial part of the various public sector licensing agreements i.e. Mapping Services Agreement for local government, the Pan Government Agreement for central government and the Digital Mapping Agreement for health organisations. As a result of the OS OpenData initiative there is now pressure to ensure that all public sector organisations have access to a common range of geographic datasets, free of charge at point of use. A working party has been set up to facilitate such a transition and bring cost savings across the public sector. The exact terms of any new agreement are still being considered and are due to come into effect 1st April 2011; it is being referred to as the 'Public Sector Mapping Agreement'.

1.4 ONS Geography and Populations

1.4.1 ONS Mid-year Population Estimates 2008

These population estimates were published on the 13th May 2010[6] along with an analysis tool which will compare the estimates for the region with national changes and against the previous year's estimates. There are also a number of comparator workbooks which look at a number of components of change affecting the estimates e.g. changes over time and changes in quinary age group components.

1.4.2 Improvements to 2008 Migration and Population Statistics[7]

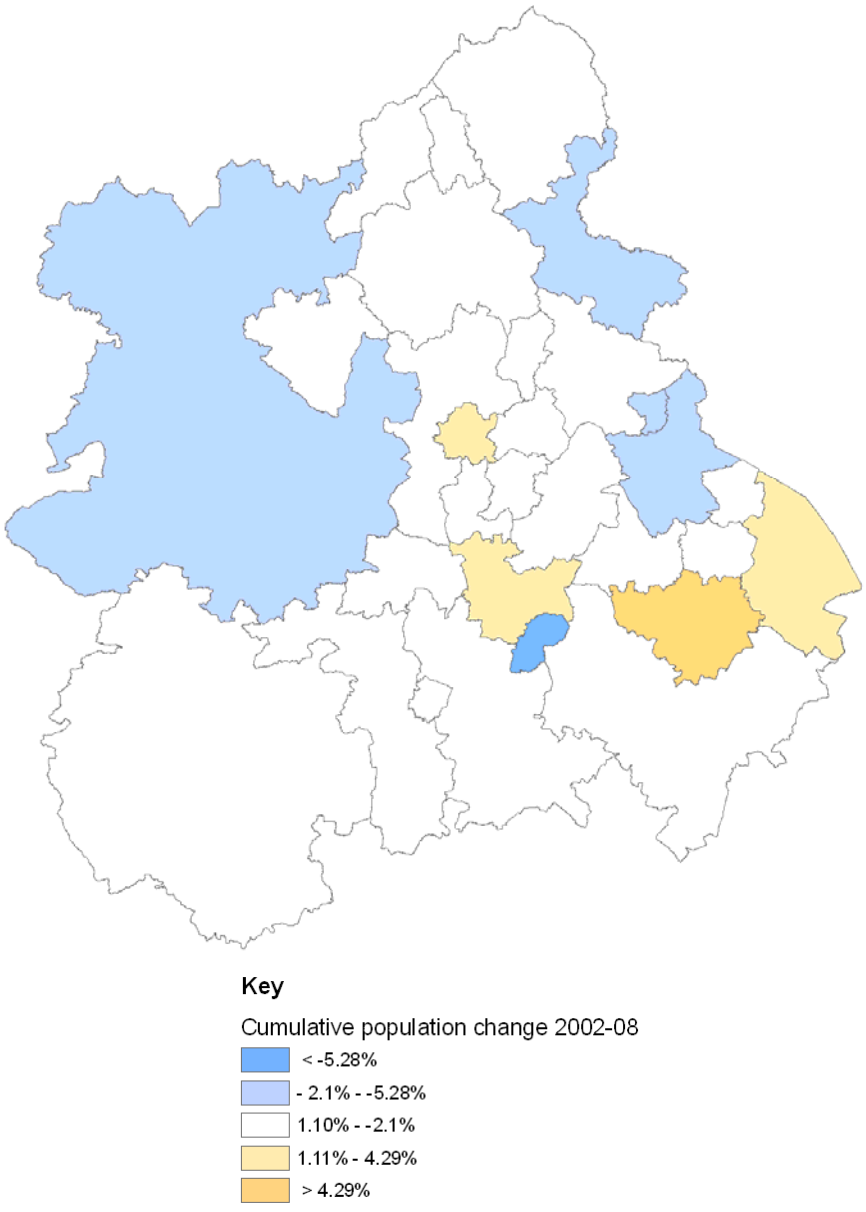
Over the last 3 years the ONS has carried out a number of improvements in its methods for the inclusion of migration in its population estimation processes. The latest improvements introduce a new methodology for the estimation of internal student migration and better apportionment of international migrants amongst local authorities. Final consultation with local authorities on the effects of the new method came to an end in January 2010 and revised mid-year population estimates 2002-2008 for local authorities were published in May 2010.

ONS provides a useful series of impacts charts[8] which provide a breakdown of the effects of the improvements to estimation at region, county and local authority level. At the regional level West Midlands adjustments are minimal, it is the between local authority level adjustments that show the greatest changes. The largest cumulative increases in population estimates for 2002-2008 are in Warwick (+2,500 people) and Birmingham (+2,400). These changes are driven by an increase in student numbers of 2,100 and 3,800 respectively and a change in international migration of +400 in Warwick and -1,400 in Birmingham.

The largest cumulative decreases in population estimates are in Solihull (-1,200) and Redditch (-1,100). Solihull's changes are due to a reduction in student numbers (-700) and a smaller reduction in international migrants, whereas reductions in Redditch are higher for international migrants (-800) than students (-300).

The largest cumulative percentage increase is in Warwick (11.9%), attributable to increases in student numbers, whilst increases in Rugby and Wolverhampton relate to lower rates of international migrant outflow than previously estimated. The greatest percentage reduction in population estimates for Redditch are attributable to downward adjustments in international migrants yet all other reductions are due to both smaller student populations and fewer international migrants.

Map 1.3: Cumulative percentage change in population estimates in local authorities 2002-2008



ONS are due to republish LSOA and Middle Super Output Area (MSOA) estimates in September 2010.

1.4.3 ONS Naming and Coding Policy

The Government Statistical Service will implement its new coding and naming policy on 1st January 2011. The new Register of Geographic Codes (RGC) should then be used in all exchanges of statistics with ONS and in all future published datasets that include codes. The aim of the policy is to adopt a non-hierarchical coding schema for UK geographies on a similar basis to those currently used for LSOAs and MSOAs. The schema will meet modern interoperability standards providing a future-proof coding scheme, negate the need to reuse codes and include metadata and guidance on their presentation and naming conventions. The RGC will apply to the geographic area of each organisation; any organisational name changes with only minor impact to boundaries will not trigger a new code.

The proposed structure of the codes will be based on 9 characters in the format: **ANNNNNNNN**
ANN will describe the entity or area type eg English Unitary Authority = **E06.**
NNNNNN will describe the specific instance of that entity eg Portsmouth (000044). The range of the codes is described in Table 1.1.

Table 1.1: Format of Register of Geographic Codes

Country	Entities RGC	A in ANN	Entities limit
England	31	E (ABCDFGH)	8*99 = 792
Wales	25	W (XYZ)	4*99 = 396
Scotland	27	S (TUV)	4*99 = 396
N Ireland	0	N (PQR)	4*99 = 396
Cross-border	1	K	1*99 = 198
Channel Isles	1	L	1*99 = 198
Isle of Man	1	M	1*99 = 198
Unassigned	-	J	1*99 = 198

The full RGC is available to download at:
http://www.ons.gov.uk/about-statistics/geography/policy/coding-and-naming-for-statistical-geographies/index.html

As a result of the RGC two additional fields appeared in the March 2010 National Statistics Postcode Directory and the NHS Postcode Directory as OldCode and NewCode. The old code is the full code required to uniquely describe each geography now and the 'NewCode' is the code as it will be under the 9 character RGC schema. The 'NewCode' will become operable in January 2011 and replace the 'OldCode' in February 2011 postcode directories.

1.4.4 2011 Census

The next, and possibly the last ever census of England and Wales is planned to take place on the 27th March 2011. Census Regulations were laid before Parliament on 4th March 2010 and came into force on 31st March 2010. The Regulations describe the delivery and collection methodology, prescribe the measures to ensure the security of the completed forms and the confidentiality of the data and includes specimens of the questionnaires to be used. Separate Regulations for Wales were laid before the National Assembly for Wales in April 2010.

A number of census rehearsals were carried out in October 2009 to test some of the new methods introduced to improve census return rates. These new approaches include better engagement in communities that have not responded well to previous census and the postal delivery of all household census forms (approximately 25 million) which is dependent on the newly developed national address register. There will be facilities to allow online completion of census forms and a questionnaire tracking system to enable a targeted field follow-up process. 17,000 addresses in Birmingham were invited to join a supplementary rehearsal to test a specific aspect of this new system.

Contracts have been awarded to process census returns and administer the staff training and recruitment process required to support the Census 2011.

The Census aims to provide consistent, joined-up and comparable UK outputs released concurrently with Scotland and Northern Ireland, free at the point of delivery, disseminated using up to date technology, with the ability to generate flexible tables online and provision of appropriate metadata. There will be a common UK statistical disclosure control methodology for census 2011 outputs. It is proposed that changes to output geography will be minimal and limited to less than 5% of output areas with simple mergers and groupings preferable to realignments although some of the worst boundaries may be investigated for alignments to real world objects. The ONS will investigate options for the extension of the central registry of local names for LSOAs and MSOAs. All possible steps will be taken to ensure that a common boundary exists between Scottish and English datasets and a separate set of boundaries reflecting mean-high-water coastline will be released in addition to those to the extent of the realm.

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CHAPTER TWO: DEPRIVATION IN THE WEST MIDLANDS STRATEGIC HEALTH AUTHORITY

2.1 Introduction

This chapter describes the general population of the West Midlands SHA in terms of its population age profile by deprivation indices. The deprivation index used is the Index of Multiple Deprivation (IMD) score. This is derived from a number of variables and is aggregated into national quintiles for ease of use. The poorest quintile of households is in IMD quintile 1 and the most affluent is in quintile 5.

2.2 Method

The approach used by the author is to use the registered populations as found on the West Midlands CBSA website[1]. This is based on patients registered to GPs in the West Midlands. The patient's postcode was linked to the IMD quintile score for households in that postcode.

IMD scores were based on 2007 and have been derived by the CIU GIS team[2]. This file contains known postcodes for the entire region and the relevant imputed IMD quintile. It should be noted that this is the most complete file available at the time of analysis.

2.3 Findings

The numbers of patients registered with West Midlands GPs on the WMCBSA database is 5,676,579 (30th June 2010). Of these, 97% (5,497,471) had postcodes that could be matched with an IMD 2007 score and the age structure by IMD quintile is described in the table below:

Table 2.1: The number of patients registered with West Midlands GPs on the WMCBSA database

Age Band	1 Most Deprived	2	3	4	5 Most Affluent	Grand Total
0-4	107687	57372	51826	45297	38562	300744
5-9	101775	57876	54830	52405	46473	313359
10-14	103719	64234	61903	59865	53237	342958
15-19	108891	69080	66852	62226	60288	367337
20-24	117623	71408	66023	52112	53176	360342
25-29	120021	74476	67041	52265	42178	355981
30-34	109385	72561	68674	57194	45785	353599
35-39	114849	82824	83519	75854	63934	420980
40-44	103956	80170	84277	82274	71898	422575
45-49	88543	69949	76526	76448	68766	380232
50-54	74887	61939	67093	70035	62174	336128
55-59	67906	61268	69283	75009	64894	338360
60-64	60229	56958	67145	73856	62684	320872
65-69	50968	45620	51950	55369	44693	248600
70-74	44422	39880	44853	46343	37429	212927
75-79	38649	35343	37724	37807	29737	179260
80-84	28350	27027	27921	26519	20472	130289
85-89	16674	16342	16764	15404	10863	76047
90-94	5687	5970	6561	6222	3891	28331
95-99	1427	1502	1722	1623	962	7236
100-104	291	220	240	271	123	1145
105-109	57	36	32	20	21	166
110-114	1			2		3
Grand Total	**1465997**	**1052055**	**1072759**	**1024420**	**882240**	**5497471**

Source: WMCBSA

Figure 2.1: Age Structure by numbers for West Midlands Registered patients with IMD Score (June 2010)

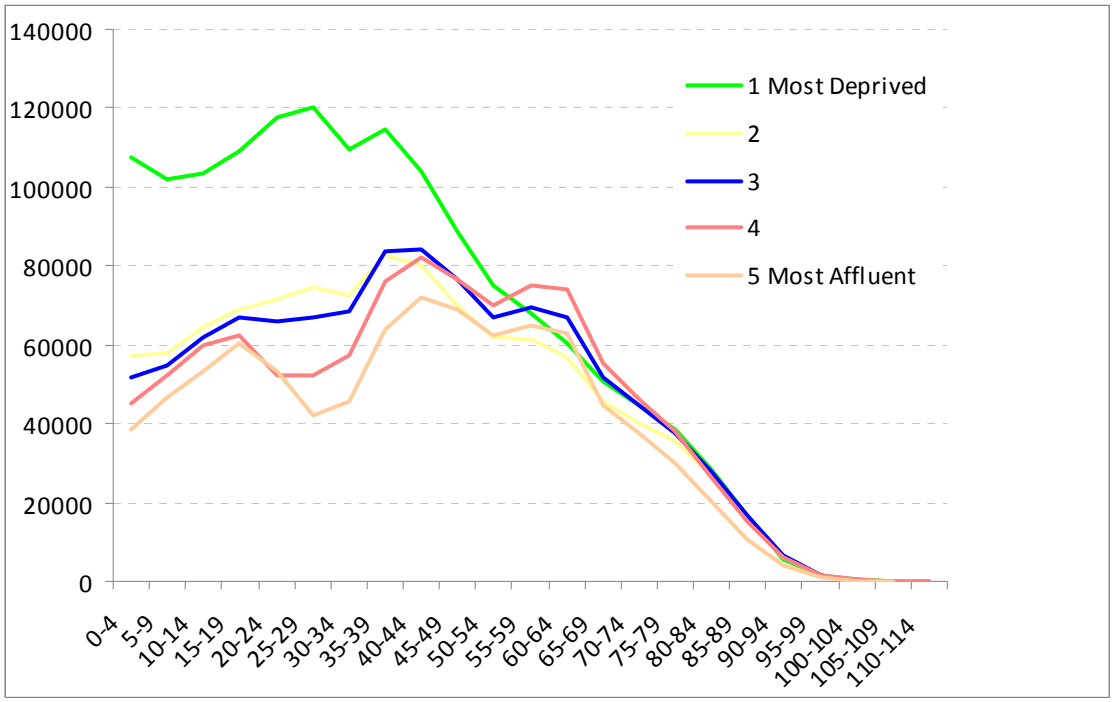


Figure 2.2: Age Structure by Percentage for West Midlands Registered patients with IMD 2007 Score (June 2010)

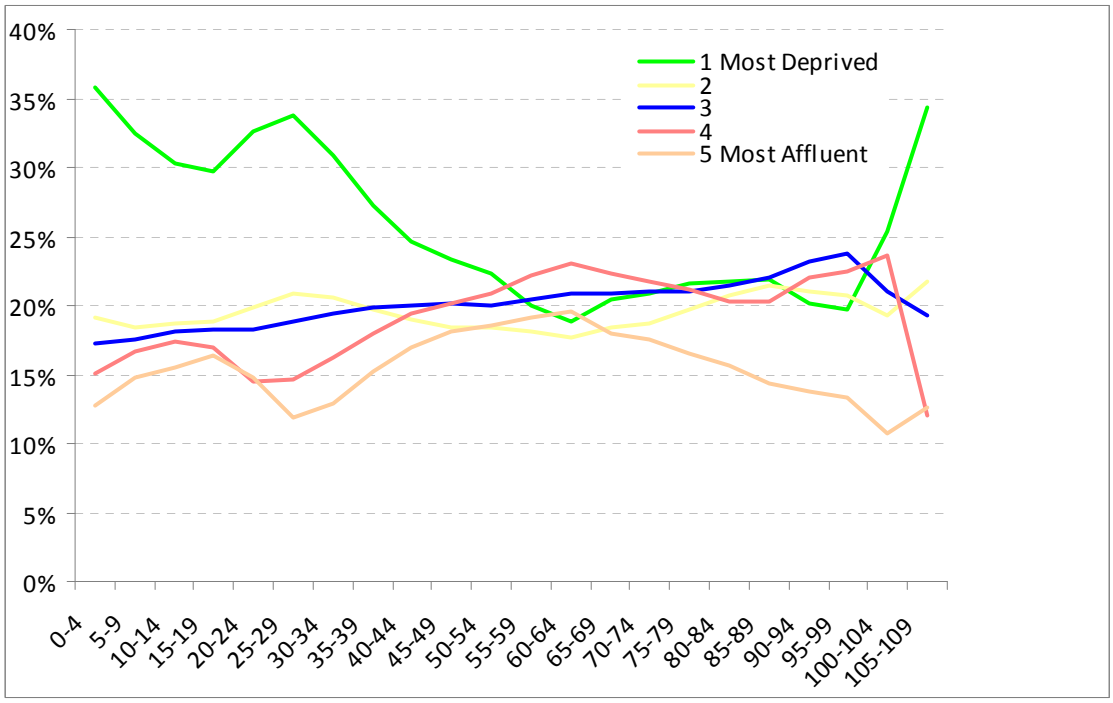
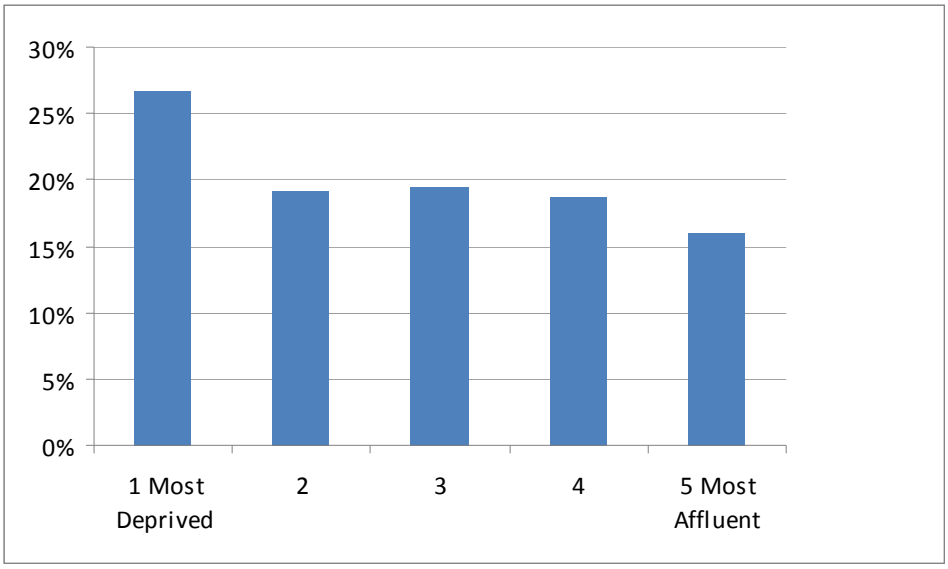


Figure 2.3: IMD 2007 Quintile Profile for West Midlands Register Patients (June 2010)



2.4 Conclusions

The splaying of the quintiles in Figure 2.3 indicates that the demography of the West Midlands is tilted heavily towards the most deprived populations.

However, placing this aside, it can be observed that children and young adults predominate the most deprived populations in the West Midlands. The proportion of poor elderly (i.e. living in the lowest quintile) is also more in the West Midlands than would be expected. These relative patterns of deprivation by age will vary from PCT to PCT.

References

1. http://www.hcs.nhs.uk/ previously WMCBSA
2. West Midlands Cancer Intelligence Unit (Diane Edwards)

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CHAPTER THREE: ACCESS TO HEALTH SERVICES IN BIRMINGHAM

ANALYSIS USING OPEN DATA

3.1 Introduction

This chapter builds on work from previous Key Health Data[1] by looking at access to local health services in Birmingham. The aim is to identify and describe the number of people who are within a reasonable distance of their local health services, with the measure being 'how long it takes to walk to the nearest GP surgery, pharmacy, dental practice or opticians'.

A road network is configured for the pedestrian user with average walk speeds. For the purpose of this piece of work, that of a woman with small child (2.592km/hr) is used[2]. Using GIS analysis, based on this speed, isochrones (areas of equal time) are generated for each health service. The isochrones can then be used to calculate and identify the number of people who live within a 5, 10, 20 or 30 minute walk, and those more than 30 minutes, from their nearest service.

With commitments, from both the Labour Government and the new Coalition Government, to free up public and Governmental data[3], the emphasis on the analysis in this chapter will be upon the use of open data.

Data.gov.uk (see Chapter One) is a portal headed by Sir Tim Berners-Lee and Professor Shadbolt set up in early 2010 by the previous Labour Government. The portal is expected to grow under the new Coalition Government as part of its Big Society declaration[3]. Its overall aim is to open up Government datasets and to help drive forward innovation.

All health service locations used in this analysis have been derived from this portal. In addition to these locations the portal signposts LSOA population estimates (2008), LSOA population-weighted centroids, deprivation indices and boundary line data which are all used in this analysis.

OpenStreetMap (OSM), founded in 2004, is a form of Volunteered Geographical Information (VGI) with the aim of creating a free digital map of the world. The data is captured using GPS devices and entered onto a master database, created under a Creative Commons licence meaning it can be freely adapted, copied and shared. The source data is made available to download at no cost.

OSM has been chosen for this analysis since, not only is its a form of open data; it contains an array of footpaths and walkways which are not captured by current Ordnance Survey datasets making it more suitable for analysing pedestrian travel movement.

Furthermore, studies by Muki Haklay [4] have shown that national completeness of OSM had grown to 70% by March 2010, with this figure being much higher in urban areas, and, in some parts, was even considered to be more complete than Meridian2.

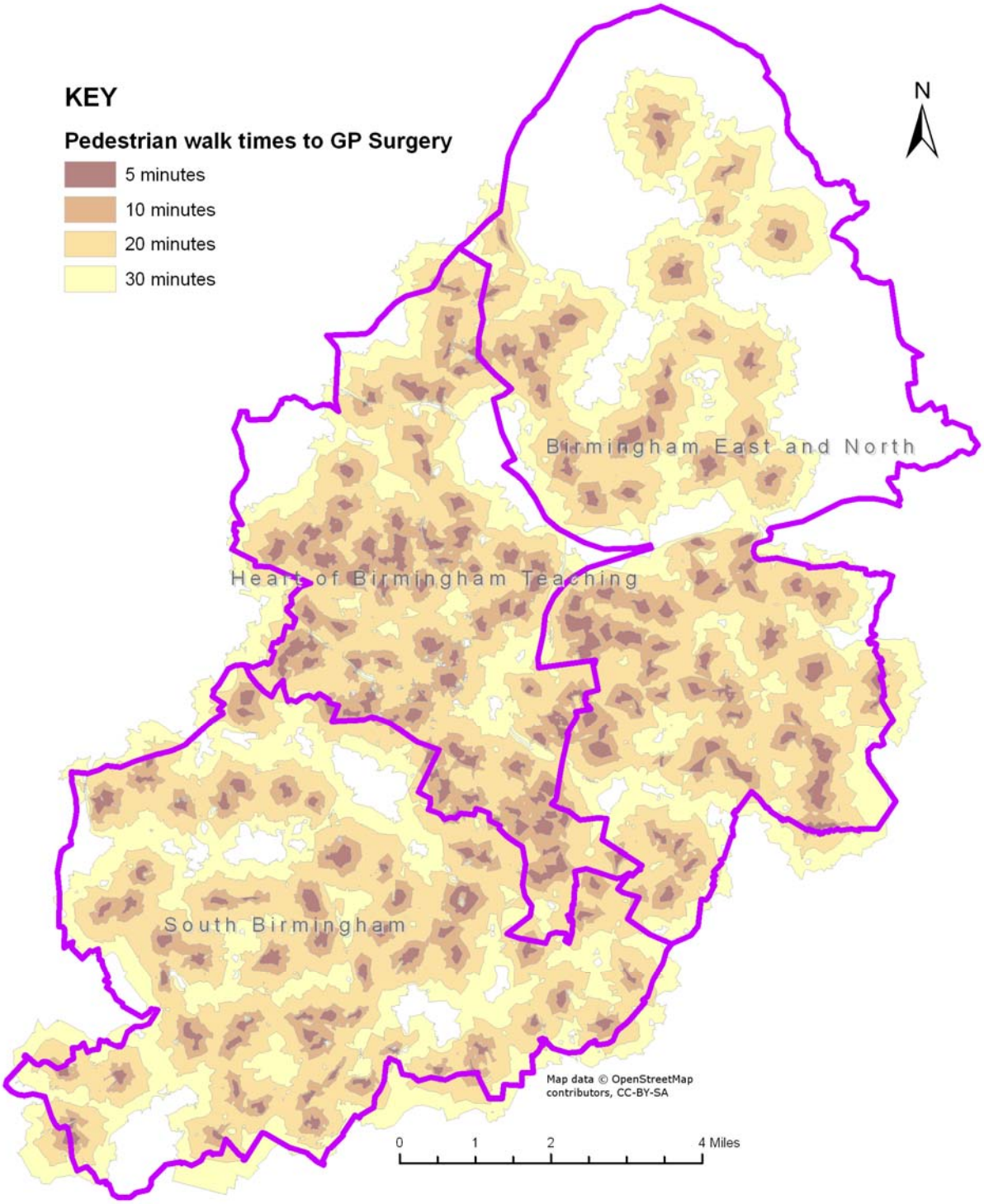
Mapping of Birmingham, the City and its metropolitan area, was completed by OSM in December 2008[5].

Further analysis by the WMCIU has shown that, excluding motorways, OSM road data contained 3.4 million metres of road network within the Birmingham local authority area, compared with 3.1 million metres for ITN and 2 million metres for Meridian2 road networks.

3.2 Access to GP Surgeries

Including branch surgeries, there are 278 GP surgeries in Birmingham's three PCTs.

Map 3.1: Access to GP surgeries generated by OSM



Across the whole Birmingham district, access to GP services appears to be very good with only 7% of the total population living more than a 30 minute walk from their nearest GP. Three quarters of the population are within a 20 minute walk.

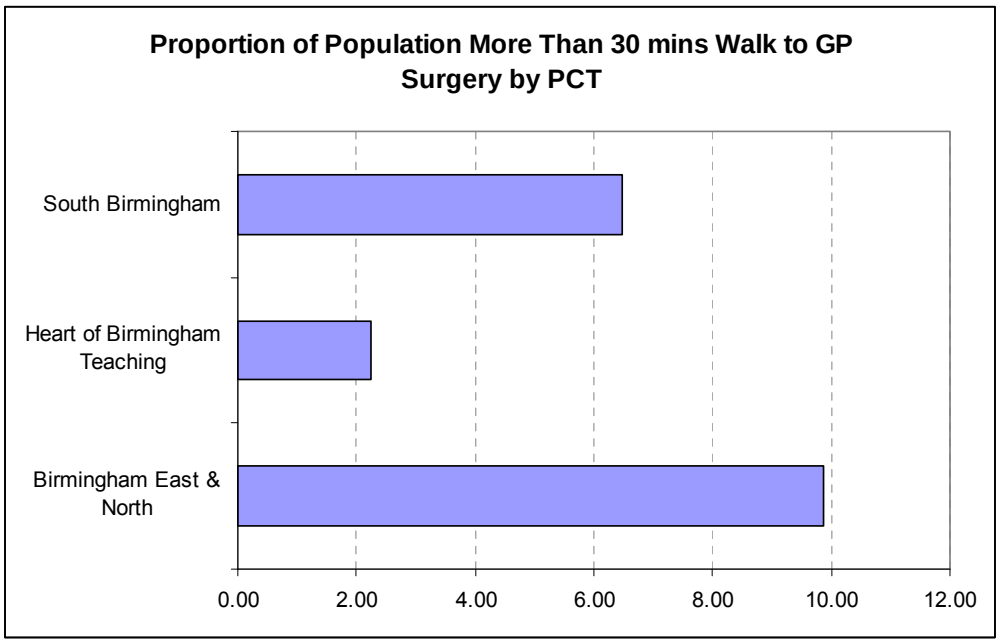
For the most deprived group, access to GP services is slightly better; the above figure now halved leaving just 3% more than a 30 minute walk. 10% live within a 5 minute walk, whilst just over a third are within a 10 minute walk.

Table 3.1: Access to GP surgeries

	% of population				
	5 mins	10 mins	20 mins	30 mins	Over 30 mins
All people	7.99	29.75	74.96	93.30	6.70
Most deprived group	10.28	34.34	81.66	96.68	3.32

At a PCT-level, Birmingham East & North was found to be the least well covered, with almost 10% of its population living more than a 30 minute walk to their nearest GP. Heart of Birmingham had the best accessibility with just 2% of its population more than a 30 minute walk away.

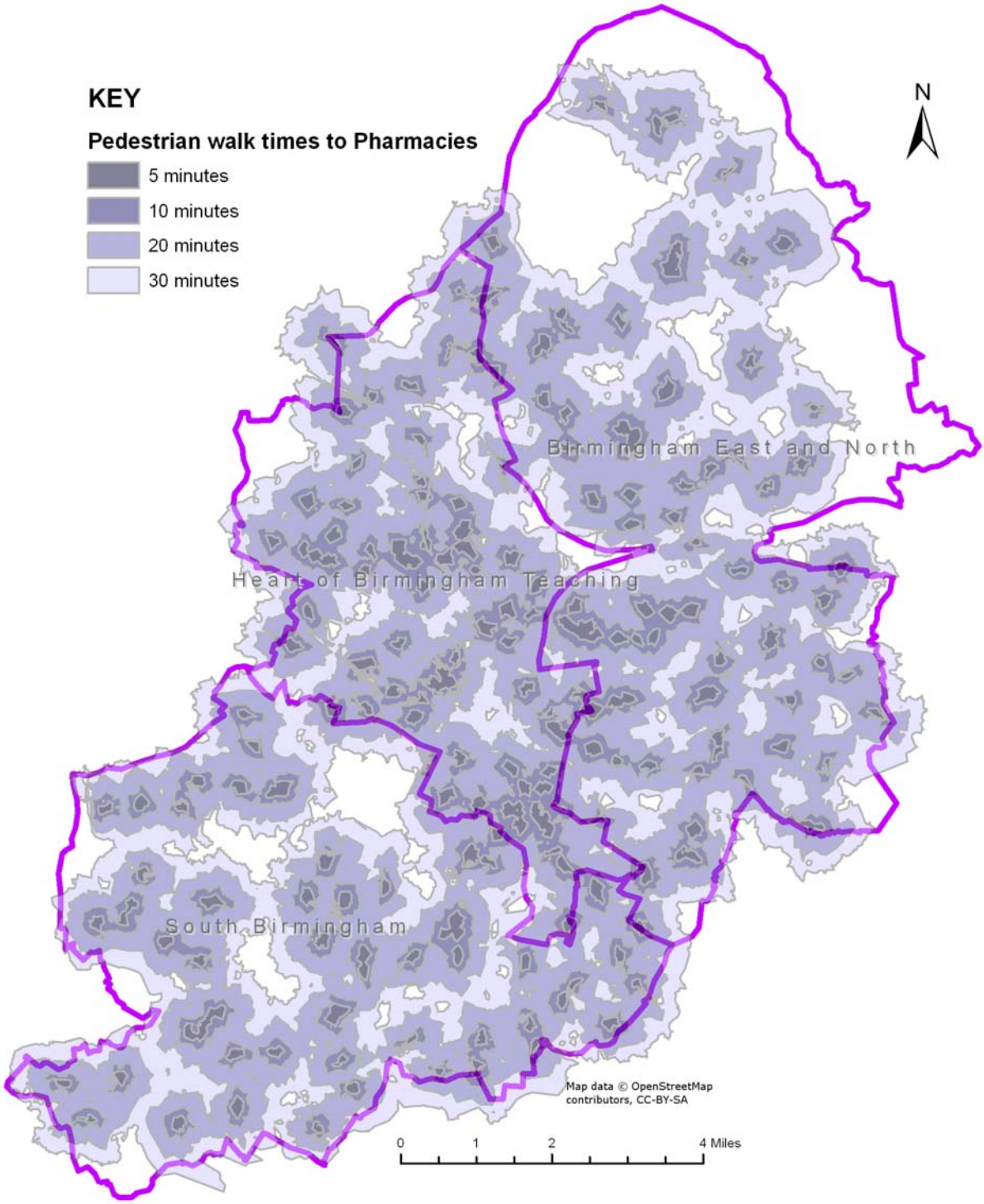
Figure 3.1: Access to GPs by PCT



3.3 Access to Pharmacies

There are 259 pharmacies within Birmingham, the most numerous of all the health services measured. Consequently, it was seen to be the most accessible of all the health services, with near complete coverage for the whole City.

Map 3.2: Access to pharmacies generated by OSM



Just 4% of the Birmingham population were found to be living more than a 30 minute walk to their nearest pharmacy. Just over a quarter of the population were within 10 minute walk, and three quarters within 20 minutes.

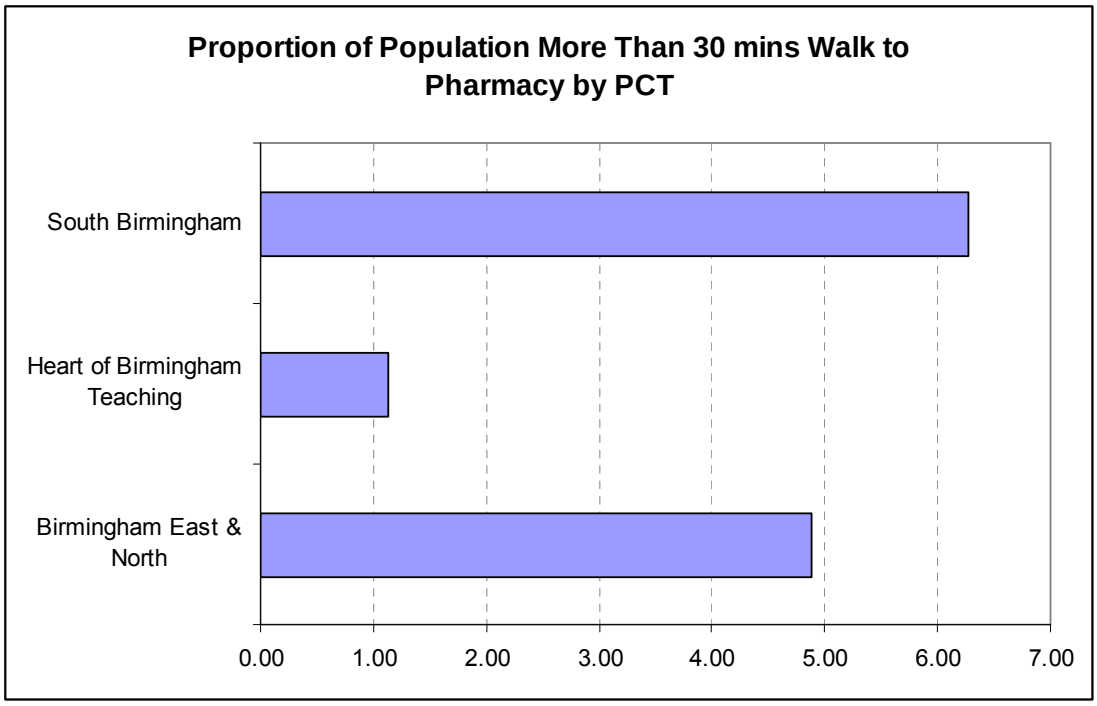
Similar to GPs, the most deprived group were measured to have better access to pharmacies, with only 1.7% living more than 30 minutes away. For the most deprived group, however, they were less well represented by pharmacies than GP services for the shortest journey times (5 minutes and 10 minutes).

Table 3.2: Access to pharmacies

	% of population				
	5 mins	10 mins	20 mins	30 mins	Over 30 mins
All people	7.28	27.19	76.87	95.69	4.31
Most deprived group	8.92	30.93	81.77	98.29	1.71

Of the PCTs, Heart of Birmingham Teaching has near-complete coverage with just 1% of its population more than 30 minutes walk from their nearest pharmacy. This figure was higher in the remaining to PCTs, with South Birmingham having the largest proportion more than 30 minutes away (6%).

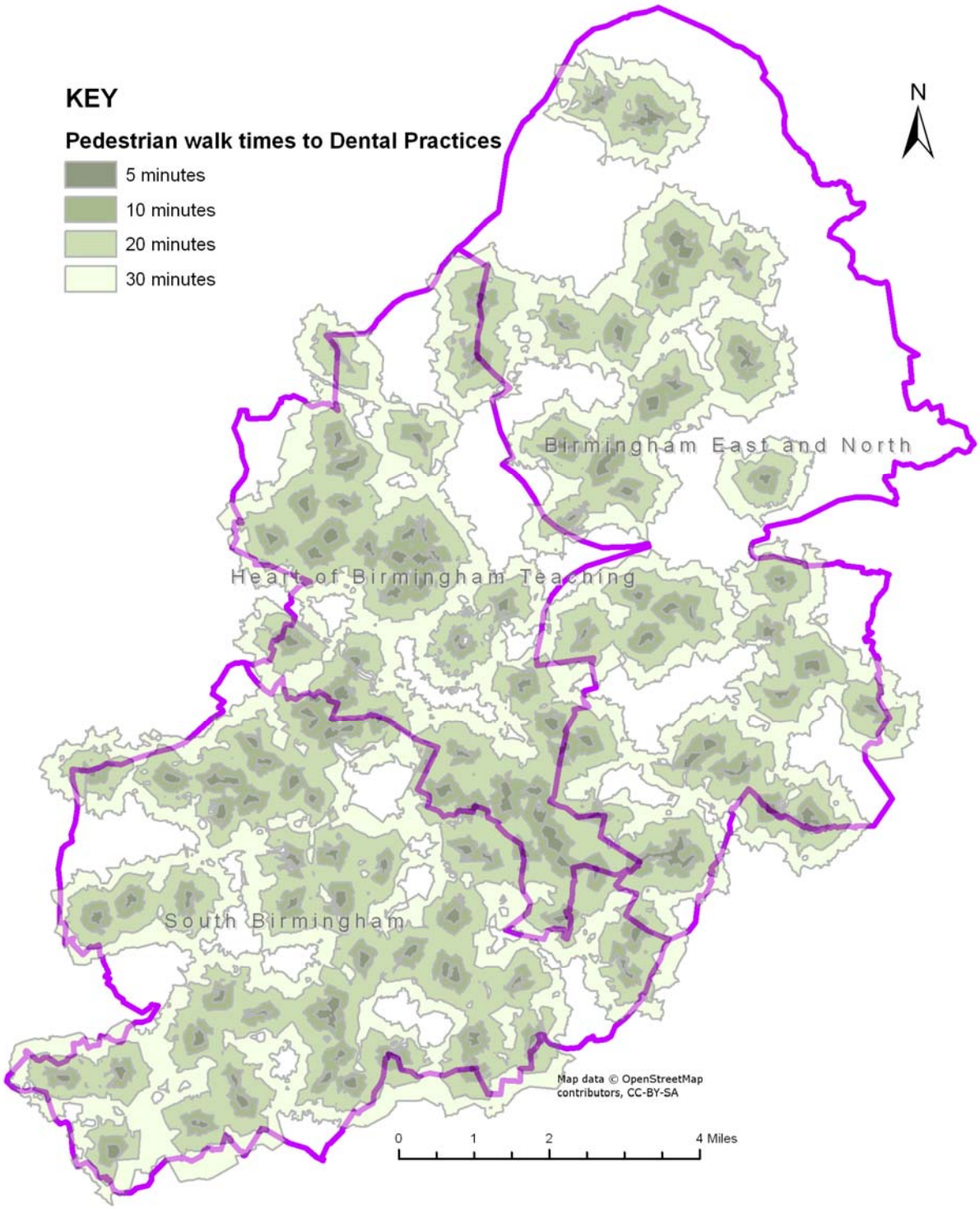
Figure 3.2: Access to pharmacies by PCT



3.4 Access to Dental Practices

With 147 dental practices in Birmingham there are fewer services than GPs, and pharmacies. Subsequently, the travel time to this type of health service is slightly longer.

Map 3.3: Access to dental practices generated by OSM



Approximately 15% of the population live more than 30 minutes away from their nearest dental practice, with this figure almost identical for all people and the most deprived groups. Over half the population (57%) are located within a 20 minute walk.

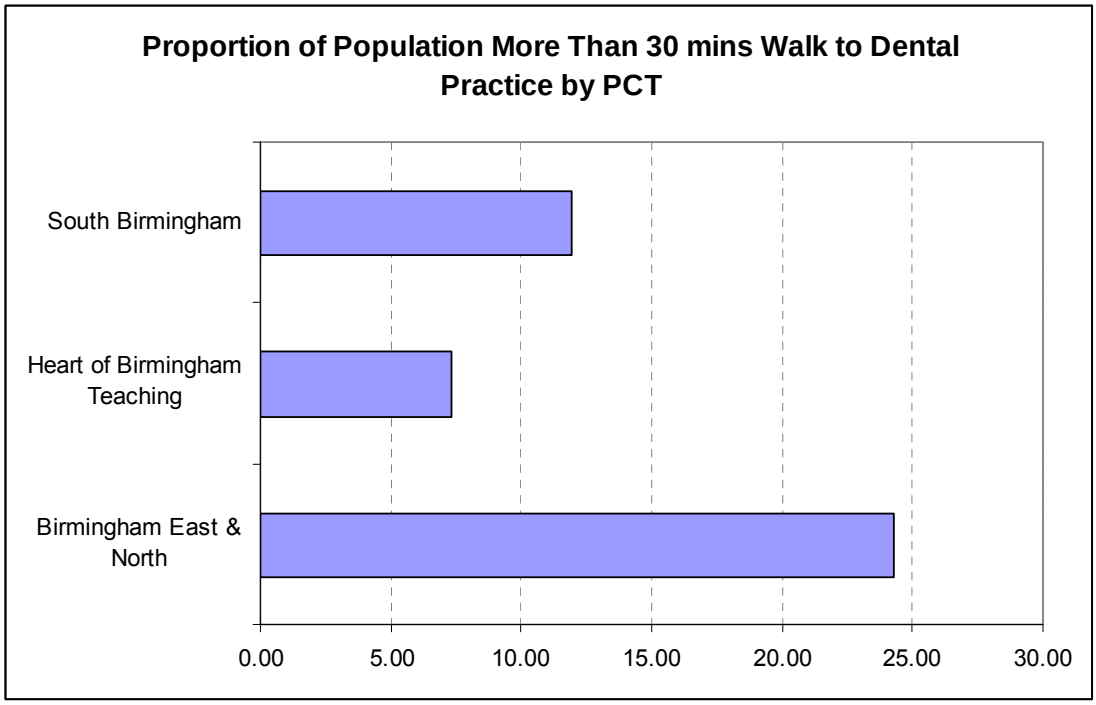
Unlike the GP surgeries and pharmacies, the most deprived group were found to have the poorer access than the rest of the population, up to and including 20 minutes walk, although these differences were very small.

Table 3.3: Access to dental practices

	% of population				
	5 mins	10 mins	20 mins	30 mins	Over 30 mins
All people	3.67	17.85	57.07	84.36	15.64
Most deprived group	3.02	17.57	56.71	84.96	15.04

Heart of Birmingham Teaching PCT was, again, found to have the best accessibility coverage with 7% of its population more than 30 minutes walk. Birmingham East & North was shown to have the poorest accessibility with a significant proportion – approximately a quarter – of its population living more than 30 minute walk to their nearest dental practice.

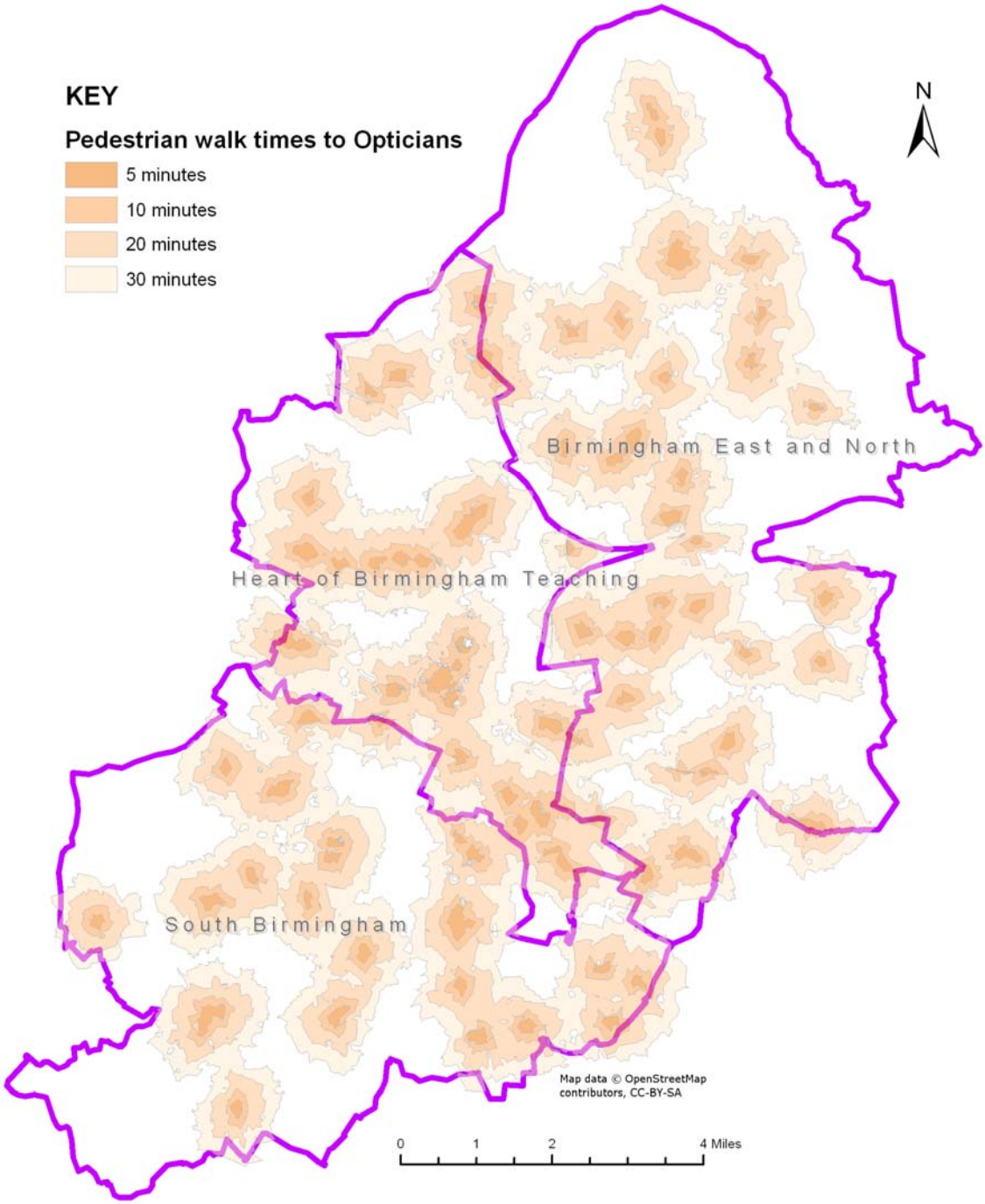
Figure 3.3: Access to dental practices by PCT



3.5 Access to Opticians

With 137 opticians found in Birmingham, there were fewer opticians than any other health service investigated, and this subsequently resulted in greater travel times for the population of Birmingham.

Map 3.4: Access to opticians generated by OSM



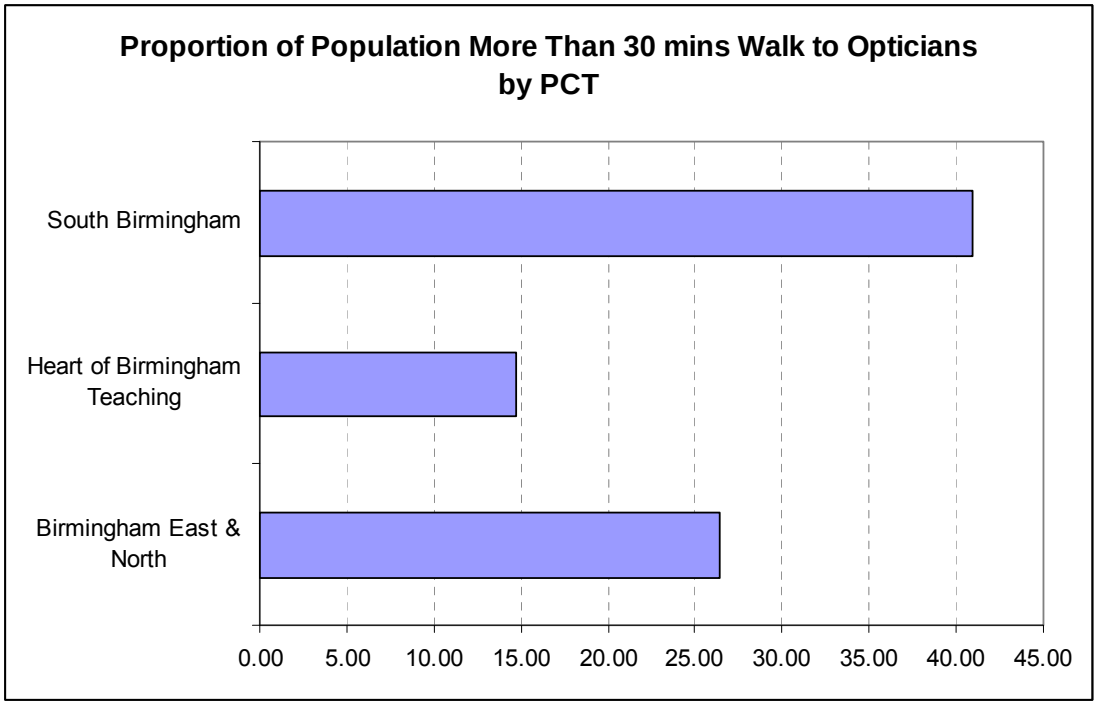
Over a quarter (28%) of Birmingham's population live more than a 30 minute walk to their nearest opticians. Similar to that of dental practices, the most deprived group were generally found to have the poorer access to services (the only exception being at the 10 minute break), with 30% of this group living more than 30 minutes walk away.

Table 3.4: Access to Opticians

	% of population				
	5 mins	10 mins	20 mins	30 mins	Over 30 mins
All people	2.74	14.02	44.69	71.86	28.14
Most deprived group	2.51	14.94	43.28	69.88	30.12

Heart of Birmingham, once more, was found to have the best accessibility of the three PCTS with 15% of its population located more than 30 minutes away.
Birmingham East & North saw just over a quarter of its population living more than 30 minutes away, South Birmingham showing a significantly higher proportion with 42%.

Figure 3.4: Access to opticians by PCT



3.6 Summary and Conclusions

This analysis has shown that for the core local health services – GP surgeries and pharmacies – there is very good coverage in Birmingham with well over 90% of the population living within 30 minutes walk. The most deprived group were found to have greater proportions living within shorter journey times.

Dental practices, and in particular, opticians were found to be slightly less accessible with more significant proportions of populations living more than a 30 minute walk away. The most deprived group were also found to be less well served than that for GPs and pharmacies.

Heart of Birmingham, which also has very high levels of deprivation, however, was found to be the most accessible of Birmingham's PCTs with much greater proportions of its populations residing closer to health services.

The analysis shows that open data can be a valuable resource in public health intelligence to help inform equity audits and needs assessments. The use of open data provides not only a low-cost option, but also

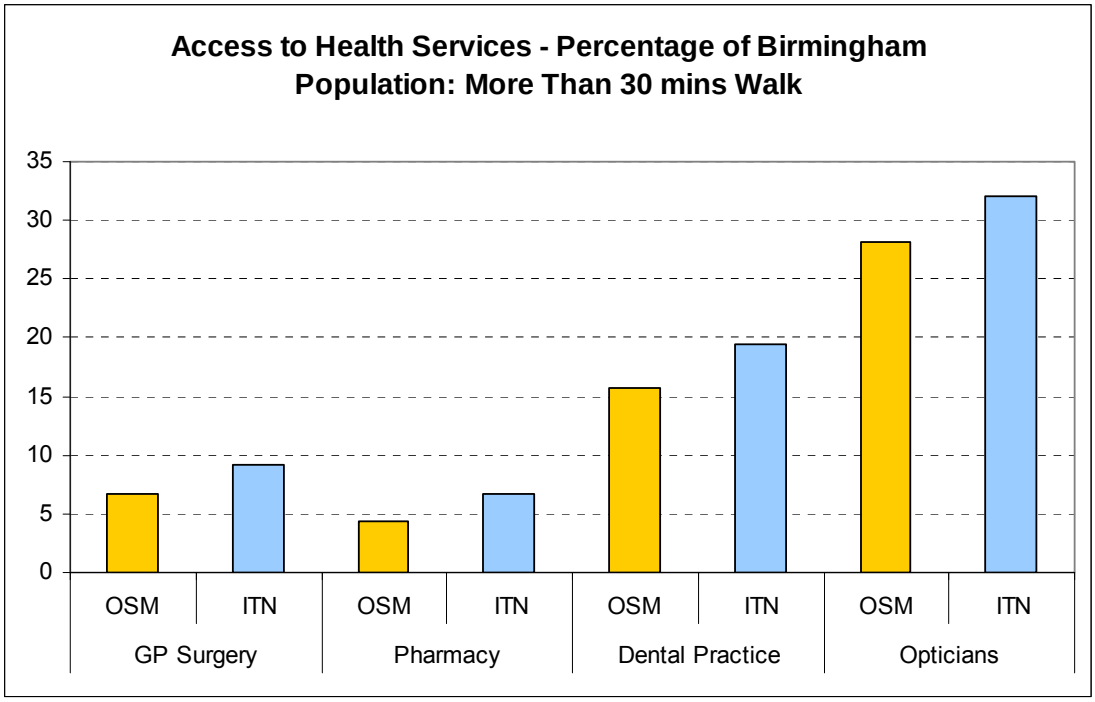
has the advantage that it can be freely distributed and shared to a much wider audience, which has the potential to disseminate such information on the web.

The launch of OS OpenData (see Chapter One) has seen a range of geographical products made openly available, yet there is little guidance on the suitability of these products, or how they may compare with premium Ordnance Survey products, such as OS MasterMap ITN.

As part of OS OpenData, Meridian2 could have been used in this analysis. However an alternative open data source was selected in OpenStreetMap: with an extra million metres of road features, and a wide network of footpaths and walkways in the Birmingham area, it was deemed the most appropriate for this specific type of pedestrian-based analysis.

Figure 3.5 below, shows a summary of the analysis in this chapter by comparing both OSM and Ordnance Survey's premium product, ITN:

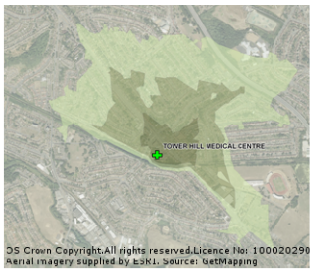
Figure 3.5: Access to health services comparing OSM and ITN



Whilst some of these differences may be considered quite small, it is worth remembering that in a city the size Birmingham with a population of just over 1 million, a difference of 5% would equate to some 50,000 people.

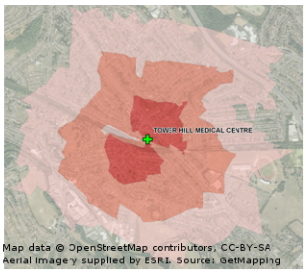
Any differences, however, are far more evident at a more localised level. It is perhaps best outlined by the example below, where in OS ITN the lack of a simple footbridge across a canal cuts off an adjacent neighbourhood from its closest GP surgery:

Figure 3.6: Differences between OSM and ITN isochrones



ITN generated isochrone without footbridge link

Geo-tagged photo identifying existence of footbridge



OSM generated isochrone with footbridge link

Although ITN is considered Ordnance Survey's most accurate and detailed road dataset, and has almost the same metres of road network as OSM in Birmingham, it lacks important footpaths and walkways which will impact upon pedestrian-based accessibility analyses.

A new component of ITN, the ITN Urban Paths Network, is due be released in the next few months and may go some way to addressing some of these issues.

The OpenStreetMap project, however, with its global team of dedicated volunteers continually mapping and updating the OSM database looks set to grow further, and provides a data-rich mapping source at no cost.

References and Acknowledgements

1 Key Health Data 2004/05 Chapter 6: Access to Services, Dr Richard Wilson
2 DfT Road Research Laboratory 1965 'Research on Road Traffic'
3 Building the Big Society', Cabinet Office News Release and announcement, 18th May 2010
4 Based on Haklay, Mordechi (Muki), March 2010, OpenStreetMap Completeness for England for March 2010 http://wiki.openstreetmap.org/wiki/Birmingham

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CHAPTER FOUR: ALCOHOL RELATED HOSPITAL ADMISSIONS AND MORTALITIES IN THE WEST MIDLANDS

4.1 Background

For many years, alcohol-related health problems have been recognized as a major public health problem[1]. Alcohol consumption is associated with a considerable morbidity and significant health service expenditures[2]. It is also a major contributor to death and disability among European populations[3]. According to the World Health Assembly (1983)[4], hazards related to alcohol consumption are among the world's major public health challenges.

The United Kingdom has a serious problem in relation to the increasing levels of the adverse effects of drinking across different genders and age groups[5]. In 2006, the UK was rated as the third highest across 25 EU member states for the number of drinks consumed in one sitting. In addition, the UK has one of the highest rates of admission to hospital or an emergency department due to alcohol use in 15-16 year olds across the EU countries[6].

Alcohol-related illness or injury accounts for nearly a million hospital admissions per year and they are increasing. The annual healthcare costs related to alcohol misuse add up to £1.7 billion per year and the bulk of these costs are borne by the NHS[7].

According to the former government national indicators, alcohol related hospital admissions; National Indicator 39 (NI39) measures the rate of alcohol related admissions per 100,000 population using Hospital Episode Statistics[7].The rate is calculated using data on those finished in-year admissions that are classified as ordinary or day cases and that have a primary or subsidiary diagnosis[7]. The alcohol related admissions were calculated using the alcohol-attributable fractions calculated by the North West Public Health Observatory (NWPHO)[8].

Each admission is assigned an attributable fraction based on the diagnosis codes and age and sex of the patient. The attributable fraction represents the proportion of admissions that can be attributed to alcohol and were based on a review of the available research. Where an admission has more than one relevant diagnosis code, the highest attributable fraction is used. Only those alcohol related diagnoses with a sufficiently high attributable fraction (an all-age fraction greater than 0.2 for either males or females) are used in order to reduce the 'noise' created by confounding factors[7]. Generally, alcohol indicators are either entirely related to alcohol (alcohol-specific) or are influenced only in part by alcohol (alcohol-attributable)[6].

The West Midlands Public Health Observatory (WMPHO) provides annual and quarterly data on the trends in alcohol related admissions for every PCT. These data indicate existing trends in alcohol related ill-health for every PCT and provide a baseline against which PCTs can measure delivery of the indicator.

This chapter demonstrates the trends in alcohol related admissions in the West Midlands region, percentage of annual change in the NI39 over last year by PCT, and trends in NI39 by age group. It will also illustrate the most common alcohol specific and alcohol attributable admissions. In addition, the chapter will look at the number of actual admissions and the number of individuals who contribute to the NI39 indicator as any intervention must be targeted at individuals or defined segment of the population.

The chapter also provides update of latest alcohol-related mortality for the West Midlands Region.
We will be using admission data for 2008/2009 as a cut-off point as this was the latest whole year data available for analysis.

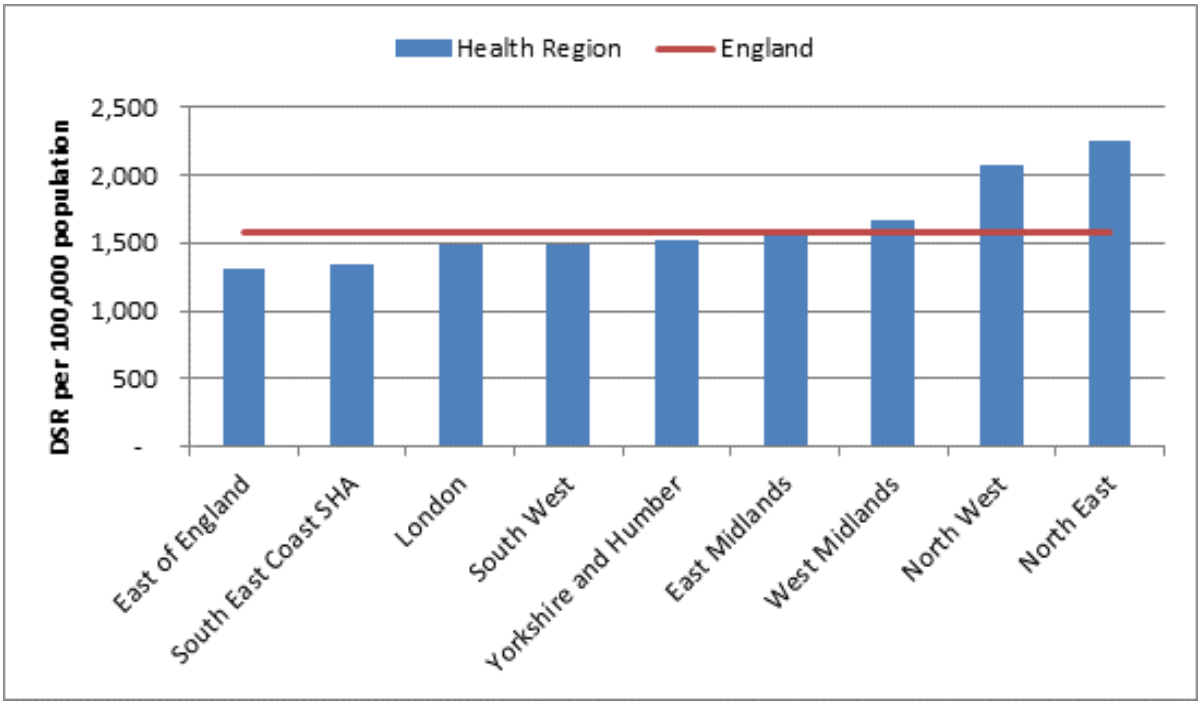
4.2 Alcohol-related Hospital Admissions

4.2.1 Alcohol related Hospital Admissions in the West Midlands compared to other English regions

In 2008/09, there were 945,223 alcohol-related admissions in hospitals of the nine English regions and 11.1% of these admissions were in the West Midlands region. Compared to other English regions, the West Midlands region had the third highest directly standardised rates (DSR) for alcohol-related hospital admissions in 2008/2009 (Figure 4.1).

Despite the steady increase in the DSR for alcohol related admissions in the West Midlands between 2002/2003 and 2008/2009, the rates stayed below the England rate and up until 2006/2007 when the West Midlands rates exceeded the England one and continued to increase in 2008/2009 (Figure 4.2).

Figure 4.1: Directly Standardised Rates (DSR) of alcohol-related admissions per 100,000 populations by health region 2008/2009



Source: HES 2008-2009, WMPHO analysis[9]

Figure 4.2: Trends in DSR alcohol related admissions between 2002/2003 and 2008/2009

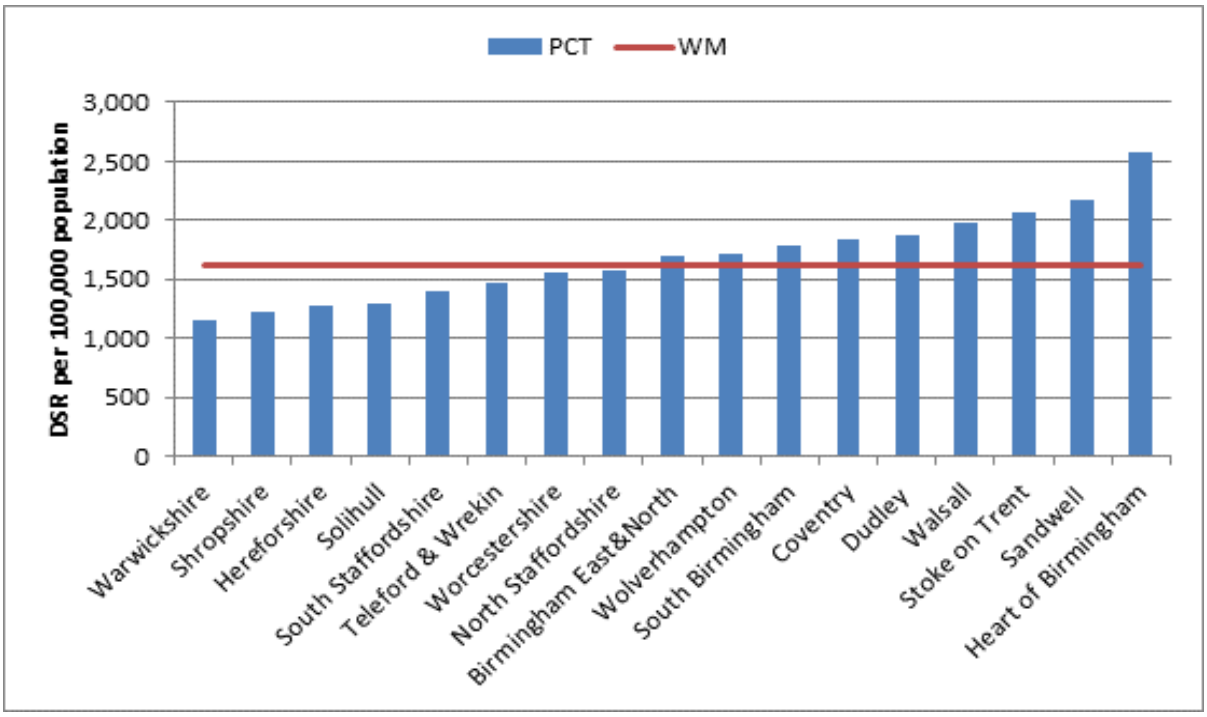
Source: HES 2008-2009, WMPHO analysis[9]

4.2.2 Alcohol related admissions in the West Midlands by PCTs

The DSR of alcohol related admissions for 2008/09 varies between different Primary Care Trusts (PCTs) within the West Midlands region, with Heart of Birmingham PCT had the highest rate of admissions (2571 per 100,000 population) and Warwickshire PCT had the lowest rate (1153 per 100,000 population) (Figure 4.3).

However, among different PCTs in the West Midlands region, Heart of Birmingham PCT showed the second highest percentage of reduction in alcohol related admissions over the previous year (2%) after Telford and Wrekin PCT (5%) (Table 4.1)

Figure 4.3: DSR Alcohol related admissions in the West Midlands by PCT for 2008/09



Source: HES 2008-2009, WMPHO analysis[9]

Table 4.1: Percentage of change in alcohol related admissions in the West Midlands over 2007/2008 by PCT

PCT	% of change over 2007/08
Telford and Wrekin	-5
Heart of Birmingham Teaching	-2
Shropshire County	2
Sandwell	2
Wolverhampton City	4
South Birmingham	5
Solihull Care Trust	6
Walsall Teaching	6
Herefordshire	7
Dudley	8
Birmingham East and North	8
Worcestershire	11
South Staffordshire	15
Warwickshire	27
North Staffordshire	28
Stoke on Trent	30
Coventry Teaching	64
West Midlands	7

4.2.3 Common disorders of alcohol related admissions

Admissions for alcohol have been grouped into alcohol-attributable admissions and alcohol-specific admissions. Tables 4.2 and 4.3 present the five common alcohol attributable and specific admissions in the West Midlands in 2008/2009. More than three quarters of all alcohol related admissions are mainly due to alcohol attributable conditions.

Over half (54%) of the alcohol related diagnoses (whether primary or secondary) fall into the category of "diseases of the circulatory system". This includes hypertensive diseases and cardiac arrhythmias. On the other hand, mental and behavioural disorders due to alcohol are the next biggest category, with 15% of all admissions.

Table 4.2: Five common alcohol attributable admissions in the West Midlands region in 2008/09

Alcohol attributable disorders	DSR per 100,000	Number	% to all alcohol attributable admissions	% to total admissions
Hypertensive diseases	579	38679	49.1	37.8
Cardiac arrhythmias	204	16314	20.7	16.0
Epilepsy and Status epilepticus	155	9037	11.5	8.8
Malignant neoplasm of breast	38	2166	2.8	2.1
Fall injuries	32	2026	2.6	2.0
Common 5 alcohol attributable disorders	1009	68221	86.6	66.7
All alcohol attributable disorders	**1193**	**78736**	**100.0**	**77.0**

Table 4.3: Five common alcohol specific admissions in the West Midlands region in 2008/09

Alcohol specific disorders	DSR per 100,000	Number	% to all alcohol specific admissions	% to total admissions
Mental and behavioural disorders due to alcohol use	277	15160	64.6	14.8
Alcoholic liver disease	77	4352	18.5	4.3
Ethanol poisoning	48	2518	10.7	2.5
Chronic pancreatitis (alcohol induced)	13	691	2.9	0.7
Toxic effect of alcohol, unspecified	7	378	1.6	0.4
Common 5 alcohol specific disorders	423	23099	98.4	22.6
All alcohol specific disorders	**430**	**23478**	**100.0**	**23.0**

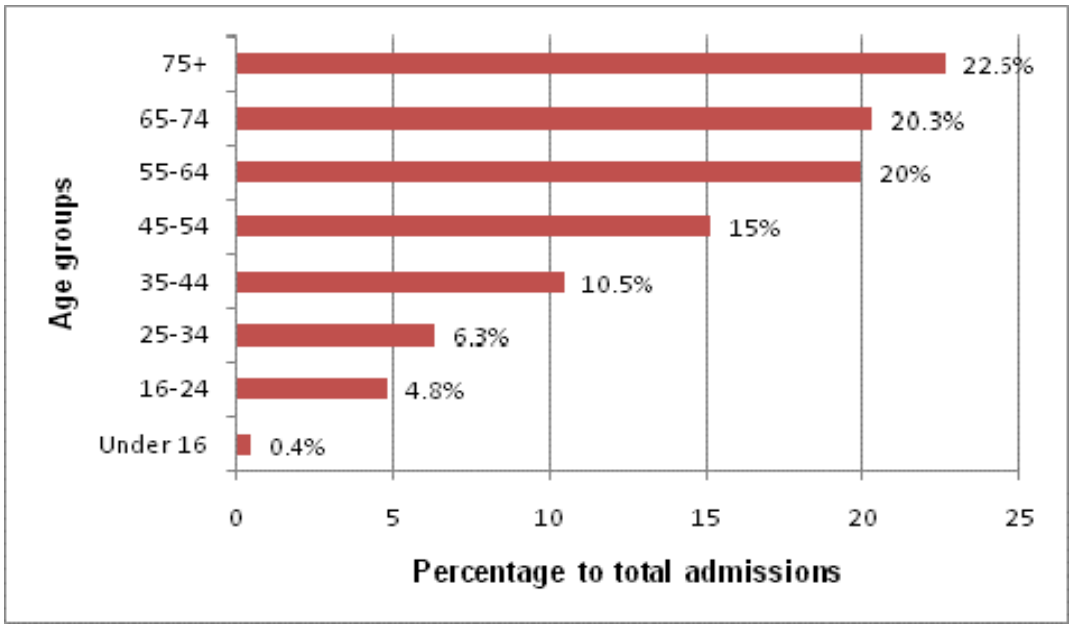
4.2.4 Age and Gender

Overall 62% of those alcohol related admissions occurring in 2008/2009 in the West Midlands were males. Between 2006/2007 and 2008/2009, the number of alcohol related admission has steadily increased among both males and females. The percentage of increase in the number of admissions between 2007/2008 and 2008/2009 is higher among males (12.5%) than among females (11.6%). However the opposite was observed between 2006/2007 and 2007/2008 (2.0% and 4.6% among males and females respectively).

Figure 4.4 shows that alcohol related admissions in 2008/2009 gradually increased with the advance of age, with 63% of admissions are among those aged 55 years and above, while those under 25 years represented only 5.2% of the total admissions.

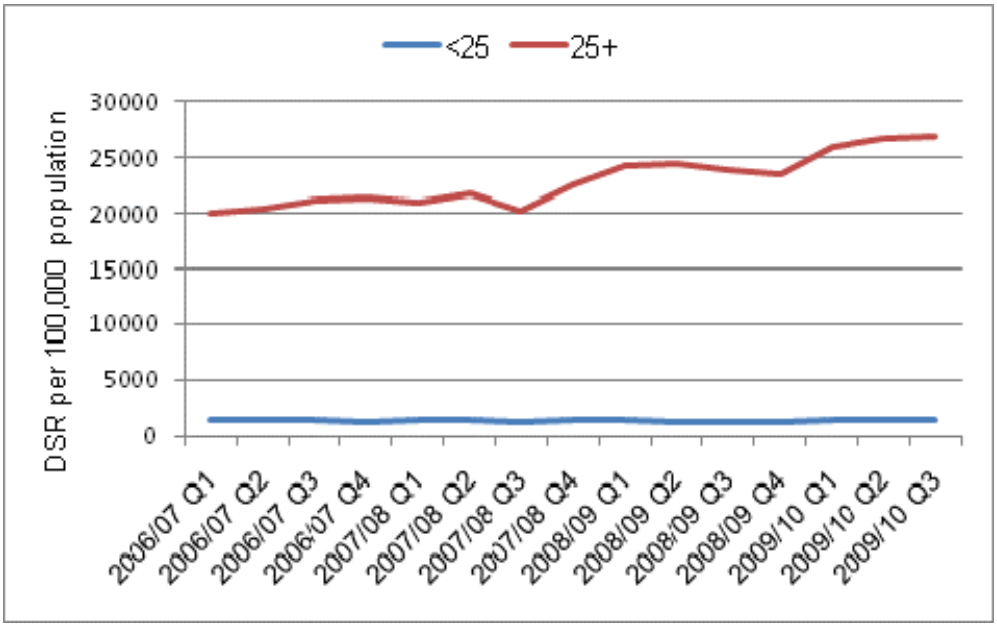
The numbers of admissions among those aged 25 years and above kept fluctuating between Quarter 1 (Q1) 2006/2007 and Q4 2008/2009 and it showed a continuous increase in the three 2009/2010 quarters (latest available quarter data). On the other hand, the numbers for those aged less the 25 years stayed nearly unchanged or slightly decreased (Figure 4.5).

Figure 4.4: Alcohol related hospital admissions in the West Midlands in 2008/2009 by age groups



Source: HES 2008-2009, WMPHO analysis[9]

Figure 4.5: Trend in alcohol related admissions In the West Midlands between Q1 2006/07 and Q3 2009/2010 by age groups



Source: HES 2008-2009, WMPHO analysis[9]

While the percentage of change in the number of admissions over the previous year (2007/2008) showed a slight decrease among those aged less than 25 years (3%), this percentage had increased to 13% among those aged 25 years and above (Table 4.4).

Table 4.4: Percentage of change in the number of alcohol admission in the West Midlands over the previous years by age groups

Age group	% change over 2006/2007	% change over 2007/2008
<25	-2.8	-3.1
25+	3.4	13.1
All age groups	3.0	12.2

Among those aged less than 25 years, the percentage of males and females admissions was very close throughout the period between 2006/2007 and 2008/2009. On the other hand, among those aged 25 years and above, males represented nearly two thirds of the total admissions during the same period (Table 4.5).

Table 4.5: Percentage of alcohol related admissions in the West Midlands between 2006/2007 and 2008/2009 by gender and age group

Year	Age group	Males	Females
2006/07	<25	51.9	48.1
	25+	62.9	37.1
2007/08	<25	49.8	50.2
	25+	62.4	37.6
2008/09	<25	51.7	48.3
	25+	62.4	37.6

Source: HES 2008-2009, WMPHO analysis[9]

4.2.5 Length of stay

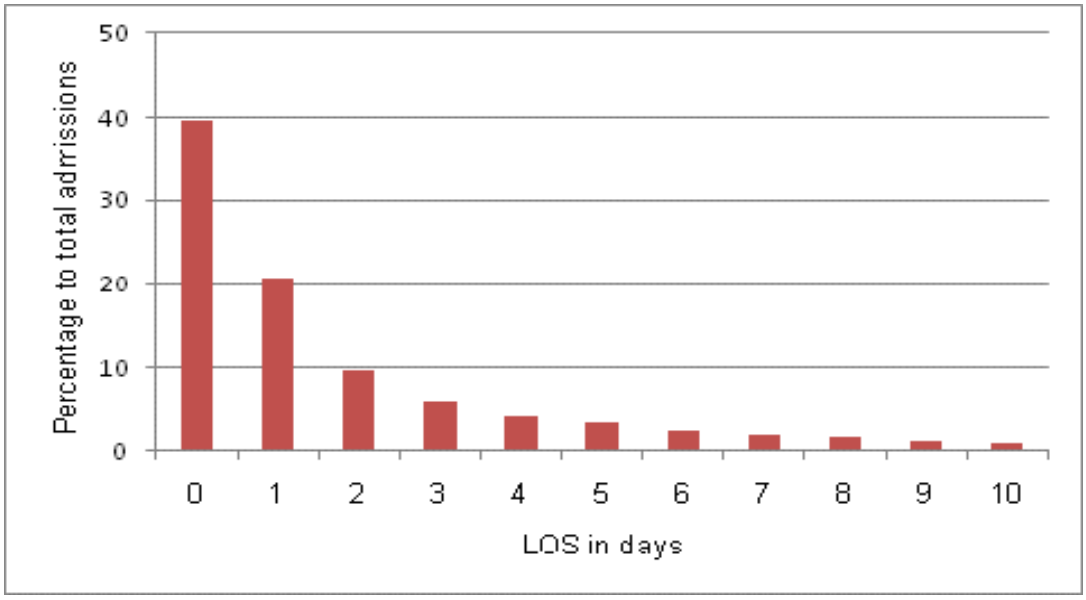
The mean length of stay (LOS) for alcohol related admissions gradually decreased from 4.4 days in 2006/2007 to 4.1 days (Table 4.6) and in 2008/2009 both men and women stayed for the same mean LOS (4.1 days). In addition, there were no statistically significant differences between the mean LOS for alcohol attributable-admissions (4.0 days) and alcohol specific admissions (4.3 days) in 2008/2009.

Table 4.6: Change in the mean LOS for alcohol related admissions in the West Midlands between 2006/2007 and 2008/2009

Year	Mean LOS	% of change
2008/09	4.1	-4.7
2007/08	4.3	-2.3
2006/07	4.4	

Moreover, nearly 40% of the admissions in the West Midlands in 2008/2009 were discharged on the same day of admission and 20.7% stayed in hospitals for only one day (Figure 4.6). On the other hand, only 8.2% of admissions stayed in hospital for more than 10 days.

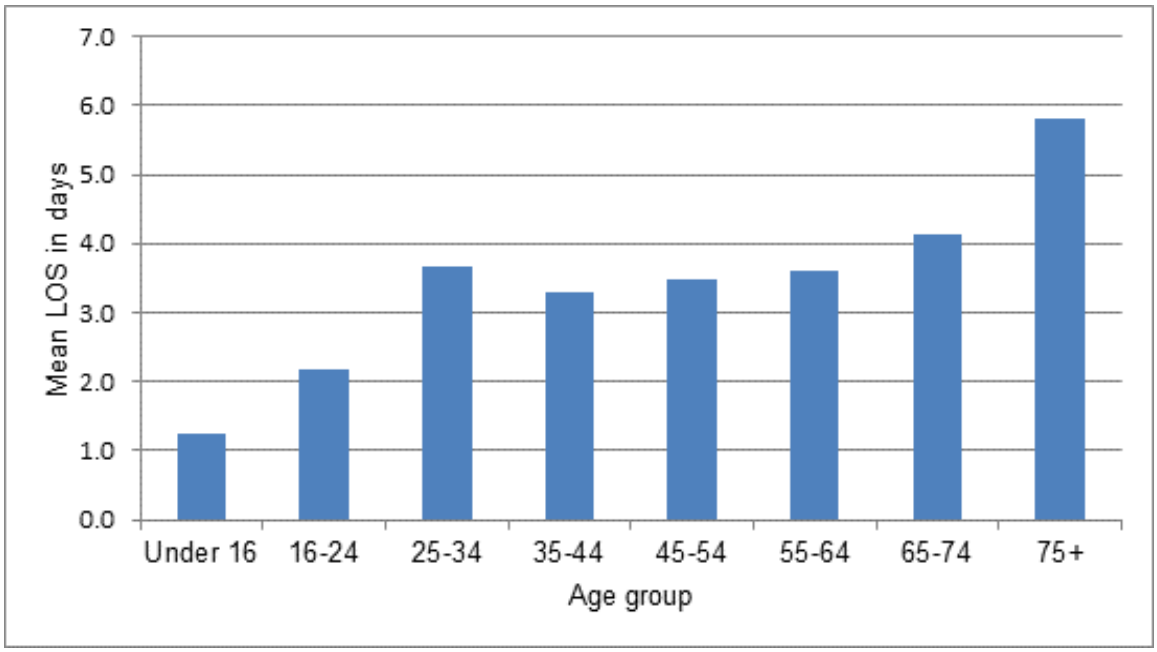
Figure 4.6: LOS in days for alcohol related admissions in the West Midlands in 2008/2009



Source: HES 2008-2009, WMPHO analysis[9]

Figure 4.7 shows that the mean LOS for alcohol related admissions in 2008/09 in the West Midlands has gradually increased with the advance of age, with the exception of those aged between 25 and 34 years.

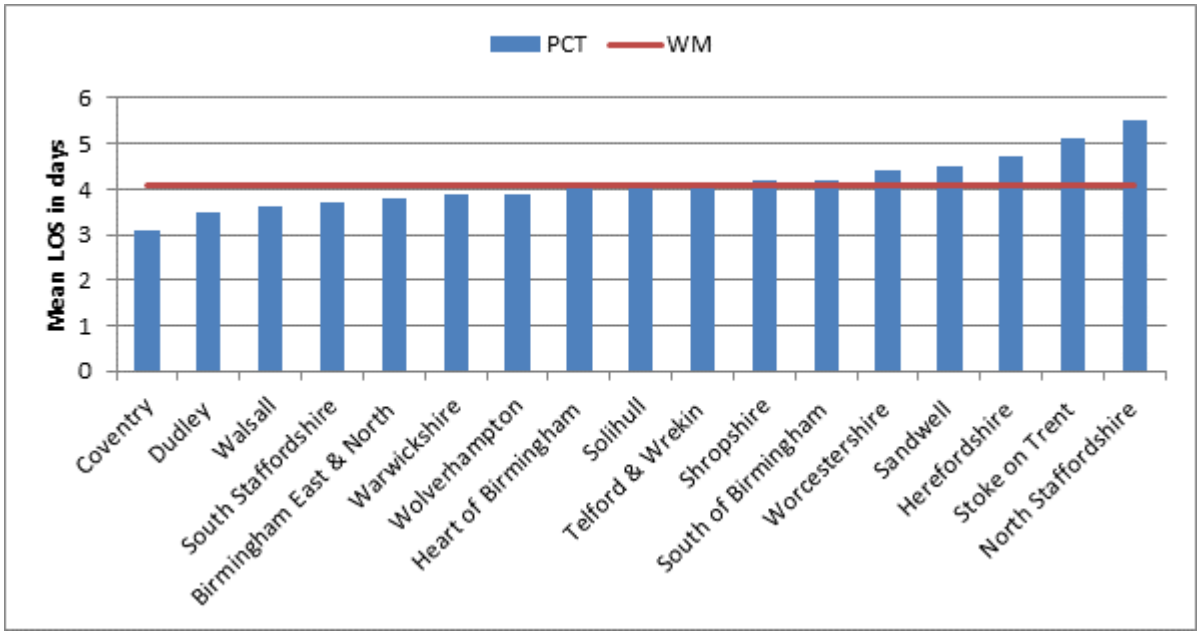
Figure 4.7: Mean LOS for alcohol related hospital admissions in the West Midlands in 2008/09 by age groups



Source: HES 2008-2009, WMPHO analysis[9]

As can be seen in Figure 4.8, the mean LOS for alcohol related admissions in 2008/09 in the West Midlands region varied considerably between different PCTs in the region, with North Staffordshire PCT had the longest mean LOS (5.5 days), while Coventry Teaching PCT had the shortest mean LOS (3.1 days).

Figure 4.8: Mean LOS for alcohol related admissions in the West Midlands in 2008/09 by PCTs



Source: HES 2008-2009, WMPHO analysis[9]

4.3 Alcohol-related admissions and persons

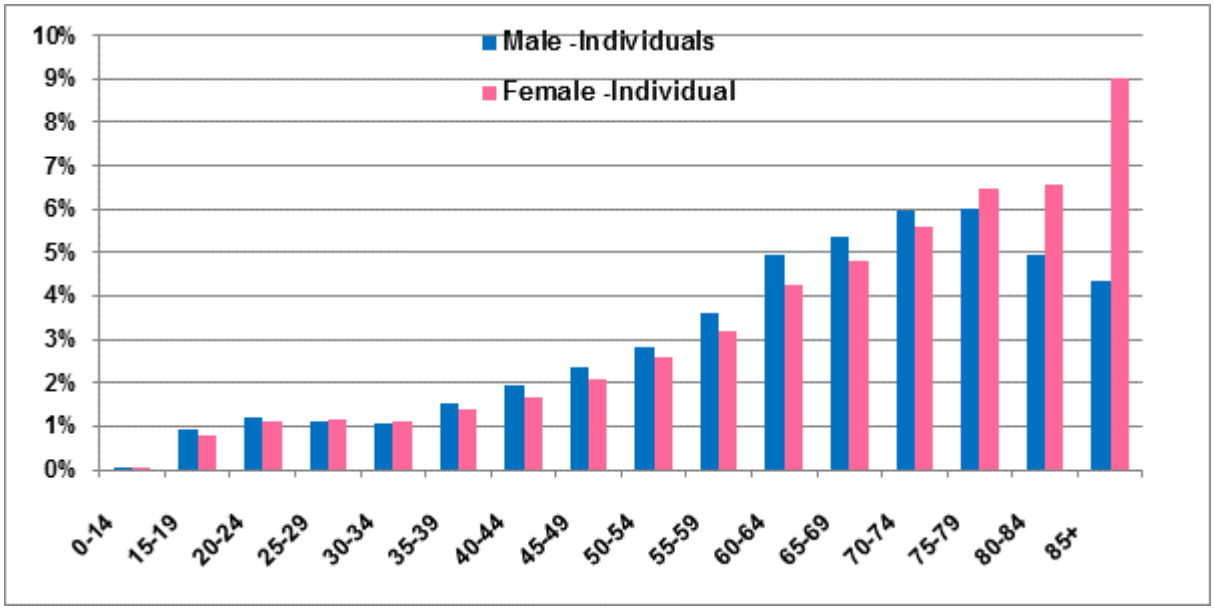
It is important to note that the number of actual admissions and the number of alcohol-related admissions will be different because of the applications of attributable fractions to real admissions. Also, the number of alcohol-related admissions and the number of persons that contribute to the alcohol admissions is likely to be different because a person may have multiple admissions within the data year. For example if a 45 year old male is admitted once for alcoholic gastritis and six times for fire injuries, he will contribute once to the total admissions of individuals in that year, 7 to the total admissions and 3.28 to the alcohol admissions in that year (attributable fraction for alcoholic gastritis is 1 and for fire injury is 0.36 thus alcohol admission in this case will be 1+ (0.36*6) =3.28)

In order to implement interventions that address alcohol harm, it is important to understand not only the number of alcohol admissions discussed in section 1.2 but also the number of individuals that contribute to the admissions. This section looks at the number of individuals admitted for alcoholic conditions and also individuals with multiple admissions. It is useful to identify patients or categories of patients who required multiple repeated inpatients treatment in order to identify appropriate course of treatment and service for this group of patient.

4.3.1 Individual by sex and age

Analysis of 2008/2009 HES data by the West Midlands Public Health Observatory showed that 259,719 individuals contributed to 102,773 alcohol admissions in the West Midlands region with some patients having more than one admission in 2008/2009. Figure 4.9 shows the relative contribution of selected age bands and sex to the overall number of individuals (note not number of NI39 admissions) with alcohol related admissions in 2008-2009. Of all the persons admitted for alcohol harm in 2008-2009, 52% were females. Generally slightly more males than females contribute to alcohol admissions until after the age of 74 when the number of females is more than that of males. The figure shows that those in the older age group contributed more to alcohol admissions than the younger age group. About 60% of all alcohol related admissions were in those aged 65 years old and over.

Figure 4.9: Relative contribution of selected age bands and sex to the overall number of persons with alcohol related admissions in 2008-2009



Source: HES 2008-2009, WMPHO analysis[9]

4.3.2 Multiple alcohol related admissions in the West Midlands

It is possible that a small number of patients could be making significant contributions to the total number of alcohol-related admissions by having repeated inpatient episodes of care than others. The need to identify these patients, their conditions and other characteristics is important to guide interventions needed to reduce the level of hospital alcohol-related admissions.

Table 4.7a and 4.7b shows the number of alcohol related admissions, the number of patients and the number of patients who were readmitted for the same conditions in 2008-2009. If, for example a patient was admitted for ethanol poisoning and then later admitted for alcohol liver diseases and ethanol poisoning at subsequent dates, the second admission for ethanol poisoning would be counted as a readmission while the admission for alcohol liver diseases would not be considered a readmission for this analysis. However all three admissions will be included in the total for alcohol-related admissions.

Multiple alcohol related admissions analysis shows that 17% of patients admitted for an alcohol-specific condition were readmitted for the same condition in 2008-2009. For alcohol-specific conditions, alcoholic liver disease had the highest percentage of readmitted patients (29%). For alcohol-attributable admission, 22% of patients admitted for an alcohol-related condition were readmitted for the same condition in 2008-2009. The highest percentage of readmitted patients for alcohol attributable condition was for malignant neoplasm of breast (50%) followed jointly by Cardiac arrhythmias (26%) and Epilepsy and Status epilepticus (26%). For alcohol-attributable admission, we cannot say exactly if the multiple admissions were alcohol induced as only a proportion of the admission (8% in the case of malignant neoplasm of breast) would be due to alcohol.

Table 4.7a: Number of alcohol-specific admission, patients and readmissions in the West Midlands 2008-2009

Alcohol-specific conditions	Number of Alcohol admission	Number of patients	Number of readmitted patients	% of patients readmitted
Alcoholic liver disease	4352	2590	758	29%
Chronic pancreatitis (alcohol induced)	691	419	104	25%
Ethanol poisoning	2518	2254	148	7%
Mental and behavioural disorders due to use of alcohol	15160	11097	1914	17%
Toxic effect of alcohol, unspecified	378	360	6	2%
Common 5 alcohol-specific conditions	23099	16720	2930	18%
All alcohol Specific conditions	**23478**	**17064**	**2948**	**17%**

Table 4.7b: Number of alcohol-attributable admission, patients and readmissions in the West Midlands 2008-2009

Alcohol-attributable conditions	Number of Alcohol admission	Number of patients	Number of readmitted patients	%of patients readmitted
Cardiac arrhythmias	16314	38215	9947	26%
Epilepsy and Status epilepticus	9037	10625	2715	26%
Fall injuries	2026	17632	730	4%
Hypertensive diseases	38679	132155	30383	23%
Malignant neoplasm of breast	2167	5524	3024	55%
Common 5 alcohol-attributable conditions	68221	204151	46799	23%
All alcohol attributable conditions	**78736**	**241926**	**52595**	**22%**

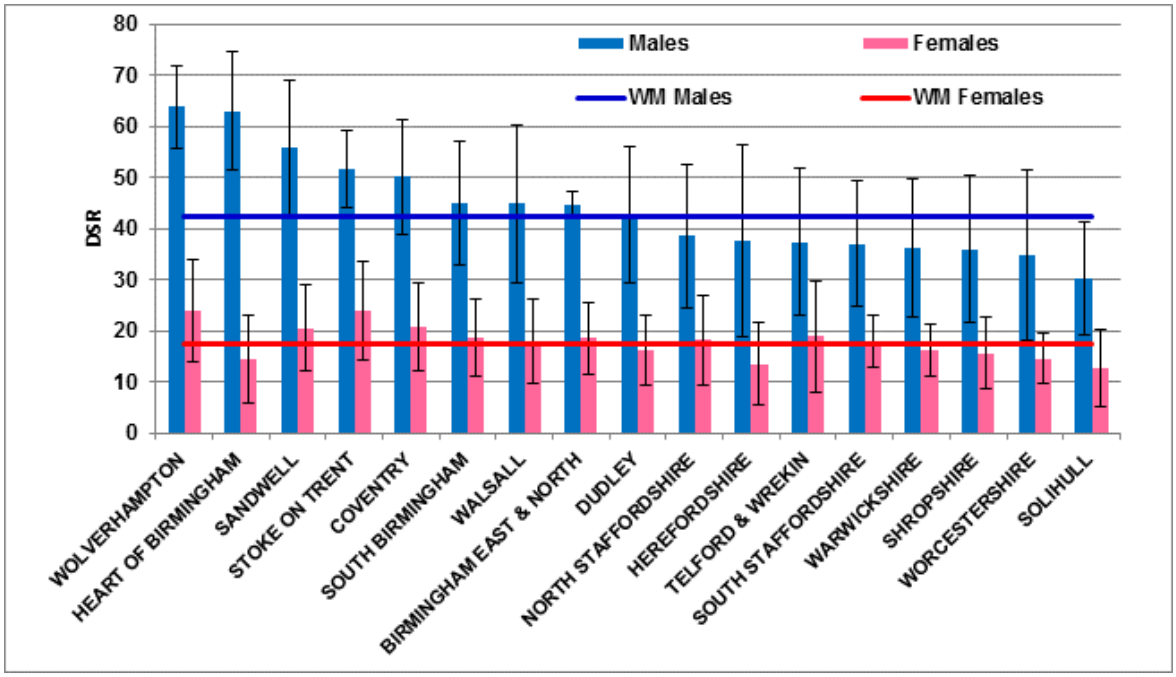
Source: HES 2008-2009, WMPHO analysis[9]

4.4 Alcohol related deaths in the West Midlands

Increased alcohol consumption is associated not only with alcohol morbidity but also with an increase in mortality. This section provides an update of latest alcohol related mortality for the West Midlands Region. The data on alcohol mortality refers to both alcohol specific and alcohol related deaths pooled for 3 years (2006 to 2008) because of small numbers.

Figure 4.10 shows alcohol-related mortality in the West Midlands by primary care trusts (PCTs). Due to the small number of deaths at PCT level a three year average has been calculated. The analysis shows that death rate in males from alcohol-related conditions in the West Midlands region is about twice that in female. Within the region, there is marked variation in alcohol-related mortality rate in males between the PCTs. The highest male alcohol-related mortality rate occurs in Wolverhampton and is over 2 times higher than the lowest found in Solihull. On the other hand there is less variation in female alcohol-related mortality within the region with the highest rate occurring in Wolverhampton and the lowest rate in Solihull.

Figure 4.10: Directly Standardised mortality rates (DSR) per 100,000 for alcohol related mortality by gender and the West Midlands PCTs, all ages, 2000-2004



Source: ONS mortality data and mid-year population estimates, WMPHO analysis[10]

4.5 Key Findings

- Alcohol related admissions give a measure of the amount of harm to physical and mental health that alcohol misuse is causing on both national and regional level.
- Alcohol related admissions represent a growing problem in the West Midlands region and levels of alcohol related admissions have increased steadily over the past few years.
- Despite the increase in the number of alcohol-related admissions over the past few years, there is a steady decline in the mean length of stay and this may reflects the NHS policy towards reducing the mean LOS for most of admissions.
- There are very evident variations in the alcohol related admissions between different PCTs, age
- Groups and genders in the West Midlands region.
- Although more people in the older age group (aged 74 and over) are admitted for an alcohol-related condition, the major age group contributing to most of the alcohol-related admissions are in those aged 55 to 74 years old.
- About a fifth of those admitted for alcohol-related conditions were readmitted for the same condition.

- Alcohol-related deaths rates are about twice that of females in the West Midlands region.
- There is a marked variation in alcohol-related deaths rates in males in the PCTs in the West Midlands region. This variation is not present in death rates in females.

4.6 Recommendations

Increasing levels of alcohol related hospital admissions across the West Midlands region need to be addressed. Reasons for increasing both alcohol attributable and specific admissions need to be tackled in order to reduce the burden on public services.

The use of social marketing tool will be useful to provide more insight and disentangle the disproportionate admission and readmission rates in the West Midlands region.

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CHAPTER FIVE: THE EPIDEMIOLOGY OF CHRONIC LIVER DISEASE

5.1 Introduction

Chronic liver disease (CLD) is a progressive destruction and scarring of the liver tissue. Early changes can progress via inflammation (hepatitis) and scarring (fibrosis) to irreversible damage (cirrhosis). Cirrhosis is regarded as a possible end stage of many liver diseases and occurs when healthy liver tissue becomes damaged and is replaced by scar tissue[1].

A variety of risk factors and diseases can result in chronic liver disease including blood borne viruses, toxin related disorders, obesity, auto-immune diseases and metabolic causes. The three commonest risk factors for CLD are excessive alcohol consumption; blood borne viruses, in particular Hepatitis B and C, and obesity[1]. Risk factors can have a multiplicative effect: an individual with more than one risk factor (e.g. Hepatitis C/obesity as well as excess alcohol consumption) can further increase their risk of CLD[2]. Metabolic disease and auto-immune disease are relatively rare.

The mortality and admission rates related to liver disease are on the rise in England. These trends are in the opposite direction to the general world trends; where liver disease rates are falling[3]. There is also an increase in the risk factors for CLD including higher alcohol related mortality and morbidity, obesity and hepatitis C. A number of national and local policies are implemented across England to tackle the risk factors for CLD but there is no specific national policy to reduce health burden of CLD.

This chapter aims to describe the pattern of mortality and morbidity of CLD across the West Midlands.

5.2 The Epidemiology of Chronic Liver Disease

The following ICD 10 codes are used by the National Centre for Health Outcomes Development (NCHOD, www.NCHOD.nhs.uk) to identify data for CLD including as well as by other organisations across the UK.

Table 5.1: ICD 10 – Codes for Chronic Liver Disease

ICD 10 – Codes	Description
K70	Alcoholic Liver Disease
K73	Chronic hepatitis, not elsewhere classified
K74	Fibrosis and cirrhosis of liver

The World Health Organisation (WHO) uses a slightly different set of ICD 10 codes for the definition of CLD including K70, K73, K74 and K76[4] (described later in the chapter).
The ICD-10 codes K70, K73-K74 have been used in this chapter to describe the epidemiology, for consistency with the NCHOD and other NHS organisations. The difference in mortalities rates between the NCHOD and WHO definitions for CLD is highlighted later in this chapter.

5.3 Mortality

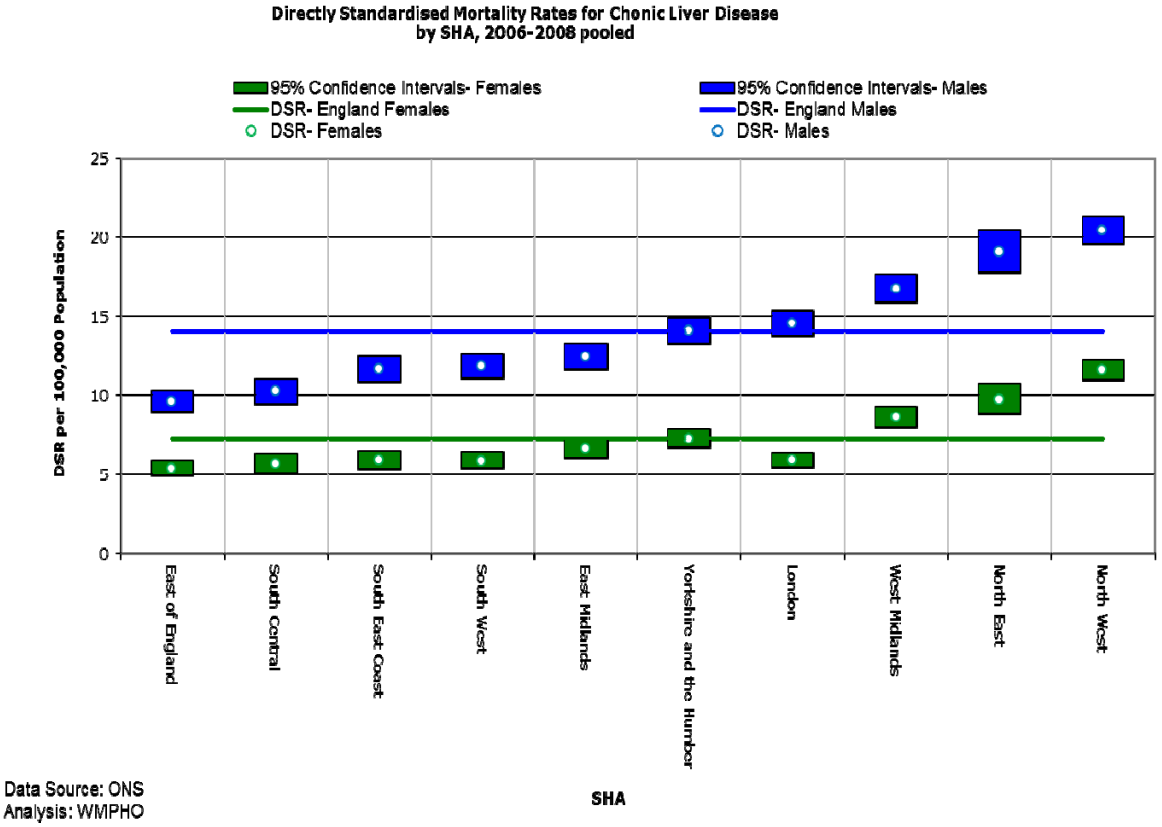
The mortality data has been sourced from the Office for National Statistics (ONS) and the analysis is produced by the West Midlands Public Health Observatory

In 2008, there were 52,132 registered deaths for both males and females in the West Midlands. Of these deaths 765 deaths were CLD deaths, contributing 1.5% of all registered deaths in West Midlands in 2008.

West Midlands has the third highest CLD mortality rate in England (Figure 5.1). The West Midlands mortality rates are significantly higher than the national rates for both males and females. The mortality rates for males are (directly standardised rates (DSR) 16.7/100,000) significantly higher than females (DSR 8.6/100,000). A similar pattern is seen across England.

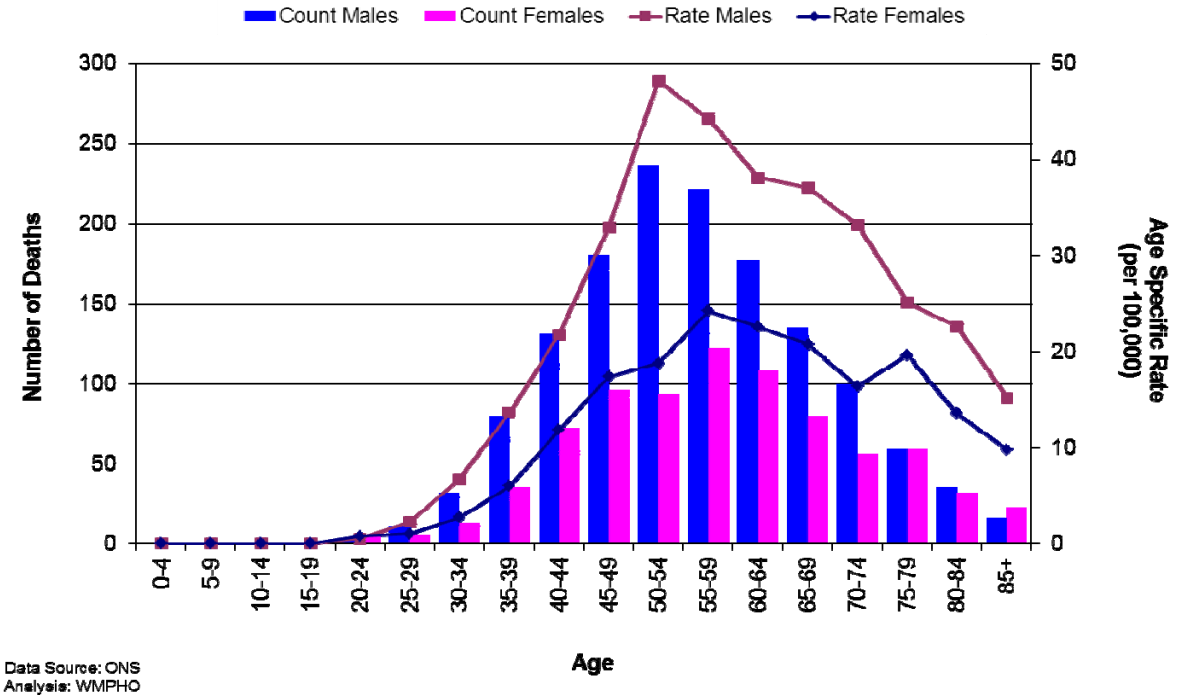
The North West has the highest mortality from CLD followed by the North East and West Midlands (significantly higher than the national average for both males and females).The East of England has the lowest mortality from CLD followed by the Strategic Health Authorities (SHA) in the South and the East Midlands (significantly lower than the national average for males and females except in the East Midlands where no statistically significant difference was found in females).

Figure 5.1: Directly Standardised CLD Mortality Rates by SHA, deaths registered 2006-08 (pooled)



No deaths for CLD occurred in those aged less than 20 years in the West Midlands between 2006 and 2008. Mortality rates then increase with age peaking at 50-54 years in males and 55-59 years in female and thereafter fall with age (Figure 5.2).

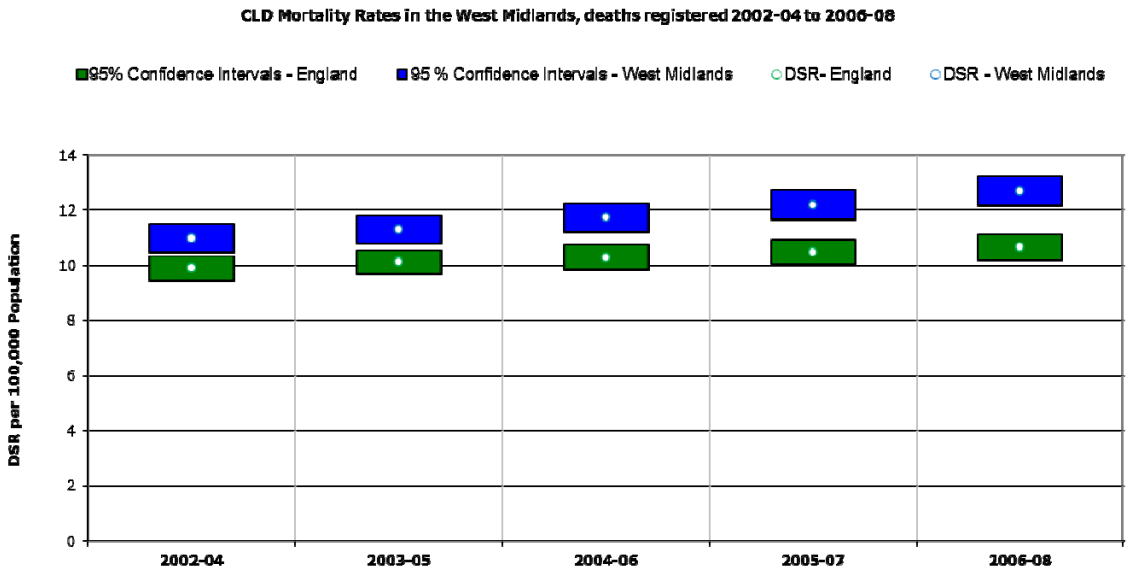
Figure 5.2: Age Profile of CLD Mortality in the West Midlands, deaths registered 2006-2008 (pooled)



Data Source: ONS
Analysis: WMPHO

The mortality from CLD has risen in England since 2002 and there has been a significant increase in mortality rates in the West Midlands from 2002-04 to 2006-08 for both males (14% rise in mortality) and females (14% rise in mortality). The gap between the West Midlands and England has also widened from 1.1/ 100,000 deaths to 2.0/100,000 deaths (Figure 5.3).

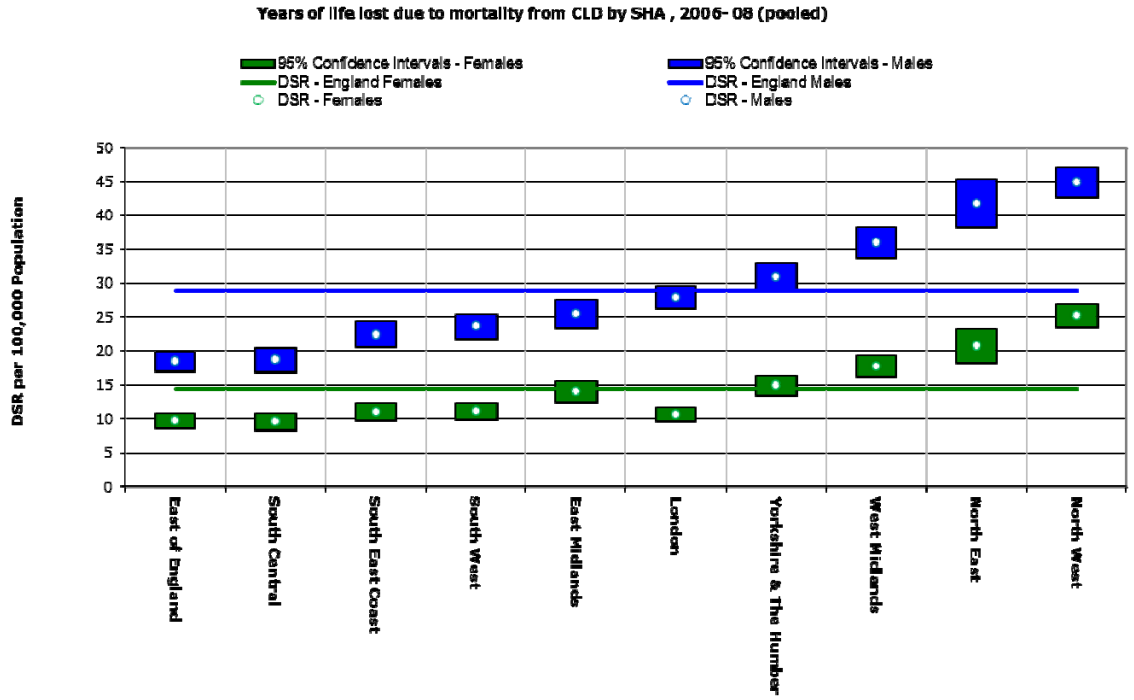
Figure 5.3: CLD Mortality Rates in the West Midlands and England, 2002-2004 to 2006-2008



Data Source: ONS
Analysis: WMPHO

Years of life lost (YLL) is a measure of premature mortality. Its primary purpose is to compare the relative importance of different causes of premature death within a particular population and it can therefore be used by health planners to define priorities for the prevention of such deaths. It can also be used to compare the premature mortality experience of different populations for a particular cause of death[5]. A similar pattern for years of life lost from CLD was observed at the SHAs (Figure 5.4) as with the CLD mortality (Figure 5.1)

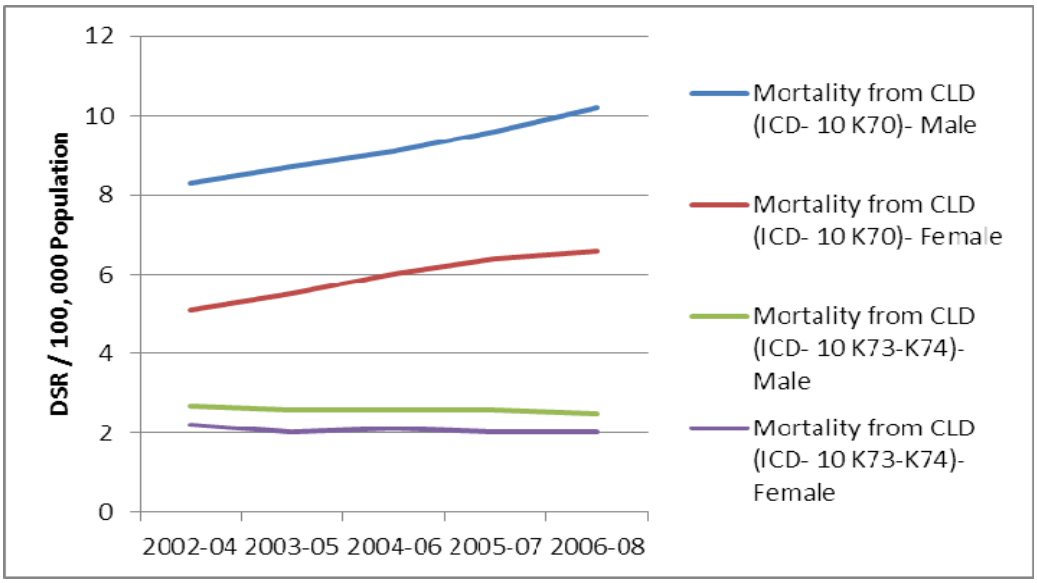
Figure 5.4: Years of Life Lost from CLD by SHA, deaths registered 2006-2008 (pooled)



Data Source: NCHOD
Analysis: WMPHO

Analysis of ICD 10 codes for CLD (Figure 5.5) shows that the increase in the CLD mortality is due to increase in the mortality from alcoholic liver disease (ICD 10 code: K70) which has increased significantly from 2002-2004 to 2006-2008 while the mortality from other causes including chronic hepatitis not elsewhere classified (ICD 10 code: K73) and fibrosis & cirrhosis of liver (ICD 10 code: K74) has remained stable over this time period.

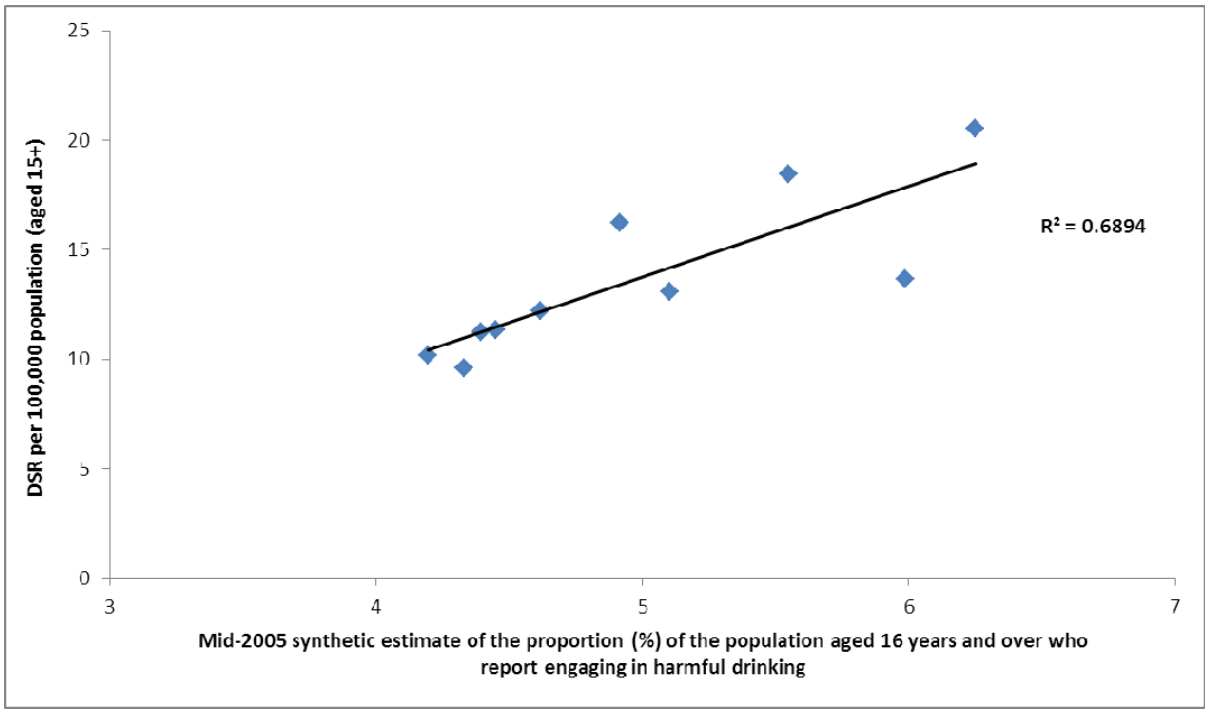
Figure 5.5: Directly Standardised CLD Mortality Rates in the West Midlands by ICD 10 codes, deaths registered 2002-2008 (pooled)



Source: ONS
Analysis: WMPHO

The North West Public Health Observatory has produced synthetic estimates for harmful drinking[6] (Mid-2005 synthetic estimate of the proportion (%) of the population aged 16 years and over who report engaging in harmful drinking, defined as consumption of more than 50 units of alcohol per week for males, and more than 35 units of alcohol per week for females). Mortality due to CLD across England shows a positive association with harmful drinking estimates (Figure 5.6).

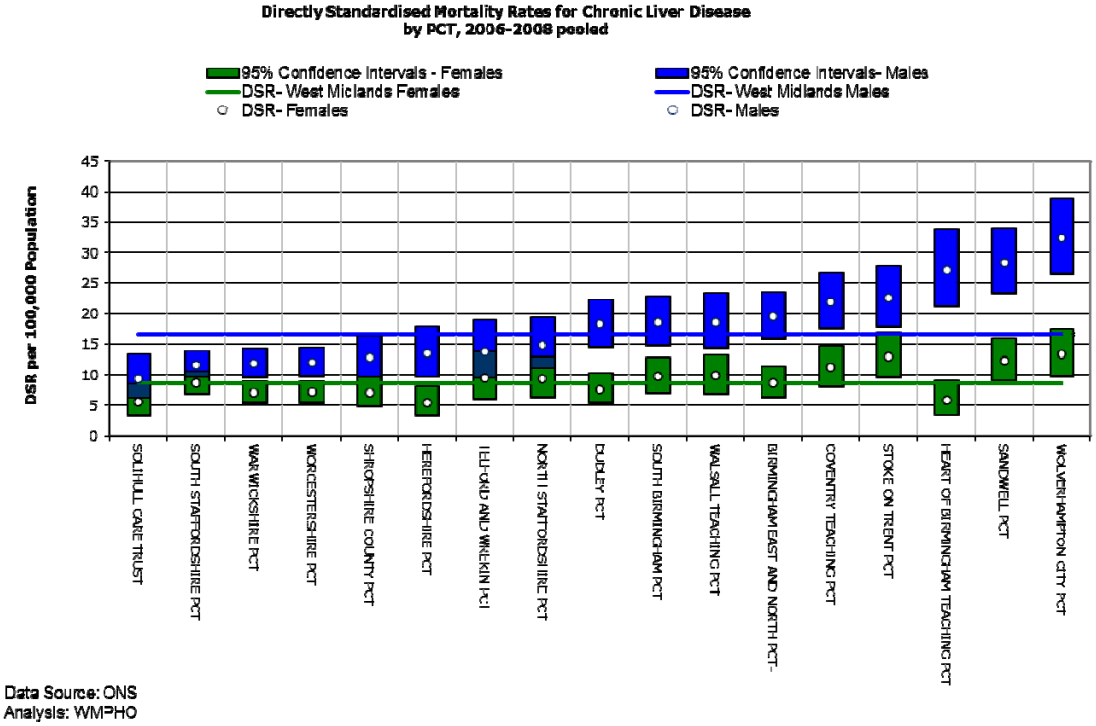
Figure 5.6: Directly Standardised CLD Mortality Rates by synthetic estimates for harmful drinking, by SHA, deaths registered 2006-2008 (pooled)



Source: ONS, LAPE
Analysis: WMPHO

CLD mortality among the PCTs (Figure 5.7) in the West Midlands SHA varies greatly. The Solihull PCT and the PCTs in the shire counties have lower mortality rates for CLD. Wolverhampton PCT has the highest mortality (3 times more than the Solihull PCT which has the lowest mortality).

Figure 5.7: Directly Standardised CLD Mortality Rates by the West Midlands PCTs, deaths registered 2006-2008 (pooled)



Data Source: ONS
Analysis: WMPHO

Figure 5.8 shows that the West Midlands CLD Mortality rates decreases with decreasing levels of deprivation

Figure 5.8: Directly Standardised CLD Mortality Rates in the West Midlands by Deprivation, deaths registered 2006-2008 (pooled)

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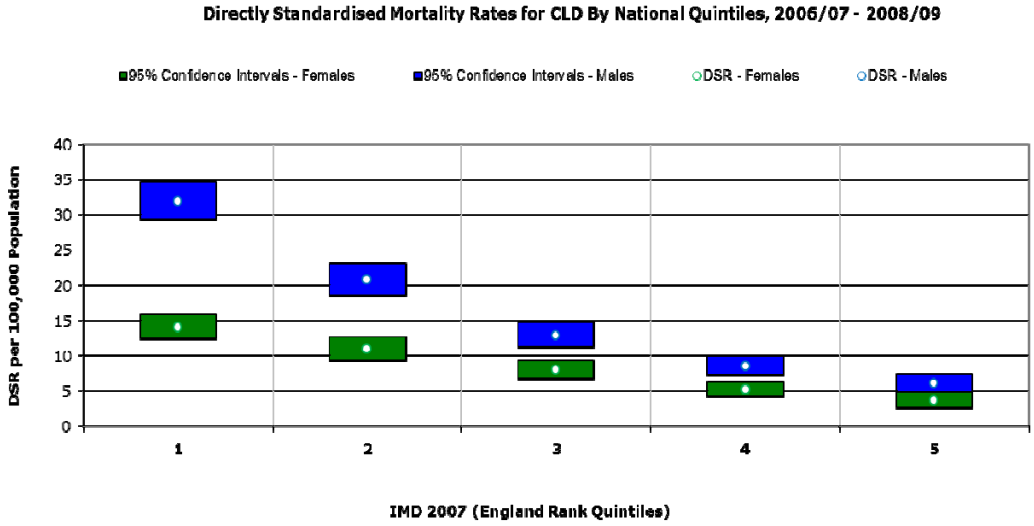
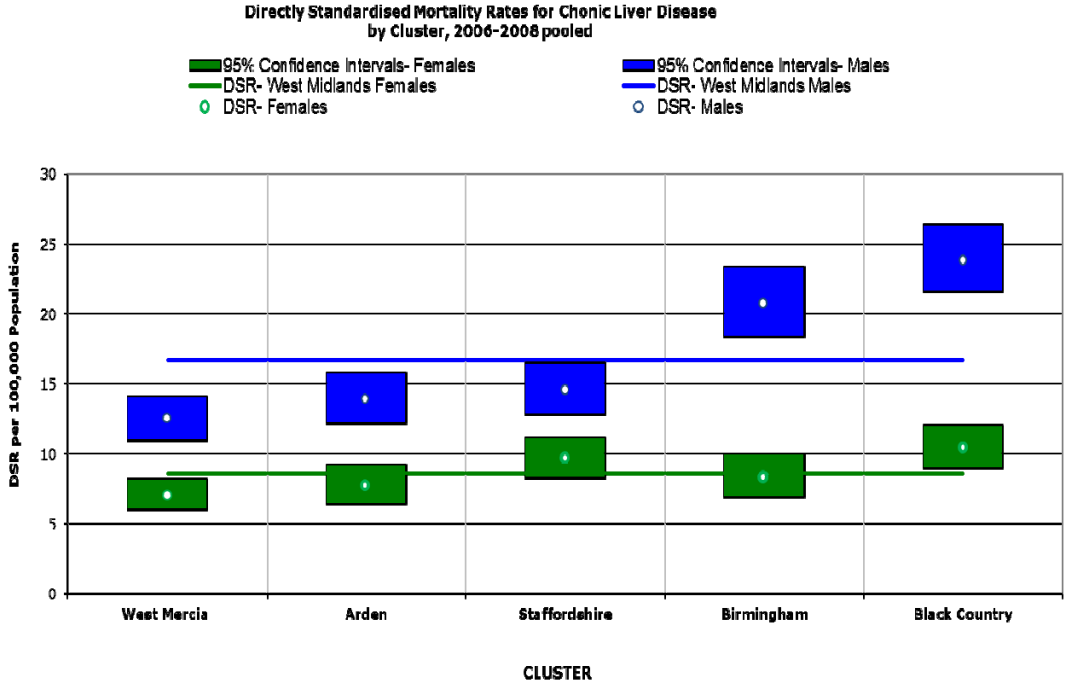


Data Source:ONS
Analysis: WMPHO

Analysis of the West Midlands PCT clusters shows that CLD mortality among males is significantly lower in West Mercia and Arden than the West Midlands average and significantly higher in Birmingham and Black Country clusters than the regional average. No statistically significant differences found among females (Figure 5.9)

Figure 5.9: Directly Standardised CLD Mortality Rates by West Midlands PCT Clusters (groupings shown below), deaths registered 2006-2008 (pooled)*



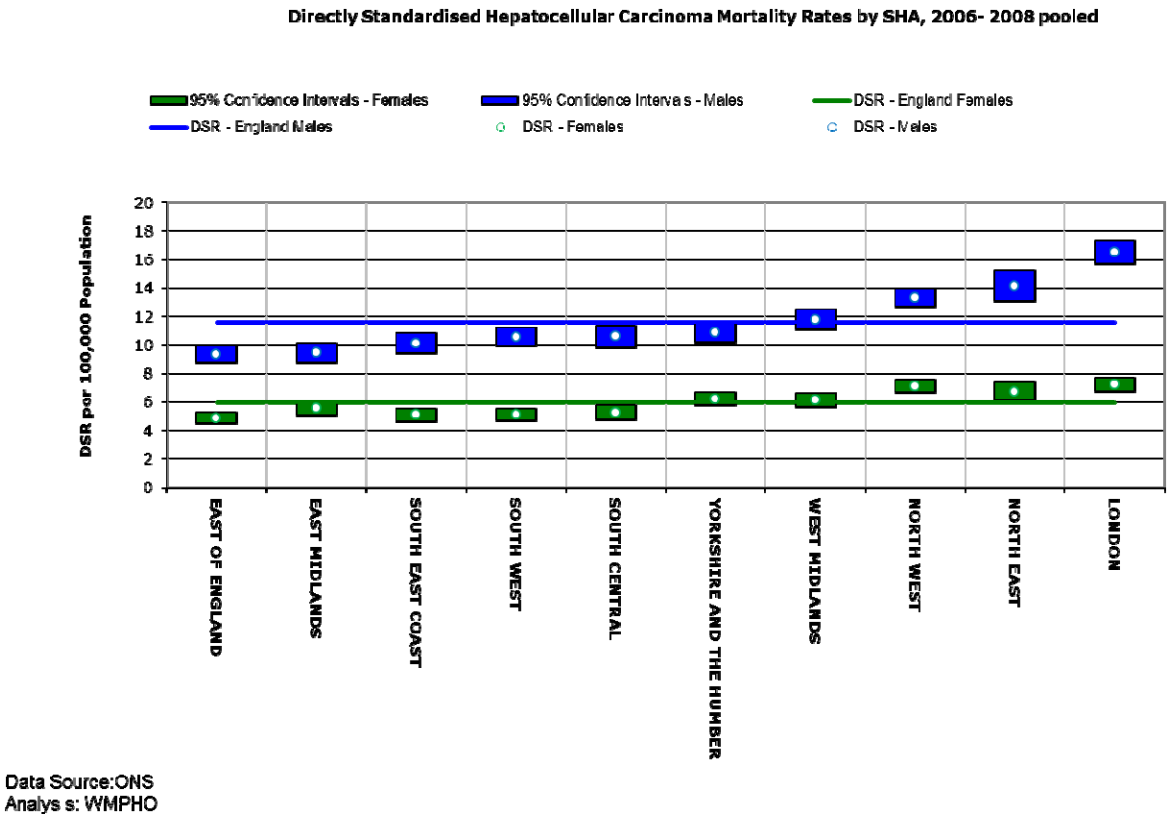
Data Source: ONS
Analysis: WMPHO

West Midlands PCT Clusters

West Mercia Cluster (Shropshire County PCT, NHS Herefordshire, NHS Telford and Wrekin & NHS Worcestershire)
Arden Cluster (Solihull NHS Care Trust, NHS Coventry & NHS Warwickshire)
Staffordshire Cluster (South Staffordshire PCT, NHS North Staffordshire & NHS Stoke-on-Trent), Birmingham Cluster (NHS Birmingham East and North, Heart of Birmingham teaching PCT & NHS South Birmingham)
Black Country Cluster (NHS Dudley, Sandwell PCT, NHS Walsall & Wolverhampton City PCT)

CLD can lead to hepatocellular carcinoma (HCC), portal hypertension, hepatorenal syndrome and hepatopulmonary syndrome. 70 to 90 % of the hepatocellular carcinomas are caused by cirrhosis[7]. London has the highest mortality from HCC followed by the North East and North West (significantly higher than England rates). The West Midlands has the fourth highest mortality from HCC (not significantly different from the national rates) (Figure 5.10).

Figure 5.10: Directly Standardised Mortality rates from Hepatocellular Carcinoma by PCT Clusters, deaths registered 2006-2008 (pooled) - ICD 10 Code: C22



Data Source:ONS
Analys s: WMPHO

The definition used by the WHO for CLD is slightly different from the NCHOD definition.

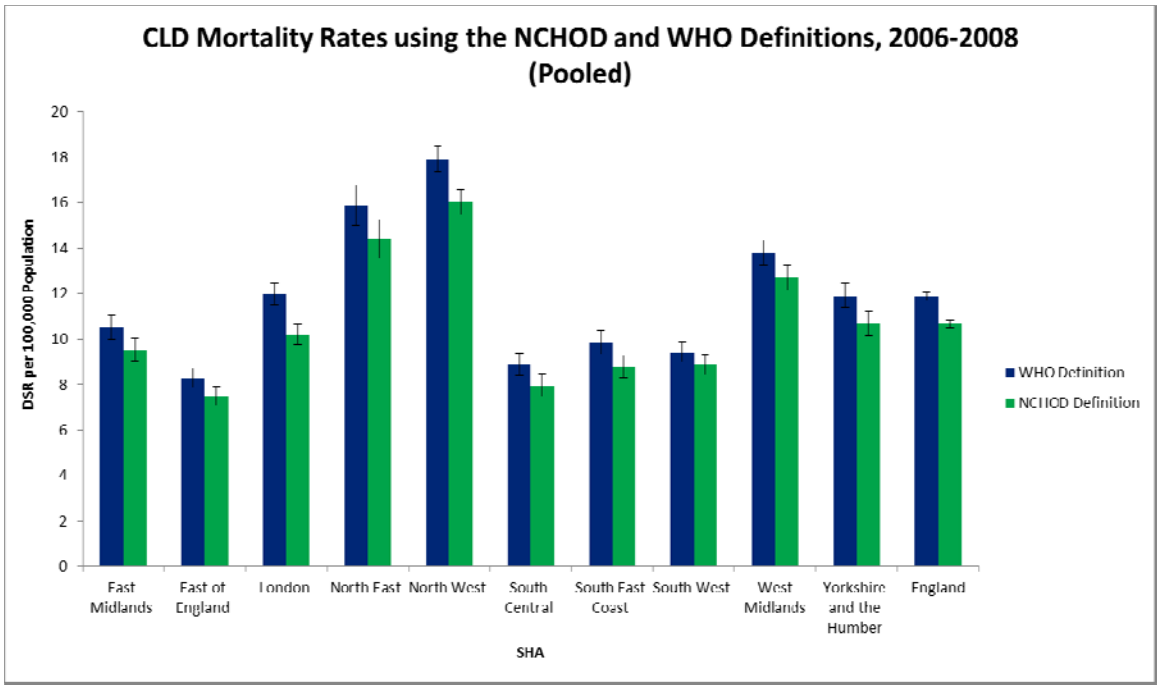
Table 5.2: ICD 10 – Codes for Chronic Liver Disease used by the NCHOD & WHO

ICD 10 Codes	Description	NCHOD	WHO
K70	Alcoholic Liver Disease	✓	✓
K73	Chronic hepatitis, not elsewhere classified	✓	✓
K74	Fibrosis and cirrhosis of liver	✓	✓
K76	Other Diseases of Liver*		✓

*ICD 10 code 76 includes fatty (change of) liver, not elsewhere classified, chronic passive congestion of liver, central haemorrhagic necrosis of liver, infarction of liver, peliosis hepatis, hepatic veno-occlusive disease, portal hypertension, hepato-renal syndrome and other specified and unspecified diseases of liver.

Comparison of the both sets shows that the mortality rates from CLD in England increase significantly if the WHO definition of CLD is used as compared to the NCHOD Definition (Figure 5.11). Significant increases in mortality rates were also observed in the West Midlands, Yorkshire and Humber, East Midlands, South East Coast, North West and London. 47% of the additional deaths in the WHO definition are classified as unspecified liver disease followed by fatty (change) of liver, not classified anywhere (36%)

Figure 5.11: Directly Standardised CLD Mortality Rates in the West Midlands, by NCHOD Definition and WHO Definition, deaths registered 2006-08 (pooled)



Source: ONS
Analysis: WMPHO

The three commonest risk factors for CLD are excessive alcohol consumption; blood borne viruses, in particular Hepatitis B and C, and obesity. The number of deaths from chronic viral hepatitis has risen since 2002. The ICD-10 codes for CLD used by the NCHOD and WHO don't include mortality from chronic viral hepatitis. The mortality from chronic viral hepatitis is small (139 deaths among males and 65 deaths among females in England between 2006 and 2008). Due to confidentiality concerns with the small numbers at the regional and PCT level, the analysis is not presented in this chapter.

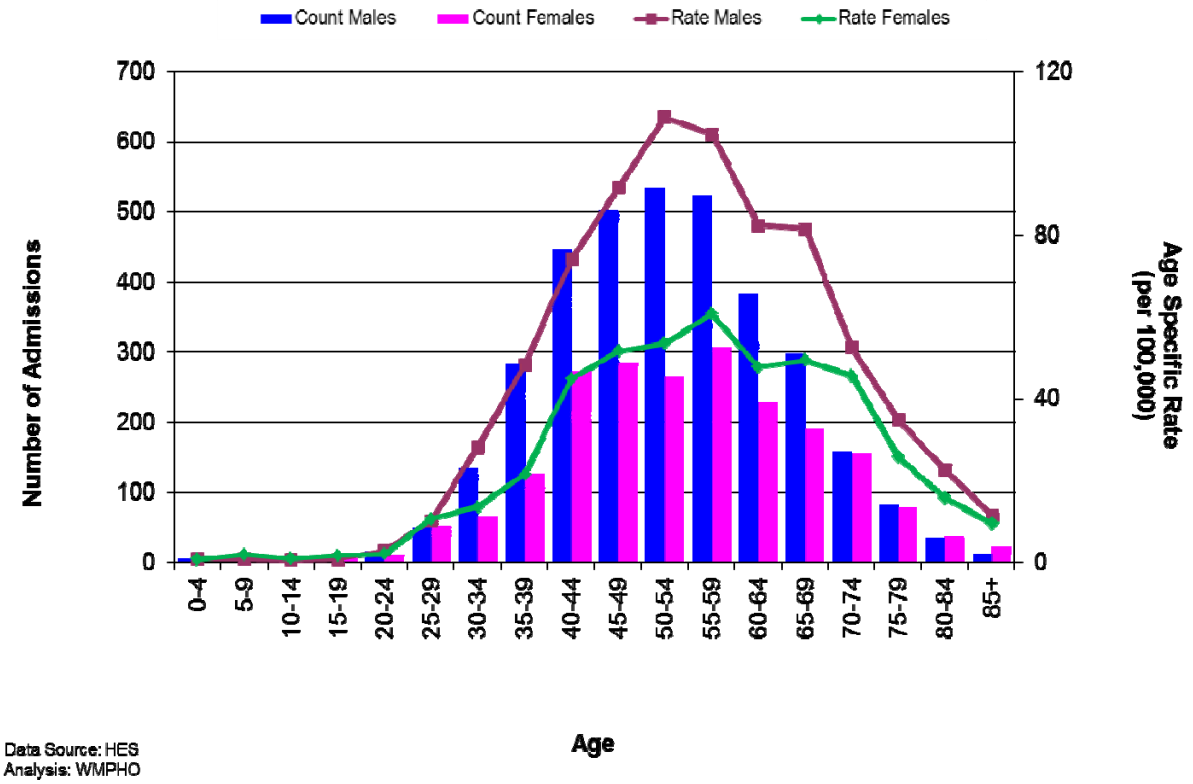
5.4 Morbidity

Hospital Episode Statistics (HES) is a data warehouse containing details of all admissions to NHS hospitals in England. It includes private patients treated in NHS hospitals, patients who were resident outside of England and care delivered elsewhere funded by the NHS (www.HESonline.nhs.uk). Inpatient data is available for every financial year from 1989/90. Healthcare providers submit data via the secondary users service (SUS). The HES data is validated, cleaned and processed by the Information Centre for Health and Social care.

In this section CLD has been defined by ICD 10 K70, K73-K74, for consistency with the mortality data shown earlier.

Age specific admission rates for CLD in the West Midlands between 2006 and 2008 (Figure 5.12) show a similar pattern to the mortality rates (Figure 5.2) for CLD.

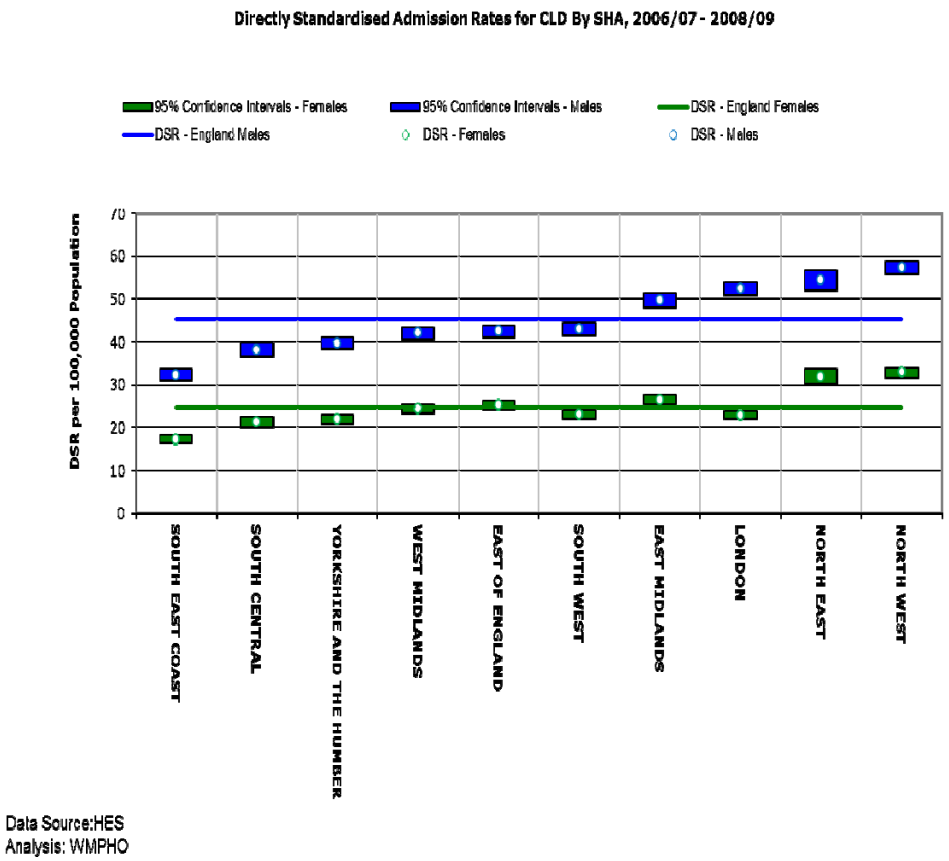
Figure 5.12: Age Profile for CLD Admission Rates by Age Groups, 2006/2007-2008/2009 (pooled)



Data Source: HES
Analysis: WMPHO

Unlike the mortality rates (Figure 5.1), the admission rates for CLD are significantly lower in the West Midlands than the national average (Figure 5.13). The lower admission rates can be due to various factors including quality of coding, completeness of data and different clinical pathway for management of CLD in the West Midlands whereby majority of the CLD patients are treated in primary care or specialist clinics in the acute trusts. For the North West and North East SHAs, both mortality and admission rates are significantly above the national average and for the South East coast and South Central SHAs, both mortality and admission rates are significantly below the national average. As with the mortality rates the admission rates are higher in males than females.

Figure 5.13: Directly Standardised Admission Rates for CLD by SHA, 2006/07-08/09 (pooled)*

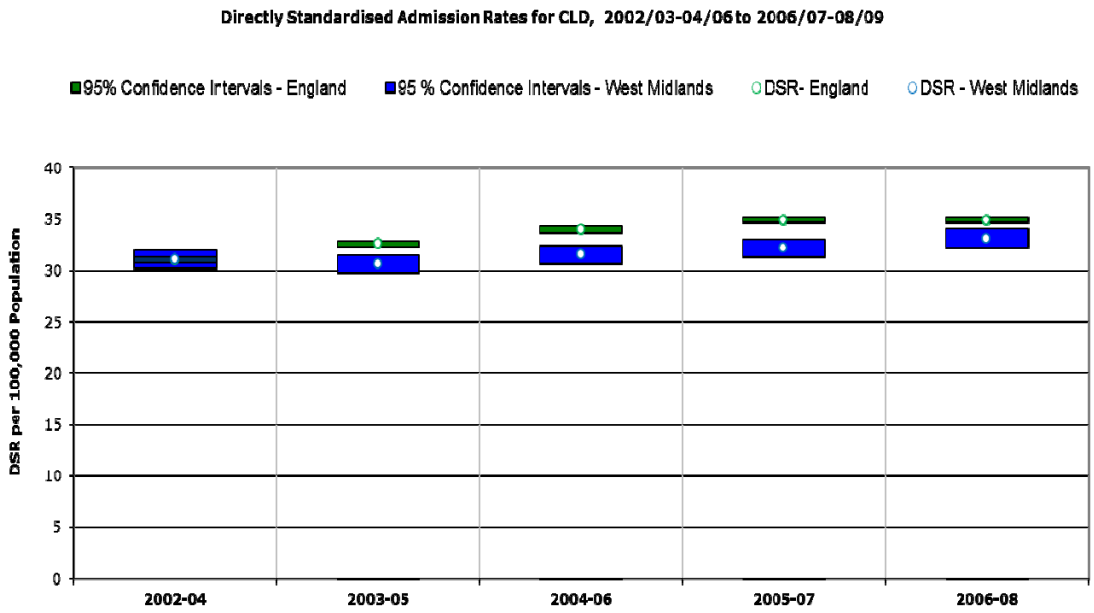


Data Source:HES
Analysis: WMPHO

*4 PCTs split between SHAs. These PCTs have been included in the SHA to which they report to.

The CLD related admissions have increased in both West Midlands and England over the years. The percentage increase is lower in the West Midlands (7%), as compared to England (12%) over the same period (Figure 5.14). The increase in admission rates for females is statistically significant, but not for males.

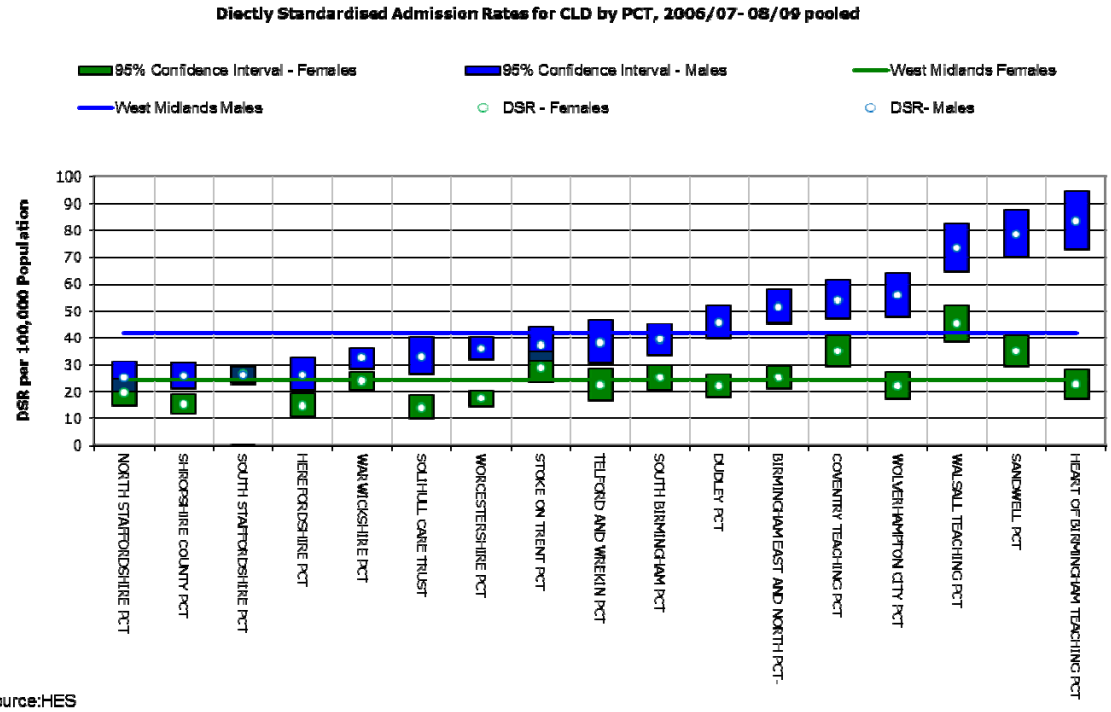
Figure 5.14: Directly Standardised Admission Rates for CLD, England and West Midlands, 2002/2003-2004/2005 to 2006/2007- 2008/2009



Data Source:HES
Analysis: WMPHO

As with the mortality rates, the admission rates are lower in the shire PCTs and the Solihull PCT. The admission rates among females show no clear pattern (Figure 5.15).

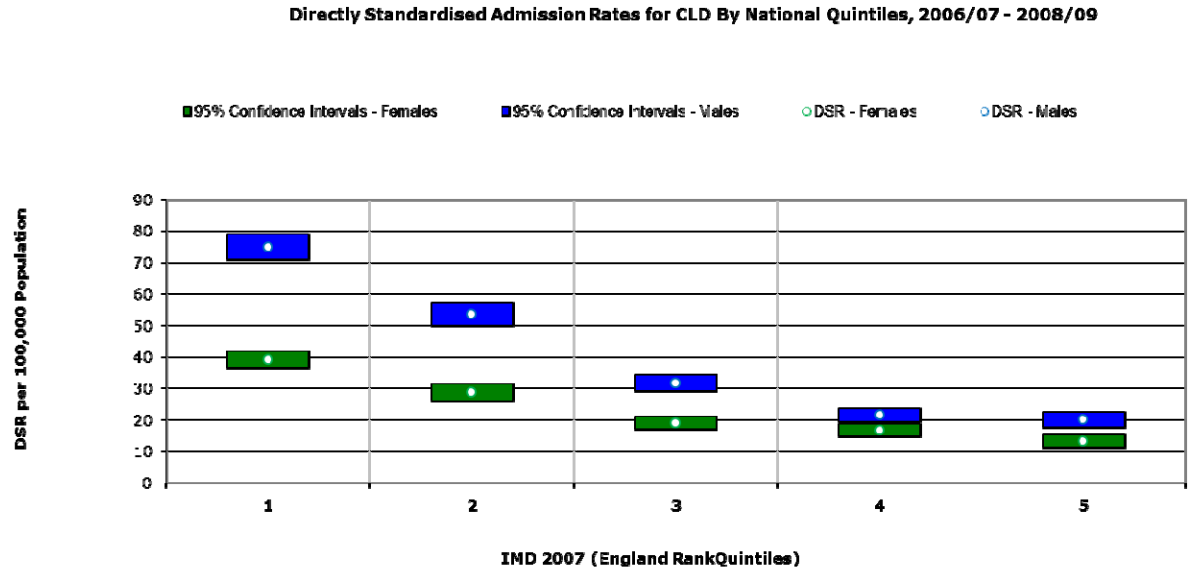
Figure 5.15: Directly Standardised Admission Rates for CLD by PCTs 2006/2007-2008/2009 (pooled)



Data Source:HES
Analysis: WMPHO

Figure 5.16 shows that the West Midlands CLD admission rates decreases with decreasing levels of deprivation (Figure 5.16). This mirrors the pattern for mortality (Figure 5.8)

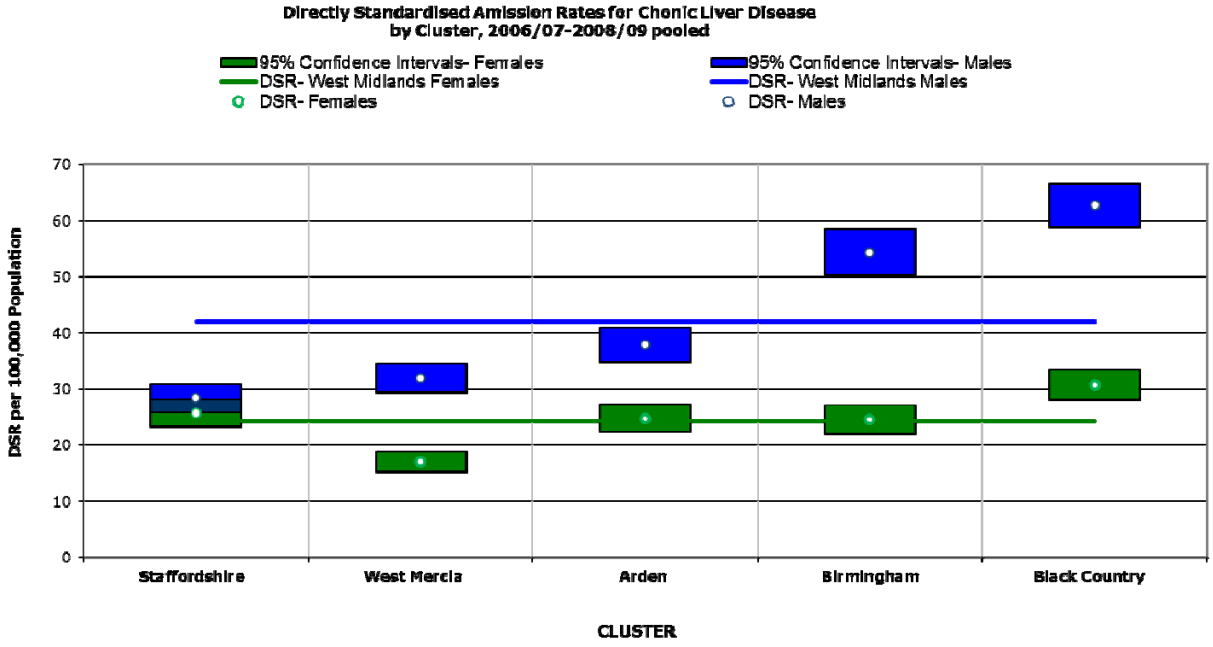
Figure 5.16: Directly Standardised CLD Admission Rates in the West Midlands by Deprivation, deaths registered 2006-2008 (pooled)



Data Source:HES
Analysis: WMPHO

The recently proposed PCT clusters analysis shows that CLD related admissions are significantly lower in West Mercia and Staffordshire than the West Midlands average and significantly higher in Birmingham and Black Country than the regional average.

Figure 5.17: Directly Standardised Admission Rates for CLD by Clusters, 2006/2007-2008/2009 (pooled)



Data Source: HES
Analysis: WMPHO

5.5 Conclusions

- Reduction of CLD should focus on preventive measures. The three commonest risk factors for CLD are excessive alcohol consumption; blood borne viruses, in particular Hepatitis B and C, and obesity.
- The mortality and admission rates related to liver disease are on the rise in England. These trends are in the opposite direction to the general world trends; where liver disease rates are falling
- In 2008, there were 52,132 registered deaths for both males and females in the West Midlands. Of these deaths 765 deaths were CLD deaths, contributing 1.5% of all registered deaths in West Midlands in 2008.
- West Midlands has the third highest CLD mortality in England. The West Midlands mortality rates are significantly higher than the national rates for both males and females. The admission rates related to CLD are significantly lower than national rates for males. The mortality and admission rates for males are significantly higher than females.
- The mortality and admissions rates for CLD increases up to the age groups of 50-54 years and 55-59 years among males and females respectively, showing higher mortality rates in males than females. This is followed by a downward trend in mortality for both sexes.
- The PCTs in the shire counties and the Solihull PCT have lower mortality and admission rates related to CLD than regional rates.
- The West Midlands CLD mortality and admission rates decrease with decreasing levels of deprivation.
- There is a significant increase in mortality and admission rates over the last 7 years. The increase in the CLD mortality is due to increase in the mortality from alcoholic liver disease (ICD 10 code: K70) which has increased significantly from 2002-2004 to 2006-2008.

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Acknowledgements

Dr John Kemm and the Information team at the West Midlands Public Health Observatory

CHAPTER SIX: EXCESS CANCER INCIDENCE AND MORTALITY IN PCTs 1996 - 2007

6.1 All invasive cancers, excl. non-melanoma skin cancer (ICD 10 C00-C97 excl. C44) – background, incidence

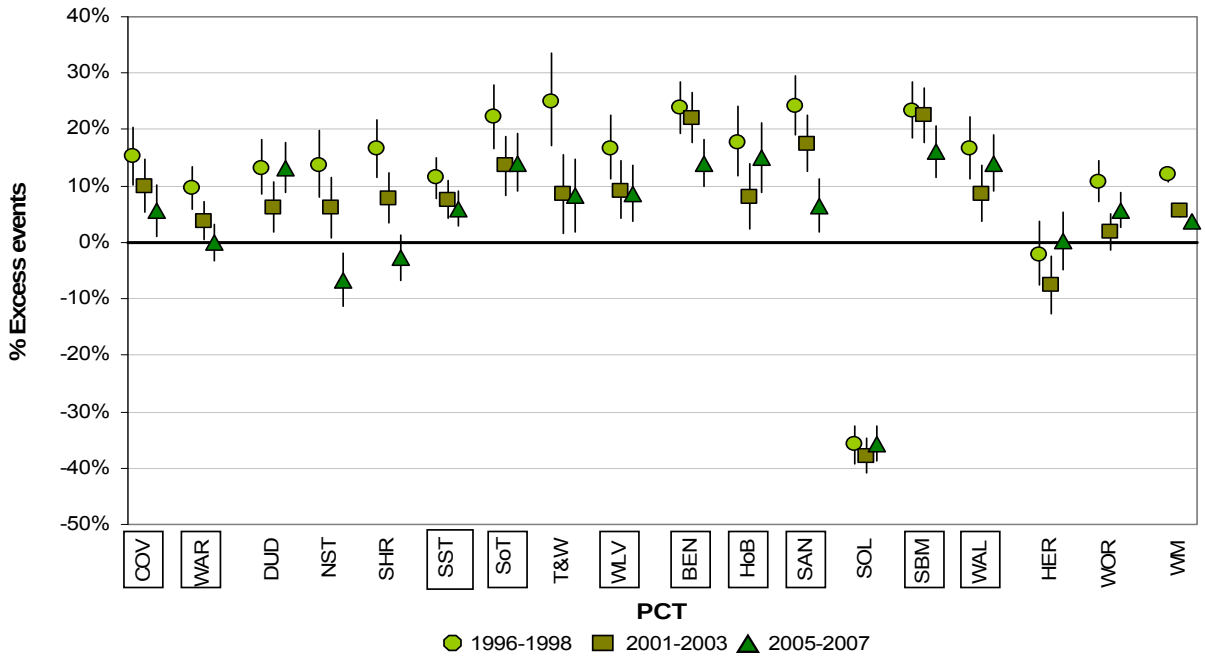
In the West Midlands there are over 26,000 invasive cancers (excluding non-melanoma skin cancer) registered annually, with approximately half diagnosed in males and half in females. The incidence of these cancers has risen from 71,000 in the 3-year period 1996-1998 to 79,000 in 2005-2007. This 11.4% increase is driven primarily by the ageing population.

6.1.1 All invasive cancers, excl. non-melanoma skin cancer (ICD 10 C00-C97 excl. C44) – males, incidence

There are significantly more cases of invasive cancer, (all invasive cancers excluding non-melanoma skin cancer), in males in the West Midlands than would be expected compared to the most affluent population.

The deprivation gap in all invasive cancer incidence in males has fallen significantly over time in the West Midlands; this trend is reflected in many PCTs. In the period 2005-2007, 1,465 more cases (4%) were registered than would be expected compared to the most affluent population, down from 3,814 (12%) in 1996-1998. Figure 6.1.1 shows the trends in the excess incidence of all invasive cancers over time for males in West Midlands PCTs. The borders around ten PCT names denote Spearhead PCTs. These are the PCTs which in 2004 contained local authorities with the worst health and deprivation indicators in England, and are where the largest excess incidence due to deprivation might be expected. Further PCT information and a guide to the PCT abbreviations can be found in Table 6.6.1 at the end of the chapter.

Figure 6.1.1: All invasive cancers, excluding non-melanoma skin cancer (ICD10 C00-C97 excl. C44): Trends in excess incidence (%) over time (1996-1998, 2001-2003, 2005-2007)
West Midlands PCTs, males



Solihull Care Trust is a clear outlier with fewer cases of invasive cancer than expected compared to the most affluent population for all years. This probably reflects the highly affluent nature of the population in this PCT. North Staffordshire PCT also experienced significantly fewer cases of invasive cancer than expected in 2005-2007.

Spearhead PCTs are more likely to perform significantly worse than the regional average compared to non-Spearhead PCTs. However, the picture is mixed, with non-Spearhead PCTs such as Dudley PCT and Telford & Wrekin PCT seeing greater excesses than Spearhead PCTs such as Warwickshire PCT and Coventry PCT. The unusually low excess in Warwickshire PCT probably reflects the relative affluence of most parts of Warwickshire compared with Nuneaton & Bedworth; the local authority area which gave rise to the Spearhead designation.

6.1.2 All invasive cancers, excl. non-melanoma skin cancer (ICD 10 C00- C97 excl. C44) – females, incidence

There are significantly more cases of invasive cancer, (all invasive cancers excluding non-melanoma skin cancer), in females in the West Midlands than would be expected compared to the most affluent population.

The deprivation gap in invasive cancer incidence in females has fallen significantly over time in the West Midlands. In the period 2005-2007, 1,465 more cases (4%) were registered than would be expected compared to the most affluent population, down from 4,200 (14%) in 1996-1998. This suggests that the deprivation gap for cancer incidence between all West Midlands residents and the most affluent population is closing. This trend is also reflected in the majority of PCTs.

Figure 6.1.2: All invasive cancers, excluding non-melanoma skin cancer (ICD10 C00-C97 excl. C44): Trends in excess incidence (%) over time (1996-1998, 2001-2003, 2005-2007)
West Midlands PCTs, females

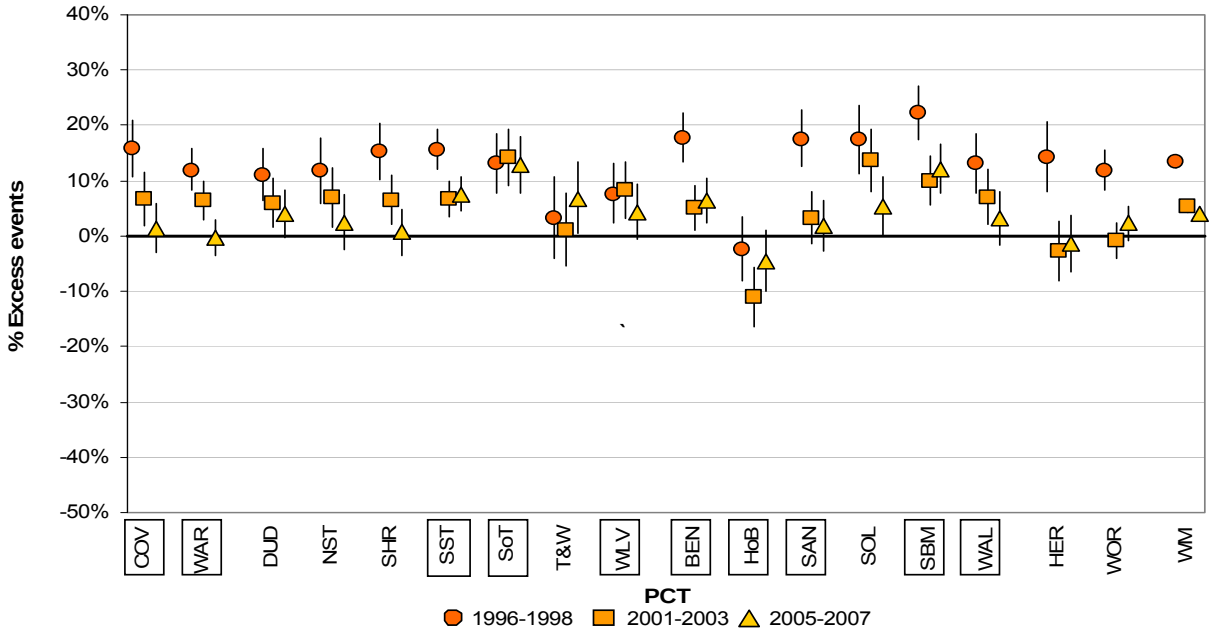


Figure 6.1.2 shows the trends in the excess incidence of all invasive cancers over time for females in West Midlands PCTs. The borders around ten PCT names denote the Spearhead PCTs. The majority of PCTs experienced higher cancer incidence than would be expected in an affluent population, although this excess has reduced over time. Stoke-on-Trent PCT is a notable exception with a steady excess incidence of over 10%, suggesting little improvement towards closing the inequalities gap.

Although the Spearhead PCTs have some of the highest excess cancer incidence events in females, there is not a clear distinction between these PCTs and the other West Midlands PCTs. Unusually, Heart of Birmingham tPCT had a smaller excess than the West Midlands average, with fewer invasive cancer cases than would be expected compared to the most affluent population. The population of Heart of Birmingham PCT is deprived, but young and ethnically diverse, leading to clear differences in incidence by cancer site, most noticeably in the incidence of melanoma skin cancer (see section 6.5).

6.2 All invasive cancers, excl. non-melanoma skin cancer (ICD 10 C00-C97 excl. C44) – background, mortality

There are over 13,500 deaths due to invasive cancer (excluding non-melanoma skin cancer) registered annually, with approximately 7,000 male and 6,500 female deaths. Deaths due to invasive cancer have decreased a little from 41,236 in the period 1996-1998 to 41,173 in 2005-2007; a decrease of only 0.2%. There are more deaths in males than in females - around 22,000 in males and 19,200 in females between 2005-2007. Improvements in treatment have increased the survival for many cancers, driving down mortality rates, but the aging population and increasing cancer incidence mean that total numbers of deaths continues to rise.

6.2.1 All invasive cancers, excl. non-melanoma skin cancer (ICD 10 C00-C97 excl. C44) – males, mortality

There are significantly more deaths due to invasive cancer, (all invasive cancers excluding non-melanoma skin cancer), in males in the West Midlands than would be expected compared to the most affluent population.

The deprivation gap in invasive cancer mortality in males has fallen significantly over time in the West Midlands. In the period 2005-2007, 3,267 extra deaths (17%) were registered than would be expected when compared to the most affluent population, down from 4,391 (25%) in 1996-1998. This suggests the deprivation gap between all West Midlands residents and the most affluent population is closing. This trend is also seen in the majority of PCTs.

Figure 6.2.1: All invasive cancers, excluding non-melanoma skin cancer (ICD10 C00-C97 excl. C44): Trends in excess mortality (%) over time (1996-1998, 2001-2003, 2005-2007)
West Midlands PCTs, males

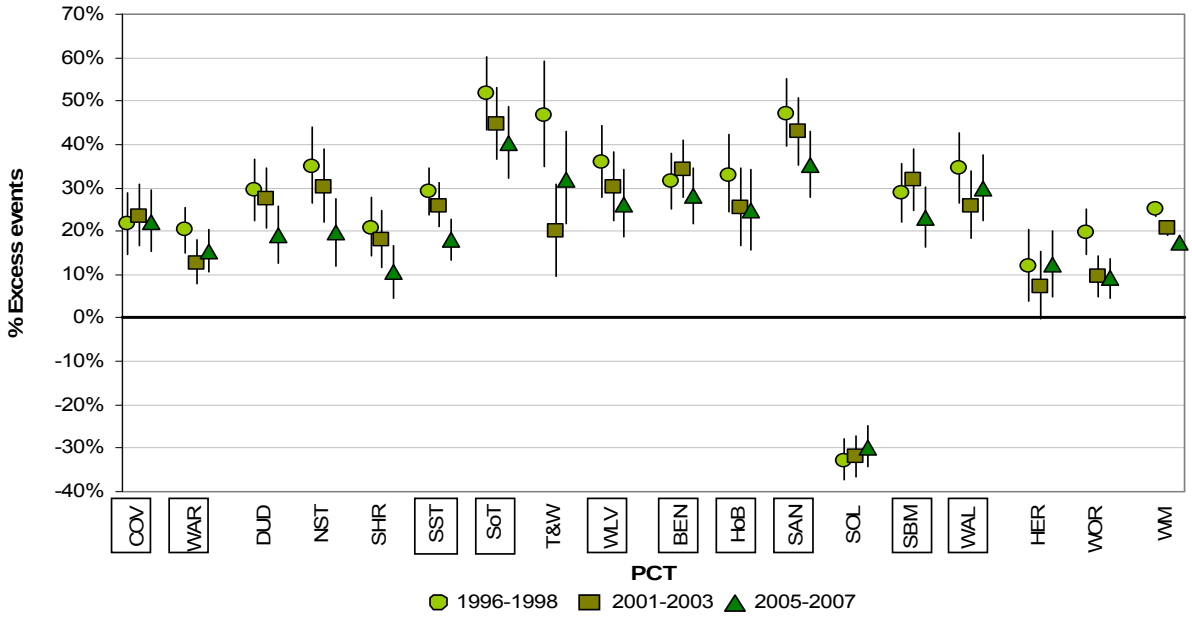


Figure 6.1.3 shows the trends in the excess deaths (%) due to all invasive cancers over time for males in West Midlands PCTs. The borders around ten PCT names denote the Spearhead PCTs. Solihull Care Trust is a clear outlier with fewer deaths due to invasive cancer than expected when compared to the most affluent population for all years. This difference is apparent for all the individual cancer sites included in this report except melanoma skin cancer.

The Spearhead PCTs are more likely to be significantly higher than the regional average than the non-Spearhead PCTs. However six of the ten Spearhead PCTs show no significant difference, and Telford and Wrekin shows significantly more excess deaths than the average despite not being a Spearhead PCT.

6.2.2 All invasive cancers, exc. non-melanoma skin cancer (ICD 10 C00-C97 excl. C44) – females, mortality

There are significantly more deaths due to invasive cancer, (all invasive cancers excluding non-melanoma skin cancer), in females in the West Midlands than would be expected compared to the most affluent population.

The deprivation gap in invasive cancer mortality in females has fallen significantly over time in the West Midlands. In the period 2005-2007, 2,942 more deaths (18%) were registered than would be expected compared to the most affluent population, down from 3,721 (24%) in 1996-1998. This suggests that the deprivation gap between all West Midlands residents and the most affluent population is closing. This trend is also seen in the majority of PCTs.

Figure 6.2.2: All invasive cancers, excluding non-melanoma skin cancer (ICD10 C00-C97 excl. C44): Trends in excess mortality (%) over time (1996-1998, 2001-2003, 2005-2007)
West Midlands PCTs, females

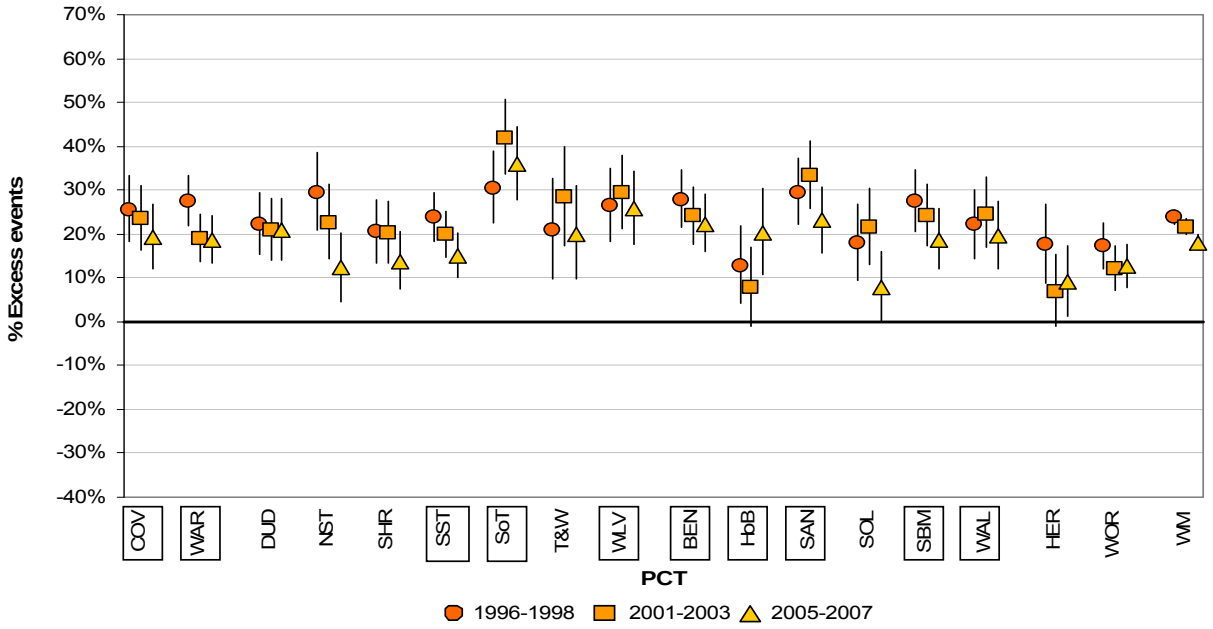


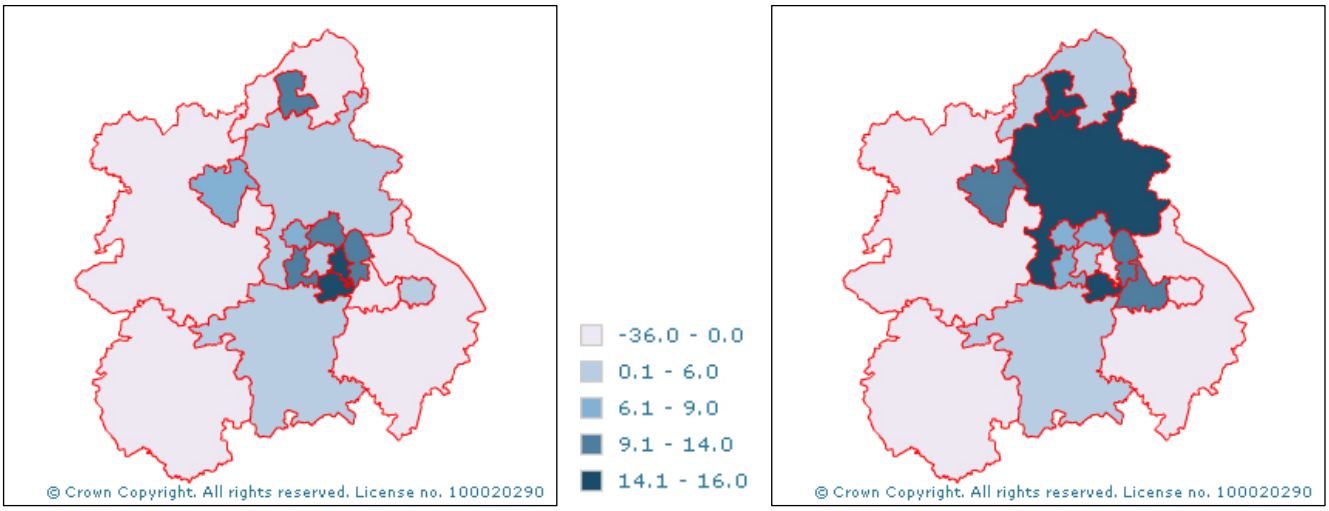
Figure 6.2.2 shows the trends in the excess deaths (%) due to all invasive cancers over time for females in West Midlands PCTs. All PCTs experienced more deaths than would be expected when compared to the most affluent population in all years studied. In 2005-2007 this excess was statistically significant in all PCTs. The percentage of excess deaths has decreased over time in the majority of PCTs; mirroring the regional trend. In 2005-2007, Stoke-on-Trent PCT had the greatest percentage of excess deaths (36%) and Solihull Care Trust experienced the fewest excess deaths (8%). The outstandingly low numbers of deaths for males in Solihull Care Trust were, however, not repeated for females.

The Spearhead PCTs do not in general appear significantly different from the regional average or the non-Spearhead PCTs. The exception is Stoke-on-Trent PCT, where the excess deaths from all invasive cancers are significantly higher than the regional average.

The WMCIU has produced an interactive e-Atlas which shows the spatial distribution of excess cancer incidence and mortality for specific cancer sites across the PCTs in the West Midlands. Maps 6.2.1 and 6.2.2 show the excess incidence and mortality of all cancers, excluding non-melanoma skin cancer for the period 2005-2007 for males and females.

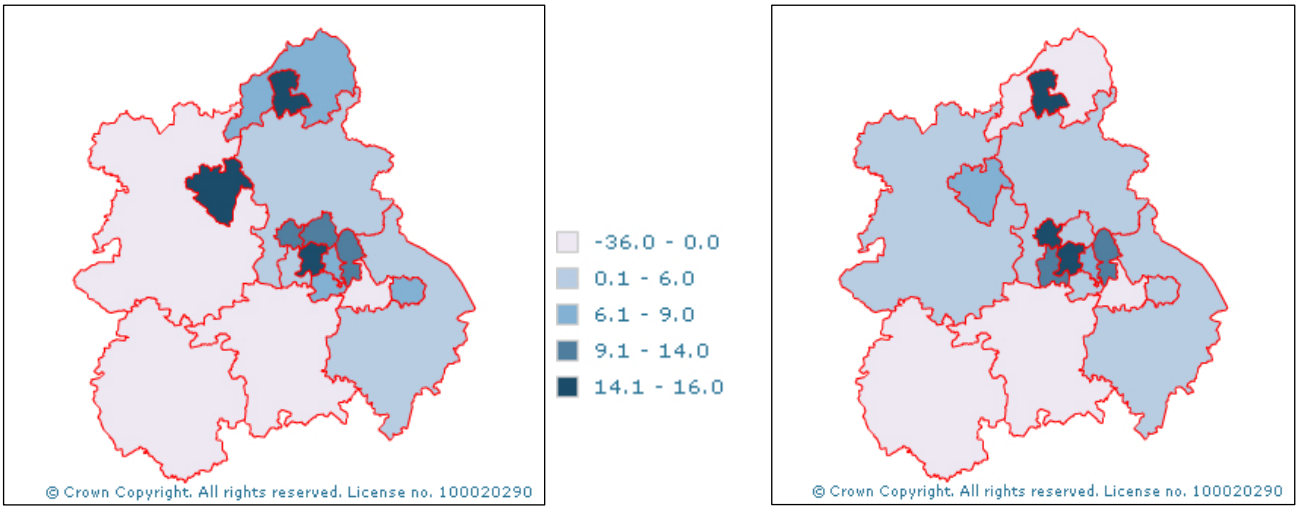
Map 6.2.1: All invasive cancers, excluding non-melanoma skin cancer (ICD 10 C00-C97 excl. C44), Incidence (2005-2007), males and females

Males **Females**



Map 6.2.2: All invasive cancers, excluding non-melanoma skin cancer (ICD 10 C00-C97 excl. C44), Mortality (2005-2007), males and females

Males **Females**



Areas with lighter shading indicate areas of fewer excess, while areas with darker shading indicate areas of excess. The key between the two sets of maps indicate the percentage excess range. For more examples of these maps and an opportunity to explore these data in an interactive e-Atlas, please visit:

http://www.wmpho.org.uk/wmciu/atlas/excess_atlas_v2/atlas.html

6.3 Lung cancer (ICD 10 C33-C34) – background, incidence

Lung cancer is the second most commonly diagnosed cancer in males and the third most commonly diagnosed cancer in females. Lung cancer has historically been linked with deprivation and the highest incidence rates are found in the most deprived groups of the region. Approximately 90% of lung cancer incidence can be attributed to smoking [i].

When both sexes are taken together, the incidence of these cancers has changed a little from 10,046 in the period 1996-1998 to 10,043 in 2005-2007. However, when the sexes are split a clear difference is seen. Male lung cancer incidence has decreased from 6,663 cases in 1996-1998 to 6,078 in 2005-2007 (a decrease of 8.8%), while female lung cancer incidence has increased from 3,383 cases in the period 1996-1998 to 3,965 in 2005-2007, (an increase of 17.2%). If current trends continue, the incidence of lung cancer in females may eventually overtake that in males.

6.3.1 Lung cancer (ICD 10 C33-C34) – males, incidence

There are significantly more cases of lung cancer in males in the West Midlands than would be expected when compared to the most affluent population. Lung cancer is the main contributor to the overall excess cancer incidence in males.

The deprivation gap in lung cancer incidence in males does not appear to be changing significantly. In the period 2005-2007, 2,292 excess cases of lung cancer (61%) were registered, down from 2,666 (67%) in 1996-1998. These large numbers of cases show how strong the link is between deprivation and lung cancer in the West Midlands. The 2,292 extra lung cancer cases form the large majority of the total excess (1,465 cancer cases[ii]) for all invasive cancers in males

Figure 6.3.1: Lung cancer (ICD10 C33-C34): Trends in excess incidence (%) over time (1996-1998, 2001-2003, 2005-2007) *West Midlands PCTs, males*

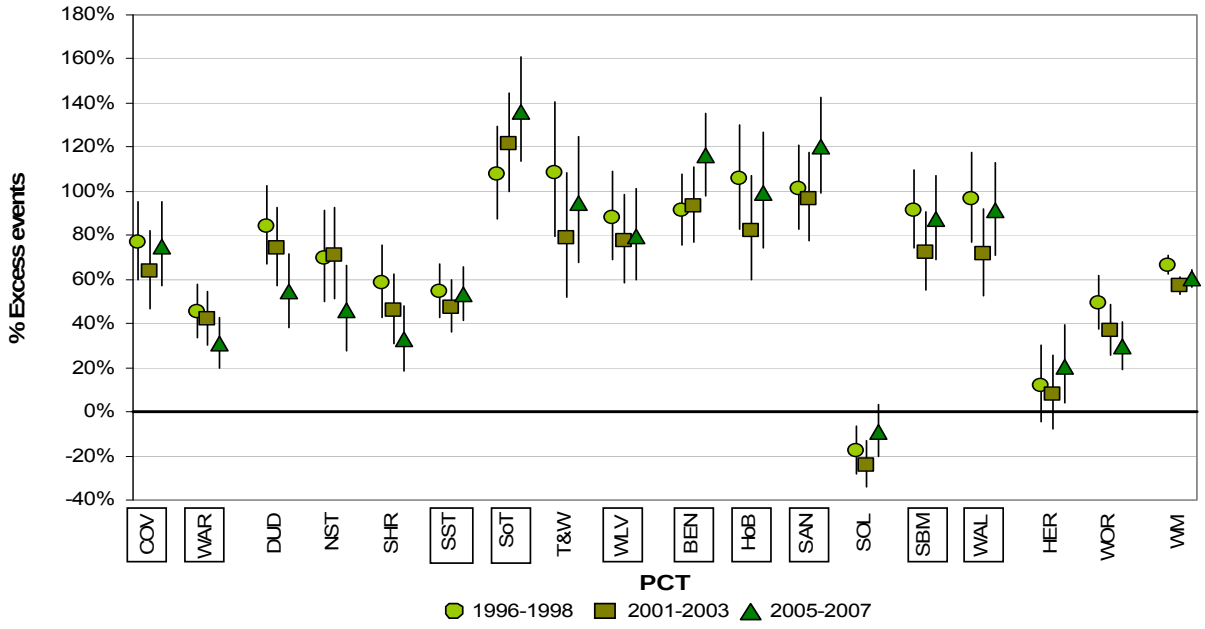


Figure 6.3.1 shows the trends in lung cancer excess incidence (%) over time for males in West Midlands PCTs. A significant excess of cases occurs in fifteen of the PCTs; and seven PCTs had significantly more cases compared to the West Midlands average in 2007. Solihull Care Trust is again a clear outlier with fewer cases of lung cancer than might be expected compared to the most affluent population. Of the ten Spearhead PCTs, the lowest excess for all years was in Warwickshire PCT and the excess in Warwickshire PCT in 2005-2007 is significantly less than in the other Spearhead PCTs.

[i] *Cancer Reform Strategy (2007)*
[ii] *There are more excess lung cancer cases than there are total excess cases, as some cancer sites such as melanoma skin are most common in the affluent population and so contribute negatively to the overall excess.*

Stoke-on-Trent PCT, Heart of Birmingham tPCT and Sandwell PCT all have an excess of over 100% - more than double the expected number of cases. Smoking rates in Stoke-on-Trent PCT and Sandwell PCT are high for the region.

6.3.2 Lung cancer (ICD 10 C33-C34) – females, incidence

There are significantly more cases of lung cancer in females in the West Midlands than would be expected when compared to the most affluent population. Lung cancer is the main contributor to the overall excess cancer incidence in females.

The deprivation gap in lung cancer incidence in females does not appear to be changing significantly. In the period 2005-2007, 1,570 extra cases of lung cancer (66%) were registered, up from 1,319 (64%) in 1996-1998. The 1,570 extra lung cancer cases form the large majority of the total excess (1,465 cancer cases [iii]) for all invasive cancers in females.

Figure 6.3.2: Lung cancer (ICD10 C33-C34): Trends in excess incidence (%) over time (1996-1998, 2001-2003, 2005-2007) *West Midlands PCTs, females*

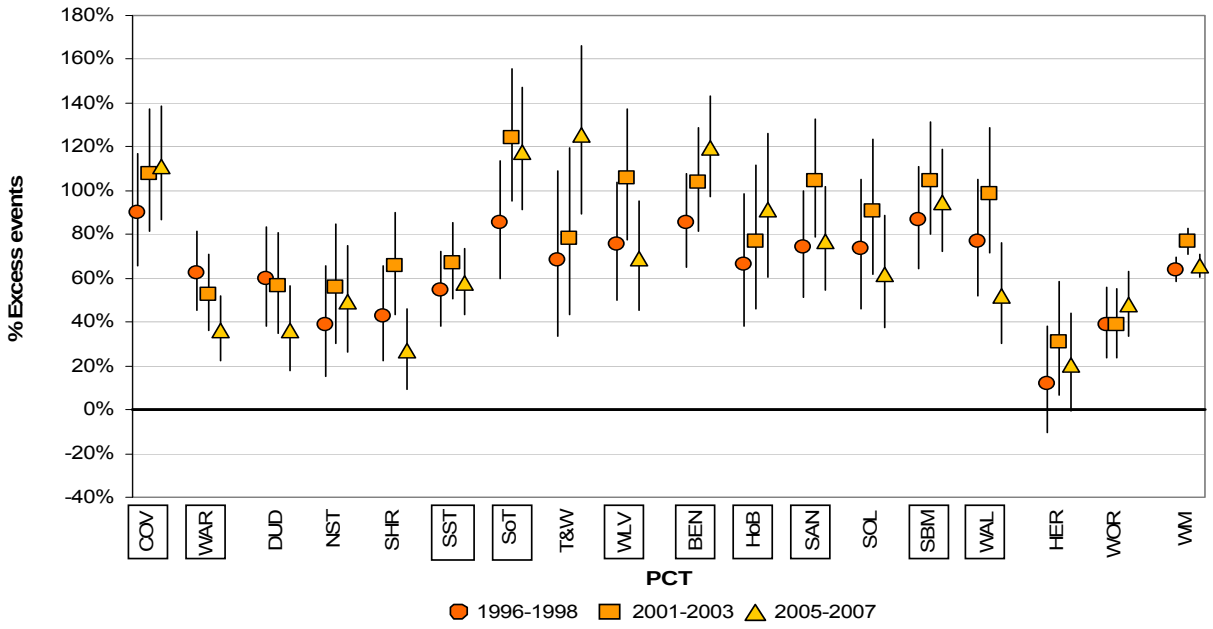


Figure 6.3.2 shows the trends in lung cancer excess incidence (%) over time for females in West Midlands PCTs. No West Midlands PCT had fewer lung cancer cases than expected in females throughout the whole period. Only six of the seventeen PCTs had an excess in 2005-2007 that is lower than in 1996-1998. With the exception of Solihull Care Trust, the proportion of excess events for female lung cancer is similar to that in males. Warwickshire PCT and Walsall tPCT had fewer cases of lung cancer in 2005-2007 compared to the other Spearhead PCTs. The PCT with the highest proportion of smokers in its population is Stoke on Trent PCT; this PCT has a high proportion of excess lung cancer cases.

[iii] *There are more excess lung cancer cases than there are total excess cases, as some cancer sites such as melanoma skin are most common in the affluent population and so contribute negatively to the overall excess.*

6.4 Lung cancer (ICD 10 C33-C34) – background, mortality

Lung cancer is still the main cause of death due to cancer in the West Midlands. Around 90% of lung cancer mortality can be attributed to smoking[iv], leading to a close association with deprivation. Deaths due to lung cancer account for more than half of the excess mortality presented in this report. Deaths from lung cancers have fallen from 8,995 in the period 1996-1998 to 8,672 in 2005-2007; with 5,332 deaths in males and 3,340 in females in 2005-2007. Overall this represents a decrease of 3.6% over the time period in this analysis. Lung cancer mortality rates in men are falling slowly over time but remain high; but rates in females have not seen a corresponding fall. Lung cancer deaths in males have decreased by 11% from 6,016 in 1996-1998 to 5,332 in 2005-2007. In females, deaths have increased by 12% from 2,979 in 1996-1998 to 3,340 in 2005-2007.

6.4.1 Lung cancer (ICD 10 C33-C34) – males, mortality

There are significantly more deaths due to lung cancer in males in the West Midlands than would be expected compared to the most affluent population. Lung cancer is the main contributor to the overall excess cancer deaths in males.

The deprivation gap in lung cancer deaths in males has closed slightly over time. In the period 2005-2007, there were 1,903 (56%) extra deaths than would be expected compared to the most affluent population, down from 2,404 (67%) in 1996-1998. The 1,903 extra lung cancer deaths account for 58% of the total excess deaths in males.

Figure 6.4.1: Lung cancer (ICD10 C33-C34): Trends in excess mortality (%) over time (1996-1998, 2001-2003, 2005-2007) *West Midlands PCTs, males*

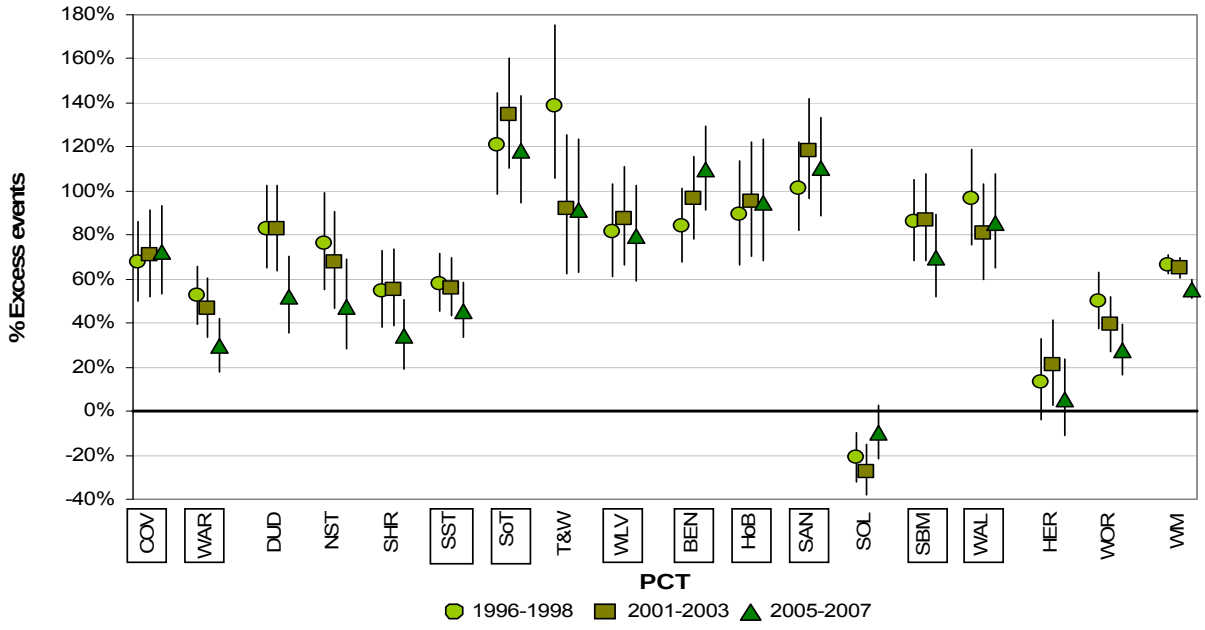


Figure 6.4.1 shows the trends in excess deaths (%) due to lung cancer over time for males in West Midlands PCTs. Significant excess deaths due to lung cancer occurred in the majority of PCTs throughout the period studied and, although there are promising trends in PCTs such as Warwickshire PCT and Dudley PCT, no significant decreases were observed. As is the case for other cancer sites, Solihull Care Trust is a clear outlier. The greatest excesses were recorded in Stoke on Trent PCT, Birmingham East & North PCT and Sandwell PCT where more than double the expected number of lung cancer deaths occurred. The majority of Spearhead PCTs have significantly higher excess deaths compared to the regional average. Warwickshire PCT is again an exception, probably due to its relatively affluent population.

[iv] *cancer reform strategy 2007*

6.4.2 Lung cancer (ICD 10 C33-C34) – females, mortality

There are significantly more deaths due to lung cancer in females in the West Midlands than would be expected compared to the most affluent population. Lung cancer is the main contributor to the overall excess mortality in females.

The deprivation gap in lung excess lung cancer deaths in females has increased significantly over time. In 2005-2007, there were 1,360 extra deaths (69%) than would be expected compared to the most affluent population, up from 1,078 (57%) in 1996-1998. The 1,360 extra lung cancer deaths account for 46% of the total excess deaths in females.

Figure 6.4.2: Lung cancer (ICD10 C33-C34): Trends in excess mortality (%) over time (1996-1998, 2001-2003, 2005-2007) *West Midlands PCTs, females*

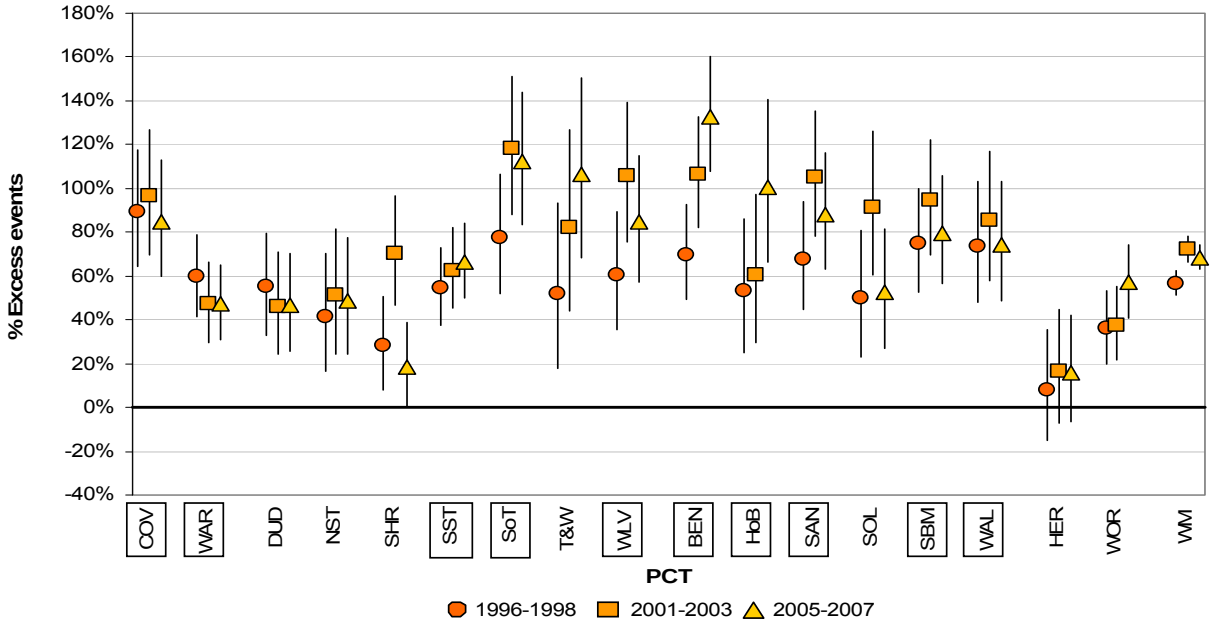


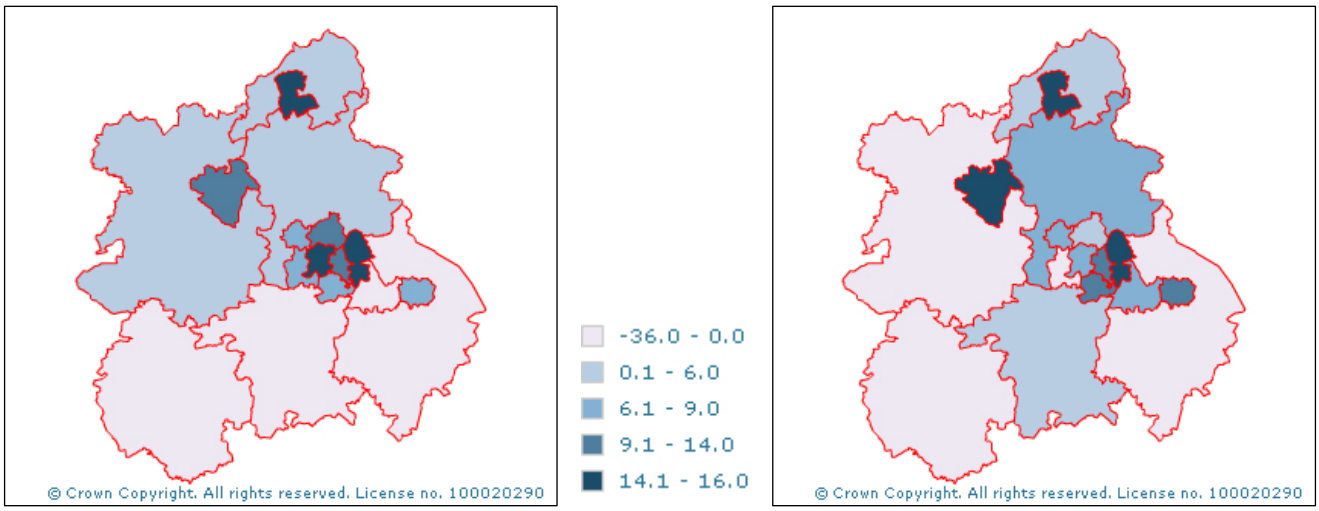
Figure 6.4.2 shows the trends in excess deaths (%) due to lung cancer over time for females in West Midlands PCTs. Excess lung cancer deaths occurred in all PCTs in the West Midlands. The excess deaths were statistically significantly higher than in the most affluent population in all PCTs with the exception of Herefordshire PCT. For many PCTs the deprivation gap appears to be widening; with twelve PCTs having more extra deaths in 2005-2007 than in 1996-1998. The largest increase in excess deaths was in Birmingham East & North PCT. Stoke on Trent PCT has the highest proportion of smokers in its population and had the second highest excess deaths due to lung cancer on 2005-2007.

Although many of the Spearhead PCTs have high excess deaths due to lung cancer, there is little difference between Spearhead and non-Spearhead PCT. Thus, Telford & Wrekin PCT has more excess deaths than Wolverhampton City PCT, and Dudley PCT and Warwickshire PCT show identical trends.

Taken from the interactive e-Atlas, maps 6.4.1 and 6.4.2 show the spatial distribution of excess cancer incidence and mortality for lung cancer for the period 2005-2007, for males and females.

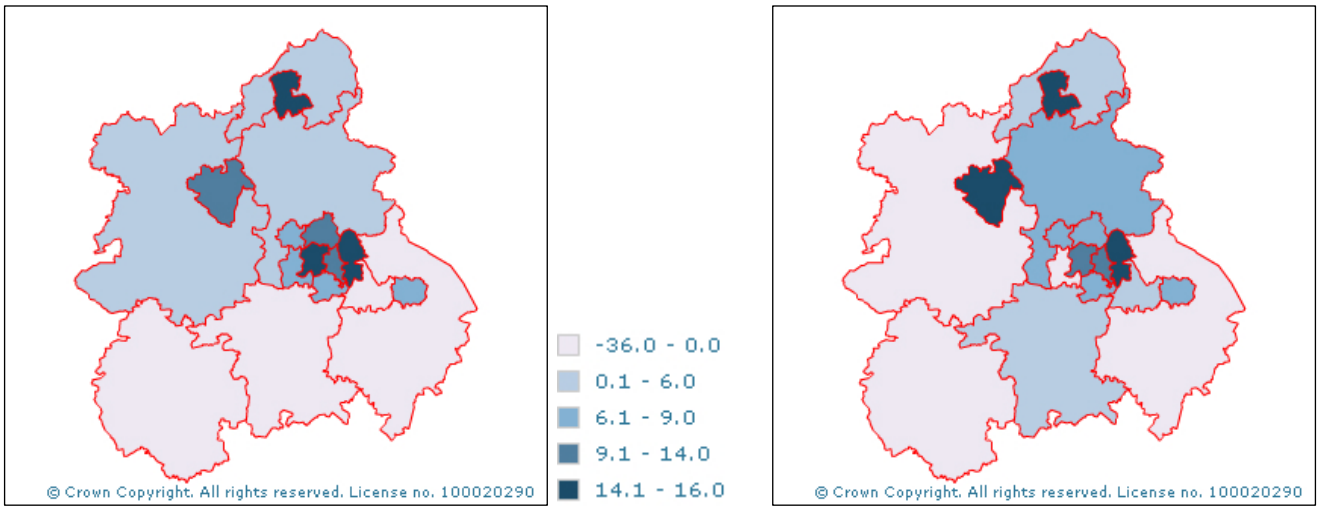
Map 6.4.1: Lung cancer (ICD 10 C33-C34), Incidence (2005-2007), males and females

Males **Females**



Map 6.4.2: Lung cancer (ICD10C33-C34), Incidence (2005-2007), males and females

Males **Females**



Areas with lighter shading indicate areas of fewer excess, while areas with darker shading indicate areas of excess. The key between the two sets of maps indicate the percentage excess range. For more examples of these maps and an opportunity to explore these data in an interactive e-Atlas, please visit:

http://www.wmpho.org.uk/wmciu/atlas/excess_atlas_v2/atlas.html

6.5 Melanoma skin cancer (ICD 10 C43) – background, incidence

Malignant melanoma is the most common cancer in young adults in the UK, although it, like the majority of cancers, is still primarily a disease of the elderly with risk increasing with age. Exposure to high levels of UV light is a major risk factor. People with fair skin (because of the lower content of melanin pigment in their skin cells), a history of sunburn and moles have a higher risk of melanoma skin cancer. Melanoma skin cancer rates have increased more dramatically than any other cancer type since the 1970's[v]. In 2007 there were 769 cases of melanoma skin cancer in the West Midlands, 374 in males and 395 in females. The analyses in this report show that melanoma skin cancer is more common in the affluent population than in the population as a whole. This may be linked to lifestyle choices such as foreign holidays, but it may also reflect the relatively low incidence of skin cancer in the minority ethnic populations which form a significant proportion of the most deprived population.

6.5.1 Melanoma skin cancer (ICD 10 C43) – males, incidence

There are significantly fewer cases of melanoma skin cancer in males in the West Midlands than would be expected when compared to the most affluent population.

The negative deprivation gap in melanoma skin cancer incidence in males has remained stable throughout the period studied. In 2005-2007, 503 fewer cases of melanoma skin cancer (-31%) were registered than would be expected compared to the most affluent population; in 1996-1998, 265 fewer cases occurred (-30%).

Figure 6.5.1: Melanoma skin cancer (ICD10 C43): Trends in excess incidence (%) over time (1996-1998, 2001-2003, 2005-2007) *West Midlands PCTs, males*

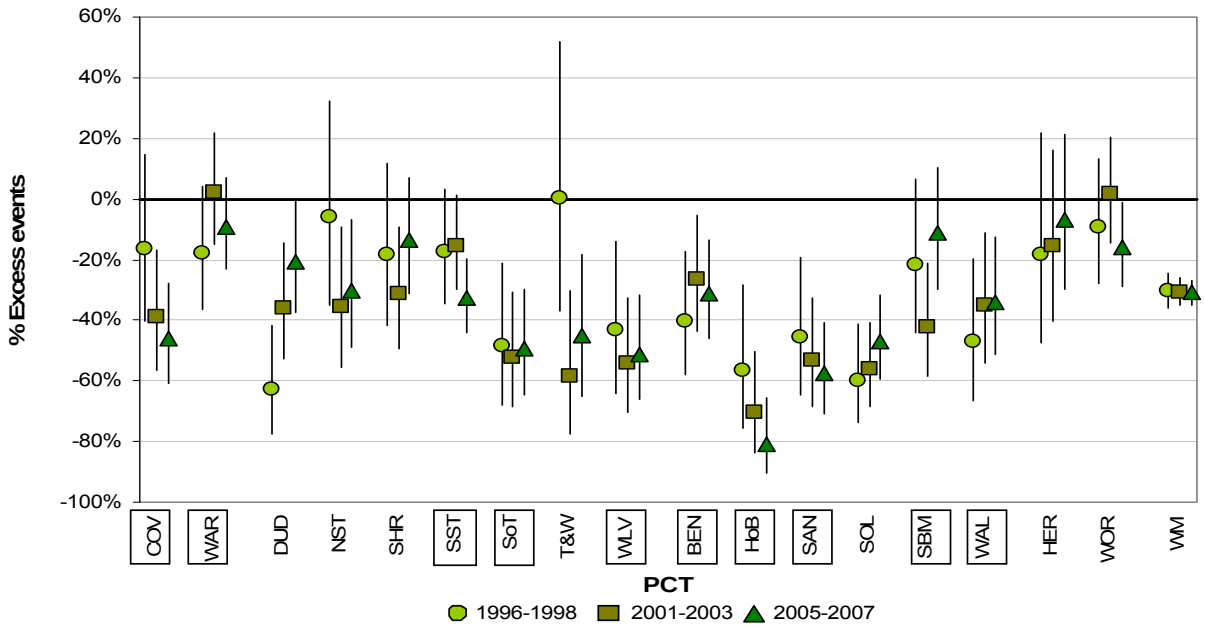


Figure 6.5.1 shows the trends in melanoma skin cancer excess incidence (%) over time for males in West Midlands PCTs. Melanoma skin cancer had the greatest negative excess incidence of all the cancer sites analysed. All PCTs experienced fewer than expected cases of melanoma skin cancer. Heart of Birmingham tPCT had the largest gap, with a negative excess of -81% in 2005-2007. This may reflect the PCT's high minority ethnic population. Seven PCTs had significantly fewer cases for the whole period, including six of the Spearhead PCTs. Solihull Care Trust is not an outlier for this cancer site.

[v] *cancer research website*

6.5.2 Melanoma skin cancer (ICD10 C43) – females, incidence

There are significantly fewer cases of melanoma skin cancer in females in the West Midlands than would be expected when compared to the most affluent population.

A negative deprivation gap for melanoma skin cancer incidence is also apparent in females with fewer cases in the West Midlands as a whole than would be expected compared to the most affluent population. This negative deprivation gap has increased significantly between 1996-1998 and 2005-2007. In the period 2005-2007, 664 fewer cases of melanoma skin cancer (-31%) were registered than would be expected compared to the most affluent population; in 1996-1998, 307 fewer cases occurred (-30%). The total number of cases of melanoma skin cancer has also increased significantly over this period.

Figure 6.5.2: Melanoma skin cancer (ICD10 C43): Trends in excess incidence (%) over time (1996-1998, 2001-2003, 2005-2007) *West Midlands PCTs, females*

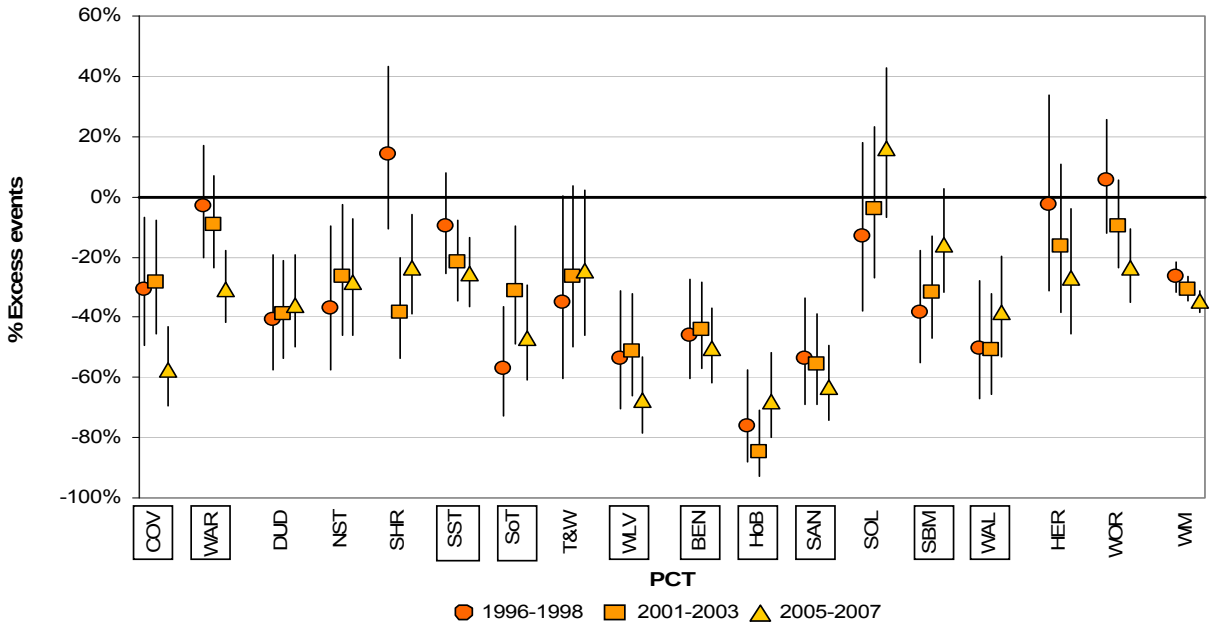


Figure 6.5.2 shows the trends in melanoma skin cancer excess incidence (%) over time for females in West Midlands PCTs. Shropshire County PCT, Worcestershire PCT (1996-1998) and Solihull Care Trust (2005-2007) are significantly different from the West Midlands average, with more excess cases of skin cancer. These are PCTs with a primarily white and relatively affluent population.

Heart of Birmingham tPCT has a significantly lower excess incidence of melanoma skin cancer compared to the West Midlands in all years. Heart of Birmingham tPCT is an ethnically diverse PCT. Only 40% of the population is white, with 60% from ethnic minorities. The pattern of excess incidence is similar to a lesser degree in Wolverhampton City PCT, Coventry PCT, Birmingham East & North PCT and Sandwell PCT all of which have substantial proportions of non-white residents (over 18%). It is difficult to distinguish the effects of ethnicity from the effects of deprivation, as many of the inner city PCTs with a high proportion of ethnic minority residents also experience high levels of deprivation.

6.6 Melanoma skin cancer (ICD10 C43) – background, mortality

Melanoma skin cancer mortality rates have not increased as dramatically as incidence rates, as this cancer has very good and improving survival of over 80%. The good survival means there are only small numbers of deaths in the West Midlands, with the result that there are wide confidence intervals in the analyses. In 2007 there were 168 deaths from melanoma skin cancer in the West Midlands, 96 in males and 72 in females.

6.6.1 Melanoma skin cancer (ICD10 C43) – males, mortality

There are significantly fewer deaths due to melanoma skin cancer in males in the West Midlands than would be expected compared to the most affluent population.

The deprivation gap for excess deaths due to melanoma skin cancer in males is unusual, as there are *fewer* cases in the West Midlands as a whole than would be expected compared to the most affluent population. Affluent people are more likely to die from melanoma skin cancer than those who are more deprived. The gap has not changed significantly over time. In the period 2005-2007, there were 95 fewer deaths (-27%) than would be expected compared to the most affluent population; in 1996-1998 there were 104 fewer deaths (-35%).

Figure 6.6.1: Melanoma skin cancer (ICD10 C43): Trends in excess mortality (%) over time (1996-1998, 2001-2003, 2005-2007) *West Midlands PCTs, males*

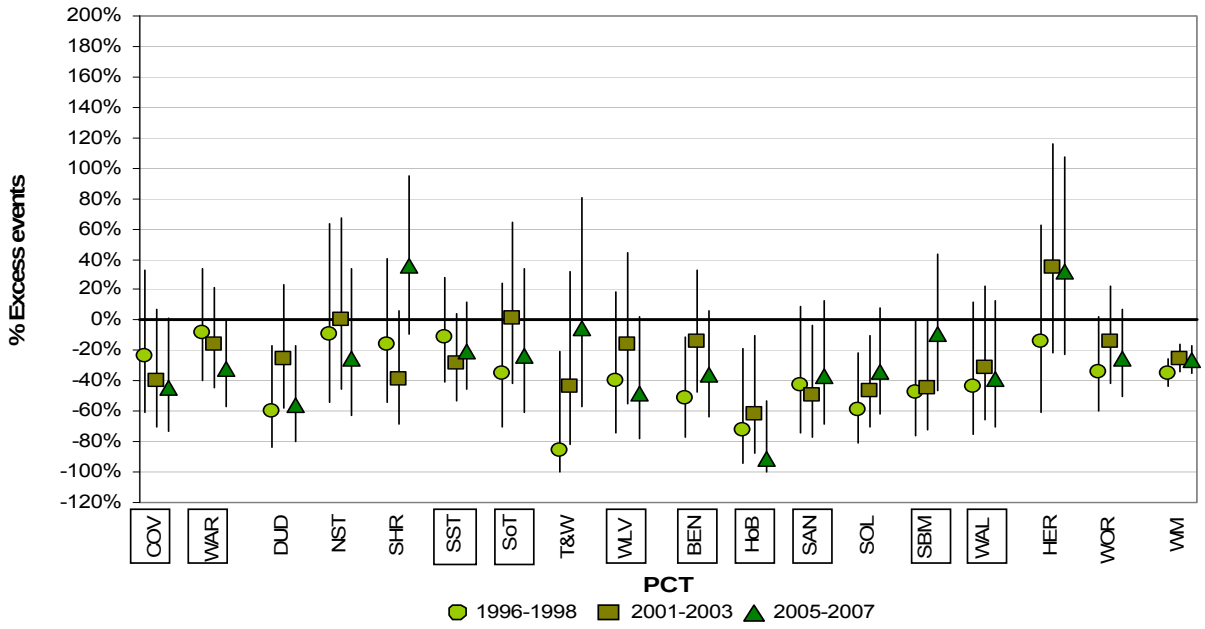


Figure 6.6.1 shows the trends in excess deaths (%) due to melanoma skin over time for males in West Midlands PCTs. Shrewsbury PCT and Herefordshire PCT experienced more deaths due to melanoma skin cancer than expected in 2005-2007, although the small numbers mean that this result is not statistically significant. The lowest % of excess deaths was seen in Heart of Birmingham tPCT. This probably reflects the PCT's highly deprived and ethnically diverse population.

6.6.2 Melanoma skin cancer (ICD 10 C43) – females, mortality

There are significantly fewer deaths due to melanoma skin cancer in females in the West Midlands than would be expected compared to the most affluent population.

The deprivation gap for excess deaths due to melanoma skin cancer in females is unusual, as there are slightly fewer deaths in the West Midlands as a whole than would be expected compared to the most affluent population. Affluent women are thus more likely to die from melanoma skin cancer than those who are more deprived. The deprivation gap in deaths due to melanoma skin cancer in females has not changed significantly over time. The numbers are very small - in the period 2005-2007, there were 30 fewer deaths (-13%) in the whole of the West Midlands than would be expected compared to the most affluent population; in 1996-1998 there were 6 fewer deaths (-3%).

Figure 6.6.2: Melanoma skin cancer (ICD 10 C43): Trends in excess mortality (%) over time (1996-1998, 2001-2003, 2005-2007) *West Midlands PCTs, females*

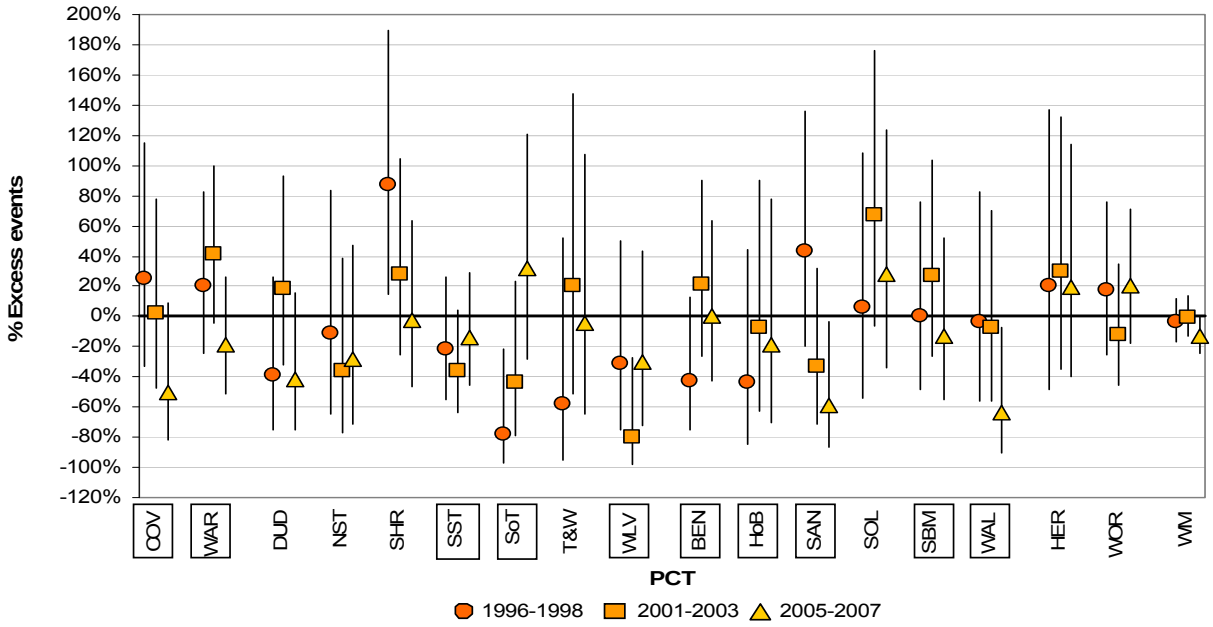


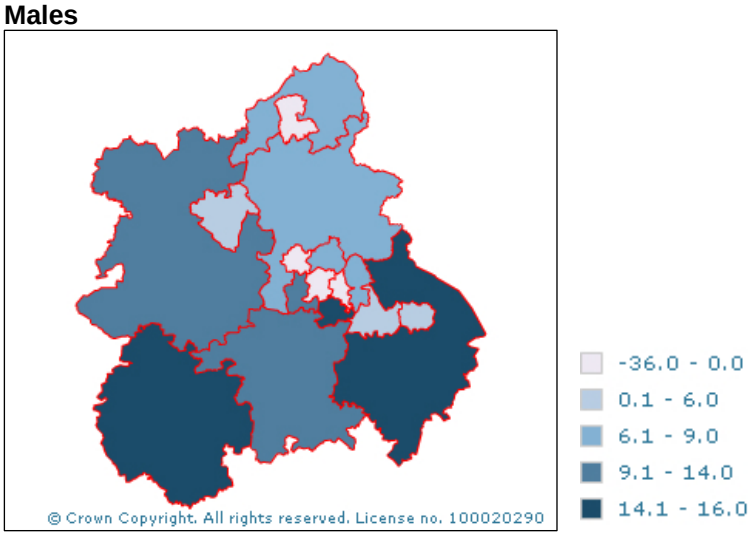
Figure 6.6.2 shows the trends in excess deaths (%) due to melanoma skin cancer over time for females in West Midlands PCTs. Stoke on Trent PCT exhibits a reverse trend in excess deaths, with the gap between rich and poor widening and a positive, though non-significant, excess of deaths in 2005-2007.

Many PCTs with large proportions of non-white residents have large negative excess deaths. This is most notable in Heart of Birmingham tPCT, Wolverhampton City PCT, Coventry PCT, Birmingham East & North PCT and Sandwell PCT which all have substantial proportions of Asian and Black populations.

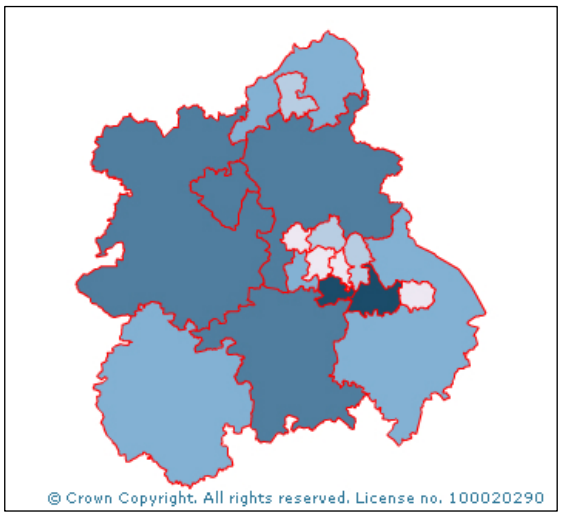
Taken from the interactive e-Atlas, maps 6.6.1 and 6.6.2 show the spatial distribution of excess cancer incidence and mortality for lung cancer for the period 2005-2007, for males and females.

Map 6.6.1: Melanoma skin cancer (ICD 10 C43), Incidence (2005-2007), males and females

Males

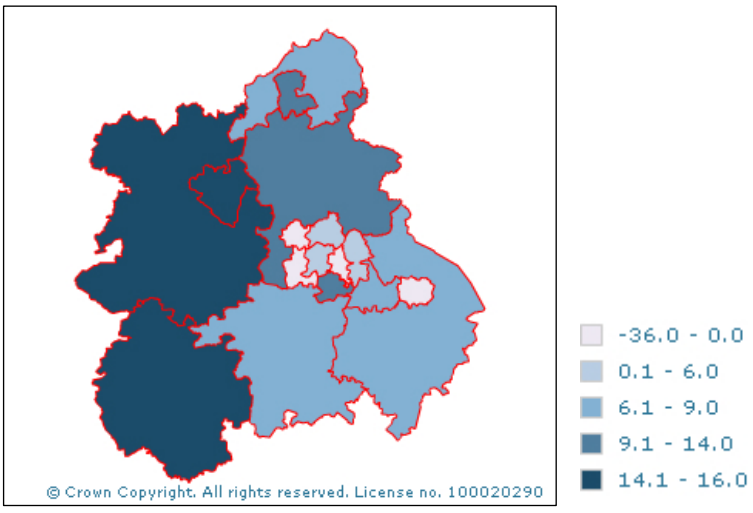


Females

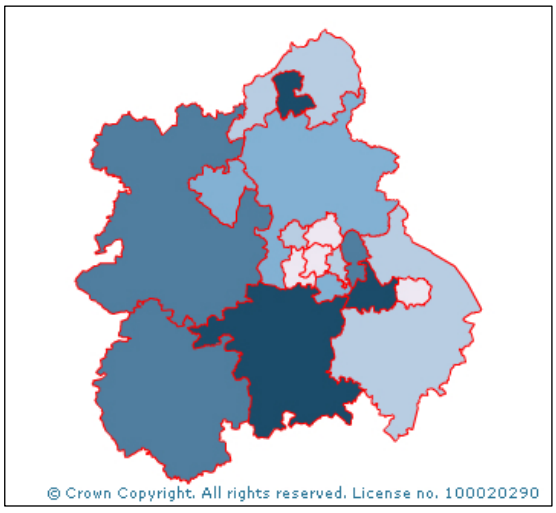


Map 6.6.2: Melanoma skin cancer (ICD10 C43), Mortality (2005-2007), males and females

Males



Females



Areas with lighter shading indicate areas of fewer excess, while areas with darker shading indicate areas of excess. The key between the two sets of maps indicate the percentage excess range. For further information on the excess cancer incidence and mortality in the West Midlands, visit the WMCIU's website for a more in-depth report at:

http://www.wmpho.org.uk/wmciu/excess_deaths.html

For more examples of these maps and an opportunity to explore these data in an interactive e-Atlas, please visit:

http://www.wmpho.org.uk/wmciu/atlas/excess_atlas_v2/atlas.html

Table 6.6.1: West Midlands PCTs

Network	PCT	PCT Code	PCT Abb	Population	Area, km^2	Population Density, People per km^2	% Urban	Deprivation score in West Midlands	Spearhead PCT
Arden	Coventry tPCT	5MD	COV	307,000	99	3,100	99	0.20	✓
Arden	Warwickshire PCT	5PM	WAR	522,000	2,000	260	56	0.11	✓
Greater Midlands	Dudley PCT	5PE	DUD	305,000	98	3,100	100	0.17	×
Greater Midlands	North Staffordshire PCT	5PH	NST	211,000	740	290	67	0.12	×
Greater Midlands	Shropshire County PCT	5M2	SHR	289,000	3,200	90	32	0.11	×
GM / EM / PB	South Staffordshire PCT	5PK	SST	604,000	1,800	330	67	0.11	✓
Greater Midlands	Stoke on Trent PCT	5PJ	SoT	248,000	140	1,700	98	0.22	✓
Greater Midlands	Telford & Wrekin PCT	5MK	T&W	162,000	290	560	87	0.17	×
Greater Midlands	Wolverhampton City PCT	5MV	WLV	237,000	69	3,400	100	0.24	✓
Pan Birmingham	Birmingham East & North PCT	5PG	BEN	399,000	120	3,300	99	0.28	✓
Pan Birmingham	Heart of Birmingham tPCT	5MX	HoB	270,000	59	4,600	100	0.40	✓
Pan Birmingham	Sandwell PCT	5PF	SAN	288,000	86	3,400	100	0.26	✓
Pan Birmingham	Solihull Care Trust	TAM	SOL	203,000	180	1,100	85	0.12	×
Pan Birmingham	South Birmingham PCT	5M1	SBM	337,000	86	3,900	100	0.21	✓
Pan Birmingham	Walsall tPCT	5M3	WAL	255,000	100	2,400	99	0.23	✓
3 Counties	Herefordshire PCT	5CN	HER	178,000	2,200	82	32	0.12	×
3C / Arden / GM	Worcestershire PCT	5PL	WOR	553,000	1,700	320	59	0.11	×

CHAPTER SEVEN: CHANGES IN HEART ATTACK ADMISSIONS AND THE SMOKING BAN

7.1 Introduction

Over the last few years, there has been an increased focus on stop smoking services commissioned by PCTs. However, it is fair to say that there has been a wide variation in the numbers smokers attending these services over time and comparatively few smokers have used services as a proportion of the whole. A more dramatic change in societal behaviour took place in July 2007 when smoking was banned in enclosed places. This paper aims to examine trends in admissions for West Midlands patients admitted to hospital with heart attacks over the last 3 years.

7.2 Methods

Anonymised aggregate data was extracted to compare finished hospital stays (FHS – i.e. deaths and discharges) for patients that were assigned a Healthcare Resource Group (HRG) for a heart attack (Source WMCBSA). The time period spanned from April 2006 – November 2009 during which the Payment by Results (PbR) tariff relating to HRG rose. HRG codes changed in April 2009.

The HRG codes used in this analysis are;

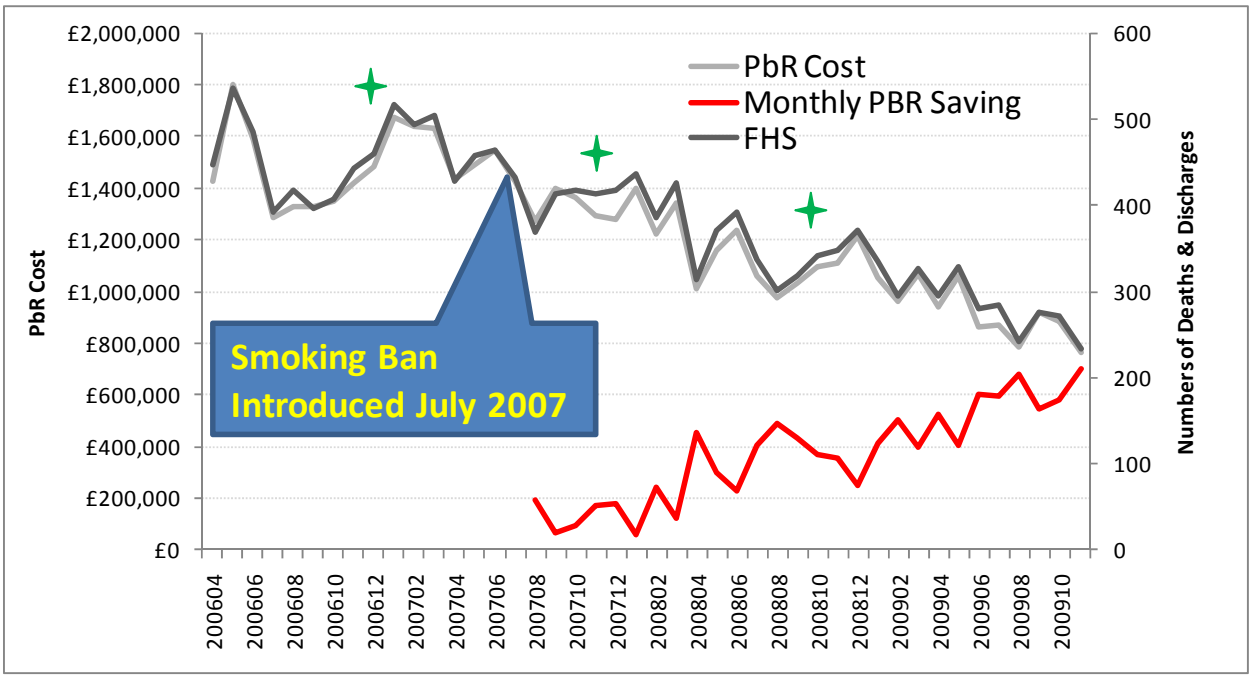
- Acute Myocardial Infarction with or without complications and co-morbidities (used before April 2009)
- Actual or Suspected Myocardial Infarction (used after April 2009)
- Cardiac Arrest (used before and after April 2009)

Deaths in A&E, homes or care homes have been excluded. It has been assumed that most heart attack patients are generally sent to hospital for care and are quickly admitted to a hospital bed from A&E.

7.3 Results

There has been a reduction in the numbers of FHS (deaths and discharges) associated with heart attacks over time (Figure 7.1). However scrutiny of Figure 7.1 not only shows that there was a change in the fluctuations over time, but the winter peaks of deaths were less marked. These are highlighted by the green stars in the figure below.

Figure 7.1: Deaths & Discharges for West Midlands Patients with Heart Attacks
(West Midlands HES April 2006 – November 2009)



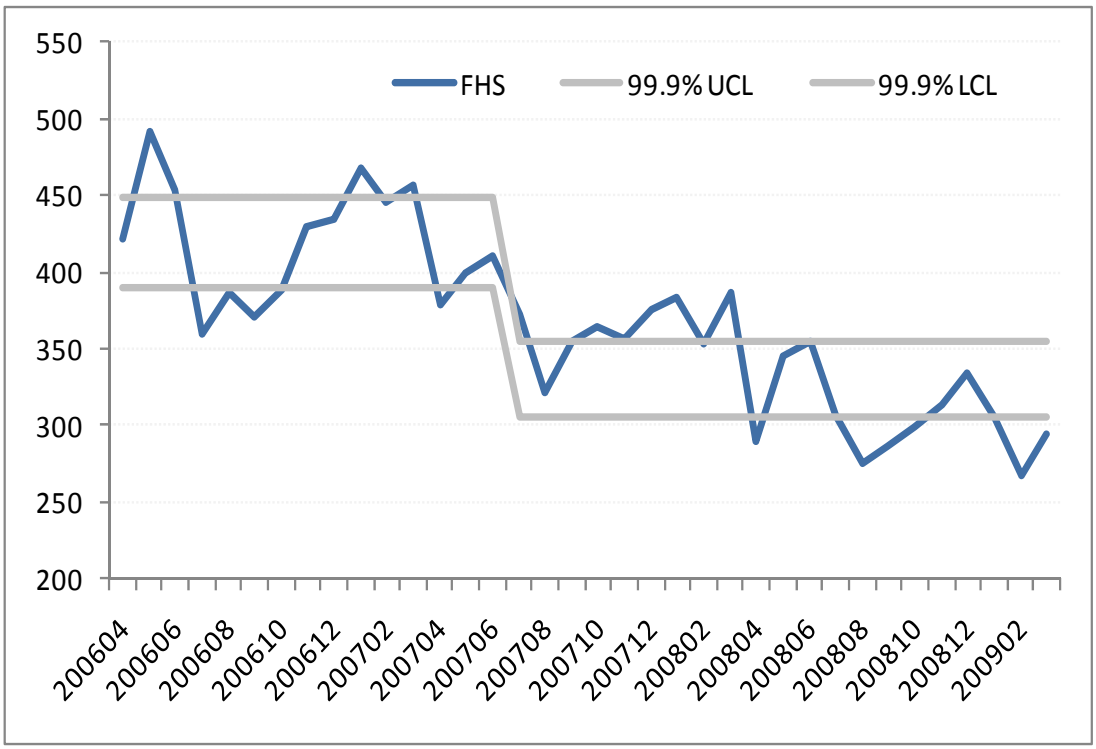
A more striking observation is that the PbR tariff costs have reduced (light grey line) and therefore cost savings have increased over time (red line).
PbR savings were calculated by comparing the monthly value for deaths & discharges after July 2007 with the average monthly value for the previous year (July 2006 – June 2007). It should be noted that PbR naturally rises because of tariff inflation.

Nevertheless, Figure 7.1 shows that there has been a halving of numbers of deaths and discharges since the smoking ban. As a result, it is therefore safe to infer that this has also been associated with a PbR saving of about half in a given year. This is the equivalent of c£6m per year. Differences in coding could account for some patients previously coded as heart attacks being coded as another HRG.

7.4 Are these trends significant?

Figure 7.2 adds control limits to the time series by using 99.9% confidence limits (6Σ) to the charts. These were derived for the time frames as defined in Figure 7.2 and confirm a significant (99.9% CIs) step change after July 2007.

Figure 7.2: Deaths and Discharges for West Midland's patients with Heart Attacks with Confidence limits. Year with month.

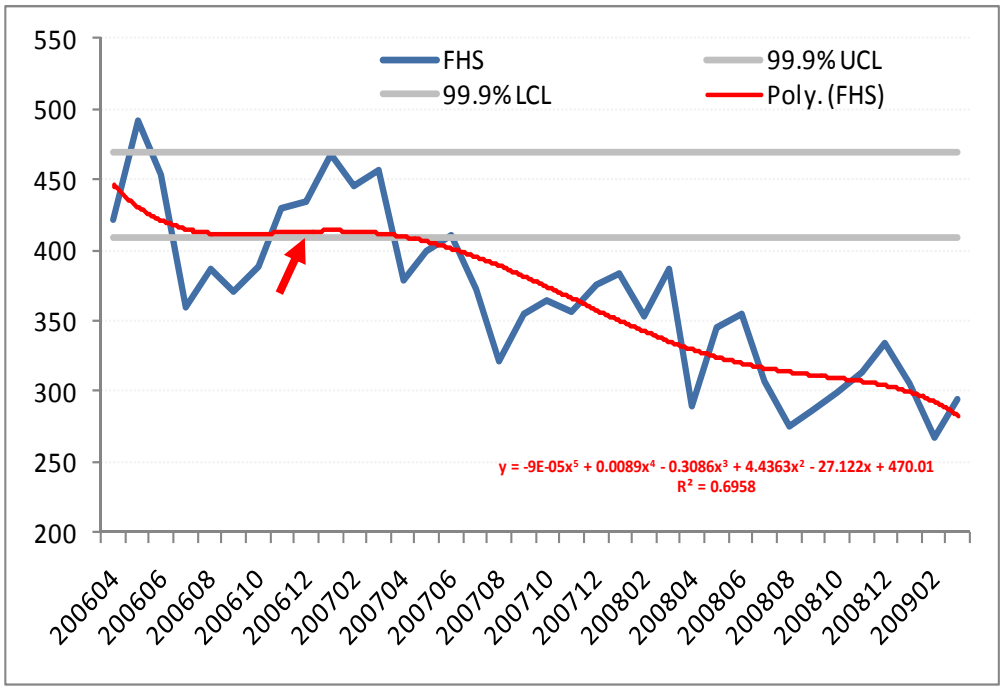


Source: West Midlands HES April 2006 – November 2009

If data was available, the time series should extend before the time period as this reduction after July 2007 may have been part of a reducing trend in general.

One way of adjusting for this is to add a trend line to observe changes in the slope. Figure 7.3 shows the polynomial trend line for the data and confirms a step change in the slope of the trend line in July 2007 (see red arrow).

Figure 7.3: Deaths and Discharges for West Midlands patients with Heart Attacks (polynomial trend line added) Year with Month



Source: West Midlands HES April 2006 – November 2009

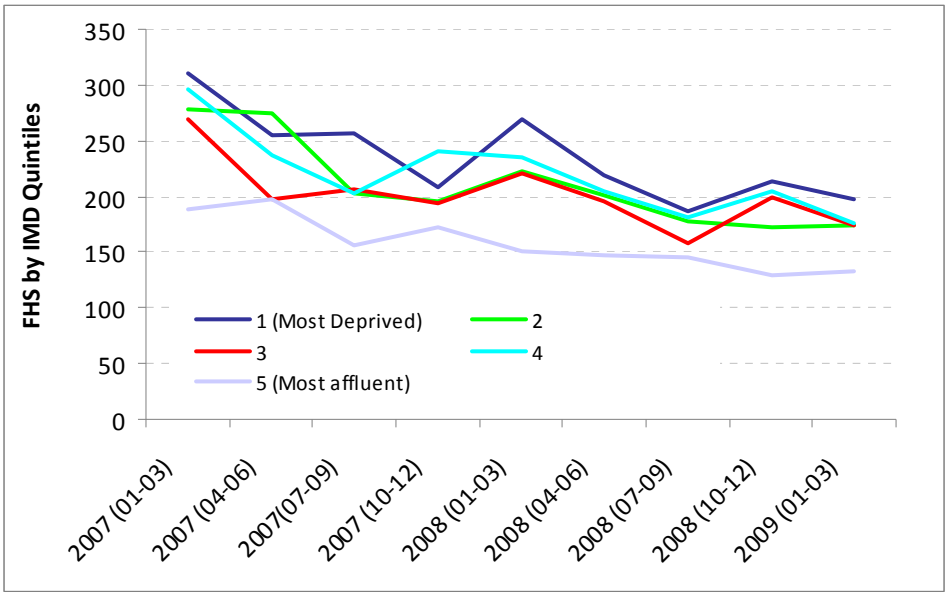
7.5 How are these affected by deprivation?

Heart disease and heart attacks are associated with more deprived populations due to a variety of reasons including lifestyle factors. Changes in lifestyle behaviour are known to occur disproportionately in the more affluent populations with ironically the lowest rates of heart disease. On this basis, a comparison of patients by IMD scores would be useful in understanding more about the impact of the smoking ban amongst different populations.

Figure 7.4 dissects out the change in admissions over the time period by considering the 2007 IMD (Index of Multiple Deprivation) of each individual who was admitted with a heart attack during the time frame. The data presented previously was based on a monthly analysis. However, the figure below uses quarterly figures as the numbers of patients in different IMD groups are low.

It is reassuring to note that Figure 7.4 shows a gentle reduction in the numbers of deaths in all IMD groups – including the most deprived populations – over the time period.

Figure 7.4: Deaths and Discharges for West Midlands patients with Heart Attacks (IMD 2007 added), Year (quarterly period)



Source: West Midlands HES April 2006 – November 2009

7.6 Conclusions

There are some methodological areas that might be explored to further colour the conclusions drawn from the data. In particular, age standardised rates might be a better offering to ensure that fluxes in the populations attending have not resulted in a change in the numbers of heart attacks. Crude admission rates are unlikely to show any difference as the population of the West Midlands is so large that the marginal effect year on year would be indiscernible.

Access to earlier data prior to April 2006 would be useful to obtain as this would add further insights into long term trends. It is known that general long term trends for heart attack mortality have shown a steady reduction in the last 20 years.

Coding differences are bound to affect casemix. This ideally needs to be explored but with the advent of HRG4, it might be difficult to obtain like for like comparisons. Future work should focus on this.

The results are corroborated through further findings,

- published evidence from Scotland[1] of reductions in heart attack related admissions post smoking ban
- published evidence that this reduced heart attacks amongst smokers and non-smokers[2]
- published evidence that there has been a measureable impact on second hand smoke inhalation[3]
- published evidence that the smoking ban was associated with changes in social-cognitive awareness as well as a reduction in number of cigarettes consumed[4]
- cardiologists have anecdotally noticed a reduction in the number of patients attending with heart attacks since the ban[5]
- recent reports confirm these findings with reductions in deaths[1]and admissions[6]

On balance, this chapter affirms the opportunities and apparent benefits for simple but cost effective public health interventions in reducing hospital admissions relating to tobacco smoking. There remain further opportunities in the “Stop before the Op” initiative.

References

1 Pell JP, Haw S. “The triumph of national smoke-free legislation.” Heart. 2009 Sep; 95(17):1377-9. Epub 2009 Jun 7.

2 Pell JP ,Haw S, Cobbe S,Newby DE, Pell ACH, Fischbacher C, McConnachie A., Pringle S, Murdoch D, Dunn F, Oldroyd K, MacIntyre P, O'Rourke B and Borland W “Smoke-free Legislation and Hospitalizations for Acute Coronary Syndrome”, NEJM, Volume 359:482-491 July 31, 2008 Number 5

3 Haw S and Gruer L “Changes in exposure of adult non-smokers to secondhand smoke after implementation of smoke-free legislation in Scotland: national cross sectional survey”. BMJ 2007;335:549 published 9 September 2007.

4 Orbell S, Lidierth P, Henderson CJ, Geeraert N, Uller C, Uskul AK, Kyriakaki M. “Social-cognitive beliefs, alcohol, and tobacco use: a prospective community study of change following a ban on smoking in public places”. Health Psychol. 2009 Nov;28(6):753-61.

5 Personal communication with Dr D Connelly, Consultant Cardiologist, Sandwell and West Birmingham Hospital

6 Sims M, Maxwell R, Bauld L and Gilmore A. “Short term impact of smoke-free legislation in England: retrospective analysis of hospital admissions for myocardial infarction” BMJ 2010; 340:2161.

Additional reference material

http://www.lho.org.uk/download.aspx?urlid=15261&urlt=1

CHAPTER EIGHT: MEASURING DISABILITY ACROSS THE WEST MIDLANDS

8.1 Introduction

Measuring the numbers of disabled people and their impairment was recognised by the West Midlands Regional Observatories Population and Society topic group as a gap in the Regional evidence base. This chapter is an attempt to map our knowledge of disability across the region and identify where gaps exists. The Regional Disability Network **http://www.rdn-wm.org.uk/** has provided guidance on both use of language and some sources of data. The networks goal is to be the voice of disabled people in the West Midlands and sees publications such as Key Health Data as important in raising the understanding of disability issues in the public sector.

In this chapter we have reviewed quantitative data on physical and sensory impairments, mental illness, learning difficulties (disabilities) and social disabilities, There is much existing qualitative 'needs' evidence in the public domain which reflects the challenges faced by Disabled people in today's society but these were beyond the scope of this chapter.

8.2 Definition of Disability

Before embarking on any work on disability it is important first to address the language and scope of the work. The Disability Discrimination Act (DDA) defines a disabled person as 'someone who has a physical or mental impairment that has a substantial and long-term adverse effect on his or her ability to carry out normal day-to-day activities'.[1] We propose to use the DDA definition in this chapter.

Definition of Impairment and Disability

- **Impairment** is an injury, illness, or congenital condition that causes or is likely to cause a long-term effect on appearance and/or limitation of function of the individual.

- **Disability** is the loss or limitation of opportunities to take part in society on an equal level with others due to social and environmental barriers

8.3 Models of Disability

There are a number of models that can be used to view and discuss disability, the two most common being the 'social model' and the medical model'. The Office of Disability Issues (ODI) and organisations in the Disability sector use and encourages others to use, the social model. It is important to be aware of these two differing views as they lend differing interpretations to how we interpret the data we have available to us and the gaps that remain.

The Social Model

Impairments and chronic illness often pose real difficulties for disabled people but they are not the main problems. It is the 'barriers' which exist in society that create the main problems. The three main areas of barrier are:

- environment (including inaccessible buildings and services)
- attitudes (stereotyping, discrimination and prejudice)
- organisations which operate inflexible procedures and practices

The Medical Model

The medical model is sometimes also known as the 'personal model'. This is the traditional view that the inability of disabled people to fully participate in society is a direct result of having a disability, not a result of physical features of society. The individual is 'impaired' and the impairment is the problem to be overcome. This model relies on a strong notion of what is 'normal', thereby emphasising the 'abnormality' of impaired people.

This model is more likely to lead to the targeting of special welfare benefits, and the provision of segregated services for disabled people.

The focus of the medical profession is to alleviate the effects of impairments, and disabled people need to be treated and rehabilitated to enable them to participate more fully. This model suggests that disabled people should try, wherever possible, to live in the norms and patterns of mainstream society. [2]

8.4 Measuring and Mapping Disability across the West Midlands

The aim is to map out the prevalence of disability by type across the region, and where possible the age, sex and ethnic distribution. The chapter will look at the data sources available, present the data where available and indicate the biggest gaps. The main content for this chapter is taken from the Office of Disability Issues. [3] For each area covered by the ODI we have highlighted where regional or lower level data is available.

8.5 Data Sources

There are two major types of data on impairment: Surveys; and administrative data. There is no single register of disabled people and their needs or services provided. In many regards this is probably the initial gap. Disability services are not the sole remit of a single agency. The challenges in using this data is that there is a lot of double counting and the data collected is still very medically orientated and focussed on individual disabled person's limits rather than barriers which prevent full inclusion in society.

Currently surveys use different wording to define disability resulting in different statistics on numbers of disabled people and exclusion of certain groups who may have rights under the Disability Discrimination Act (DDA). Furthermore, current survey questions often adopt a medical model approach to defining disability, without considering the social barriers that restrict people's life opportunities.

ODI and Office of National Statistics (ONS) have continued to consult other government departments and disabled people on how to revise the questions used. It is anticipated that a recommended set of standard disability questions will be available before the end of 2010.[4]

On the KHD website (**http://www.bham.ac.uk/keyhealthdata)** there is a downloadable data set of all measures of disability uncovered in producing this chapter.

8.6 General Demographics

- It is estimated that there are over 10 million people with a limiting long term illness, impairment or disability in the UK (Department of Work and Pensions 2010)
- The most commonly reported impairments are those that affect mobility, lifting or carrying. [5]
- The prevalence of disability rises with age. Around 1 in 20 children are disabled, compared to around 1 in 7 working age adults and almost 1 in 2 people over state pension age.[5]

Regionally there were 993,458 people with a limiting long term illness in the 2001 Census. However, we are unable to count how many people have each type of limiting long term illness or disability. The data we do have on the types of disability people have is listed in Table 8.1. However within this table there will be much double counting. This is evident from the data provided by the National Health Information Centre on those people who are either blind or partially sighted with an additional impairment (Table 8.2).

Table 8.1: People with a disability living in the West Midlands, and the source of data

Disability	Source	Date	People
Learning Disabilities Register (ages 18+)	QOF	April 2009	19,156
People registered as deaf or hard of hearing	NHSIC	March 2007	25,975
People registered as blind	NHSIC	March 2008	15,975
People registered as partially sighted	NHSIC	March 2008	16,215
Down's Syndrome	PANSI/POPPI *	2010	*2,116*
Autistic Spectrum Disorder (18-64)	PANSI*	2010	*33,304*
Moderate or serious physical disability	PANSI/POPPI*	2010	336,465
Permanently unable to work due to a physical disability	PANSI*	2010	140,896
In receipt of Disability Living Allowance	NOMIS	Nov 2009	150,530
In receipt of Income support for disability	NOMIS	Nov 2009	97,000
In receipt of incapacity benefit / severe disablement allowance	NOMIS	Nov 2009	203,110
Personal Social Services Expenditure			
Adults aged under 65 with a physical disability or sensory impairment	NHSIC	April 2009	18,340
Adults aged under 65 with learning disabilities	NHSIC	April 2009	10,685
Adults aged under 65 with mental health needs	NHSIC	April 2009	9,985

* Data from PANSI and POPPI are estimates based on historical counts or survey data

Table 8.2: Blind or partially sighted people with more than one disability, March 2008

		Blind or partially sighted people registered with / who are					
	Total	Mental health problems	Learning disability	Physical disability	Deaf with speech	Deaf without speech	Hard of hearing
West Midlands	11,020	355	450	5,230	1,915	905	2,165
		3.2%	4.1%	47.5%	17.4%	8.2%	19.6%

In Table 8.3, the counts of people in receipt of benefit are listed by the condition for which they qualify. This is the best data we have on the types of impairment in the population; however it should be noted that not all of these people would fall under the DDA definition. There are three key data issues with using this information:

1 There are differences in the categorisation used for the different benefits. Incapacity Benefit uses ICD 10; where as the other 3 use a Department of Work and Pension (DWP) specific classification. that does not match ICD 10. A key concern is the inability to properly allocate the musculoskeletal conditions and injuries in the DWP classification.

2 There will also be double counting across benefit groups as people are often in receipt of more than one benefit.

3 The data for Attendance Allowance, Disability Living Allowance and Income Support are based on 5% samples and therefore are unreliable below counts of 500, and therefore unreliable below West Midland level in all but the largest local authorities.

Table 8.3: People in receipt of benefits by medical condition, across West Midlands, November 2009

	Incapacity benefit / severe disablement		Attendance allowance[1]	Disability living allowance[1]	Income support[1]
Certain infectious parasitic diseases (A00-B99)	1,150				
Neoplasms (C00-D48)	2,870	Malignant disease	2,000	4,400	
Diseases of the blood and blood forming organs and certain diseases involving the immune mechanism (D50-D89)	380				
Endocrine, nutritional and metabolic diseases (E00-E90)	3,280	Diabetes mellitus	1,700	2,000	
Mental and behavioural disorders (F00-F99)	84,740	Mental health causes	4,400	34,600	
		Learning difficulty	100	2,000	
		Parkinson's disease	1,500	12,000	
Diseases of the nervous system (G00-G99)	13,950	Epilepsy	100	42,300	
		Multiple sclerosis		300	
Diseases of the eye and adnexa (H00-H59)	1,960	Blindness	1,600	7,200	
Diseases of the ear and mastoid process (H60-H95)	840	Deafness	200	7,100	
Diseases of the circulatory system (I00-I99)	10,860	Stroke related	5,200	10,400	
		Heart disease	5,200	24,300	
Diseases of the respiratory system (J00-J99)	4,540	Chest disease	3,300	7,300	
Diseases of the digestive system (K00-K99)	2,870				
Diseases of the skin and subcutaneous system (L00-L99)	1,240				
Diseases of the musculoskeletal system and connective tissue (M00-M99)	38,390	Arthritis	14,100	61,400	
		Muscle / joint / bone disease	1,800	20,200	
		Back ailments	1,400	7,700	
Diseases of the genitourinary system (N00-N99)	1,510	Renal disorders	400	5,400	
Pregnancy, childbirth and the puerperium (O00-O99)	110				
Congenital malformations, deformations and chromosomal abnormalities (Q00-Q99)	2,370				
Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified (R00-R99)	20,170				
Injury, poisoning and certain other consequences of external causes(S00-U23)	9,790				
Factors influencing health status and contact with health services (Z00-Z99)	2,100	Frailty	6,200	1,500	
		Other disabling condition	5,100	43,400	
Total	203,110		54,300	293,500	97,000

1 - 5% sample data

There is some data available on the age profile of people living with impairment. For those registered as blind (Figure 8.1) and those in receipt of Disability Living Allowance (Figure 8.3) show an increasing number as age increases, however the rate of deafness is more u-shaped with a distinctly younger cohort of people (Figure 8.2)

Figure 8.1: People registered as blind by age.

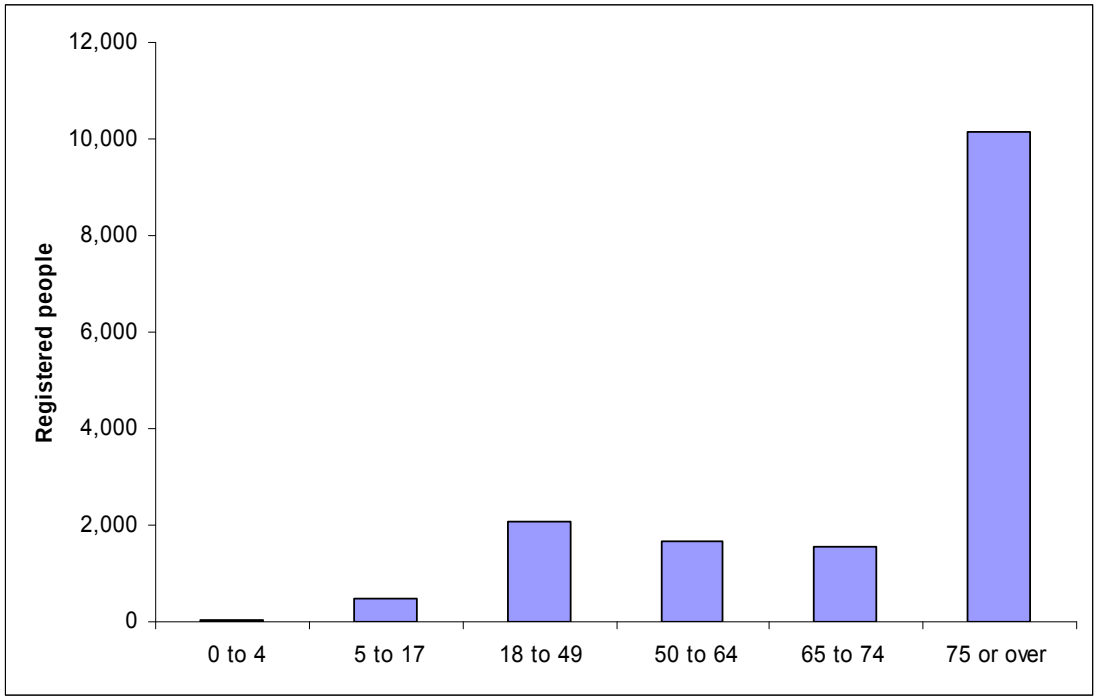


Figure 8.2: People registered as deaf, rate per 1,000 population

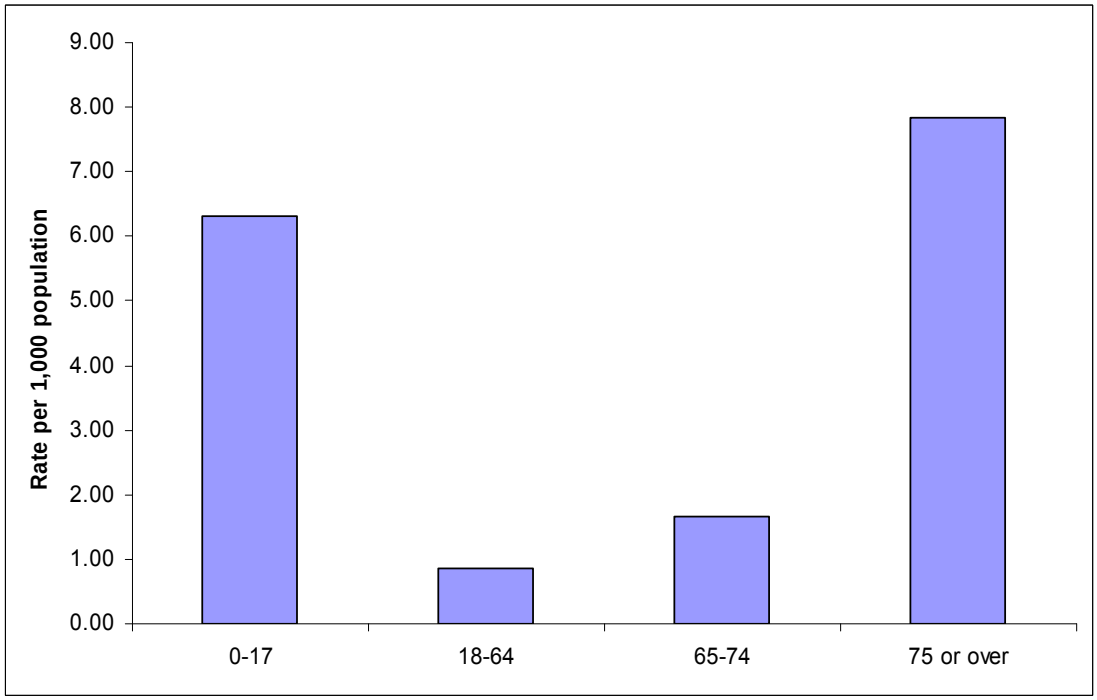
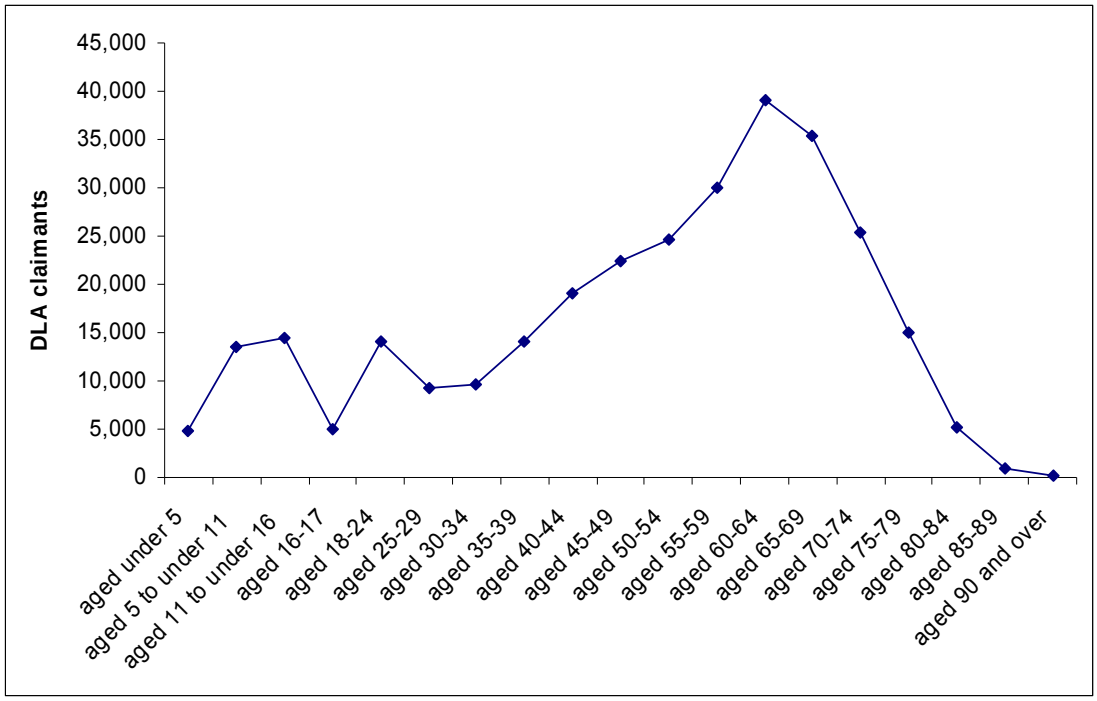


Figure 8.3: People in receipt of Disability Living Allowance, November 2009



8.7 Living Standards

- A substantially higher proportion of individuals who live in families with disabled members, live in poverty compared to individuals who live in families where no-one is disabled
- 23 per cent of individuals in families with at least one disabled member live in relative income poverty, on a Before Housing Costs basis, compared to 16 per cent of individuals in families with no disabled member [6]
- 29 per cent of children in families with at least one disabled member are in poverty, a significantly higher proportion than the 20 per cent of children in families with no disabled member [6]

This data is based on the Households below Average Income survey for which we have not been able to resolve to below National level.

8.8 Employment

- The employment rate gap between disabled and non disabled people has decreased from around 36% in 2002 to around 30% in 2009 [7]

- However, disabled people are far less likely to be in employment. Although there have been significant improvements in the employment rates of disabled people in the last decade, the employment rates of disabled people are around 47%, compared with around 77% of non-disabled people [7]

This data is based on the Labour Force Survey some of which is available at a sub-regional level on the NOMIS website **(www.nomisweb.co.uk),** however this data is not on that site.

8.9 Education

Between 2005/06 and 2008/09, the percentage of pupils at the end of Key Stage 4 achieving 5 or more GCSEs at grades A*-C has

- increased from 66.3 per cent to 80.2 per cent for students without Special Educational Needs (SEN)
- increased from 19.8 per cent to 40.3 per cent for students with SEN without a statement
- Increased from 8.7 per cent to 14.9 per cent for students with SEN with a statement. [8]

This data is based on National Pupil Database. This should be available locally through local authority education departments.

8.10 Post-19 Education

- Disabled people are around twice as likely not to hold any qualifications compared to non disabled people, and around half as likely to hold a degree level qualification
- 24.3 per cent of working age disabled people do not hold any formal qualification compared to 10 per cent of working age non disabled people
- 11.4 per cent of working age disabled people hold degree-level qualifications compared to 21.8 per cent of working age non disabled people [7]

This data is based again from the Labour Force Survey some of which is available at a sub-regional level on the NOMIS website (www.nomisweb.co.uk), however this data is not on that site.

8.11 Independent Living

- Over a fifth of disabled people say that they do not frequently have choice and control over their daily lives [8]

This is one area where data is collected and available, at least partial sub-regionally. National Indicator NI136 gives information on the number of adults that are assisted directly through social services assessed/care planned, funded support to live independently, plus those supported through organisations that receive social services grant funded services. The information is broken down by primary client (adults with a learning disability, a physical disability, a mental health problem, a substance misuse problem and vulnerable people) and by age group (adults aged 18 - 64 and older people aged 65 and over).

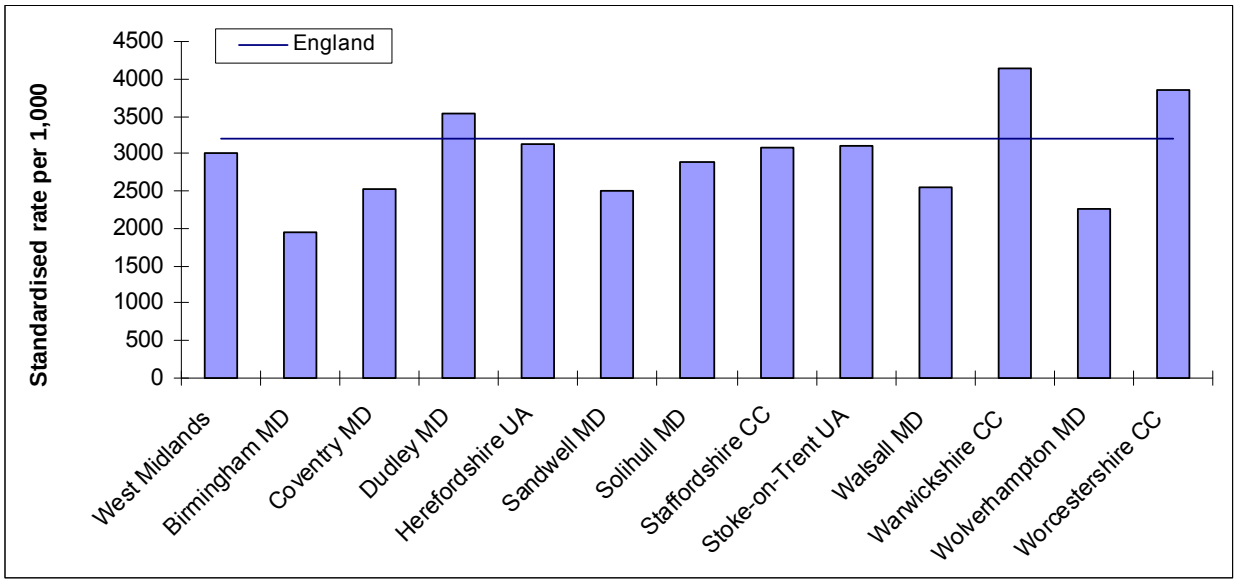
Table 8.4 lists the breakdown of people aged 18-64 with a learning disability helped to live independently. The problem with this indicator is we do not know the population of the West Midlands with a learning disability to know what proportion of people are being assisted. This data is available sub-regionally.

Table 8.4: People aged 18-64 with a learning disability

Residential status	People
Helped to live independently	11,363
Residential and nursing care during the year, purchased or provided by the CSSR	3,887
In receipt of social care through a Direct Payment and /or an Individual Budget	1,216

However for those people aged 65, the breakdown by impairment is not provided despite it being report under NI136. What we have is the number of adults all ages per 100,000 population that are assisted directly through social services assessed/care planned, funded support to live independently, plus those supported through organisations that receive social services grant funded services. The indicator is age standardised and adjusted for likely needs for social care services using needs-weighted population data produced from Relative Needs Formula (RNF) allocation calculations.

Figure 8.4: People aged over 65 helped to live independently, standardised rate per 1,000



8.12 Discrimination

Although there is very little data available at regional level about discrimination there are several studies by voluntary organisations working in this sector which provide qualitative information on the impact of discrimination on the lives of Disabled people. Some studies focus on disabled people with a single impairment and evidence the different barriers experienced by different impairment groups

- Disabled people are significantly more likely to experience unfair treatment at work than non disabled people. In 2008, 19 per cent of disabled people experienced unfair treatment at work compared to 13 per cent of non disabled people [10]
- Around a third of disabled people experience difficulties, related to their impairment or disability in accessing public, commercial and leisure goods and services [11]

These data come from the Fair Treatment at Work Survey, and Taking Part Survey and are not found at a regional level.

8.13 Leisure, social and cultural activities

- Disabled people remain significantly less likely to participate in cultural, leisure and sporting activities than non disabled people. In 2008/2009, 51.8 per cent of disabled people engaged in cultural, leisure and sporting activities compared to 69.7 per cent of non disabled people [12]

These data come from the Citizenship Survey and again they are not found at a regional level.

8.14 Participation

- Disabled people are just as likely to have engaged in civic involvement as non disabled people. In 2008/09, 60 per cent of disabled people undertook at least one activity of civic involvement in the last 12 months compared to 62 per cent of non disabled people
- However, disabled people are significantly less likely to engage in formal volunteering. In 2008/09, 21 per cent of disabled people engaged in formal volunteering at least once a month compared with 27 per cent of non disabled people[12]

These data come from the Citizenship Survey and are not found at a regional level.

8.15 Transport

- Around a fifth of disabled people report having difficulties, related to their impairment or disability, in accessing transport [9]
- Between 2005/2006 and 2007/2008, the percentage of buses with low floor wheelchair access increased from 50.4% to 62% [13]

These data come from the Opinions Survey and the Annual Sample Survey of Bus Operators and are not found at a regional level.

8.16 Communications

- Around half of households with a disabled member have access to the internet compared to over two thirds of households with no disabled members [15]

These data come from the British Social Attitudes Survey and are not found at a regional level,

8.17 Justice System

- Across all age groups, disabled people are significantly more likely to be victims of crime than non disabled people. This gap is largest amongst 16-34 year olds where 42 per cent of disabled people reported having been a victim of crime compared to 32 per cent of non disabled people
- Disabled people are also less likely than their non disabled peers to think the Criminal Justice System (CJS) is fair. This gap is largest amongst 16-34 year olds where 53 per cent of disabled people think that the CJS is fair compared to 64 per cent of non disabled people [16]

These data come from the British Crime Survey and again that are not found at a regional level.

8.18 Housing

- Although the gap in non-decent accommodation has closed over recent years, 1 in 3 households with a disabled person still live in non-decent accommodation [16]
- 1 in 5 disabled people requiring adaptations to their home believe that their accommodation is not suitable [17]

These data come from the English House Condition Survey and the Survey of English Housing and again that are not found at a regional level,

8.19 Life Opportunities Survey

The Life Opportunities Survey (LOS) is a new national survey sponsored by ODI. It aims to collect information on people's life opportunities, covering areas such as work, education, social participation and the use of public services. The survey also aims to identify the reasons why people do not take part in work or leisure activities that they would like to, or why people experience difficulties with using public services. There are specific questions which examine daily living through the lens of discrimination encountered.

8.20 Data archives

The Economic and Social Data Service **(http://esds.ac.uk)** stores record level data for the surveys listed below and used in this chapter, and is free to access for public sector and non-commercial organisations. It was beyond the resources available to this study to undertake any detailed analyses of these surveys.

- British Crime Survey
- Citizenship Survey
- English House Condition Survey
- Fair Treatment at Work Survey
- Family Resources Survey
- House Below Average Income
- Labour Force Survey
- ONS Opinions Survey
- Survey of English Housing
- Taking Part Survey

The British Attitudinal Survey can be accessed through a dedicated website at the National Centre for Social Research **(http://www.britsocat.com).**

8.21 Conclusion

There remains an on-going paucity of data on disability, even filling the data gaps proves challenging without trying to look at the social model. The most comprehensive data set remains the benefits data. The registers of people who are blind or deaf are perhaps role models for other impairments, but there remain deficiencies in terms of equalities with no data on ethnicity, deprivation or sexuality. Until these areas are addressed commissioners will lack the appropriate data to design services to fit the needs of their populations

References

1 Office of Disability Issues 2010 http://www.officefordisability.gov.uk/research/definitions.php Accessed July 2010

2 Office of Disability Issues 2010a: http://www.officefordisability.gov.uk/resources/models-of-disability.php Accessed July 2010

3 Office of Disability Issues 2010b: http://www.officefordisability.gov.uk/research/definitions.php Accessed July 2010

4 Office of Disability Issues 2010c: http://www.officefordisability.gov.uk/research/facts-and-figures.php Accessed July 2010

5 Statistical sources were quoted by Office of Disability Issues, the links provided here are to the survey websites, not necessary the actual data reported.

6 Department of Work and Pensions 2010 Family Resources Survey 2008/09 http://statistics.dwp.gov.uk/asd/frs/ Accessed July 2010

7 Department of Work and Pensions 2010a Households Below Average Income 2008/09 http://statistics.dwp.gov.uk/asd/hbai/hbai_2009/index.php?page=chapters Accessed July 2010

8 Office of National Statistics 2010: Labour Force Survey 2009 http://www.ons.gov.uk/about-statistics/user-guidance/lm-guide/sources/household/lfs/index.html Accessed July 2010

9 Department for Children, Schools and Families 2010: National Pupil Database: Attainment Tables 2005/06-2008/09 http://www.dcsf.gov.uk/performancetables/ Access July 2010

10 Office of National Statistics 2010a Opinions Survey 2009 http://www.ons.gov.uk/about/who-we-are/our-services/omnibus-survey

11 Department for Business, Innovation and Skills 2010: Fair Treatment at Work Survey 2008 http://www.bis.gov.uk/files/file52809.pdf Access July 2010

12 Department for Culture, Media and Sport 2010: Taking Part Survey 2008/09 http://www.culture.gov.uk/what_we_do/research_and_statistics/4828.aspx Access July 2010

13 Department of Communities and Local Government 2010: Citizenship Survey 2008/09 http://www.communities.gov.uk/publications/communities/citizenshipsurveyaprmar08 Access July 2010

14 Department for Transport 2010: Annual Sample Survey of Bus Operators http://www.dft.gov.uk/pgr/statistics/datatablespublications/public/bus/latest/bus2010q01.pdf Access July 2010

15 National Centre for Social Research: British Social Attitudes Survey, 2006 http://www.britsocat.com/Body.aspx?control=HomePage Access July 2010
16 Home Office 2010: British Crime Survey 2008/09 http://rds.homeoffice.gov.uk/rds/bcs1.html
17 Department of Communities and Local Government: 2010a: English House Condition Survey 2007/08 http://www.communities.gov.uk/housing/housingresearch/housingsurveys/englishhousecondition/ Access July 2010
18 Department of Communities and Local Government: 2010b: Survey of English Housing 2007/08 http://www.communities.gov.uk/housing/housingresearch/housingsurveys/surveyofenglishhousing/ Access July 2010

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CHAPTER NINE: SURVEILLANCE OF CLOSTRIDIUM *DIFFICILE* INFECTION IN THE WEST MIDLANDS

9.1 Introduction

Clostridium *difficile* infection (CDI) is the most important cause of hospital-acquired diarrhoea[1]. Over 80% of reported CDIs affect those aged over 65 years. The symptoms of CDI vary according to the severity of the infection, but can, in addition to diarrhoea, include abdominal pain, fever and loss of appetite. In severe cases the condition can lead to pseudomembraneous colitis (inflammation of part of the large bowel) and death [1].Various risk factors have been shown to be associated with CDI and these include:

- Age >60 years
- Antibiotic therapy
- Current immunosuppressive therapy
- Severe underlying illness
- Prolonged hospital stay
- Recent surgery
- Nursing home residence
- Sharing a room and/ or facilities with a patient who has tested positive for CDI
- Use of proton pump inhibitors (PPIs)

9.2 Surveillance

Mandatory reporting of CDI for the 65+ age group was introduced in January 2004 and was extended to all ages over 2 from April 2007. Reporting is done via the web-based HCAI Data Capture System, which is managed on behalf of the Department of Health by the Health Protection Agency (HPA). This chapter will describe the change in the incidence of CDI in the West Midlands between 2008 and 2009 and will also include a health economy view of CDI in the region. The West Midlands region consists of 19 Acute Trusts and 17 Primary Care Trusts (PCTs).

In the reporting of CDI, a distinction is made between those cases that are deemed to have originated within an acute trust and those which are not. The relevant definitions are:

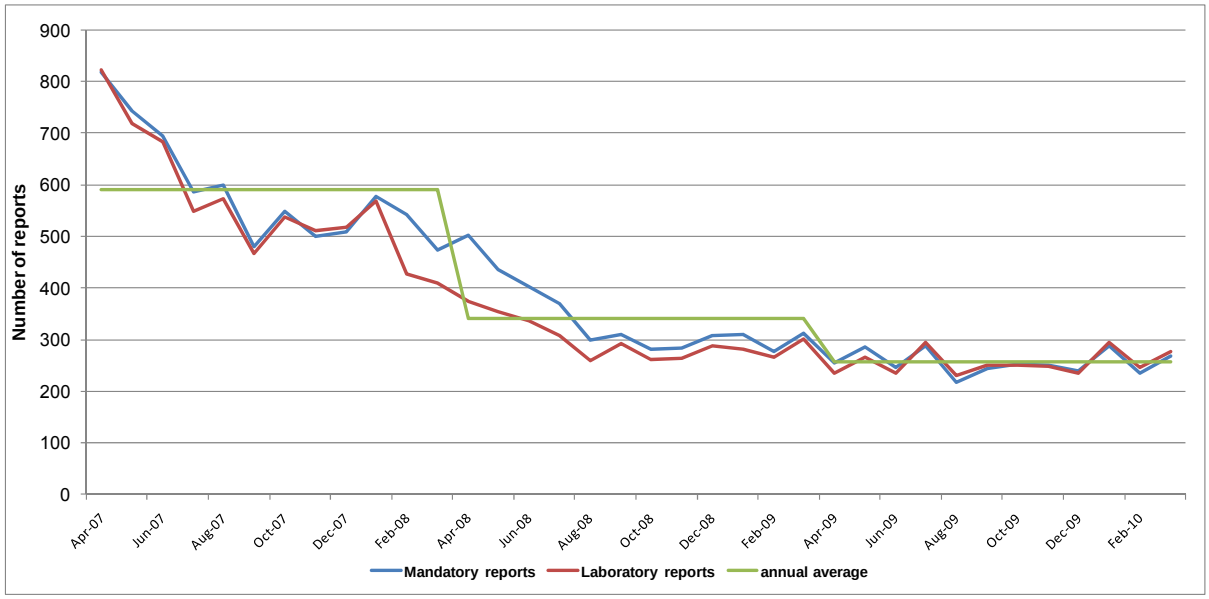
- 'Trust apportioned' – this is where the specimen is taken on or after the third day of admission (commonly referred to as 'post-48 hour' cases), where the day of admission is construed as day 1.
- 'Non-acute trust apportioned' – any specimens taken within 3 days (i.e. on day 1, 2 or 3), or where the patient is not admitted or where the specimen is taken from healthcare settings other than an acute trust, such as GP surgeries and PCT hospitals are often referred to as community cases. Such cases are presumed to be of community origin, but in the absence of root cause analysis, however, it is difficult to determine the origin of an infection.

All post-48 hour cases are apportioned to an acute trust and count towards the trust's national and locally agreed trajectory. All cases, whether post-48 hour or non-acute trust apportioned, are allocated to PCTs and again there are national and local targets in place.

9.3 West Midlands Regional Overview

Figure 9.1 shows the number of reports of CDI, made via the mandatory reporting system and via laboratory reporting, since April 2007, when mandatory reporting was extended to those aged 2-64. As the figure illustrates, there has been a sharp fall in the number of cases reported every month, which is likely to be a reflection of the impact of control measures implemented nationally.

Figure 9.1: Number of reports of CDI made since April 2007 in the West Midlands



In 2009, a total 3,176 cases of CDI were reported across the West Midlands region on the mandatory reporting system. This includes all cases attributed to acute trusts and to the community (i.e. non-trust apportioned cases). This represents a reduction of 33.6% compared with the 4,784 cases reported in 2008.

Within this overall reduction, the per cent apportioned to non acute settings increased from 44% (n=2,135/4,784) to 49% (n=1,570/3,176) in 2009 (Figure 9.2). However, as Figures 9.3a and 9.3b illustrate, at the PCT level, there was more variation in the proportional distribution of cases between acute trusts and community settings in 2008 compared with 2009, and, in several PCTs, a greater proportion of cases were not attributed to an acute trust. The observed decline in CDI incidence in the region may be attributed to improvements in surveillance and increased adherence to recommended infection control measures, the routine application of learning from root cause analyses of CDI mortality (a minimum of all deaths with CDI mentioned in part 1a of the death certificate) and improved clinical management of patients with CDI. Health economies are also now working together to improve the management of individuals in community (non acute) settings with CDI or individuals identified as having a higher risk of infection in a bid to further improve the quality and safety of patient care and improve patient outcomes.

Figure 9.2: Distribution of CDI cases between acute trust and non acute trust (community onset) in the West Midlands

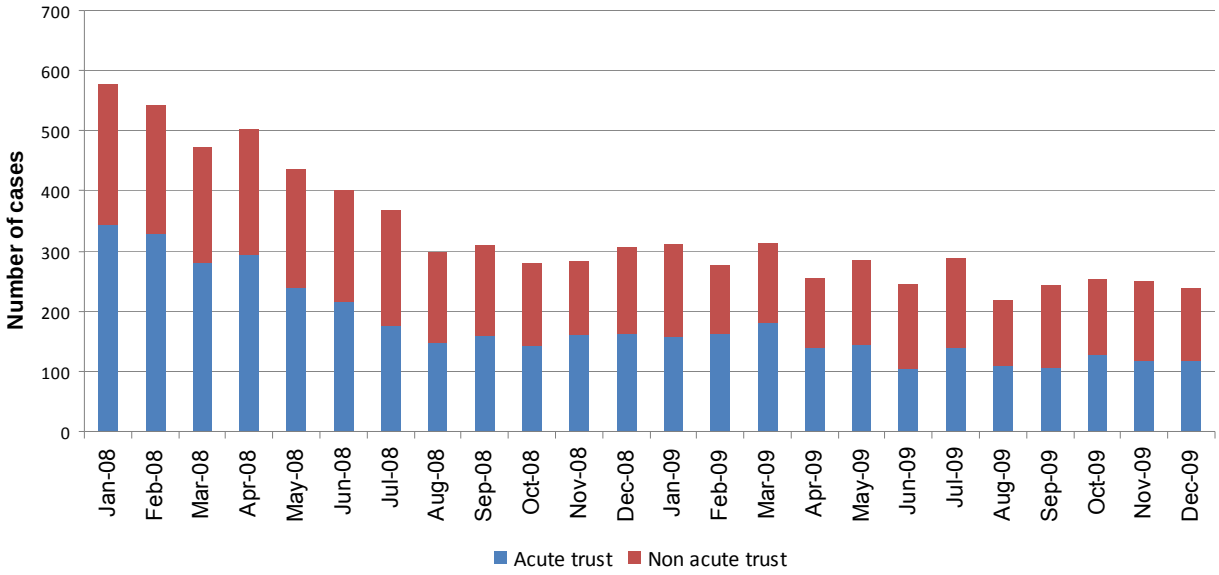


Figure 9.3b: Proportion of cases of CDI that are not apportioned to an acute trust 2008 by West Midlands Primary Care Trust*

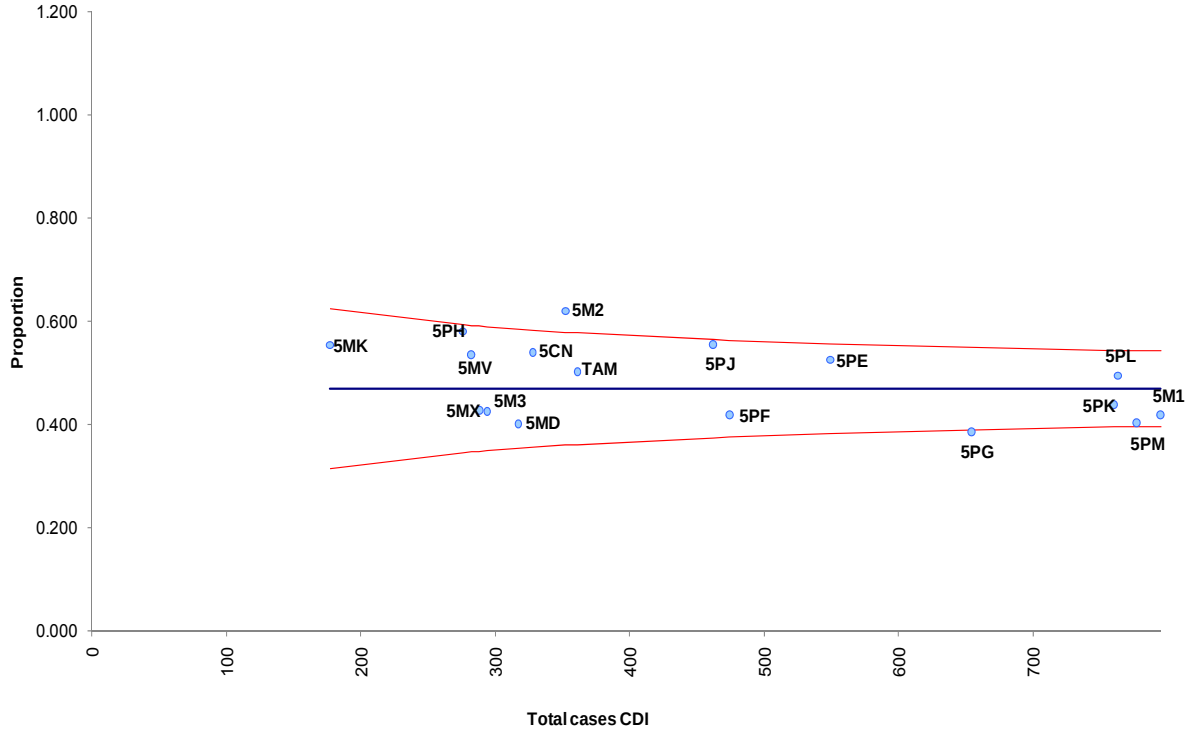
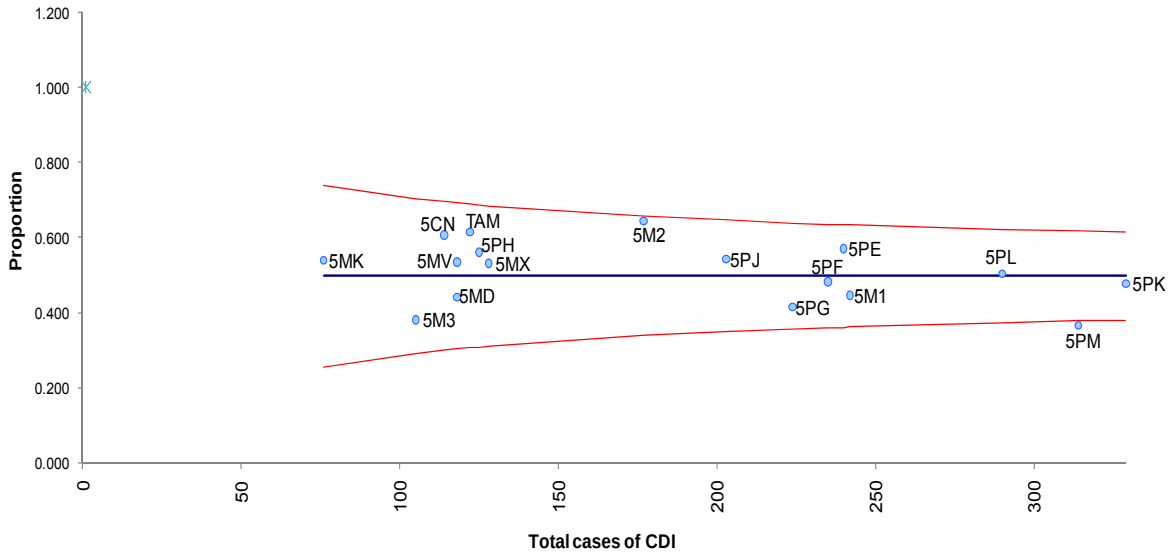


Figure 9.3b: Proportion of cases of CDI that are not apportioned to an acute trust 2009 by West Midlands Primary Care Trust*



* See appendix for key to Primary Care Trust codes

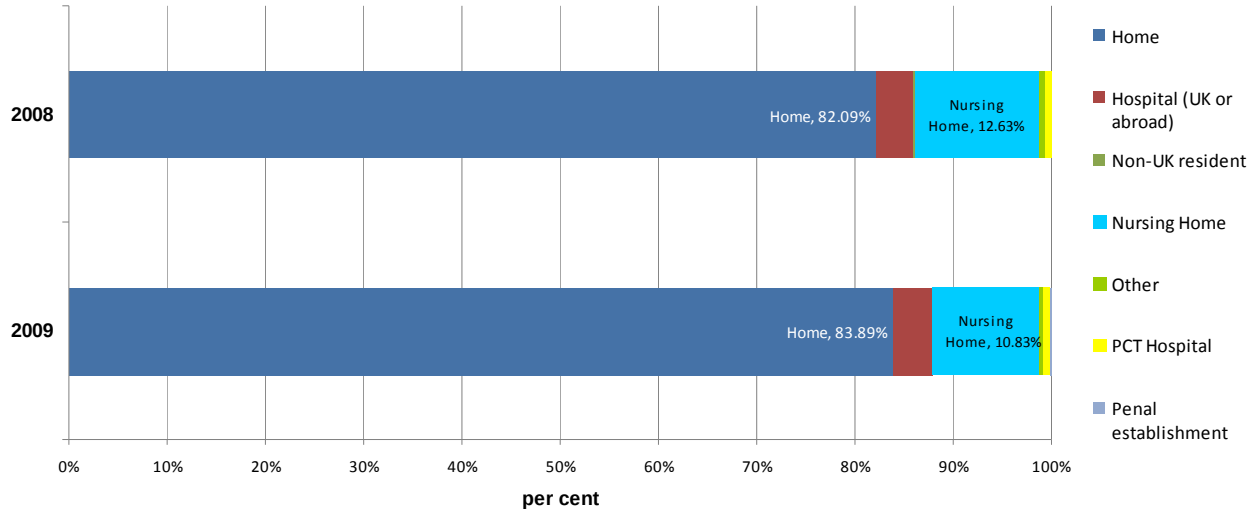
The reduction of CDIs is subject to national targets, which require a 30% reduction in 2010/2011 against a 2007/08 baseline. However, nationally this target was met two years ahead of schedule. In the West Midlands, 7,074 cases of CDI were reported on the mandatory reporting system in 2007/2008, against 4089 in 2008/09, marking a 42% reduction. The national rate of reduction over the same period was 36%.

For 2010/2011, the CDI objective challenges trusts to make further improvements and also encourages the development of multidisciplinary, health economy-based strategies to improve on the performance in previous years. In addition to national objectives, more stringent locally agreed objectives are also in place.

9.4 Patient Demographics

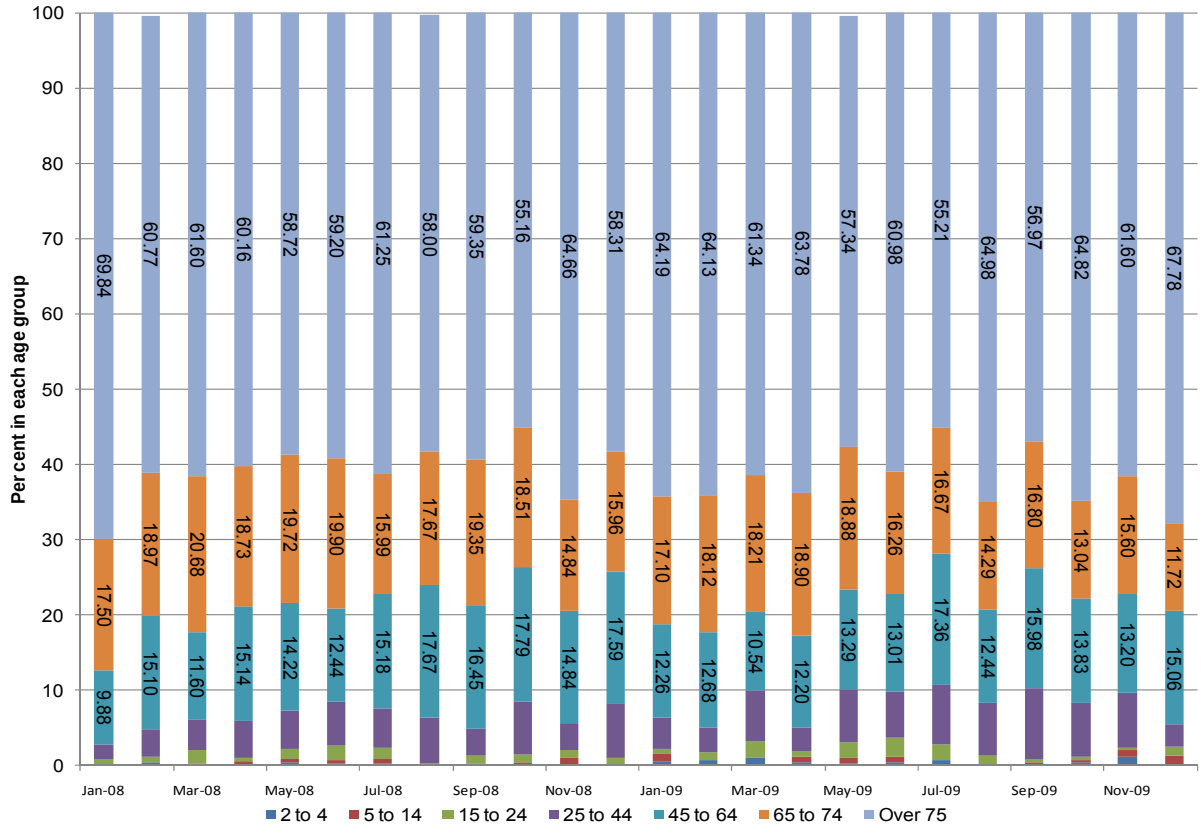
Most hospital inpatients (whether pre or post 3 days) who tested positive for CDI were admitted from home, followed by those admitted from all care homes (Figure 9.4).

Figure 9.4: Location West Midlands inpatients with CDI were admitted from



As over 60% of patients are over the age of 75, it is not surprising that nursing homes are the second largest location from which inpatients were admitted. As Figure 9.5 illustrates, CDI primarily affects older people, with 80% of patients aged 65 years and over.

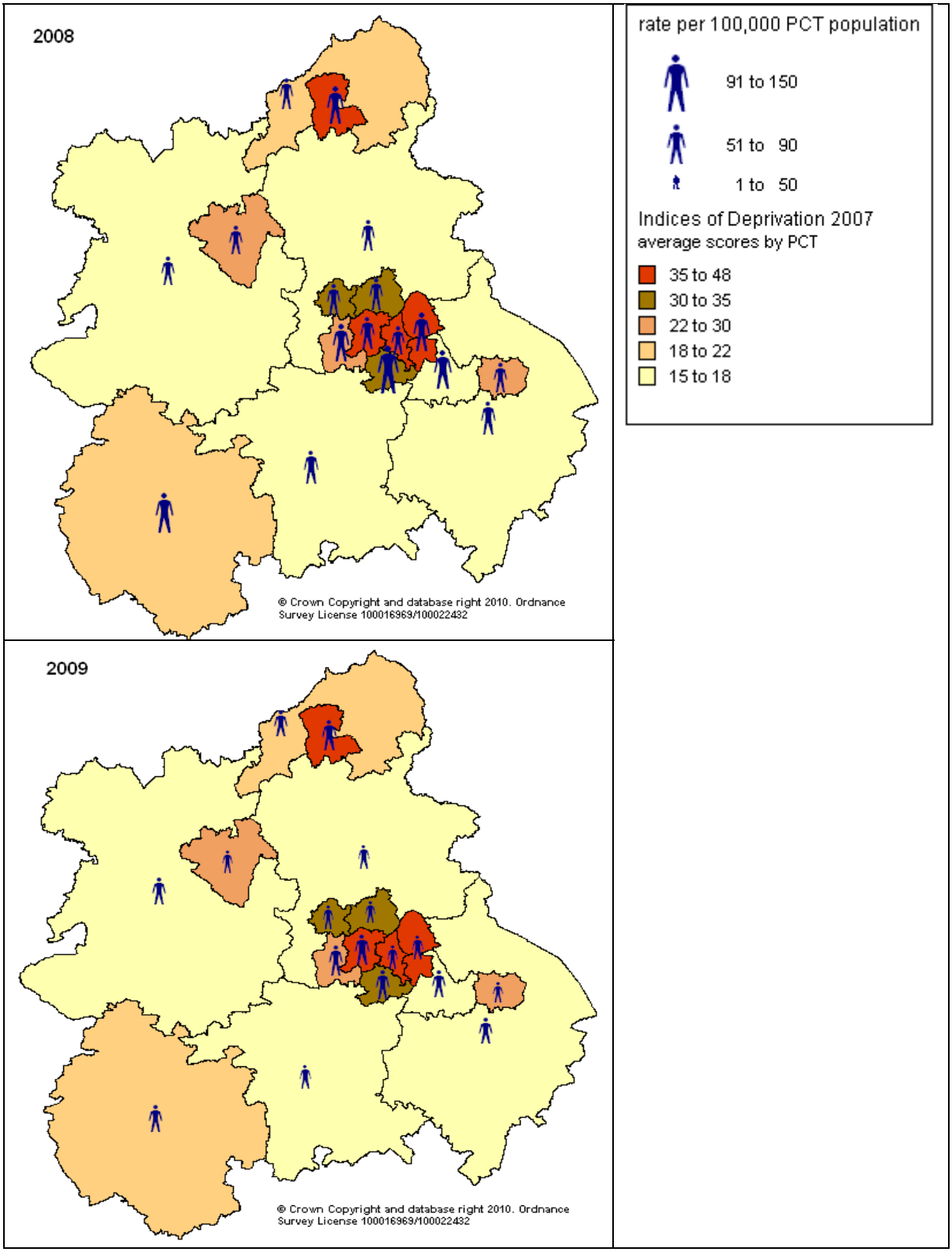
Figure 9.5: Age distribution of CDI patients, West Midlands, 2008 – 2009.



Maps 9.1a and 9.1b show the rate of CDI in PCTs in the region (includes acute trust and community cases) by background Indices of Deprivation in 2008 and 2009. There does not appear to be any correlation

between deprivation and the occurrence of CDI, however, it is apparent that there has been a clear reduction in CDI rates in most PCT areas between 2008 and 2009.

Maps 9.1a and 9.1b: Rates of CDI per 100,000 of West Midlands PCT population mapped against Indices of Deprivation. All positive CDIs reported on the HCAI Data Capture System for the relevant periods have been used for these calculations.



9.5 Link with Norovirus

Noroviruses are a leading cause of acute viral gastroenteritis, particularly in the winter months. Symptoms generally include vomiting and diarrhoea, but can also include fever and abdominal cramps.

There is no causal link between norovirus infection and CDI [2]. Any apparent correlation in the occurrence of both infections is likely to be attributable to the likelihood of increased ascertainment of CDI during the winter months through a rise in the incidence of viral gastrointestinal infections such as norovirus or rotavirus. This increase in patients with diarrhoeal symptoms during winter can lead to more testing and a subsequent rise in false-positive CDI results [3]. Figure 9.6 shows these seasonal peaks in norovirus and CDI occurrence, though it is a lot weaker with regard to the latter.

Another possible explanation for the seasonality in CDI is the impact of increased antibiotic usage in treating secondary bacterial infections following increased admission of elderly patients during the winter months from respiratory infections [3].

However, Figure 9.8 paints a somewhat contradictory picture and appears to show that the observed increase in stool specimens being examined in the winter and the corresponding rise in C. *difficile* toxin tests does not translate to a similar rise in the proportion of cases that test positive for CDI. . There may be a number of reasons for this including variability in the sensitivity of laboratory tests and kits being used across the region.

Figure 9.6: Quarterly laboratory reports of noroviruses and CDI

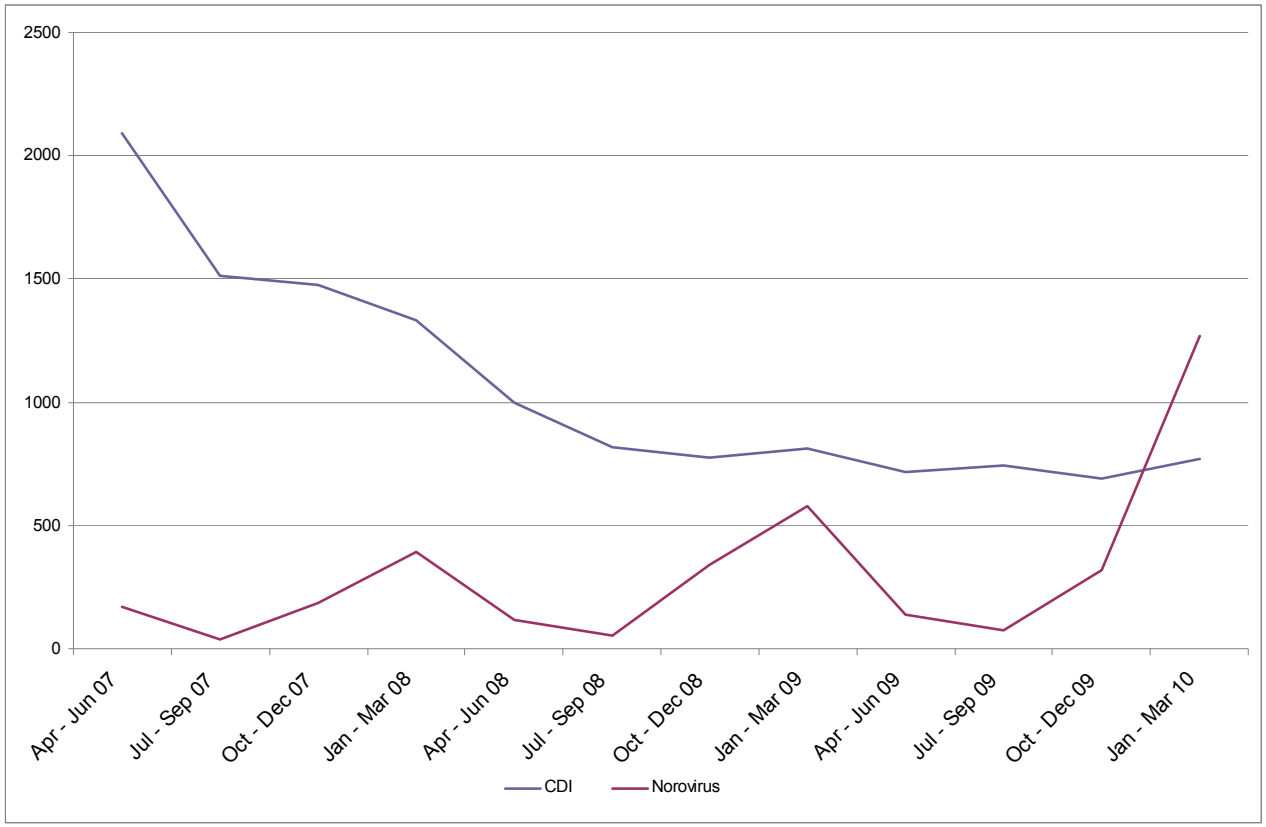
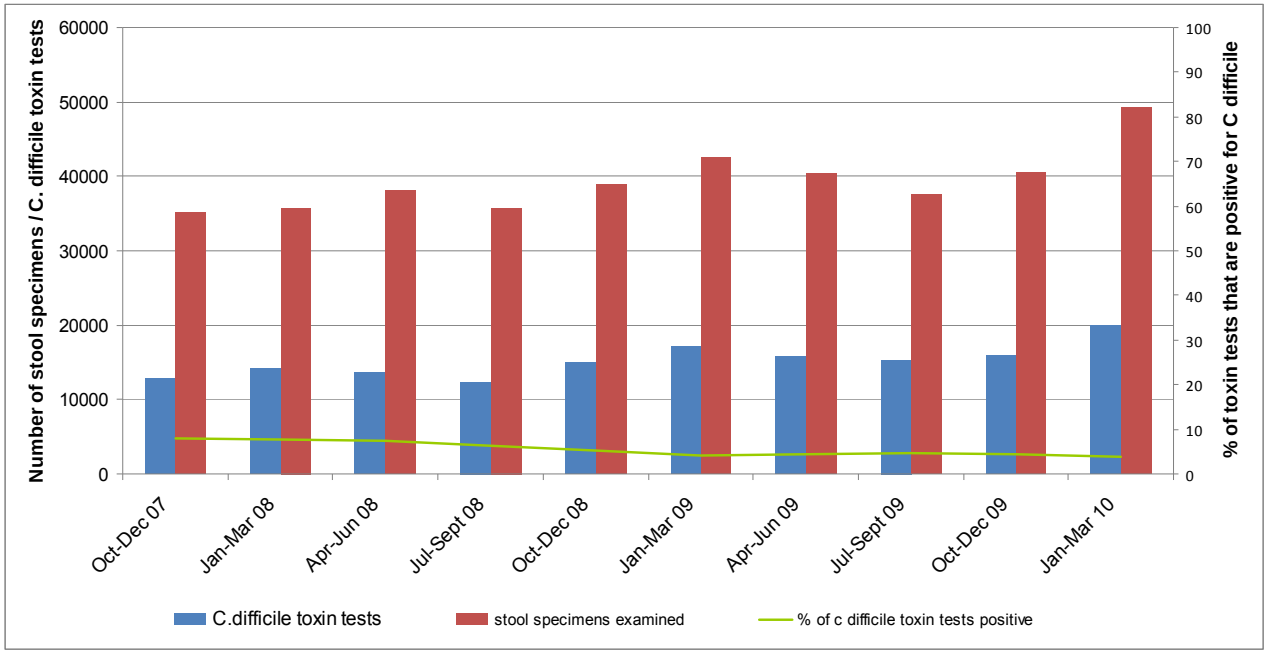


Figure 9.7: Quarterly number of stool specimens examined, C. *difficile* toxin tests done and the per cent of the latter that are positive for CDI (West Midlands)



9.6 Health Economy Approach

Due to the national and regional prioritisation of HCAI prevention and control, and subsequent improvements to CDI surveillance and infection control procedures, considerable progress has been made in reducing the rates of CDI across the region.

To ensure the maintenance of this downward trend in CDI incidence, a health economy-based approach is necessary given our understanding of the interconnections between health and social care provision in acute and community settings. There is a recognition that such an approach requires multi-disciplinary, cross-agency input to identify and tackle local issues that promote the spread of CDIs and to this end, steps have been taken in the region to engage all relevant stakeholders in developing, implementing and monitoring plans to prevent and control CDIs.

Current health economy initiatives of relevance to CDI prevention and control include joint root cause analyses between the acute trust and primary care; cross sector collaboration in promoting the judicious prescribing of antibiotics; and the provision of tools and support to nursing and residential care homes. There are also other initiatives, led jointly by the HPA and Strategic Health Authority, aimed at improving the local and regional surveillance of health-care associated infections, including CDI, through the development new tools, optimisation of existing systems, and provision of training and education to key personnel.

Appendix

Key to Primary Care Trust codes

PCCode	NewPCTName
5PJ	Stoke On Trent PCT
5PH	North Staffordshire PCT
5PF	Sandwell PCT
5M2	Shropshire County PCT
5MK	Telford and Wrekin PCT
TAM	Solihull Care Trust
5M1	South Birmingham PCT
5M3	Walsall Teaching PCT
5MV	Wolverhampton City PCT
5PL	Worcestershire PCT
5PM	Warwickshire PCT
5PG	Birmingham East and North PCT
5MD	Coventry Teaching PCT
5PK	South Staffordshire PCT
5PE	Dudley PCT
5MX	Heart of Birmingham Teaching PCT
5CN	Herefordshire PCT

References

1. See www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/ClostridiumDifficile
2. See **Letter to the Editor: Increased detection of Clostridium *difficile* during a norovirus outbreak** by S.P. Barrett, A.H. Holmes, W.A. Newsholme and M. Richards, *Journal of Hospital Infection*, Volume 66, Issue 4, August 2007, Pages 394-395
3. Health Protection Agency. Quarterly Epidemiological Commentary: Mandatory MRSA bacteraemia & *Clostridium difficile* infection (up to January - March 2010). Available from URL: http://www.hpa.org.uk/web/HPAwebFile/HPAweb_C/1274091661838

Further information and other useful resources
General information and epidemiological data - For general information and epidemiological data about CDI, including monthly reports by hospital:

C. difficile methodology - new minimum standard for CDI, for implementation from April 2011.
www.dh.gov.uk/en/Publichealth/Healthprotection/Healthcareassociatedinfection/Nationalupdates/DH_114862
Clostridium difficile infection: how to deal with the problem
www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_093220

Noroviruses – for general information and epidemiological data on noroviruses:
www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/Norovirus
All links checked on 28 June 2010

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Obaghe Edeghere, Health Protection Agency and Helen Bagnall, Health Protection Agency

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CHAPTER TEN: MEASLES AND MUMPS IN THE WEST MIDLANDS 1989 – 2009

10.1 Introduction

The Health Protection Agency (HPA) is responsible for collating Notifications of Infectious Diseases (NOIDs). The HPA West Midlands Regional Epidemiology Unit (REU) uses NOIDS data on measles and mumps along with other surveillance data to monitor disease trends, vaccination coverage levels and also identify outbreaks and clusters. These NOIDS based surveillance information on measles and mumps are currently disseminated on a quarterly basis via a report that is circulated to all Primary Care Trust (PCT) leads and Health Protection Units in the region.

10.2 Notification of Infectious Diseases (NOIDs)

There has been a statutory requirement to notify certain infectious diseases since the end of the 19th century. Diseases such as cholera, diphtheria, smallpox and typhoid had to be reported in London from 1891 and the rest of England and Wales from 1899. In 2010 the Health protection legislation in England was updated and the revised measures are contained within the amended Public Health (Control of Disease) Act 1984 and its accompanying Regulations[1, 2]. These new Regulations for clinical notifications came into force on 6th April 2010 and in addition to a specified list of infectious diseases which now includes 30 diseases, there is also a requirement for Registered Medical Practitioners (RMPs) to notify cases of other infections or contamination which could present a significant risk to human and public health[1].

The prime purpose of the notification system is to provide a timely system for detecting possible outbreaks and epidemics. The accuracy of the diagnosis is secondary and need only be based on clinical suspicion. As notifications are based on clinical suspicion there are limitations to the data which should be considered when interpreting the data. Nevertheless, NOIDs data are very important for showing trends over time.

10.3 Immunisation data

The Measles, Mumps and Rubella vaccine (MMR) was introduced in Britain in 1988. This is one of the vaccine programmes monitored by the HPA Centre for Infections (CfI) which collates UK immunisation coverage statistics from child health information systems for children who have reached their first, second or fifth birthday during each reporting quarter. Data are produced every quarter by the HPA[3] and annual national data are available back to 1997. Data included in this chapter are for Quarter 3 2006 (October – December) to Quarter 3 2009 (October to December).

10.4 Results

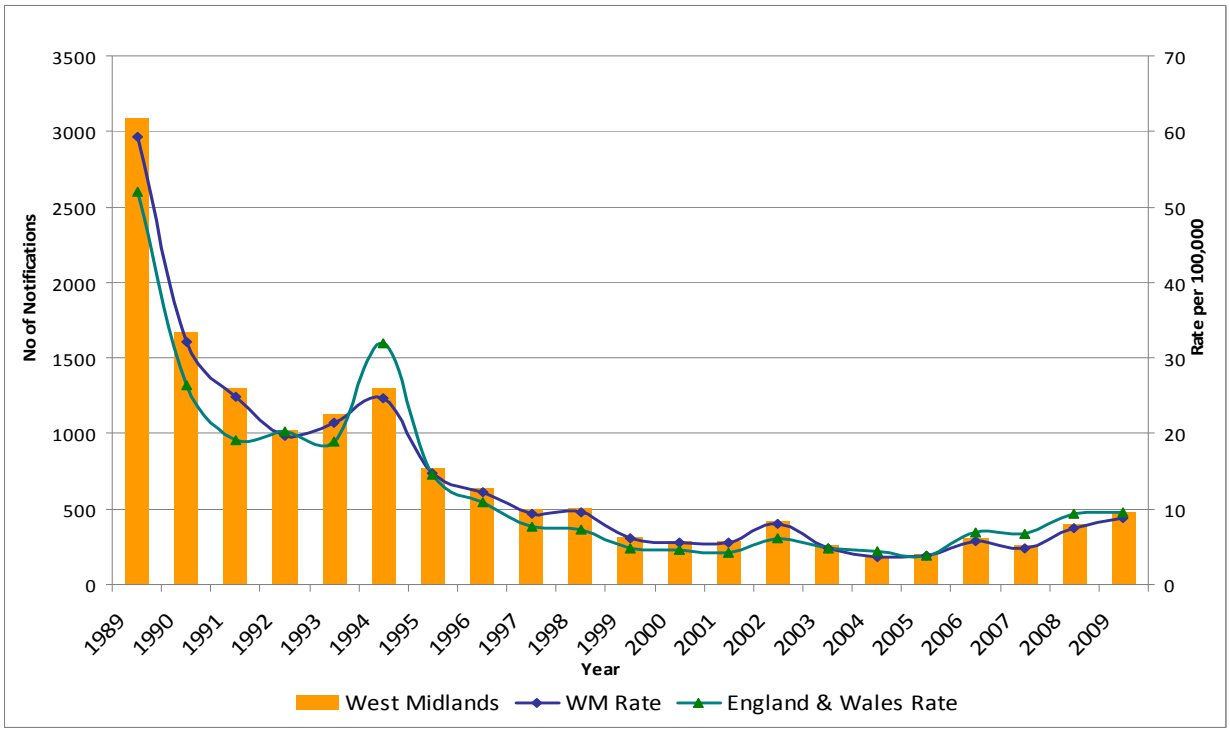
NOIDs

10.4.1 Measles in the West Midlands, 1989 – 2009

Notifications of measles in the West Midlands have steadily decreased in the last 20 years with a small increase seen in the last two years (Figure 10.1). This small increase may be a residual effect partly attributable to the decrease in MMR vaccine uptake in the target age group that arose following negative publicity about the vaccine.

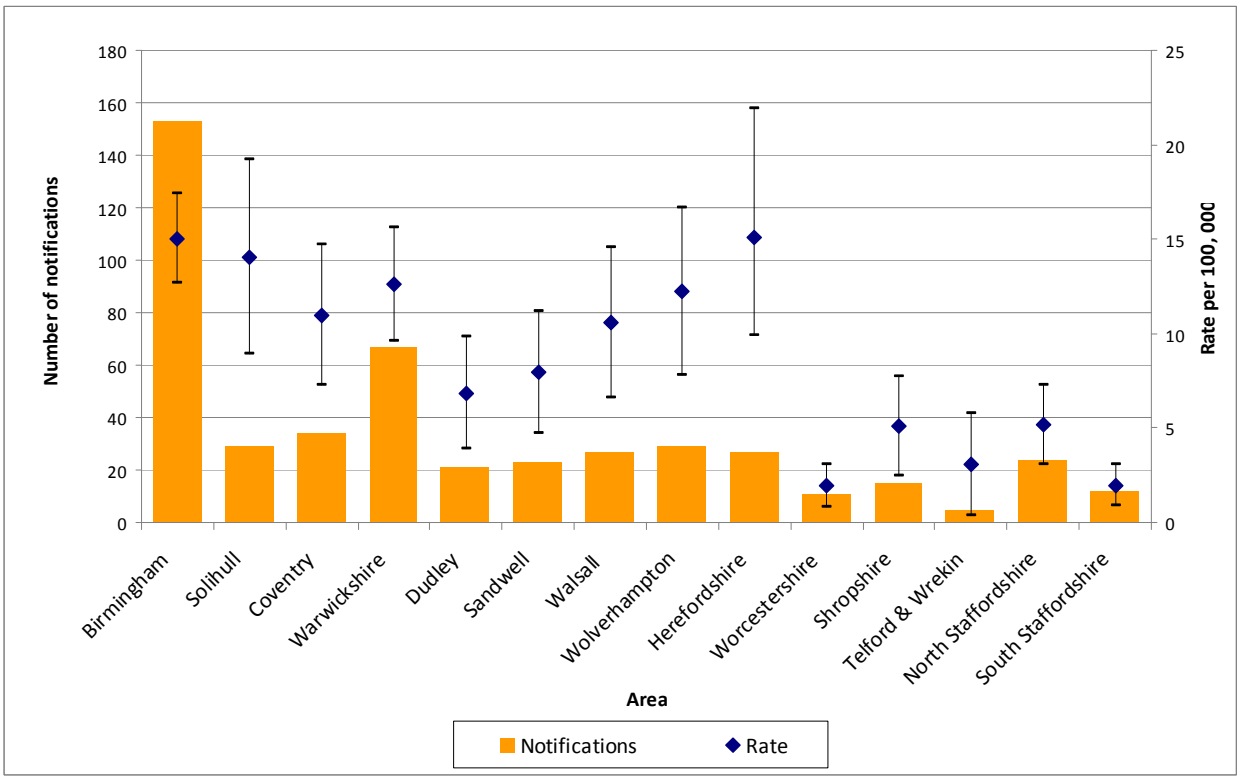
Notifications have decreased from over 3,000 (59.2 per 100,000) in 1989 to just under 500 (8.8 per 100,000) in 2009. At the beginning of this time period, rates observed in the West Midlands were above those in England and Wales. However in the last few years measles notifications in the West Midlands have been lower than in England and Wales.

Figure 10.1: Number and rate of measles notifications in the West Midlands and England & Wales, 1989 – 2009



In 2009 in the West Midlands, notifications varied from 15.1 per 100,000 in Birmingham and Herefordshire to 2.0 per 100,000 in Worcestershire and South Staffordshire (Figure 10.2). Overall rates in the West Midlands were lower than in England and Wales (8.8 per 100,000 compared to 9.6 per 100,000).

Figure 10.2: Number and rate of measles notifications in the West Midlands, 2009

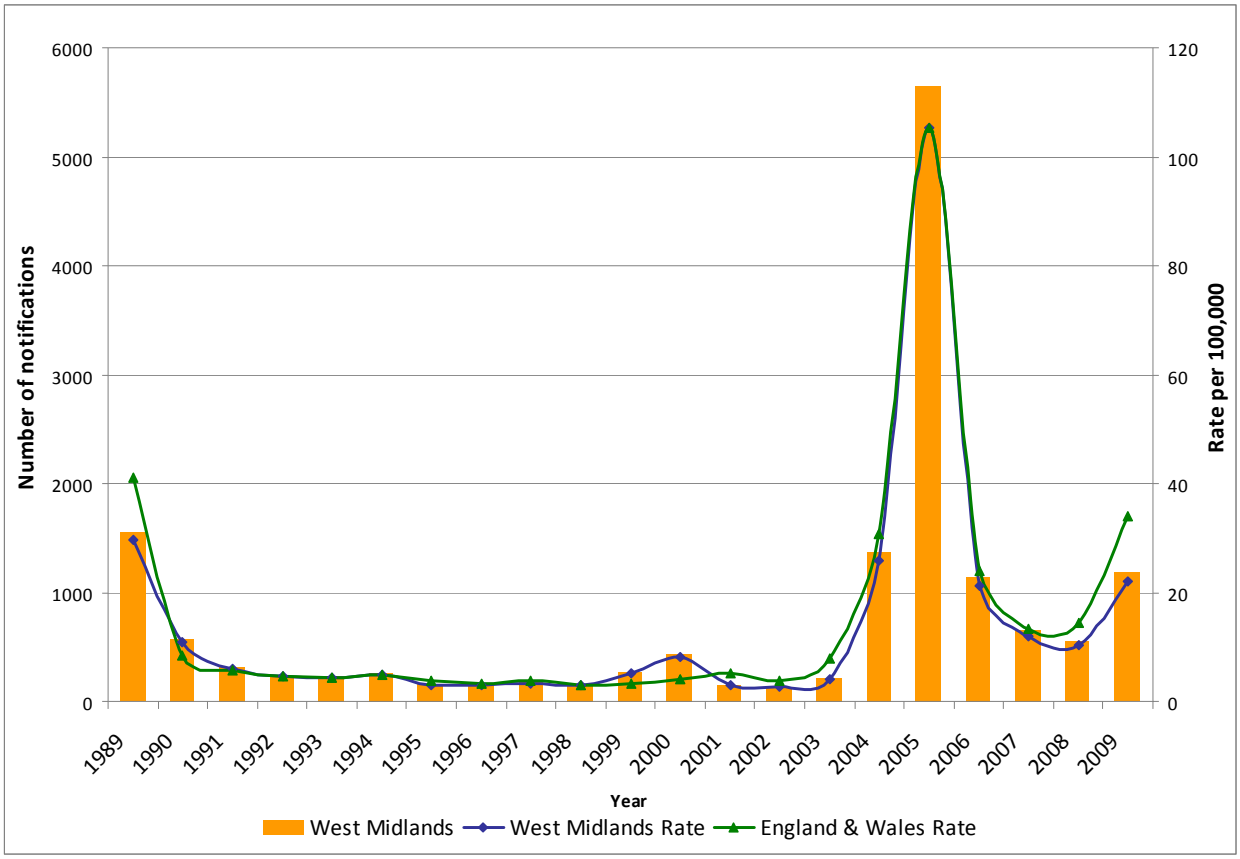


10.4.2 Mumps in the West Midlands 1989 – 2009

Clinical notifications of mumps in the West Midlands decreased from 1,546 notifications (30.0 per 100,000) in 1989 to 151 notifications (2.9 per 100,000) in 1998 (Figure 10.3). In recent years, notifications have increased again peaking to 5,640 (105.4 per 100,000) in 2005. Throughout most of this time period, rates in the West Midlands have been similar to those in England and Wales, however in 2009 rates were 22.0 per 100,000 in the West Midlands compared to 34.1 per 100,000 in England and Wales. Nationally, an increase was observed in 2003 which continued in 2004 and 2005. In the West Midlands this increase started towards the end of 2004 and peaked in 2005 before decreasing to 2004 levels the following year.

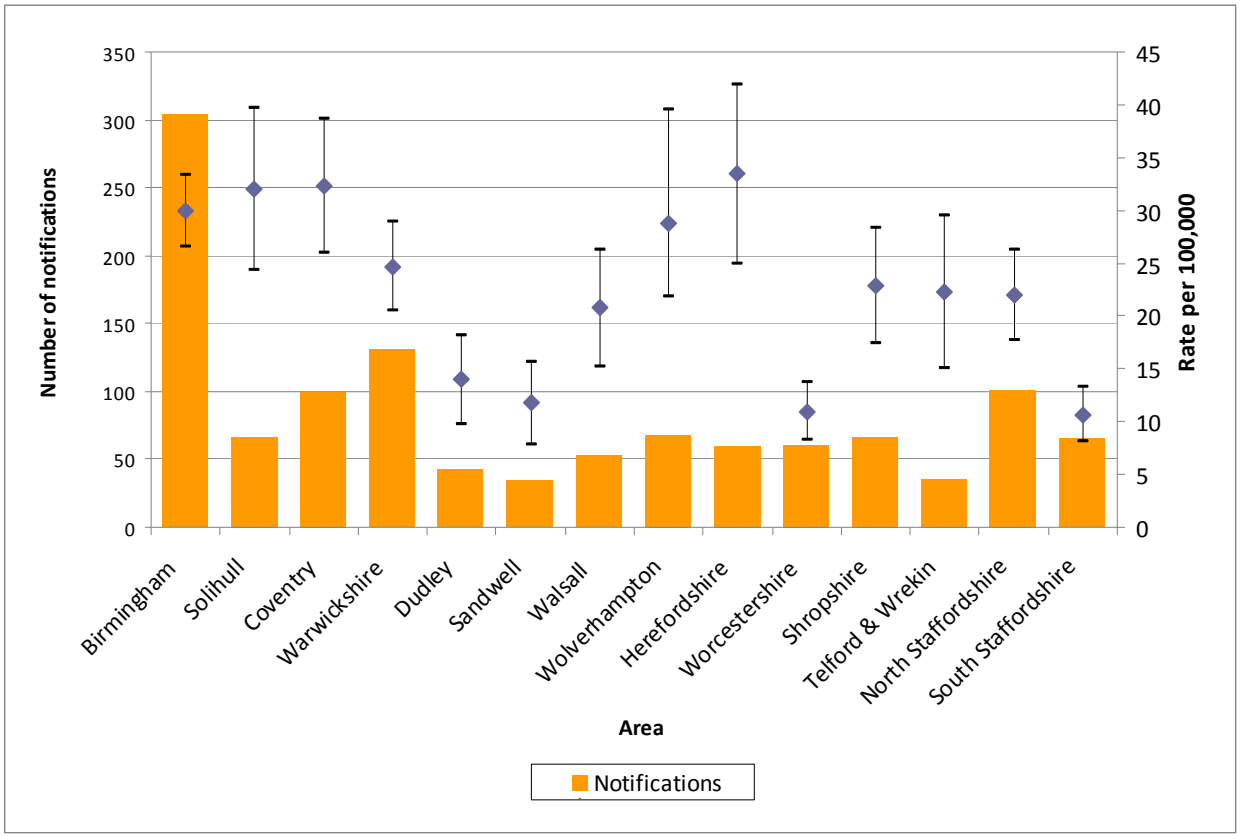
During this time of increased incidence the majority of reported cases were in older teenagers and younger adults particularly those in the 15-24 age group with many of these cases associated with outbreaks in universities and colleges across England and Wales[4]. This observed increase in susceptibility in the 15-24 age group may be attributed to low levels of natural immunity (as very few persons in this age group had been previously infected) and also low levels of acquired immunity because they either never received the MMR vaccine as they were too old when it was introduced in 1988 or may have received only one dose[5].

Figure 10.3: Number and rate of mumps notifications in the West Midlands and England & Wales, 1989 – 2009



In 2009 mumps rates were highest in Solihull, Coventry and Herefordshire (32.0, 32.3 and 33.4 per 100,000 respectively) (Figure 10.4). Overall the West Midlands rate was lower than the England and Wales rate (22.0 per 100,000 compared to 34.1 per 100,000).

Figure 10.4: Number and rate of mumps notifications in the West Midlands, 2009



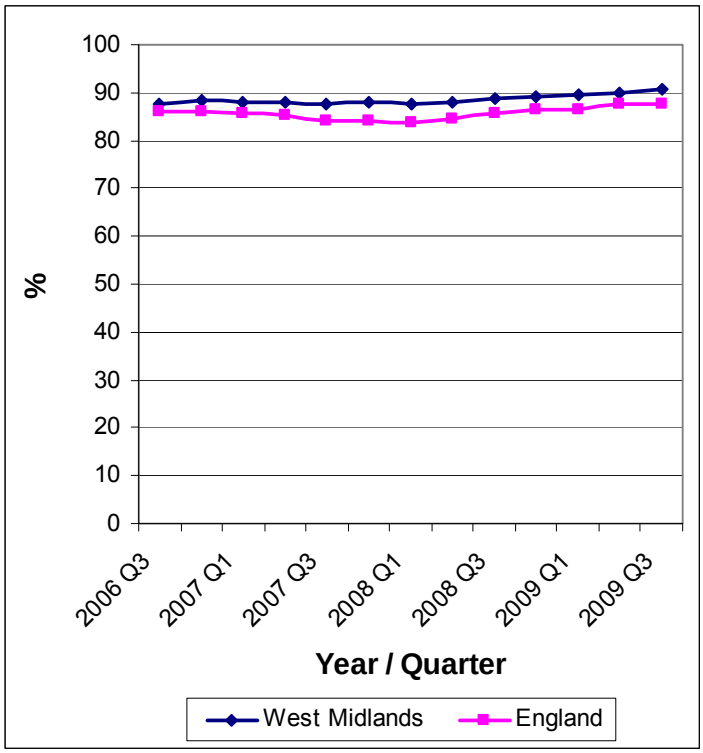
10.4.3 MMR coverage data

In recent years (2006-2009), MMR coverage has increased in the West Midlands both at 24 months and five years of age (Figures 10.5, 10.6 and10.7). This improvement may be linked to the introduction of immunisation performance indicators within the Vital Signs programme as part of the NHS Operating Framework[6]. Throughout this time period, coverage in the West Midlands has been above coverage in England both at 24 months and 5 years.

During this time period, the overall uptake of the first dose of the MMR vaccine (MMR1) by 24 months of age was highest in Heart of Birmingham tPCT and North Staffordshire PCT. The lowest coverage was observed in Herefordshire PCT and Coventry tPCT. All PCTs in Shropshire and Staffordshire had higher coverage than the England average during this time.

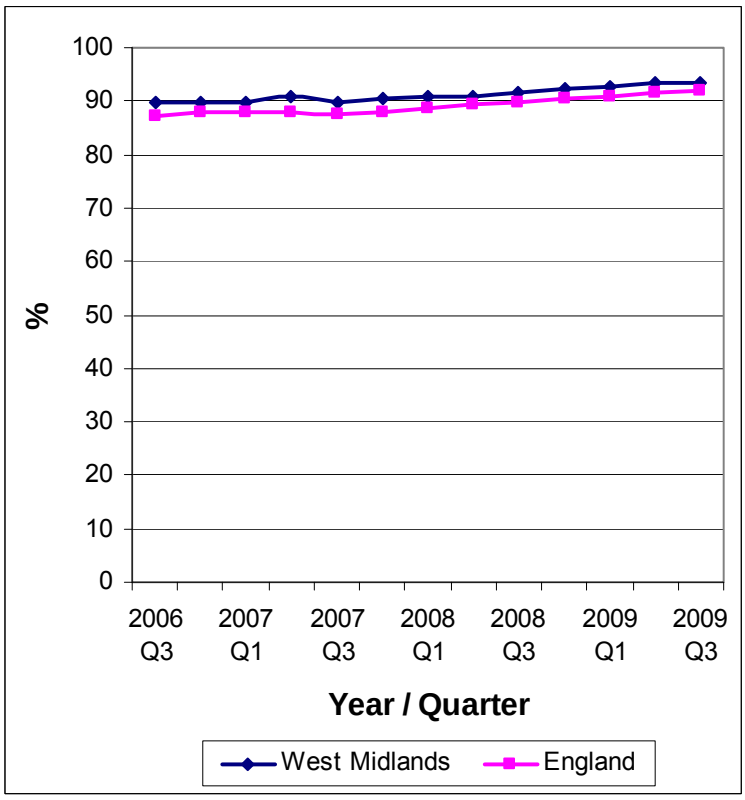
In the most recent quarter (2009 Q3), West Midlands coverage was at 90.7% with Warwickshire PCT having the highest coverage (95.2%) increasing from 87.9% in 2008 Q4. Coventry tPCT also saw a large increase from 79.4% in 2008 Q4 to 92.4% in the most recent quarter.

Figure 10.5: Uptake of MMR1 at 24 months in the West Midlands and England, 2006 – 2009



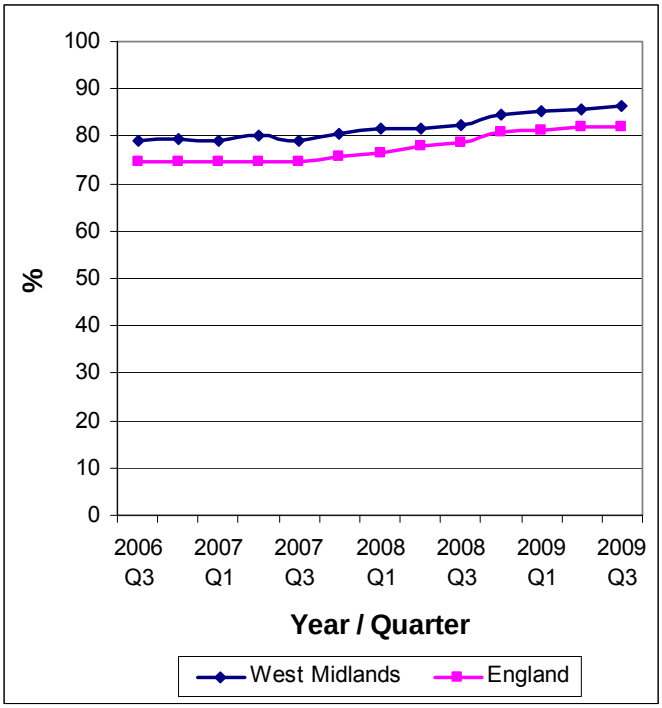
The highest coverage for the MMR1 at five years of age (Figure 10.6) was in Heart of Birmingham tPCT and Stoke on Trent PCT. Lowest coverage was in Herefordshire and Solihull PCTs. Again all PCTs in Shropshire and Staffordshire had higher coverage than the England average during this time. In the most recent quarter, the regional coverage was 93.5% with Coventry tPCT having the highest coverage (96.9%) increasing from 89.5% in 2009 Q2.

Figure 10.6: MMR1 5 years in the West Midlands and England, 2006 – 2009



The highest coverage for the booster dose at 5 years (Figure 10.7) was in North Staffordshire and Stoke on Trent PCTs. The lowest uptake was in Birmingham East and North and South Birmingham PCTs. Again the largest increase in the recent quarter was seen in Coventry tPCT which increased from 76.6% in 2009 Q2 to 90.6% in Q3. In the most recent quarter the West Midland's coverage was 86.3%.

Figure 10.7 Uptake of pre-school booster (MMR2) at 5 years in the West Midlands and England, 2006 – 2009



10.5 Discussion

In recent years, MMR coverage in the West Midlands has continued to increase but most PCTs do not yet meet the World Health Organisation (WHO) recommended target of ≥95%[7]. Achieving this vaccination threshold is needed to interrupt and reduce transmission in the community and ensure adequate herd immunity.

Notifications of measles and mumps have increased in the most recent years with most of the observed increases in 2008 and 2009 linked to clusters and outbreaks in the region. Following a measles outbreak that started in autumn 2008, the HPA West Midlands commenced enhanced surveillance of all cases reported to inform the outbreak management. The findings showed that between 1st November 2008 to the 31st March 2009 the majority of reported cases occurred in Warwickshire PCT (22%) and the majority of laboratory confirmed cases were in children aged less than 5 years (52%) and between 5 and 14 years (33%). Where known, 64% of cases had not had their MMR vaccine, 27% had received at least 1 dose and 9% had received 2 doses.

The HPA and NHS continue to promote MMR vaccination and regularly remind parents of the importance of children receiving two doses before they start school.

References

1 HPA/NOIDs: http://www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/NotificationsOfInfectiousDiseases/ Last accessed 16th April 2010.

2 OPSI: http://www.opsi.gov.uk/si/si2010/uksi_20100659_en_1. Last accessed 16th April 2010.

3 HPA/COVER data: http://www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/VaccineCoverageAndCOVER/. Last accessed 24th June 2010.

4 Savage E, Ramsey M, White J, *et al.* Mumps outbreaks across England and Wales in 2004: observational study. BMJ 2005; 330:1119.

5 Olowokure B, Clark L, Elliot AJ, *et al*. Mumps and the media: changes in the reporting of mumps in response to newspaper coverage. J Epidemiol Community Health 2007;61:385.
HPA/immunisation data: http://www.hpa.org.uk/hpr/infections/immunisation.htm#cover. Last accessed 6th July 2010.

6 WHO: http://www.euro.who.int/__data/assets/pdf_file/0008/79028/E87772.pdf. Last accessed 6th July 2010.

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CHAPTER ELEVEN: PREVALENCE OF VASCULAR DISEASE RELATED CONDITIONS AMONGST VARIOUS CULTURAL (ETHNIC) GROUPS IN BIRMINGHAM, UK

11.1 Introduction

This chapter details the prevalence of vascular-related conditions in Heart of Birmingham Teaching Primary Care Trust (HoBtPCT) in the population aged 40 years and over. It is well known that the prevalence of vascular-related conditions is dependent on gender, age and ethnicity. Methods of assessing prevalence by gender and age group are well established. However, methods for establishing prevalence incorporating ethnicity (cultural origin) are not generally available.

HoBtPCT has a registered population of 320,805 (April, 2010). The majority (64%) of the resident population is from what are usually considered minority ethnic groups while 36% of residents are white. (ONS, 2007). It has a young population with only 33% aged 40 years and over.

For more than 5 years, HoBtPCT has invested considerable effort and resources in primary health care services specifically to promote the identification of vascular-related conditions (listed in Table 11.1). Data from nearly 100,000 identifiable clinical records of patients aged 40y+ registered with 70 of the 74 general practices is stored on a secure central database managed by one of the authors (FB).

The purpose of the database is to improve care and facilitate clinical quality assurance, e.g. it is used to generate automated, sophisticated patient reports of a standard that would be written by a hospital consultant designed to enhance clinical management.

11.2 Method

A more detailed technical methodology is available at the end of the chapter (Appendix A)

The technique developed to incorporate cultural origin is feasible since:

a. HoBtPCT is a large PCT with ~ 300,000 registered population

b. A high proportion of general practices (95%) cooperate and support enhanced vascular disease control activities

c. Seventy-seven percent (77%) of the population has a medical record containing the patients' "self-reported cultural identification".

d. The bulk of HoBtPCT population comprises just a few cultural groups: indigenous UK (white/British), Bangladeshi, Pakistani, Indian and Black. As a result, nearly 50% of patients with no record of "self-reported cultural identification" (ethnicity) can be appropriately assigned using a '"common names" algorithm by Mosaic Origins software program [1]

For the purpose of this work, the term ethnicity includes cultural origin and 'self-reported cultural identification'.

Data from all 98,982 patients aged 40+ years has been used. Of these, 43,000 were identified as having one or more of the seven vascular-related conditions. Table 11.1 shows the number of patients identified (total population and 40y+) as well as the conditions' prevalence in the 40y+ population.

Table 11.1: Vascular-related conditions in Heart of Birmingham Teaching Primary Care Trust*

	Condition	QOF Indicators	Number on disease register (all ages)	Number on disease register (aged 40y+)	Prevalence (aged 40y+)
1.	Coronary Heart Disease	CHD1	7,822	7,677	7.8%
2.	Heart Failure	HF 1	1,542	1,486	1.5%
3.	Diabetes	DM19	18,282	16,754	16.9%
4.	Chronic Kidney Disease	CKD1	7,172	7,045	7.1%
5.	Atrial Fibrillation	AF1	1,723	1,690	1.7%
6.	Hypertension	BP1	34,217	32,393	32.7%
7.	Stroke	Stroke 1	2,995	2,887	2.9%

* Total 40y+ population of 98,982 from 70 of 74 practices.

Unfortunately, 23% of "self reported cultural identification" 'Ethnicity, Ethnic code data' extracted from Read Code fields (9i or 9S) were missing. Mosaic Origins software was used to help mitigate this deficiency. Mosaic Origins software is a database which uses over 400,000 first names and one million surnames to identify the origin of an individual's name, which has been used in social marketing by the NHS [1]. It can allocate likely country of origin based on first name and surname. By using this software, 47% of the 23% culturally non-identified patients were assigned to a major cultural group (ethnicity). Even so, the ethnicity of about 12% of all patients remained as "unknown".

Further analysis was carried out to impute the ethnic categories of the outstanding "unknowns"; the methodology for this is described in Appendix A.

11.3 Findings

For each of the seven identified vascular-related conditions, prevalence is reported by five-year age bands, gender and ethnicity. Results are presented as graphs in the following order:

a. Separate male / female based on the 76,231 (76k) patients with self-assigned ethnicity.

b. Separate male / female based on all 98,982 patients comprising:
- the 76,231 (76k) patients with self assigned ethnicity information
- Origins assignment of 10,741 (11k) of the unassigned patients
- 12,010 (12k) residual unknowns.

c. Separate male / female based on all 98,982 patients comprising:
- the 76k patients with self assigned ethnicity information
- Origins assignment of 10,741 (11k) of the unassigned patients
- imputed ethnicity for the 12,010 (12k) residual unknowns.

In addition, tables of confidence intervals are presented for the prevalence figures based on all patients where ethnicity is fully assigned. Details of the methodology used to calculate the confidence intervals are given in Appendix A

11.4 Ongoing work

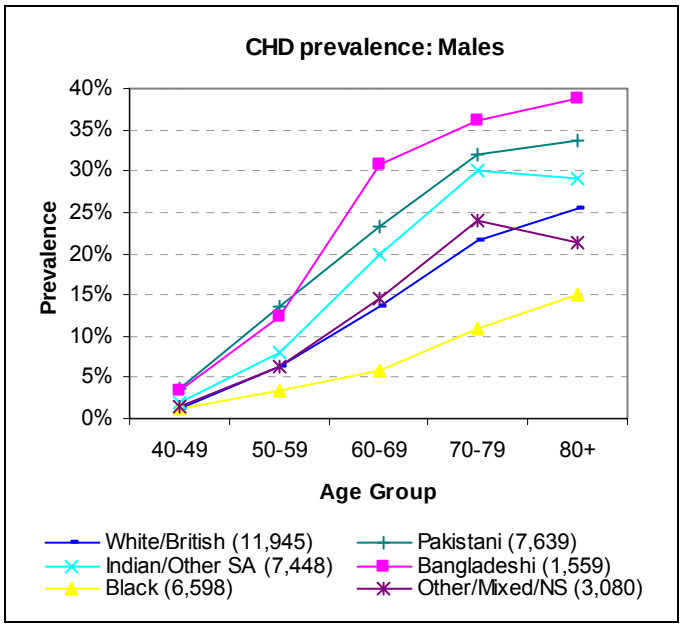
By applying these age, gender and ethnic prevalence rates to the population profile of each general practice, it should be possible to calculate the expected number (count) of registered patients with each

vascular-related condition at each practice, e.g. expected number of QOF registered diabetic patients for each practice.

A subsequent report will explore the extent of systematic under-reporting by practices and whether such under-reporting appreciably lowers the estimate of the population prevalence. This is part of ongoing work in the HoBtPCT.

11.5 Coronary Heart Disease

Figure 11.1a: Coronary Heart Disease prevalence for males and females by age and ethnicity (self-assigned).



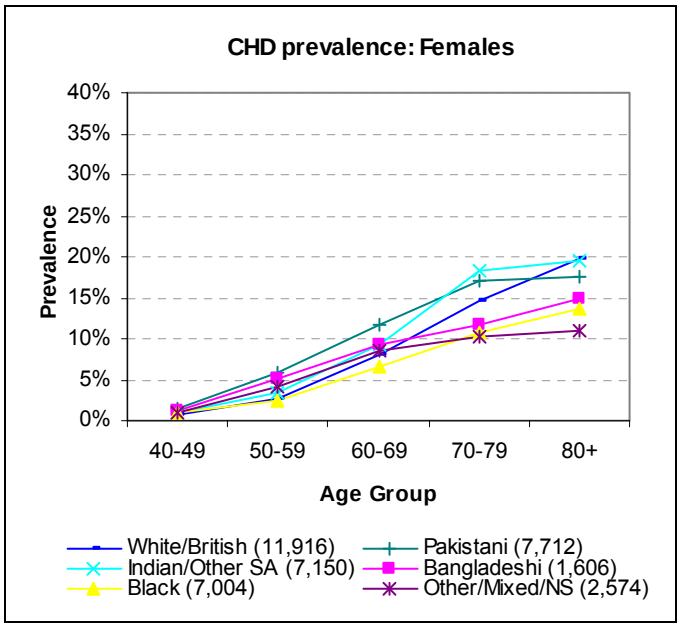
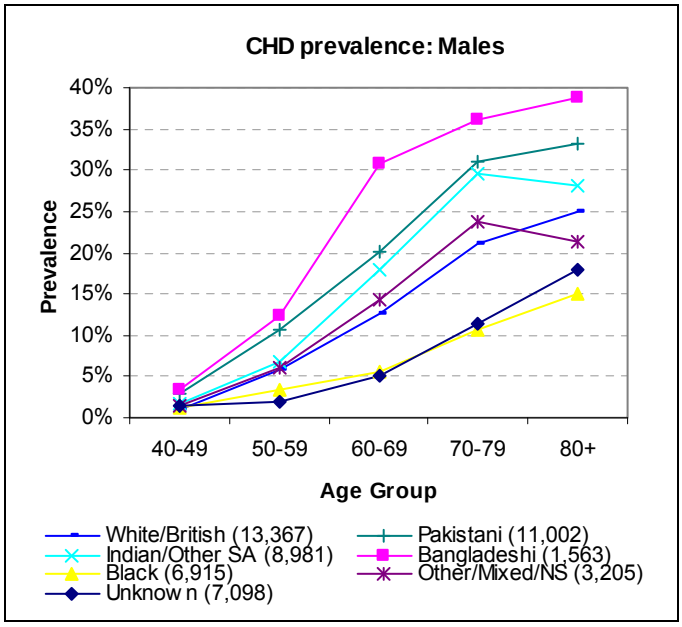


Figure 11.1b: Coronary Heart Disease prevalence for males and females by age and ethnicity (self assigned and Origins-assigned)



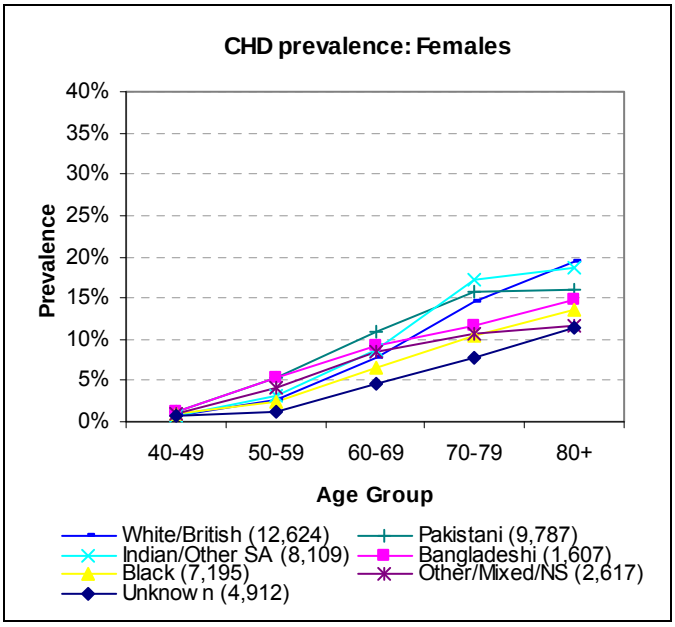
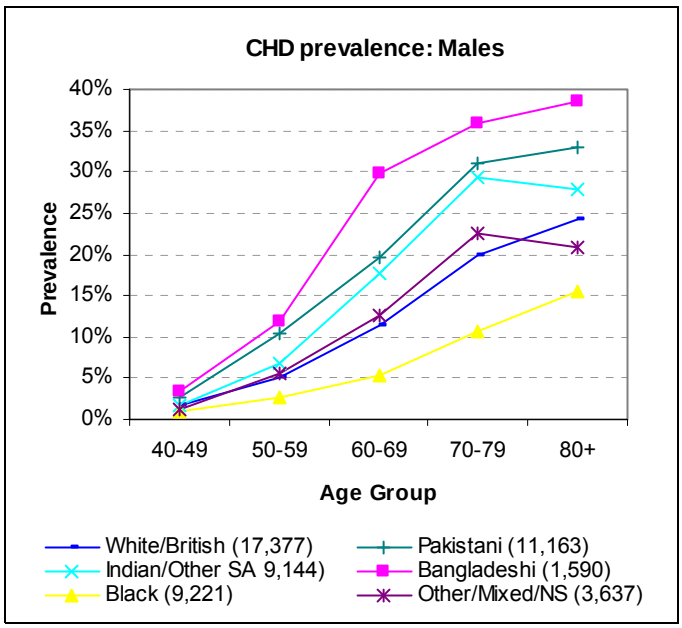


Figure 11.1c: Coronary Heart Disease prevalence for all males and females by age and ethnicity (self-assigned, Origins-assigned and unknown imputed)



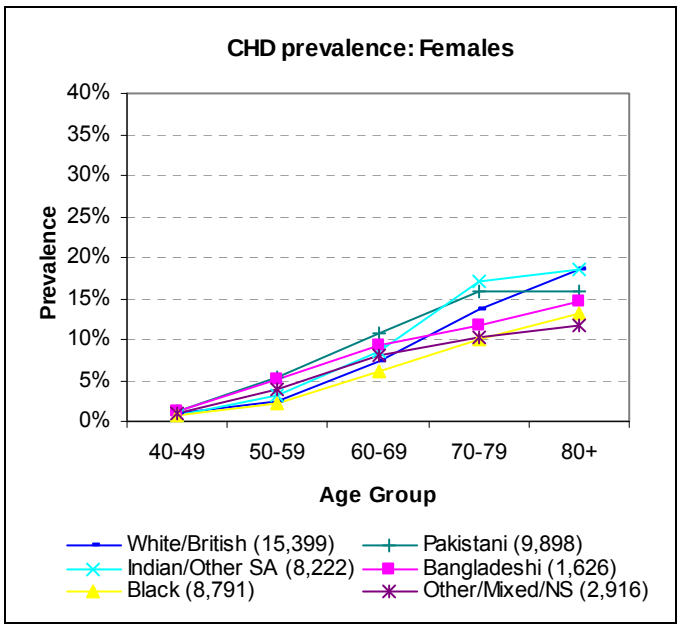
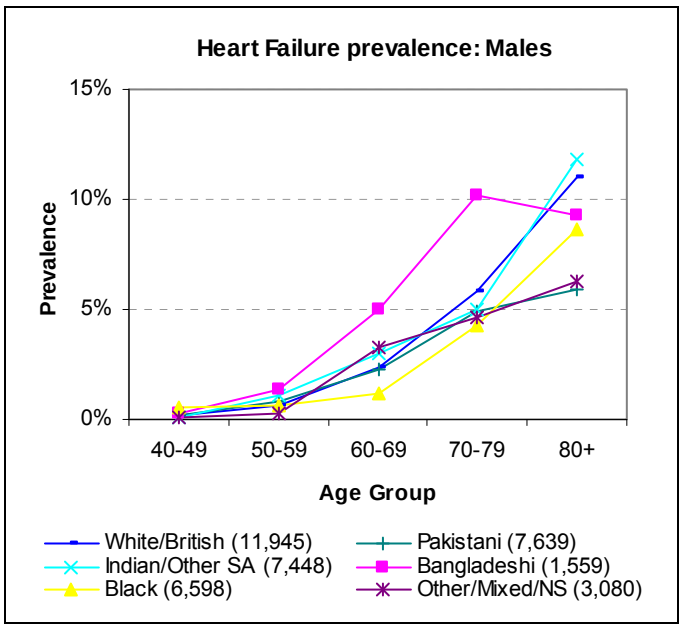


Table 11.2: Confidence limits for Coronary Heart Disease prevalence for all males and females by age and ethnicity (self-assigned, Origins-assigned and unknown imputed)

Gender	Agegroup	Bangladeshi		Indian		Pakistani		Black		Other		White/British		All ethnic groups	
		LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL
Male	40-49	2.4%	5.0%	1.2%	2.1%	2.2%	3.1%	0.7%	1.2%	0.8%	1.8%	1.3%	2.0%	1.6%	1.9%
	50-59	9.1%	15.6%	5.9%	7.7%	9.5%	11.6%	2.2%	3.6%	4.3%	7.3%	4.4%	5.7%	6.2%	7.0%
	60-69	23.0%	37.8%	15.8%	19.7%	17.6%	22.1%	4.2%	6.9%	9.8%	16.3%	10.4%	12.5%	12.7%	14.2%
	70-79	30.2%	42.1%	26.3%	32.4%	28.5%	33.5%	9.1%	12.5%	18.5%	27.4%	18.4%	21.6%	21.4%	23.4%
	80+	26.9%	51.8%	23.4%	33.0%	29.0%	37.5%	12.6%	19.0%	14.7%	28.7%	21.7%	26.8%	23.1%	26.5%
All males		12.5%	15.9%	8.9%	10.1%	10.9%	12.1%	3.6%	4.4%	5.6%	7.2%	8.0%	8.8%	8.3%	8.7%
Female	40-49	0.5%	2.5%	0.4%	1.0%	0.9%	1.6%	0.6%	1.1%	0.5%	1.6%	0.7%	1.3%	0.8%	1.1%
	50-59	3.6%	7.4%	2.5%	3.9%	4.6%	6.2%	1.6%	3.0%	2.7%	5.5%	2.0%	3.0%	3.1%	3.8%
	60-69	6.5%	12.9%	7.3%	10.2%	9.3%	12.4%	4.8%	7.7%	5.7%	11.1%	6.4%	8.3%	7.6%	8.8%
	70-79	8.0%	16.7%	14.8%	19.5%	13.9%	17.9%	8.5%	11.8%	7.3%	14.3%	12.3%	15.0%	12.8%	14.5%
	80+	6.0%	31.7%	15.1%	22.4%	12.8%	19.6%	10.6%	16.1%	7.3%	18.2%	16.7%	20.3%	15.7%	18.2%
All females		4.6%	6.8%	5.3%	6.3%	6.0%	7.0%	3.5%	4.3%	3.4%	4.9%	6.4%	7.2%	5.6%	6.0%
Persons		8.8%	10.9%	7.3%	8.1%	8.7%	9.5%	3.7%	4.3%	4.8%	5.9%	7.3%	7.9%	7.1%	7.4%

11.6 Heart Failure

Figure 11.2a: Heart Failure prevalence for males and females by age and ethnicity (self-assigned)



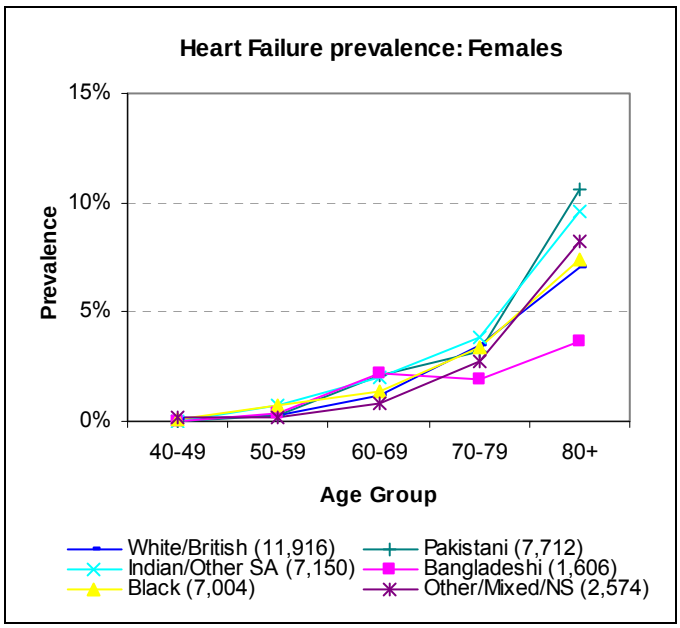
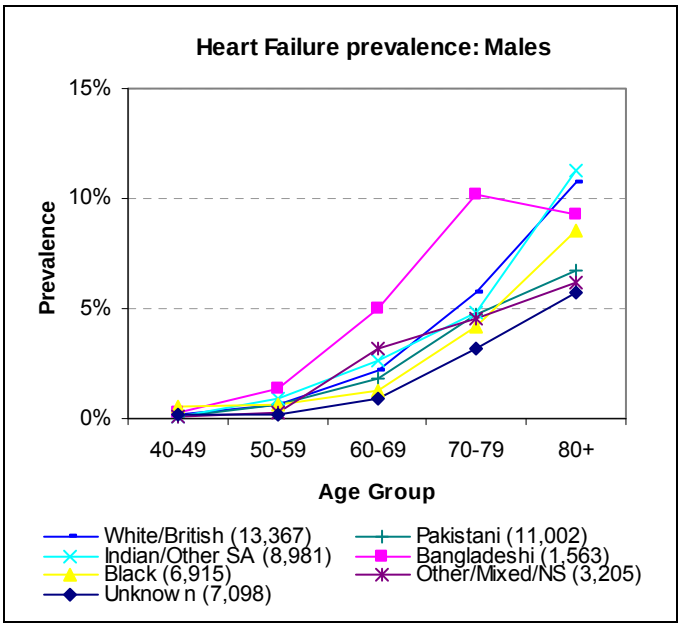


Figure 11.2b: Heart Failure prevalence for males and females by age and ethnicity (self-assigned and Origins-assigned)



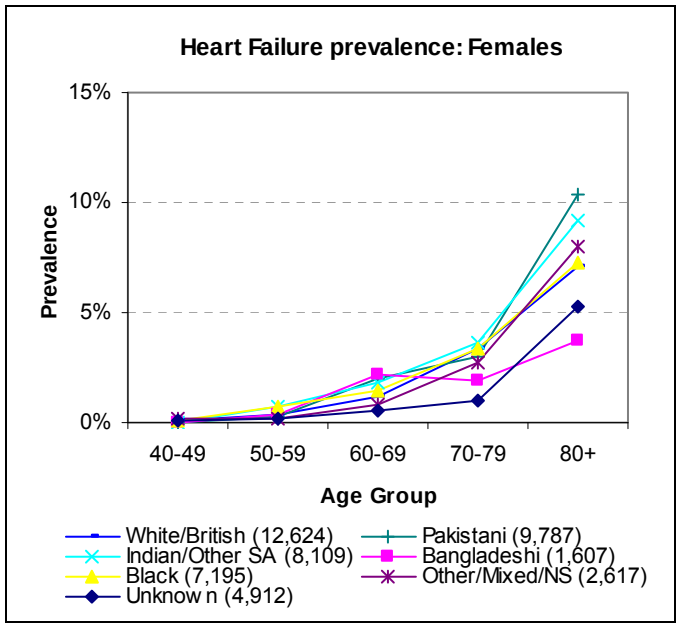
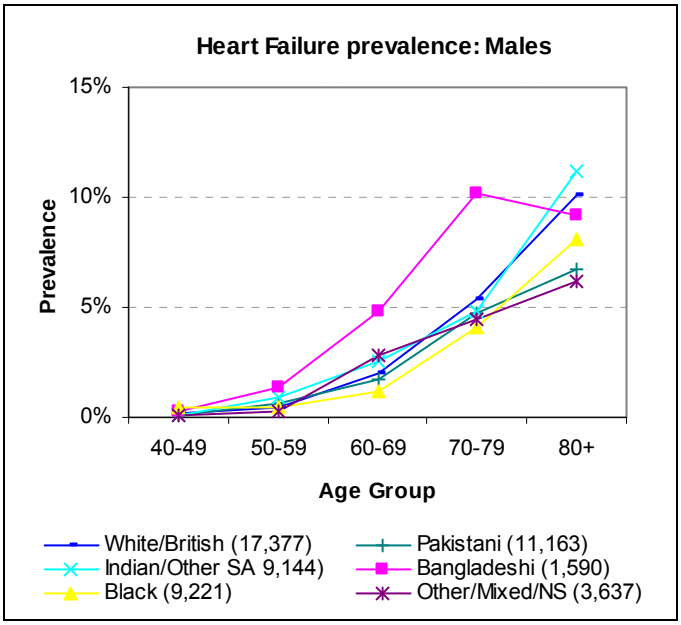


Figure 11.2c: Heart Failure prevalence for all males and females by age and ethnicity (self-assigned, Origins-assigned and unknown imputed)



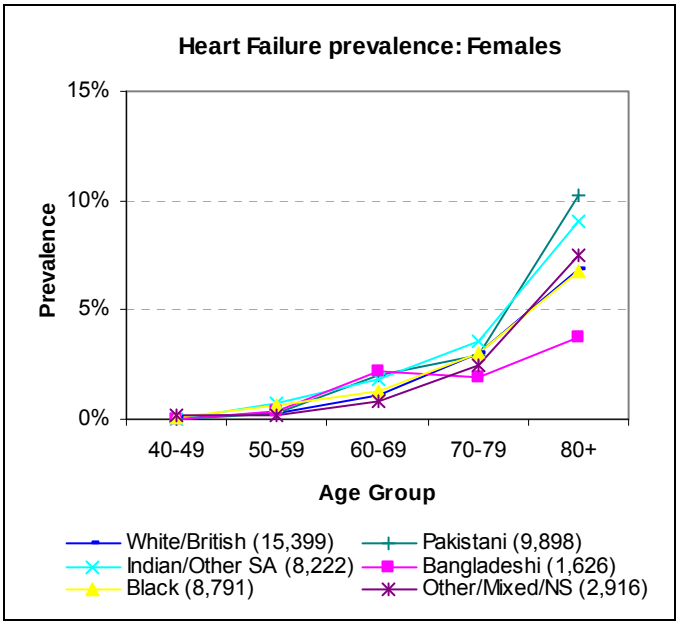
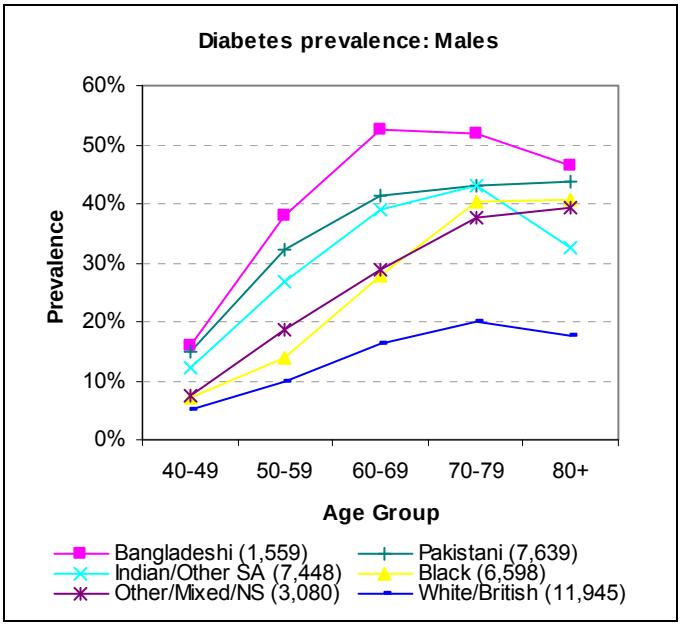


Table 11.3: Confidence limits for Heart Failure prevalence for all males and females by age and ethnicity (self-assigned, Origins-assigned and unknown imputed)

Gender	Age group	Bangladeshi		Indian		Pakistani		Black		Other		White/British		All ethnic groups	
		LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL
Male	40-49	0.1%	1.0%	0.0%	0.3%	0.1%	0.3%	0.3%	0.7%	0.0%	0.3%	0.1%	0.3%	0.1%	0.3%
	50-59	0.6%	3.1%	0.6%	1.3%	0.4%	1.0%	0.3%	0.9%	0.1%	0.8%	0.3%	0.7%	0.5%	0.8%
	60-69	2.4%	9.7%	1.9%	3.5%	1.2%	2.7%	0.7%	2.0%	1.6%	4.9%	1.6%	2.5%	1.8%	2.4%
	70-79	7.0%	14.5%	3.6%	6.5%	3.7%	6.0%	3.1%	5.3%	2.7%	7.2%	4.5%	6.4%	4.5%	5.6%
	80+	4.0%	19.7%	8.3%	15.1%	4.8%	9.3%	6.0%	10.9%	3.1%	11.7%	8.5%	12.1%	8.0%	10.2%
All males		2.1%	3.7%	1.4%	1.9%	1.1%	1.5%	1.2%	1.7%	0.8%	1.4%	1.8%	2.2%	1.5%	1.7%
Female	40-49	0.0%	0.7%	0.0%	0.1%	0.0%	0.2%	0.0%	0.2%	0.0%	0.5%	0.0%	0.2%	0.0%	0.1%
	50-59	0.1%	1.4%	0.5%	1.1%	0.1%	0.5%	0.4%	1.1%	0.0%	0.8%	0.2%	0.5%	0.3%	0.6%
	60-69	1.1%	4.5%	1.3%	2.7%	1.4%	2.8%	0.7%	2.1%	0.3%	2.3%	0.8%	1.5%	1.2%	1.7%
	70-79	0.7%	4.8%	2.6%	4.9%	2.2%	4.0%	2.2%	4.1%	1.2%	5.0%	2.4%	3.8%	2.7%	3.5%
	80+	0.7%	17.8%	6.7%	12.1%	7.8%	13.4%	5.0%	9.1%	4.2%	13.2%	5.8%	8.1%	6.7%	8.5%
All females		0.5%	1.5%	1.2%	1.8%	1.0%	1.5%	1.0%	1.5%	0.6%	1.2%	1.5%	1.9%	1.3%	1.5%
Persons		1.4%	2.3%	1.4%	1.7%	1.1%	1.4%	1.2%	1.5%	0.7%	1.2%	1.7%	2.0%	1.4%	1.6%

11.7 Diabetes

Figure 11.3a: Diabetes prevalence for males and females by age and ethnicity (self-assigned)



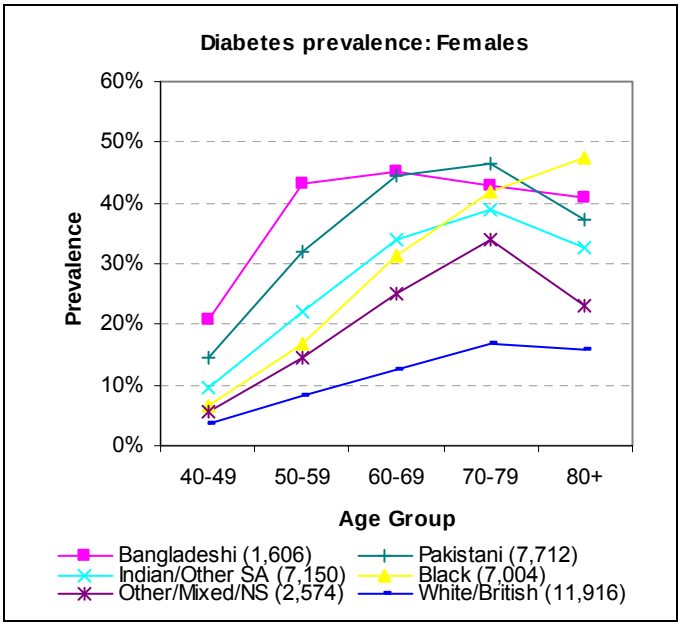
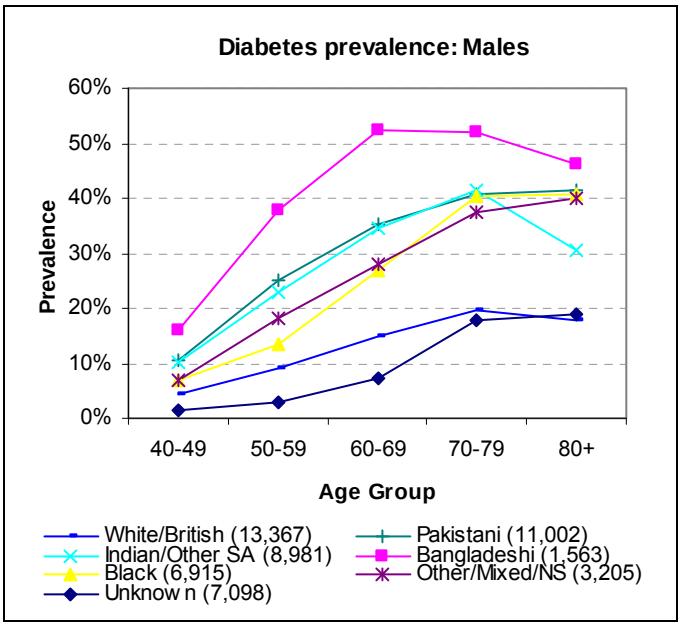


Figure 11.3b: Diabetes prevalence for males and females by age and ethnicity (self-assigned and Origins-assigned)



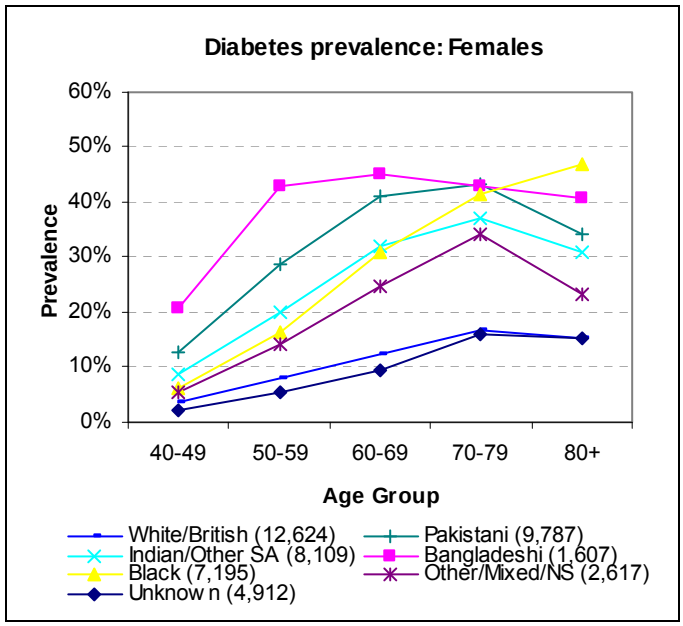
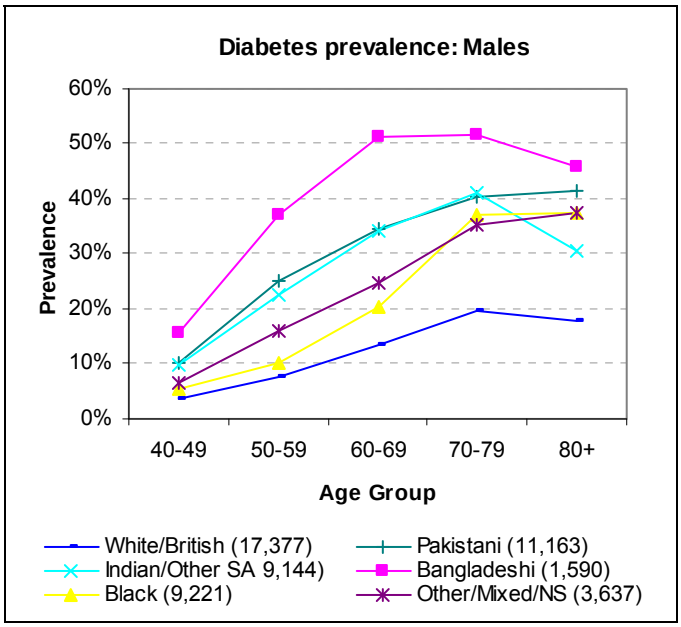


Figure 11.3c: Diabetes prevalence for all males and females by age and ethnicity (self-assigned, Origins-assigned and unknown imputed)



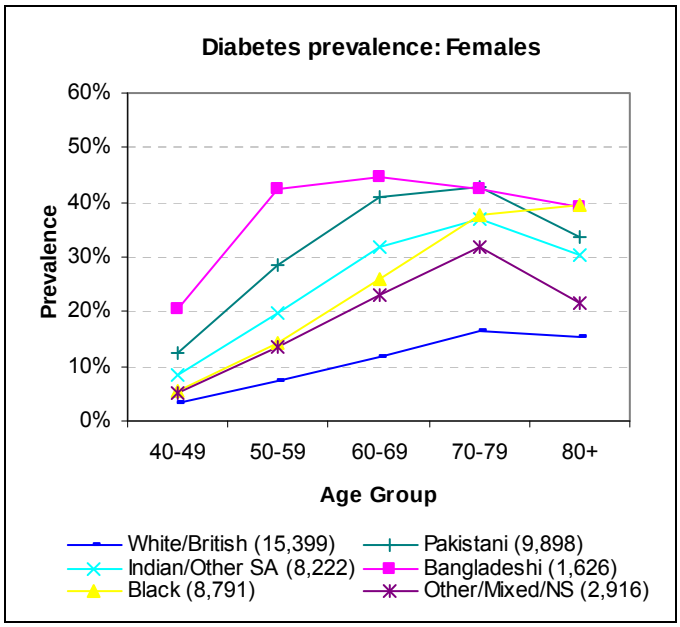
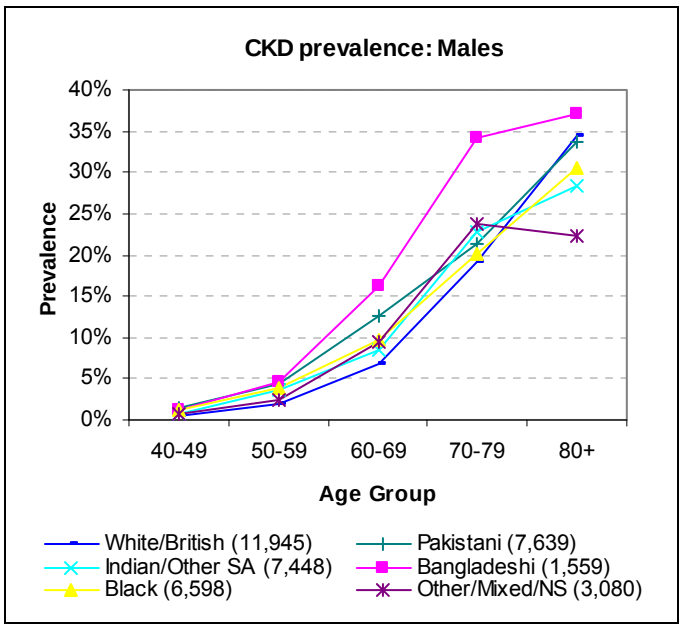


Table 11.4: Confidence limits for diabetes prevalence for all males and females by age and ethnicity (self-assigned, Origins-assigned and unknown imputed)

Gender	Age group	Bangladeshi		Indian		Pakistani		Black		Other		White/British		All ethnic groups	
		LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL
Male	40-49	13.2%	18.3%	9.0%	11.0%	9.5%	11.2%	4.9%	6.3%	5.3%	7.6%	3.1%	4.0%	6.9%	7.6%
	50-59	32.3%	42.0%	21.2%	24.2%	23.5%	26.4%	9.0%	11.6%	14.0%	18.6%	6.8%	8.4%	16.0%	17.3%
	60-69	43.1%	59.2%	31.8%	36.6%	32.0%	37.4%	18.0%	22.8%	20.8%	29.2%	12.5%	14.7%	21.8%	23.6%
	70-79	45.3%	57.7%	38.0%	44.6%	37.9%	43.2%	34.5%	39.8%	30.5%	40.6%	17.9%	21.1%	31.3%	33.6%
	80+	33.4%	58.9%	25.7%	35.5%	36.9%	45.8%	33.2%	41.7%	29.6%	46.2%	15.6%	20.2%	27.4%	30.9%
All males		28.4%	32.9%	21.0%	22.7%	21.4%	23.0%	13.7%	15.1%	13.7%	16.0%	9.3%	10.2%	16.0%	16.7%
Female	40-49	17.3%	24.0%	7.6%	9.7%	11.5%	13.6%	5.0%	6.4%	4.1%	6.5%	2.7%	3.7%	7.1%	7.9%
	50-59	38.4%	46.9%	18.3%	21.4%	26.9%	30.2%	12.6%	15.8%	11.1%	16.0%	6.6%	8.4%	17.3%	18.7%
	60-69	39.4%	50.3%	29.4%	34.2%	38.4%	43.3%	23.3%	28.6%	19.2%	27.4%	10.7%	13.0%	24.1%	26.0%
	70-79	36.0%	49.3%	33.9%	39.8%	40.2%	45.6%	35.2%	40.4%	26.9%	37.5%	15.2%	18.1%	29.3%	31.5%
	80+	23.7%	57.4%	26.3%	34.9%	29.4%	38.1%	35.6%	43.6%	15.7%	29.4%	13.7%	17.0%	22.6%	25.5%
All females		33.2%	37.8%	19.9%	21.7%	25.6%	27.3%	16.1%	17.7%	12.0%	14.5%	9.1%	10.0%	17.2%	17.9%
Persons		31.4%	34.7%	20.7%	21.9%	23.6%	24.8%	15.1%	16.2%	13.3%	15.0%	9.3%	10.0%	16.7%	17.2%

11.8 Chronic Kidney Disease

Figure 11.4a: Chronic Kidney Disease prevalence for males and females by age and ethnicity (self-assigned)



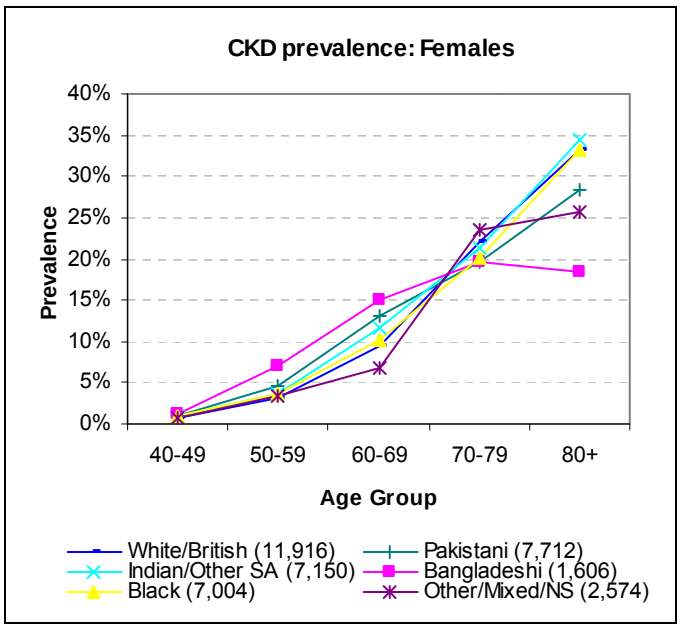
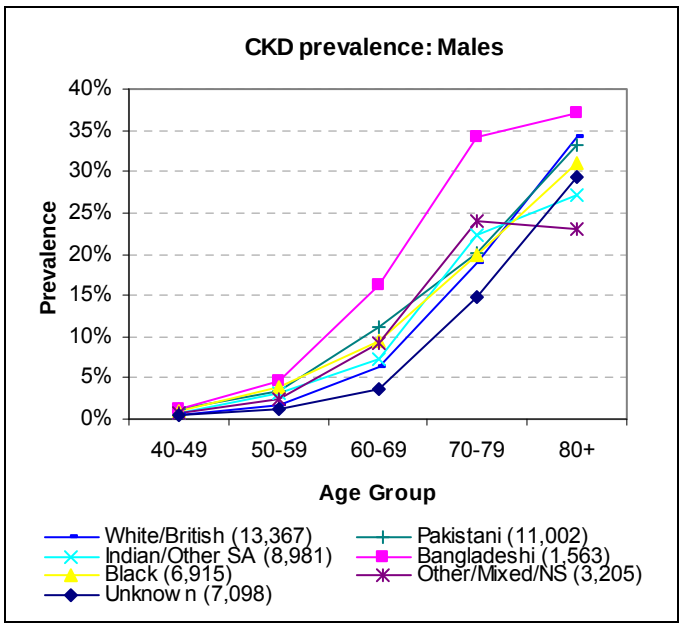


Figure 11.4b: Chronic Kidney Disease prevalence for males and females by age and ethnicity (self-assigned and Origins-assigned)



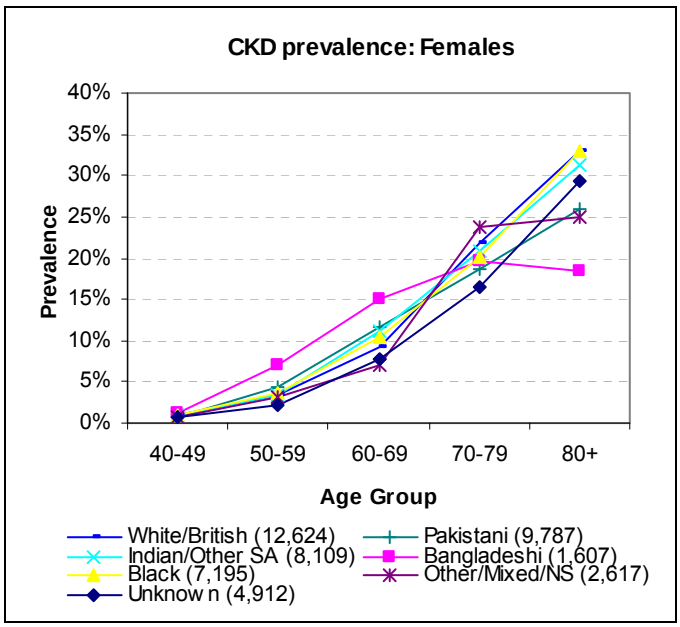
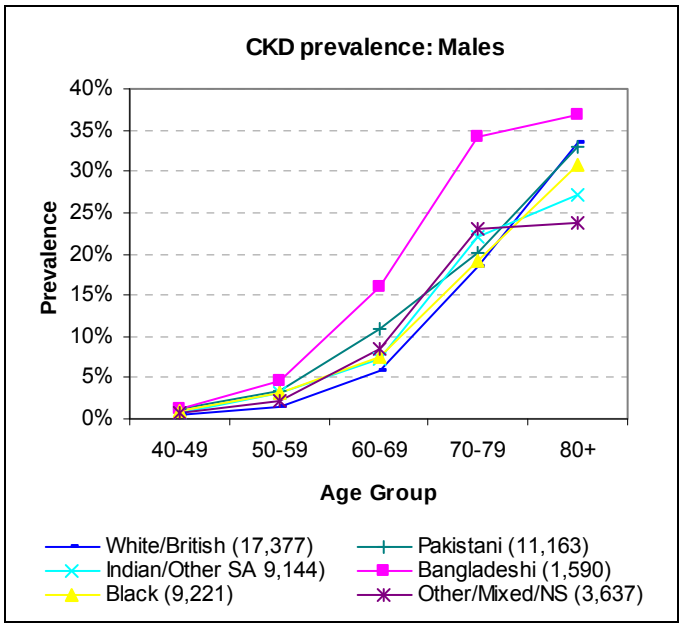


Figure 11.4c: Chronic Kidney Disease prevalence for all males and females by age and ethnicity (self-assigned, Origins-assigned and unknown imputed)



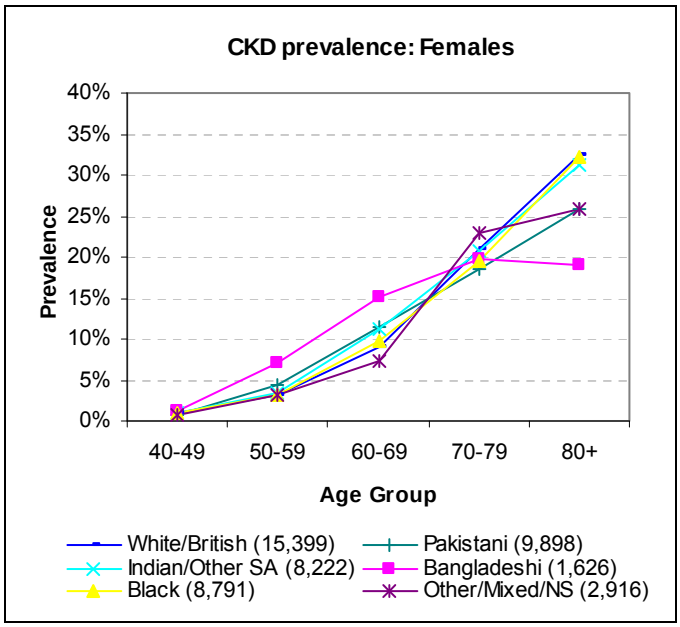
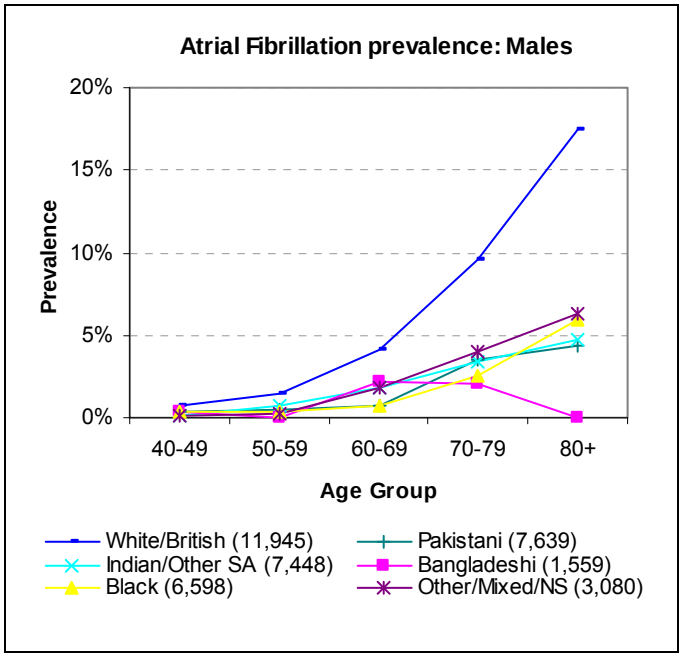


Table 11.5: Confidence limits for Chronic Kidney Disease prevalence for all males and females by age and ethnicity (self-assigned, Origins-assigned and unknown imputed)

Gender	Age group	Bangladeshi		Indian		Pakistani		Black		Other		White/British		All ethnic groups	
		LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL
Male	40-49	0.6%	2.2%	0.4%	0.9%	0.9%	1.5%	0.7%	1.2%	0.4%	1.2%	0.3%	0.6%	0.7%	0.9%
	50-59	2.8%	7.1%	2.5%	3.7%	2.8%	4.0%	2.4%	3.9%	1.5%	3.4%	1.2%	2.0%	2.4%	2.9%
	60-69	10.9%	22.8%	6.0%	8.6%	9.3%	12.8%	6.1%	9.3%	6.1%	11.5%	5.1%	6.6%	6.8%	8.0%
	70-79	28.5%	40.2%	19.5%	25.1%	18.1%	22.4%	17.1%	21.5%	18.8%	27.8%	16.8%	20.0%	19.3%	21.3%
	80+	25.4%	50.1%	22.7%	32.3%	29.0%	37.5%	26.9%	35.1%	17.1%	31.8%	30.8%	36.4%	29.9%	33.5%
All males		8.3%	11.2%	5.0%	6.0%	6.0%	6.9%	5.8%	6.8%	4.2%	5.6%	6.0%	6.7%	6.0%	6.4%
Female	40-49	0.6%	2.6%	0.6%	1.3%	0.6%	1.2%	0.6%	1.2%	0.4%	1.3%	0.6%	1.2%	0.7%	1.0%
	50-59	5.1%	9.6%	2.7%	4.1%	3.7%	5.2%	2.5%	4.1%	2.1%	4.7%	2.5%	3.7%	3.3%	4.0%
	60-69	11.6%	19.4%	9.6%	12.8%	10.1%	13.3%	8.1%	11.7%	5.1%	10.2%	8.1%	10.2%	9.5%	10.9%
	70-79	14.9%	25.6%	18.5%	23.5%	16.6%	20.8%	17.5%	21.8%	18.4%	28.0%	19.5%	22.7%	19.3%	21.3%
	80+	8.8%	36.8%	27.0%	35.7%	22.2%	30.2%	28.4%	36.0%	19.2%	33.7%	30.4%	34.6%	29.5%	32.6%
All females		7.2%	10.0%	7.0%	8.1%	6.5%	7.5%	6.7%	7.8%	4.8%	6.5%	9.7%	10.6%	7.9%	8.4%
Persons		8.1%	10.1%	6.1%	6.8%	6.4%	7.0%	6.4%	7.1%	4.7%	5.8%	7.8%	8.4%	7.0%	7.3%

11.9 Atrial Fibrillation

Figure 11.5a: Atrial Fibrillation prevalence for males and females by age and ethnicity (self-assigned)



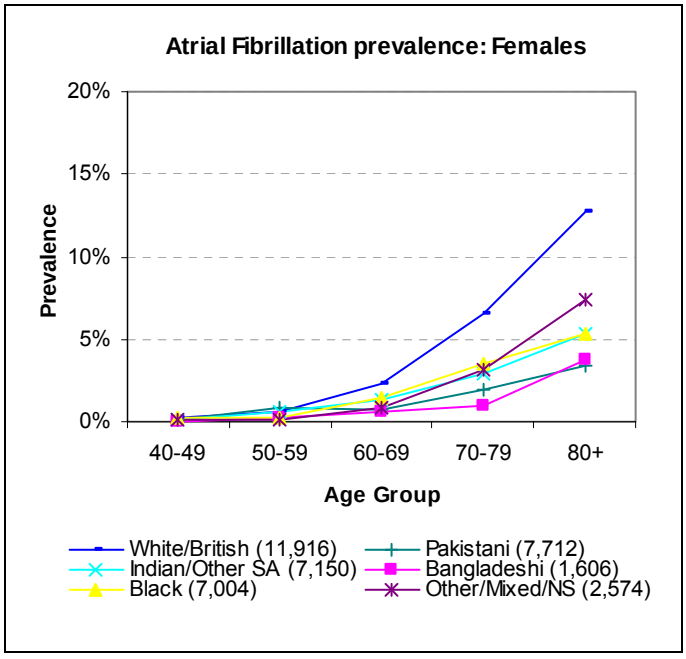
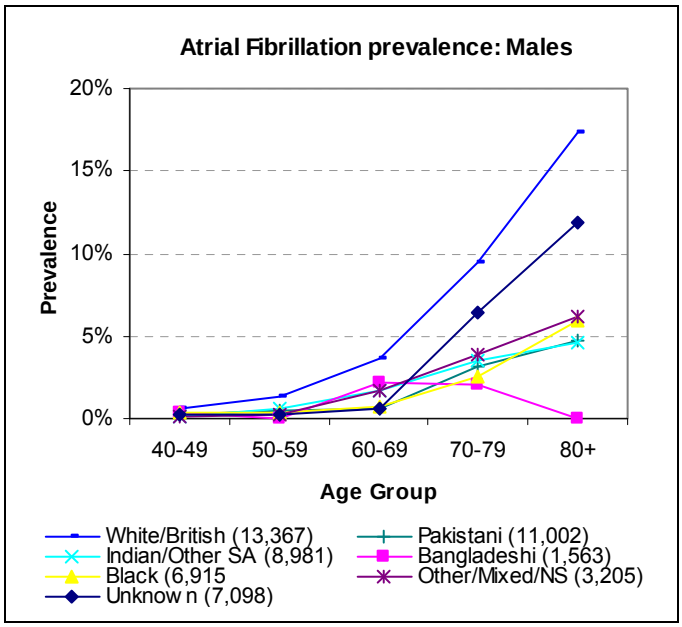


Figure 11.5b: Atrial Fibrillation prevalence for males and females by age and ethnicity (self-assigned and Origins-assigned)



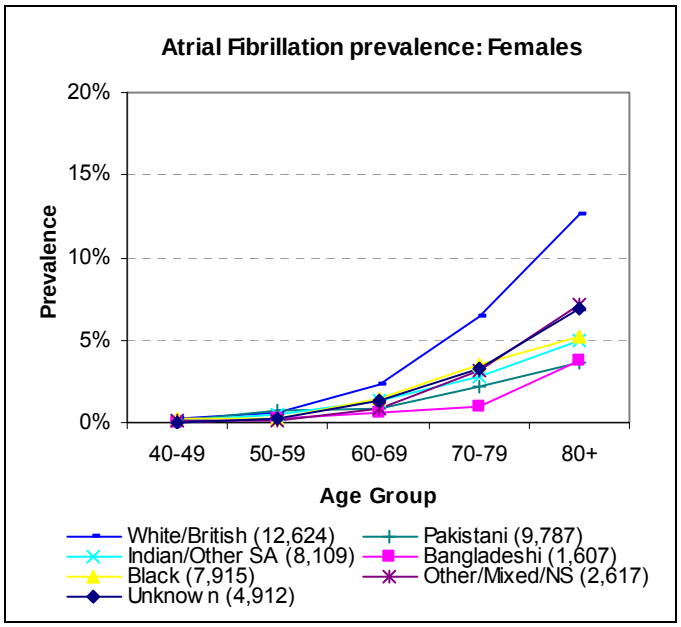
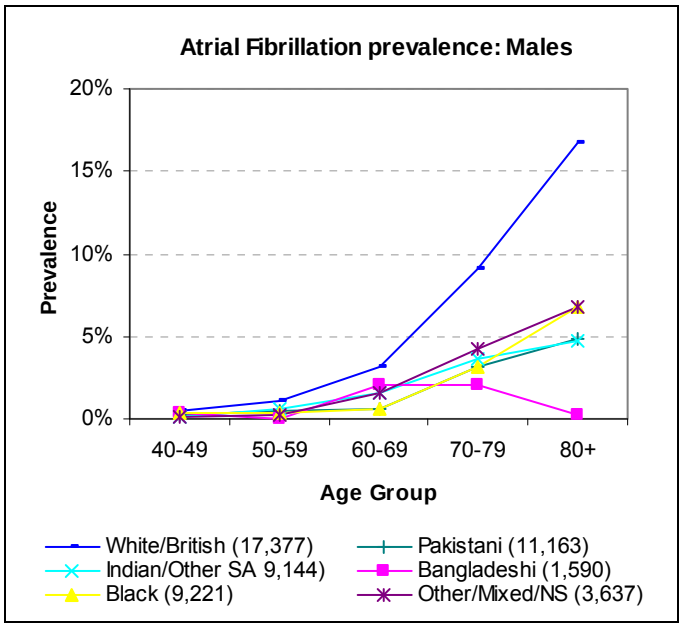


Figure 11.5c: Atrial Fibrillation prevalence for all males and females by age and ethnicity (self-assigned, Origins-assigned and unknown imputed)



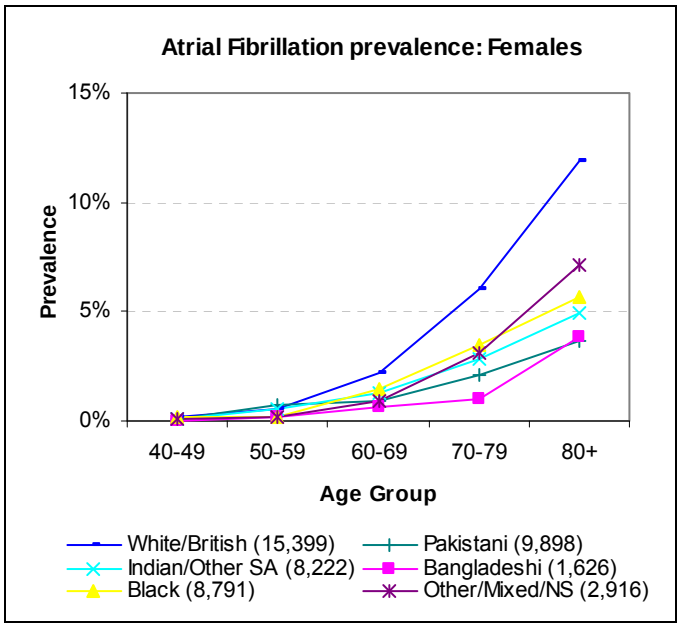
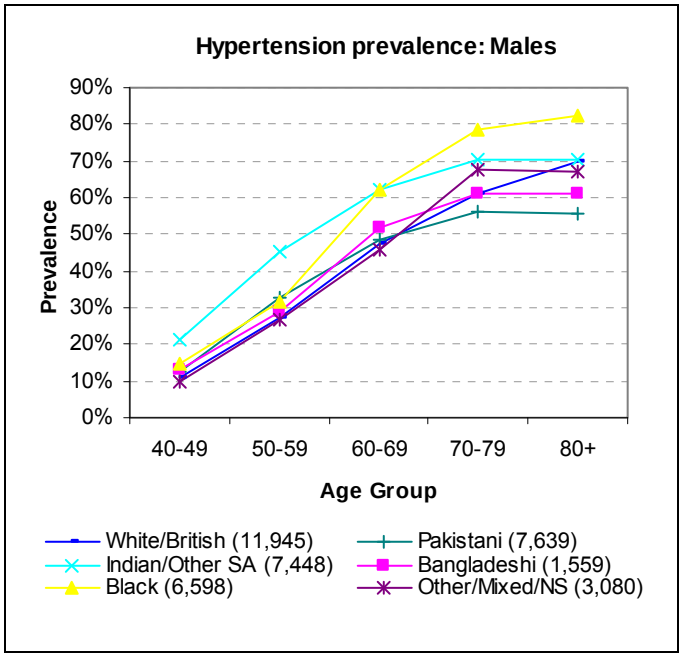


Table 11.6: Confidence limits for Atrial Fibrillation prevalence for all males and females by age and ethnicity (self-assigned, Origins-assigned and unknown imputed)

Gender	Age group	Bangladeshi		Indian		Pakistani		Black		Other		White/British		All ethnic groups	
		LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL
Male	40-49	0.1%	1.2%	0.1%	0.3%	0.1%	0.4%	0.2%	0.5%	0.0%	0.4%	0.3%	0.7%	0.2%	0.4%
	50-59	0.0%	1.0%	0.4%	0.9%	0.3%	0.8%	0.1%	0.7%	0.1%	0.8%	0.8%	1.4%	0.5%	0.8%
	60-69	0.7%	5.9%	1.1%	2.4%	0.3%	1.2%	0.3%	1.3%	0.7%	3.3%	2.7%	3.8%	1.8%	2.4%
	70-79	0.9%	4.7%	2.5%	5.0%	2.3%	4.2%	2.3%	4.2%	2.5%	6.9%	7.9%	10.3%	4.8%	5.9%
	80+	0.0%	6.9%	2.9%	7.5%	3.2%	7.2%	4.9%	9.4%	3.6%	12.6%	14.6%	19.0%	9.1%	11.4%
All males		0.4%	1.3%	0.8%	1.3%	0.7%	1.1%	0.9%	1.3%	0.6%	1.3%	3.1%	3.6%	1.7%	1.9%
Female	40-49	0.0%	0.7%	0.0%	0.3%	0.0%	0.3%	0.1%	0.4%	0.0%	0.4%	0.1%	0.3%	0.1%	0.2%
	50-59	0.0%	1.1%	0.3%	0.9%	0.5%	1.1%	0.1%	0.6%	0.0%	0.8%	0.3%	0.8%	0.4%	0.6%
	60-69	0.2%	2.3%	0.8%	2.0%	0.5%	1.5%	0.9%	2.3%	0.3%	2.4%	1.7%	2.7%	1.3%	1.8%
	70-79	0.3%	3.5%	2.0%	4.0%	1.5%	3.1%	2.6%	4.6%	1.7%	5.8%	5.2%	7.0%	3.6%	4.5%
	80+	0.7%	18.0%	3.3%	7.4%	2.3%	5.8%	4.0%	7.8%	3.9%	12.7%	10.5%	13.5%	7.8%	9.7%
All females		0.2%	0.8%	0.8%	1.3%	0.7%	1.0%	1.0%	1.4%	0.6%	1.3%	2.8%	3.3%	1.5%	1.8%
Persons		0.3%	0.9%	0.9%	1.2%	0.8%	1.0%	1.0%	1.3%	0.7%	1.1%	3.0%	3.4%	1.6%	1.8%

11.10 Hypertension

Figure 11.6a: Hypertension prevalence for males and females by age and ethnicity (self-assigned)



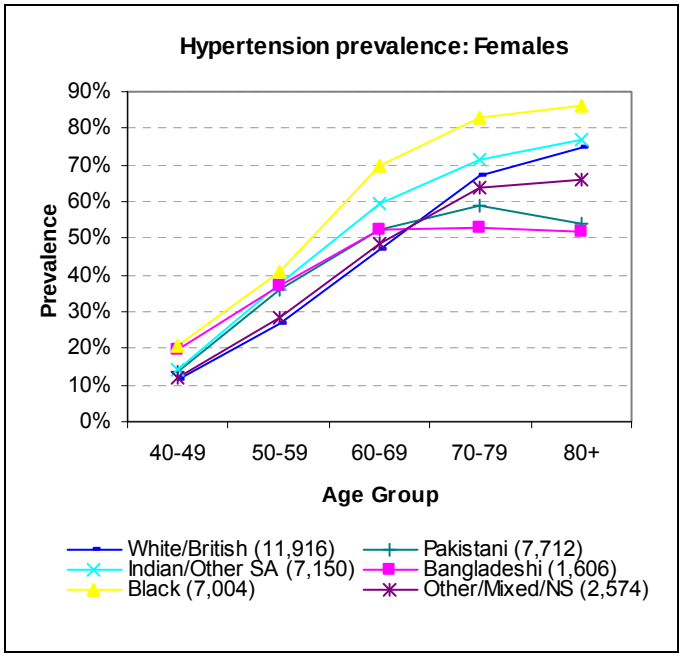
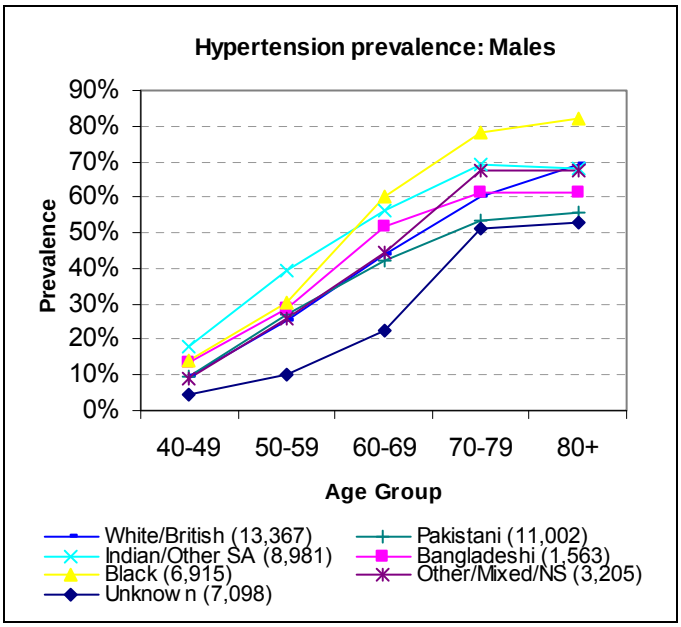


Figure 11.6b: Hypertension prevalence for males and females by age and ethnicity (self-assigned and Origins-assigned)



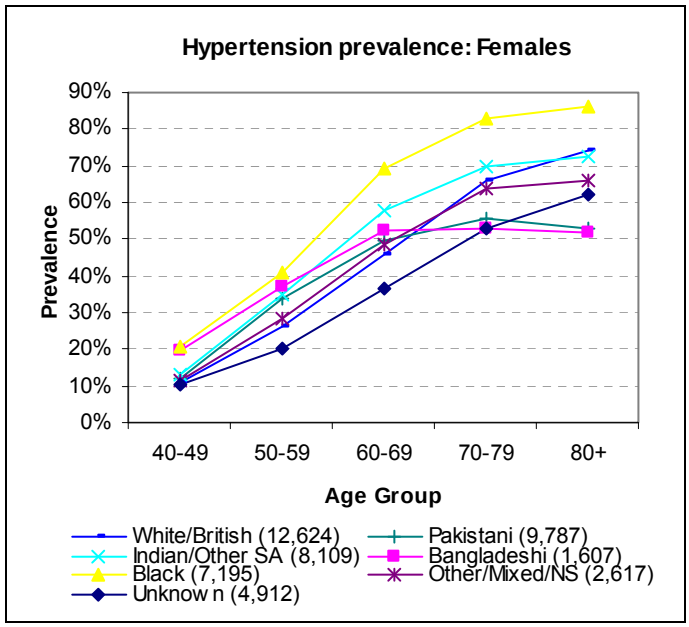
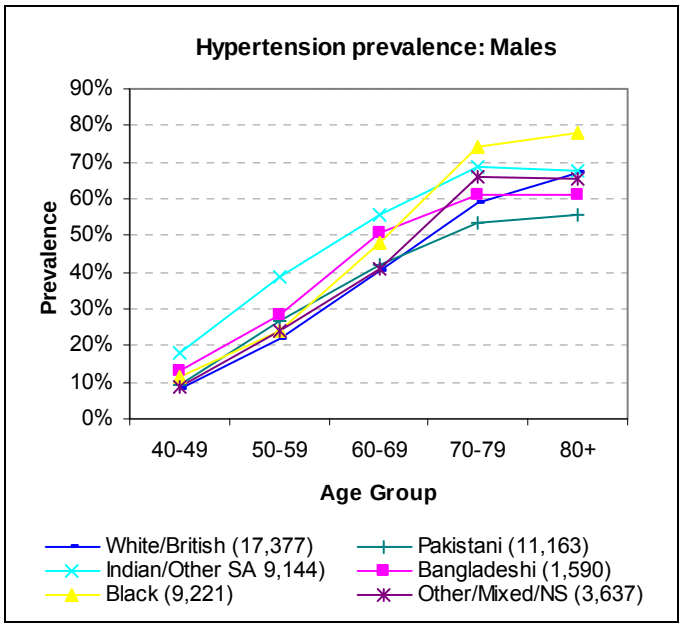


Figure 11.6c: Hypertension prevalence for all males and females by age and ethnicity (self-assigned, Origins-assigned and unknown imputed)



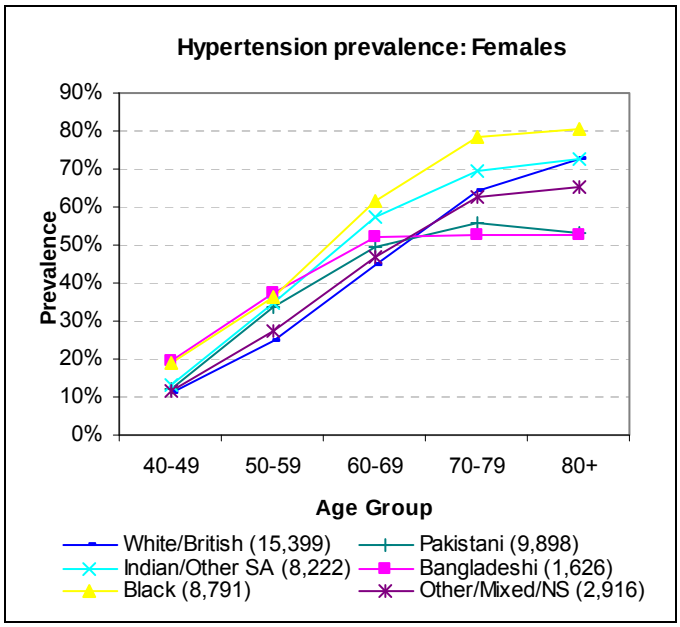
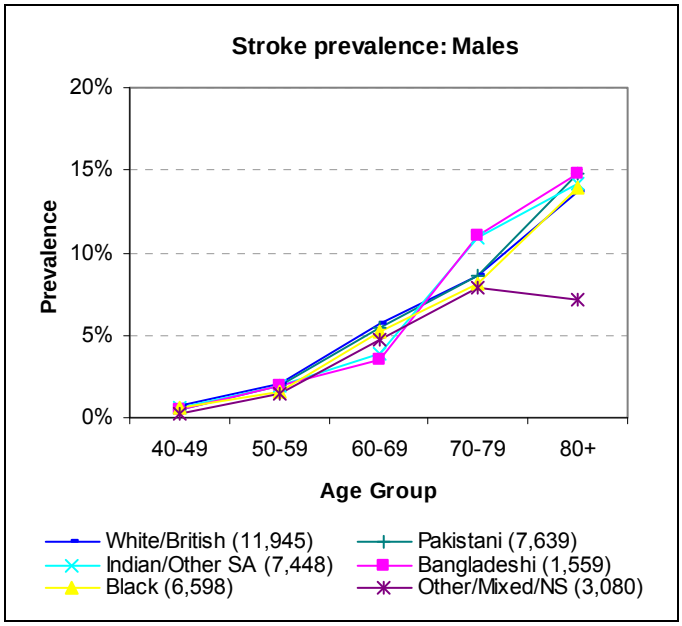


Table 11.7: Confidence limits for Hypertension prevalence for all males and females by age and ethnicity (self-assigned, Origins-assigned and unknown imputed)

Gender	Age group	Bangladeshi		Indian		Pakistani		Black		Other		White/British		All ethnic groups	
		LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL
Male	40-49	10.9%	15.7%	16.5%	19.1%	8.7%	10.4%	10.8%	12.7%	7.5%	10.1%	7.5%	8.9%	10.6%	11.4%
	50-59	23.9%	33.0%	37.2%	40.7%	25.3%	28.3%	22.5%	26.1%	21.2%	26.6%	20.4%	22.8%	26.5%	28.0%
	60-69	42.9%	58.9%	53.0%	58.1%	39.0%	44.5%	44.8%	50.8%	36.4%	45.9%	38.9%	42.0%	43.5%	45.7%
	70-79	54.9%	67.0%	65.5%	71.7%	50.9%	56.3%	71.8%	76.6%	60.7%	70.7%	56.9%	60.9%	61.5%	63.9%
	80+	47.8%	72.8%	62.4%	72.5%	51.3%	60.3%	74.0%	81.3%	57.1%	73.4%	64.3%	69.9%	65.2%	68.8%
All males		27.1%	31.6%	36.6%	38.6%	24.5%	26.1%	30.0%	31.9%	22.3%	25.0%	28.2%	29.6%	29.3%	30.1%
Female	40-49	16.4%	23.0%	12.0%	14.5%	11.2%	13.3%	17.7%	20.1%	9.8%	13.2%	10.0%	11.8%	13.2%	14.3%
	50-59	33.0%	41.4%	32.9%	36.6%	32.0%	35.5%	34.2%	38.6%	24.3%	30.7%	23.6%	26.4%	30.7%	32.4%
	60-69	46.8%	57.6%	55.0%	60.0%	47.0%	51.9%	58.9%	64.7%	42.1%	51.9%	42.8%	46.2%	49.6%	51.8%
	70-79	46.1%	59.5%	66.4%	72.1%	52.8%	58.2%	76.0%	80.5%	56.8%	67.8%	62.3%	66.0%	64.5%	66.8%
	80+	35.0%	69.3%	68.2%	76.5%	48.5%	57.7%	76.9%	83.4%	57.1%	72.8%	70.8%	74.8%	69.5%	72.5%
All females		34.1%	38.8%	36.7%	38.8%	30.8%	32.6%	39.6%	41.7%	26.4%	29.7%	36.3%	37.8%	35.7%	36.6%
Persons		31.3%	34.5%	36.9%	38.4%	27.7%	28.9%	35.0%	36.4%	24.5%	26.6%	32.2%	33.2%	32.4%	33.0%

11.11 Stroke

Figure 11.7a: Stroke prevalence for males and females by age and ethnicity (self-assigned)



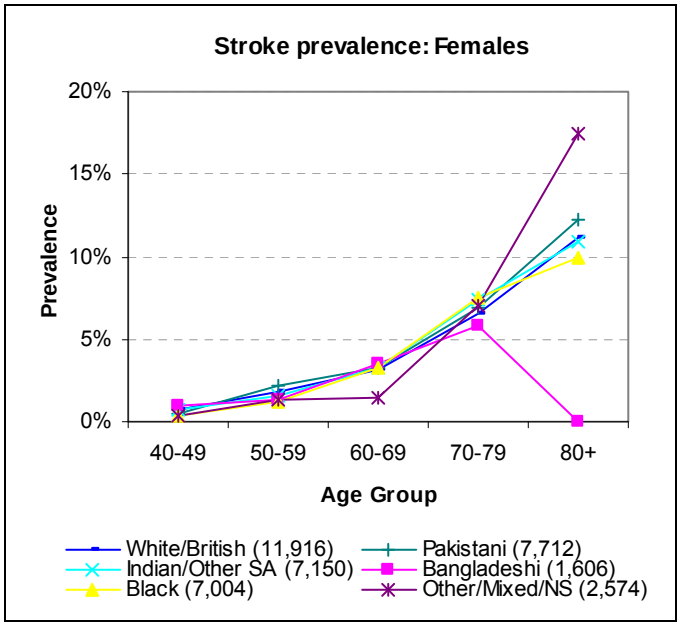
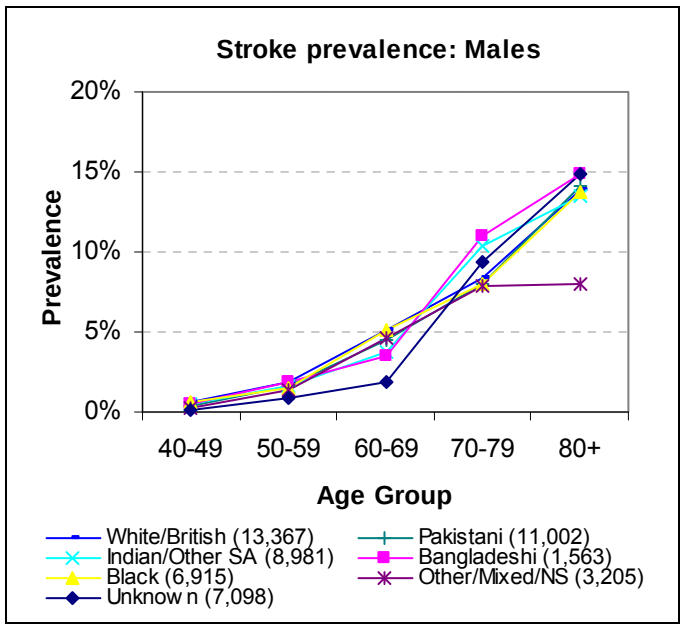


Figure 11.7b: Stroke prevalence for males and females by age and ethnicity (self-assigned and Origins-assigned)



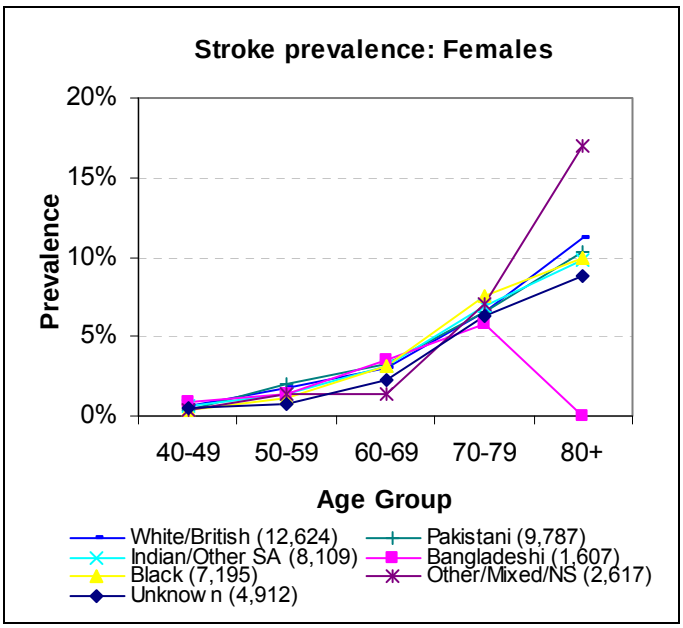
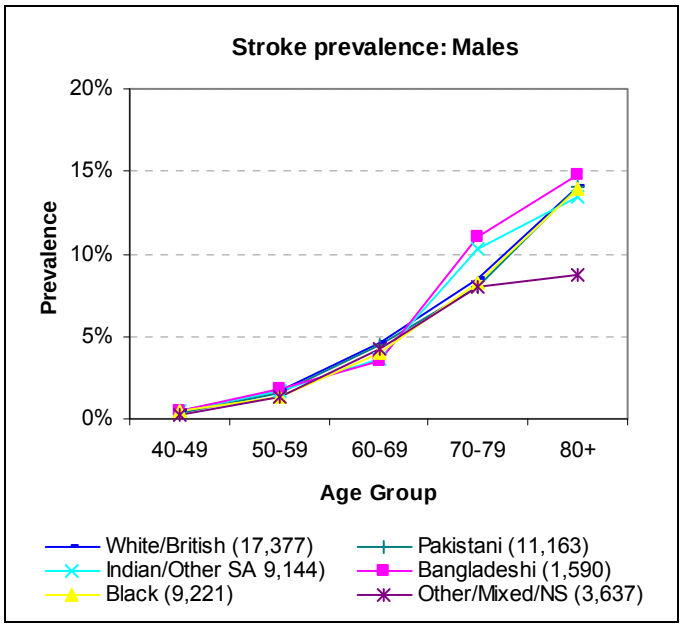


Figure 11.7c: Stroke prevalence for all males and females by age and ethnicity (self-assigned, Origins-assigned and unknown imputed)



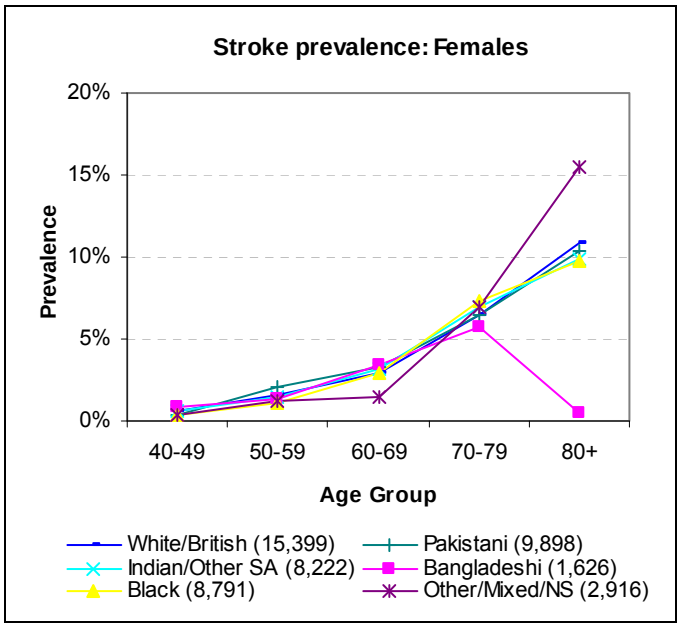


Table 11.8: Confidence limits for Stroke prevalence for all males and females by age and ethnicity (self-assigned, Origins-assigned and unknown imputed)

Gender	Age group	Bangladeshi		Indian		Pakistani		Black		Other		White/British		All ethnic groups	
		LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL
Male	40-49	0.2%	1.3%	0.3%	0.8%	0.3%	0.6%	0.3%	0.7%	0.1%	0.6%	0.3%	0.6%	0.3%	0.5%
	50-59	0.9%	3.8%	1.3%	2.2%	1.2%	2.1%	0.9%	1.9%	0.8%	2.3%	1.3%	2.1%	1.4%	1.8%
	60-69	1.5%	7.9%	2.8%	4.8%	3.4%	5.7%	3.0%	5.4%	2.6%	6.6%	3.9%	5.3%	3.9%	4.7%
	70-79	7.7%	15.5%	8.5%	12.6%	6.7%	9.6%	6.9%	9.9%	5.6%	11.4%	7.5%	9.8%	8.0%	9.4%
	80+	7.7%	26.5%	10.2%	17.6%	11.2%	17.5%	11.2%	17.3%	4.9%	14.9%	12.1%	16.2%	12.4%	15.1%
All males		2.5%	4.2%	2.5%	3.2%	2.4%	3.0%	2.6%	3.2%	1.6%	2.5%	3.3%	3.8%	2.9%	3.1%
Female	40-49	0.4%	2.1%	0.4%	1.0%	0.2%	0.7%	0.2%	0.6%	0.2%	0.9%	0.4%	0.9%	0.4%	0.6%
	50-59	0.7%	2.8%	1.0%	2.0%	1.6%	2.7%	0.7%	1.7%	0.7%	2.4%	1.2%	2.0%	1.3%	1.8%
	60-69	1.9%	6.1%	2.4%	4.2%	2.5%	4.3%	2.1%	4.2%	0.7%	3.3%	2.4%	3.6%	2.7%	3.4%
	70-79	3.3%	9.8%	5.5%	8.7%	5.3%	8.0%	6.1%	8.9%	4.5%	10.4%	5.6%	7.5%	6.2%	7.4%
	80+	0.0%	12.7%	7.4%	13.0%	7.9%	13.5%	7.6%	12.4%	10.4%	22.4%	9.6%	12.4%	9.6%	11.7%
All females		1.6%	3.0%	2.3%	3.0%	2.3%	2.9%	2.2%	2.8%	1.7%	2.7%	3.2%	3.8%	2.7%	3.0%
Persons		2.2%	3.3%	2.5%	3.0%	2.4%	2.8%	2.5%	2.9%	1.8%	2.4%	3.3%	3.7%	2.8%	3.0%

Additional data
The detailed methodology (Appendix A) is presented within this report, please refer to the accompanying CD-ROM and Key Health Data website (http://www.bham.ac.uk/keyhealthdata) where further appendices are available.

Appendix B: Prevalence data in numerical - tabular format.
Appendix C: Base numbers used for prevalence calculations.

Reference

1. http://publicsector.experian.co.uk/Products/Mosaic%20Origins.aspx Accessed 24 June 2010.

APPENDIX A
Detailed methodology

1 *Calculation of disease prevalence*
Prevalences for each of the vascular diseases was calculated in each age/gender/ethnic group by the formula p = r/n, where p is the disease prevalence, r is the number of patients on the disease register in the specified age/gender/ethnic group and n is the total number of patients in the same age/gender/ethnic group.

2 *Cultural Assignment*
In the data for HoBtPCT practices, there were 137 codes for EMIS self-assessed cultural identity and 181 separate Origins labels. Several "pragmatic" attempts were made to group clearly identifiable cultural subgroups into sensible larger groups, and the following re-coding system agreed.

Enhanced Health Services regrouped the EMIS codes into the broad categories used in the 2001 Census. These were amalgamated into the following six categories: Bangladeshi, Pakistani, Indian/Other South Asian, Black, White/British and Other/Mixed/Not stated.

The Origins labels of the 23k patients with unrecorded EMIS ethnicity were examined to assess whether they could be grouped into the same ethnic categories. After some work validating Origins labels against ethnic codes in the full data set, it was decided that assignment of the Origins labels as given in Table 11.9 below was fairly reliable. Thus patients who had unknown cultural identity but any of these Origins labels were allocated to an ethnic grouping.

It is worth noting that the Origins label Bangladesh Muslim has been assigned to Pakistani rather than Bangladeshi ethnicity. On validation, disease prevalence profiles for Bangladesh Muslim origin were more similar to the profiles for Pakistani than Bangladeshi ethnicity. Across the whole dataset, more people with Bangladesh Muslim Origins label had self-assigned Pakistani ethnicity than any other.

3 *Imputation of ethnicity for patients with unknown cultural identity*
Using the methodology described above, it was possible to assign a cultural identity to 10,741 of the 22,751 with unknown ethnicity. However, there remained 12,010 patients with unknown ethnicity, including around 10,000 whose name was of English, Scottish or Welsh origin. Names from these countries of origin are particularly ambiguous since these patients could equally be of black or white ethnicity.

Ethnic categories were imputed for these patients by considering the distribution of self-assigned ethnic groupings of those with all ambiguous Origins labels across the whole dataset (see Table 11.10 below). The patients with unknown ethnicity were then distributed in the same proportions.

Table 11.9: Assignment of Origins labels to ethnic categories

Origins label	Recoded ethnic grouping
INDIA SIKH	Indian
INDIA HINDI	Indian
INDIA PUNJABI	Indian
MUSLIM INDIA	Indian
INDIA JHARKAND	Indian
INDIA UTTAR PRADESH	Indian
INDIA MARATHI	Indian
INDIA RAJASTHAN	Indian
GOA	Indian
INDIA HIMACHAL	Indian
INDIA BENGALI	Indian
INDIA HARYANA	Indian
INDIA GUJARATI	Indian
INDIA ANDAMAN	Indian
INDIA KERALA	Indian
INDIA OTHER	Indian
INDIA TELUGU	Indian
SOUTH ASIA (UNSPECIFIED)	Other South Asian
SRI LANKA	Other South Asian
PAKISTAN	Pakistani
MUSLIM (UNSPECIFIED)	Pakistani
BANGLADESH MUSLIM	Pakistani
MOROCCO	Pakistani
PAKISTANI KASHMIR	Pakistani
MUSLIM OTHER	Pakistani
PAKISTANI NORTH	Pakistani
BANGLADESH HINDU	Bangladeshi
BLACK CARIBBEAN	Black
NIGERIA	Black
SOMALIA	Black
SIERRA LEONE	Black
GHANA	Black
BLACK SOUTHERN AFRICA	Black
USA BLACK	Black
ETHIOPIA	Black
ALGERIA	Black
SOUTH AFRICA : SHONA	Black
CONGO	Black
KENYAN AFRICAN	Black
AFRICAN (OTHER)	Black
ERITREA	Black
SENEGAL	Black
ZIMBABWE	Black
ANGOLA	Black
IVORY COAST	Black
SOUTH AFRICA : NDEBELE	Black
TANZANIA	Black
CHINESE CANTONESE	Other
CHINESE MANDARIN	Other

IRELAND	White/British
POLAND	White/British
NORTHERN IRELAND	White/British
USA WHITE	White/British

Table 11.10: Proportion of patients with unknown ethnicity assigned to each ethnic category

Ethnic grouping	Number	Percentage
White/British	6,786	56.5
Black	3,901	32.5
Indian/Other South Asian	275	2.3
Pakistani	272	2.3
Bangladeshi	46	0.4
Other/mixed/not stated	730	6.1
Total	**12,010**	**100.1***

* 0.1% rounding error

4 ***Calculation of confidence limits for prevalence***

Tables 11.2-11.8 show confidence limits for disease prevalence which have been applied using the Wilson Score method [Wilson EB. Probable inference, the law of succession, and statistical inference. J Am Stat Assoc 1927; 22:209-12], as recommended by the Association of Public Health Observatories [Eayres D. APHO Technical Briefing 3: Commonly used public health statistics and their confidence intervals, APHO March 2008].

Formulas for upper and lower 100(1- α) % limits for the prevalence p are as follows:

$$p_{lower} = \frac{\left(2O + z^2 - z\sqrt{z^2 + 4Oq}\right)}{2\left(n + z^2\right)} \qquad p_{upper} = \frac{\left(2O + z^2 + z\sqrt{z^2 + 4Oq}\right)}{2\left(n + z^2\right)}$$

Where O is the observed number of individuals in the PCT population with the specified disease;
n is the total number of individuals in the PCT population;
q = (1-p) is the proportion without the specified disease;
z is the 100(1- α/2)th percentile value from the Standard Normal distribution. For example for a 95% confidence interval,
α= 0.05, and z = 1.96 (i.e. the 97.5th percentile value from the Standard Normal distribution).

Table 11.11 Participating GPs in Heart of Birmingham Teaching Primary Care Trust.

Abhyanker US	Majeed I
Abrol V	Marok IS
Agarwal MD	Melchior AM
Ahmad ME	Nandi DK, Bath SS, Latthe M, GK Hundle
Ahmad Y, Ahmad N, Ahmad S, Ahmad A	Nye MYL
Ahmed B, Haroon AM	O'Brien EF
Ahmed F, Ruby A	Ojukwu C I
Ahmed R	Pandit SS
Alam MK	Raghavan S
Aston Pride Franchise	Rajput VK, Rajput S
Asylum Seekers Health Team	Ramachandram RS
Bansel JK	Ramarao MV
Bartley KM	Ray S, Misra PK, Mukherjee S, Muralidhar R, Benn SVA, Joshi SM
Bathla V	Saini MS
Bhalla SK	Salim M
Bhattacharyya B	Shah SY, Mann AB, Poltock TL
Brinksman S & Partners (Batra S, Conlon MH, Manley VC, Saunders PB, Hull MRP)	Shah VM , Shah MJ
Chaparala BC	Sharma A
Cheema MN	Shaylor JL, Delaney BC, Harris GPM, Rati NK, Empson BD, Murdoch W, Iyengar PG
ChilversMcCrea Healthcare	Sidhom ATM
Chitre RB	Singh HJ
Chunduri DR	Sinha AK
Dadheech VK, Dadheech HH	Sinha ASP
Deng ZB	Sinha M
Eccleston DB, Bailey KM, Harding NJ, Butler SP, Brewin T	Soyannwo
El-Sheikh OAA	Summerfield Group Practice/Foundation
Fawcett CJ, Alonzo KHR	Thompson AP
Firstcare Practice (Dr Rahman)	Vatish RK
Gaspar AS, Masood A, John A	Verma SK, Zafar SA, Zafar A
Gini PC	Walji MTI
Hafeez A, Hafeez F	
Hall MG, Jassel GS, Mavi BS	
Hyman BM	
Karamdad DR, Ali Z	
Karzoun FK, Gill SK	
Kathuria UC	
Khan MA	
Khattak SH, Khattak SS	
Kulshrestha RP, Kulshrestha S	
Madhavan P	

Acknowledgements
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CHAPTER TWELVE: DEATHS IN ACCIDENTAL DWELLING FIRES IN THE WEST MIDLANDS

12.1 Background

Fatalities in fires are relatively rare occurrences. In the UK in 2008, 327,000 fires led to 453 deaths.[1] However they remain a serious risk to human health to which certain groups in society appear to have much more exposure than others. In the UK, serious fires are routinely investigated by the local fire service and fatalities are carefully investigated in Coroner's Courts to determine a definitive cause of death, but relatively little research is done using these very rich data sources. This chapter draws upon a piece of observational research done by third year medical students at the University of Birmingham, in which these reports were used to explore characteristics of people who die in accidental dwelling fires.

12.2 Known Risk Factors

A search was made of the relatively limited peer-reviewed literature written on the subject of risk factors for death in fires. In summary, the following factors were highlighted

- Age: The very young and the elderly are at increased risk, although the definition of elderly varies from 65+ to 85+.[2-7]
- Ethnicity: There is mixed evidence, with some studies showing minority ethnic groups are at higher risk [4,5] whereas others suggest that they are not.[6]
- Social class: Several studies note an increased risk of fire fatalities with increased deprivation.[2, 3] Some show a linear relationship. [3,8]
- Alcohol/intoxication: A number of studies highlight this as a risk factor [6,9,10] and in one it is suggested that it is the strongest risk factor.[11]
- Smoking: Smoking is often the most likely cause of the fire in other studies [5, 11] and has been shown to be a risk factor for death in fires. [6,12]
- Disability: A known risk factor, [3,9,11,13] often described in terms of conditions that impair escape.
- Mental Health: Mental illness is not commonly considered in detail in the literature as a separate risk factor, but is sometimes considered in the more general context of ill health and disability when researching risk factors[9]
- Smoke alarms: Absence of a fitted smoke alarm is a known risk factor.[3,5,9,11]
- Building type: Living in purpose built flats has been suggested as a risk factor in the UK[3]. Evidence suggests that living in mobile homes is a risk factor in the United States.[11]

12.3 Materials and Method

This study investigated a cohort of individuals who had died in incidents which occurred in dwellings (as opposed to vehicles, places of work or other locations) and which were thought to be of accidental origin, rather than homicide or deliberate self harm. The incidents were limited to the area served by the West Midlands Fire Service (WMFS). This comprises seven Local Authorities (LAs) namely Birmingham, Coventry, Wolverhampton, Walsall, Sandwell, Solihull and Dudley. The date range used comprised the calendar years of 2003 to 2007 inclusive.

The fatalities were identified from WMFS records and for each case copies of three documents were obtained. Firstly, the report of the Fire Research and Investigation Section (FRIS) was used. The FRIS routinely records investigations into the cause of fire where the size is significant, the cause was not immediately clear or injuries or fatalities were sustained. Secondly there was the fire service incident report recorded the activities of the Fire Service at the time of response, including details of what occurred, actions taken by officers and details provided by witnesses or survivors. Finally there was the record of the

Coroners inquest, in which a much richer account of circumstantial factors and the details of investigations and statements obtained after the fact were recorded.

Initially cases were checked to ensure they met the inclusion criteria for the study. When all of the inclusions had been agreed, items captured from the coroners' reports were: (i) for the deceased: age, sex, ethnicity, discovery in the same room as the origin of the fire or not, evidence of intoxication inferred from blood alcohol levels and cause of death; (ii) for the property: presence and functionality of a smoke alarm and source of ignition. Alcohol intoxication was considered to be present if exceeding the UK legal driving limit; 80mg alcohol / 100ml blood. Items extracted from FRIS reports were: (i) for the deceased: evidence for impaired mobility, for any physical illness and for any mental illness, whether initially rescued alive, acute mental state before the fire and evidence for acute intoxication; (ii) of the property: postcode, multiple residency status of the property, evidence of smoking behaviour among residents; and whether single or multiple fatalities were involved.

Due to the large number of illnesses that the deceased may have suffered from, typically previous researchers of this topic tended to group them according to functional deficit. The classification used in this study follows that of Holborn et al [3] for disability, ill health and mental illness, disability including both sensory and motor disabilities.

Mental illness was further classified by using the main sub-divisions of mental disorders used by the National Library of Medicine National Institutes for Health (US) Diagnostic and Statistical Manual version four (DSM4);[14] that is, disorders of impulsive behaviour, mood, personality, psychosis, substance abuse and finally, one category of miscellaneous. This final category applied to disorders falling outside the other categories or if evidence was insufficient to classify a disorder.

In cases where multiple residency status of the property could not be confirmed, incident reports were consulted.

Evidence of smoking behaviour was inferred from witness statements and smoking materials discovered on inspection of the property.

Evidence of impaired mobility was captured from witness statements regarding aids to mobility used; this included walking sticks, wheelchairs, home modifications and other mobility aids.

Evidence of physical and mental illness was derived from witness statements and the presence of such indicators as medication containers or NHS correspondence. Evidence on acute mental state was gained from witness statements.

A case was not considered to be rescued alive if they were pronounced dead before arrival at hospital.

Where blood alcohol levels were not available on the coroner's report, evidence for acute intoxication was also judged from witness statements.

Deprivation was measured by mapping the postcode of the incident address to a Lower Level Super Output Area (LSOA), the deprivation for which was obtained from the Indices of English Deprivation Index of Multiple Deprivation for 2007 (IMD2007).[15]

Cases were divided by year between the researchers for analysis. To minimise recording bias, two cases were randomly selected from each member's dataset to be cross-analysed by the group.

5 year fatality rate was estimated using the mid-period population estimates from the seven local authorities named above.[16]

12.4 Results

12.4.1 Case Selection

A total of 109 cases were initially selected as having involved fatalities in fires during the period in question. Of these, a number were excluded for various reasons. Four were excluded as there was incomplete information (specifically a full set of the three sources of documents were not available). Six cases were excluded due to a verdict of suicide given at a Coroner's inquest and a further seven were excluded because an open verdict was returned. A further thirteen cases were excluded as they had occurred as a result of a vehicle fire and a further five were excluded as they had also not occurred in a dwelling. This left a total of seventy-four cases.

12.4.2 Overall Mortality Rate

The crude (i.e. unadjusted for age or sex) 5-year mortality rate from accidental deaths in dwelling fires in the West Midlands is 2.9 per 100,000 persons, giving a one-year crude mortality rate of 0.58 per 100,000. The one year crude mortality rate for England in 2005 is 0.81 per 100,000, calculated using estimated resident populations.[17]

12.4.3 Age, Sex and Ethnicity

The mean age of the deceased was 58.25 and the median age was 66 years (range 18 months – 90 years). 40 fire victims were male (54%) and 34 were female (46%). This is summarised in the age-sex pyramid below (Figure 12.1). Comparison with the estimated resident population of the WMFS area for mid 2005 (the middle of our study period) is included in Table 12.1. Data for ethnicity is also shown.

Figure 12.1: Age-sex pyramid showing the age and sex distribution of the victims of accidental fires in the study period (2003-2007) in the West Midlands.

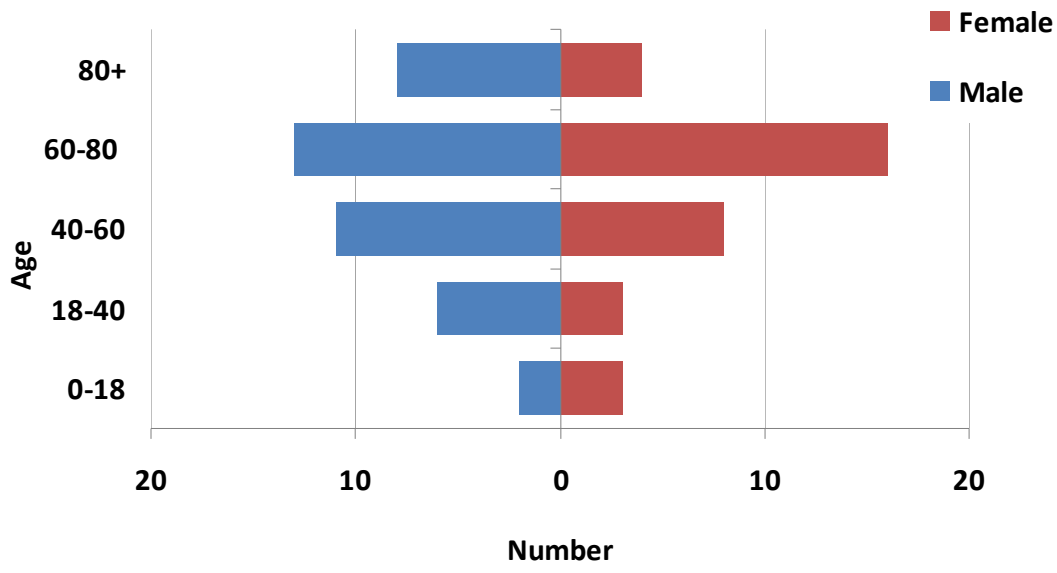


Table 12.1: A comparison of the demographic characteristics of fatalities with the England and Wales population.

	Number and (%) of deaths	Estimated % of WMFS population mid 2005
Age (%)		
0-18	5 (6.8)	25.3
18- 40	9 (12.2)	30.0
40- 60	19 (25.7)	24.4
60+	41 (55.4)	20.3
Sex (%)		
Male	40 (54.1)	49.1
Female	33 (45.9)	50.9
Ethnicity (%)		
White	63 (85.1)	77.6
Mixed race	1 (1.4)	2.4
Black African, Black Caribbean	5 (6.8)	4.3
South Asian	5 (6.8)	14.2
Others	0 (0)	1.5

12.4.4 Deprivation and Housing

Deprivation data are shown in Table 12.2. Cases were placed into quintiles according to ranked Index of Multiple Deprivation (IMD) 2007 scores of the place of residence, with 1 being the most deprived and 5 the least. The mid period population estimates of LSOAs of the Local Authorities in the WMFS area [18] was stratified into deprivation quintiles by matching them to the IMD 2007 scores

Our cohort shows a greater amount of deprivation compared to the West Midlands population average.

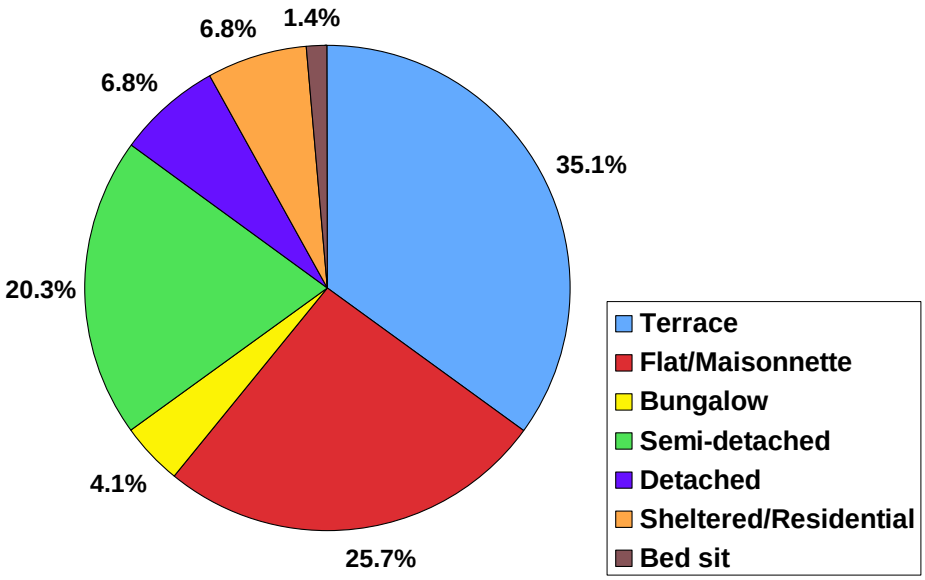
Table 12.2 Relative risk of death in accidental dwelling fires in the West Midlands by deprivation quintile

Deprivation Quintile	Deaths	Mid-period population estimates of the WMFS area (1000's)	Crude 5 Year mortality rate / 100,000	Relative risk using quintile 5 as a reference with 95% CIs
1	43	1135.2	3.8	2.6 (0.35 – 3.62)
2	17	570.2	3.0	2.0 (0.30 – 3.45)
3	4	401.8	1.0	0.7 (0.14 – 2.81)
4	7	269.5	2.6	1.8 (0.25 – 3.69)
5	3	206.1	1.5	-

As can be seen in Table 12.2, the relative risk of death in an accidental dwelling fire is over 2 ½ times greater in the most deprived population than in the least deprived, although owing to the very small numbers involved, the confidence intervals of the relative risk estimates are very wide.

Information on types of property in our study is shown in Figure 12.2. For comparison, the 2005/2006 Survey of English Housing (SEH)[19] reported the breakdown of the national housing stock as follows**:** detached (22%), semi-detached (33%), terraced (27%), purpose-built flat (13%), converted flat (4%) and other (1%). Owing to differences in how dwellings are categorised in the SEH, direct comparison is difficult. Also at the time of writing the authors had no data on the proportions of dwelling types in the WMFS area.

Figure 12.2: Housing type of fatalities in the study population.



12.4.5 Source of ignition

Table 12.3: Source of ignition

Source of ignition	Deaths	%
Careless disposal of smoking materials	20	27.0
Smoking materials otherwise implicated	20	27.0
Electrical	12	16.2
Naked flame	10	13.5
Candle	3	4.1
Child with lighter	3	4.1
Match	2	2.7
Incense burner	1	1.4
Gas cooker	1	1.4
Gas lighter	1	1.4
Gas explosion	1	1.4

The majority of cases involved smoking materials either directly, in that a discarded cigarette was ignited material in the dwelling, or that smoking materials were otherwise implicated.

It was unclear in this iteration of the annalysis to what extent the electrical fires involved actual electrical faults or defective wiring compared to mis-use of electrical appliances.

12.4.6 Smoking and Intoxication

Of all 74 cases, 53 (71.6%) had evidence of smoking in the property. 20 of 74 (27.0%) cases had evidence of intoxication at the time of the fire. 17 deaths (23.0%) occurred where there was evidence of both smoking and intoxication.

In dwellings where smoking materials were identified as the cause of the fire, it was not always clear whether the deceased themselves was definitely a smoker, but it would appear likely that for the most part they were. The national prevalence of smoking has been estimated at 24% for men and 21% for women, [16] so it would appear that smokers are highly overrepresented as subjects of this study.

The descriptions of source of ignition were not always consistently recorded in coroners' reports. For example, 'careless disposal of smoking material' was recorded separately to 'smoking material'. A similar problem has been encountered by other studies. Holborn et al [3] classified 'careless disposal of cigarettes, cigars or tobacco' separately to 'other careless action with cigarettes, cigar or tobacco'. In reporting these results the authors have decided to maintain this distinction, although there is a degree of ambiguity as to the criteria applied to cases in coroner's courts that determine how each is applied.

Unsurprisingly, for cases found in the same room as the origin of the fire, smoking-related activities were the most common source of ignition. For the cases found in a different room, a relatively smaller proportion were due to smoking-related activities (42.3% vs. 60.5%), though this was still the most common source of ignition.

12.4.7 Smoke Alarms

A minority of deaths (23, 31.1%) involved people who did have a functioning smoke alarm. A number of deaths (25, 33.8%) occurred in properties that did in fact have a smoke alarm but it was found to be not working at the time. The remaining 26 subjects (35.1%) died in properties in which an alarm had not been fitted at all.

The number of functional smoke alarms for each deprivation quintile was as follows: 13 of 43 for quintile 1 (30.2%), 6 of 17 for quintile 2 (35.3%), 1 of 4 for quintile 3 (25.0%), 3 of 7 for quintile 4 (42.9%) and 0 for quintile 5.

Of the 53 cases where there was evidence of smoking within the property, 17 (32.1%) had no smoke alarm and 36 (67.9%) had at least one smoke alarm, but of these, 18 were non-functional, leaving 18 of the 53 with a working smoke alarm.

Rates of evidence of smoking for each deprivation quintile was as follows: 30 of 43 (69.8%) for quintile 1; 13 of 17 (76.5%) for quintile 2; 2 of 4 (50.0%) for quintile 3; 6 of 7 (85.7%) for quintile 4 and 2 of 3 (66.7%) for quintile 5.

Thompson et al 2004 (USA) found that 6.6% of smoke alarms are not functional one year post-installation,[20] but in this study the authors were unable to establish how long the smoke alarms had been installed, or how well they had been maintained. Also, no difference was found in the proportion of functioning smoke alarms between smokers and non-smokers. It was anticipated by the authors that evidence of deactivation of smoke alarms by smokers (to preclude accidental activation) may be found but this did not appear to be the case in this sample of incidents.

12.4.8 Living Alone

47 (63.5%) of the deceased lived alone. Only 13 of 47 (27.7%) of cases that lived alone were rescued alive compared to 19 of 27 (70.4%) of cases that lived with others. 12 cases (16.2%) were involved in incidents with multiple fatalities.

12.4.9 Physical and Mental Health

Of the 74 cases, 31 (41.9%) had evidence of limited mobility, 6 (8.1%) had evidence of sensory impairment and 28 (37.8%) had evidence of physical illness. 24 of the 31 (77.4%) victims with impaired mobility were found in the same room as the fire, compared to 24 of 43 (55.8%) of victims who were apparently fully mobile. Holbourn et al [3] reported that 21% of fatalities in their study had some form of physical disability.

Evidence of mental illness was found in 25 of 74 cases (33.8%). Fatalities with evidence of mental illness were more likely to have evidence of smoking (96.0% of those with a mental illness compared to 59.2% of those without) and evidence of intoxication (56.0% and 12.2%, respectively).

A Household Survey of Psychiatric Morbidity in England (2007) shows 17.6% of the population having at least one common mental health disorder,[21] although this excludes substance abuse. In the study population the prevalence of mental illness would appear to be much larger. Also it is probably underestimated; in many cases the evidence for mental illness was inferred from psychotropic medication found in the dwelling, but we have evidence that around three quarters of those with a common mental disorder receive no drug treatment, [21] making this an unreliable indicator of mental illness. Also, it was not always clear in the Coroner's reports how rigorously checks had been made concerning the mental state of the deceased. In cases of people in frequent contact with mental health services, or people who were known locally to be suffering from a mental illness perhaps because of unusual patterns of behaviour remarked upon by witnesses, this was less likely to be a problem, but there may have been a group in the study population who were suffering from a mental illness which did not come to light during the investigation.

There was no sizeable difference in the rates of mobility impairment between our data and the Health Survey for England.[22] Among the study subjects, 41.9% had evidence for impaired mobility while nationally 39% of men and 47% of women over 65 reported difficulty walking half a mile.

Table 12.4: Impaired mobility and mental illness

Deprivation quintile	Deaths	Evidence of impaired mobility	Evidence of mental illness
1	43	16 (37.2%)	11 (25.6%)
2	17	10 (58.8%)	8 (27.1%)
3	4	2 (50.0%)	2 (50.0%)
4	7	2 (28.6%)	3 (42.9%)
5	3	1 (33.3%)	1 (33.3%)
Total	74	31 (41.9%)	25 (33.8%)

12.5 Discussion and Recommendations

This study triangulates quite well to the limited evidence base that exists on risk factors for fire deaths. The study has shown that smoking appears to be the most consistent risk factor for death in fire and so smokers remain the single most important group to whom prevention strategies need to be aimed.

Despite this it is still difficult to tease out the relative impact of the various risk factors we have considered. For example, people living in deprived neighbourhoods appear much more likely to die in fires, but so are people who smoke. However we know that smoking is more prevalent in deprived areas, [23] so is smoking still a more important risk factor than deprivation? Deprivation may influence building type that someone lives in which in turn may affect the degree to which there are combustible materials in it. Also how overcrowded it is, or the choice of furnishings may all be related to socio-economic status. We would need a different statistical approach to the analysis and much more data to assign robust risk weightings to these factors. However intuitively and with some support from our data, it would appear that smoking remains a very important variable, as we see similar over-representation of deaths in properties where people smoke even in the (relatively few) fatal fires occurring in less deprived areas.

That people with impaired mobility were not apparently overrepresented in our study population was to some degree encouraging. However we did see evidence of a large number of our sample having some sort of other illness. We did not have a ready mechanism to compare this proportion with a prevalence estimate for the general population. It is unclear to what extent this was an important factor as the authors did not have a reliable population prevalence estimate which used the same definition of physical illness as the one used in this study. Also we should consider the extent to which this is co-linear with smoking. In a sample in which many people smoke or live with a smoker, we would expect to see a prevalence of a range of chronic conditions which is higher than the population average.

Mental health is a possible risk factor for fatal fires. 33.8% of our study population had evidence of mental illness. It would be interesting to estimate more reliably what the prevalence of mental illness was in this group of people as it may have been under recorded. There are several potential mechanisms by which mental illness could increase risk of fire fatality. Directly, fire setting may result from behavioural disorders, attention seeking behaviour or suicide attempts and some cases where this occurred were in our initial sample. However Coroners are likely to return open or suicide verdicts in such cases as intent was difficult to establish, so these cases were excluded from this study. However in the remainder reduced cognitive ability owing to the use of psychotropic medication may warrant consideration as a factor in some cases.

We demonstrate in our cohort that fully functional smoke alarms are worryingly low in number despite being an important preventative measure. Recent strategies have been aimed at maintenance of smoke alarms as well as installation, which the results of this study suggest is very timely, as in this sample almost as many people had a non-functioning alarm as did not have one at all. From a policy point of view it is less clear what can be done as despite this being a low cost intervention the cost effectiveness of giving them away has been questioned.[24]

It is also useful to highlight the role of carers and health and social care professionals in being aware of fire risk and fire prevention in caring for people who have mental health problems or who may be dependent of alcohol or drugs. In particular the checking of fire alarms during scheduled visits and assessments would be relatively cheap and easy to complete.

Also, it may be useful to extend this study further. Certainly a larger study with more data points would offer more opportunity to complete something more statistically rigorous. Also incorporating non-fatal incidents into the analysis may offer the chance to use a case controlled approach to look at the differences between people who have a fire in their dwelling but survive and those that do not. Such a study has not yet been attempted in the UK although similar study designs have been used elsewhere.[9,10] Another area of investigation would be to focus on people with physical or mental health problems to explore to what extent they were in touch with health and social care providers prior to the incident. This would help to establish whether indeed there may have been opportunities for preventative intervention or not, as well as help establish a more reliable prevalence estimate for mental and physical illnesses in the group.

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CHAPTER THIRTEEN: PATIENT SATISFACTION WITH GP PRACTICES IN THE WEST MIDLANDS

13.1 Background

Since 2007 the NHS has commissioned an annual independent survey of patient satisfaction with GP services. The aim of this chapter is to present some summary statistics from the results of the 2008/2009 survey[1].

The survey is divided into several domains which are listed in detail in the technical appendix on the survey website. Some deal with the physical environment of the surgery, some explore communication by telephone, whilst others consider the actual clinical encounter itself. There are questions about patient preference such as the availability of appointments on preferred dates or the ability to see a preferred member of staff. Also there are questions about out-of-hours services.

The results of the questions are publically available at practice level on a Department of Health website with the aggregated responses to each question being shown for all of the practices in England.

13.2 Method

Whilst the survey results themselves are freely available, the size and complexity of them makes meaningful analysis quite difficult. The approach that we took was to use control charts to analyse a small selection of the questions and group the results by Primary Care Trust. The rationale for doing this was that as Commissioners, the PCTs will encourage practices to improve on various aspects of service delivery determined locally. Also some important aspects of primary care such as out-of-hours services are administered on a PCT-wide basis.

In general, methods for understanding variations in healthcare have sought to identify units with "unacceptable" variations – e.g. such as those units who are at the bottom of performance league tables or below a set standard. In contrast, Shewhart's theory of variation classifies variation according to the action required to reduce it [2]. Shewhart's theory proposes two kinds of variation – (1) common cause variation which is intrinsic to all processes and (2) special cause variation which arises from unusual circumstances extrinsic to the process. Shewhart proposed that the most effective action to reduce common cause variation was to change the underlying process, whereas special cause variation required detective work to find the cause and then act on it. Shewhart devised a simple graphical method, the control chart, for discriminating between the common and special causes of variation and guiding the appropriate actions. Control charts offer a novel, easy to communicate, scientifically sound way of understanding and reducing variation in healthcare.

The patient satisfaction control charts have % dissatisfaction on the y-axis and sample size and number of survey responders on the x-axis. The control chart has three additional lines. The central line is the average or the mean and the upper and lower lines are termed control limits. Control limits represent the limits of common cause variation set at three standard deviations around the mean. The control limits get closer to the mean as the number of patients in the sample increases. Points within the limits (empty circles) are consistent with common cause variation require a fundamental change to the underlying process for improvement. Points above the upper control limit identify especially higher patient dissatisfaction (red dots). Points below the lower control limit identify especially lower dissatisfaction (green dots).

Four questions from the survey were analysed. Firstly, the authors wanted to look at access to services. The first point of contact for a patient is usually to seek an appointment by phone. There were a number of questions in the instrument about telephoning practices. The first of these (question 5a) simply asked respondents how satisfied they were with the ease with which they were able to get through to the surgery on the phone in the last six months. There were other questions relating to telephone contact as well, including speaking to a doctor on the phone (5b), speaking to a nurse (5c) or obtaining test results (5d). We chose 5a for analysis as it focussed on initial contact with the surgery and would have been answered by a larger number of respondents. The proportion of respondents who answered "not very easy"" or "not at all easy" as a proportion of everyone who answered the question was the datum used for each practice.

The second question we chose (question 21) was a simple question which asked whether the respondent had trust and confidence in the doctor they last saw at the surgery. In this case we analysed the proportion of patients who answered "No, not at all" as a proportion of all of the people who responded to the question.

The third question we examined was one of a number about the out-of-hours GP service. We chose question 36 in which respondents were asked how they rated the care received for the out-of-hours GP service. In this case we looked at the proportion of respondents who selected "poor" or "very poor". In this question we had much smaller denominators as only patients who had stated that they had tried to use out-of-hours services were asked to respond.

Finally we analysed the results from question 25. This simply asked for the respondents satisfaction with care received at the surgery overall. We took the proportion of people who answered "fairly dissatisfied" or "very dissatisfied" as our datum for each practice.

13.3 Results

We obtained valid survey data for 977 practices in the West Midlands region. Figures 13.1 to 13.68 inclusive, show the individual control charts for the practice responses grouped in each of the 17 PCTs in the region. Figures 13.1 to 13.17 show the results for the question 5a about getting through on the telephone, figures 13.18 to 13.34 show the results for the question concerning trust and confidence in the GP, figure 35 to 51 show the results relating to out of hours care and figures 13.52 to 13.68 show the results relating to overall satisfaction with care received.

The first set of charts show considerable variation in many PCTs. In each control chart, we can see three distinct patterns – points above, points below and points within the control limits. Points above/below are consistent with special cause variation and points within are consistent with common cause variation. For example, for BEN PCT, the control chart is dominated by a cluster of practices (red dots) above the upper control limit and another cluster of practices (green dots) below the lower control limit. A minority of practices are within the control limits. This patterns suggests that "three" types of systems exist for patients getting through on the phone – the red, the green and the white. A similar pattern emerges in respect of other PCTs.

In the second set of charts which examine reported lack of trust and confidence in the last GP seen; we see that the majority of data points for all PCTs are within the control limits and only a minority are above (red dots) the upper control limit, suggesting that there are special causes of variation in a minority of practices in each PCT.

The third set of charts related to question 35, that of satisfaction with out-of-hours services. Although we see quite a wide degree of variation within the practices, owing to the much smaller numbers of respondents the control limits are very wide. There are very few data points outside the control limits for any of the PCTs.

The results for the last question we analysed probably offer us the most interesting insights. There are some PCTs Heart of Birmingham and Birmingham East and North in particular) where we see very wide variation across the practices, but in most we see patterns where small groups of outliers do appear to have a very different distribution to the rest of the PCT. Also as in the other three questions, generally rural PCTs have lower levels of dissatisfaction and fewer outliers than urban ones.

Figure 13.1: Birmingham East and North PCT: Getting through on the telephone

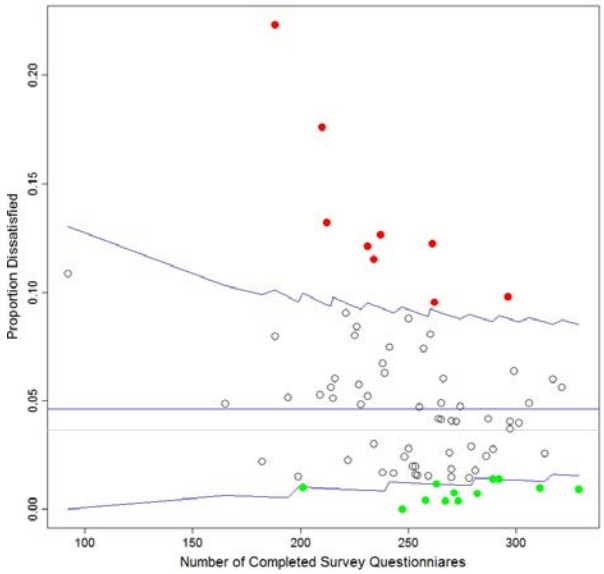


Figure 13.2: Coventry Teaching PCT: Getting through on the telephone

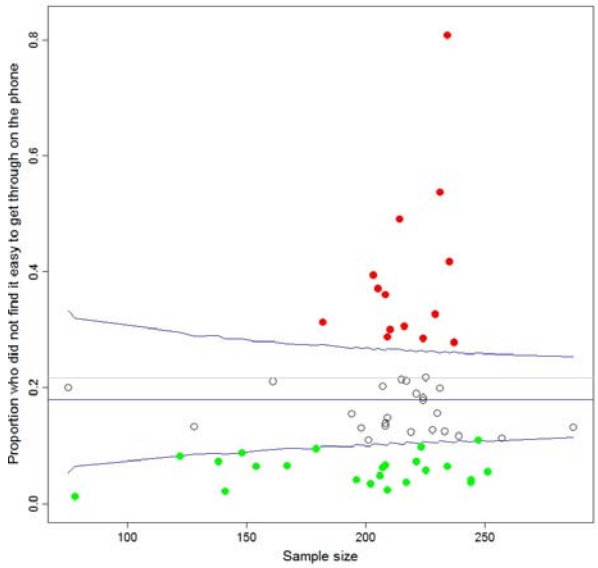


Figure 13.3: Dudley PCT: Getting through on the telephone

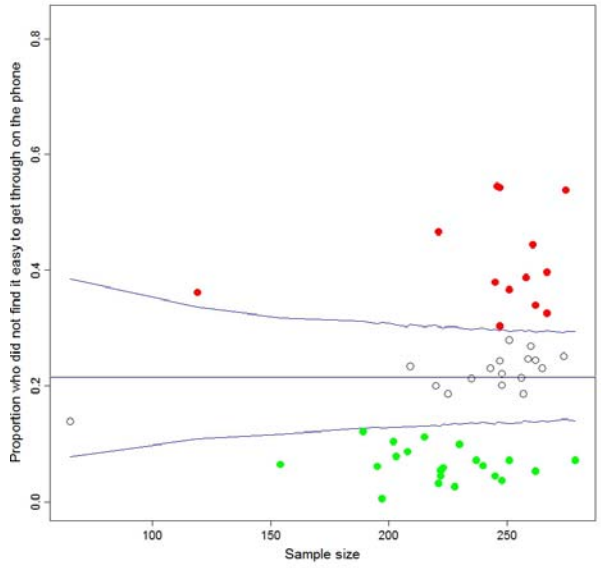


Figure 13.4: Heart of Birmingham Teaching PCT: Getting through on the telephone

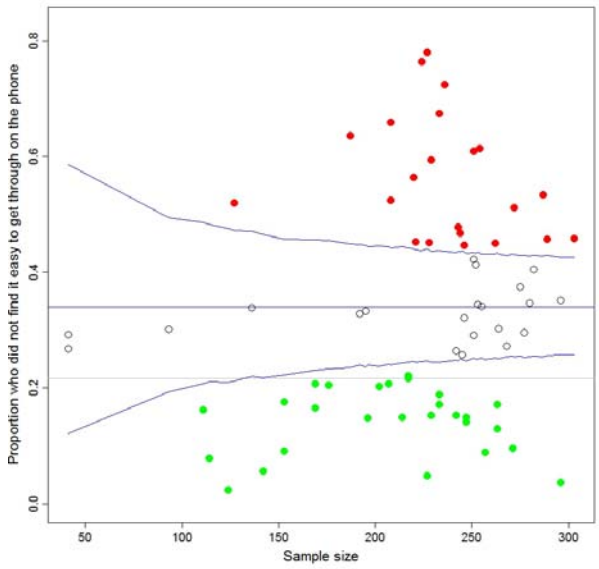
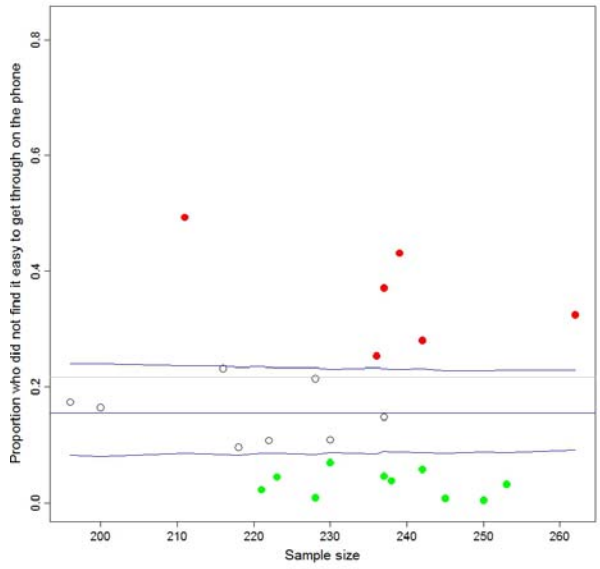


Figure. 13.5: Herefordshire PCT: Getting through on the telephone	Figure 13.6: North Staffordshire PCT: Getting through on the telephone



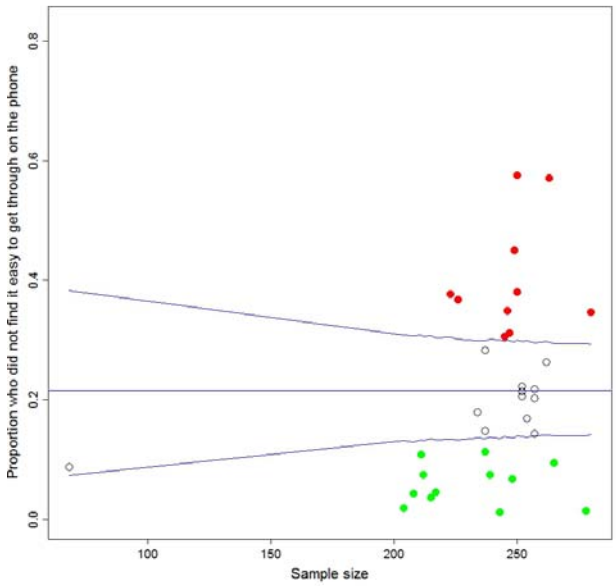
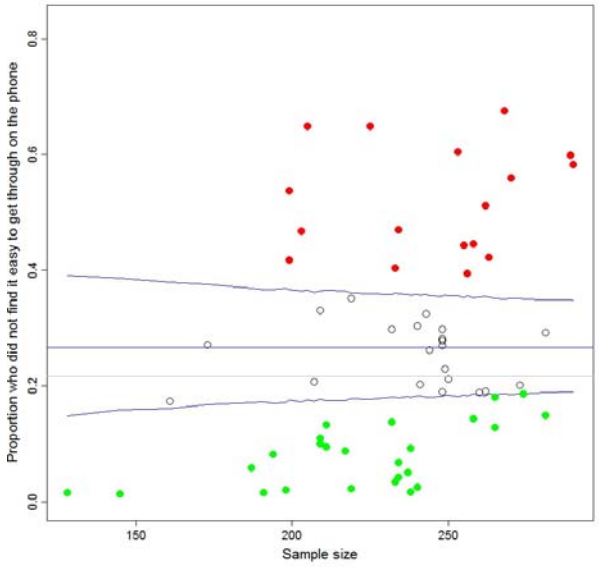


Figure 13.7: Sandwell PCT: Getting through on the telephone	Figure 13.8: Shropshire County PCT: Getting through on the telephone



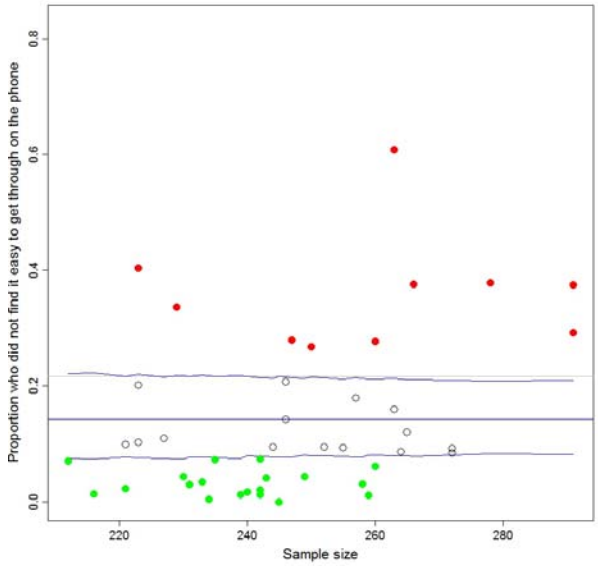


Figure 13.9: Solihull Care Trust: Getting through on the telephone

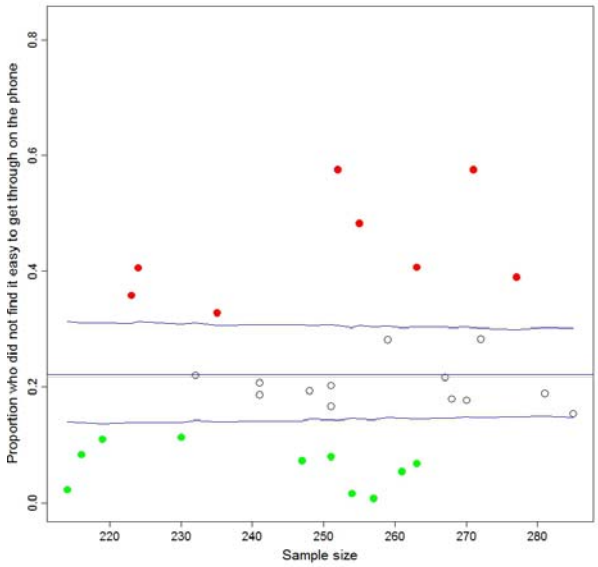


Figure 13.10: South Birmingham PCT: Getting through on the telephone

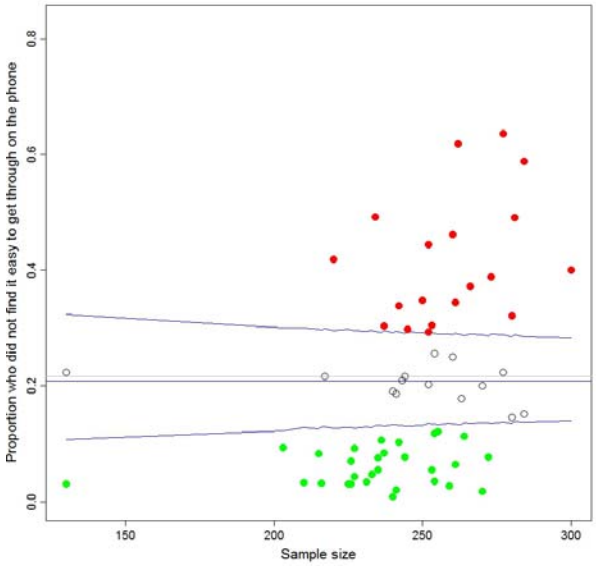


Figure 13.11: South Staffordshire PCT: Getting through on the telephone

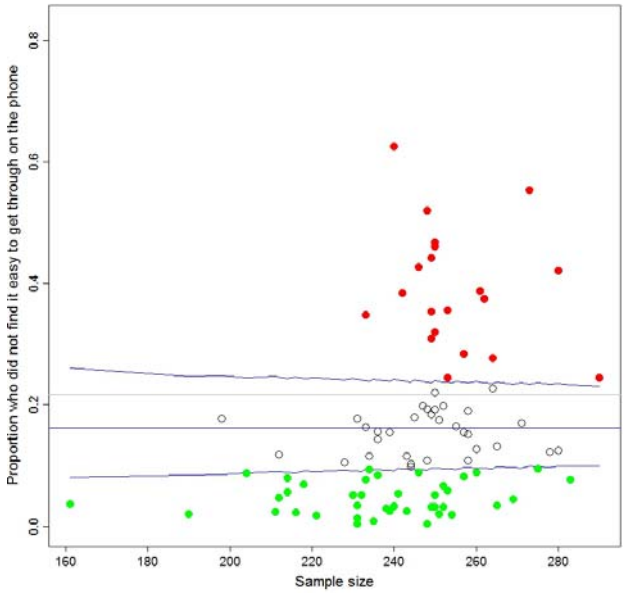


Figure 13.12: Stoke-on-Trent PCT: Getting through on the telephone

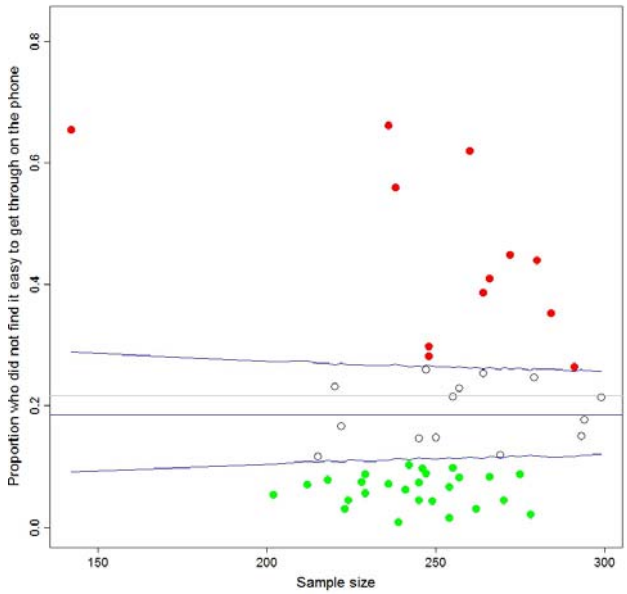
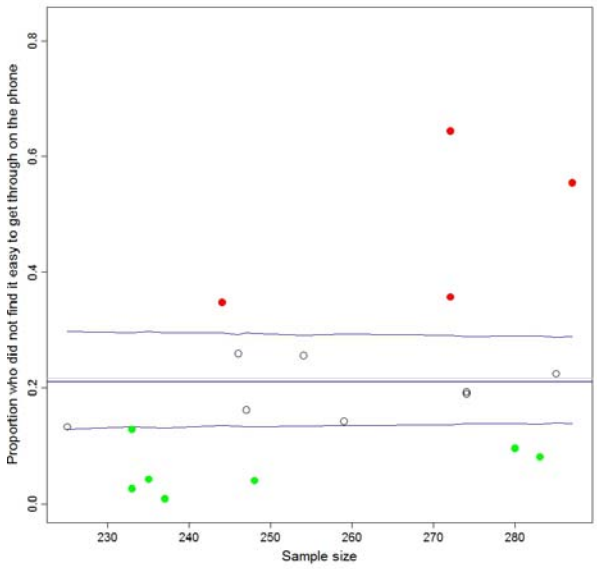


Figure. 13.13: Telford And Wrekin PCT: Getting through on the telephone	Figure 13.14: Walsall Teaching PCT: Getting through on the telephone



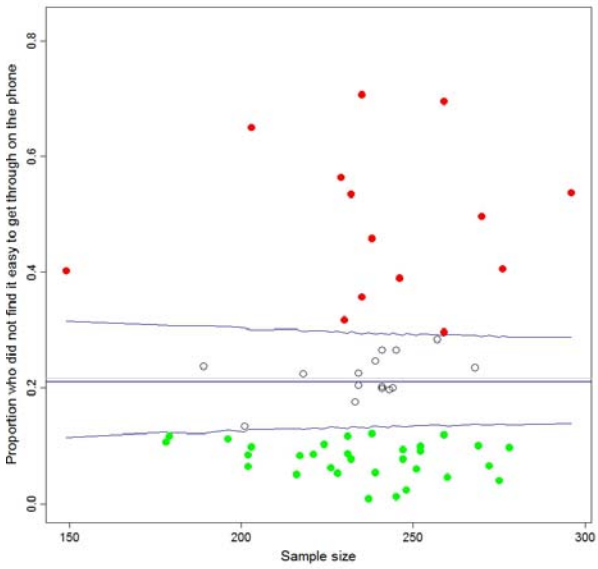
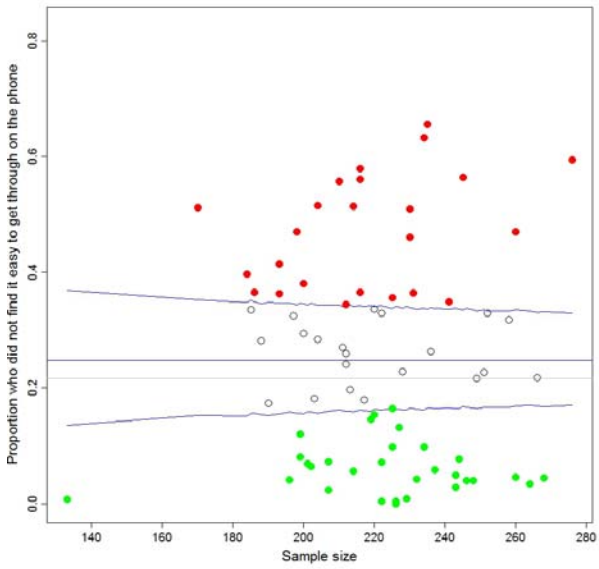


Figure 13.15: Warwickshire PCT: Getting through on the telephone	Figure 13.16: Wolverhampton City PCT: Getting through on the telephone



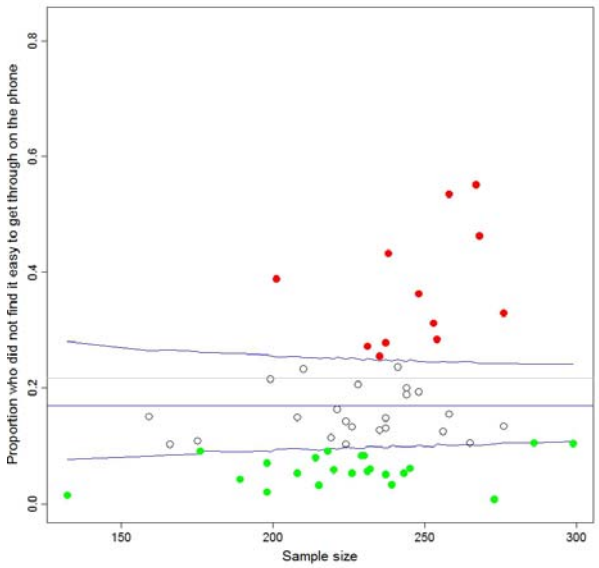


Figure 13.17: Worcestershire PCT:
Getting through on the telephone

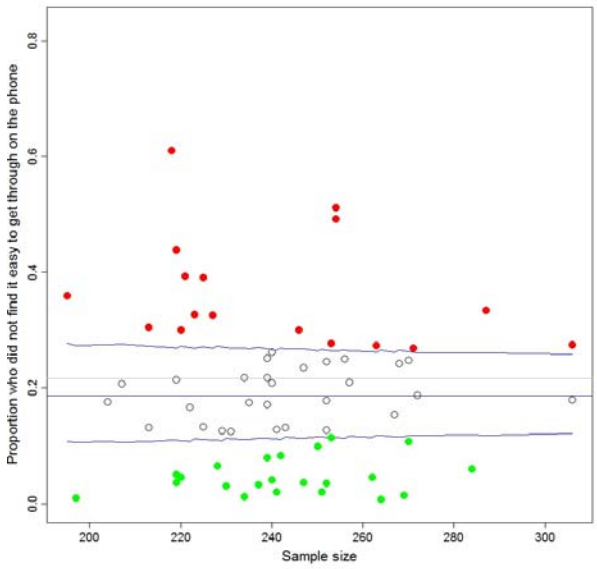


Figure 13.18: Birmingham East and North PCT:
Lack of confidence and trust in the doctor last seen

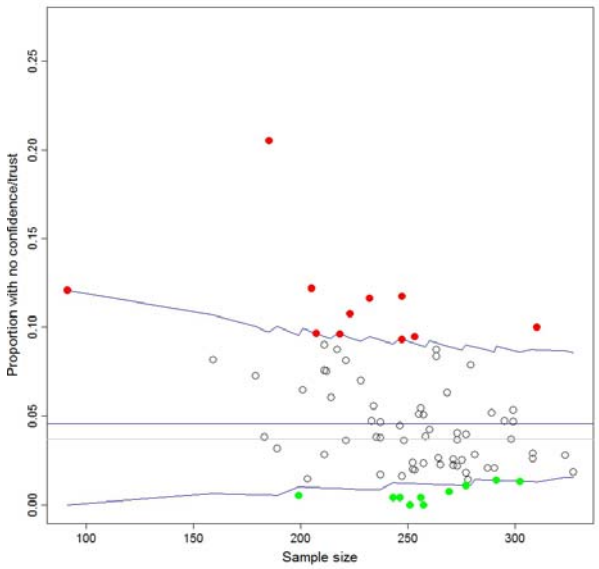


Figure 13 19: Coventry Teaching PCT:
Lack of confidence and trust in the doctor last seen

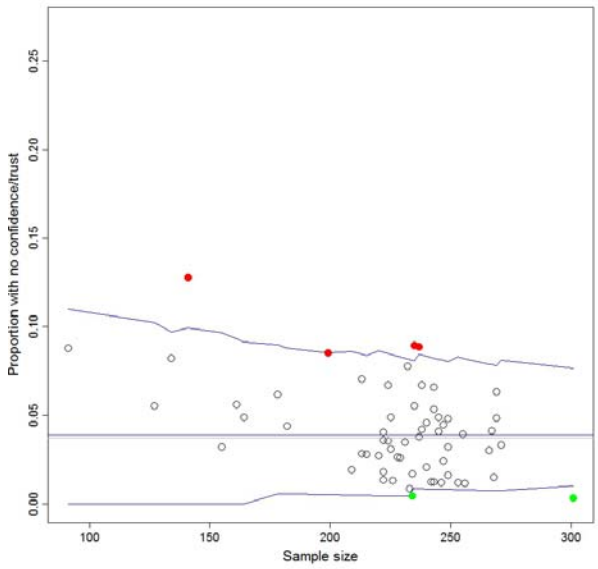
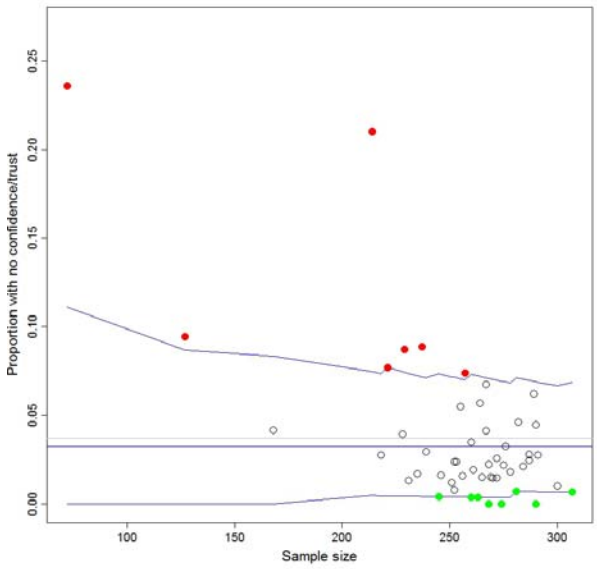


Figure 13.20: Dudley PCT: Lack of confidence and trust in the doctor last seen	Figure 13.21: Heart of Birmingham PCT: Lack of confidence and trust in the doctor last seen



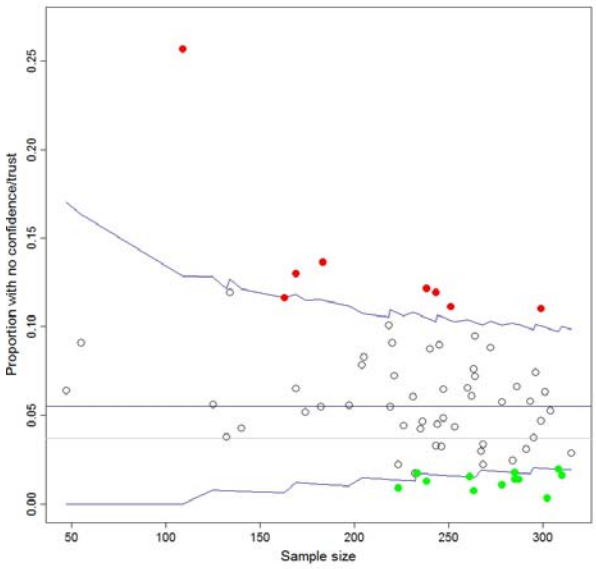
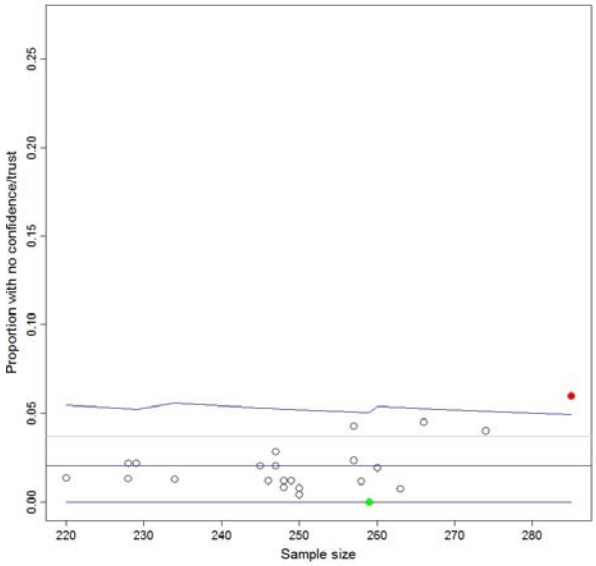


Figure 13.22: Herefordshire PCT: Lack of confidence and trust in the doctor last seen	Figure 13.23: North Staffordshire PCT: Lack of confidence and trust in the doctor last seen



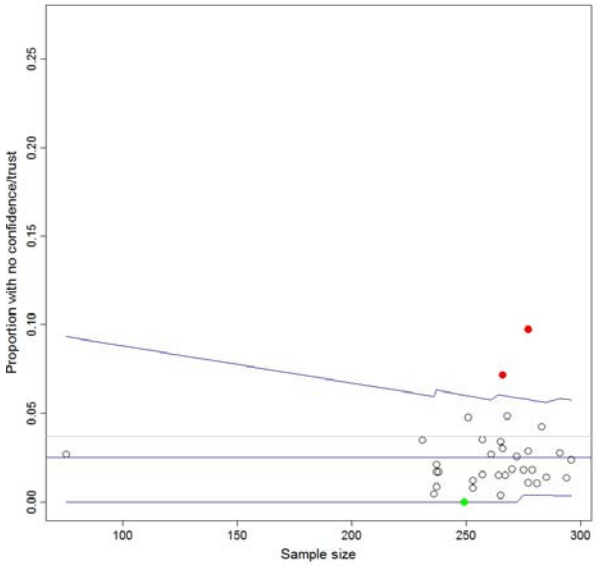
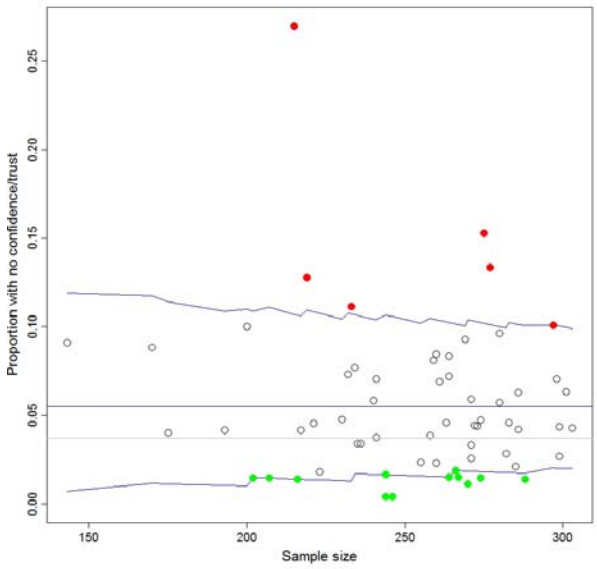


Figure 13.24: Sandwell PCT: Lack of confidence and trust in the doctor last seen	Figure 13.25: Shropshire County PCT: Lack of confidence and trust in the doctor last seen



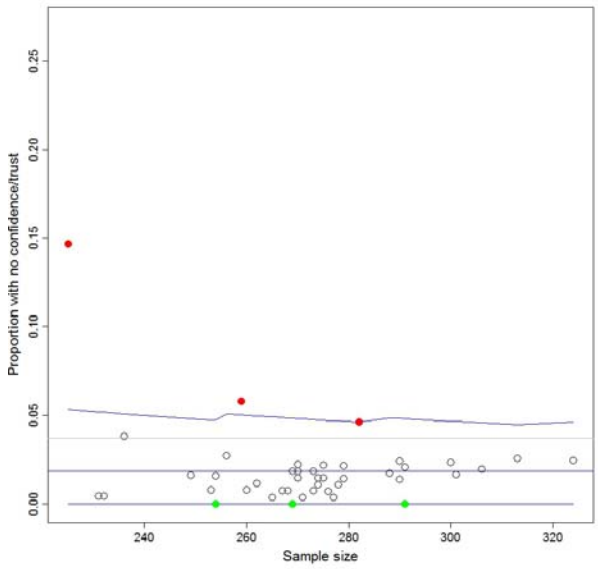
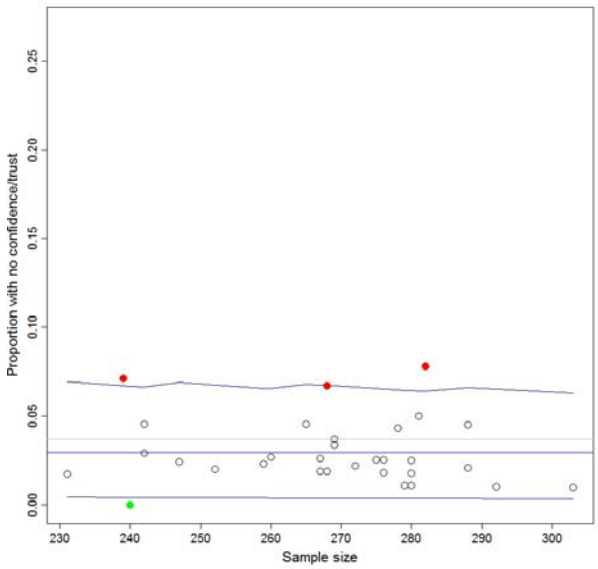


Figure 13.26: Solihull Care Trust: Lack of confidence and trust in the doctor last seen	Figure 13.27: South Birmingham PCT: Lack of confidence and trust in the doctor last seen



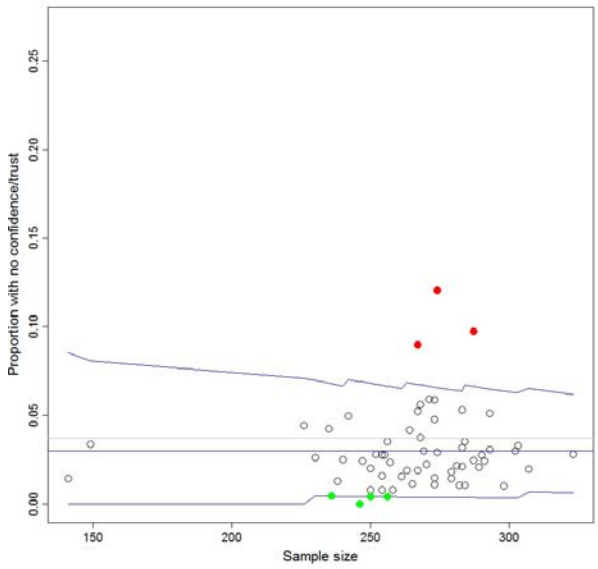
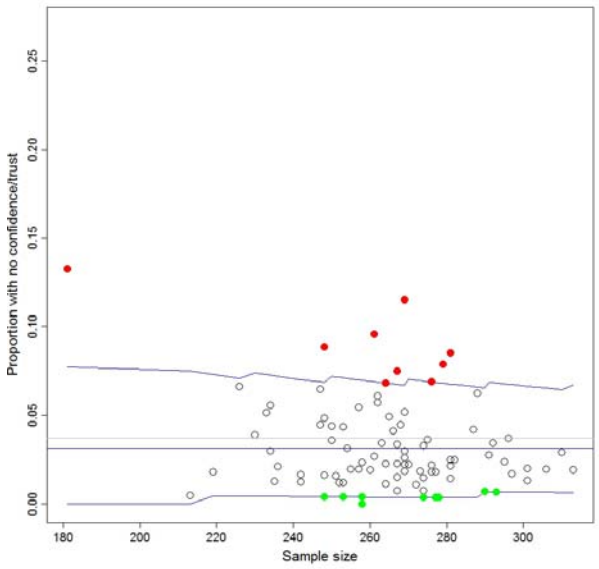


Figure 13.28: South Staffordshire PCT: Lack of confidence and trust in the doctor last seen	Figure 13.29: Stoke-on-Trent PCT: Lack of confidence and trust in the doctor last seen



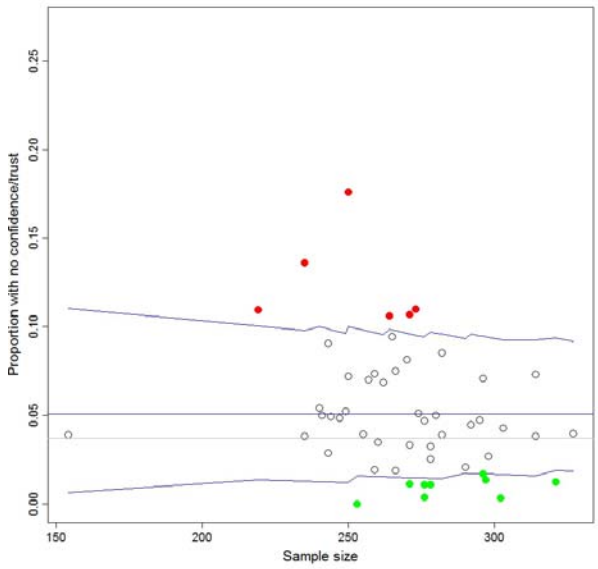
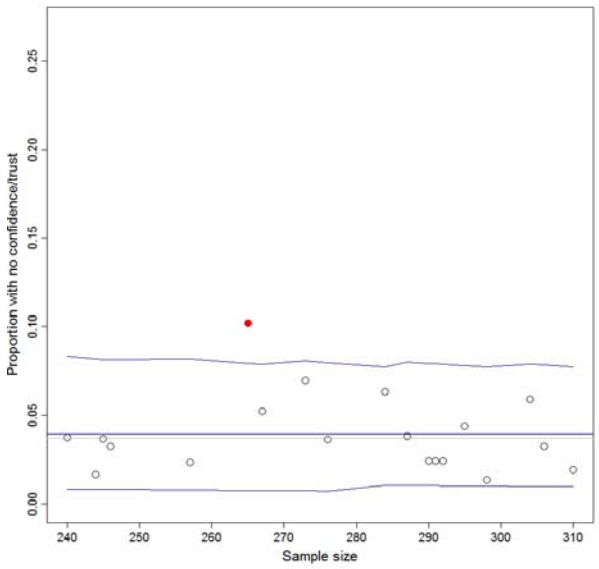


Figure 13.30: Telford And Wrekin PCT: Lack of confidence and trust in the doctor last seen	Figure 13.31: Walsall Teaching PCT: Lack of confidence and trust in the doctor last seen



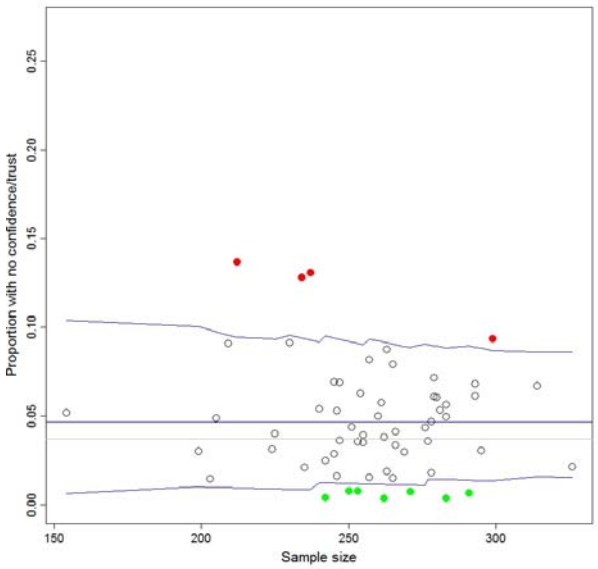


Figure 13.32: Warwickshire PCT:
Lack of confidence and trust in the doctor last seen

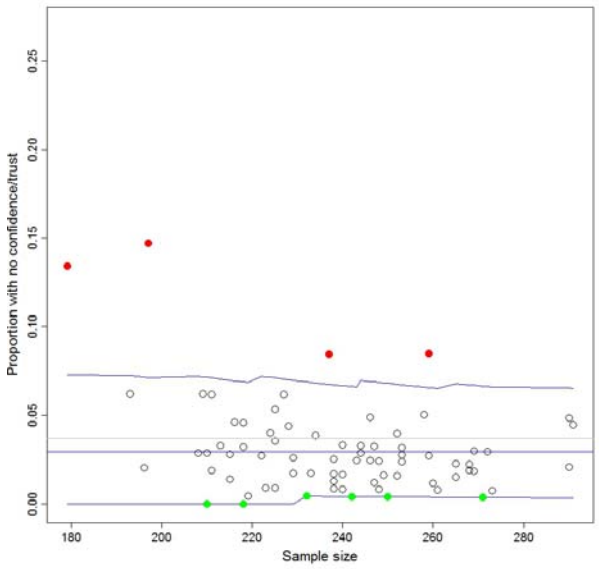


Figure 13.33: Wolverhampton City PCT:
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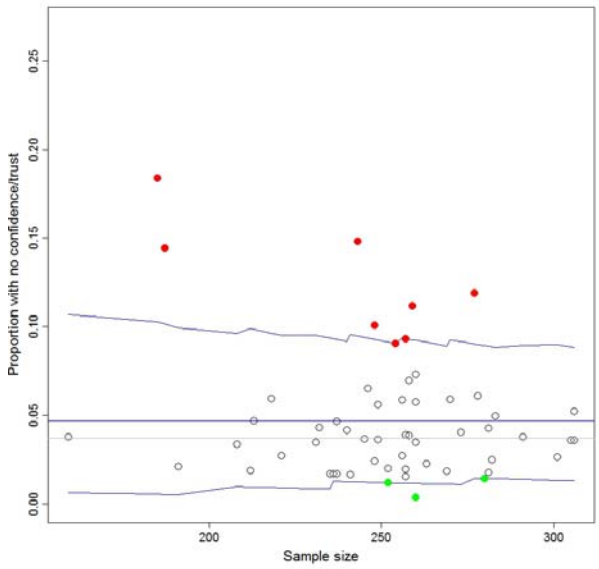

Figure 13.34: Worcestershire PCT:
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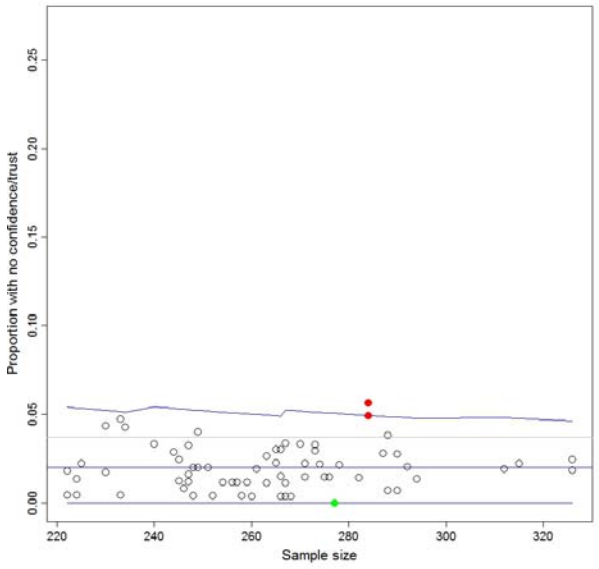


Figure 13.35: Birmingham East and North PCT: Dissatisfaction with out-of-hours care

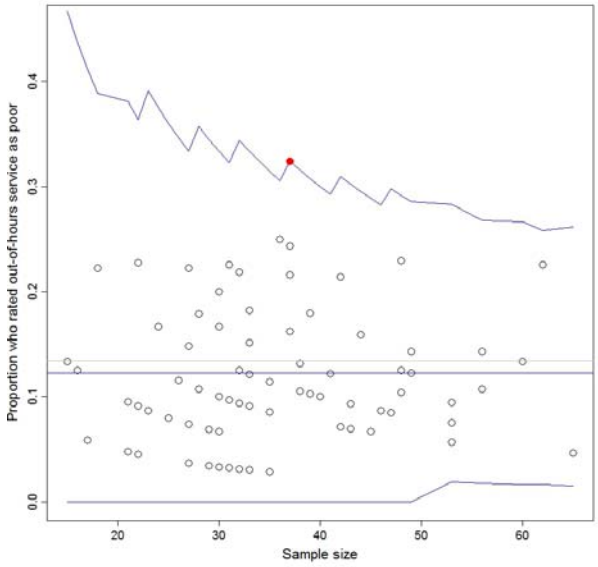


Figure 13.36: Coventry Teaching PCT: Dissatisfaction with out-of-hours care

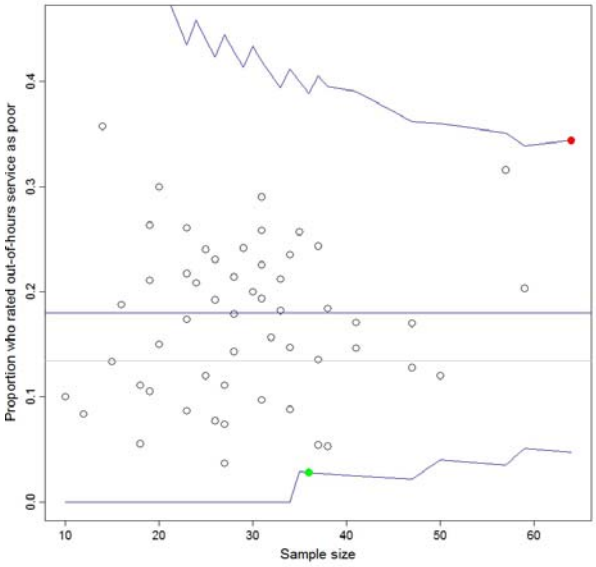


Figure 13.37: Dudley PCT: Dissatisfaction with out-of-hours care

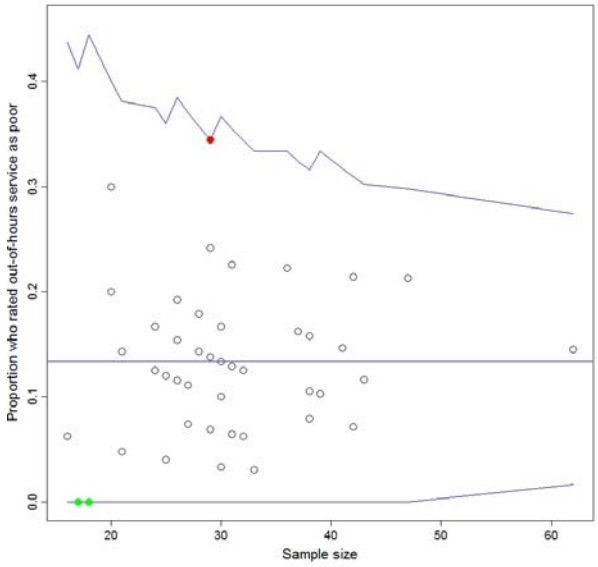


Figure 13.38: Heart of Birmingham Teaching PCT: Dissatisfaction with out-of-hours care

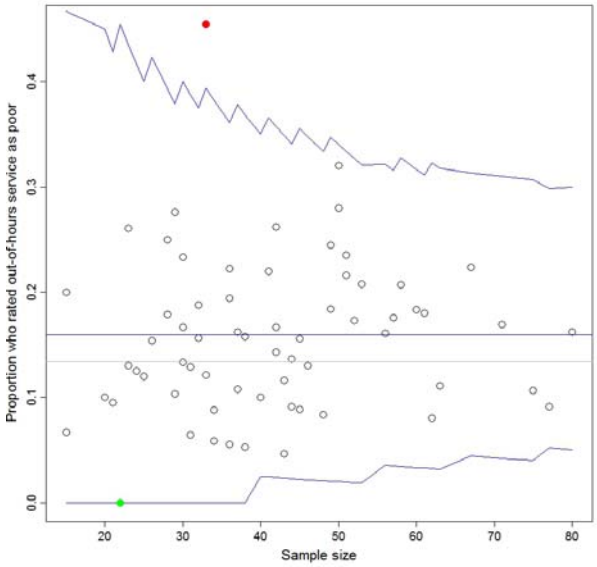


Figure 13.39: Herefordshire PCT: Dissatisfaction with out-of-hours care

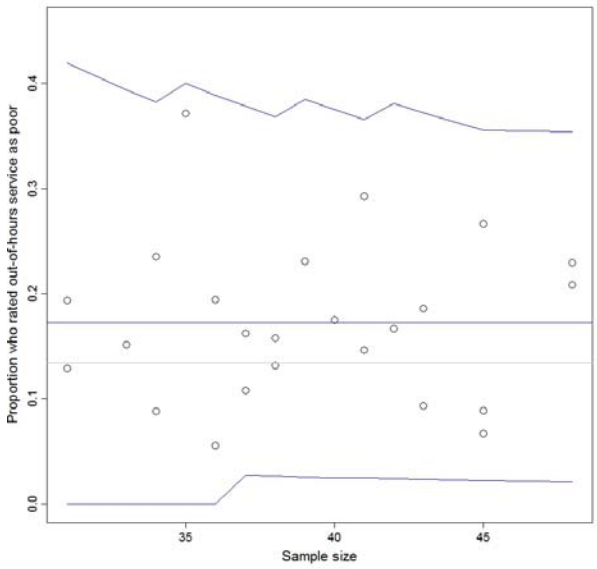


Figure 13.40: North Staffordshire PCT: Dissatisfaction with out-of-hours care

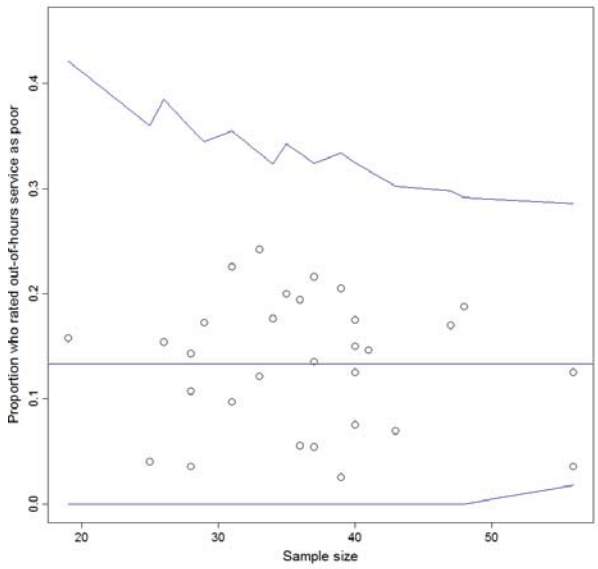


Figure 13.41: Sandwell PCT: Dissatisfaction with out-of-hours care

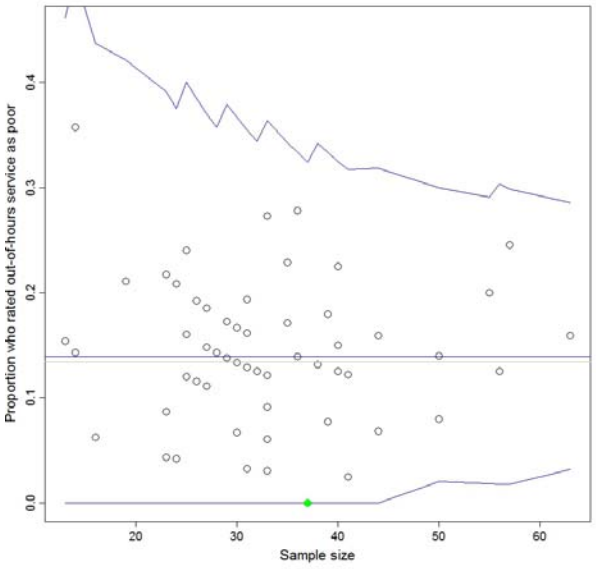


Figure 13.42: Shropshire County PCT: Dissatisfaction with out-of-hours care

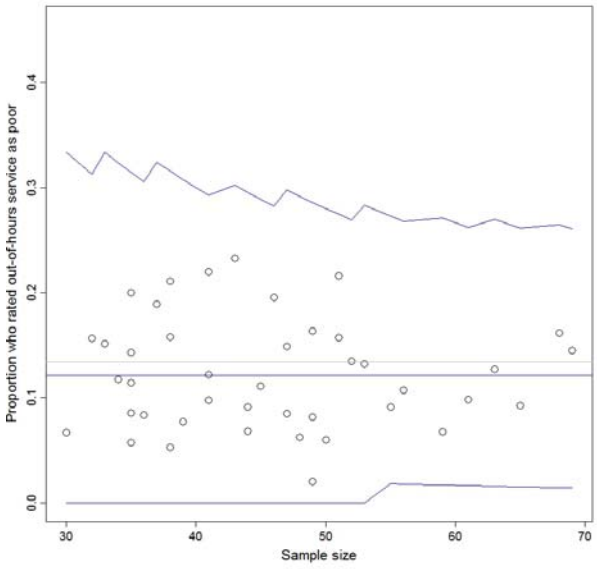


Figure 13.43: Solihull Care Trust: Dissatisfaction with out-of-hours care

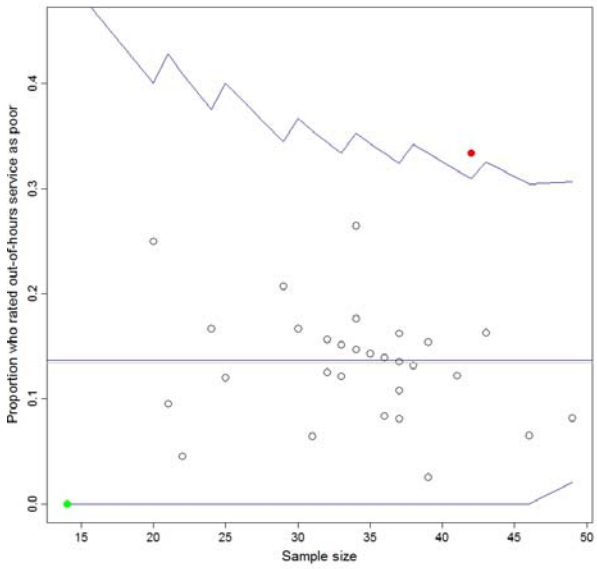


Figure 13.44: South Birmingham PCT: Dissatisfaction with out-of-hours care

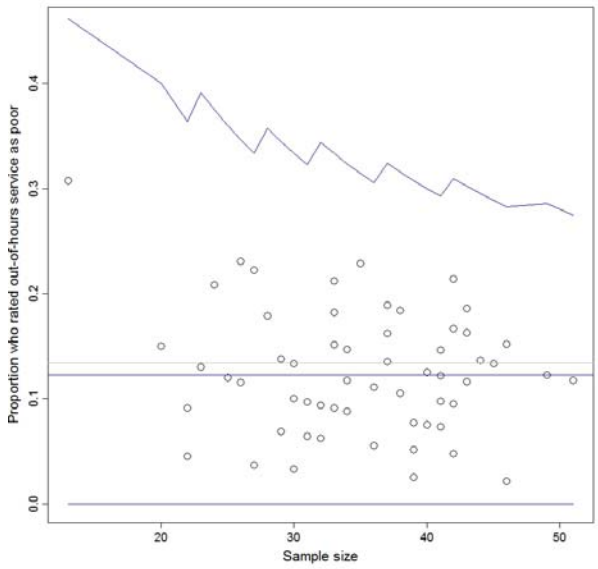


Figure 13.45: South Staffordshire PCT: Dissatisfaction with out-of-hours care

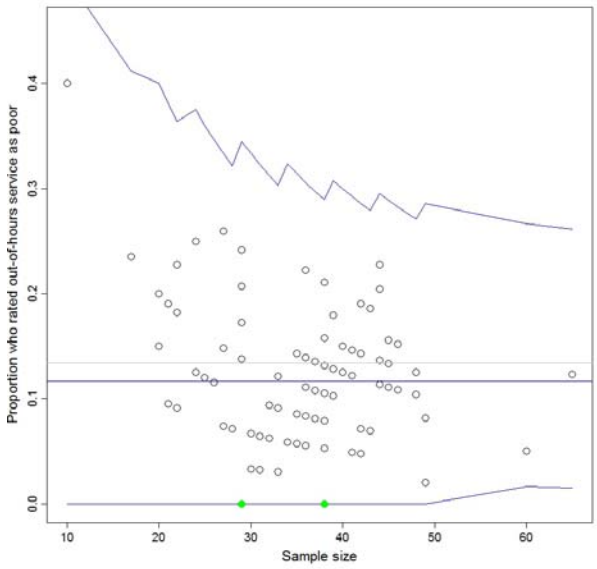


Figure 13.46: Stoke-on-Trent PCT: Dissatisfaction with out-of-hours care

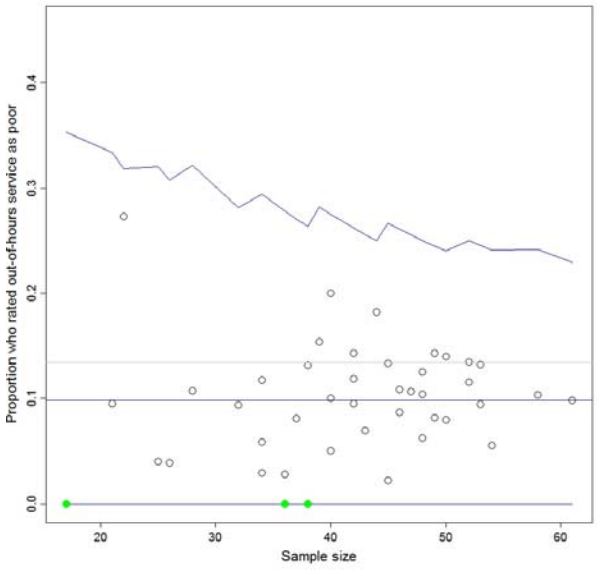
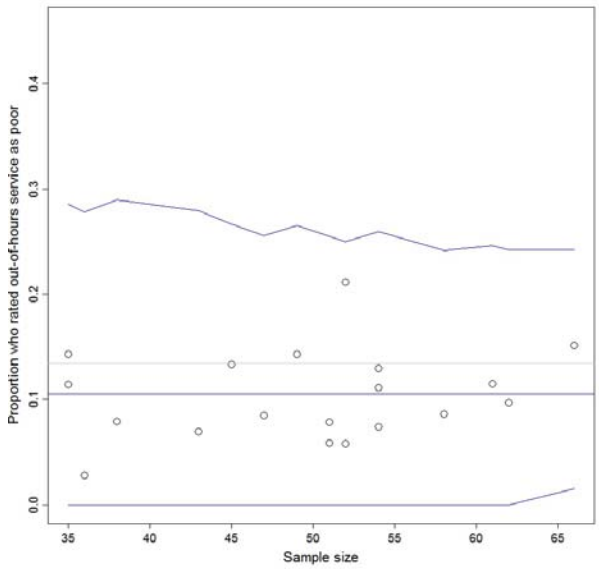


Figure 13.47: Telford And Wrekin PCT: Dissatisfaction with out-of-hours care	Figure 13.48: Walsall Teaching PCT: Dissatisfaction with out-of-hours care



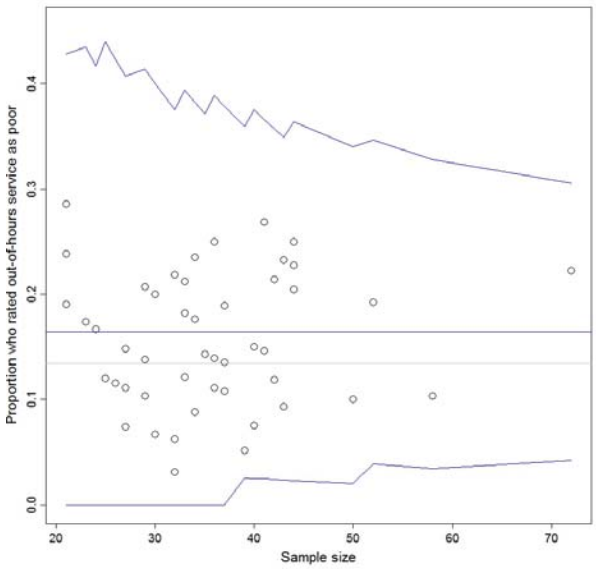
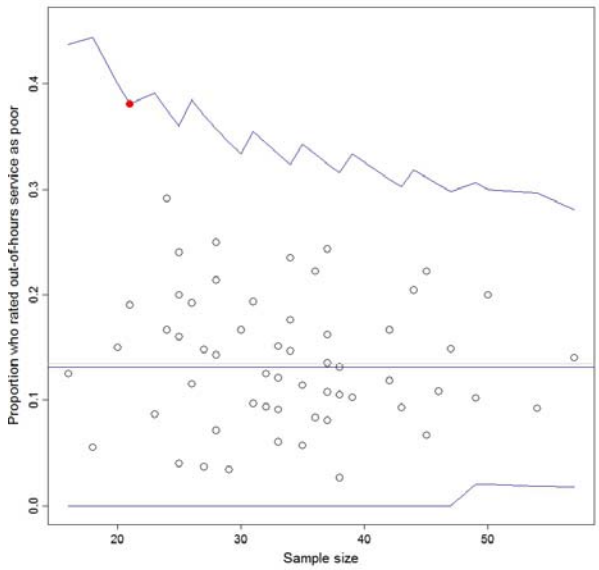


Figure 13.49: Warwickshire PCT: Dissatisfaction with out-of-hours care	Figure 13.50: Wolverhampton City PCT: Dissatisfaction with out-of-hours care



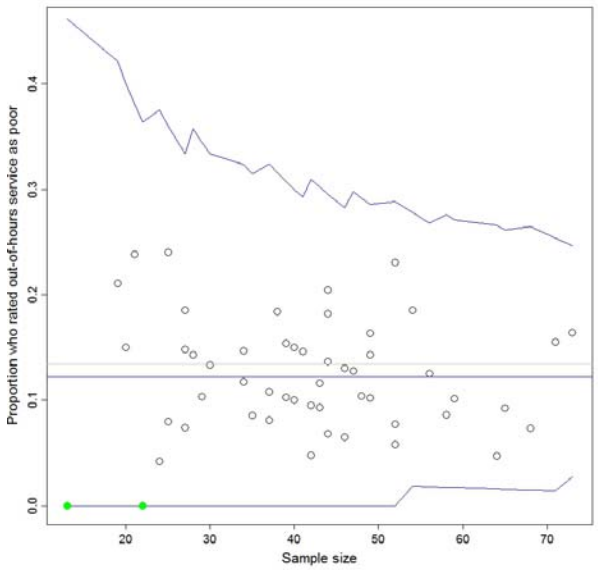


Figure 13.51: Worcestershire PCT: Dissatisfaction with out-of-hours care

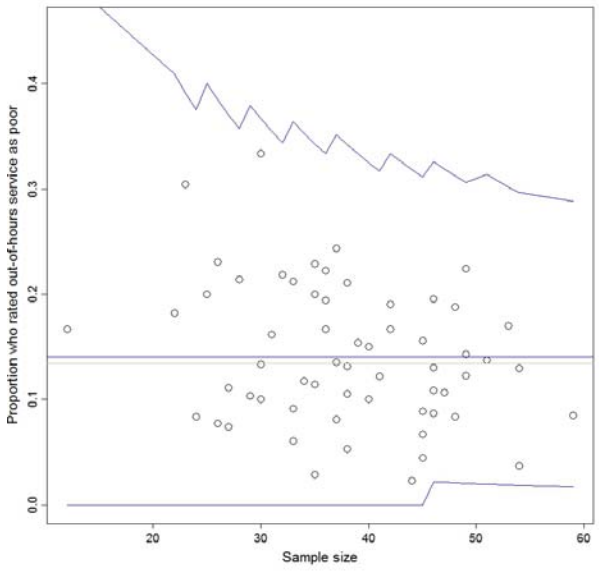


Figure 13.52: Birmingham East and North PCT: Overall dissatisfaction with care received at the surgery

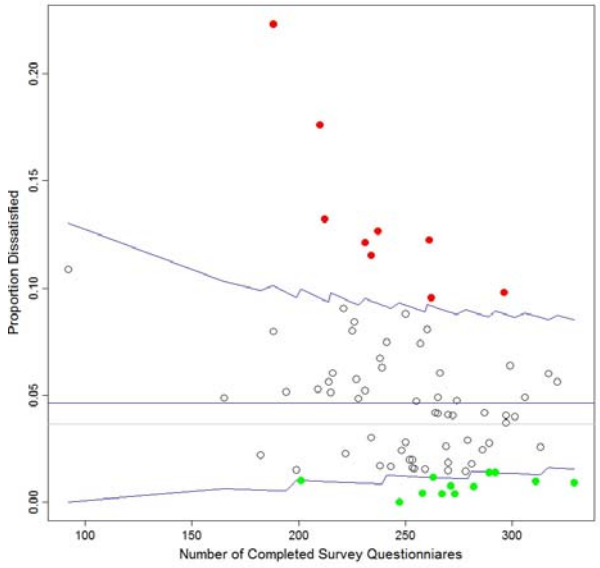


Figure 13.53: Coventry Teaching PCT: Overall dissatisfaction with care received at the surgery

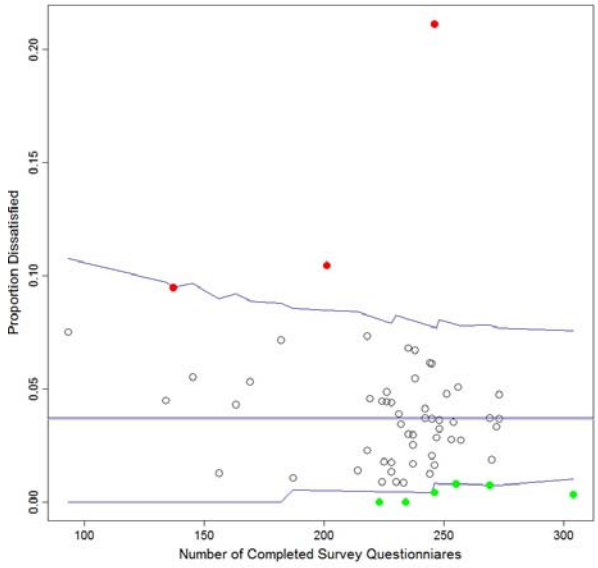


Figure 13.54: Dudley PCT:
Overall dissatisfaction with care received at the surgery

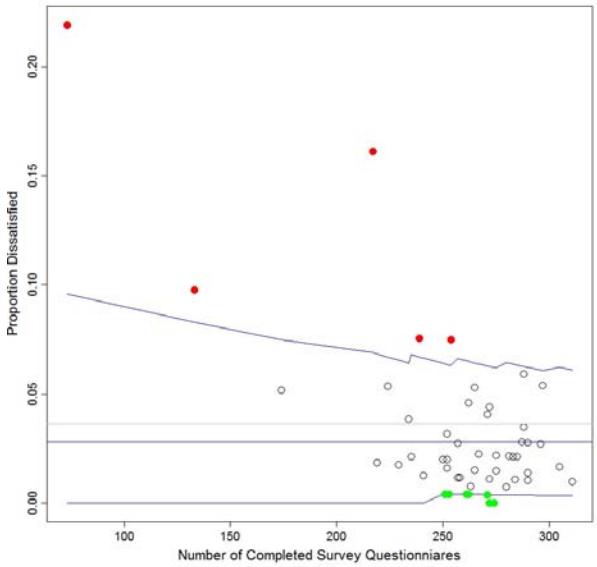


Figure 13.55: Heart of Birmingham Teaching PCT
Overall dissatisfaction with care received at the surgery

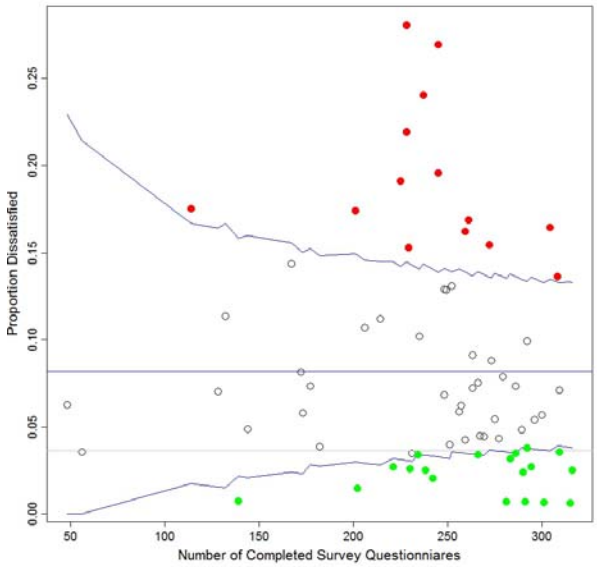


Figure 13.56: Herefordshire PCT:
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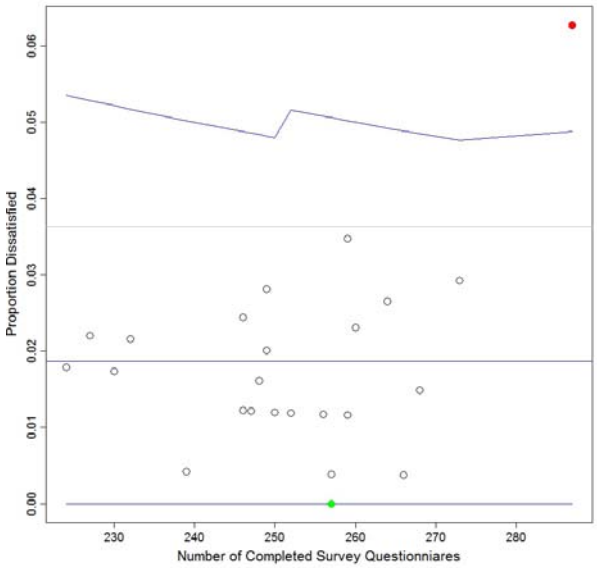


Figure 13.57: North Staffordshire PCT:
Overall dissatisfaction with care received at the surgery

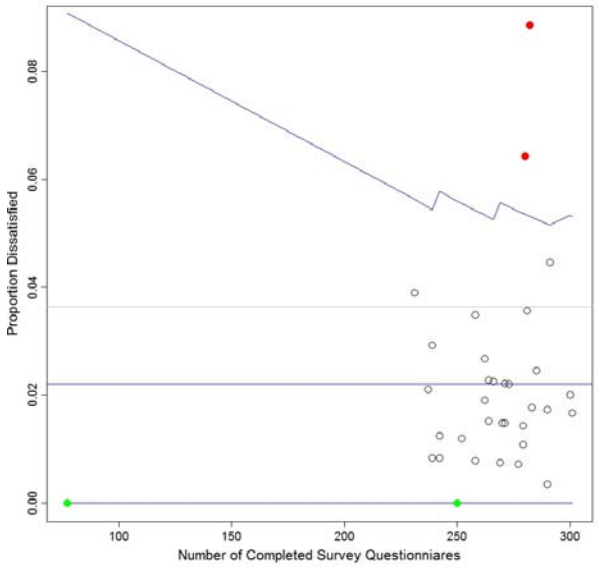


Figure 13.58: Sandwell PCT:
Overall dissatisfaction with care received at the surgery

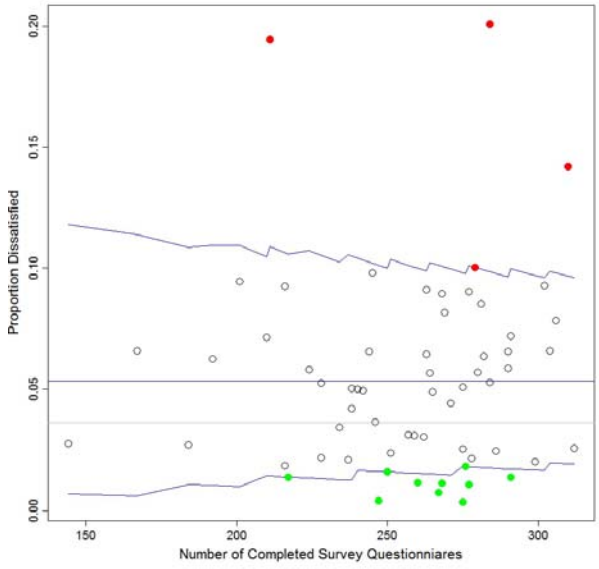


Figure 13.59: Shropshire County PCT:
Overall dissatisfaction with care received at the surgery

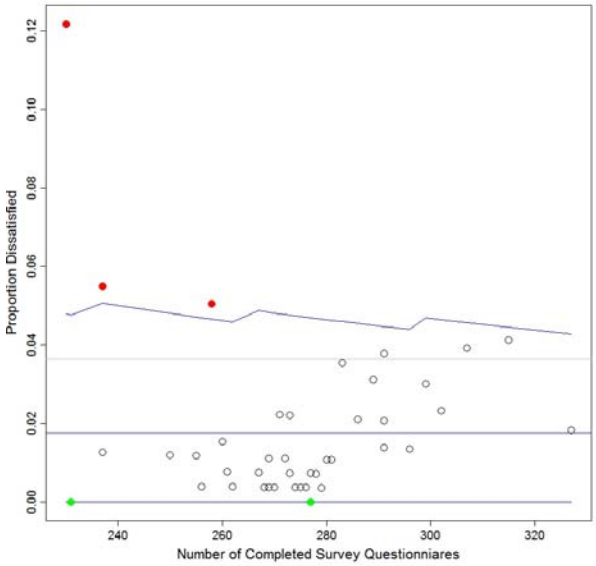


Figure 13.60: Solihull Care Trust:
Overall dissatisfaction with care received at the surgery

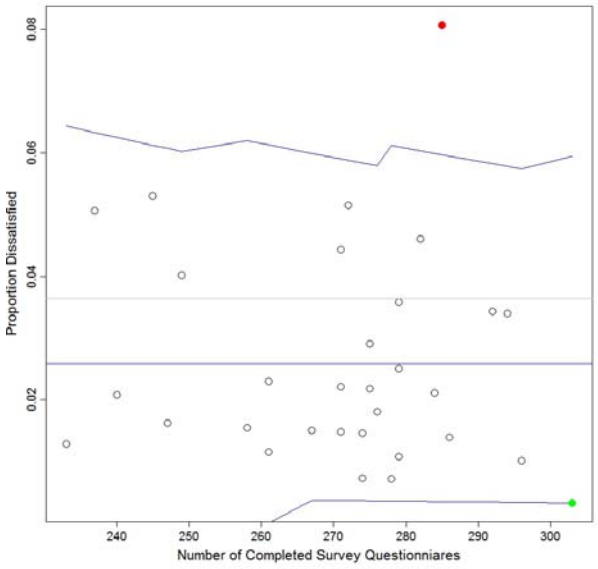


Figure 13.61: South Birmingham PCT:
Overall dissatisfaction with care received at the surgery

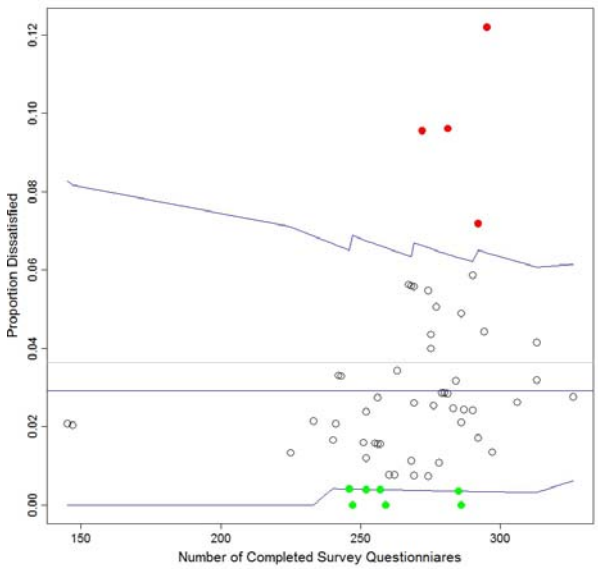
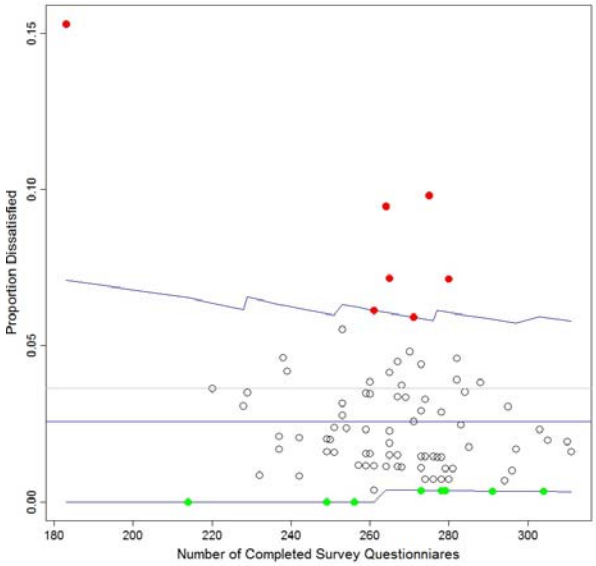


Figure 13.62: South Staffordshire PCT: Overall dissatisfaction with care received at the surgery	Figure 13.63: Stoke-on-Trent PCT: Overall dissatisfaction with care received at the surgery



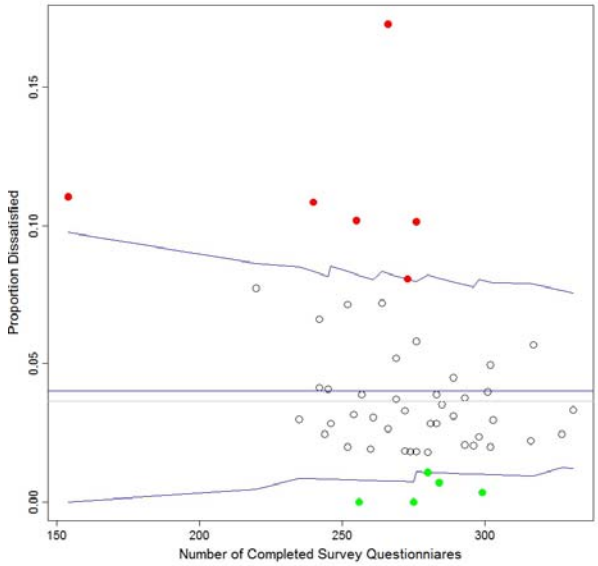
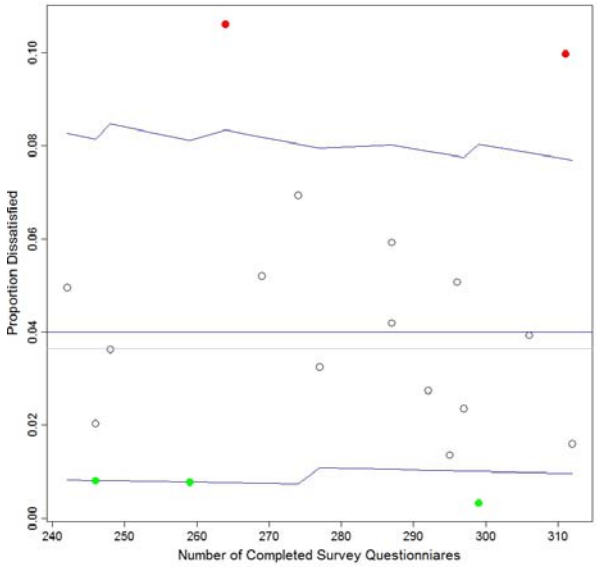


Figure 13.64: Telford And Wrekin PCT: Overall dissatisfaction with care received at the surgery	Figure 13.65: Walsall Teaching PCT: Overall dissatisfaction with care received at the surgery



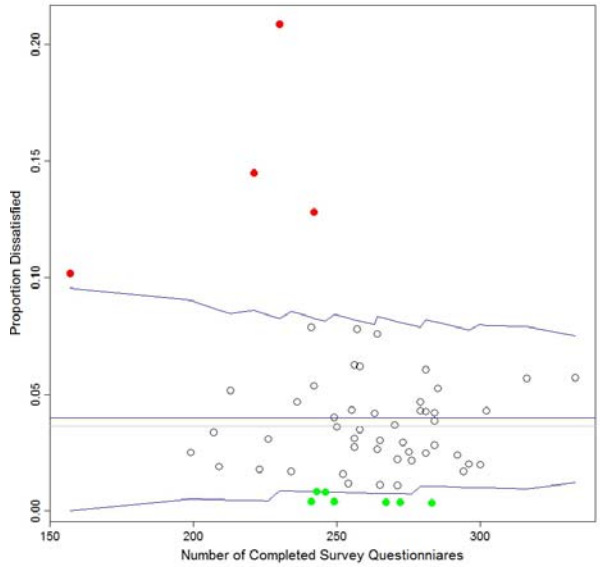


Figure 13.66: Warwickshire PCT:
Overall dissatisfaction with care received at the surgery

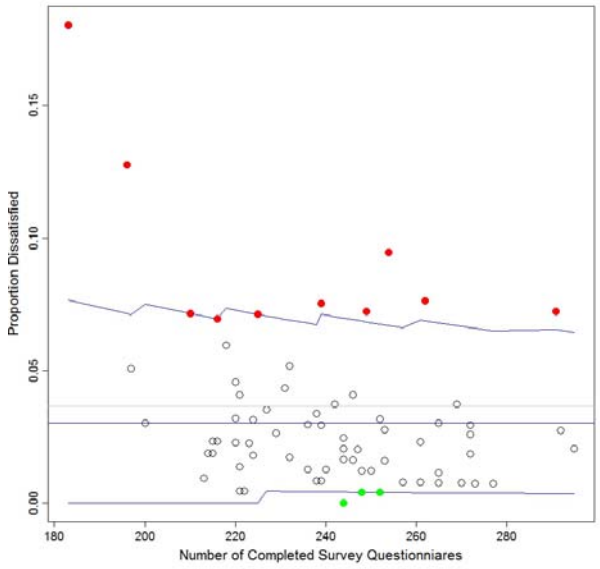


Figure 13.67: Wolverhampton City PCT:
Overall dissatisfaction with care received at the surgery

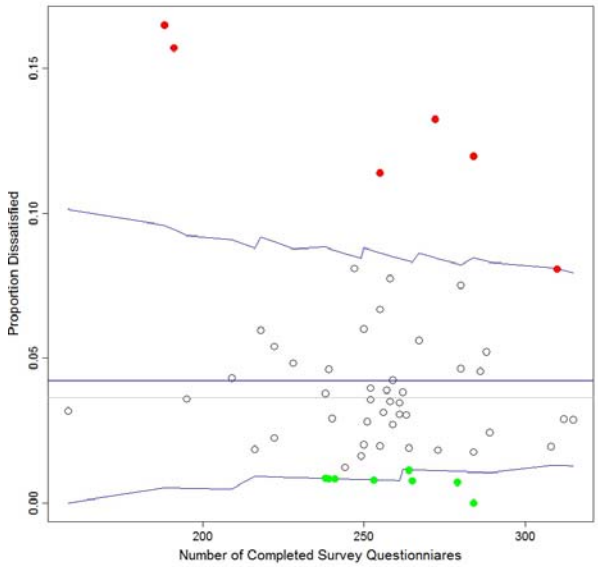
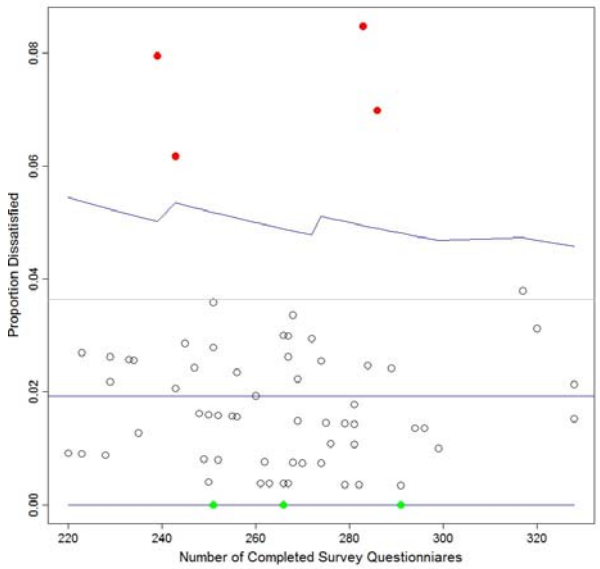


Figure 13.68: Worcestershire PCT:
Overall dissatisfaction with care received at the surgery



13.4 Discussion

We already have some evidence from the literature that obtaining appointments is a source of dissatisfaction amongst patients. A study conducted in nine European countries using a standard validated satisfaction questionnaire found that respondents in the in the UK reported least satisfaction with the ability of obtain an appointment[3]. In the same study it was also shown that rural patients in the UK had more satisfaction in this domain than urban ones, which was the opposite of the pattern observed in all the other countries in the study except Slovenia.

Targeting GP practices to see most of their patients within 24 hours has resulted in some of them using a process whereby patients can only book an appointment on the day upon which they are seen. However by making all appointment seekers ring in a limited window of time in the morning, many callers will be unable to get through at all, or available appointments may run out before they are able to get through. Qualitative research carried out on this particular issue has found a high degree of patient dissatisfaction arising from this particular issue[4]. In these practices the call handling system becomes the *de facto* mechanism for rationing appointments. Clearly this process is very different to those is practices who do not use this system.

The issue of patient trust in the doctor that they saw is interesting. Despite high degrees of dissatisfaction with being able to get an appointment, there were relatively few outliers in the reporting of trust and confidence in the GP themselves. As has been observed this is an area in which relatively little research has been done historically [4]. However recent research in the East Midlands[5] reported that ethnic minorities and younger people reported lower levels of trust in their GP. If this was generalisible to the respondents in this study, then the ethnic and demographic composition of the populations in some PCTs may reduce the levels of trust and confidence reported in them.

The relatively small numbers of respondents meant that our control limits for measuring satisfaction with out of hours services were very wide. It would be interesting to explore this issue in greater detail however as there is some evidence to suggest that dissatisfaction with out-of-hours services may be contributing to demand at Emergency Departments. The authors have commenced on some follow-up work which will investigate this area further.

There are some generic patterns of dissatisfaction seen across the region. As has been said there is a noticeable urban / rural divide in the propensity of the average level of satisfaction to be greater or less than the regional average. We need to be aware of some possible confounders. Firstly there is age. These results have not been age adjusted, but there are significant differences in the demographic composition of respondents between PCTs. Also urban PCTs particularly those in Birmingham had a higher proportion of ethnic minority respondents. As has been stated ethnic minority subjects will often report lower levels of satisfaction with services in surveys. Whilst often reported, relatively little work has been done that explores possible reasons for this. A recent study has highlighted possible differences in how people assess care quality between ethnic groups, in particular perceptions of waiting times[6]. Also this study found interesting differences between ethnic groups in areas such as waiting times, communication and continuity of care.

The other problem we have is that postal surveys do tend to have a relatively low response rate. In this case the average response rate for the region was 37.7%, which was only just below the national average. This does raise the usual questions about the generalisibility of responders to the population from which they were selected. However by using control charts we are able to focus not on the aggregate level of dissatisfaction but the extent to which there are unusual patterns of dissatisfaction within the samples.

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4. Pearson S, Raeke L. Patient's trust in physicians: many theories, few measures, little data. J Gen Intern Med 2000; 15: 509-513
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CHAPTER FOURTEEN

WEST MIDLANDS PERINATAL AND INFANT MORTALITY 2008-2009

We are pleased again this year to be able to include, as a stand-alone chapter, a perinatal & infant mortality update from the West Midlands Perinatal Institute.

WEST MIDLANDS PERINATAL & INFANT MORTALITY 2008-9

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We present the annual update of the of the West Midlands mortality rates, up to 2009 for stillbirths and neonatal deaths, and to 2008 for infant deaths.

The information is based on the WM Perinatal Death Notifications (PDNs) which the Perinatal Institute receives from its network of co-ordinators in West Midlands units. PCT cohorts are defined by postcode at delivery.

The information may sometimes differ from the last ONS Vital Statistics, because our data include late ascertained cases which are notified to us on an ongoing basis. We have also implemented regular cross checks with the West Midlands Safeguarding Children's Boards.

This report includes

- birth rate trends for West Midlands and England & Wales (Section 1);
- a short description of West Midlands maternity demographics based on PEER 09/10 (Section 1);
- numbers, rates and 3-year moving averages for West Midlands, its five Clusters and 17 PCTs, for
  - stillbirths (from 24 weeks);
  - early neonatal deaths (birth to age 7 days);
  - perinatal deaths (stillbirths and early neonatal deaths);
  - neonatal deaths (birth to age 28 days); and
  - infant deaths (birth to 12 months).

Although some of these categories overlap, they are all presented for ease of reference and comparison with other reports. Unlike previous national reports, we continue presenting trends by 3- year moving average, as year-on-year variation often falsely identifies outliers.

As in previous years, we also present 'corrected' rates, where we exclude congenital anomalies and pre-viable births, to allow more useful comparisons between PCTs with different populations. Where available, we also include comparison with similarly adjusted or corrected rates in national reports.

For stillbirths and infant deaths, we have undertaken the following additional analyses:

1. major classification groups, to assess the main contributing causes (Sections 3 & 8); and
2. mortality rates plotted against deprivation index of the birth population; this shows each PCT's rate within the context of the level of deprivation within its own population (Sections 9 & 10).

The data presented here are a regional summary only. Specific Cluster, PCT and Trust specific reports have been sent to respective stakeholders. The data team at the West Midlands Perinatal Institute also provide an ongoing service of ad-hoc analyses in response to specific requests (www.pi.nhs.uk/data/datarequests).

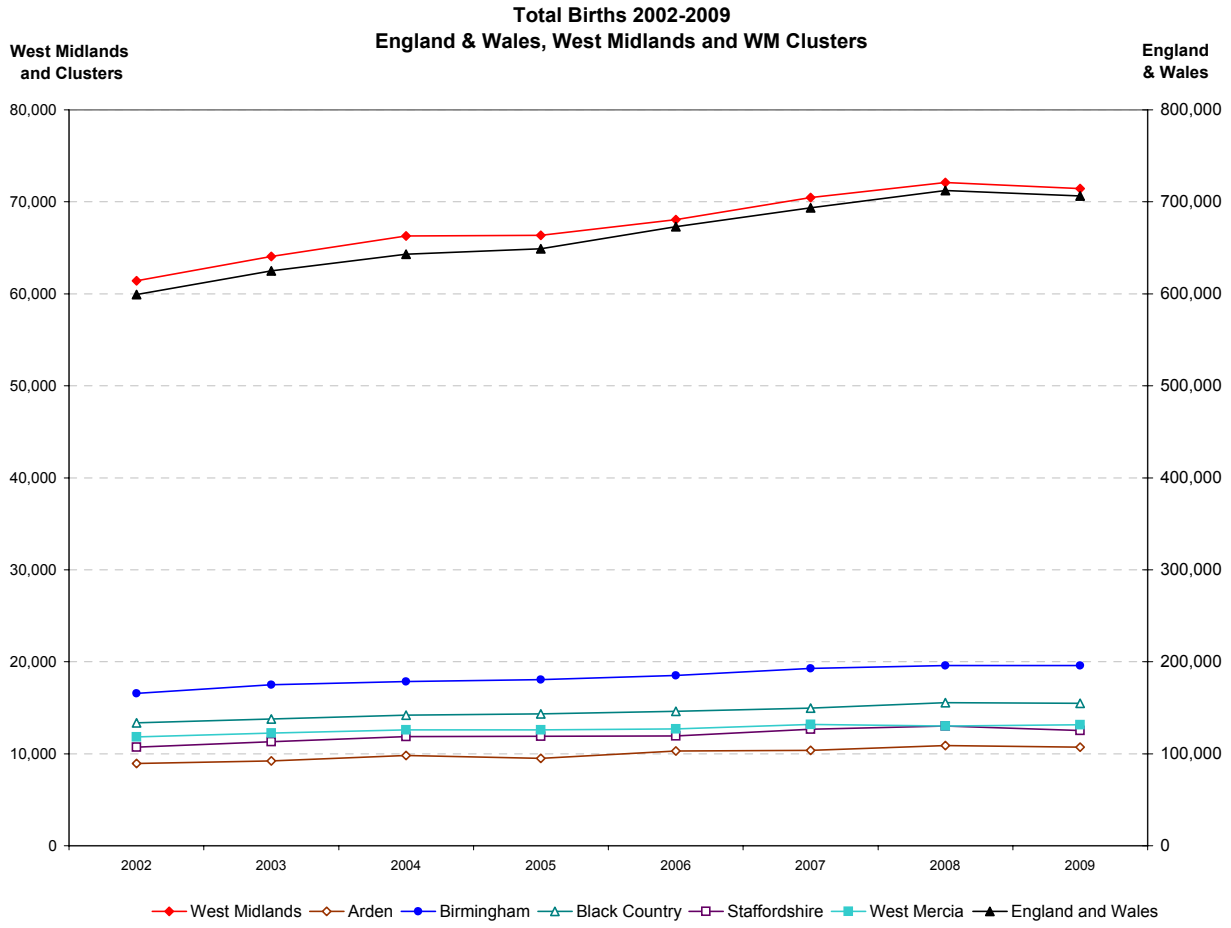
Currently, work is in progress to analyse denominator data including medical and social risk factors, collected through our new regional data collection system implemented in 2009 with support from NHS West Midlands' Investing for Health Programme. This will allow a more thorough assessment of underlying causes, and will be presented in next year's edition of Key Health Data for the West Midlands.

1. Births: West Midlands and England & Wales 2002-2009

Source: ONS

	2002	2003	2004	2005	2006	2007	2008	2009 *
England and Wales	599,279	624,816	643,026	649,094	672,966	693,356	712,328	706,248
West Midlands	61,417	64,079	66,285	66,351	68,063	70,476	72,110	71,452
Arden	8,953	9,230	9,799	9,498	10,301	10,382	10,903	10,705
Birmingham	16,573	17,517	17,852	18,047	18,508	19,261	19,606	19,584
Black Country	13,362	13,772	14,189	14,329	14,605	14,973	15,555	15,487
Staffordshire	10,704	11,314	11,864	11,894	11,934	12,656	13,023	12,519
West Mercia	11,824	12,246	12,580	12,582	12,715	13,204	13,023	13,157

* Provisional, live births only



Characteristics of Maternity Population (n=48,499)

Deprivation - IMD Quintile		**Maternal Age**		**Body Mass Index**	
1 (least)	8.0%	< 16	0.2%	< 18.5	3.3%
2	11.5%	< 18	2.0%	18.5 - 24.9	48.0%
3	15.9%	< 20	7.4%	25 - 29.9	28.2%
4	20.4%	20 - 24	23.0%	30 - 34.9	12.8%
5 (most)	44.2%	25 - 29	29.2%	35 - 39.9	5.2%
		30 - 34	24.3%	30+	20.4%
Ethnic Origin		35 - 39	13.1%	35+	7.6%
African	3.5%	35+	16.1%	40+	2.4%
African Caribbean	2.3%	40+	3.0%		
British European	67.0%				
Eastern European	2.9%	**Smoking**		**Prematurity**	
Middle Eastern	1.3%	At booking	19.3%	< 37 weeks	6.7%
South Asian	17.6%	Late in pregnancy	14.0%	< 34 weeks	2.1%
Bangladeshi	2.1%	Cessation	25.9%		
Indian	5.0%			**IUGR**	14.2%
Pakistani	10.4%			(<10th customised centile)	
Other/Mixed	5.5%				

Source: West Midlands Perinatal Episode Electronic Record (PEER) 7/2009 - 6/2010. Ascertainment: 82.7%

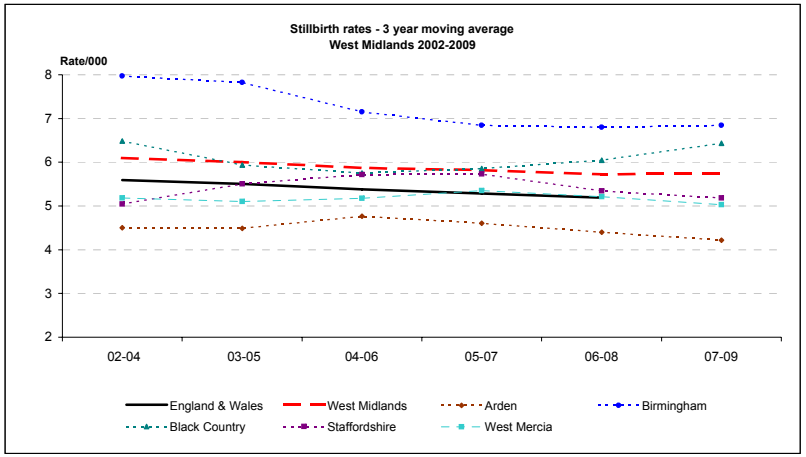
2 A: Stillbirths 2002-2009

Rate/1,000	2002	2003	2004	2005	2006	2007	2008	2009	2009 CI
England and Wales*	5.6	5.7	5.5	5.4	5.3	5.2	5.1		
West Midlands	6.4	6.2	5.8	6.1	5.8	5.6	5.8	5.8	5.3 - 6.4
Arden Cluster	4.9	4.2	4.4	4.8	5.0	3.9	4.2	4.5	3.4 - 5.9
Coventry	6.1	4.7	4.2	4.1	5.0	3.9	6.0	3.8	2.4 - 6.1
Warwickshire	4.1	3.9	4.5	5.3	5.1	4.0	2.9	5.0	3.5 - 7.1
Birmingham Cluster	7.4	8.7	7.8	7.0	6.7	6.9	6.8	6.8	5.8 - 8.1
Birmingham East and North	7.6	10.8	8.1	7.3	8.0	7.7	7.4	7.2	5.5 - 9.5
Heart of Birmingham	9.0	9.4	10.1	8.7	6.2	8.1	6.3	8.3	6.3 - 11.0
South Birmingham	4.4	6.1	6.6	4.8	6.0	6.7	7.4	5.7	3.9 - 8.2
Solihull	8.0	6.3	3.0	5.9	5.2	1.4	5.5	4.2	2.2 - 8.0
Black Country Cluster	7.7	6.2	5.6	6.0	5.6	5.9	6.6	6.8	5.6 - 8.2
Dudley	7.6	6.2	5.1	7.8	5.6	5.3	7.2	5.5	3.6 - 8.5
Sandwell	9.4	6.0	5.8	6.7	6.2	5.9	6.6	8.0	5.8 - 10.9
Walsall	4.9	6.6	5.2	4.4	3.9	5.9	6.0	5.7	3.7 - 8.7
Wolverhampton	8.8	5.9	6.5	4.8	6.8	6.8	6.3	7.7	5.2 - 11.2
Staffordshire Cluster	5.1	5.2	4.8	6.5	5.9	4.9	5.3	5.4	4.2 - 6.8
North Staffordshire	5.5	4.5	4.3	6.8	6.2	2.9	8.5	2.9	1.3 - 6.2
South Staffordshire	4.6	4.1	4.2	5.6	5.6	4.8	4.7	5.6	4.1 - 7.7
Stoke on Trent	6.1	7.9	6.3	8.0	6.1	6.2	4.6	6.3	4.2 - 9.4
West Mercia Cluster	5.7	4.8	5.1	5.4	5.0	5.6	5.0	4.5	3.5 - 5.8
Herefordshire	7.0	3.0	2.9	4.2	7.0	6.6	1.7	3.3	1.5 - 7.1
Shropshire	2.9	6.0	4.3	2.5	4.3	5.2	6.2	4.1	2.3 - 7.1
Telford&Wrekin	8.3	5.2	9.4	5.8	5.1	7.1	6.4	5.7	3.4 - 9.8
Worcestershire	5.8	4.7	4.5	6.9	4.8	5.0	4.9	4.6	3.2 - 6.6

3 year moving averages

	02-04	03-05	04-06	05-07	06-08	07-09
England & Wales	5.6	5.5	5.4	5.3	5.2	
West Midlands	6.1	6.0	5.9	5.8	5.7	5.7
Arden	4.5	4.5	4.8	4.6	4.4	4.2
Birmingham	8.0	7.8	7.1	6.8	6.8	6.8
Black Country	6.5	5.9	5.8	5.9	6.0	6.4
Staffordshire	5.0	5.5	5.7	5.7	5.3	5.2
West Mercia	5.2	5.1	5.2	5.4	5.2	5.0

*ONS



2 B: Stillbirths 2002-2009 - CORRECTED

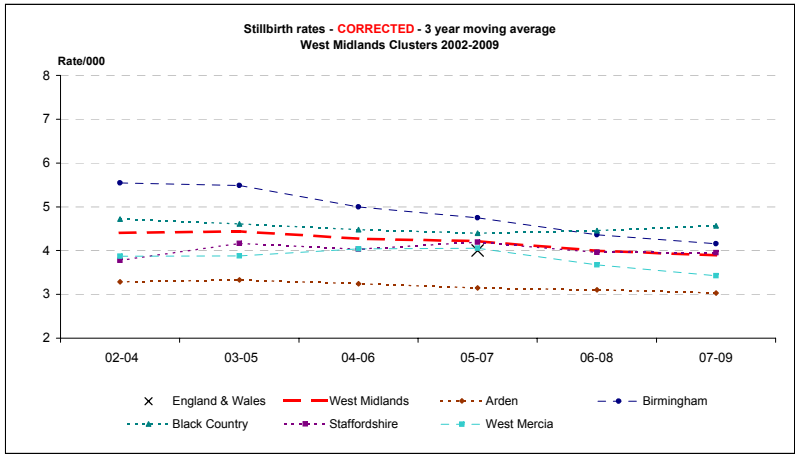
Excluding major congenital anomalies

Rate/1,000	2002	2003	2004	2005	2006	2007	2008	2009	2009 CI
England and Wales**				4.1	4.1	3.9			
West Midlands	4.6	4.4	4.2	4.7	3.9	4.0	4.0	3.6	3.2 - 4.1
Arden Cluster	3.4	3.3	3.3	3.5	3.0	3.0	3.3	2.8	2.0 - 4.0
Coventry	4.7	3.9	3.2	3.1	3.3	3.4	5.4	2.1	1.2 - 3.9
Warwickshire	2.4	2.8	3.3	3.7	2.8	2.7	1.8	3.3	2.1 - 5.1
Birmingham Cluster	5.5	5.9	5.3	5.3	4.4	4.5	4.1	3.8	3.1 - 4.8
Birmingham East and North	6.0	7.2	5.4	5.4	4.4	4.7	4.5	3.9	2.7 - 5.7
Heart of Birmingham	6.3	6.6	6.4	6.9	4.6	5.1	4.4	3.8	2.5 - 5.8
South Birmingham	3.5	3.2	4.9	3.5	4.6	5.0	4.0	4.2	2.7 - 6.5
Solihull	5.3	5.4	2.5	4.9	3.8	1.4	2.8	2.8	1.3 - 6.1
Black Country Cluster	5.2	4.6	4.3	4.9	4.2	4.1	5.0	4.6	3.6 - 5.8
Dudley	4.6	3.9	4.5	7.8	3.4	2.8	5.1	3.8	2.3 - 6.4
Sandwell	7.0	4.3	4.1	4.3	5.2	3.8	5.6	4.2	2.7 - 6.5
Walsall	4.3	5.1	3.8	3.8	3.0	4.8	4.7	3.8	2.3 - 6.4
Wolverhampton	4.6	5.5	4.9	3.5	5.3	5.0	4.5	6.8	4.5 - 10.2
Staffordshire Cluster	3.8	4.3	3.2	5.0	3.9	3.7	4.2	3.9	3.0 - 5.2
North Staffordshire	4.4	4.5	3.8	5.8	4.1	1.9	6.6	1.4	0.5 - 4.2
South Staffordshire	3.2	3.7	2.6	4.0	3.6	3.6	3.7	4.1	2.9 - 6.0
Stoke on Trent	4.8	5.6	3.9	6.2	4.4	4.9	3.8	4.9	3.1 - 7.8
West Mercia Cluster	4.2	3.1	4.3	4.2	3.6	4.3	3.1	2.9	2.1 - 4.0
Herefordshire	6.3	1.2	2.9	3.0	4.7	5.5	1.7	1.6	0.6 - 4.8
Shropshire	2.2	4.2	4.0	2.5	2.9	4.2	3.8	2.7	1.4 - 5.3
Telford&Wrekin	6.2	3.1	6.6	4.8	3.3	5.3	3.7	3.5	1.8 - 7.0
Worcestershire	4.0	3.1	4.0	5.1	3.8	3.7	2.9	3.1	2.0 - 4.9

3 year moving averages

		02-04	03-05	04-06	05-07	06-08	07-09
England & Wales	**				4.0		
West Midlands		4.4	4.4	4.3	4.2	4.0	3.9
Arden		3.3	3.3	3.2	3.1	3.1	3.0
Birmingham		5.5	5.5	5.0	4.7	4.4	4.2
Black Country		4.7	4.6	4.5	4.4	4.5	4.6
Staffordshire		3.8	4.2	4.0	4.2	4.0	4.0
West Mercia		3.9	3.9	4.0	4.1	3.7	3.4

**CEMACH



x = England & Wales 3 y adjusted average from CEMACH

3. Stillbirths in the West Midlands, 2002 -2009: Classification in main groups

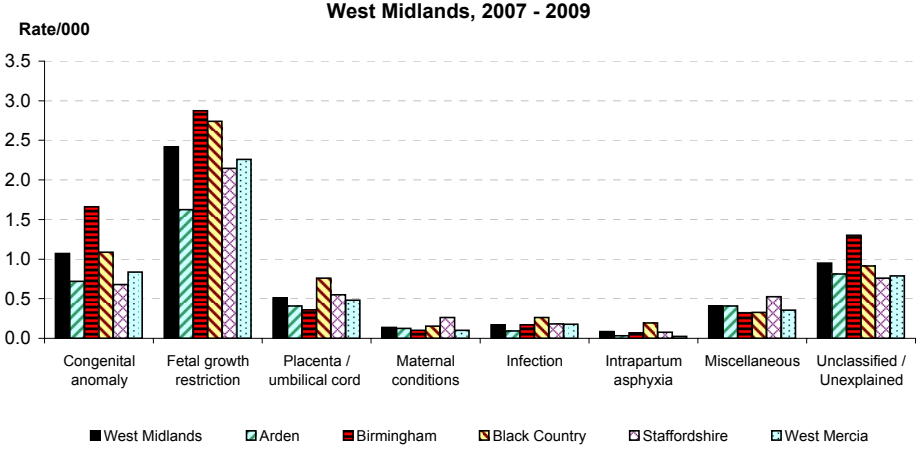
Groups based on ReCoDe classification (BMJ 2005)

	2002	2003	2004	2005	2006	2007	2008	2009
Births	61417	64079	66285	66351	68063	70476	72110	71452
MAIN GROUPS								
Congenital anomaly	64	62	54	55	75	73	86	71
Fetal growth restriction	149	141	153	169	157	156	162	173
Placenta / umbilical chord	59	69	54	39	43	29	50	41
Maternal conditions	12	13	7	9	7	12	9	9
Infection	14	10	7	4	11	14	14	8
Intrapartum asphyxia	12	17	6	9	11	8	6	4
Miscellaneous	16	20	23	29	24	30	35	23
Unclassified / Unexplained	65	63	79	89	64	76	54	87

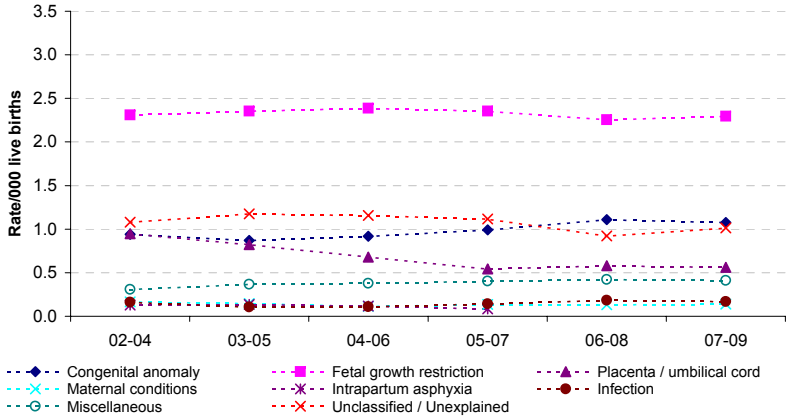
3-year moving averages

MAIN GROUPS	02-04	03-05	04-06	05-07	06-08	07-09
Congenital anomaly	0.9	0.9	0.9	1.0	1.1	1.1
Fetal growth restriction	2.3	2.4	2.4	2.4	2.3	2.3
Placenta / umbilical cord	0.9	0.8	0.7	0.5	0.6	0.6
Maternal conditions	0.2	0.1	0.1	0.1	0.1	0.1
Infection	0.2	0.1	0.1	0.1	0.2	0.2
Intrapartum asphyxia	0.2	0.2	0.1	0.1	0.1	0.1
Miscellaneous	0.3	0.4	0.4	0.4	0.4	0.4
Unclassified / Unexplained	1.1	1.2	1.2	1.1	0.9	1.0

Stillbirth Rates - Main Groups
West Midlands, 2007 - 2009



Stillbirths - Main Groups, 3-year moving average
West Midlands, 2002 - 2009



	West Midlands		Arden		Birmingham		Black Country		Staffordshire		West Mercia	
Births 2007-9	214,038		31,990		58,451		46,015		38,198		39,384	
MAIN GROUPS - 2007-9	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate
Congenital anomaly	229	1.1	23	0.7	97	1.7	50	1.1	26	0.7	33	0.8
Fetal growth restriction	517	2.4	52	1.6	168	2.9	126	2.7	82	2.1	89	2.3
Placenta / umbilical cord	109	0.5	13	0.4	21	0.4	35	0.8	21	0.5	19	0.5
Maternal conditions	29	0.1	4	0.1	6	0.1	5	0.2	10	0.3	4	0.1
Infection	36	0.2	3	0.1	10	0.2	9	0.3	7	0.2	7	0.2
Intrapartum asphyxia	18	0.1	1	0.0	4	0.1	9	0.2	3	0.1	1	0.0
Miscellaneous	87	0.4	13	0.4	19	0.3	21	0.3	20	0.5	14	0.4

4 A: Early Neonatal deaths 2002-2009

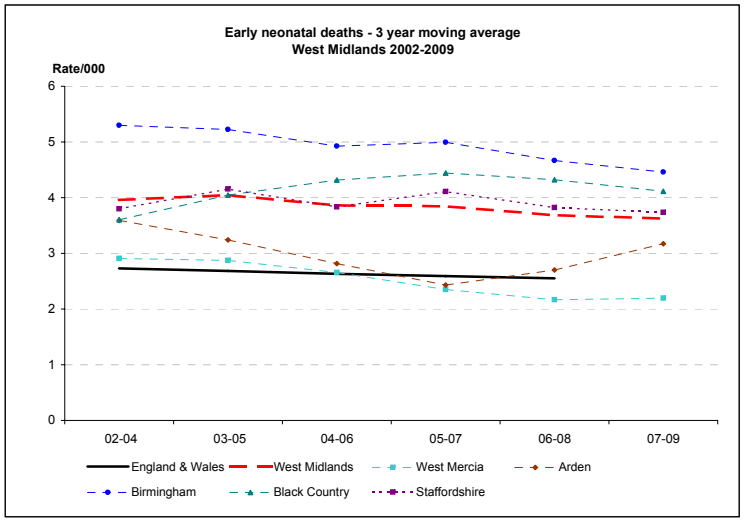
Early neonatal = birth to age 7 days

Rate/1,000	2002	2003	2004	2005	2006	2007	2008	2009	2009 CI
England and Wales*	2.7	2.8	2.7	2.6	2.6	2.6	2.5		
West Midlands	3.8	4.2	3.9	4.1	3.6	3.8	3.6	3.5	3.1 - 3.9
Arden Cluster	3.8	3.3	3.7	2.8	2.0	2.5	3.5	3.5	2.5 - 4.8
Coventry	6.6	4.2	5.3	3.1	1.7	2.3	4.1	4.7	3.1 - 7.1
Warwickshire	1.9	2.6	2.6	2.5	2.3	2.7	3.0	2.5	1.5 - 4.1
Birmingham Cluster	5.5	5.8	4.6	5.3	4.9	4.8	4.3	4.3	3.4 - 5.3
Birmingham East and North	5.2	6.5	4.0	5.6	5.0	5.5	5.1	3.6	2.5 - 5.4
Heart of Birmingham	7.6	7.2	5.9	5.5	5.5	5.6	4.2	4.2	2.8 - 6.2
South Birmingham	4.1	4.9	4.9	5.3	4.9	3.9	2.8	6.3	4.4 - 9.0
Solihull	3.8	2.0	2.0	3.9	2.9	2.3	5.5	1.9	0.7 - 4.8
Black Country Cluster	3.2	3.5	4.0	4.6	4.3	4.4	4.2	3.7	2.9 - 4.8
Dudley	1.5	1.5	2.0	2.8	3.7	3.1	3.0	2.5	1.3 - 4.7
Sandwell	4.2	4.3	4.1	5.8	5.8	3.6	4.2	2.5	1.5 - 4.4
Walsall	3.1	3.0	3.8	6.4	3.6	6.8	4.4	4.9	3.1 - 7.7
Wolverhampton	4.3	5.2	6.5	2.9	4.1	4.5	5.4	5.4	3.4 - 8.5
Staffordshire Cluster	3.1	4.6	3.6	4.2	3.6	4.4	3.4	3.4	2.5 - 4.6
North Staffordshire	2.2	3.5	1.9	2.4	1.6	6.8	6.2	3.8	1.9 - 7.6
South Staffordshire	2.4	4.3	3.4	4.1	3.7	4.8	2.9	3.1	2.0 - 4.8
Stoke on Trent	5.1	6.0	5.2	5.7	4.7	2.5	2.8	3.6	2.1 - 6.1
West Mercia Cluster	2.8	2.9	3.0	2.7	2.2	2.1	2.2	2.3	1.6 - 3.3
Herefordshire	1.9	0.6	1.8	4.2	2.9	1.1	2.9	0.5	0.1 - 3.1
Shropshire	3.3	3.2	1.1	1.8	2.9	1.7	2.4	2.7	1.4 - 5.4
Telford&Wrekin	2.1	2.6	3.8	1.0	2.8	0.4	5.1	2.2	0.9 - 5.2
Worcestershire	3.1	3.5	4.0	3.3	1.5	3.2	0.8	2.6	1.6 - 4.3

3 year moving averages

	02-04	03-05	04-06	05-07	06-08	07-09
England & Wales	2.7	2.7	2.6	2.6	2.6	
West Midlands	4.0	4.0	3.9	3.8	3.7	3.6
Arden	3.6	3.2	2.8	2.4	2.7	3.2
Birmingham	5.3	5.2	4.9	5.0	4.7	4.5
Black Country	3.6	4.0	4.3	4.4	4.3	4.1
Staffordshire	3.8	4.2	3.8	4.1	3.8	3.7
West Mercia	2.9	2.9	2.7	2.4	2.2	2.2

*ONS



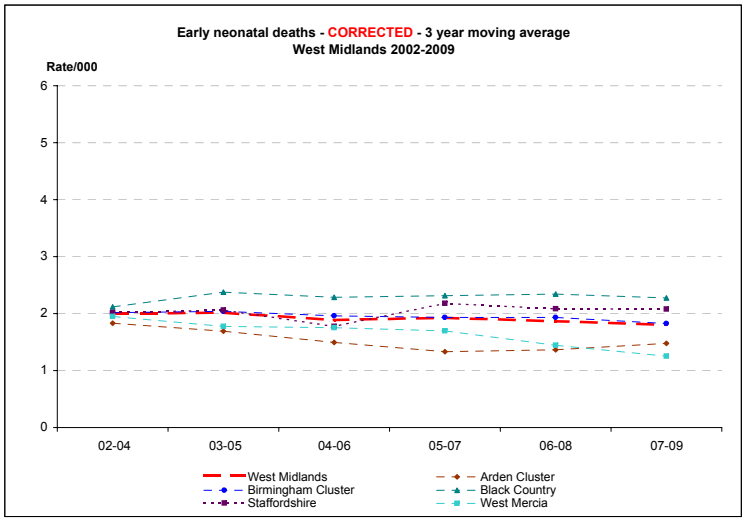
4 B: Early Neonatal Deaths 2002-2009 - CORRECTED

Corrected = excluding major congenital anomalies, <22 weeks gestation and/or <500g birthweight

Rate/1,000	2002	2003	2004	2005	2006	2007	2008	2009	2009 CI
West Midlands	1.9	2.1	2.0	2.0	1.7	2.1	1.8	1.5	1.3 - 1.9
West Mercia Cluster	2.4	1.8	1.7	1.8	1.7	1.5	1.1	1.1	0.7 - 1.9
Arden Cluster	1.8	2.0	1.7	1.4	1.4	1.3	1.5	1.7	1.1 - 2.7
Coventry	2.8	2.4	2.8	1.3	1.7	1.1	1.9	2.4	1.3 - 4.2
Warwickshire	1.1	1.7	1.0	1.4	1.2	1.3	1.1	1.2	0.6 - 2.4
Birmingham Cluster	2.2	2.0	1.9	2.2	1.8	1.8	2.2	1.5	1.0 - 2.1
Birmingham East and North	1.7	2.4	1.8	2.3	2.3	1.9	2.5	0.7	0.3 - 1.7
Heart of Birmingham	3.1	2.4	1.5	2.0	1.7	1.9	1.2	1.7	1.0 - 3.2
South Birmingham	1.9	1.5	3.0	2.8	1.4	2.2	1.9	2.3	1.3 - 4.2
Solihull	1.6	1.0	1.0	1.5	1.4	0.0	4.6	1.4	0.5 - 4.2
Black Country Cluster	1.6	2.1	2.6	2.4	1.9	2.7	2.5	1.7	1.2 - 2.5
Dudley	0.6	1.5	1.4	2.3	1.7	2.2	2.2	0.8	0.3 - 2.4
Sandwell	2.1	2.3	2.7	2.2	3.4	1.4	2.3	1.3	0.6 - 2.8
Walsall	1.2	1.5	2.0	3.8	0.3	5.1	2.2	2.2	1.1 - 4.3
Wolverhampton	2.5	3.3	4.6	1.3	1.9	2.4	3.3	2.7	1.4 - 5.1
Staffordshire Cluster	1.6	2.7	1.8	1.8	1.8	2.9	1.5	1.8	1.2 - 2.7
North Staffordshire	1.1	2.0	0.5	1.0	0.5	3.4	2.8	1.0	0.3 - 3.5
South Staffordshire	1.2	2.4	1.9	2.0	2.0	3.8	1.6	1.9	1.1 - 3.3
Stoke on Trent	2.7	3.7	2.4	1.8	2.1	1.1	0.8	1.9	0.9 - 4.0
West Mercia Cluster	2.4	1.8	1.7	1.8	1.7	1.5	1.1	1.1	0.7 - 1.9
Herefordshire	1.9	0.0	1.2	3.0	2.9	0.6	1.7	0.5	0.1 - 3.1
Shropshire	3.3	2.5	0.4	1.8	2.5	1.7	1.0	1.4	0.5 - 3.5
Telford&Wrekin	1.6	2.1	1.4	0.5	1.4	0.4	3.2	0.4	0.1 - 2.5
Worcestershire	2.3	1.9	2.5	2.0	1.2	2.1	0.2	1.5	0.8 - 2.8

3 year moving averages

	02-04	03-05	04-06	05-07	06-08	07-09
West Midlands	2.0	2.0	1.9	1.9	1.9	1.8
Arden Cluster	1.8	1.7	1.5	1.3	1.4	1.5
Birmingham Cluster	2.0	2.0	2.0	1.9	1.9	1.8
Black Country	2.1	2.4	2.3	2.3	2.3	2.3
Staffordshire	2.0	2.1	1.8	2.2	2.1	2.1
West Mercia	1.9	1.8	1.8	1.7	1.4	1.3



Corrected = excluding major congenital anomalies, <22 weeks gestation and/or <500g birthweight

5 A: Perinatal Deaths 2002-2009

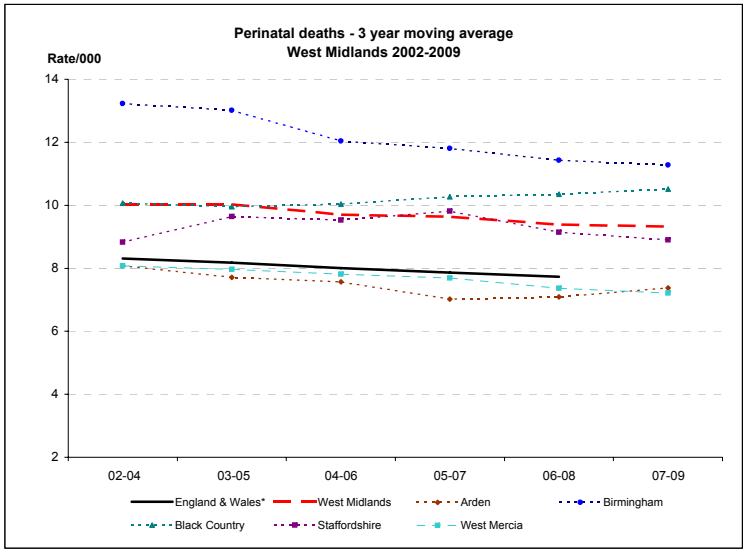
Perinatal = stillbirths and early neonatal deaths

Rate/1,000	2002	2003	2004	2005	2006	2007	2008	2009	2009 CI
England and Wales*	8.3	8.5	8.1	7.9	7.9	7.7	7.6		
West Midlands	10.2	10.3	9.6	10.1	9.4	9.5	9.3	9.2	8.5 - 9.9
Arden Cluster	8.7	7.5	8.1	7.6	7.1	6.5	7.7	7.9	6.4 - 9.8
Coventry	12.7	8.9	9.5	7.2	6.6	6.2	10.1	8.6	6.3 - 11.6
Warwickshire	6.0	6.5	7.1	7.8	7.4	6.7	5.9	7.5	5.6 - 10.0
Birmingham Cluster	12.9	14.5	12.3	12.2	11.6	11.6	11.1	11.1	9.7 - 12.6
Birmingham East and North	12.7	17.2	12.0	12.8	13.0	13.1	12.4	11.0	8.8 - 13.7
Heart of Birmingham	16.5	16.6	16.0	14.2	11.7	13.7	10.4	12.3	9.8 - 15.5
South Birmingham	8.4	11.0	11.5	10.1	10.9	10.6	10.1	12.2	9.4 - 15.7
Solihull	11.7	8.3	5.0	9.8	8.0	3.7	11.0	6.1	3.6 - 10.4
Black Country Cluster	10.9	9.7	9.7	10.5	9.9	10.4	10.7	10.5	9.0 - 12.2
Dudley	9.0	7.7	7.1	10.6	9.2	8.3	10.2	8.0	5.5 - 11.4
Sandwell	13.6	10.3	9.9	12.4	11.9	9.5	10.8	10.5	8.0 - 13.8
Walsall	8.0	9.5	9.0	10.8	7.4	12.7	10.4	10.6	7.7 - 14.4
Wolverhampton	13.1	11.1	13.0	7.7	10.9	11.2	11.6	13.0	9.7 - 17.4
Staffordshire Cluster	8.2	9.8	8.4	10.7	9.5	9.3	8.7	8.7	7.2 - 10.5
North Staffordshire	7.7	8.0	6.2	9.2	7.7	9.7	14.6	6.7	4.0 - 11.2
South Staffordshire	6.9	8.4	7.6	9.6	9.3	9.5	7.6	8.7	6.8 - 11.2
Stoke on Trent	11.2	13.8	11.5	13.6	10.8	8.7	7.4	9.9	7.1 - 13.6
West Mercia Cluster	8.5	7.7	8.1	8.1	7.2	7.7	7.1	6.8	5.5 - 8.3
Herefordshire	8.9	3.6	4.7	8.4	9.9	7.7	4.6	3.8	1.9 - 7.9
Shropshire	6.2	9.1	5.4	4.3	7.2	6.9	8.6	6.8	4.4 - 10.4
Telford&Wrekin	10.3	7.8	13.2	6.8	7.9	7.6	11.5	7.9	5.0 - 12.5
Worcestershire	8.8	8.1	8.5	10.2	6.3	8.2	5.7	7.2	5.4 - 9.7

3 year moving averages

	02-04	03-05	04-06	05-07	06-08	07-09
England & Wales*	8.3	8.2	8.0	7.9	7.7	
West Midlands	10.0	10.0	9.7	9.6	9.4	9.3
Arden	8.1	7.7	7.6	7.0	7.1	7.4
Birmingham	13.2	13.0	12.0	11.8	11.4	11.3
Black Country	10.1	10.0	10.0	10.3	10.3	10.5
Staffordshire	8.8	9.6	9.5	9.8	9.1	8.9
West Mercia	8.1	8.0	7.8	7.7	7.4	7.2

*ONS



5 B: Perinatal Deaths 2002-2009 - CORRECTED

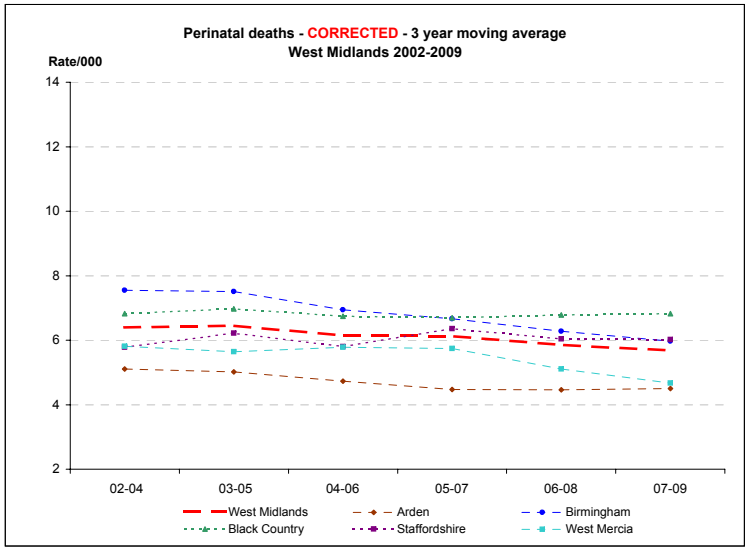
Corrected = excluding major congenital anomalies, <22 weeks gestation and/or <500g birthweight

Rate/1,000

	2002	2003	2004	2005	2006	2007	2008	2009	2009 CI
West Midlands	6.5	6.5	6.2	6.7	5.7	6.1	5.8	5.2	4.7 - 5.7
Arden Cluster	5.1	5.2	5.0	4.8	4.4	4.2	4.8	4.5	3.4 - 5.9
Coventry	7.4	6.3	6.0	4.4	5.0	4.6	7.3	4.5	2.9 - 6.9
Warwickshire	3.6	4.4	4.3	5.2	4.0	4.0	2.9	4.5	3.1 - 6.5
Birmingham Cluster	7.7	7.9	7.1	7.5	6.2	6.3	6.3	5.3	4.4 - 6.4
Birmingham East and North	7.7	9.6	7.1	7.6	6.7	6.6	6.9	4.6	3.3 - 6.5
Heart of Birmingham	9.4	9.0	7.9	8.9	6.2	7.0	5.6	5.7	4.1 - 8.0
South Birmingham	5.4	4.6	7.8	6.2	6.0	7.2	5.9	6.5	4.6 - 9.2
Solihull	6.9	6.3	3.5	6.4	5.2	1.4	7.3	4.2	2.2 - 8.0
Black Country Cluster	6.8	6.8	6.9	7.3	6.1	6.7	7.5	6.3	5.1 - 7.6
Dudley	5.2	5.4	5.9	10.1	5.0	5.0	7.2	4.7	2.9 - 7.5
Sandwell	9.1	6.5	6.8	6.4	8.6	5.2	7.9	5.5	3.7 - 8.0
Walsall	5.5	6.6	5.8	7.6	3.3	9.9	6.8	6.0	3.9 - 9.0
Wolverhampton	7.1	8.8	9.4	4.8	7.1	7.4	7.7	9.5	6.7 - 13.3
Staffordshire Cluster	5.4	7.0	5.0	6.7	5.7	6.6	5.8	5.7	4.5 - 7.1
North Staffordshire	5.5	6.5	4.3	6.8	4.6	5.3	9.4	2.4	1.0 - 5.6
South Staffordshire	4.4	6.1	4.5	6.1	5.6	7.4	5.3	6.0	4.5 - 8.2
Stoke on Trent	7.5	9.2	6.3	8.0	6.4	6.0	4.6	6.8	4.6 - 10.1
West Mercia Cluster	6.6	4.9	6.0	6.0	5.3	5.8	4.1	4.0	3.1 - 5.3
Herefordshire	8.2	1.2	4.1	6.0	7.6	6.0	3.4	2.2	0.9 - 5.6
Shropshire	5.5	6.7	4.3	4.3	5.4	5.9	4.8	4.1	2.3 - 7.1
Telford&Wrekin	7.8	5.2	8.0	5.3	4.7	5.8	6.9	4.0	2.1 - 7.5
Worcestershire	6.3	5.0	6.5	7.1	5.0	5.8	3.1	4.6	3.2 - 6.6

3 year moving averages

	02-04	03-05	04-06	05-07	06-08	07-09
West Midlands	6.4	6.4	6.2	6.1	5.9	5.7
Arden	5.1	5.0	4.7	4.5	4.5	4.5
Birmingham	7.5	7.5	6.9	6.7	6.3	6.0
Black Country	6.8	7.0	6.7	6.7	6.8	6.8
Staffordshire	5.8	6.2	5.8	6.4	6.0	6.0
West Mercia	5.8	5.6	5.8	5.7	5.1	4.7



Corrected = excluding major congenital anomalies, <22 weeks gestation and/or <500g birthweight

6 A: Neonatal deaths 2002-2009

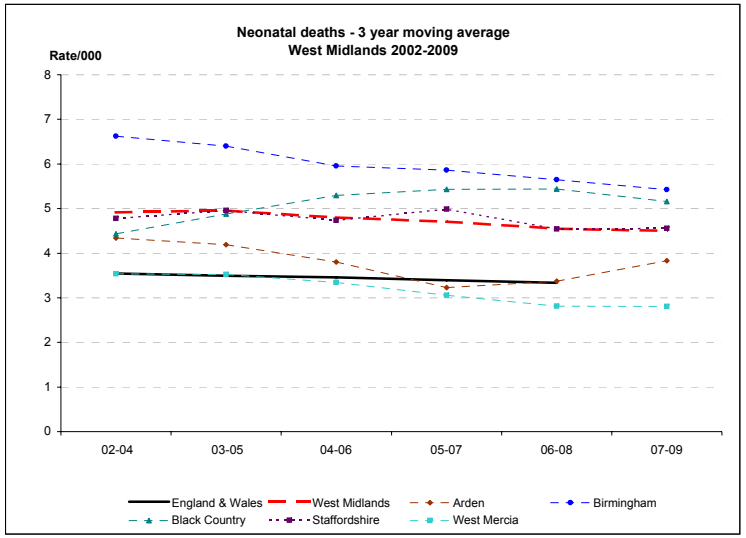
Neonatal = birth to age 28 days

Rate/1,000	2002	2003	2004	2005	2006	2007	2008	2009	2009 CI
England and Wales*	3.6	3.6	3.5	3.4	3.5	3.3	3.2		
West Midlands	4.8	5.2	4.8	5.0	4.7	4.5	4.5	4.5	4.1 - 5.0
Arden Cluster	4.0	3.9	5.0	3.6	2.8	3.3	4.0	4.2	3.2 - 5.6
Coventry	7.2	4.5	6.8	4.1	2.8	3.7	4.8	5.4	3.6 - 7.9
Warwickshire	1.9	3.5	3.8	3.2	2.8	3.0	3.4	3.3	2.2 - 5.1
Birmingham Cluster	7.0	7.5	5.6	6.3	6.1	5.3	5.6	5.4	4.5 - 6.5
Birmingham East and North	7.1	8.2	5.3	5.9	6.3	5.9	6.5	4.8	3.4 - 6.7
Heart of Birmingham	8.9	9.5	7.2	7.9	7.3	6.4	5.8	5.9	4.3 - 8.3
South Birmingham	5.7	6.1	5.2	6.0	5.6	4.2	3.8	7.2	5.1 - 10.0
Solihull	3.8	2.9	3.0	3.9	3.3	3.2	6.5	1.9	0.7 - 4.8
Black Country Cluster	4.1	4.4	4.8	5.4	5.6	5.2	5.4	4.8	3.8 - 6.0
Dudley	2.0	2.7	2.0	3.7	5.6	3.1	4.6	3.3	1.9 - 5.8
Sandwell	5.5	5.1	4.9	6.0	7.4	5.0	5.0	3.2	1.9 - 5.2
Walsall	4.0	3.6	5.3	8.2	4.2	7.7	6.1	6.8	4.6 - 10.0
Wolverhampton	4.6	6.2	7.5	3.5	5.0	5.3	6.3	6.5	4.3 - 9.9
Staffordshire Cluster	4.5	5.3	4.5	5.1	4.6	5.2	3.8	4.7	3.6 - 6.0
North Staffordshire	3.3	4.0	2.4	3.4	1.6	8.3	6.6	5.8	3.3 - 10.0
South Staffordshire	3.4	4.8	4.0	5.0	4.9	5.2	3.3	4.2	2.9 - 6.0
Stoke on Trent	7.5	7.3	6.7	6.3	5.9	3.6	3.1	5.0	3.1 - 7.8
West Mercia Cluster	3.5	3.5	3.6	3.4	3.0	2.7	2.7	3.0	2.2 - 4.1
Herefordshire	1.9	0.6	3.0	5.4	3.5	1.1	2.9	1.1	0.3 - 4.0
Shropshire	4.0	4.6	1.8	1.8	4.0	2.4	3.1	3.7	2.1 - 6.7
Telford&Wrekin	2.6	3.1	4.3	2.9	3.3	1.8	5.5	2.7	1.2 - 5.8
Worcestershire	4.0	4.0	4.3	3.8	2.3	3.7	1.5	3.3	2.1 - 5.1

3 year moving averages

	02-04	03-05	04-06	05-07	06-08	07-09
England & Wales	3.5	3.5	3.5	3.4	3.3	
West Midlands	4.9	5.0	4.8	4.7	4.6	4.5
Arden	4.3	4.2	3.8	3.2	3.4	3.8
Birmingham	6.6	6.4	6.0	5.9	5.6	5.4
Black Country	4.4	4.9	5.3	5.4	5.4	5.2
Staffordshire	4.8	5.0	4.7	5.0	4.5	4.6
West Mercia	3.5	3.5	3.3	3.1	2.8	2.8

*ONS



6 B: Neonatal Deaths 2002-2009 - CORRECTED

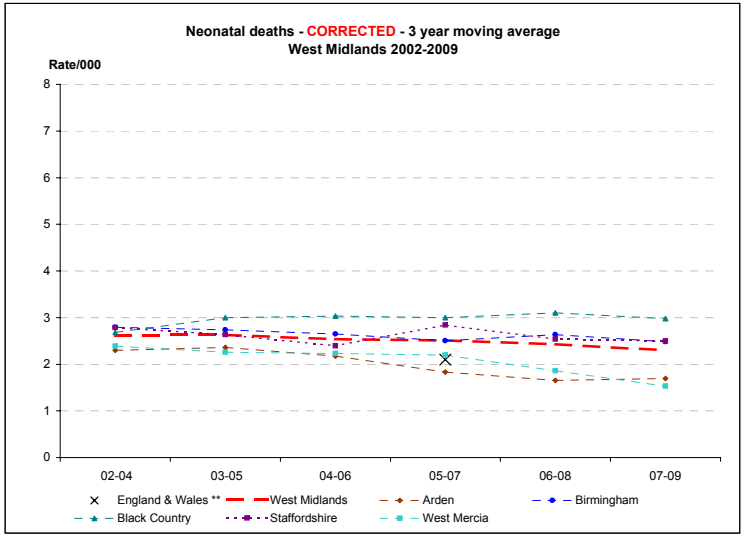
Corrected = excluding major congenital anomalies, <22 weeks gestation and/or <500g birthweight

Rate/1,000	2002	2003	2004	2005	2006	2007	2008	2009	2009 CI
England and Wales**				2.1	2.3	2.0			
West Midlands	2.6	2.8	2.5	2.6	2.5	2.5	2.3	2.1	1.8 - 2.5
Arden Cluster	1.8	2.5	2.6	2.0	2.0	1.5	1.5	2.1	1.4 - 3.1
Coventry	2.8	2.6	3.3	2.1	2.4	1.8	1.9	2.6	1.5 - 4.5
Warwickshire	1.1	2.4	2.1	2.0	1.7	1.3	1.1	1.7	0.9 - 3.1
Birmingham Cluster	2.9	2.9	2.5	2.7	2.7	2.1	3.1	2.2	1.6 - 3.0
Birmingham East and North	2.6	2.9	2.9	2.6	3.1	2.1	3.2	1.3	0.7 - 2.5
Heart of Birmingham	3.7	3.9	2.2	3.1	3.1	2.5	2.6	3.0	1.9 - 4.8
South Birmingham	3.0	2.2	3.2	3.0	1.9	2.4	2.3	3.0	1.8 - 5.0
Solihull	1.6	2.0	1.0	1.5	1.9	0.9	5.5	1.4	0.5 - 4.2
Black Country Cluster	2.1	2.7	3.2	3.1	2.8	3.1	3.4	2.5	1.8 - 3.4
Dudley	1.2	2.1	1.4	2.8	3.1	2.2	3.5	1.4	0.6 - 3.2
Sandwell	2.9	2.8	3.2	2.4	4.3	1.8	2.7	1.5	0.7 - 3.1
Walsall	1.9	2.1	2.9	5.5	0.8	6.0	3.3	4.1	2.5 - 6.7
Wolverhampton	2.5	3.9	5.5	1.6	2.8	2.7	4.2	3.3	1.8 - 5.9
Staffordshire Cluster	2.9	3.3	2.2	2.5	2.5	3.5	1.6	2.4	1.7 - 3.4
North Staffordshire	2.2	2.5	0.5	1.5	0.5	3.9	2.8	2.4	1.0 - 5.6
South Staffordshire	2.2	2.9	2.5	2.8	3.1	4.1	1.7	2.2	1.3 - 3.7
Stoke on Trent	4.8	4.6	2.7	2.4	2.7	2.2	0.8	2.8	1.5 - 5.1
West Mercia Cluster	2.9	2.3	2.0	2.5	2.2	1.9	1.5	1.2	0.8 - 2.0
Herefordshire	1.9	0.0	1.8	4.2	3.5	0.6	1.7	0.5	0.1 - 3.1
Shropshire	3.6	3.9	0.7	1.8	3.6	2.1	1.4	1.7	0.7 - 4.0
Telford&Wrekin	2.1	2.1	1.9	1.9	1.4	0.9	3.2	0.4	0.1 - 2.5
Worcestershire	3.1	2.3	2.7	2.5	1.5	2.6	0.8	1.5	0.8 - 2.8

3 year moving averages

	02-04	03-05	04-06	05-07	06-08	07-09
England & Wales **				2.1		
West Midlands	2.6	2.6	2.5	2.5	2.4	2.3
Arden	2.3	2.4	2.2	1.8	1.7	1.7
Birmingham	2.8	2.7	2.6	2.5	2.6	2.5
Black Country	2.7	3.0	3.0	3.0	3.1	3.0
Staffordshire	2.8	2.6	2.4	2.8	2.5	2.5
West Mercia	2.4	2.3	2.2	2.2	1.9	1.5

**CEMACH



x = England & Wales 3 y adjusted average from CEMACH

Corrected = excluding major congenital anomalies, <22 weeks gestation and/or <500g birthweight

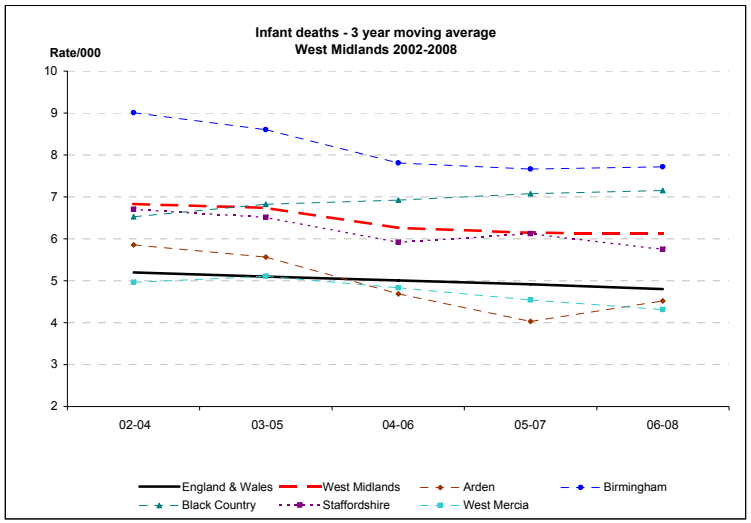
7 A: Infant Deaths 2002-2008

Rate/1,000	2002	2003	2004	2005	2006	2007	2008	2008 CI
England and Wales*	5.3	5.3	5.1	5.0	5.0	4.8	4.8	4.6 - 4.9
West Midlands	6.7	7.5	6.4	6.4	6.0	6.0	6.4	5.8 - 7.0
Arden Cluster	5.1	5.8	6.7	4.2	3.2	4.6	5.6	4.4 - 7.2
Coventry	8.6	6.6	8.5	4.9	3.3	5.5	7.6	5.5 - 10.5
Warwickshire	2.6	5.2	5.4	3.8	3.2	4.0	4.2	2.8 - 6.1
Heart of Birmingham	9.2	10.4	7.5	8.0	7.9	7.1	8.1	6.9 - 9.5
South Birmingham	9.2	11.6	7.3	7.7	7.9	8.0	9.3	7.3 - 11.9
Heart of Birmingham	12.2	12.8	9.8	9.9	9.6	8.7	8.4	6.4 - 11.1
South Birmingham	7.6	9.1	6.2	7.4	7.5	5.0	6.4	4.5 - 9.1
Solihull	3.8	2.9	4.5	4.9	4.8	4.6	7.4	4.5 - 11.9
Black Country Cluster	6.1	6.9	6.5	7.0	7.2	7.0	7.2	6.0 - 8.7
Dudley	3.2	4.5	3.4	5.9	7.0	4.2	5.7	3.7 - 8.7
Sandwell	7.9	7.8	6.8	7.0	8.6	7.5	8.4	6.1 - 11.4
Walsall	6.8	7.2	7.3	10.2	6.6	10.5	7.2	4.9 - 10.5
Wolverhampton	6.4	8.2	8.8	4.8	6.3	5.6	7.5	5.1 - 11.0
Staffordshire Cluster	6.8	7.6	5.8	6.2	5.8	6.4	5.1	4.0 - 6.5
North Staffordshire	4.9	5.5	4.3	3.4	2.6	8.3	7.1	4.3 - 11.7
South Staffordshire	5.4	7.5	5.1	5.9	6.1	6.4	4.2	2.9 - 6.0
Stoke on Trent	10.6	9.3	7.9	8.3	7.1	5.2	5.6	3.7 - 8.5
West Mercia Cluster	4.9	5.1	4.9	5.4	4.3	4.0	4.6	3.6 - 6.0
Herefordshire	4.5	3.0	4.7	7.8	4.1	1.7	5.7	3.1 - 10.5
Shropshire	5.5	6.3	2.5	4.0	5.4	4.2	5.5	3.4 - 9.0
Telford&Wrekin	5.2	3.7	5.7	5.4	3.7	2.7	7.9	4.9 - 12.6
Worcestershire	4.7	5.5	5.7	5.3	4.0	5.1	2.8	1.7 - 4.4

Infant death rates - 3 year moving average - PDN

	02-04	03-05	04-06	05-07	06-08
England & Wales	5.2	5.1	5.0	4.9	4.8
West Midlands	6.8	6.7	6.3	6.1	6.1
Arden	5.9	5.6	4.7	4.0	4.5
Birmingham	9.0	8.6	7.8	7.7	7.7
Black Country	6.5	6.8	6.9	7.1	7.2
Staffordshire	6.7	6.5	5.9	6.1	5.7
West Mercia	5.0	5.1	4.8	4.5	4.3

*ONS



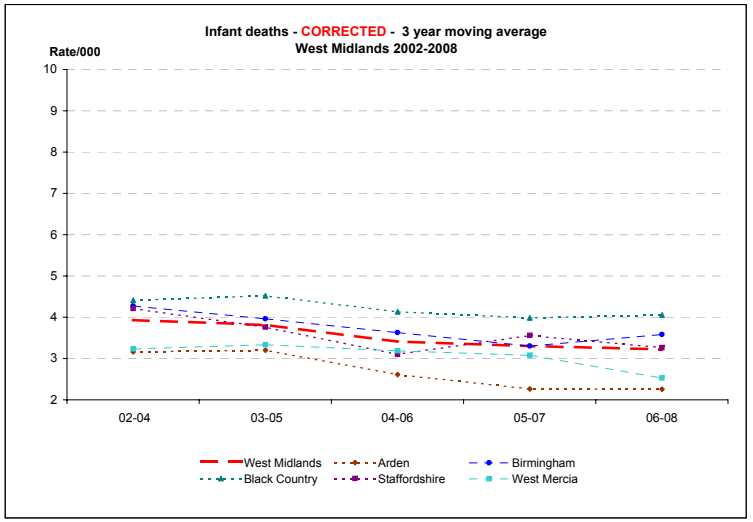
7 B: Infant deaths 2002-2008 - CORRECTED

Corrected = excluding major congenital anomalies, <22 weeks gestation and/or <500g birthweight

Rate/1,000	2002	2003	2004	2005	2006	2007	2008	2008 CI
England and Wales							N/A	
West Midlands	3.9	4.3	3.6	3.6	3.1	3.3	3.3	2.9 - 3.8
Arden Cluster	2.2	3.8	3.4	2.4	2.0	2.3	2.4	1.6 - 3.5
Coventry	3.6	3.7	4.0	2.6	2.6	2.7	3.7	2.3 - 5.9
Warwickshire	1.3	3.9	2.9	2.3	1.7	2.0	1.4	0.8 - 2.7
Birmingham Cluster	4.4	4.6	3.8	3.5	3.6	2.9	4.3	3.4 - 5.3
Birmingham East and North	4.0	4.9	4.5	3.3	4.3	2.8	4.2	2.9 - 6.1
Heart of Birmingham	6.0	5.8	4.3	3.5	3.9	3.5	3.7	2.4 - 5.6
South Birmingham	4.1	3.9	3.4	4.4	2.6	3.1	4.0	2.6 - 6.3
Solihull	1.6	2.0	1.5	2.0	2.9	0.9	6.5	3.8 - 10.8
Black Country Cluster	4.0	4.7	4.5	4.4	3.6	4.0	4.5	3.6 - 5.7
Dudley	2.3	3.3	2.8	4.8	3.7	3.1	4.0	2.5 - 6.7
Sandwell	5.3	5.6	4.4	2.9	4.8	2.7	5.4	3.7 - 8.0
Walsall	4.3	4.8	4.4	7.0	2.5	7.7	3.9	2.3 - 6.5
Wolverhampton	3.9	5.2	6.5	2.9	3.1	3.0	4.5	2.7 - 7.4
Staffordshire Cluster	4.6	5.1	3.0	3.2	3.0	4.4	2.4	1.7 - 3.4
North Staffordshire	3.8	4.0	1.9	1.5	1.0	3.9	2.8	1.3 - 6.2
South Staffordshire	3.6	4.8	2.9	3.4	3.5	5.1	2.3	1.4 - 3.8
Stoke on Trent	7.2	6.3	4.0	3.9	3.2	3.3	2.3	1.2 - 4.4
West Mercia Cluster	3.7	3.1	2.9	4.0	2.7	2.6	2.3	1.6 - 3.3
Herefordshire	3.2	1.8	3.5	6.0	3.5	1.1	2.9	1.2 - 6.7
Shropshire	4.4	4.6	1.5	3.6	4.7	3.5	2.4	1.2 - 5.0
Telford&Wrekin	4.7	2.6	2.4	3.4	1.9	0.9	3.7	1.9 - 7.3
Worcestershire	3.3	2.9	3.5	3.8	1.8	3.2	1.6	0.9 - 3.0

3 year moving averages

	02-04	03-05	04-06	05-07	06-08
West Midlands	3.9	3.8	3.4	3.3	3.2
Arden	3.2	3.2	2.6	2.3	2.3
Birmingham	4.3	4.0	3.6	3.3	3.6
Black Country	4.4	4.5	4.1	4.0	4.1
Staffordshire	4.2	3.8	3.1	3.6	3.3
West Mercia	3.2	3.3	3.2	3.1	2.5



Corrected = excluding major congenital anomalies, <22 weeks gestation and/or <500g birthweight

8. Infant Deaths in West Midlands, 2002-2008: main groups

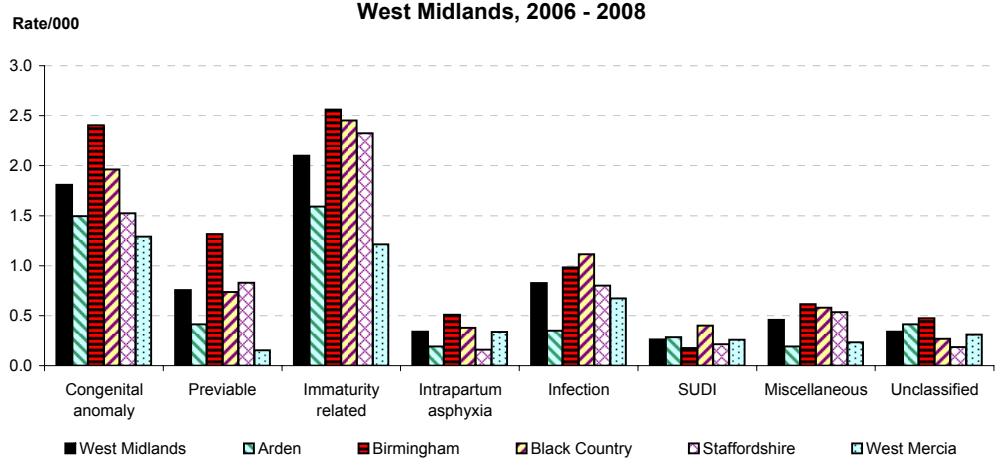
Groups based on Fetal/Neonatal/Infant classification after Hey (BJOG 1986)

	2002	2003	2004	2005	2006	2007	2008
Live Births	61026	63684	65902	65948	67671	70078	71694
MAIN GROUPS							
Congenital anomaly	106	111	110	113	126	117	136
Previable	53	79	61	67	53	49	56
Immaturity related	135	172	171	155	140	141	159
Intrapartum asphyxia	11	23	15	18	24	24	23
Infection	57	59	51	62	31	40	25
SUDI	67	62	39	40	59	47	67
Miscellaneous	20	36	30	28	14	23	18
Unclassified	11	13	3	7	13	29	30

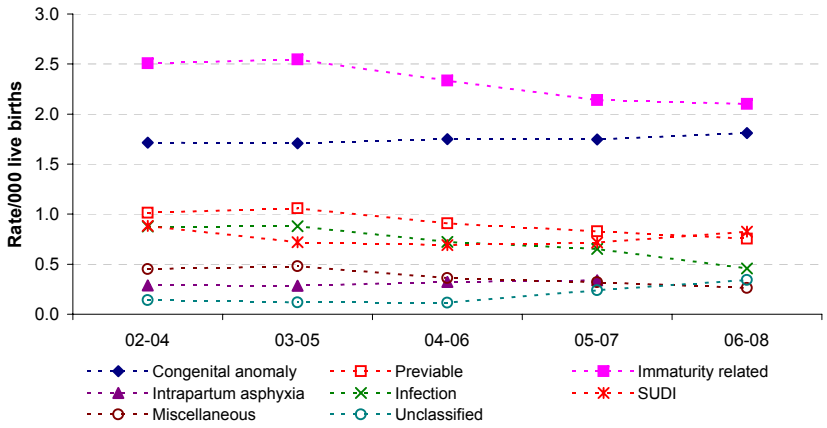
3-year moving averages

MAIN GROUPS	02-04	03-05	04-06	05-07	06-08
Congenital anomaly	1.7	1.7	1.7	1.7	1.8
Previable	1.0	1.1	0.9	0.8	0.8
Immaturity related	2.5	2.5	2.3	2.1	2.1
Intrapartum asphyxia	0.3	0.3	0.3	0.3	0.3
Infection	0.9	0.9	0.7	0.7	0.5
SUDI	0.9	0.7	0.7	0.7	0.8
Miscellaneous	0.5	0.5	0.4	0.3	0.3
Unclassified	0.1	0.1	0.1	0.2	0.3

Infant Death Rates: Main Groups
West Midlands, 2006 - 2008



Infant Deaths - Main Groups, 3-year moving average
West Midlands, 2002 - 2008

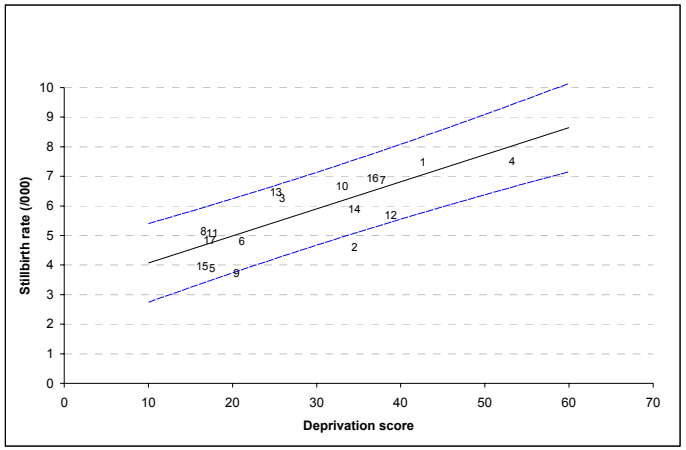


	West Midlands		Arden		Birmingham		Black Country		Staffordshire		West Mercia	
Live Births 2006-8	209,443		31,447		56,985		44,860		37,412		38,739	
MAIN GROUPS - 2006-8	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate
Congenital anomaly	379	1.8	47	1.5	137	2.4	88	2.0	57	1.5	50	1.3
Previable	158	0.8	13	0.4	75	1.3	33	0.7	31	0.8	6	0.2
Immaturity related	440	2.1	50	1.6	146	2.6	110	2.5	87	2.3	47	1.2
Intrapartum asphyxia	71	0.3	6	0.2	29	0.5	17	0.4	6	0.2	13	0.3
Infection	173	0.8	11	0.3	56	1.0	50	1.1	30	0.8	26	0.7
SUDI	55	0.3	9	0.3	10	0.2	18	0.4	8	0.2	10	0.3
Miscellaneous	96	0.5	6	0.2	35	0.6	26	0.6	20	0.5	9	0.2
Unclassified	71	0.3	13	0.4	27	0.5	12	0.3	7	0.2	12	0.3

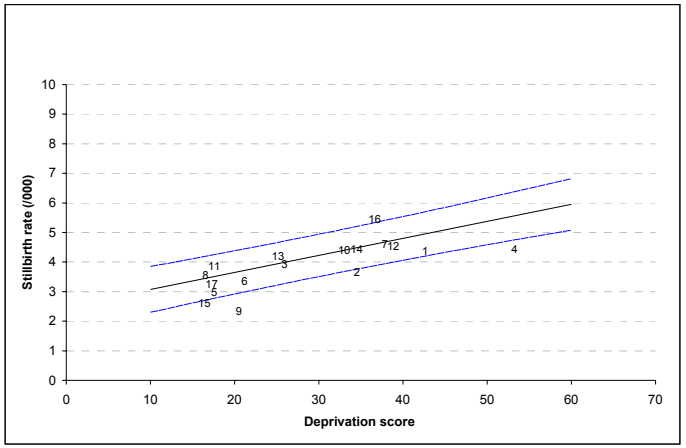
9. Stillbirths and Deprivation, West Midlands PCTs

Graphs show stillbirth rates for the last triennium (2007-9) for West Midlands PCTs, plotted against each PCT's deprivation score (IMD 2007).
Regression line with 90% prediction intervals (based on 2002-200 9 data) are also shown

A. Crude rates



B. Corrected rates - after excluding major congenital anomalies

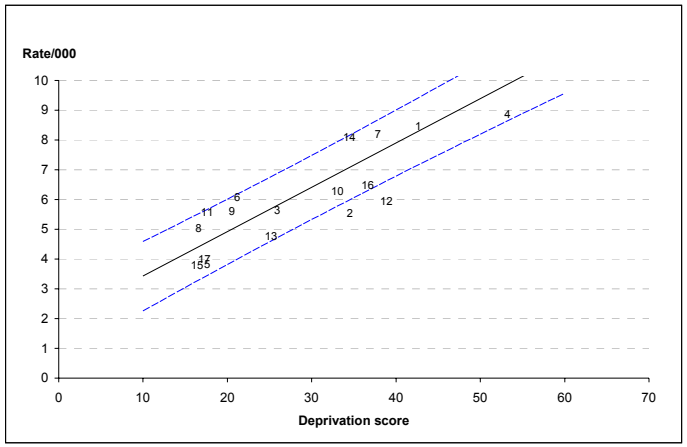


PCT	Key	PCT	Key	PCT	Key
Birmingham East and North	1	Sandwell	7	Telford and Wrekin	13
Coventry Teaching	2	Shropshire	8	Walsall Teaching	14
Dudley	3	Solihull	9	Warwickshire	15
Heart of Birmingham Teaching	4	South Birmingham	10	Wolverhampton	16
Herefordshire	5	South Staffordshire	11	Worcestershire	17
North Staffordshire	6	Stoke on Trent Teaching	12		

10. Infant Deaths and Deprivation, West Midlands PCTs

Graphs show infant deaths for the last available triennium (2006-8) for West Midlands PCTs, plotted against each PCT's respective deprivation score (IMD 2007).
Regression line with 90% prediction intervals (based on 2002-2008 data) are also shown

A. Crude rates



B. Corrected rates (after excluding major congenital anomalies and neonatal deaths <22 weeks and/or <500g