Key Health Data for the West Midlands – 2007/08

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NOTES

PREFACE

This is the tenth 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. The report is a collaborative project between West Midlands Public Health Observatory, Health Protection Agency (West Midlands), West Midlands Cancer Intelligence Unit, Sandwell Primary Care Trust, West Midlands Ambulance Service, West Midlands Regional Children's Tumour Registry, NHS West Midlands, Department of Health (West Midlands) and the West Midlands Commissioning Business Support Agency.

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 can also be downloaded from our website:

www.pcpoh.bham.ac.uk/publichealth/publications/key_health_data/index.html

We thank those who have contributed and helped with its production, and trust that is 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&EMDS	Accident and Emergency Minimum Dataset
A&ESC	Accident and Emergency Surveillance Centre
ALL	Acute Lymphoblastic Lymphoma
AMPDS	Advanced Medical Priority Dispatch System
BCH	Birmingham Children's Hospital
BCS	British Crime Survey
BEN PCT	Birmingham East and North
BMI	Body Mass Index
CBSA	Commissioning Business Support Agency
CCLG	Children's Cancer and Leukaemia Group
CDS	Commissioning Data Set
CHD	Coronary Heart Disease
CI	Confidence Interval
CKD	Chronic Kidney Disease
CNS	Central Nervous System
COPD	Chronic Obstructive Pulmonary Disease
DEFRA	Department of Food and Rural Affairs
DfT	Department for Transport
DSR	Directly Standardised Rates
ECS	Emergency Care System
ED	Emergency Department
EOC	Emergency Operations Centre
GOR	Government Office Region
HCAI	Healthcare Associated Infection
HES	Hospital Episodes Statistics
HIV	Human Immunodeficiency Virus
HoBt	Heart of Birmingham Teaching
HPA	Health Protection Agency
ICD	International Classification of Diseases
ID	Indices of Deprivation
IMD	Index of Multiple Deprivation
LA	Local Authority
LL	Lower Limit
LSOA	Lower Super Output Area
MRSA	Methicillin Resistant Staphylococcus Aureus
NCHOD	National Centre for Health Outcomes Development
NCIS	National Cancer Information Service
NHS	National Health Service
NHS IC	National Health Service Information Centre
NHS PD	National Health Service Postcode Directory
NSTS	NHS Strategic Tracing Service
ONS	Office for National Statistics
OS	Ordnance Survey
PbR	Payment by Results
PCT	Primary Care Trust
PRF	Patient Report Form

QMAS	Quality Management Analysis System
QOF	Quality Outcomes Framework
SDU	Sustainable Development Unit
SHA	Strategic Health Authority
SRR	Standardised Rate Ratios
SSI	Surgical Site Infections
SUS	Secondary Users Service
TIA	Transient Ischaemic Attack
tPCT	Teaching PCT
UKACR	United Kingdom Association of Cancer Registries
UL	Upper Limit
WMAS	West Midlands Ambulance Service
WMCIU	West Midlands Cancer Intelligence Unit
WMPHO	West Midlands Public Health Observatory
WMRCTR	West Midlands Regional Children's Tumour Registry
YHPHO	Yorkshire and Humber Public Health Observatory

CHAPTER ONE: HEALTH GEOGRAPHY

A NATIONAL CANCER INFORMATION SERVICE

1.1 Introduction

During 2007 the West Midlands Cancer Intelligence Unit led a number of linked initiatives on behalf of the UK Association of Cancer Registries (UKACR) to facilitate the development of an internet enabled National Cancer Information Service (NCIS) due to be launched in October 2008. These initiatives will provide consistent baseline information needed for the production of cancer statistics required in the Cancer Reform Strategy.

1.2 Time Series Population Denominators 1981-2006

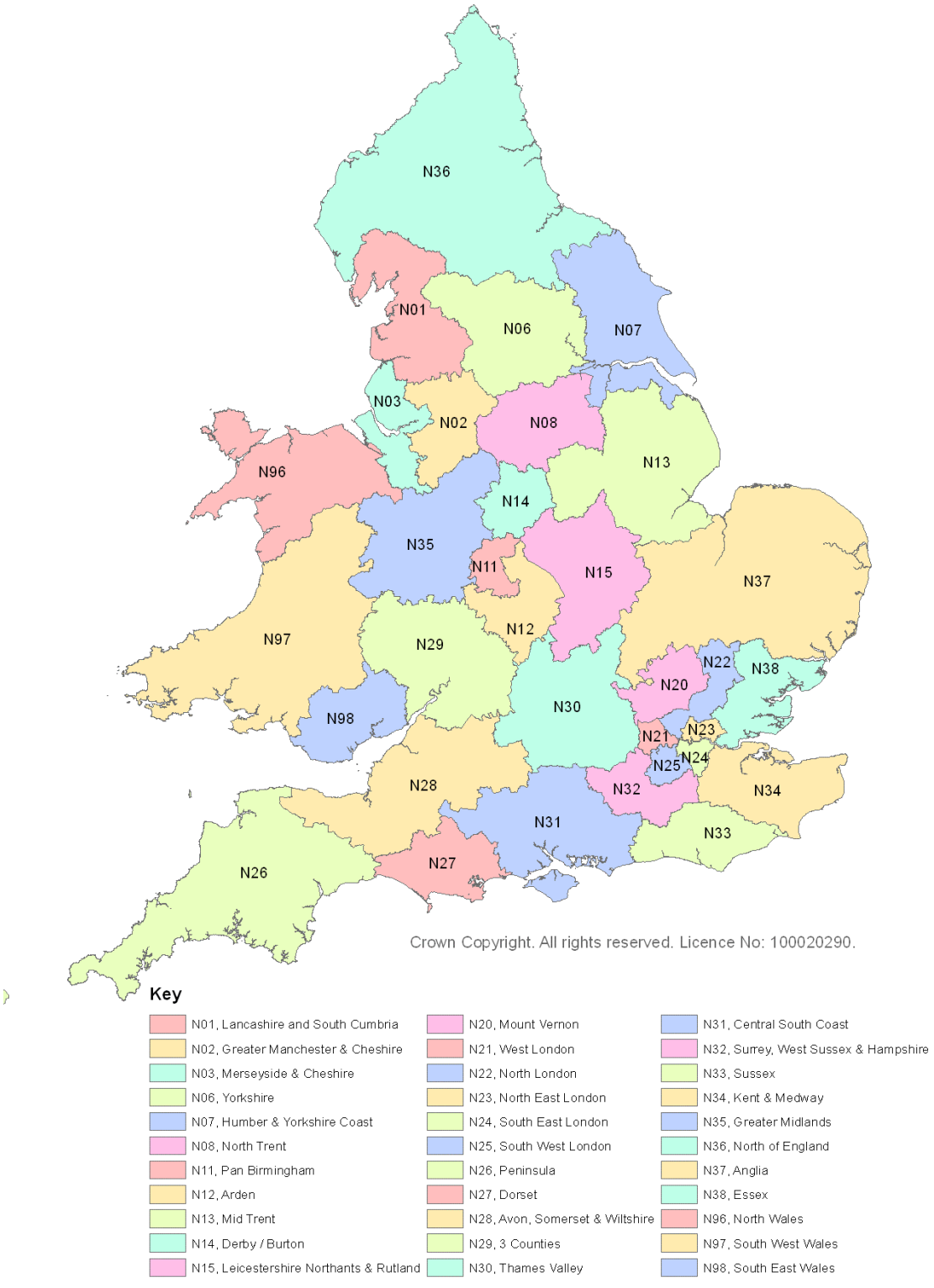
Cancer Registries in England and Wales now have access to a unique consistent time series population denominator dataset for five-year age-sex groups at Lower Super Output Area (LSOA) level for all years 1981 - 2006. This dataset collates annually adjusted population estimates for 2002 -2006 supplied by Office for National Statistics under a Microdata Release Data Access Agreement with historic population estimates adjusted to LSOA boundaries by Paul Norman, University of Leeds, for all years 1981-2001. Populations for all current higher area geographies are built from this dataset.

1.3 Cancer Network Geography

Networks of cancer care were identified in the Calman Hine Report 1995 as the organisational model for delivering improvements in cancer services. Initially 34 Cancer Networks were developed for England as part of the NHS Cancer Plan 2000 to bring together health service providers and commissioners of cancer care at all levels in the health service. Following a number of local realignments there are now 30 Cancer Networks in England; Wales have established 3 similar organisations.

As part of the development process of the NCIS Cancer Networks were identified as a crucial geography for which cancer statistics should be routinely provided. To be consistent with cancer registry statistics UKACR have identified the geographical extent of each cancer network in terms of resident populations. These extents have been agreed with the Directors of the Cancer Networks and the Department of Health Cancer Action Team. A national boundary set is produced from aggregations of LSOAs. The first annual review of Cancer Network boundaries will be carried out early in 2009.

Map 1.1: Cancer Networks in England and Wales



1.4 Development of the NHS Postcode Directory (NHS PD)

The inclusion of a Cancer Network field and a Cancer Registry field in the NHS PD further supports the collection and provision of cancer information throughout the health service. Like the Cancer Network field the Cancer Registry field in the NHS PD will indicate the resident populations included in each cancer registry database in terms of whole LSOAs. Supported by the NHS Information Centre these fields will appear for the first time in the August 2008 release of the NHS PD.

1.5 Access to Digital Map Data by NHS Organisations

Following numerous extensions to the Ordnance Survey (OS) Pilot NHS (England) Agreement the NHS Information Centre awarded a new procurement contract to Dotted Eyes, Bromsgrove starting 1st May 2008. All NHS organisations may now purchase licenses for geographical data through the NHS Digital Mapping Agreement.
All users should be aware that any maps published before 30th April 2008 under the Ordnance Survey pilot agreement may continue to be used in their published state, as would happen in any other published report. However any use of OS data supplied under the pilot agreement should cease immediately. To continue to use digital map data all NHS organisations should register under the new arrangements. Both the NHS Information Centre and Dotted Eyes websites provide information on how this should be done, see:

http://www.ic.nhs.uk/statistics-and-data-collections/population-and-geography/nhs-digital-mapping-agreement

and

http://www.dottedeyes.co.uk/sectors/health_care/index.php

References and Further Reading

1. Department of Health. The NHS Cancer Plan. 2000.

2. Department of Health. Cancer Reform Strategy. 2007.

3. The Expert Advisory Group on Cancer to the Chief Medical Officers of England and Wales. Calman Hine Report. 1995.

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CHAPTER TWO: COMPARING THE 2004 AND 2007 INDICES OF DEPRIVATION

2.1 Introduction

The English Indices of Deprivation 2007, which were published in December 2007, allow for the first time a comparison to be made between ID 2004 and ID 2007.

In light of the Guidance Paper 'Using the English Indices of Deprivation 2007' [1], which states that "Index scores from 2004 cannot be compared with those from 2007", this chapter will only look at changes in national rank as a means of comparison and not scores.

The chapter is divided into three sections and aims to primarily describe the change in the ranks of Indices of Deprivation, and only in Section Three does it describe areas of deprivation.

It is important to note that since the Indices are relative to other Lower Super Output Areas (LSOAs) in England, an area which has seen a change in rank (for better or for worse) does not necessarily mean it is getting more or less deprived.

Section One: focuses on national rank positions (where 1 is the most deprived) and the change experienced in average rank, showing regional comparisons in England before looking at change specifically within the West Midlands. This analysis covers all domains (see extended chapter on accompanying CD-ROM).

Section Two: provides further analysis within the region by specifically looking at PCT-level (based on 2006 boundaries), and their respective changes in terms of a population-weighted average rank change. (Note: due to the calculation of population-weighted average ranks, the ranks for this measure have been inverted: i.e. 1 is now the least deprived.)

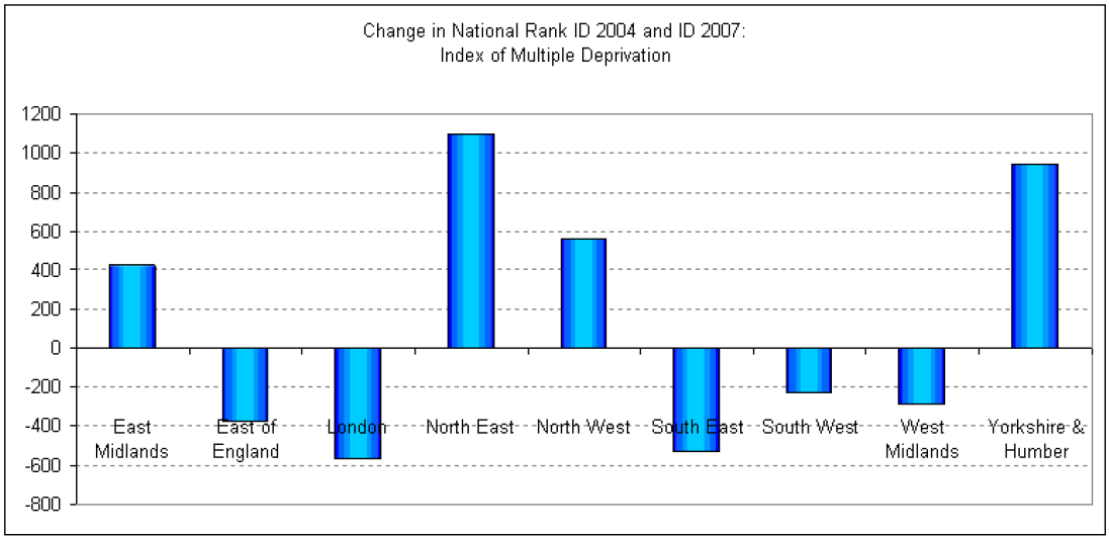
Section Three: shows the most deprived LSOAs within the region, containing 10% of the region's population (based on 2001 census population for the 2004 indices and mid-2005 population estimates for the 2007 indices). This measure can help identify regional 'hotspots' of deprivation and describes how these have changed between the 2004 and 2007 Indices. These results have also been summarised according to PCT (using 2006 boundaries).

Please note due to the size of this chapter a reduced version is presented here, the original full-length version, covering all domains is available on the accompanying CD-ROM.

Section One - Changes in National Rank

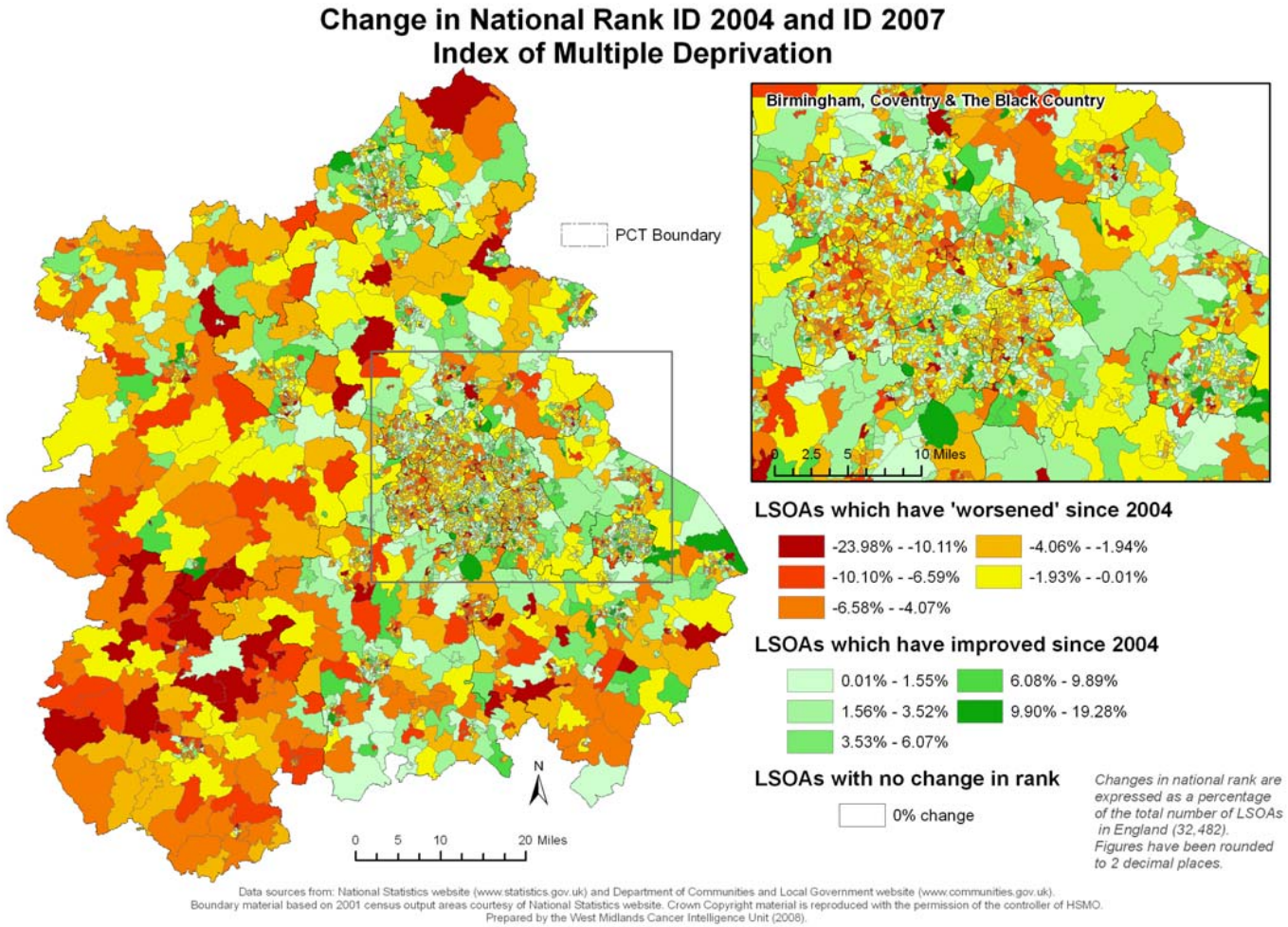
2.2 Index of Multiple Deprivation

Figure 2.1: Average change in rank per LSOA for Index of Multiple Deprivation by Government Office Region



The average rank change, per LSOA, for the West Midlands has seen a decrease (i.e. 'worsening') in rank of 286.5, a change that is comparable to that of the South West. The West Midlands is one of five regions to have shown an average decrease. In comparison the Yorkshire & Humber and North East regions have seen the greatest improvement in terms of average rank per LSOA.

Map 2.1: Changes in National Rank ID 2004 and 2007: Index of Multiple Deprivation



Of all the 3,482 LSOAs in the West Midlands: 61.1% have decreased in rank, 38.8% have improved in rank and three LSOAs have remained at exactly the same rank. The areas that have seen the biggest declines in rank are mainly located in the West, and in the more rural areas of the region, in particular Herefordshire.

2.3 Summary of average LSOA change in rank by GOR for all domains

The table below summarises the findings in terms of average rank change per LSOA by Government Office Region for each domain:

Table 2.1: Summary table showing average change in rank per LSOA for all domains, by Government Office Region

	Overall IMD	Barriers to Housing & Services	Crime	Education, Skills & Training	Employment	Health Deprivation	Income	Living Environment
East Midlands	422.85	132.72	459.61	-177.24	647.54	670.37	295.58	808.74
East of England	-374.17	956.66	-201.53	-291.29	-794.19	-689.96	-426.86	52.42
London	-564.50	-90.73	343.01	1068.57	-873.46	-521.18	-405.29	-1308.04
North East	1099.77	-803.31	754.22	-2.87	1414.74	954.69	966.11	736.98
North West	560.13	-238.84	-888.96	-322.10	953.15	591.69	486.45	267.34
South East	-531.37	979.62	-1110.91	-208.60	-892.20	-560.49	-444.78	-346.36
South West	-228.17	131.67	325.81	-196.60	-23.69	-221.20	-144.37	-1311.15
West Midlands	***-286.46***	***-3209.61***	***1109.14***	***26.08***	***51.86***	***-151.18***	***-187.20***	***8.46***
Yorkshire & Humber	942.58	1399.74	466.45	-145.80	990.23	942.37	714.67	1022.33

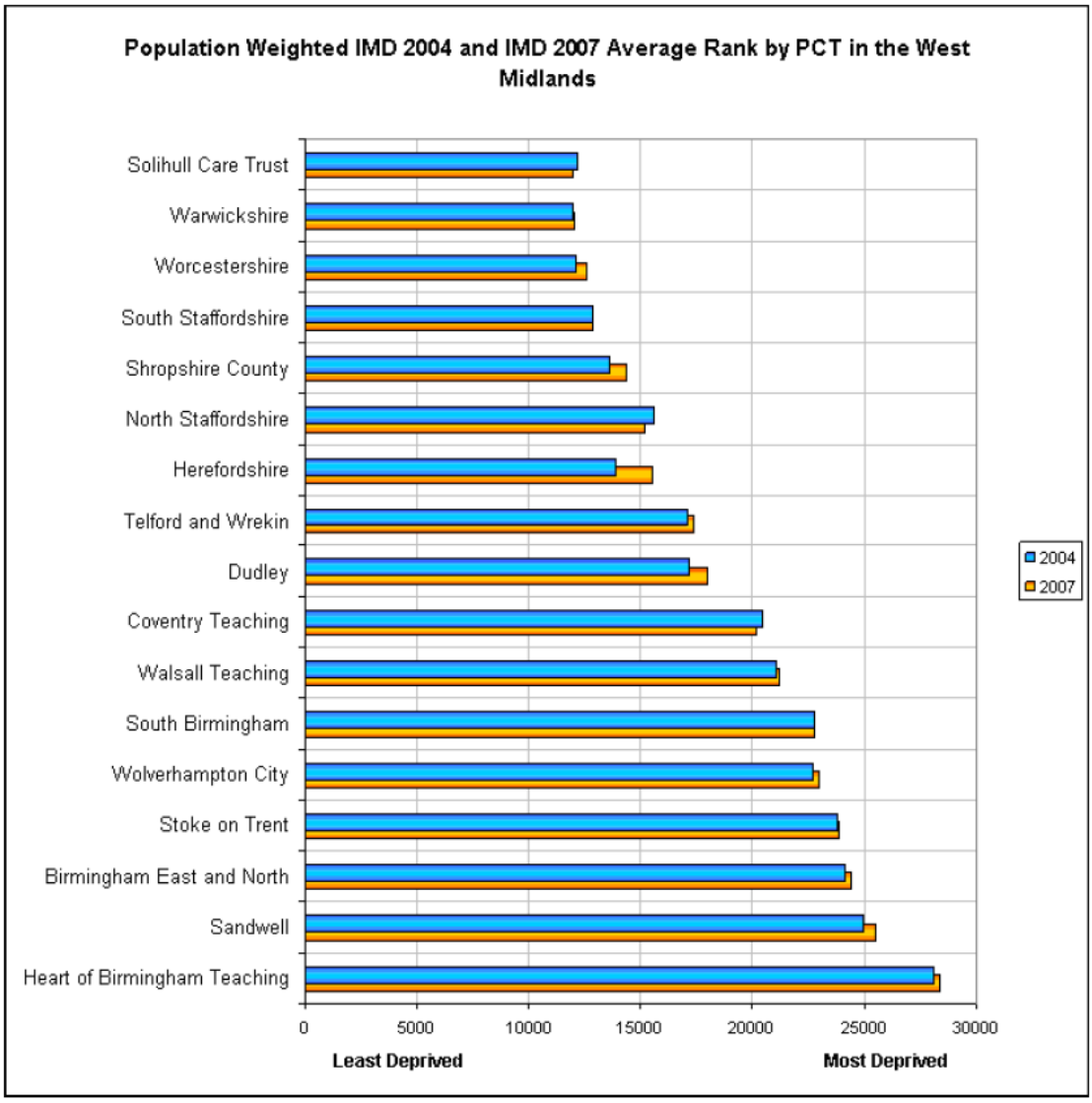
The greatest change that has occurred in the West Midlands region has been in the Barriers to Housing and Services Domain – which has seen by far the biggest decrease out of all the regions and the greatest change out of all the domains.

The Crime domain has experienced the second biggest change in the West Midlands and has seen a significant improvement, in fact seeing the biggest increase amongst all the regions in the country.

The West Midlands is one of just two regions to have seen average change for the Education, Skills & Training Domain to have improved, whilst it has also seen some improvement in both the Employment and Living Environment domains.

Section Two
2.4 A Comparison of the Indices at PCT- Level within the West Midlands

Figure 2.2: Population-weighted average rank per LSOA for Index of Multiple Deprivation by PCT



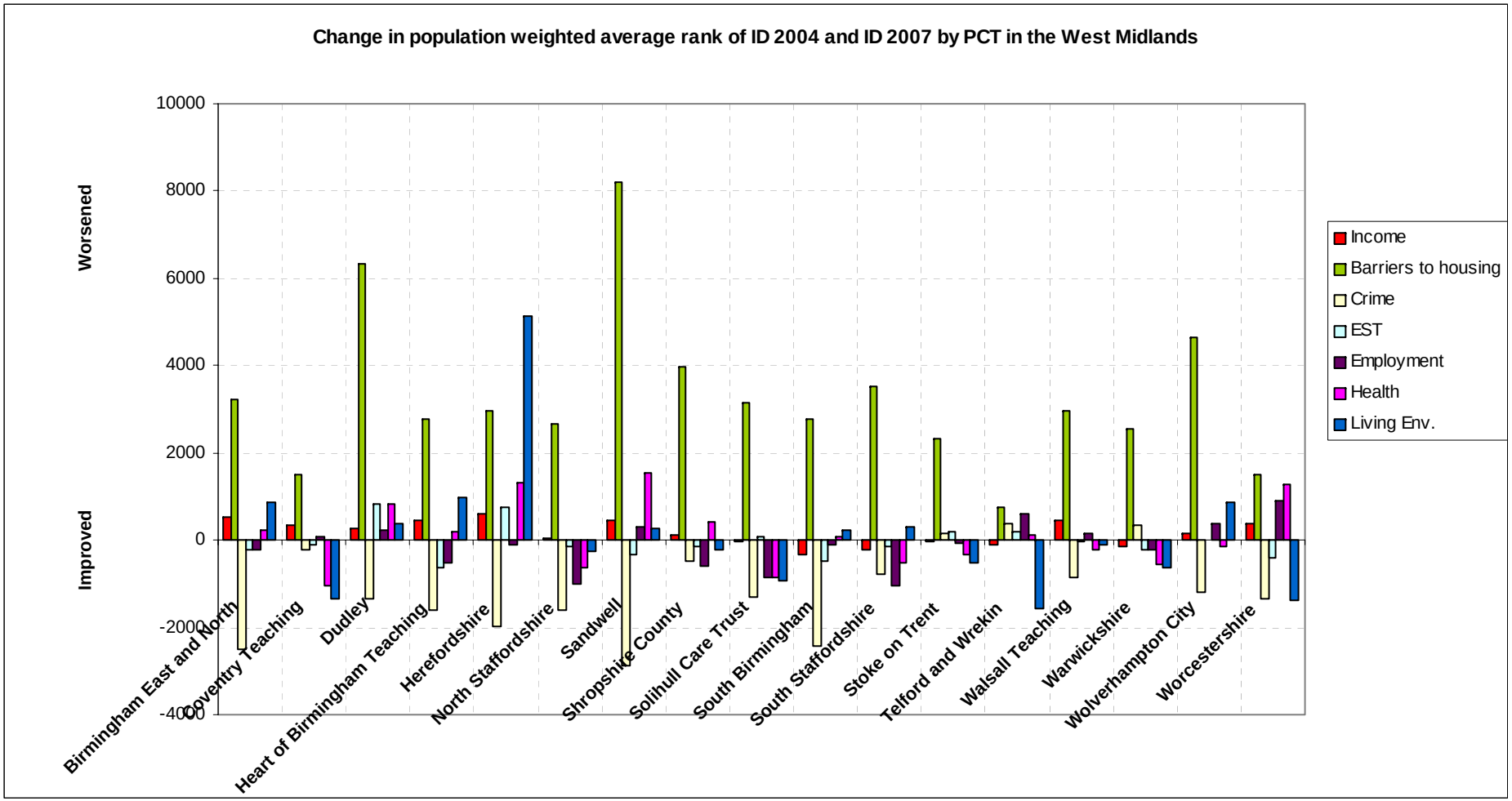
Herefordshire PCT has experienced the greatest change and indeed seen its average rank worsen the most.

Only four PCTs (South Birmingham, Solihull Care Trust, North Staffordshire and Coventry) have seen their average rank improve.

The top three most 'deprived' PCTs – Heart of Birmingham, Sandwell, and Birmingham East & North – have remained so for both 2004 and 2007 indices.

Figure 2.3 below shows the rank change for each PCT per domain:

Figure 2.3: Change in population-weighted average rank per LSOA for all domains by PCT



The West Midlands' overall poor performance in the Barriers to Housing domain (Table 2.1) is reflected by each PCT, which have all shown high levels of decline – most notably in Sandwell and Dudley. Even those PCTs which have shown good overall improvement (such as Solihull and North Staffordshire) have still shown to be to be deteriorating greatly in this domain.

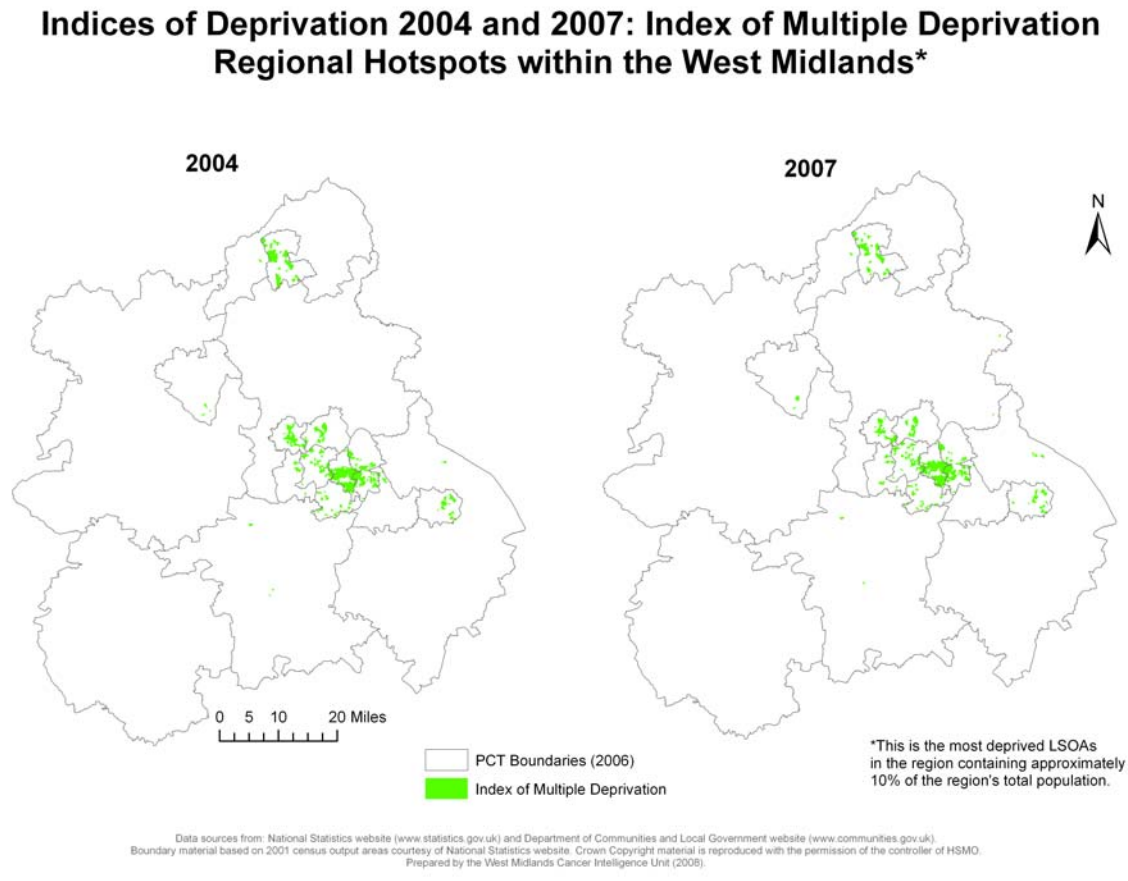
Hereford's overall poor performance can perhaps be attributed to its extremely poor performance, in the Living Environment domain - in which it has declined in rank by some 5,000. This is in stark contrast to the performance of the other PCTs in this domain.

The region's good performance in the Crime domain (Table 2.1) is reflected by the fact that all but three PCTs have shown levels of improvement in this domain.

Section Three – Regional Hotspots

2.5 Index of Multiple Deprivation

Map 2.2: Indices of Deprivation 2004 and 2007: Index of Multiple Deprivation Regional Hotspots within the West Midlands



The 'hotspots' of deprivation in the region, for the overall IMD measure, have seen little change and are generally located in the Region's main urban areas (Birmingham and the Black Country, Coventry and Stoke-on-Trent).

Results are summarised below, where it is evident that Birmingham East & North has seen the biggest increase.

Table 2.2: Index of Multiple Deprivation 'hotspots' by PCT

PCT	% of LSOAs as 'hotspots' in 2004	% of LSOAs as 'hotspots' in 2007	% Increase/ Decrease
Heart of Birmingham Teaching	55.15	53.33	-1.82
Birmingham East and North	27.95	32.28	4.33
Stoke-on-Trent	23.03	19.39	-3.64
Sandwell	14.97	17.65	2.67
Wolverhampton City	16.46	13.29	-3.16
Coventry Teaching	12.18	11.68	-0.51
Walsall Teaching	11.24	11.24	0.00
South Birmingham	10.36	10.36	0.00
Dudley	3.47	4.46	0.99
Telford and Wrekin	2.78	2.78	0.00
Warwickshire	0.30	0.90	0.60
Solihull Care Trust	3.76	0.75	-3.01
North Staffordshire	0.74	0.74	0.00
Worcestershire	0.83	0.55	-0.28
South Staffordshire	0.00	0.52	0.52
Herefordshire	0.00	0.00	0.00
Shropshire County	0.00	0.00	0.00

Both Birmingham East and North and Sandwell PCTs have shown the biggest percentage increase of identified hotspots.

Despite Stoke-on-Trent PCT and Wolverhampton City PCT experiencing the biggest decreases in identified hotspots they both remain in the top five.

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References and Further Reading

1. The English Indices of Deprivation 2007, Data and publications available from: http://www.communities.gov.uk/communities/neighbourhoodrenewal/deprivation/deprivation07/

2. The English Indices of Deprivation 2004, Data and publications available from: http://www.communities.gov.uk/archived/general-Content/communities/indicesofdeprivation/216309/

CHAPTER THREE: THE NHS CARBON FOOTPRINT

ESTIMATING THE CO_2 EMISSIONS OF PATIENT JOURNEYS

> *"The environment, which shapes our lives and our health, is under threat from climate change. By taking action to become a low carbon organisation, the NHS can help to combat the direct risks to health of climate change."*

Rt Hon Dawn Primarolo MP
Minister for Public Health

3.1 Introduction

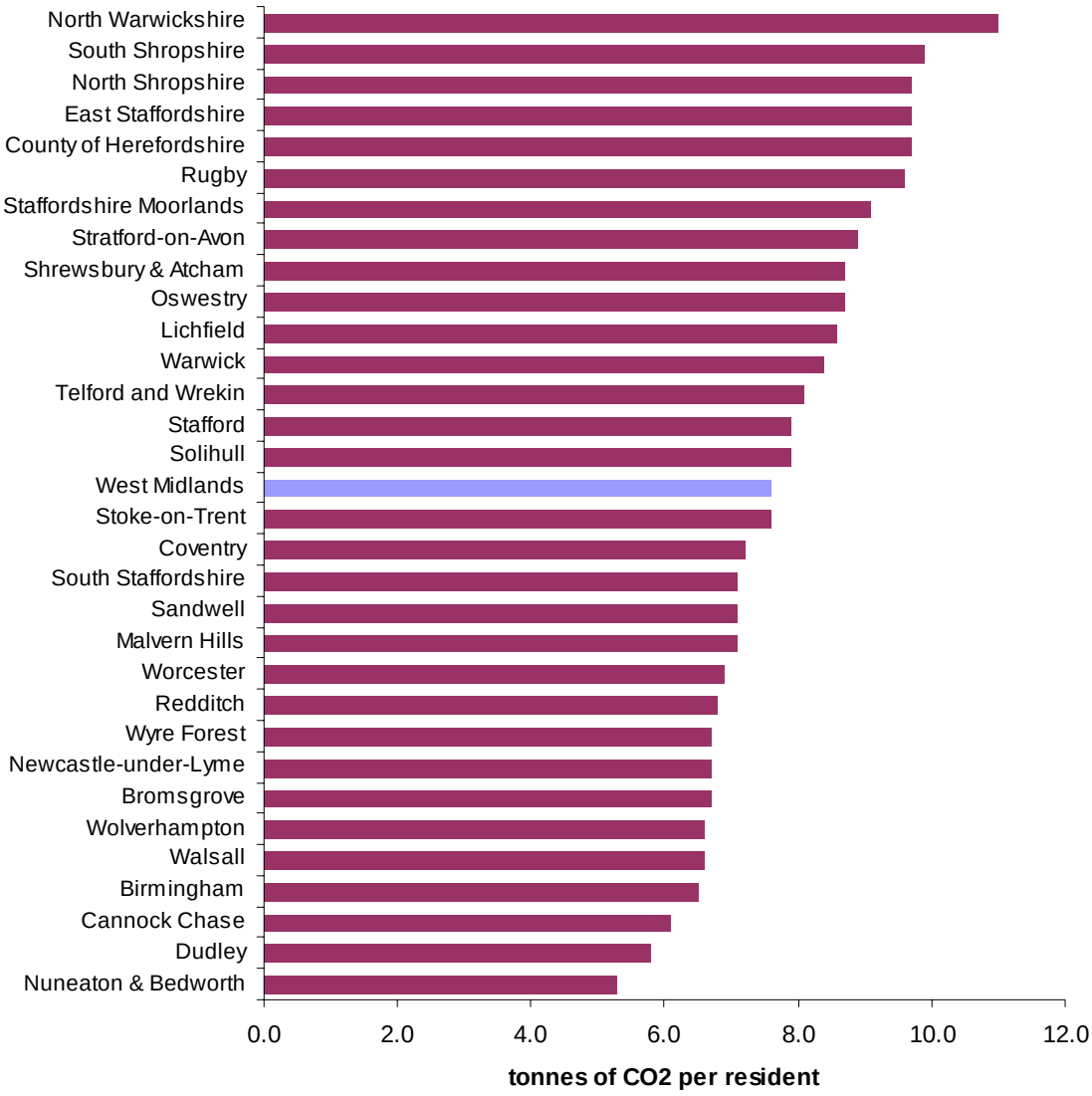
Climate change is recognised as one of the most significant challenges facing the world, and it will have serious implications for health and for the NHS. Health depends on a wide variety of determinants, and many of them (for example temperature, pollution levels, access to food and water, and stress levels) will be affected by climate change. In the UK the positive effects of a warmer climate, such as a reduction in cold-related deaths, are likely to be outweighed by a series of negative impacts, such as:

- An increase in heat-related deaths – predicted to reach 20,000 a year in the UK by 2050 due to more frequent and severe heat waves
- Increased cases of skin cancer and cataracts
- Injuries and infectious diseases as a result of increased flooding – a Foresight report predicted that by 2080 over 3 million people in the UK could be at risk from flooding
- Anxiety and depression linked to physical and economic insecurity
- Respiratory disease, insect-borne disease, and food poisoning are also expected to increase [1]

On a global and national scale, the poorest countries and communities who are less able to adapt, will suffer the most severe consequences, exacerbating concerns about existing health inequalities.

It is has been estimated that the average person in the West Midlands produces 7.6 tonnes of CO_2 (t CO_2) every year. This ranges from a low of 5.3 t CO_2 for people living in Nuneaton and Bedworth to a high of 11 t CO_2. [2]

Figure 3.1: Carbon dioxide emissions, 2005, tonnes per person



Source: Association of Public Health Observatories (2007) [3]

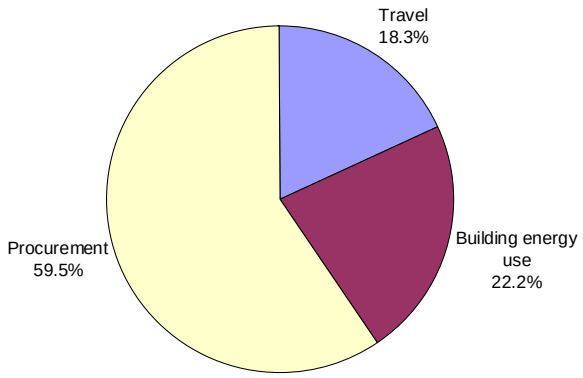
The Climate Change Bill [4] will commit the Government to reducing the UK's carbon emissions by at least 60% by 2050, making the UK the first country in the world to put reducing carbon emissions into law. The NHS currently has a target of a 15% reduction in primary energy consumption between 2000 and 2010, as well as a target to improve energy efficiency.

Currently the NHS is not on track to meet these targets; despite some improvement in energy efficiency, total energy consumption increased in the NHS by 7.0% between 1999/00 and 2004/5. Corporately the NHS is dedicated to becoming an exemplar for public sector action on climate change and sustainability. The Sustainable Development Unit (SDU) has been set up which will lead on a carbon reduction strategy for the NHS, in addition to wider sustainable development issues such as the role of the NHS as a good corporate citizen.

The SDU has published the first NHS carbon footprinting report that has calculated that 18 million tonnes of carbon dioxide (Mt CO_2) each year contributing approximately 3 per cent of total England emissions. The NHS in England is the largest contributor to public sector emissions, being responsible for 30 per cent of the whole of England's public sector emissions [5].

The greatest proportion of CO_2 emissions comes from the creation and distribution of the equipment and consumables that the NHS purchases annually at 11.07 Mt CO_2 (59.5%) Travel accounts for 3.4 Mt CO_2 (18.3%).

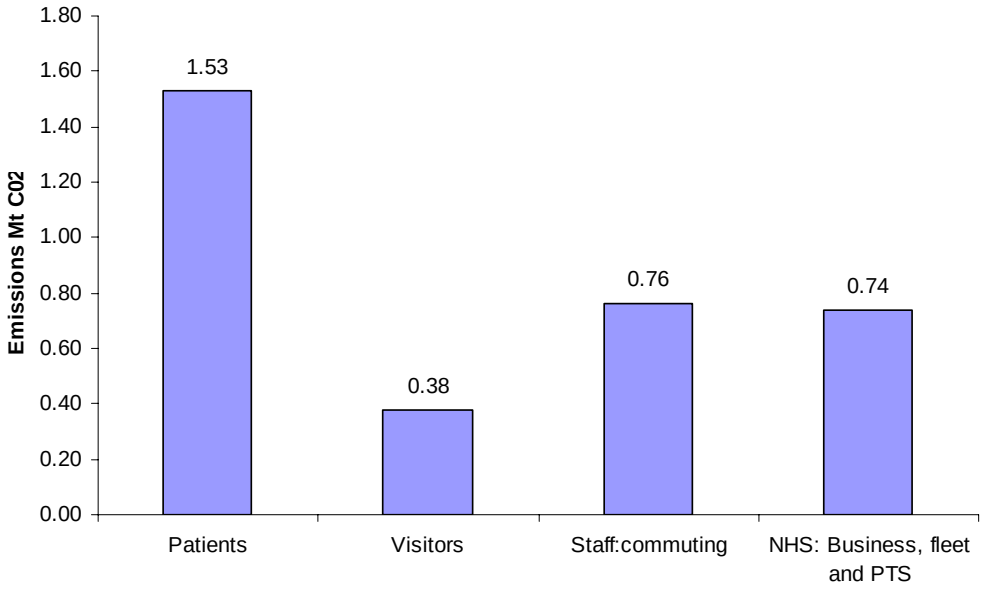
Figure 3.2: NHS England CO_2 emissions: Primary sector breakdown, 2004



Source: Sustainable Development Commission (2008a) [5]

The emissions for travel have been further broken down by Patients and visitors, Staff and Business travel. The estimates of emissions from patient, visitor and staff commuting travel are estimated from the Transport Statistics Bulletin: National Travel Survey 2006, Department for Transport. These emissions are then added to those calculated from the business/fleet/patient transport services (PTS) travel emissions which are obtained from an Input-Output model. This analysis found that patients' own travel to and from services was the greatest contributor to emissions making up 1.53Mt CO_2 (56.2%); followed by staff commuting and travel on NHS business including ambulances and patient transport services around 0.75Mt CO_2 (Figure 3.3)

Figure 3.3: NHS England CO_2 emissions: Travel emissions by sub-group, 2004



Source: Sustainable Development Commission (2008a) [5]

The Department for Transport (DfT) has forecast that 'business as usual' transport-related emissions in the UK will rise by 35 per cent by 2030 (over a 1990 baseline). Under this scenario, NHS transport-related emissions are also predicted to increase. It is therefore increasingly important for the NHS to recognise, understand and take responsibility for its CO_2 emissions. Green travel plans can promote healthy methods of transport and help to change travel patterns of patients, staff and visitors; encouraging active travel (such as walking, cycling or taking public transport) in place of using a car can reduce the carbon footprint of the organisation and deliver multiple public health benefits.

3.2 This Project

These national models are limited as they cannot be tailored to individual PCTs or providers. To address this gap in our knowledge, a project was conceived to look at how we can use our resources in the Region to produce a methodology that would be replicable and updateable. The concept we came up with was to an estimate the total CO_2 emitted as the result of patient journeys to hospital. To enable this, the Regional GIS Service created a matrix of distances from the centre of each Lower Super Output Area (LSOA) to each major acute provider. This matrix is based on the shortest road distance.

Different types of admissions and attendances will have different journey profiles and therefore a set of hypothetical journey profiles were produced upon which to base the model.

Table 3.1: Model journey profiles for patients and visitors

	Patient	Visitor
Elective	One return journey on admission day One return journey on day of discharge	One return journey for every overnight stay
Emergency	One return journey on admission day One return journey on day of discharge	One return journey for every overnight stay
Maternity	One return journey on admission day One return journey on day of discharge	One return journey for every overnight stay
Transfers	One return journey on admission day One return journey on day of discharge	One return journey for every overnight stay
Outpatient	One return journey on day of appointment	No visitors
Day Case	Average 1.5 return journeys on admission day	No visitors
Accident and Emergency	No journey for those admitted (either Emergency or other admission) One return journey on day of attendance for other attenders	No visitors

The assumptions for these journey profiles seem fairly intuitive. A patient going into hospital for an overnight stay will either be driven to hospital by a relative or a carer, by patient transport services or private taxi. The person who took them would then have to return most likely to the start position (home). On discharge the patient is likely to be taken home by the same transport method. If they stay overnight then it is likely that on average a patient will have at least one set of visitors every day. For day cases, it is assumed at least half the patients will park during their visit, whilst others will be dropped off and picked up later, given 1.5 return journeys per admission. All of these models ignore public transport usage, which would reduce the Carbon emissions per patient. For this study data on patient travel to hospital by public transport was not available so the journeys could not be adjusted for this.

The strength of this methodology is the ability to vary the assumptions: increasing the number of visitors; reducing the number of patient's journeys (if statistics on overnight parking is available); or introducing a public transport dimension for buses or trains. The model is very flexible in this regard. It is less flexible in regard to varying the starting points for visitors and or emergencies, although it is possible to change the destination allowing planners to consider the benefits off placing services closer to home.

The estimates of CO_2 per km were taken from the Transport Direct website [6]. There are two estimates provided (0.128kg per km in a small car and 0.257 kg per km in a large car) and for the purposes of this study the average of the two were used. The model is not restricted to these, it is possible to use any alternative or vary the emissions estimate to reflect changes in car ownership trends towards lower CO_2 emitting vehicles.

Due to the level of data required for the model it was decided for this example to restrict the output to just one PCT, Sandwell. As an example PCT it is not necessarily the most representative of the Region being a wholly urban PCT with no rural areas. In 2006/7 there were 470,343 hospital admissions and attendances, most being outpatients. The average journey to hospital was only 4.9km. The longest average journeys were recorded for elective admissions as many of these were seen outside the PCT in Dudley and Birmingham.

Table 3.2: Hospital attendances and average journey length

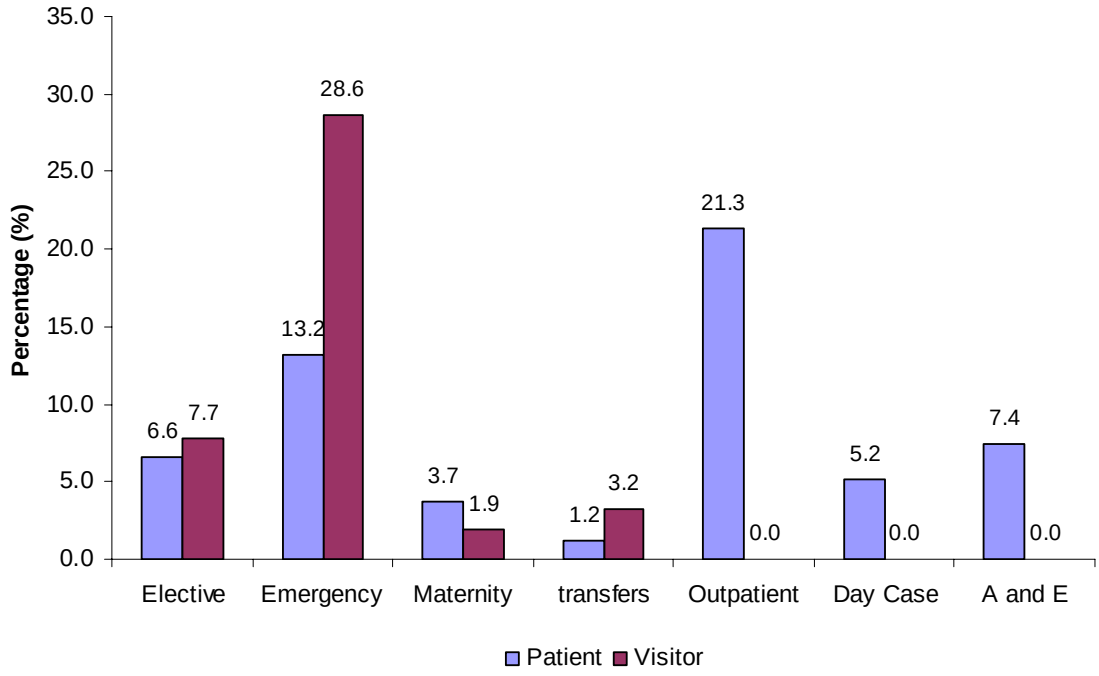
	Patient Attendances	Visitors	All events	Average Distance (KM)
Elective	13,775	36,084	49,859	8.1
Emergency	38,533	164,612	203,145	5.8
Maternity	11,260	11,498	22,758	5.6
Transfers	2,995	14,402	17,397	6.9
Outpatient	287,100	-	287,100	6.0
Day Case	22,164	-	22,164	5.3
AandE	94,516	-	94,516	5.3
Total	470,343	226,596	696,939	4.9

The model estimates that patient related travel results in 6.8million km of travel and just under 1,400 t CO_2 (Table 3.3). Patients attending for an Outpatient appointment contribute the greatest proportion of emissions (21.3%)(Figure 3.4). Visitor journeys contribute just over 41% of emissions. When we look at the combination of patients and visitors, those resulting from an emergency admission produced the greatest emissions.

Table 3.3: Patient and Visitor journeys and estimated CO_2 emissions for Sandwell PCT

	Patient		Visitor		Total	
	KM	KG	KM	KG	KM	KG
Elective	444,999	86	525,641	101	970,640	187
	(6.6%)	(6.6%)	(7.7%)	(7.7%)	(14.3%)	(14.3%)
Emergency	893,431	172	1,941,358	374	2,834,789	546
	(13.2%)	(13.2%)	(28.6%)	(28.6%)	(41.7%)	(41.7%)
Maternity	252,623	49	128,309	25	380,932	73
	(3.7%)	(3.7%)	(1.9%)	(1.9%)	(5.6%)	(5.6%)
Transfers	82,137	16	220,648	42	302,785	58
	(1.2%)	(1.2%)	(3.2%)	(3.2%)	(4.5%)	(4.5%)
Outpatient	1,447,205	279	-	-	1,447,205	279
	(21.3%)	(21.3%)			(21.3%)	(21.3%)
Day Case	349,964	67	-	-	349,964	67
	(5.2%)	(5.2%)			(5.2%)	(5.2%)
A and E	503,695	97	-	-	503,695	97
	(7.4%)	(7.4%)			(7.4%)	(7.4%)
Total	3,974,054	765	2,815,957	542	6,790,010	1,307
	(58.5%)	(58.5%)	(41.5%)	(41.5%)	(100.0%)	(100.0%)

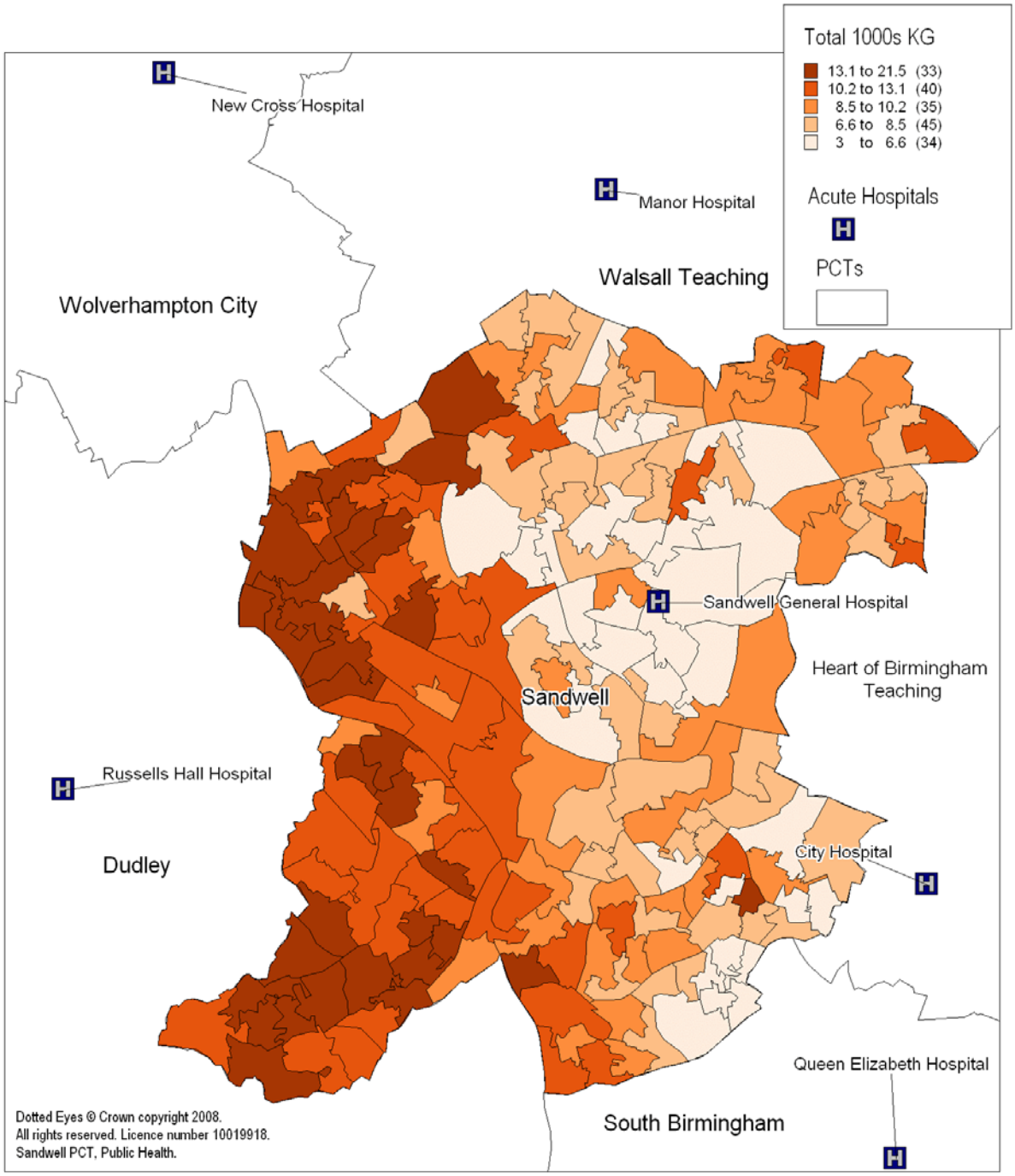
Figure 3.4: Patient and Visitor journeys and proportion of total estimated CO_2 emissions for Sandwell PCT



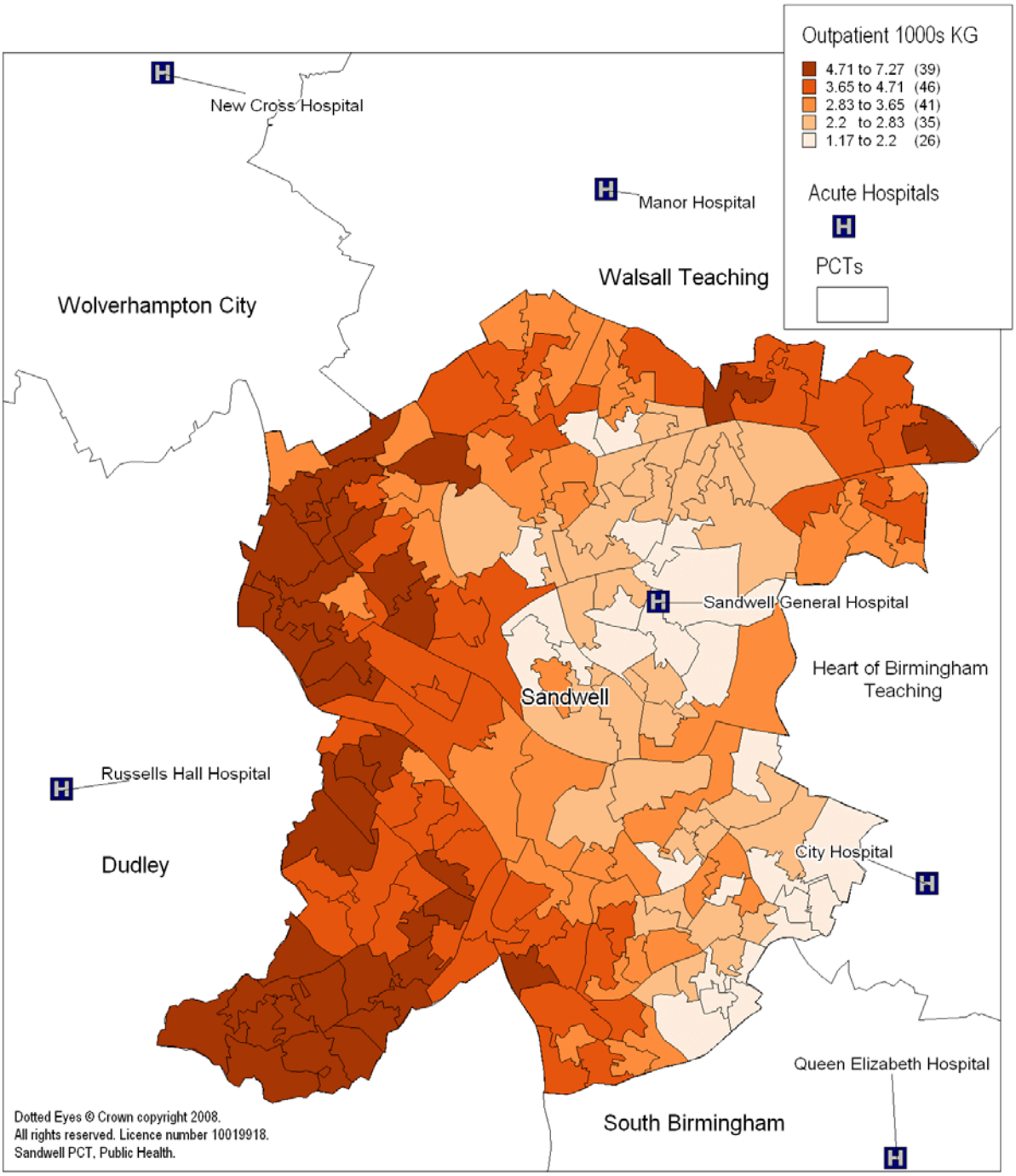
As this method is based on patient data the model can be re-run for specific age, sex, and diagnosis or condition group. As the data has a geographical reference, SOA, it is also possible to map the areas with the greatest emissions and how that relates to the provision of health services. It is possible, therefore, to investigate how different service re-design options would impact on carbon emissions, for example delivering outpatient clinics outside of hospital. Using the road network, a distance matrix for alternative providers could be produced and substituted into the model changing the destination of the patient to be a clinic rather than a hospital.

The mapping of the emissions data for Sandwell residents (where ever they are treated) does not produce any startlingly unusual results with the areas around Sandwell Hospital, the main provider, having the lowest levels with emissions increasing as you move further away (Map 3.1 and 3.2). . Interestingly the proximity of other providers, especially Dudley does not appear to have a substantial reduction on emissions for those living in the west of the PCT. This is particularly true for Outpatients indicating that there are significant issues in the South West of the PCT in terms of access and with substantial knock effects for the amount of CO_2 emitted.

Map 3.1: Total emissions for patient and visitor journeys by Super Output Area (SOA)



Map 3.2: Emissions for outpatient attendances by Super Output Area (SOA)



3.3 Conclusion

The model goes further than the SDU initial assessment based on the National Transport Survey, as it actually allows Trusts to understand the impact of the location of their services on the total carbon emissions. It clearly works to highlight the areas where the provision of services does little to reduce emissions. The model would allow PCTs to plan how they could reduce transport related emissions and over time show whether they have been successful or not. The plan is now to produce instructions and an excel workbook to enable others to replicate the model for their own use and to test out different scenarios.

It is interesting that the model used here produces a greater emission contribution for visitors than the SDU model, 41.5% compared to only 19.9%.

References

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CHAPTER FOUR: WEST MIDLANDS AMBULANCE SERVICE DATA COLLECTION AND ANALYSIS

4.1 Introduction

West Midlands Ambulance Service (WMAS) attends around 600,000 patients per year, serving a population of around 5.3 million people across the region.

The Trust was formed in July 2006 with the merger of Coventry & Warwickshire, Hereford & Worcestershire and West Midlands Ambulance Service (only covering the Birmingham and Black Country and Shropshire areas). Staffordshire joined the Trust in October 2007.

All emergency calls come in to our Emergency Operations Centres (EOCs) across the region, and every call that is received generates a unique log on the computer systems within these EOCs.

4.2 What data is collected?

Call data

When a call comes into the EOC, key information is collected including the location of the incident, a brief description of the emergency and the phone number of the caller. This is to enable us to send the appropriate resources and to give the responding ambulance crews vital information to best treat the patient.

As soon as the location of the incident is identified, the call is passed to our dispatchers in order for them to assign a suitable vehicle (resource) to the case. This includes traditional ambulances, rapid response cars, motorcycles and air ambulances, of which there are four in the region. There are also around 2,500 volunteer Community First Responders. All of these are dispatched from the EOC.

While the dispatchers are assigning a vehicle, the call taker continues to ask the caller a series of detailed questions regarding the patient's condition to determine the chief complaint and category of call, using the Advanced Medical Dispatch Priority System (AMPDS). The answers to the questions determine the chief complaint and the category of the call.

- Chief complaint: it is important to note that the chief complaint of the patient is based upon the symptoms given by the caller, not the underlying cause. There are a few exceptions to this but if, for instance a patient is unconscious due to drinking excess alcohol, they are categorised as 'unconscious' - the alcohol is not recorded as a cause at that point.

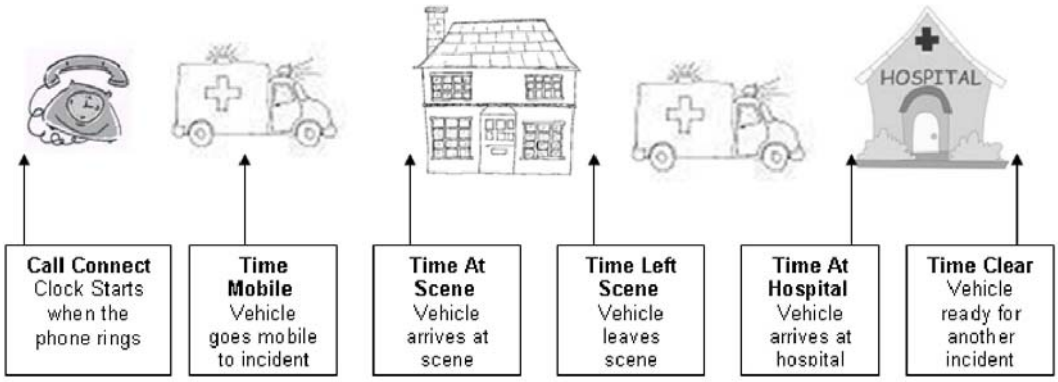
- Category of call: calls are categorised according to the seriousness of the patient's condition and this determines our target response times.

  Category A (Life threatening) – Target time: 8 minutes
  Category B (Serious but not life threatening) - Target time: 19 minutes
  Category C (Non serious or life threatening) - Target time: 30 minutes

Time data

National Ambulance targets are based on response times to incidents, an incident being defined as a resource arriving at the scene. The clock starts as soon as the call is connected to the control room switchboard.

At every stage throughout the call process and subsequent responses to and treatment of the patient, times are automatically recorded. Times are generated for all calls received and every response sent to an incident not just the first vehicle on scene. These are shown below:



The data collected during the call and the time data received from vehicles is very consistent and accurate. The questions asked by the call taker are pre-determined to increase not only the accuracy but also the consistency of the data captured. The ambulance crew presses a button at each stage in their response to an incident to generate the time data from the vehicles, assuring accuracy of data as well as consistency.

Patient Report Form

Whilst attending an incident the ambulance crew record the patient's medical details as well as any treatment given on a paper based Patient Report Form (see Section 4.5). This data is held separately from the data recorded within the call and the time information described above. They can be linked, although there is, inevitably a small amount of unmatchable data.

4.3 Information for PCTs

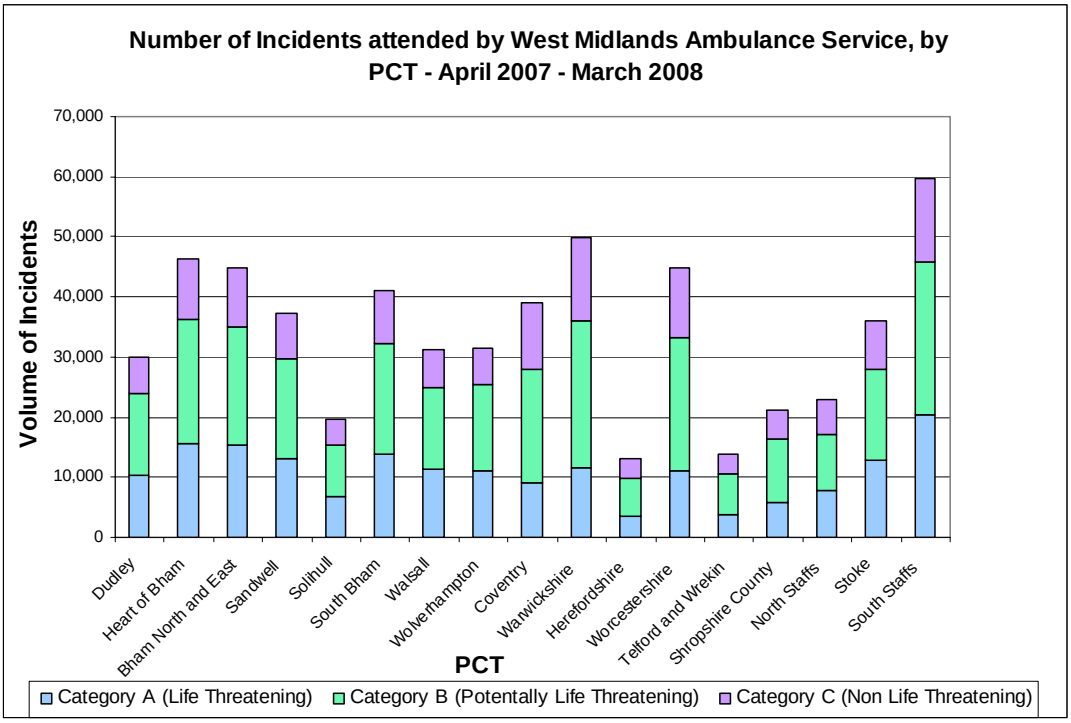
Analysis of data captured during calls and from the vehicles can produce detailed and accurate information both internally for the Ambulance Service and to external partners such as Primary Care Trusts (PCTs) and Acute Trusts.

Number of calls

At a top level, incident volume data is a key part of our data analysis. Internally this enables resources to be targeted most effectively and forecasts to be made of future demand across the region. This data can also be of benefit to external partners by informing the planning of provision of alternative or specialist services and in predicting demand.

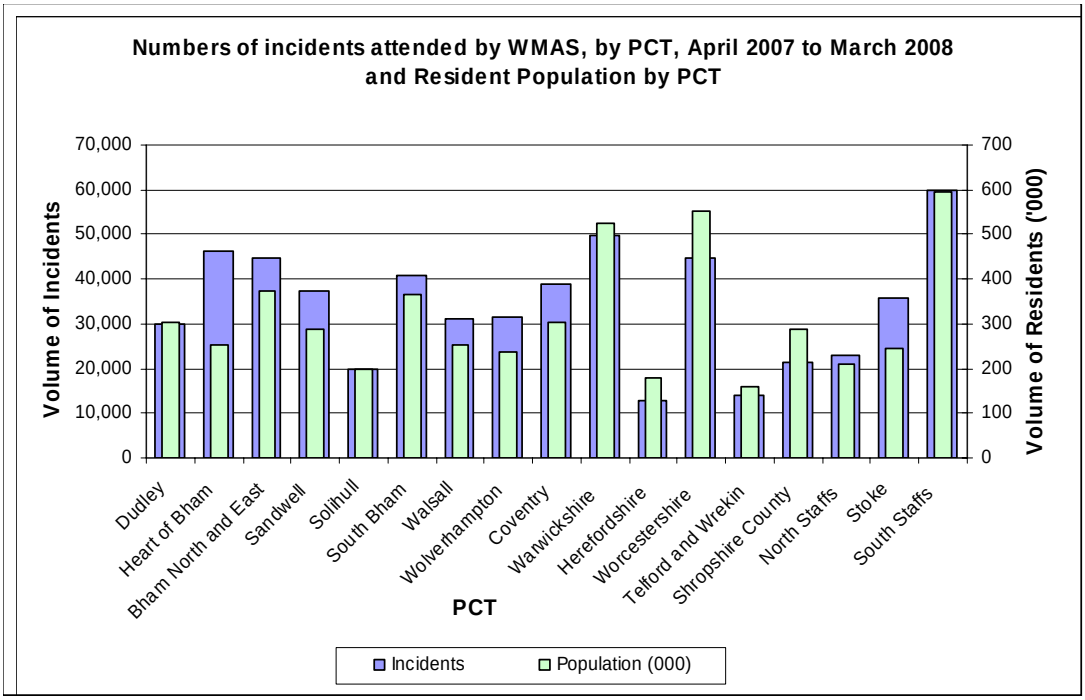
Figure 4.1 (below) illustrates the number of emergency incidents attended by the WMAS for each PCT in the region over the last financial year. It shows the total demand by PCT and also what proportion of these incidents fell into each of the 3 categories. Note that the information relates to the PCT area in which the incident occurred in, and not necessarily where the patient lives.

Figure 4.1: Number of Incidents attended by West Midlands Ambulance Service, by PCT - April 07 - March 08



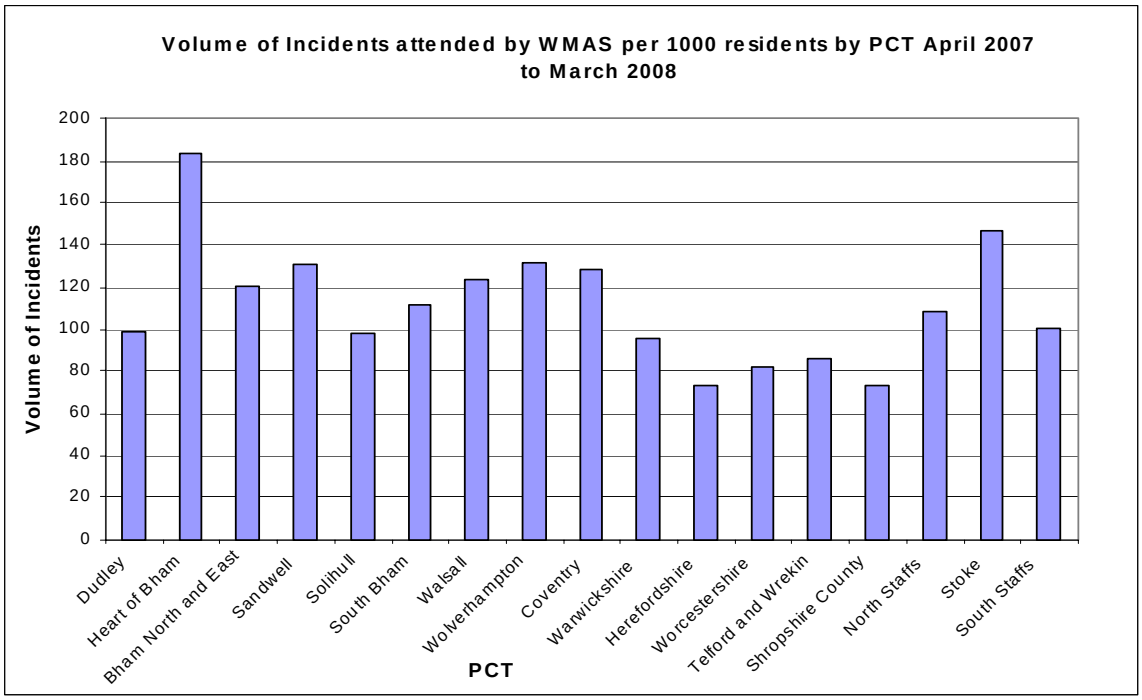
Alone this data shows the mix of calls by categorisation. However, it is also valuable to compare this data to other datasets to determine any other trends. The following chart combines the above data with resident population per PCT.

Figure 4.2: Numbers of incidents attended by WMAS, by PCT, April 2007 to March 2008 and Resident Population by PCT



In order to get a direct comparison across the region, Figure 4.3 shows the volume of calls per resident population ('000)

Figure 4.3: Volume of Incidents attended by WMAS per 1000 residents by PCT April 2007 – March 2008



As the Figures 4.1 – 4.3 show, there is a wide variation across the region both in the volume of incidents West Midlands Ambulance Service attends and the rates of calls per resident population. It is, however, important to note that ambulance incident volumes are based on the PCT where the incident occurred, not where the patient lives. This will inflate the rates of calls in some PCTs, particularly those that have a lot of visitors from other PCT areas.

For example, Heart of Birmingham PCT has the highest volume of incidents in relation to the resident population. The main entertainment areas of Birmingham City Centre lie within this PCT so there are many extra non-resident people, particularly at weekends, who may require an ambulance.

Of course other factors may influence the rate of ambulance call outs in a geographical area. Levels of social deprivation, the degree of rurality of the area and the provision of alternative pathways of emergency care for local residents by the PCT are all factors that can attribute to the volume of incidents.

Further analysis of this volume data by days of the week, or hours of the day could reveal useful information for healthcare planners. Comparing commercial with residential areas one might expect to see a difference between weekday and weekend ambulance activity. The time of year can also influence the volumes of calls. During summer months, the volume of ambulance incidents decreases as people are out of the region on holiday, whilst in winter they increase with more incidents caused by poor weather such as falls and Road Traffic Collisions.

Type of calls - chief complaint

Table 4.1 shows the breakdown of calls for each PCT by chief complaint (AMPDS code) for a one-month period. This allows us to see a much greater level of detail in relation to the demand placed on the ambulance service, Information such as this may be of particular use when a PCT is looking at the provision of alternative care pathway services.

For example compare Worcestershire PCT and Telford and Wrekin PCT. Total demand was only 3.2 times greater in Worcestershire yet, when looking specifically at falls, there are over 10 times the number of call outs for falls in Worcestershire than Telford and Wrekin. Falls accounted for 6% of demand in Telford and Wrekin, yet they accounted for almost 20% in Worcestershire. This type of comparative information could be of great interest to PCTs when performing demand analysis and planning alternative care pathway provision for falls. This type of information could provide key detail regarding targeting services and resources to specific demand.

The n/a and *na categories are where no chief complaint code was recorded. These are, in the main, due to computer failure, and cases have had to be recorded on paper. They are then retrospectively added onto the computer system, but the code cannot always be added as the questions that generate the chief complaint code (AMPDS code) cannot be completed afterwards.

Table 4.1: Incidents attended by WMAS, by chief complaint, for each West Midlands PCT. January 2008 (highest figures in yellow for each category)

AMPDS	Dudley	Heart of Bham	N&E Bham	Sandwell	Solihull	South Bham	SW Staffs	Walsall	Wolverhampton	Coventry	Warwickshire	Herefordshire	Worcestershire	Telford and Wrekin	Shropshire County	North Staffs	Stoke	South Staffs	TOTAL
n/a	25	51	27	26	9	38	1	13	35	2	2	0	2	6	5	1	0	0	243
Abdo Pain	109	193	152	154	59	140	15	108	114	140	198	40	108	54	50	83	160	221	2,098
Allergic Reaction	24	48	37	27	10	37	5	33	16	20	28	6	22	6	12	7	10	17	365
Animal Bites	2	5	3	4	2	1	0	1	0	3	3	1	4	0	2	1	2	0	34
Assault/Rape	83	180	105	95	41	121	1	74	89	125	114	28	99	41	38	45	115	126	1,520
Back Pain	36	49	43	43	20	34	5	25	34	47	67	6	35	15	13	22	30	60	584
Breath Problems	335	463	554	539	220	453	42	435	424	375	434	118	393	144	184	276	459	734	6,582
Burns/Explosion	36	25	27	23	8	33	2	19	25	22	14	5	14	3	6	5	11	14	292
COI/Inhalation/Hazchem	2	4	3	3	2	3	1	5	1	2	3	2	0	2	2	0	7	7	49
Cardiac/Respiritory	30	33	48	47	13	49	6	33	34	43	68	12	66	12	22	38	39	70	663
Chest Pain	306	501	482	396	211	426	35	350	351	344	400	130	432	126	199	236	355	552	5,832
Choking	9	20	20	13	3	11	0	8	4	5	11	5	11	5	4	8	5	15	157
Convulsion/Fitting	77	174	161	141	75	131	10	122	111	146	166	50	159	52	64	77	134	185	2,035
Diabetic Prob	49	66	67	57	35	76	5	49	81	56	66	10	75	27	16	35	70	78	918
Drowning/Diving	2	2	0	0	0	1	0	1	0	3	1	0	0	0	2	0	0	0	12
Electroction	0	1	0	0	0	1	1	1	0	1	0	0	1	0	0	0	0	2	8
Eye Problem/Injury	7	7	11	12	3	9	0	7	8	3	2	2	5	3	1	2	4	5	91
Fall/Back	190	130	301	168	141	249	31	176	158	345	627	172	703	68	155	321	357	664	4,956
Headache	18	55	28	38	7	40	2	21	29	34	26	10	20	10	12	16	24	45	435
Heart Problem	22	26	28	30	16	41	3	24	23	15	40	12	41	13	22	37	37	75	505
Heat/Cold exposure	1	0	4	1	0	3	0	0	0	1	1	0	0	0	1	3	0	3	18
Haemmorhage/Laceration	78	136	134	128	80	119	19	105	93	149	135	41	115	43	59	64	119	204	1,821
Entrapments (non vehicle)	3	1	1	4	0	1	0	2	1	0	1	0	2	0	0	0	0	1	17
Overdose/poisoning	117	182	180	145	63	187	9	103	101	125	151	60	185	59	78	55	121	158	2,079
Pregnancy/Miscarriage/Birth	57	157	86	88	14	101	2	51	38	70	34	8	38	36	24	16	50	60	930
Psychatric/Suicide/	62	100	65	53	44	81	4	33	40	43	56	15	53	24	20	42	60	78	873
Sick Person (specific)	179	328	317	295	141	256	24	224	209	358	382	56	218	90	116	224	342	537	4,296
Stabbing/Shooting	6	23	10	7	1	16	0	7	14	15	5	1	8	3	5	2	2	8	133
Stroke/CVA	50	57	78	54	32	60	15	66	67	50	77	27	73	13	44	44	34	99	940
Traffic Accident	71	131	119	103	54	106	14	50	73	90	195	39	153	36	71	66	91	151	1,613
Traumatic Injury	305	321	423	353	226	405	46	272	283	258	336	37	174	145	265	65	106	174	4,194
Unconscious/Fainting	191	266	245	193	119	223	31	174	180	273	351	89	329	76	149	113	210	345	3,557
Unknown	27	47	45	39	24	44	3	30	33	62	44	15	67	15	27	33	38	69	662
GP referral	35	70	32	19	61	89	3	38	13	5	57	0	1	0	0	0	0	0	423
NA	2	9	3	6	11	8	0	7	13	42	48	0	1	2	4	9	20	80	265
TOTAL	**2,546**	**3,861**	**3,839**	**3,304**	**1,745**	**3,593**	**335**	**2,667**	**2,695**	**3,272**	**4,143**	**997**	**3,617**	**1,129**	**1,672**	**1,946**	**3,012**	**4,837**	**49,210**

(AMPDS) Advanced Medical Priority Dispatch System

There are many ways in which this data could be further analysed to provide information that is of use to PCTs. Such analyses might include:

- The volume of calls for each of these chief complaints by category (A,B,C) per PCT: the number of these patients transported to hospital could be determined as well.

- Useful information might be gained by looking at the age of the patient against the chief complaint.

- The data could be broken down by postcode area, so for example it would be possible to identify if there was a certain postcode area where a lot of the falls are taking place in Worcestershire. Looking at the data in this level of detail might influence preventative action and health promotion within the PCT.

- Clusters of calls can be identified, where particular types of call (e.g. assaults) are prevalent within specific areas such as postcode area. This could be tied in with socio-demographic data to identify whether explanations can be found for specific clusters.

Some of these analyses have been performed recently at the request of a number of PCTs in the region. Where appropriate these requests are developed into routine reports that go out to all PCTs in the region on a monthly/quarterly basis.

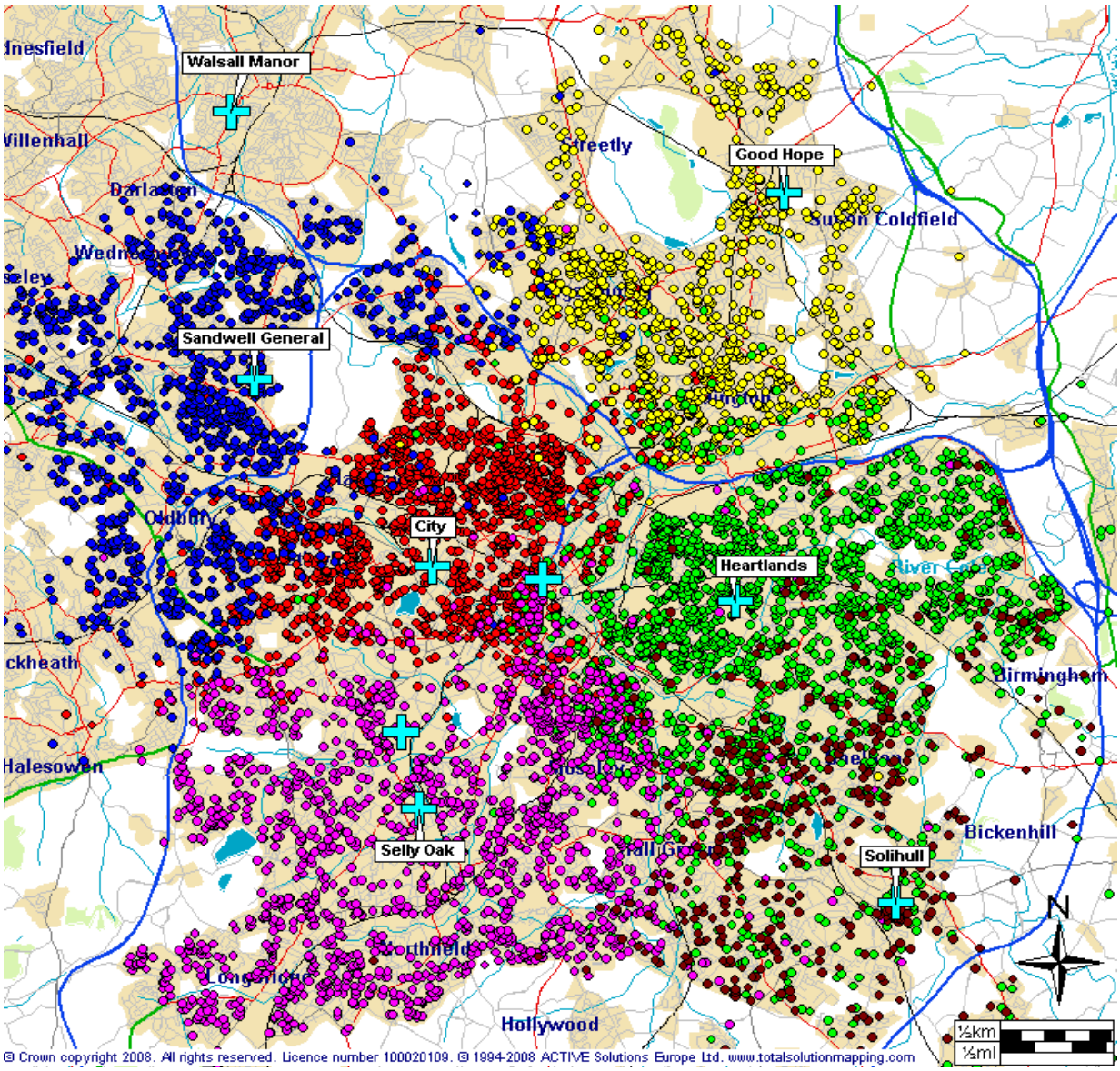
4.4 Information for Acute Trusts

West Midlands Ambulance Service data is collected and analysed by individual hospitals. Information regarding hospital delays in patient handover is routinely shared with both acute trusts and PCTs. This information is also monitored live within our control rooms in order for us to work together with acute trusts to manage capacity and handover delays in real time. This helps to prevent backlogs of ambulance crews. Demand forecasting is shared with the acute trusts as another tool to aid in managing capacity.

If required, information can also be produced to identify both the geographic area of incident and the types of cases that are taken to each hospital. This can be used by acute trusts to examine whether the patients are being taken into the correct hospital according to agreed boundaries. This information could also help in assessing whether specialist services in particular hospitals are being used effectively, for example Selly Oak Hospital in Birmingham has a specialist burns centre. Data purely for burns patients could be mapped to see if they were being taken to their nearest, or specialist, hospital. It could also be reversed to show the geographic spread of the burns patients taken to Selly Oak.

An example of the type of mapping that is possible is seen below in Map 4.1. This shows all Category A transports by hospital over a one-year period. Breaking down the information by hospital shows from which geographic area patients are taken to each hospital. It also shows areas of cross over where patients are taken to a hospital, which isn't geographically closest.

Map 4.1: Volume of Patient Transports 2005-2006 Coloured by Destination

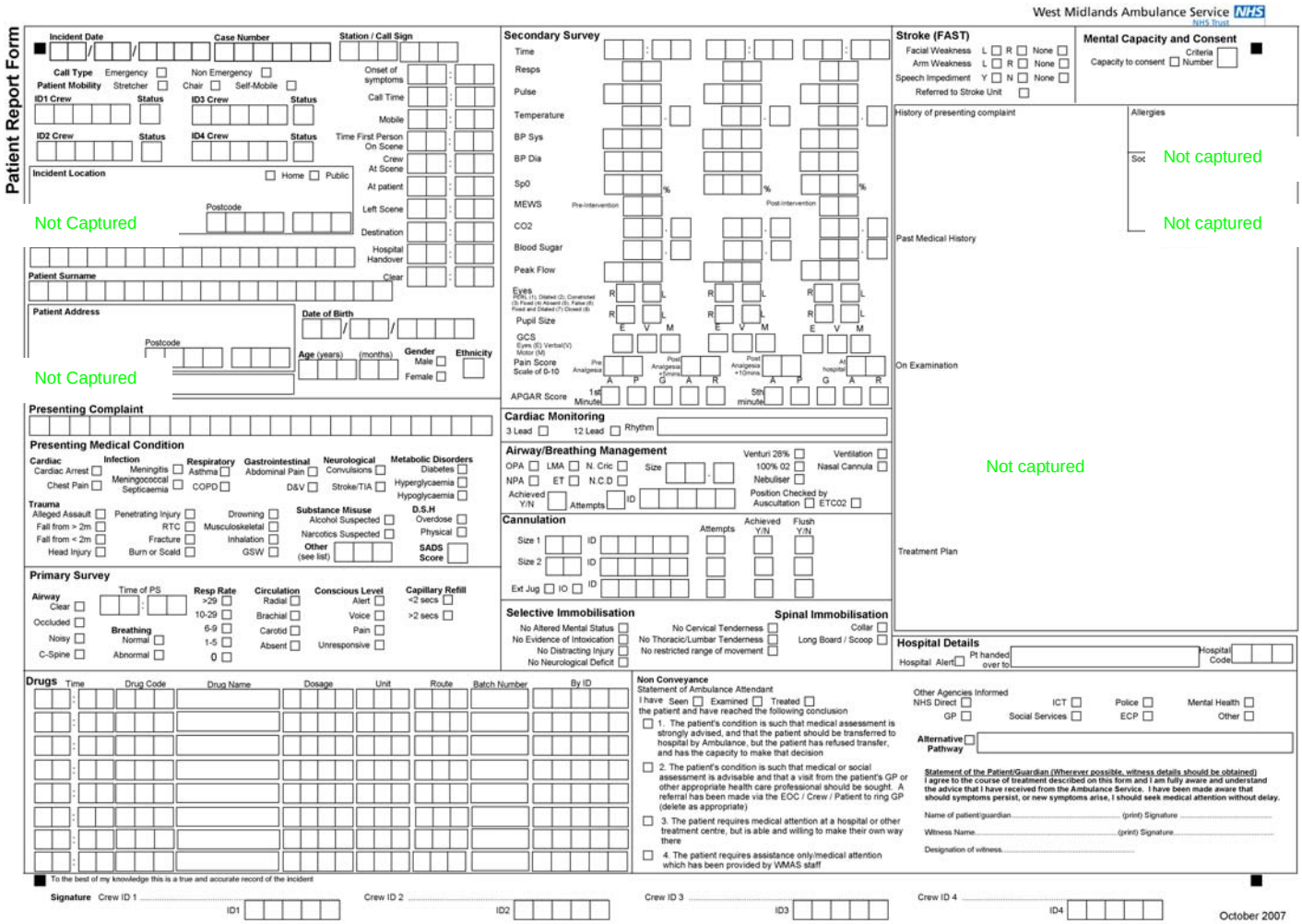


Key	Count	Description
	2201	City
	1126	Good Hope
	2566	Heartlands
	1530	Sandwell
	1860	Selly Oak
	536	Solihull
	9819	Total

Note: these hospitals were selected for the purposes of this illustration. Other patients may have been transported to other hospitals from the geographic area shown.

4.5 Patient Report Form Data

Ambulance crews complete a Patient Report Form (PRF) by hand every time they see a patient even if no treatment is administered. A form (sample below) is filled in for each patient seen at the incident. Approx 50,000 Patient Report Forms are filled in every month.



West Midlands Ambulance Service Patient Report Form

The Patient Report Form contains medical based information to enable us to provide an accurate description of the condition of the patient as well as any treatment given by the crew. A copy of this form is left with the patient at home if they are not transported to hospital, or given to hospital staff when the patient is handed over at hospital to ensure that a continuous record of the patient's care is maintained.

In addition to providing the patients and hospitals with medical information, these forms are used for Clinical Audit.

All PRFs are scanned into a computer system and key data is manually processed on all forms. All the auditable data is collected electronically during this process. The only fields not collected are the free text boxes (as detailed on image above). An electronic image is created in the scanning process and this is used if the form is required in future.

Clinical audit is an important function within the ambulance service as it ensures that correct methods of treatment are used and that treatment is accurately recorded. We have an internal clinical audit department who undertake both routine and adhoc audits as required by the Trust and nationally.

The data quality of these forms is dependant upon the accuracy of the information given at the time (e.g. a time taken from a watch rather than the synchronised times received from the vehicles). This is because they are completed manually whilst the crews are at incidents and some responses are subjective.

The date and unique number given to every case links PRF data and the call/time data. As the two data sets are held separately there is, inevitably, a small amount of unmatchable data. However for most data requests we will use the call/time data using the chief complaint as in the example above (Table 4.1) rather than linking the two datasets.

4.6 Electronic Patient Report Form – Emergency Care System (ECS)

The Emergency Care System project is underway in the Coventry and Warwickshire Locality which forms the initial stage of a proposed regional implementation. Roll out of ECS began in April 2008, with a potential roll out planned across the Trust.

ECS allows the staff to electronically enter the patient's details when at an incident which are stored on the NHS database. This has a number of benefits both to the patient and to the Trust. The patient's details can be electronically viewed on a database and information can be accessed and collated in a number of ways. Because the data does not have to be scanned and manually processed, more timely data analysis can take place. The other main internal benefit is the increase in data quality and consistency of the data that is received from the ECS.

In future developments of ECS, additional uses of the data will be released, such as the potential to allows the receiving acute trust to view the information relating to a patient in real time rather than waiting for the ambulance to arrive with the patient. This can save valuable time in the treatment of the most seriously injured patients. The receiving acute trust will be able to integrate the demographics into the hospital record system therefore improving current established paper hospital handover data.

4.7 Internal use of Information

Within the Ambulance Trust the data collected is used to enable the Trust to meet the demands of the public. Demand forecasting is the most typical analysis performed and this is based on both current and historical data. It is broken down to identify exactly where demand is likely to be.

Dynamic Resource Management is key to meeting demand and arriving at the maximum number of incidents in the minimum amount of time. Analysing data on an hour-by-hour basis is also used to ensure the number of vehicles available meets the likely forecast demand.

Mapping is used to identify areas where we fail to reach patients quickly and allows us to place new vehicles or redeploy resources to cover demand.

At a more local level, cardiac data is analysed at postcode area level to inform the placement of defibrillators at key public sites such as shops or leisure centres. This work is done in conjunction with the British Heart Foundation. Training is then provided by the Ambulance Service to members of staff at these locations to use the equipment and very often help save the life of cardiac arrest patients.

In addition to analysis of historical data, real-time information such as the volume of calls and performance against targets is used on a daily basis within the EOCs. Having this data available in a live context means that any problems such as hospital delays or with

performance against our response targets can be identified and remedial action can be implemented immediately.

4.8 Conclusion

The volume and accuracy of the data collected by the ambulance service means that it can prove a valuable tool both internally and externally for partner organisations.

West Midlands Ambulance Service currently provides key data to PCTs and acute trusts in the region. This includes our performance against key targets by PCT and the volume of calls undertaken per PCT every month.

In conjunction with the PCTs, work to provide a wider range of routine information to partner organisations is ongoing, at the same time this ensures that the distributed data is both relevant and consistent.

Working with key partners, data from the West Midlands Ambulance Service can help to develop, monitor and improve healthcare provision across the region.

Acknowledgement: Dr Kristina Routh

CHAPTER FIVE: SYNTHETIC ESTIMATES OF ATTENDANCES AT EMERGENCY DEPARTMENTS IN THE WEST MIDLANDS FOLLOWING ASSAULT

5.1 Introduction

According to the British Crime Survey [1] (BCS), there has been a steady decline in most crimes, including violent crimes, since 1995. However violent crime remains a common phenomenon. In the latest BCS, 4.1% of males and 2.3% of females reported that they had been a victim in the year prior to the survey. In the group most likely to be a victim, males aged between 16 and 24, this proportion was 13.4%.

The incidence of violence in populations is difficult to model. There are strong associations with alcohol consumption and also much seasonality. Also, multi-variate analysis shows that patterns can be complicated by things like weather and even sporting events [2,3].

Tools like the BCS and data on reported crime from the Police can help build a picture of the incidence of violent crime, but the impact on health services is less easy to determine. Within the NHS, assault cases are most commonly seen in the emergency department (ED). Most presentations are of 'walking wounded' whose injuries are treated without admission and who are discharged from care within hours of arrival. The few cases that are serious enough to need admission are easier to monitor but the rest are not. The data set used in EDs can help, but the variable needed to determine the reason for presentation is captured poorly in many EDs and not at all in others.

This is a particular problem for commissioners of health care. No-one really knows, even approximately, what kind of burden assaults impose on the wider health economy without being able to count these non-admitted cases. The purpose of this brief chapter is to take a limited range of data that does exist on attendances for assault and use them to make an estimate of how many there are in the regional population. Also it will explore some of the demographic and socio-economic characteristics of this group of attenders.

5.2 Method

At the outset there was choice of methods that could be used to make these estimates. There is a family of statistical methods used in missing data problems that involve building complex multi-variate models of the data that are available and using outputs of these to populate our estimates. We opted for a simpler method that took rates from a known population and applied them to our total population of interest taking into account the demographic and socio-economic make-up of the populations concerned.

Whilst the Accident and Emergency minimum data set (A&EMDS) is captured inconsistently in hospitals in the region, in some EDs, the data quality is very good. Some work specifically relating to assaults has been done by the project before [2] but this related to one large ED only. Since then, the A&E Surveillance Centre (A&ESC) has been working on a meta-data set to systematically assess data quality in all the EDs for which data are available. Drawing upon this work, this analysis takes a subset of data from Units specially chosen because the particular variables needed to examine assault were felt to be unusually complete. Rates are calculated using these data which, after being stratified by age sex and deprivation, are applied to the regional population.

Using the metadata we had already determined, we selected seven EDs where it was decided that assault data were identifiable and likely to be complete. Having identified the hospitals of interest, the next task was to find areas where the residents are highly likely to present at one of the selected units. There are some areas where (usually for geographical reasons) most people with an emergency care need will generally present at one particular hospital. Therefore the cases presenting at that hospital, from that area can give us a fairly accurate picture of the rate at which its residents need emergency care. In other areas the

choice of hospital is less predictable and patients may commonly present at more than one hospital. We wanted to restrict our initial analysis to populations where there was very little 'leakage' to other hospitals, where there was something akin to a 'closed' health economy for emergency care in that area involving a known population largely presenting to one hospital. We had no practical way to measure this using ED attendances alone, owing to gaps in our data collection. However we decided to use emergency admissions to hospital as a proxy. We looked at all of the Lower Level Super Output Areas (LSOAs) in the region and chose those in which more than 90% of all emergency admissions to an acute hospital was to a hospital where one of our target EDs was located. We did this using Hospital Episode Statistics (HES). For this calculation we excluded children and older people as the admission patterns of these groups can be skewed by a range of local service factors.

Once this was done we had a patchwork of SOAs around the region for which we assumed we had virtually all the assault presentations in our ED data set. The total number of residents in this population was estimated at approximately 644,000 people with 3,083 recorded assault cases.

This population was then stratified by Townsend deprivation score quintile (within Region). Specific attendance rates for each five-year age band, sex and quintile were calculated. These were then applied to similarly stratified denominator populations. For both the denominator population of the attenders and for the calculation of the estimated regional rates we used Experian estimates of LSOA population. Confidence intervals were applied using the Wilson procedure and expected totals calculated for Primary Care Trusts (PCTs). Age sex standardised rates were calculated within Townsend quintile using the exact method to calculate confidence intervals.

5.3 Results

Table 5.1: Estimated emergency department attendance counts for assault in the resident populations of PCTs in the West Midlands, 2005/2006

PCT	Estimated attendances	- lower ci	+ upper ci
Herefordshire	583	538	632
South Birmingham	2430	2335	2528
Shropshire County	940	882	1002
Walsall	1413	1341	1488
Coventry	1917	1833	2004
Telford & Wrekin	719	668	773
Wolverhampton City	1527	1453	1606
Heart of Birmingham	2520	2424	2620
Dudley	1356	1286	1430
Sandwell	1813	1732	1898
Birmingham East & North	2443	2348	2542
North Staffordshire	740	689	795
Stoke on Trent	1373	1302	1447
South Staffordshire	2157	2068	2249
Worcestershire	1898	1815	1986
Warwickshire	1866	1784	1953
Solihull	734	683	789
West Midlands all	26430	26114	26750

Table 5.1 shows the expected number of attendances in the resident PCT populations of the region. As can be seen there is considerable variation, largely due to the demographic and socio-economic composition of the populations.

Figure 5.1: Frequency distribution of estimated ED attendances for assault, by age and sex in the West Midlands Region, 2005/2006

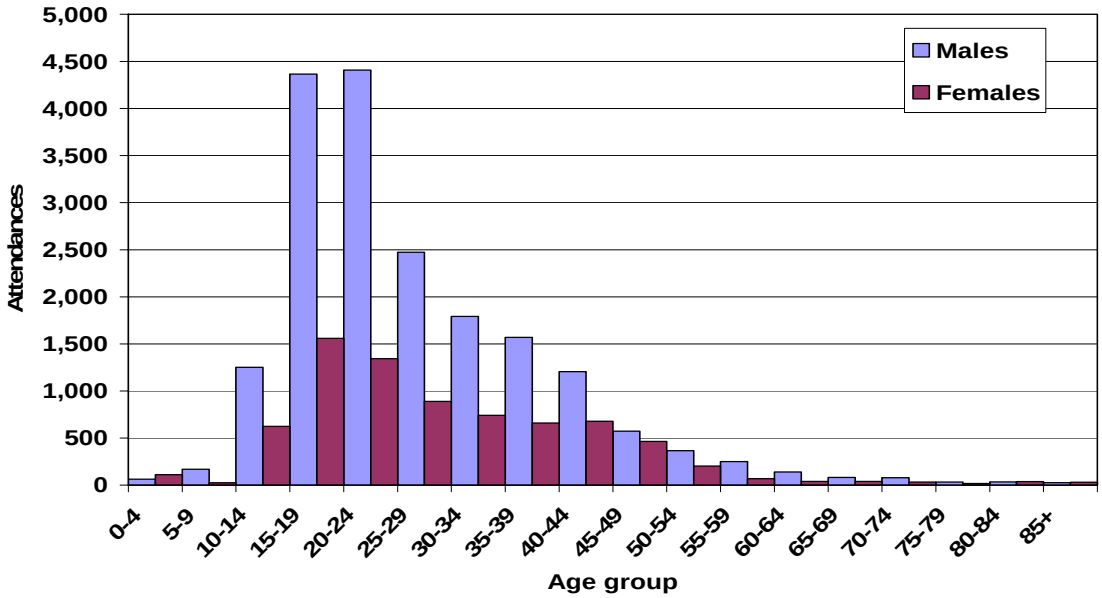


Figure 5.1 shows the total expected counts for males and females by age group. There is a strong correlation between younger populations and low socio economic status. Some of the populations with the most young people are in the poorer inner city areas which amplifies the number of assault victims we find living in these areas.

Figure 5.2: Estimated directly standardised rates of ED attendance for assault, by Townsend quintile of area of residence 2005/2006

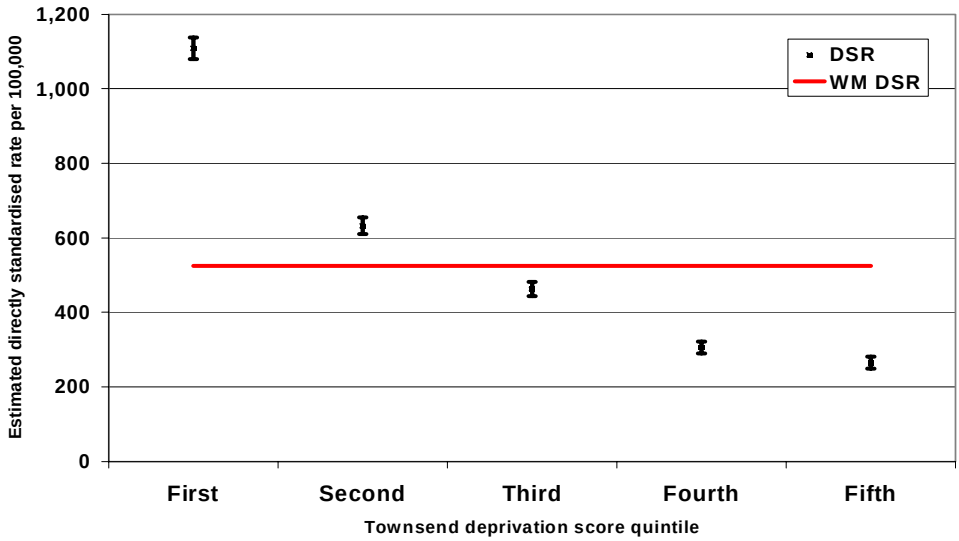


Figure 5.2 shows the expected rates in each of the five Townsend quintiles when directly standardised for age and sex. As can be seen there is more than a three fold difference in the estimated rates between the most deprived and least deprived populations, even when adjusting for age and sex.

Figure 5.3: Directly standardised estimated ED attendance rates per 100,000 for assault, by PCT resident population 2005 / 2006

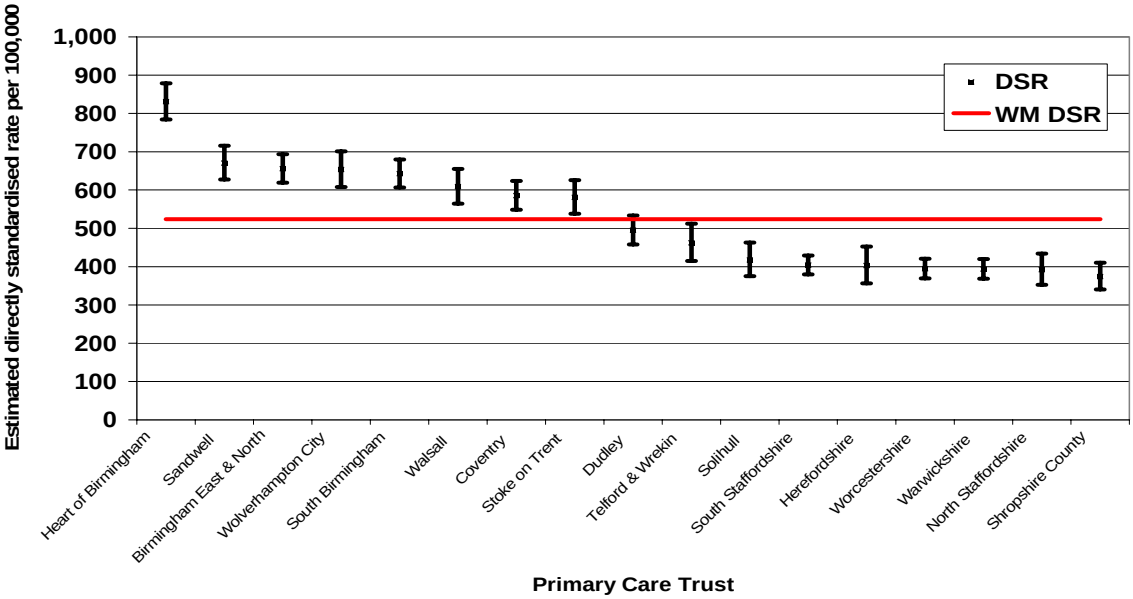


Figure 5.3 shows the expected directly standardised rates of attendance per 100,000 resident population for the PCTs of the Region. The relative attendance rates reflect the impact that deprivation has on the incidence of assaults, even when adjusting for age.

5.4 Discussion

Assault imposes a significant burden on society in terms of the physical and psychological harm to victims, resources of the police and criminal justice system and loss of time to the workforce. Also, especially for those patients who require admission and further treatment, there is a considerable cost to the NHS. However the cost to PCTs of ED attendance alone is not actually that great. The billed care to Primary Care Trusts for the walking wounded is probably in the order of £2.5 - £3 million a year for the whole region, using the tariff costs of attendances. Whilst not a large amount in terms of health spend on say chronic diseases, these events should, firstly, be seen as avoidable and secondly there is an opportunity cost involved in not being able to use scarce emergency resources elsewhere. In particular these events are largely out of normal working hours and so occupy the relatively limited numbers of overnight staff disproportionately.

In terms of the social and demographic patterns observed, we see that it is largely younger males that are victims. This, combined with the higher attendance rates in deprived neighbourhoods, means that there are high expected rates in our most deprived PCTs as they also have comparatively young populations. These findings are unsurprising and are consistent with the findings of the BCS.

There are number of possible weaknesses of the model that has been used here. One of particular concern is the effect of proximity to hospital. Our sample was drawn largely from neighbourhoods which happen to be close to a hospital as this was clearly a factor in making one provider very dominant in its provision of emergency services. Intuitively we would expect that there may be a lower threshold to attend an ED for populations resident proximal to it. We have not attempted to adjust for this in this iteration of estimates. Also it should be noted that in the Region, young, deprived populations where assault is more commonplace do tend to have acute hospitals nearby. Also these estimates have not yet been validated, however it is possible to make some comparisons with the findings of the British Crime Survey. The latest survey suggests that 12% of all respondents sought medical help for their injuries, with just 2% going on to require an admission. Of this 12% it can be assumed that almost all

would have presented at an ED. If we crudely apply the proportions of reported assaults in each of the age groups in the 2006/7 BCS to the population of the West Midlands, then apply a blanket 12% 'sought medical help' rate to this figure, we arrive at a total of a little over 19,000 ED attenders. Whilst somewhat less than our estimate, the BCS does not include children and also does not count multiple attendances, as respondents are asked if they have been assaulted at all in a twelve month period. If these sources of undercounting were taken into account, the BCS would offer a greater degree of triangulation of our findings.

Apart from providing some baseline assessment of the impact of assault on EDs, this work has provided an opportunity for the A&ESC to develop estimation methods. Assault, along with a great many health phenomena seen in EDs but less common in admitted patient care, remains very difficult to monitor using routinely collected data; neither are there immediate plans to reform data capture in EDs to improve this situation. It is likely that synthetic estimates will remain the best way to use the limited data available for the foreseeable future. These estimates will be tested and validated further and hopefully refined methods using more complete data and more advanced methods can be used to provide better estimates in the future.

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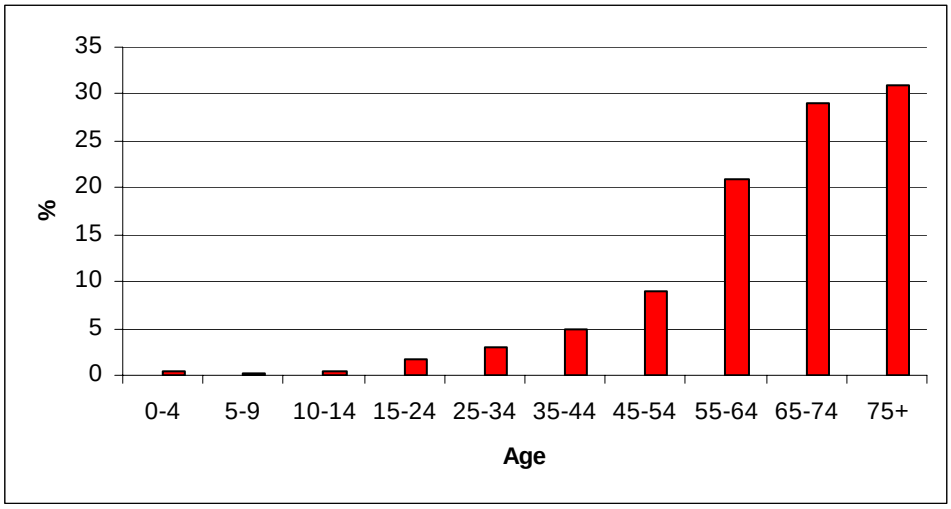
CHAPTER SIX: CHILDHOOD CANCER IN THE WEST MIDLANDS

A REPORT FROM THE WEST MIDLANDS REGIONAL CHILDREN'S TUMOUR REGISTRY (WMRCTR)

6.1 Introduction

Cancer is predominantly a disease of the elderly; in 2005, 71% of cases developed in people over the age of 60 [1]. Childhood cancer (i.e. occurring in those under 15 years) is a very rare disease, accounting for only 0.5% of all cancers at all ages (Figure 6.1).

Figure 6.1: All cancers England & Wales (childhood cancer 0-14 years)



It is estimated that in developed countries 1 in 650 children will develop cancer before the age of 15 [2], compared with asthma, where the figure is closer to 1 in 8. The causes of childhood cancer are not well understood, unlike the adult scenario, where cancer is largely accepted to be a disease of old age, when cell division becomes less efficient, or is related to lifestyle and environmental factors such as smoking, exposure to carcinogenic substances etc.

Childhood malignancy is very different from that seen in adults, particularly in histological subtype, in that most adult cancers are carcinomas, whereas these tumours are exceedingly rare in children (<4%). Conversely, many childhood tumours are never seen in adults, as they develop in the immature cells of the developing tissue (-"blastomas"). Most paediatric malignancies are detected earlier than those in adults and response to treatment is also very different, resulting in superior survival rates.

Research into childhood cancer has been hampered by the relatively small numbers involved and therefore it is vital that all cases are recorded. The UK cancer registration scheme is acknowledged to be one of the best in the world for ascertainment and in addition, there is a separate National Register of Childhood Tumours [3], which obtains notifications from all of the main regional Registries and Cancer Intelligence Units, as well as from the 21 centres which specialise in the treatment of childhood malignancies.

There are also 5 English regional childhood cancer registries (North-West, Yorkshire, Northern, West Midlands and South-West) which record and analyse the cases in their areas. These specialist registries are able to collect extra information and undertake in-depth analyses on their small number of cases, unlike the main regional registries which of necessity handle huge volumes (the West Midlands Cancer Intelligence Unit receives around 35,000 notifications per year, compared with approximately 1,450 recorded by the National Register of Childhood

Tumours in Oxford). The following chapter has been prepared by the West Midlands Regional Children's Tumour Registry (WMRCTR), which was established in 1984 at Birmingham Children's Hospital NHS Foundation Trust (BCH), and holds data on all cases since 1957. Thus the WMRCTR is able to undertake analyses on over 50 years' worth of data on this rare disease.

6.2 Incidence trends

A previous report [4] presented data for the West Midlands from 1994-2003; this report will include the years 1997-2006. There were 1,288 cases of malignancy and benign brain tumours diagnosed in this latest period in West Midlands residents aged less than 15 years. In 2000, there were 1,400 new cases diagnosed in Great Britain, giving a national age-standardised incidence rate (ASR) of 139 per million per year [3]. In the West Midlands, the ASR for 1997-2006 for all types of cancers together was 131.4 per million per year (95% CI 124.1 -138.7), compared with 131.8 for 1994-2003, showing that there has been no increase in incidence. Figure 6.2 shows the individual annual ASRs for the later period, for the whole region, demonstrating no general increase.

Figure 6.2: ASR 1997-2006 all West Midlands childhood cancers

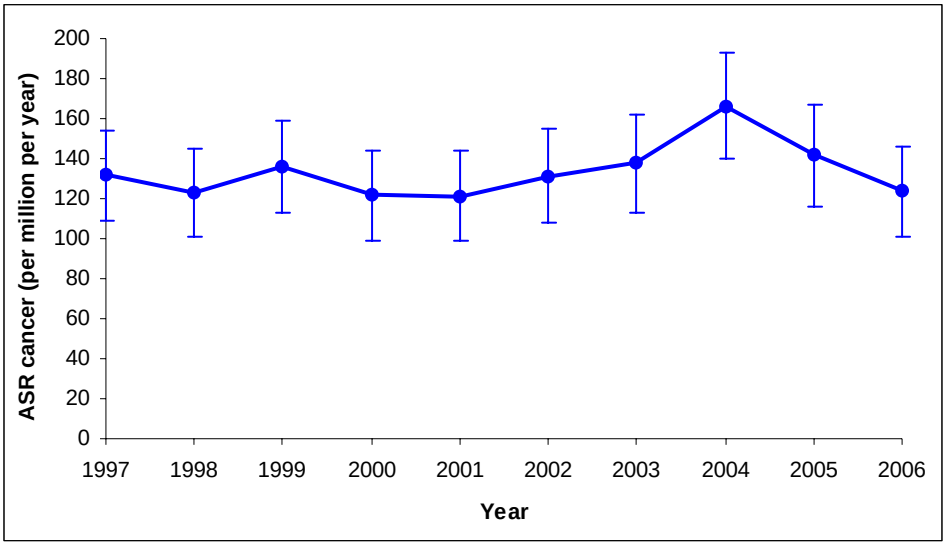


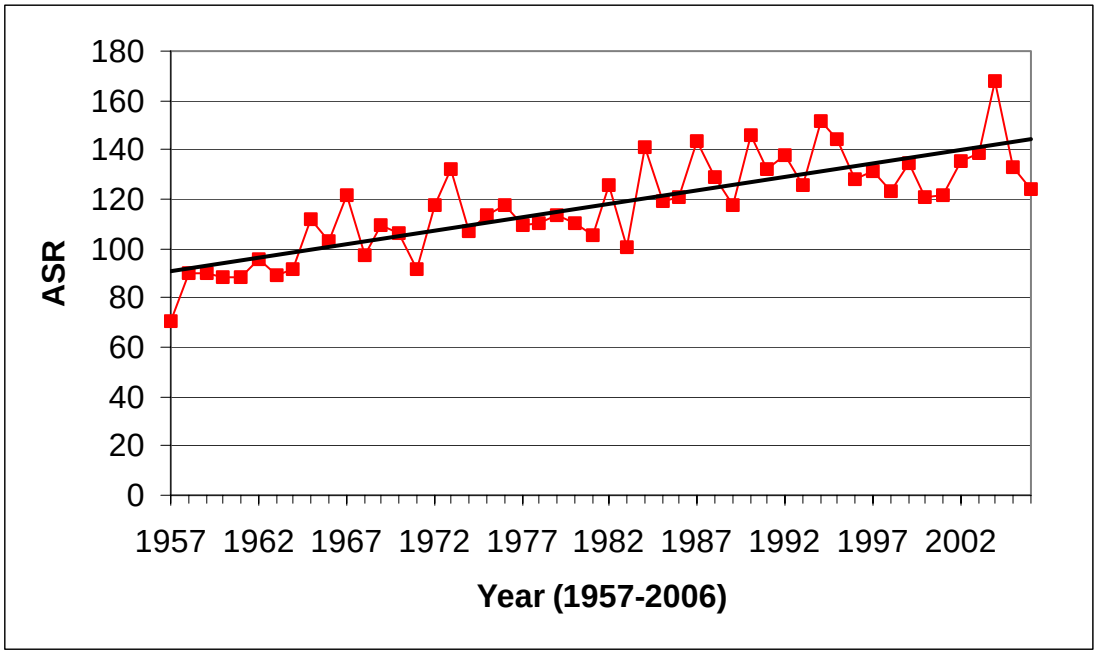
Table 6.1 shows the 1997-2006 ASRs for the West Midlands SHA and for the 5 counties which comprise it. Cancer rates are lowest in Shropshire and highest in Hereford and Worcester, although these differences are not significant.

Table 6.1: West Midlands 1997-2006: incidence of childhood cancer by county (per million per year)

	No. Cases	**ASR (95% CI)**
West Midlands SHA	1288	131.4 (124.1 – 138.7)
Counties:		
- Hereford and Worcester	173	141.8 (120.4 – 163.3)
- Shropshire	99	124.4 (99.5 – 149.3)
- Staffordshire	259	139.8 (122.5 – 157.2)
- West Midlands	***632***	***125.5 (115.5 – 135.4)***
- Warwickshire	125	140.0 (115.1 – 164.9)

Examination of the whole 50-year period (Figure 6.3) reveals a significantly rising rate ($p<0.001$), of one extra case, year on year. If we divide the period into 2 25-year cohorts, the rise is still statistically significant in each ($p=0.008$ for 1957-82; $p<0.001$ for 1983-2006).

Figure 6.3: ASRs for all West Midlands childhood cancers 1957-2006



Leukaemia is the most common form of childhood cancer in developed countries, accounting for around one third of cases. This compares with the adult picture, where leukaemia is seen in less than 10% cases. There has also been a highly significant increase in incidence in the West Midlands over the 50 years since 1957 ($p<0.0001$), representing an increase of 0.37 cases per year (Figure 6.4a). However, on further analysis, in the first 25 years to 1981, although the increase in incidence was significant ($p=0.001$), from 25–45 cases per year, in the second 25 year period, there was no significant increase ($p=0.195$, 40-49.7 cases per year), as illustrated by the 3-year rolling averages (Figure 6.4b). There could be several explanations for the early escalation in incidence rates, as well as a genuine increase, such as improved cancer registration efficiency, more sophisticated diagnostic techniques, or even changes in post-mortem practice. This underlines the importance of caution in interpreting temporal trends in disease incidence.

Figure 6.4a: Leukaemia - Annual ASRs plus linear trend, 1957-2006

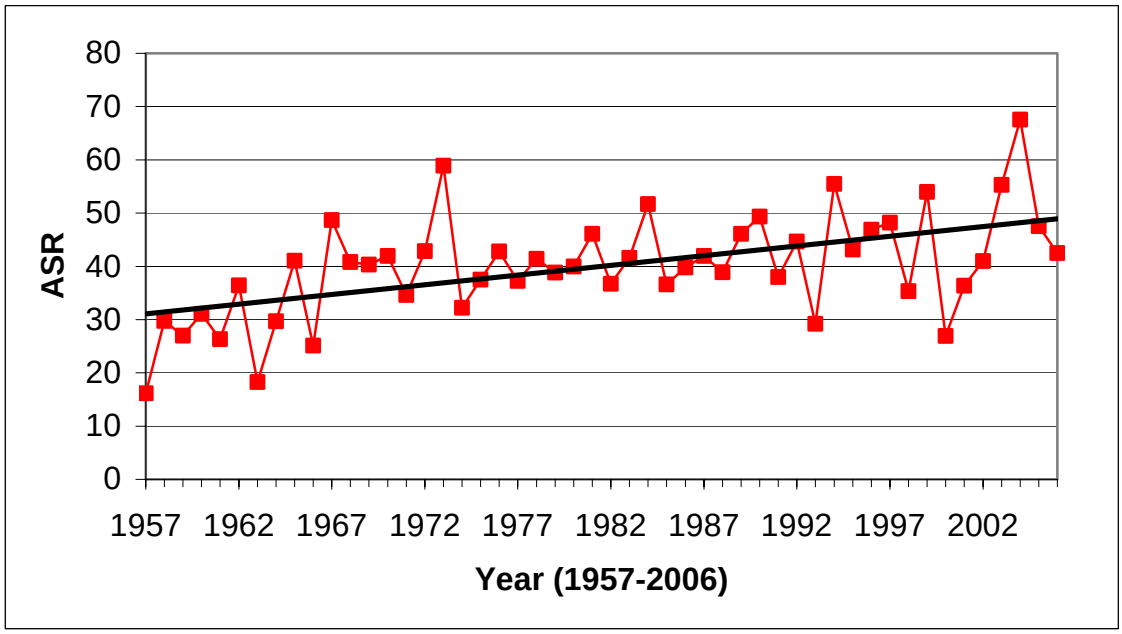
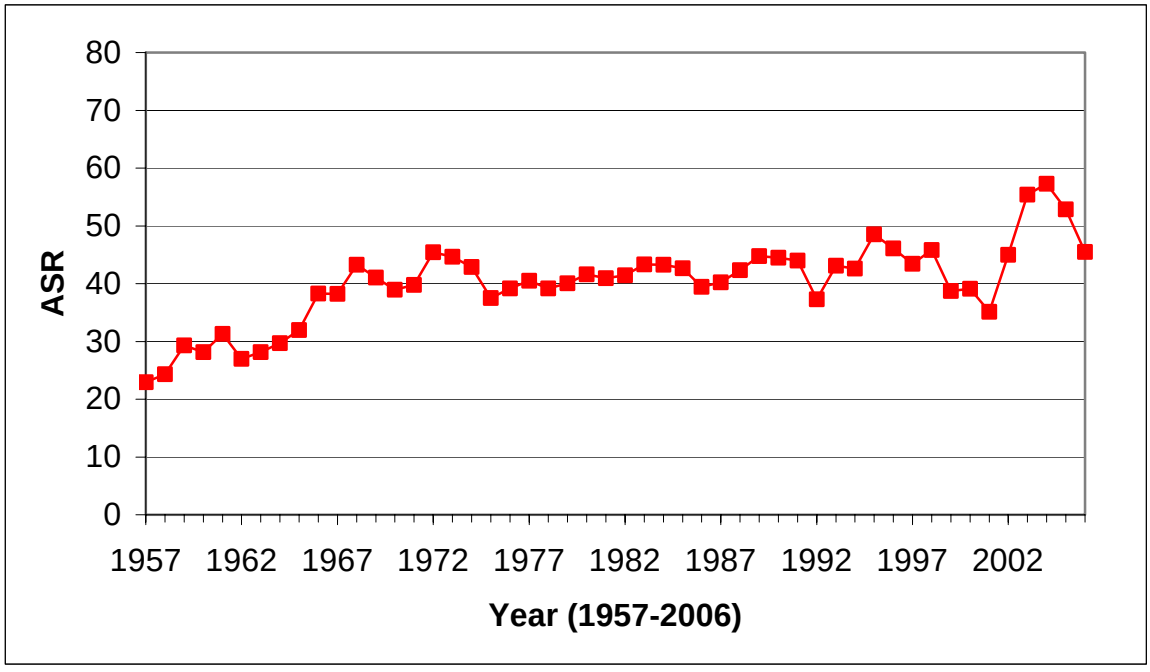
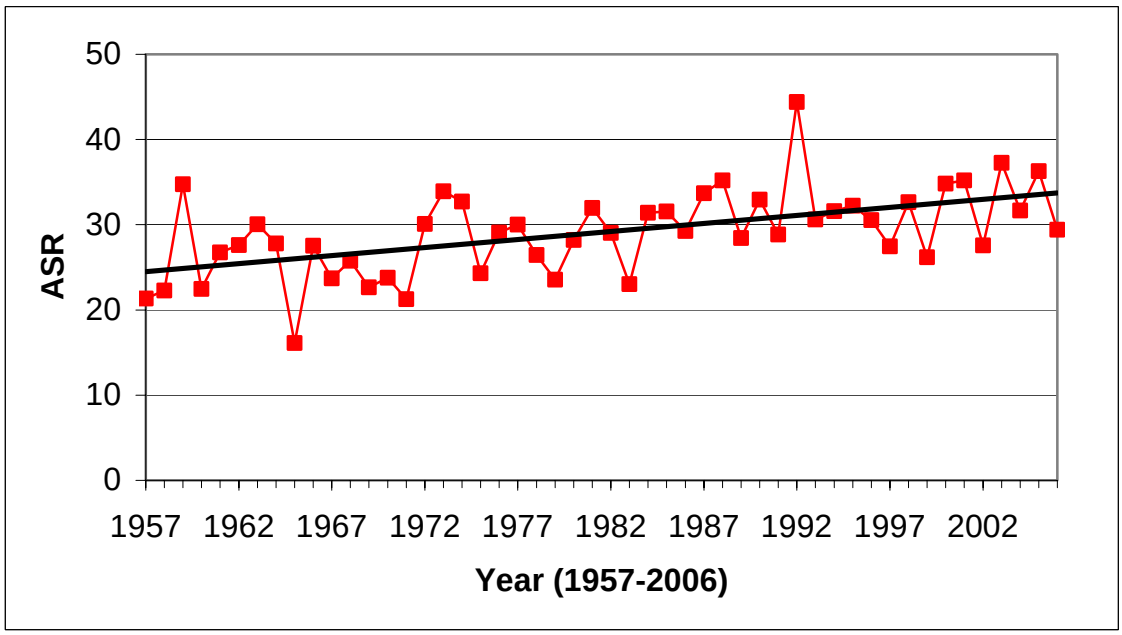


Figure 6.4b: Leukaemia - Annual ASRs 3-year rolling average, 1957-2006



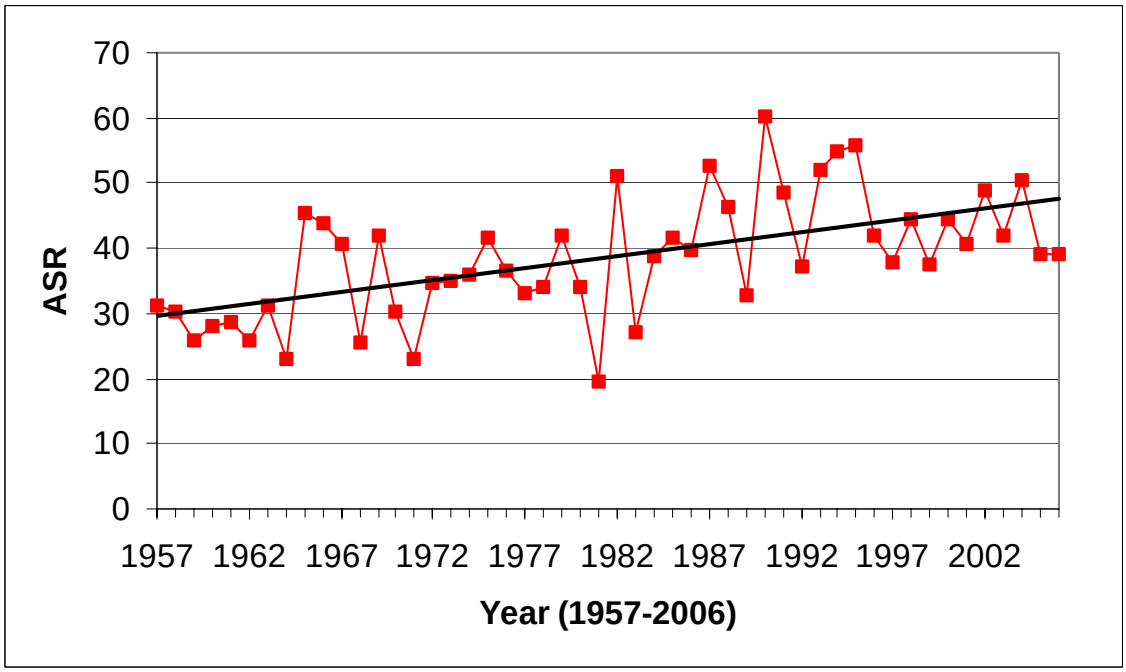
Brain and central nervous system (CNS) tumours are the most common solid tumour of childhood, second in incidence to leukaemia, accounting for around 25%, and here too there has been a significant increase ($p<0.001$) since 1957 (Figure 6.5).

Figure 6.5: ASRs for West Midlands brain and CNS tumours 1957-2006



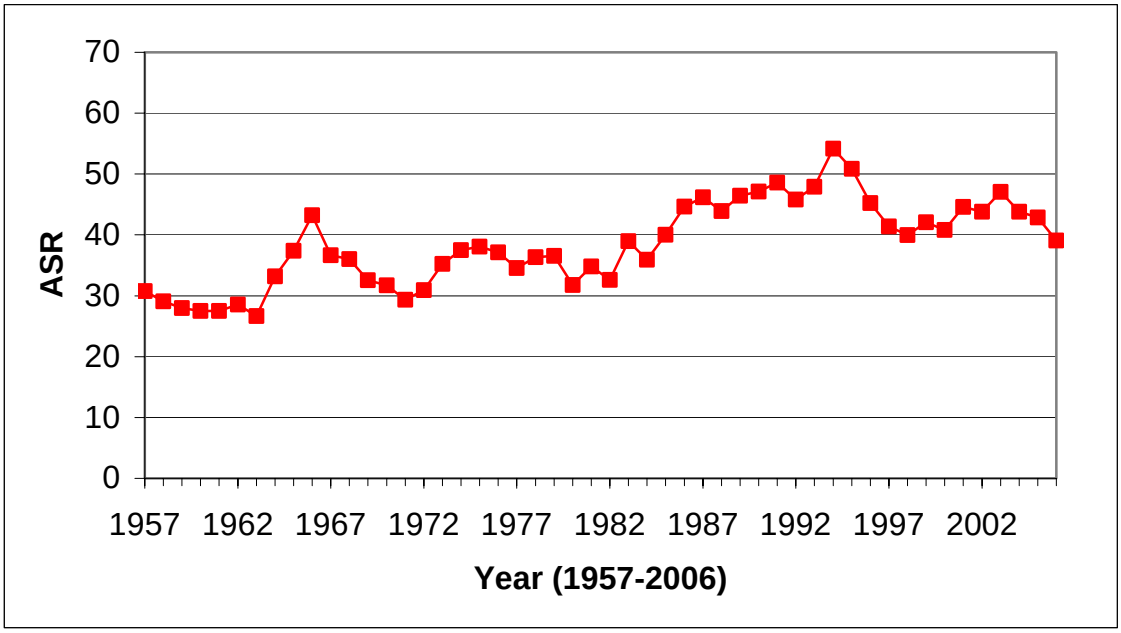
The incidence of childhood lymphoma (Hodgkin and non-Hodgkin) has also risen significantly over the whole period ($p<0.001$) and in each of the 25-year periods ($p=0.05$ and 0.012). Finally, the increase in incidence of other solid tumours is also significant over the 50 years ($p<0.001$), although only the second era (1983-2006) shows a significant rise ($p=0.02$)
(Figures 6.6).

Figure 6.6a: Solid tumours – Annual ASRs plus linear trend 1957-2006



Annual ASRs plus linear trend (gradient for trend = + m0.37 cases per year: R2 = 0.33)

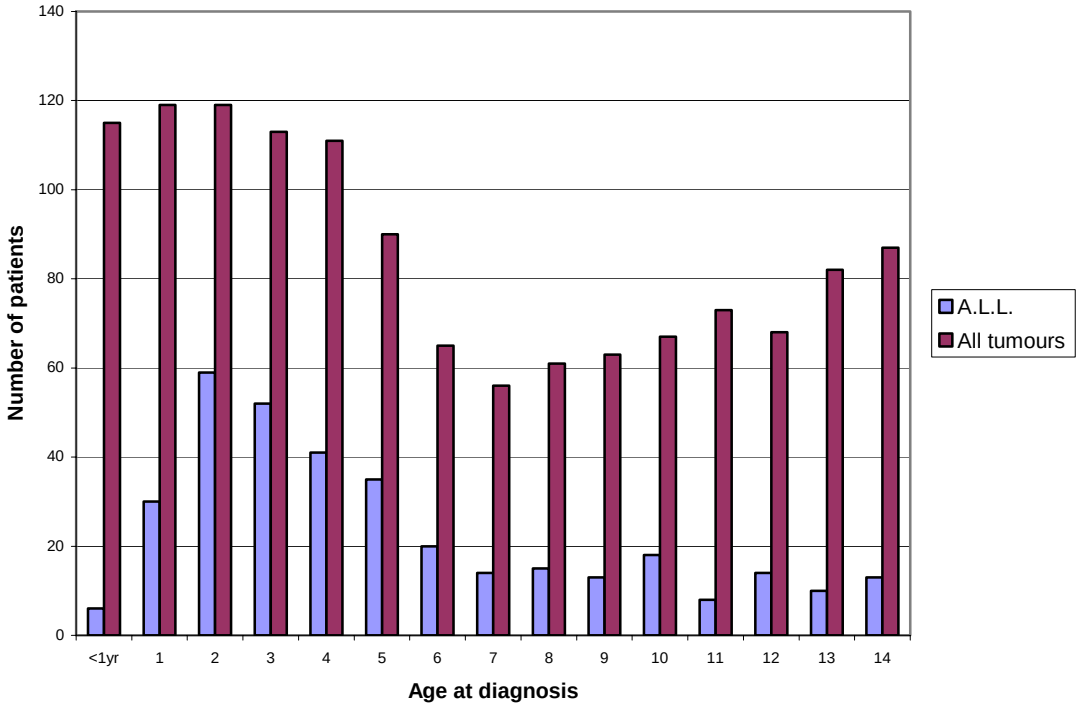
Figure 6.6b: ASRs for West Midlands solid tumours 1957-2006: 3-year rolling average



6.3 Sex and Age

Childhood cancer is universally more prevalent in boys than girls [3], which is borne out by the West Midlands figures for 1997-2006, in which 55% were boys, although some non-gonadal cancers are more common in girls (e.g. adenocarcinoma of the adrenal and thyroid glands). Certain other tumour types, such as Non-Hodgkin lymphoma, are more common in boys. Almost half of all paediatric malignancies occur in the under 5s, reflecting the fact that they develop in primitive cells. The most common type of leukaemia, acute lymphoblastic leukaemia (A.L.L.), which represents 80% of all childhood leukaemias, has its age peak between 2-3 years of age. The West Midlands age breakdown of all tumours, illustrating A.L.L. separately, is shown in Figure 6.7, showing that our age distributions follow these general trends.

Figure 6.7: Age distribution of West Midlands childhood malignancies, showing peak in A.L.L. incidence



6.4 Ethnic incidence and Trends

The West Midlands has a large ethnic population: 10.9% of children were of South Asian origin and 2.1% black in the 2001 census. In the period 1997-2006, there were 168 (13%) cases of cancer in South Asian children and 31 (2.4%) in black children. Certain patterns, both excesses and deficits, have previously been observed in particular tumour types in Asian children [5], in a study of the cases diagnosed 1982-91. Overall, Asian children had higher rates of cancer than white children (ASRs of 163.9 and 130.9 respectively, $p<0.05$, SRR 1.22) and showed statistically significant excesses of lymphomas and germ cell tumours, as well as a deficit of brain and CNS tumours. In the 4-year period 1989-92, the overall ASR was unchanged at 131/million/year in white children, but was even higher (186.7) in the Asians ($p<0.05$).

We have now been able to analyse more ethnic data in 2 periods 1987-96 and 1997-2006 (Table 6.2), using ethnic population figures from the 1991 and 2001 censuses respectively. The results from the former period largely support the conclusions previously described, of higher overall and certain specific (particularly Hodgkin lymphoma and germ cell tumour) rates. Analysis of the 2nd period, 1997-2006 shows that the Asian rates are becoming more like those of the white children, in that, although the overall rates are higher, this is no longer significant (SRR 1.18). The rates of soft tissue sarcomas are now similar to those of the white children and the deficit seen in brain and CNS tumours has now disappeared. Rates of retinoblastoma (a tumour of the eye) are still higher but non-significant and the excess of germ cell tumours has also disappeared. Apart from lymphoma, where the rates are still significantly higher (SRR 2.02), other rates – leukaemias, brain/CNS and other solid tumours – are all approximately 10% higher than in white children (although non-significant). The reason for this is unclear, but one suggestion is that it might represent under-counting of the Asian population denominator.

Table 6.2a: ASRs for cancer in White and South Asian children in Birmingham HA 1987-96

	White		South Asian		Comparison
1987-1996	No. cases	ASR (per 10^6/yr)	No. Cases	ASR (per 10^6/yr)	SRR* (95% CI)
Leukaemia	**349**	**42.2**	**48**	**51.8**	**1.23 (0.88 – 1.71)**
Lymphoma	**90**	**10.1**	**23**	**21.5**	**2.12 (1.16 - 3.88)$^+$**
- Hodgkin Lymphoma	*39*	*4.3*	*12*	*10.6*	*2.44 (1.01 – 5.92)$^+$*
- Non-Hodgkin Lymphoma	*50*	*5.7*	*10*	*9.6*	*1.70 (0.74 – 3.91)*
CNS tumours	**305**	**35.6**	**22**	**21.7**	**0.61 (0.43 – 0.87)**
Solid tumours	**386**	**46.4**	**54**	**61.1**	**1.31 (0.95 - 1.81)**
- Sarcomas	*141*	*16.3*	*11*	*10.3*	*0.63 (0.38 – 1.05)*
- Neuroblastoma	*71*	*9.0*	*13*	*15.5*	*1.73 (0.83 – 3.58)*
- Retinoblastoma	*47*	*5.9*	*11*	*13.3*	*2.25 (0.93 – 5.44)*
- Wilms' tumour	*59*	*7.4*	*5*	*5.9*	*0.80 (0.35 – 1.84)*
- Germ cell tumours	*13*	*1.5*	*10*	*11.6*	*7.54 (1.74 – 32.7)$^+$*
All malignant tumours	**1130**	**134.4**	**147**	**156.0**	**1.16 (0.96 – 1.40)**

* - standardised rate ratio – ratio of the ASR in South Asians cf. the ASR in Whites.
$^+$ - $p < 0.05$

Population figures derived from the 1991 census, when Whites comprised 85.6% and South Asians 9.7% of the childhood population of West Midlands SHA.

Table 6.2b: ASRs for cancer in White and South Asian children in Birmingham HA 1997-2006

	White		South Asian		Comparison
1997-2006	No. Cases	ASR (per 10^6/yr)	No. Cases	ASR (per 10^6/yr)	SRR* (95% CI)
Leukaemia	**350**	**45.1**	**54**	**49.5**	**1.10 (0.81 – 1.48)**
Lymphoma	**107**	**11.7**	**28**	**23.6**	**2.02 (1.19 - 3.45)$^+$**
- Hodgkin Lymphoma	*44*	*4.5*	*17*	*14.1*	*3.13 (1.39 – 7.07)$^+$*
- Non-Hodgkin Lymphoma	*62*	*7.0*	*11*	*9.5*	*1.36 (0.66 – 2.79)*
CNS tumours	**255**	**30.7**	**37**	**33.9**	**1.11 (0.77 – 1.58)**
Solid tumours	**325**	**41.5**	**49**	**45.4**	**1.09 (0.80 - 1.50)**
- Sarcomas	*104*	*11.7*	*15*	*13.0*	*1.12 (0.63 – 1.97)*
- Neuroblastoma	*60*	*8.6*	*8*	*7.8*	*0.91 (0.44 – 1.84)*
- Retinoblastoma	*30*	*4.4*	*8*	*7.8*	*1.75 (0.68 – 4.50)*
- Wilms' tumour	*60*	*8.5*	*6*	*5.9*	*0.69 (0.33 – 1.44)*
- Germ cell tumours	*20*	*2.6*	*3*	*3.0*	*1.14 (0.32 – 4.10)*
All malignant tumours	**1037**	**128.9**	**168**	**152.4**	**1.18 (0.99 – 1.41)**

* - standardised rate ratio – ratio of the ASR in South Asians to the ASR in Whites.
$^+$ - $p < 0.05$

Population figures derived from the 2001 census, when Whites comprised 82.5% and South Asians 10.9% of the childhood population of West Midlands SHA.

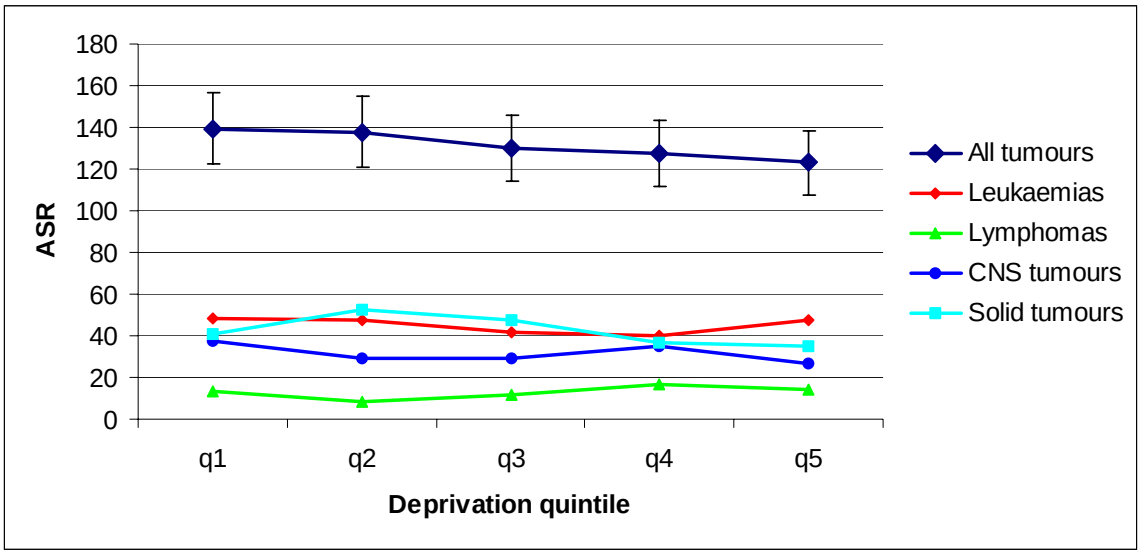
6.5 Social deprivation

The influence of social deprivation on childhood cancer incidence was investigated using the Index of Multiple Deprivation (IMD) – an area-based deprivation measure derived from the 2001 census. The West Midlands SHA contains 3,482 super output areas (SOAs), each containing between 50 and 850 (average = 295) children under 15. These SOAs were ranked according to their IMD score, and then aggregated into quintiles, each quintile containing a 5th of the SHA's childhood population. Cancer cases were then linked, via their postcode and SOA to the appropriate quintile, and age-standardised cancer incidence rates derived for each quintile. The results are shown in Figure 6.8.

Whilst the 95% confidence intervals reveal that there is no significant difference in cancer incidence between the five areas, a significant trend in the rates is apparent (p = 0.003).

Cancer rates increase as deprivation score decreases, and the rate in the 20% of children who reside in the most affluent SOAs is 13% higher than the rate in children living in the most deprived SOAs (Standardised Rate Ratio=1.13; 95% CI= 0.95-1.35). The reasons for this gradient are unknown. However, an association between acute lymphoblastic leukaemia (where viral exposure is a suspected cause) and higher social class has previously been demonstrated [6].

Figure 6.8: West Midlands cancer incidence by deprivation quintiles



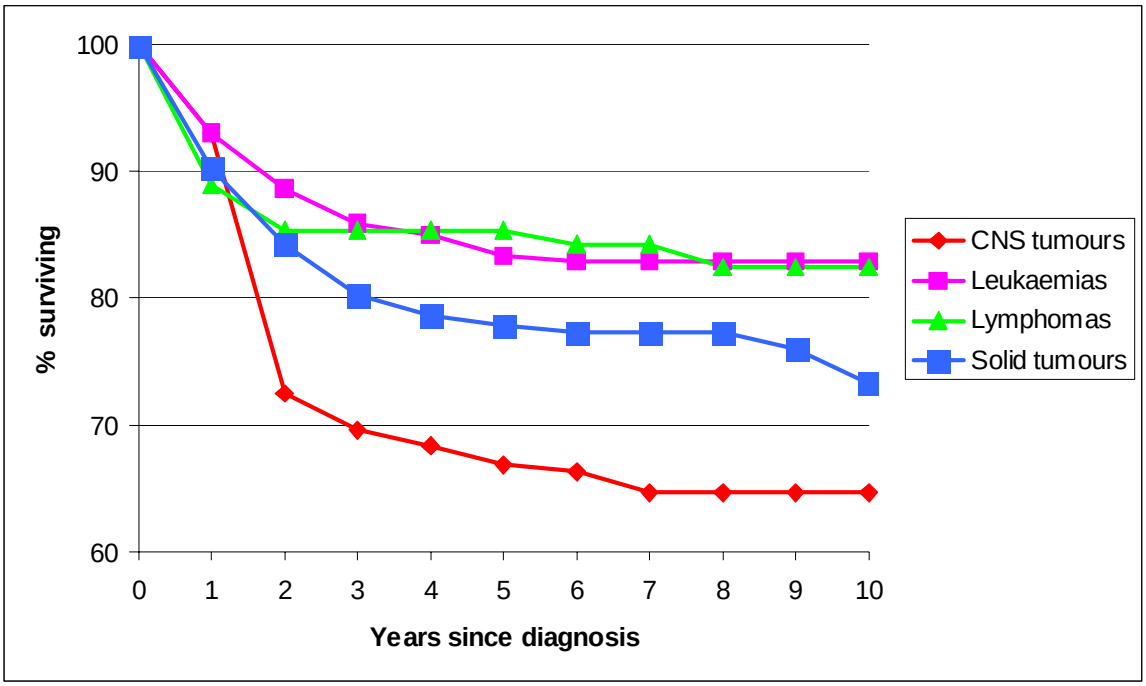
6.6 Survival

Childhood cancer is the leading cause of death from illness in the paediatric age-group and in 2000, it was responsible for 20% of all childhood deaths. However, owing to major advances in treatment, notably in chemotherapy regimens, since the 1970s, over 75% of all children with cancer can now be called cured, having reached 5 years' survival from diagnosis. This compares with around 25% in the 1960s. At the end of 2000, there were over 26,000 survivors of childhood cancer in the UK [7]. This contrasts with the situation in adult cancer, where less than half of men and less than a third of women survive for 5 years.

Contributing to this dramatic increase in childhood survival has been the centralisation of care into 21 UK centres under the auspices of the Children's Cancer & Leukaemia Group (CCLG), resulting in increased recruitment into clinical trials, such that almost 90% of eligible patients take part. In the West Midlands, BCH has been the regional referral centre since the early 1970s, and survival rates in the region have also improved significantly [8].

Figure 6.9 shows the survival rates for childhood cancers 1997-2006 by diagnostic type (the graph has been expanded in order to separate the lines). This illustrates that brain and CNS tumours have the lowest survival rate, at around 65%. However, this is somewhat misleading, as there are several types of brain tumour in the paediatric age-range, each with its own survival rate, ranging from 100% for low-grade astrocytoma, which is usually successfully treated with surgery alone to around 30% for brain stem tumours which are mostly inoperable. Leukaemia has the highest survival rate, of over 80%, a dramatic increase from the 1960s, when 5-year survival was less than 5%. Lymphomas, mainly Hodgkin lymphoma, have a similarly high survival rate. The apparent fall in survival from solid tumours after 8 years is likely to be a statistical artefact.

Figure 6.9: West Midlands childhood cancer survival 1997-2006 by diagnostic type



6.7 Follow-up

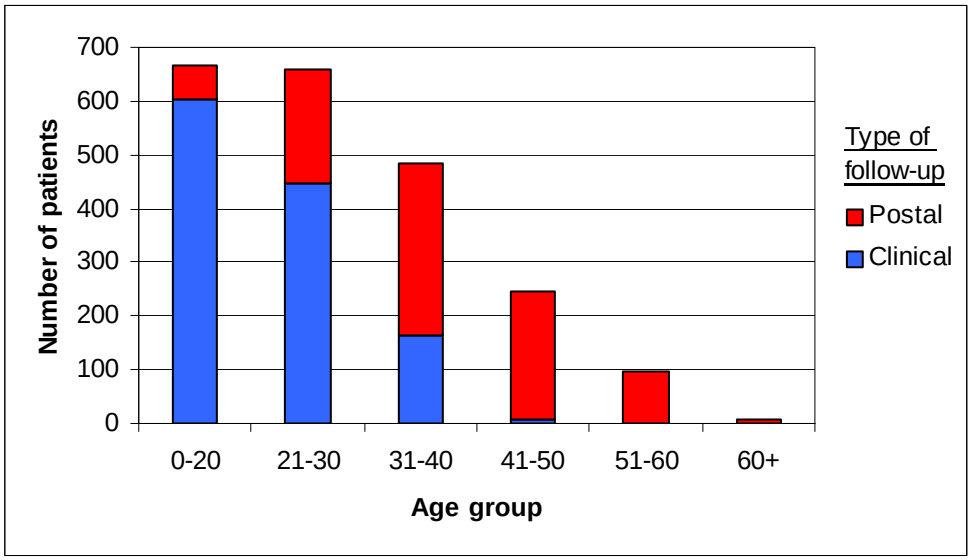
Now that survival rates are generally so high in childhood cancer, the study of long-term effects is of paramount importance. These can range from minor cosmetic issues to more serious consequences such as cardiac problems in later life, as well as intellectual impairment and growth disturbance. Since these are usually the result of the treatment of the original disease, e.g. mutilating surgery, intensive chemotherapy and irradiation, research into the late effects of the disease can influence the development of treatment regimens for future patients.

BCH has instituted a progressive pathway of follow-up, whereby patients are seen in clinics at BCH until they reach 16, when they are seen in "transition" clinics for 2 years, preparing them for the dedicated adult long-term follow-up clinics at University Hospital, Selly Oak. It is hoped that, by being offered monitoring in adult clinics by specialists in childhood cancer treatment who are aware of the potential late effects of their disease and treatment, they will continue to attend for many years.

However, it has become evident that not only is it unnecessary for patients with low-grade disease to attend clinics, but many of them do not wish to do so. The increase in the number of survivors over the last 30 years has meant an escalating workload for the follow-up clinics, so many patients have been discharged to the care of their GPs. Added to these are those who have moved away from the region, who have defaulted from clinic attendance, and who were never treated at BCH in the early years. In order to maintain surveillance of these patients, the WMRCTR has established a system of postal follow-up, whereby health and social information is sought from the GP via a questionnaire every 3 years.

Figure 6.10 shows the current ages of the survivors on both clinical and postal follow-up, revealing that, as expected, the older survivors are no longer attending clinics. Analysis of the first 10 years' results of the postal follow-up system [9] on patients diagnosed from 1957 revealed a GP response rate of 85.8%, with no difference between those GPs inside and external to the West Midlands (87% and 84.5% respectively). At the end of 2006 there were 1,220 patients attending clinics and 935 patients on postal follow-up, with ages ranging from 5-62 years. Not all of these latter are free from health problems, which has implications for primary care as well as hospital workload.

Figure 6.10: Current age of survivors on active follow-up



Almost three-quarters (74%) of patients had at least one medical problem and, as might be expected, brain tumour survivors had the greatest number of problems per patient. Figure 6.11 illustrates the long-term effects experienced by all survivors, broken down into the major groups, with some examples of single problems within 3 groups. It can be seen that endocrine dysfunction was the most common problem, experienced by 26% of patients. Table 6.3 shows the percentage of problems affecting survivors according to the treatment they received and it is immediately obvious that those undergoing all 3 modalities are the worst affected, with those having chemotherapy alone experiencing the fewest problems.

Figure 6.11: Types of problem experienced by survivors

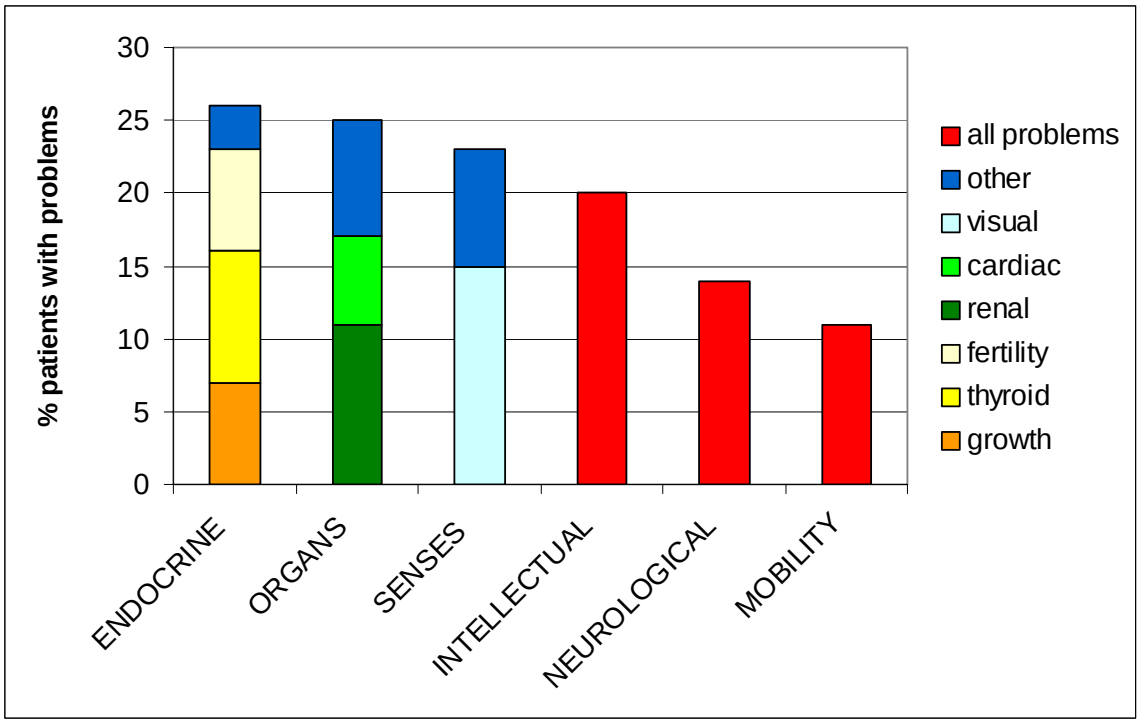


Table 6.3: Health problems by treatment modality

Treatment modality	% with Problems
All 3 modalities	93
Surgery + chemotherapy	83
Surgery + radiotherapy	82
No treatment	79
Surgery alone	71
Chemotherapy + radiotherapy	69
Radiotherapy alone	69
Chemotherapy alone	60

6.8 Second malignancies

One of the more uncommon consequences of childhood cancer is the development of a second primary tumour, either in the paediatric age-group or, more usually, much later in adulthood. These are mostly related to the treatment of the original disease, i.e. radio- or chemotherapy; osteosarcoma (bone tumour) after retinoblastoma (eye tumour) and basal cell carcinoma (skin cancer) after irradiation, and leukaemia after chemotherapy occur frequently. In some instances there is a genetic component, leading to a predisposition to cancer; certain familial syndromes and osteosarcoma after retinoblastoma are examples.

Since the records of the WMRCTR began, 156 patients have developed second tumours. The average age at development of a second malignancy was 23 years overall, ranging from an average of 18 for a secondary leukaemia to 28 for non-brain solid tumours. Thirty-nine (25%) of these second malignancies developed in the paediatric age-range (0-14 years). Table 6.4 shows the types and numbers of the original and subsequent diseases, indicating that solid tumours were the most common form of second malignancy (88, 56%), the majority of these carcinomas, usually developing in the radiation field. Brain tumours were the next most common form (51, 33%), many again developing in the radiation field after cranial irradiation. Lymphomas and leukaemias were the least common (9, 6% and 8, 5% respectively).

Table 6.4: Second malignancies in patients diagnosed 1957-2003

1st tumour type	No.	2nd tumour type	No.	%
Brain/CNS	47	Brain	25	53
		Leukaemia	1	2
		Lymphoma	2	4
		Other solid tumours	19	40
Leukaemia	27	Brain	13	48
		Leukaemia	1	4
		Lymphoma	3	11
		Other solid tumours	10	37
Lymphoma	28	Brain	2	7
		Leukaemia	5	18
		Lymphoma	3	11
		Other solid tumours	18	64
Other solid tumours	54	Brain	11	20
		Leukaemia	1	2
		Lymphoma	1	2
		Other solid tumours	41	76

Acknowledgements
The authors are grateful to Dr Helen Jenkinson and the Directors of the WMRCTR for permission to present these data.

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CHAPTER SEVEN: HEALTHCARE ASSOCIATED INFECTIONS (HCAI)

7.1 Introduction

Healthcare associated infections are infections that are acquired in hospitals or as a result of healthcare interventions. The term is sometimes also used to describe an infection acquired by a healthcare worker in the course of his or her work. The issue is of equal importance for healthcare providers in the independent and voluntary sectors. The reduction, prevention and control of HCAI are a high priority for all NHS Trusts.[1] This profile has been enhanced by the Government's determination to reduce the rates of MRSA bacteraemia and of Clostridium *difficile* (C*. difficile*) infections. The Healthcare Commission has published three documents relating to investigations into C*. difficile* outbreaks (Stoke Mandeville Hospital, Buckinghamshire Hospitals NHS Trust; University of Leicester NHS Trust and Maidstone and Tunbridge Wells NHS Trust) [2]

It is estimated that HCAI costs the health service around £1 billion per year with each episode costing between £4,000 and £10,000. Patients who get a HCAI are subjected to increased anxiety, pain, and suffering. Reducing HCAI improves the patient experience and clinical outcomes as well as the efficiency of health services, reducing the length of stay and lost bed days and reducing associated management costs.[3]

The Health Act 2006 establishes a code of practice for trusts helping them to plan and implement systems for the prevention and control of HCAI ensuring a safe and clean environment for their patients. It supports a number of published guidance documents published by the Department of Health on the prevention, management and control of HCAI such as The Health Act 2006 and Going further faster: Implementing the Saving Lives delivery programme 2007.

Recent focus on the prevention and control of HCAI has highlighted the need to tackle this agenda across the whole health economy with acute and primary care NHS trusts working in collaboration with local authority and private sector health providers.

In order to achieve this, surveillance of HCAI is changing subject to Department of Health requirements to more readily define HCAI acquired in wider community settings and identifying the impact on non-NHS healthcare providers. This evidence is supporting joint responsibility action plans for health care providers across defined population areas.

Reduction targets for trusts have been implemented by the Department of Health for both methicillin resistant Staphylococcus *aureus* (MRSA) bacteraemia and Clostridium *difficile* infection, both significant contributors to the burden of HCAI.

7.2 MRSA

Staphylococcus *aureus* is a bacterium that is commonly found on human skin and mucosa (e.g. lining of nose). The bacterium usually lives harmlessly on the skin and in the nose of about one third of normal healthy people. This is called colonisation or carriage. S*. aureus* can cause actual infection and disease, particularly if there is an opportunity for the bacteria to enter the body – for example, via a cut or an abrasion.

Methicillin resistant S*. aureus* (MRSA) are varieties of S*. aureus* that have developed resistance to the antibiotic methicillin. Methicillin is an old antibiotic which is used as an indicator for flucloxacillin resistance, the antibiotic which is usually used to treat S*. aureus* infections. Methicillin resistance usually indicates resistance to other penicillin-related antibiotics too.[4]

7.3 Clostridium *difficile*

C*. difficile* infection ranges from mild to severe diarrhoea to, in rare cases, severe inflammation of the bowel which can result in a condition known as pseudomembranous colitis. The acquisition of C*. difficile* is associated with the use of broad spectrum antibiotics such as cephalosporins and quinalones.

People who are at increased risk of developing C*. difficile* infection are the elderly (specially those aged 65 years and above) and those individuals with serious underlying disease for example chronic renal impairment or respiratory illness and may require frequent antimicrobial treatment[5.]

7.4 Surveillance

Interventions supporting the prevention and control of MRSA and C*. difficile* infection have been enhanced by the establishment of real-time web-based mandatory surveillance. This surveillance is being used as an epidemiological tool. It is also used to support performance management in acute trusts which are subject to targets set by the Department of Health. This use of surveillance data has not been tried anywhere else in the world.[3]

National surveillance of HCAI is collated by the Health Protection Agency on behalf of the Department of Health. Targeted mandatory surveillance of HCAI commenced in 2001 requiring laboratories to submit reports of MRSA bacteraemia. In October 2005 this system was enhanced to provide additional information with the introduction of the web-based system.

Figure 7.1: MRSA Bacteraemia cases in West Midlands 2001/2-2007/8

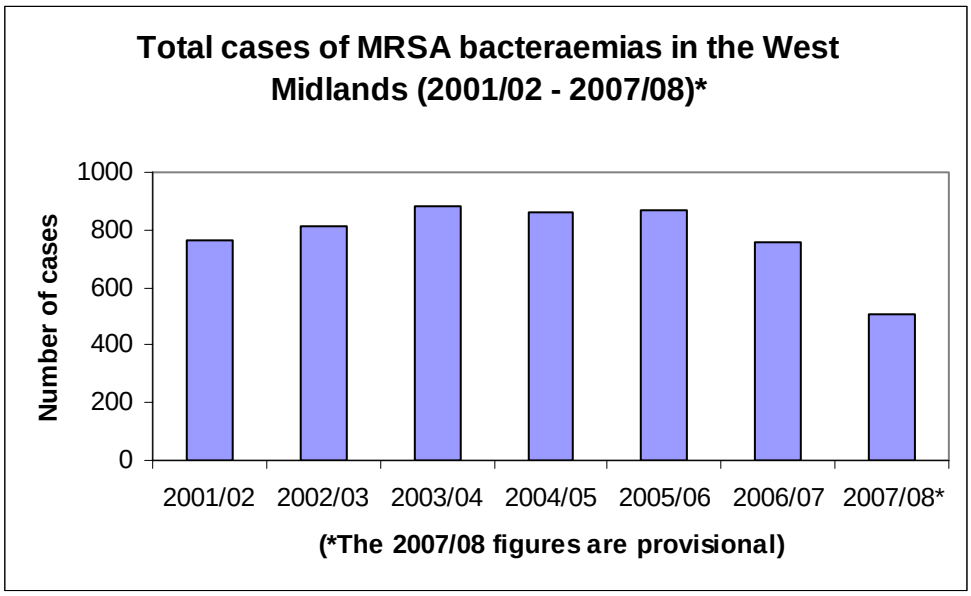


Figure 7.1 demonstrates that there has been a significant decrease in the number of MRSA bacteraemia cases since 2004. The target reduction for MRSA bacteraemia is 50% (against the 2003/04 baseline) by 2008.

Figure 7.2: MRSA Bacteraemia rates by Trust Type

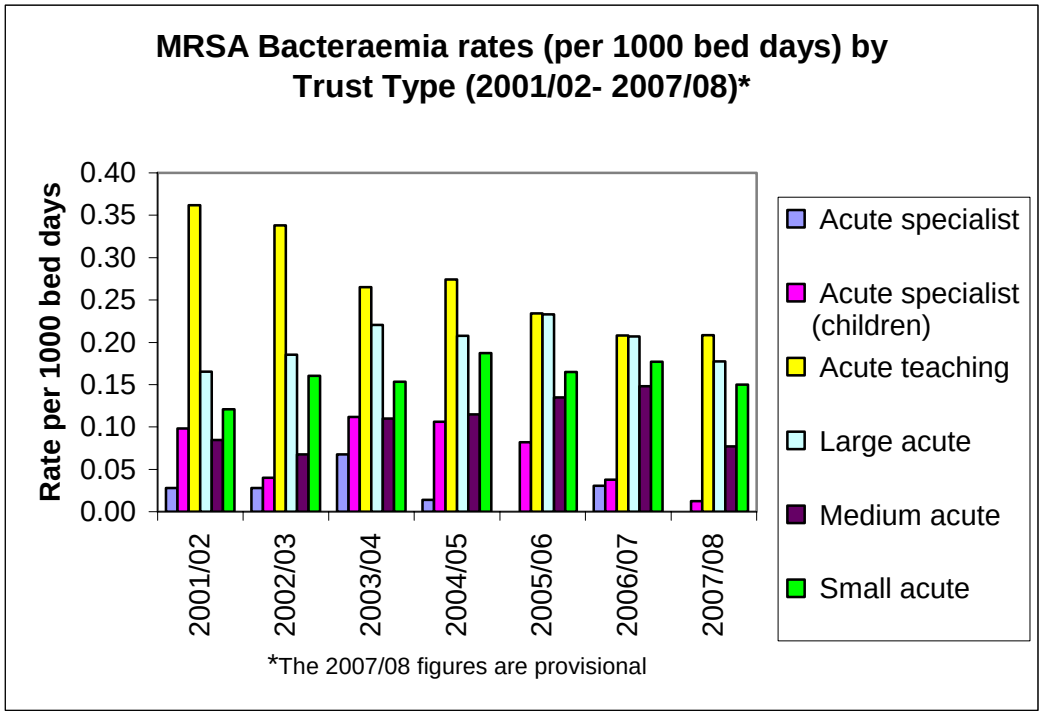


Figure 7.2: effectively demonstrates overall downward trend in MRSA in all hospital categories

C. *difficile* data collection, voluntary since 1990 became mandatory in January 2004 for patients aged over 65 years. In April 2007 the scheme was extended to include data for patients aged over 2 years. It also enabled further information to be extracted to support the primary care trusts and strategic health authorities in reviewing improvement targets for acute trusts.

Figure 7.3: Clostridium *difficile* cases in West Midlands (by age) April 2007- March 2008

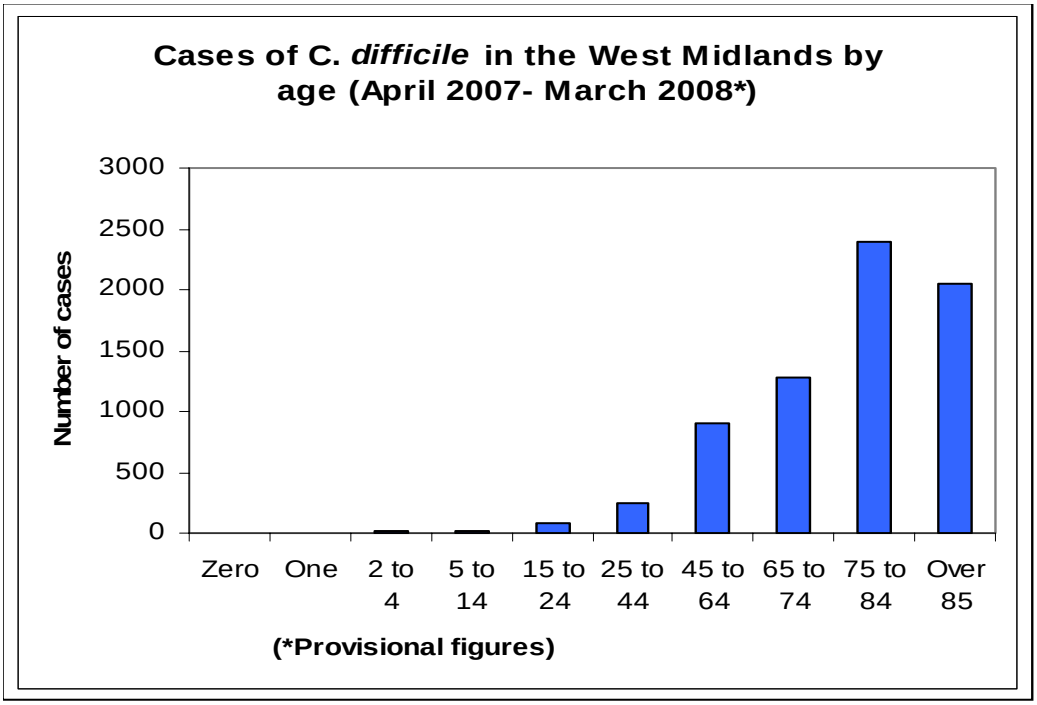
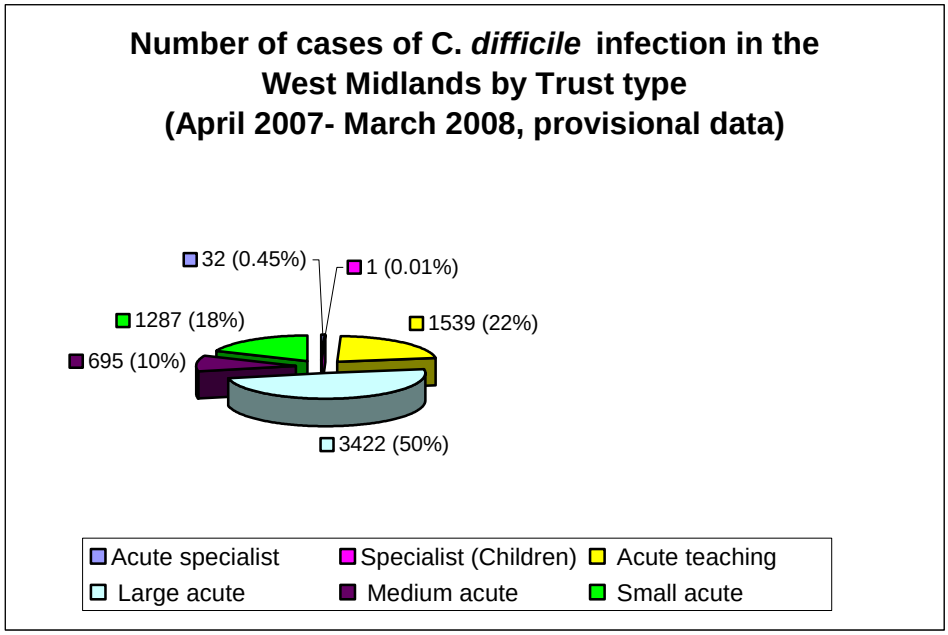


Figure 7.4: Number of cases of C. difficile infection in the West Midlands by Trust type (April 2007- March 2008, provisional data)



7.5 Surgical site infection

Surgical site infections (SSI) are significant, accounting for 22% of all HCAI[4, 6] .The SSI surveillance system was established in 1997. It became mandatory in 2004 for all trusts to undertake surveillance in at least one of four categories of orthopaedic surgery, for at least one three-month period each year. These are hip replacement, knee replacement, hip hemiarthroplasty and open reduction of long bone fractures.

Staphylococcus *aureus* is recognised as a major cause of SSI accounting for 45% of all SSI from 2004 to 2007. Of these 28% are MRSA infections[4] other significant infections have been attributed to Streptococcus, Enterococcus, Acinetobacter and Pseudomonas species.

In addition to the mandatory surveillance requirements, trusts may contribute voluntarily to surveillance of other categories of procedure in the same system. In practice most trusts now participate in several areas of the surveillance system continuously. These may include abdominal hysterectomy, vascular surgery, limb amputation, small bowel surgery and large bowel surgery.[3]

7.6 Health economy working

Embedding the responsibility for reducing HCAI within the culture of all healthcare providers and establishing responsibility for this function with Chief Executive Officers is essential to successful infection prevention and control programmes.
Strategies for combating the problems of HCAI are often simple and effective. Hand washing and cleaner environments as well as better management of antibiotic prescribing are all high on the list of control measures and yet failure to comply with these simple requirements continues to contribute to the burden of HCAI.
The Health Protection Agency, Primary Care Trusts, Local Authorities and acute trusts are continuing to work in partnership through local Health Economy fora to achieve compliance with these control measures and reduce the burden of HCAI within the region.

Acknowledgements:
Dr David Hunt and Shakeel Suleman of the Health Protection Agency (West Midlands)

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CHAPTER EIGHT: DIABETES IN THE WEST MIDLANDS

LA level data

8.1 Introduction

Diabetes affects people of all ages, it is a leading cause of blindness in the UK and the number of people affected by diabetes is increasing. Diabetes has a huge impact on life expectancy with Type 1 diabetes reducing an individual's life expectancy by at least 15 years and Type 2 diabetes by up to 10 years[1]. It is estimated the NHS spend around 5% of its budget to care for people with diabetes[1].

8.2 Prevalence

The global picture

Globally in 2000 it was estimated that 171 million people had diabetes (a prevalence of 2.8%)[2], by 2030 this number is expected to rise to 366 million people (a prevalence of 4.4%). 90% of these people have Type 2 diabetes (resulting from the body's ineffective use of insulin). India, China and the USA have the highest numbers of people with diabetes worldwide.

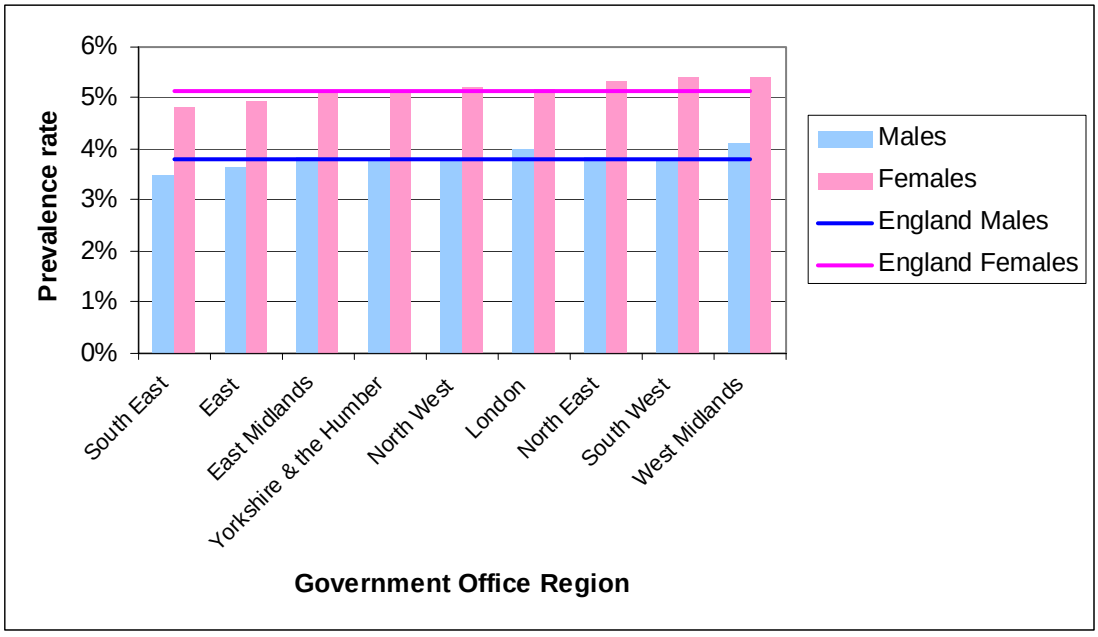
The national picture

In England 2,262,484 [3] (4.48%) people were estimated to have had diabetes in 2005.

The regional picture

The West Midlands is estimated to have one of the highest prevalence rates in the country from Type 1&2 diabetes (Figure 8.1). The prevalence of diabetes is higher in Females than Males.

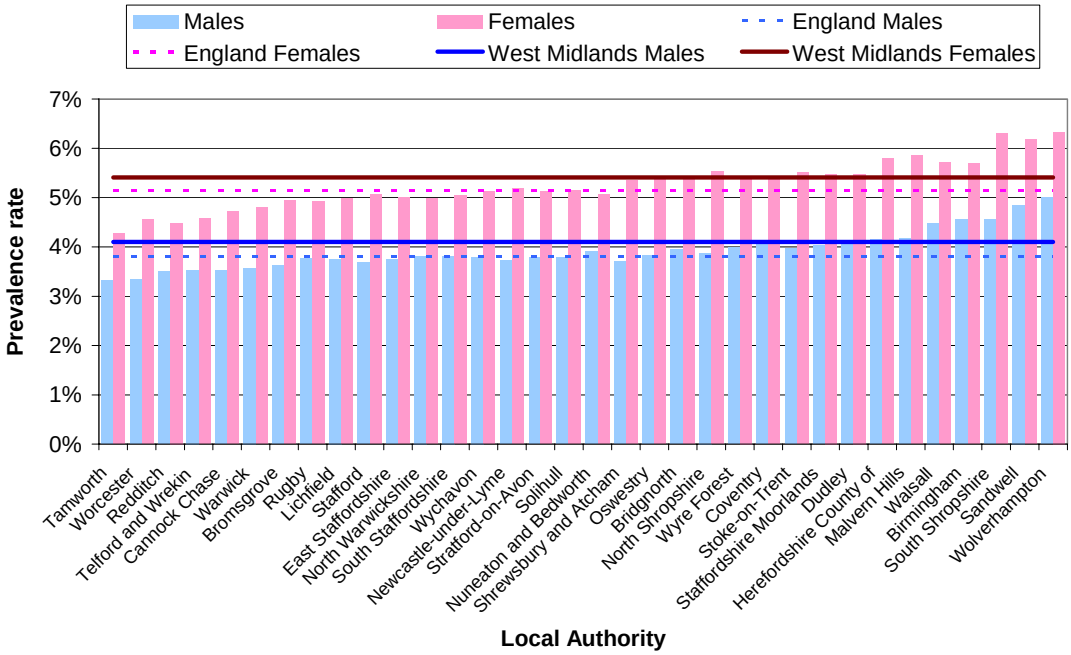
Figure 8.1: Estimated prevalence and number of people with diabetes, 2005 by Government Office Region



Source: PBS prevalence model – Phase 3 [3]

The PBS model generates expected total numbers of persons with Type 1 and 2 diabetes (both undiagnosed and diagnosed combined) in 2005. The model applies age/sex/ethnic group specific estimates of diabetes prevalence rates, derived from epidemiological population studies, to 2005 resident populations.

Figure 8.2: Estimated prevalence and number of people with diabetes, 2005, by Local Authority



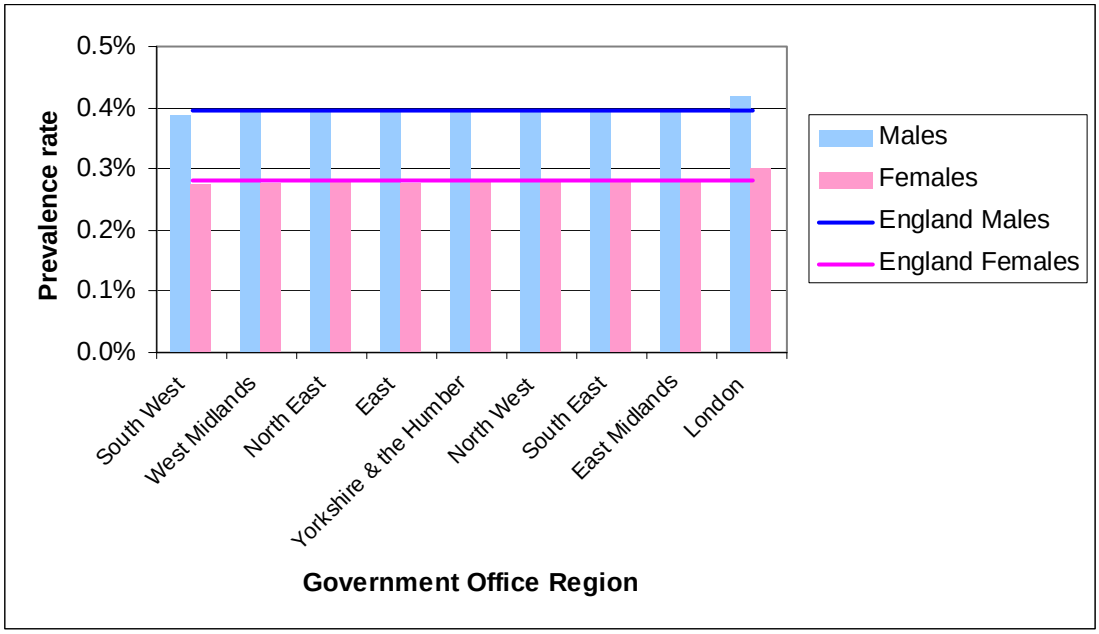
Source: PBS prevalence model – Phase 3 [3]

The more urban Local Authorities have the highest rates of diabetes in the region, with Wolverhampton LA nearly a whole percentage greater than the England average.

Type 1 diabetes occurs due to the body's own autoimmune response which causes the destruction of insulin producing cells, treatment is by insulin injections. Type 1 diabetes is usually identified in the teen years.

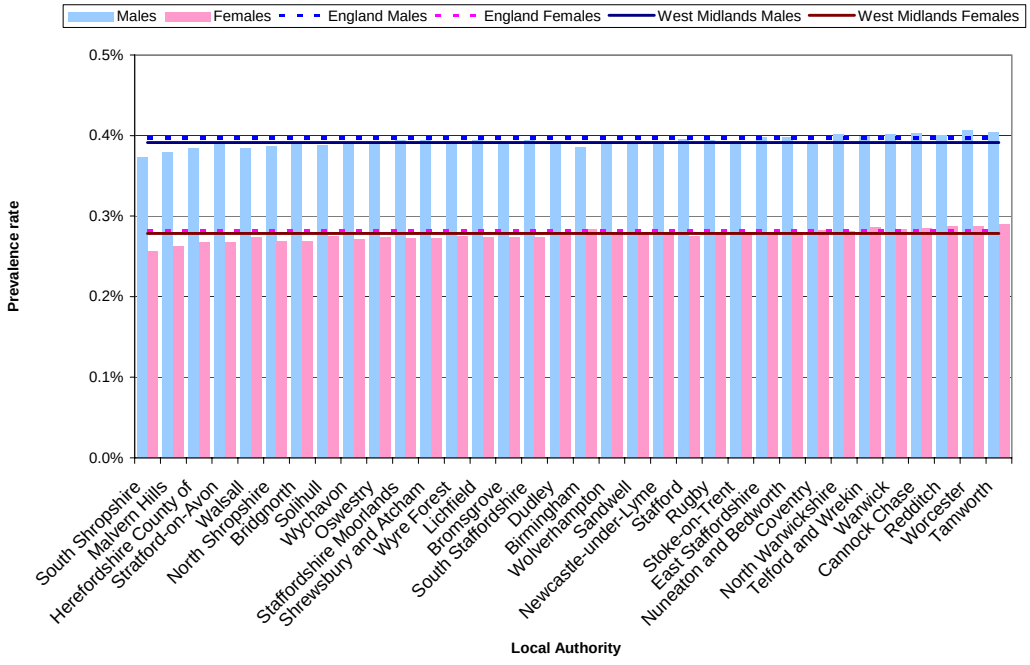
Type 1 diabetes accounts for between 5.8 – 9.1% of all people with diabetes. The prevalence rates of Type 1 diabetes are roughly the same across the regions, within the West Midlands there is also little variation.

Figure 8.3: Estimated prevalence and number of people with Type 1 diabetes, 2005, by Government Office Region



Source: PBS prevalence model – Phase 3 [3]

Figure 8.4: Estimated prevalence and number of people with type 1 diabetes, 2005, by Local Authority

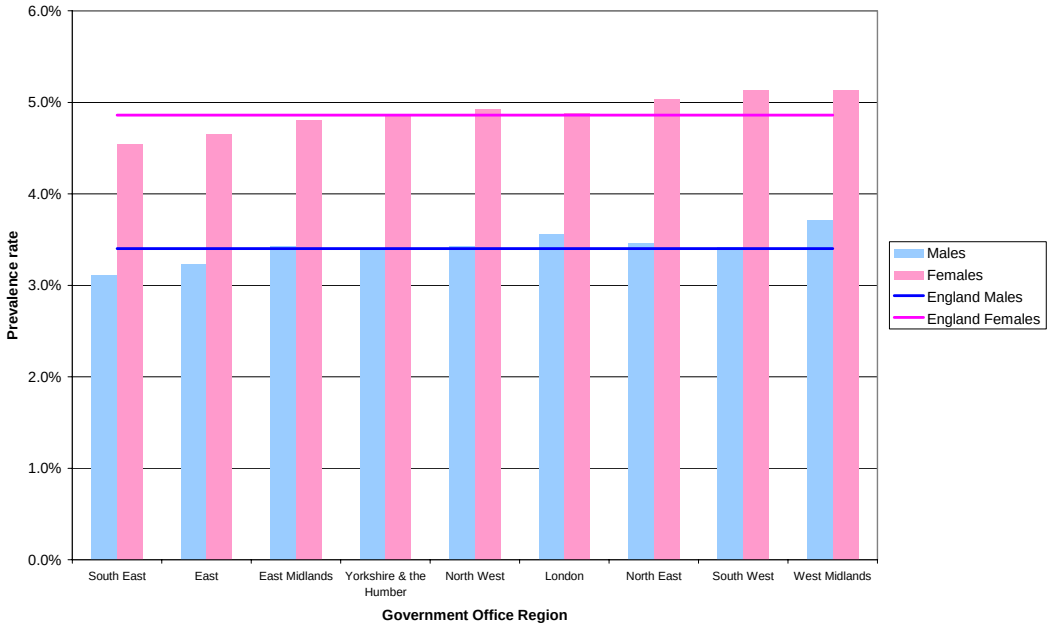


Source: PBS prevalence model – Phase 3 [3]

Type 2 diabetes occurs due to insufficient amounts of insulin being produced. It is largely managed by diet. Type 2 diabetes occurs largely in adults but is becoming increasingly seen in younger age groups due to higher levels of obesity. Type 2 diabetes accounts for between 85 – 95% of all people with diabetes.

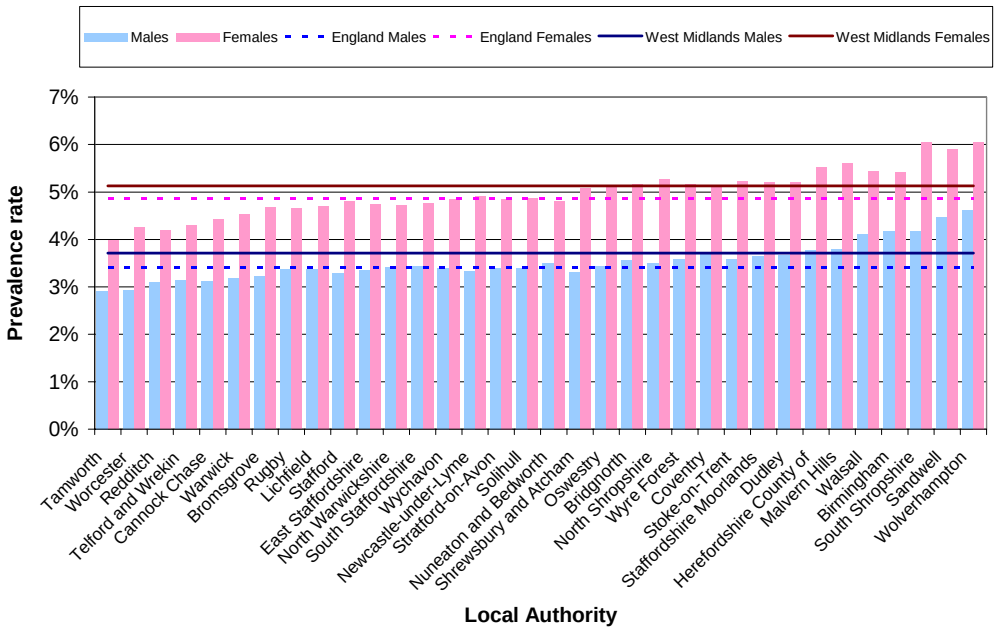
The West Midlands region has the highest estimated prevalence of diabetes in the country, above the England average for both males and females. Within the West Midlands, Wolverhampton, Sandwell and South Shropshire are highest with an estimated prevalence of around 5% for females and 3.5% for Males.

Figure 8.5: Estimated prevalence and number of people with Type 2 diabetes, 2005, by Government Office Region



Source: PBS prevalence model – Phase 3 [3]

Figure 8.6: Estimated prevalence and number of people with Type 2 diabetes, 2005, by Local Authority



Source: PBS prevalence model – Phase 3 [3]

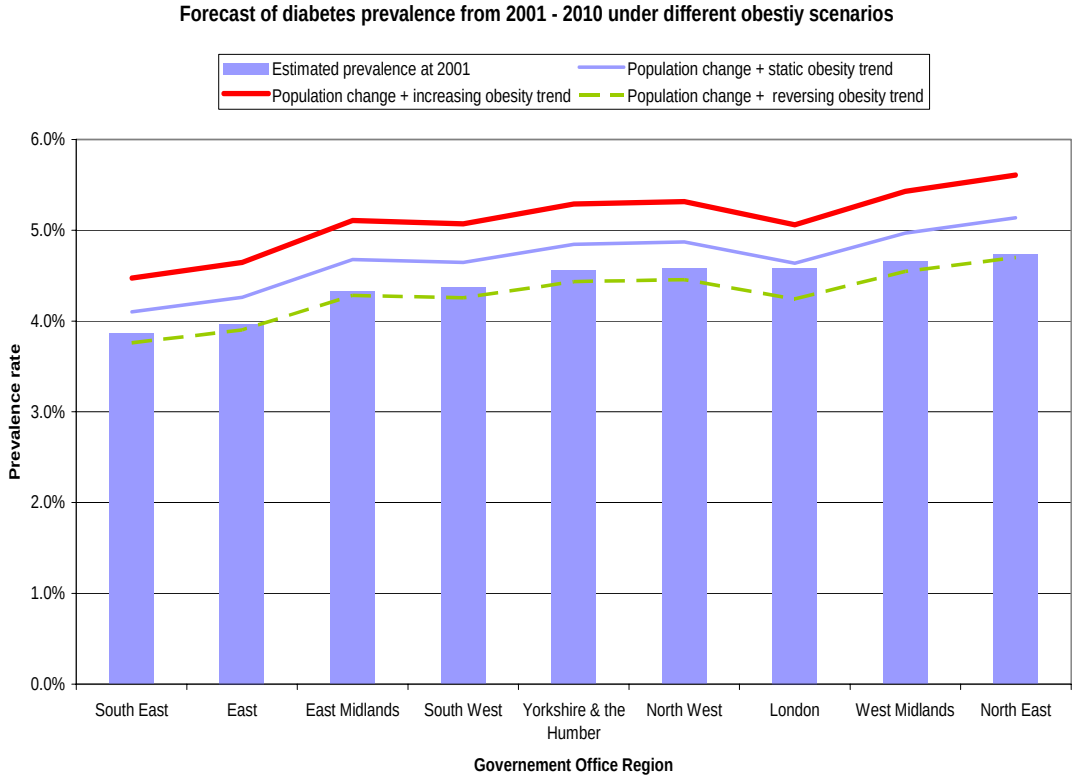
8.3 Obesity trend data linked in with diabetes

The Information centre for health[4] report that the risk of developing Type 2 diabetes is 13 times more likely in obese women than non obese women and 5 times more likely in obese men compared to non obese men.

In England in 2006, 24.9% of males and 25.2% of females were classed as obese (BMI >30)[5]. In the Health Survey for England 2003, 23% of males and 28.7% of females in the West Midlands region were reported as obese.

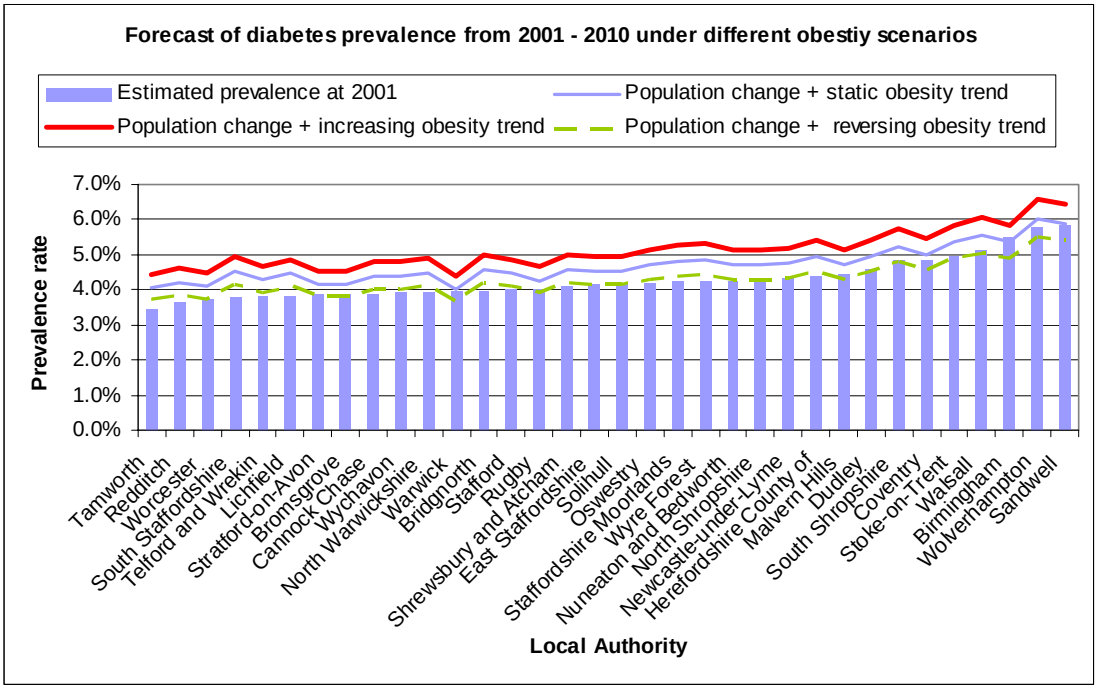
The PBS model estimates the prevalence of diabetes in 2001 and 2010 using different obesity scenarios. Figure 8.7 shows that even if the obesity trend stays static, there will still be an increase in the prevalence rate of diabetes. The West Midlands has one of the highest prevalence rates in England.

Figure 8.7: Estimated prevalence of diabetes (type 1 and 2 – diagnosed and undiagnosed) in 2001 and 2010 modelled using PBS with different obesity scenarios, by Government Office Region



Source: PBS prevalence model – Phase 2 [3]

Figure 8.8: Estimated prevalence of diabetes in 2001 and 2010 modelled using PBS with different obesity scenarios, by Local Authority



Source: PBS prevalence model – Phase 2 [3]

8.4 Diabetes related hospitalisations

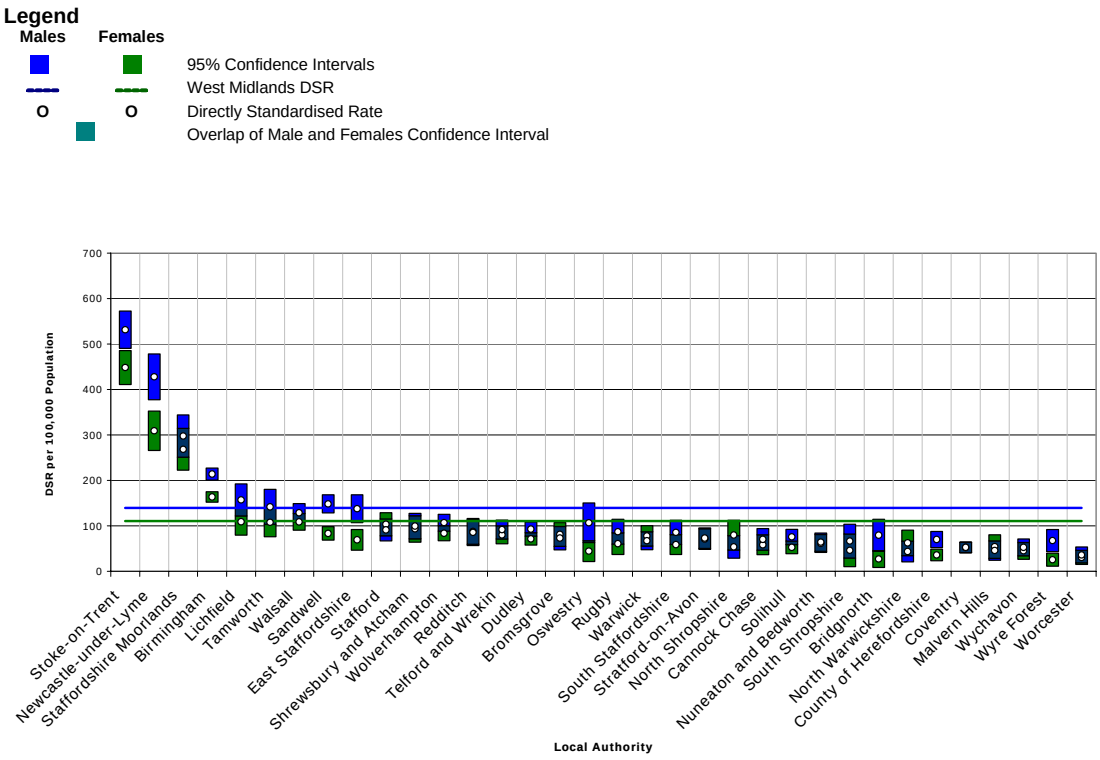
In 2006/07 there were over 7,000 admissions to hospital within the West Midlands where diabetes was classed as a primary cause.

Table 8.1: Directly Standardised Admission Rates and numbers for Diabetes (ICD10 E10-E14), All ages, Males & Females, 2006/07

	Males				Females			
	No.	DSR Per 100,000	95%CI LL	95%CI UL	No.	DSR Per 100,000	95%CI LL	95%CI UL
England	30621	115.5	114	117	24252	85.9	85	87
West Midlands	3929	139.5	135.1	143.9	3303	110.7	106.7	114.6

Source: HES, Mid year 2006 population estimate
Note: Data around hospitalisations look at any mention of diabetes in primary diagnosis

Figure 8.9: Directly Standardised Admission Rates for Diabetes (ICD10 E10-E14) by Primary Care Trust, All ages, Males & Females, 2006/07



Source: HES, Mid year 2006 population estimate

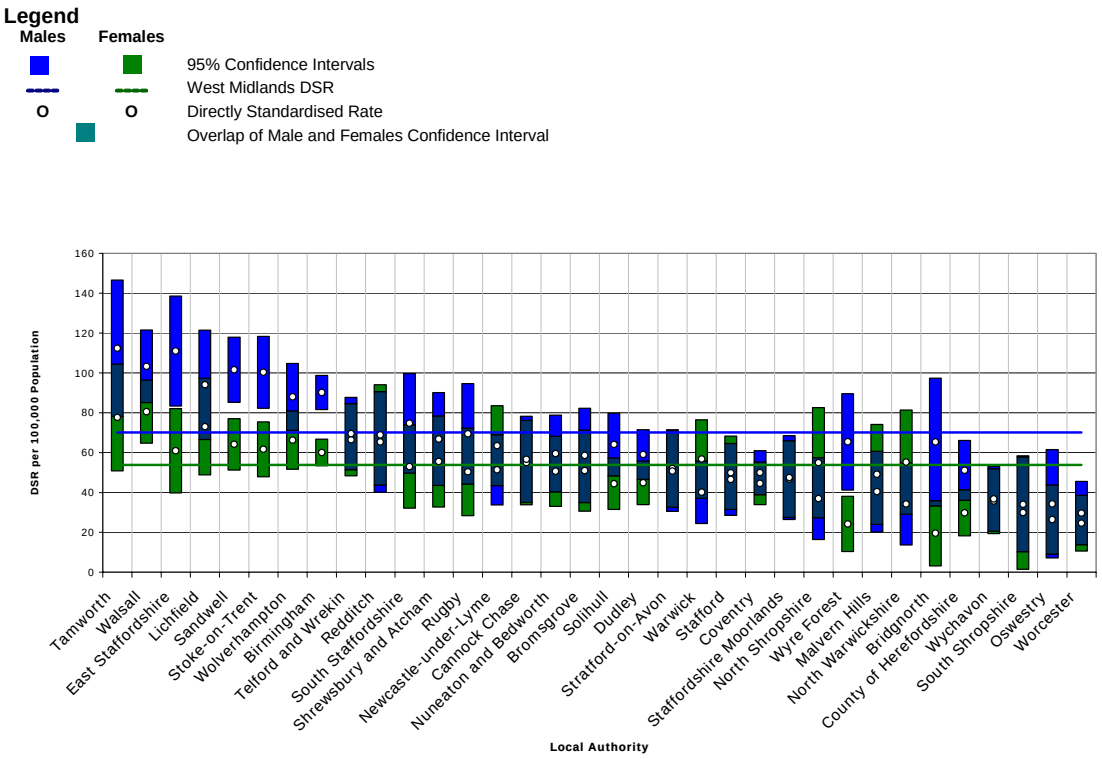
8.5 Diabetes related emergency hospital admissions

There were over 3,500 diabetes related emergency admissions to hospital within the West Midlands between 2006/07. Half of all admissions for diabetes are emergency. This is lower than nationally where over 60% of admissions are emergency.

Table 8.2: Directly Standardised Emergency Admission Rates and numbers for Diabetes (ICD10 E10-E14), All ages, Males & Females, 2006/07

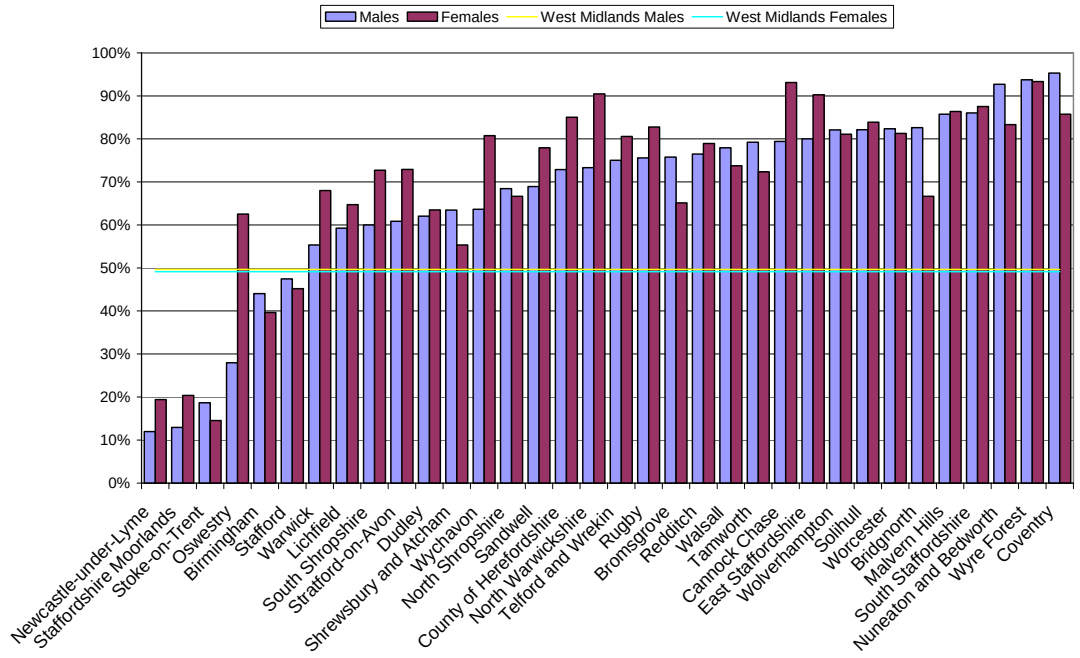
	Males				Females			
	No.	DSR Per 100,000	95%CI LL	95%CI UL	No.	DSR Per 100,000	95%CI LL	95%CI UL
England	18553	70.9	70	72	15560	56.2	55	57
West Midlands	1951	70.2	67.0	73.3	1623	53.9	51.1	56.6

Figure 8.10: Directly Standardised Emergency Admission Rates for Diabetes (ICD10 E10-E14) by Local Authority, All ages, Males & Females, 2006/07



Source: HES, Mid year 2006 population estimate

Figure 8.11: Proportion of admissions that are emergency admissions by Local Authority 2006/07



Source: HES

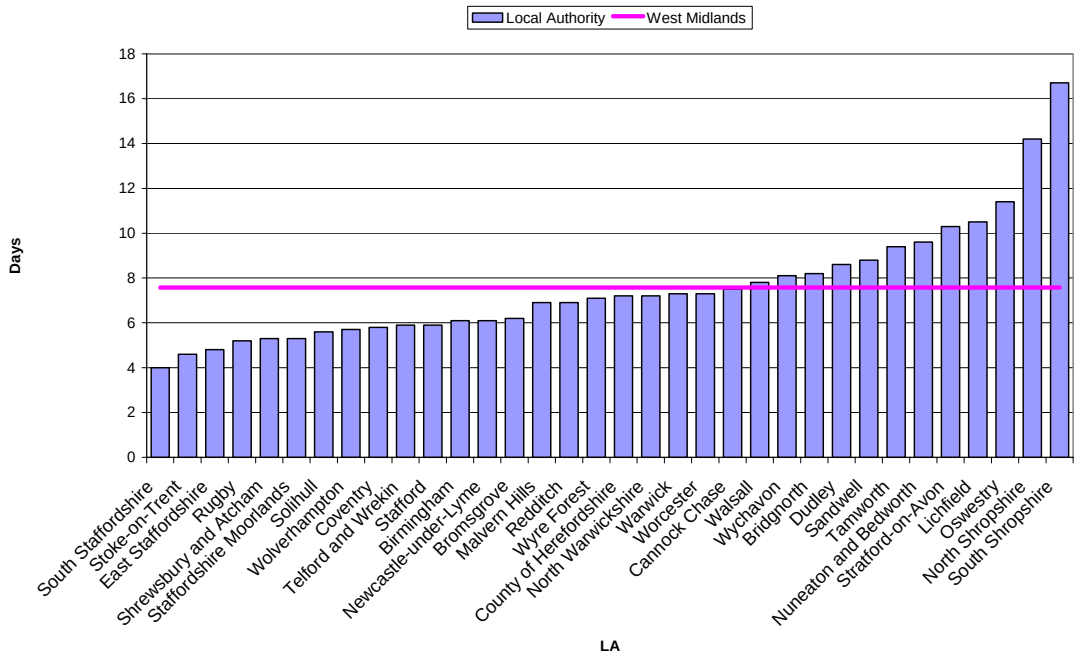
Figure 8.11 shows there is wide variation between the local authorities, Newcastle-under-Lyme have a low percentage of admissions that are emergency (12% for Males, 19% for Females) whereas Coventry have a much higher percentage (95% for Males, 86% for Females).

8.6 Average length of stay for diabetes

The average length of stay for all diabetes admissions in the West Midlands is 7.6 days.

In people with diabetic foot disease, a strategy in Southampton managed to reduce the length of stay for patients from an average of 50 days to 18.5 days, they estimated this has saved them £2.2 million over the first 22 months of the project. They managed to achieve this by introducing a multidisciplinary Diabetes Foot Protection Team.[6]

Figure 8.12: Average length of stay for diabetes patients in the West Midlands, LA, 2006/07



Source: HES

8.7 Diabetes complications data

Diabetes complications can be broadly put into three categories, Macrovascular, Microvascular and Other. The diabetes commissioning toolkit[7] breaks this down as shown in the table below.

Macrovascular	Cerebrovascular disease
	Ischaemic HD
	Peripheral arterial disease
Microvascular	Retinopathy
	Nephropathy
	Neuropathy
Other	Depression
	Amputations
	Problems in pregnancy
	Erectile Dysfunction

The number of admissions with diabetic complications have been obtained from the Hospital Episode Statistics (HES). The admissions were derived from records where the primary diagnosis was diabetes (ICD10 E10- E14) and secondary diagnosis was one of the complications above and also where the primary diagnosis was the complication and diabetes was recorded as a secondary diagnosis.

Table 8.3: Number of diabetes complications in the West Midlands, 2004/05, 2005/06, 2006/07 pooled

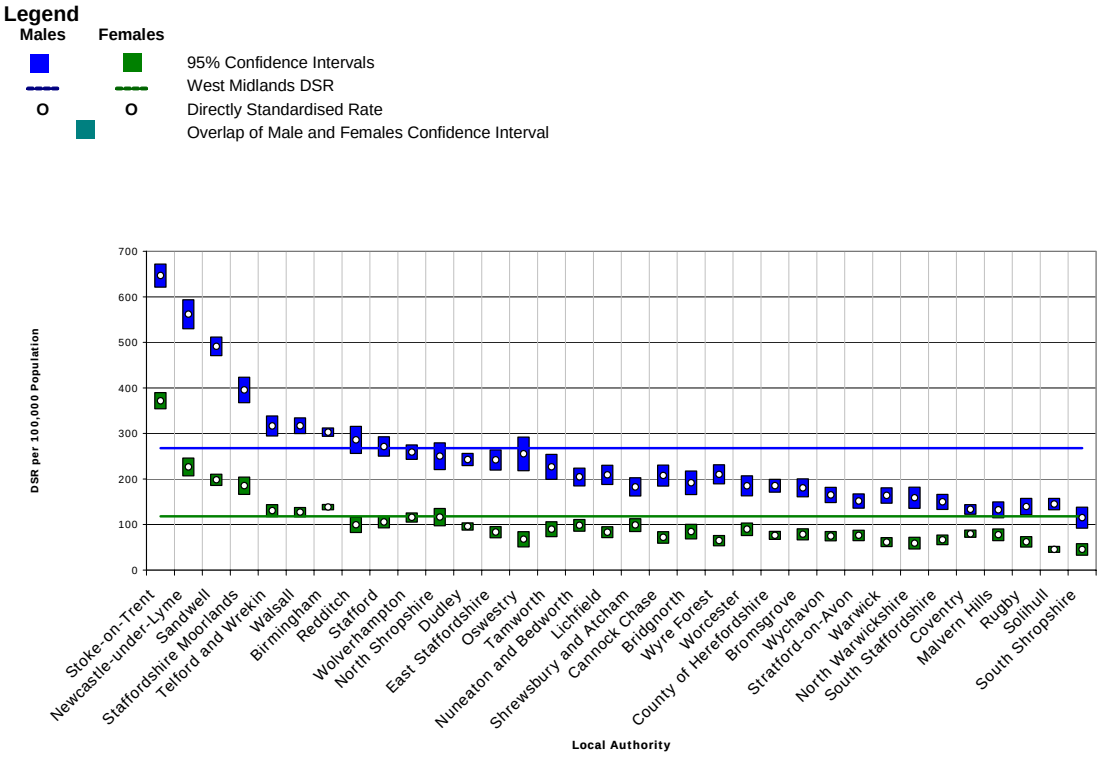
	Males				Females			
	No.	DSR	95%CI LL	95%CI UL	No.	DSR	95%CI LL	95%CI UL
Cerebrovascular disease	2656	26.6	25.6	27.7	2264	16.6	15.9	17.4
Ischaemic Heart disease	11712	127.2	124.9	129.5	6381	57.1	55.6	58.6
Peripheral arterial disease	7646	83.3	81.4	85.2	2874	24.7	23.7	25.7
Retinopathy	1725	19.8	18.9	20.8	1394	14.8	14.0	15.6
Nephropathy	238	2.7	2.4	3.1	139	1.5	1.3	1.8
Neuropathy	60	0.7	0.5	0.9	32	0.4	0.2	0.5
Depression	133	1.6	1.3	1.9	157	1.6	1.3	1.9
Amputations	529	5.6	5.2	6.1	157	1.3	1.1	1.6
Problems in pregnancy	-	-	-	-	8	0.1	0.0	0.2
Erectile Dysfunction	12	0.15	0.06	0.23	-	-	-	-
All complications	24711	268	264	271	13406	118	116	120

Source: HES; ONS mid year population estimates (2004, 05, 06)

8.8 All diabetic complications (as outlined in the table)

In 2006/07 there were over 12,700 hospital admissions with diabetic complications within the West Midlands.

Figure 8.13: Directly Standardised Admission Rates for Specified diabetic complications* by Local Authority, All Ages, Males & Females, 2004/05 – 2006/07 pooled



Source: HES; ONS mid year population estimates (2004, 05, 06)

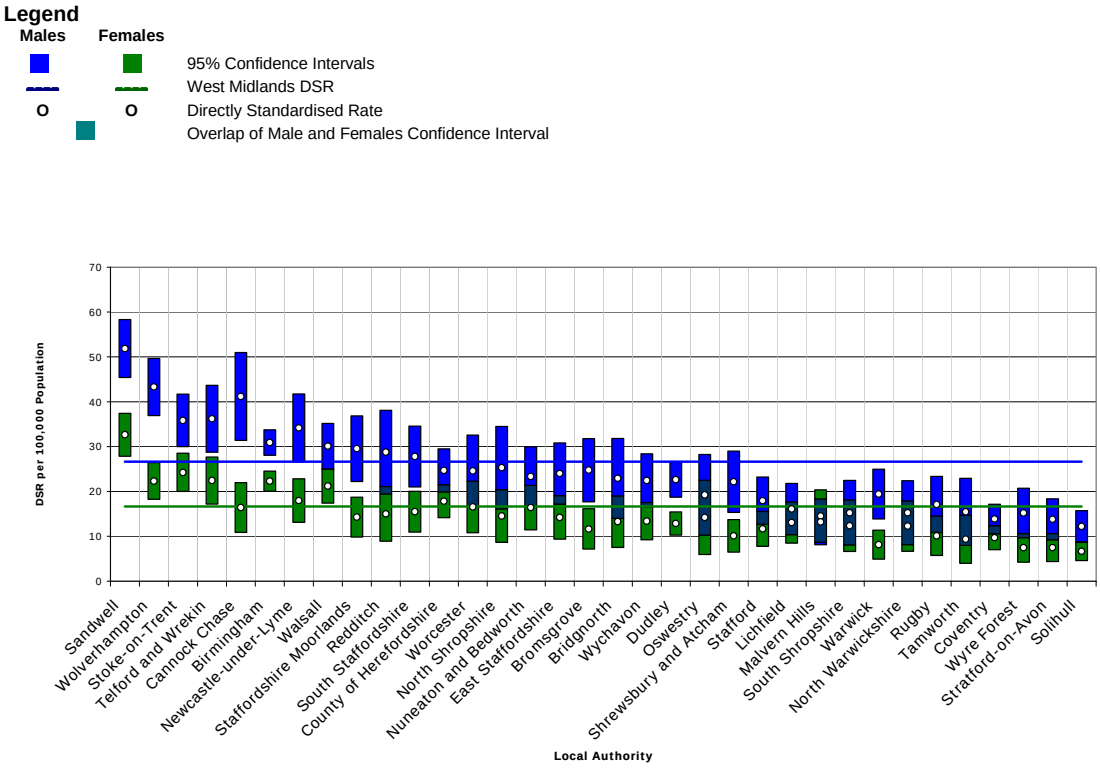
** Specified complications include: Cerebrovascular disease, Ischaemic heart disease, peripheral arterial disease, retinopathy, nephropathy, neuropathy, depression, amputation, erectile dysfunction, problems in pregnancy – See appendix for ICD10 codes used.*

The next few charts show the rates of diabetic complications by type of complication and broken down by local authority. As actual numbers are small the graphs have wide confidence intervals so caution should be taken when interpreting the results.

8.9 Cerebrovascular disease

The diabetic population are more at risk of developing a cerebrovascular complication if their blood pressure is not managed properly and is too high.

Figure 8.14: Directly Standardised Admission Rates for Cerebrovascular complications with Diabetes (ICD10 I60 - I69 with ICD10 E10-14) by Local Authority, All Ages, Males & Females, 2004/05 – 2006/07 pooled



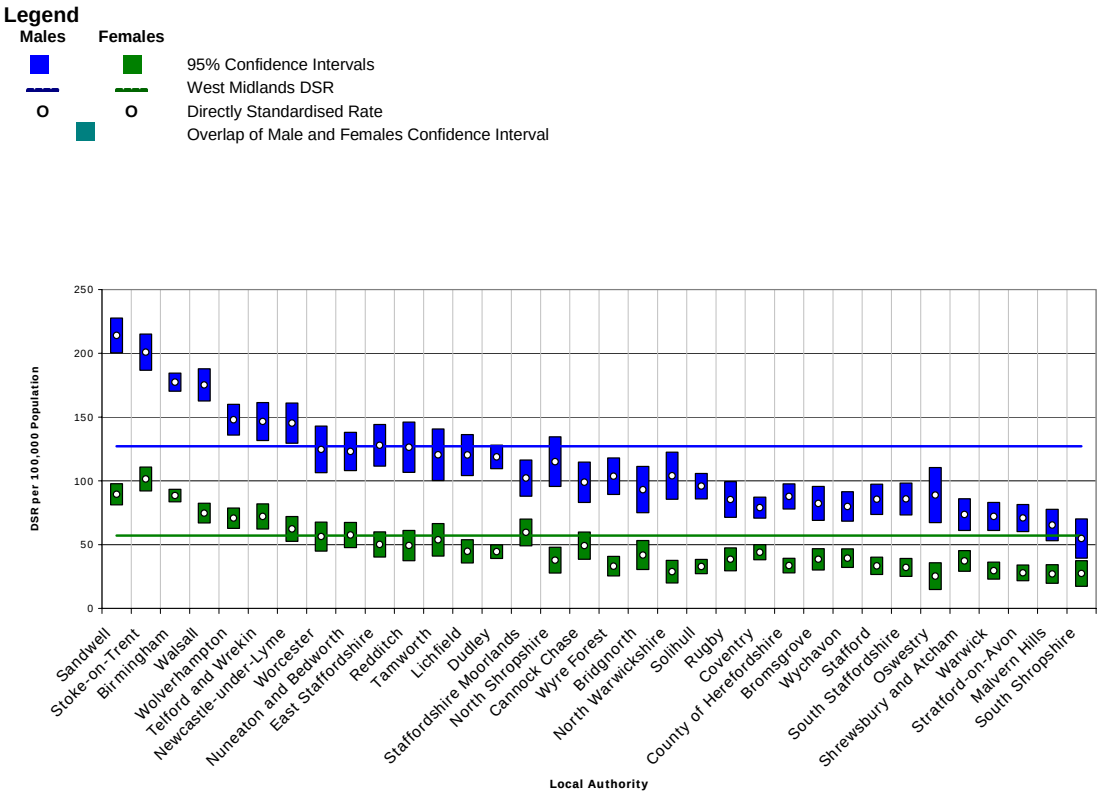
Source: HES; ONS mid year population estimates (2004, 05, 06)

Figure 8.14 shows the rate of the local authority population admitted to hospital with a cerebrovascular complication as either a primary or secondary diagnosis with diabetes as either a primary or secondary diagnosis. It is evident that there is wide variation across the region where the rate of admission in Sandwell for diabetics with a cerebrovascular complication is roughly 5 times greater than Solihull who have the lowest rate for the combined years 2004/05 – 2006/07.

8.10 Ischaemic Heart Disease

Diabetics are at risk of ischaemic heart disease if their diabetes is not managed properly as high levels of blood glucose can lead to clogging of the arteries.

Figure 8.15: Directly Standardised Admission Rates for Ischaemic Heart Disease complications with Diabetes (ICD10 I60 - I69 with ICD10 E10-14) by Local Authority, All Ages, Males & Females, 2004/05 – 2006/07 pooled



Source: HES; ONS mid year population estimates (2004, 05, 06)

8.11 Deaths from diabetes

In the West Midlands over 700 people die each year as a result of diabetes.

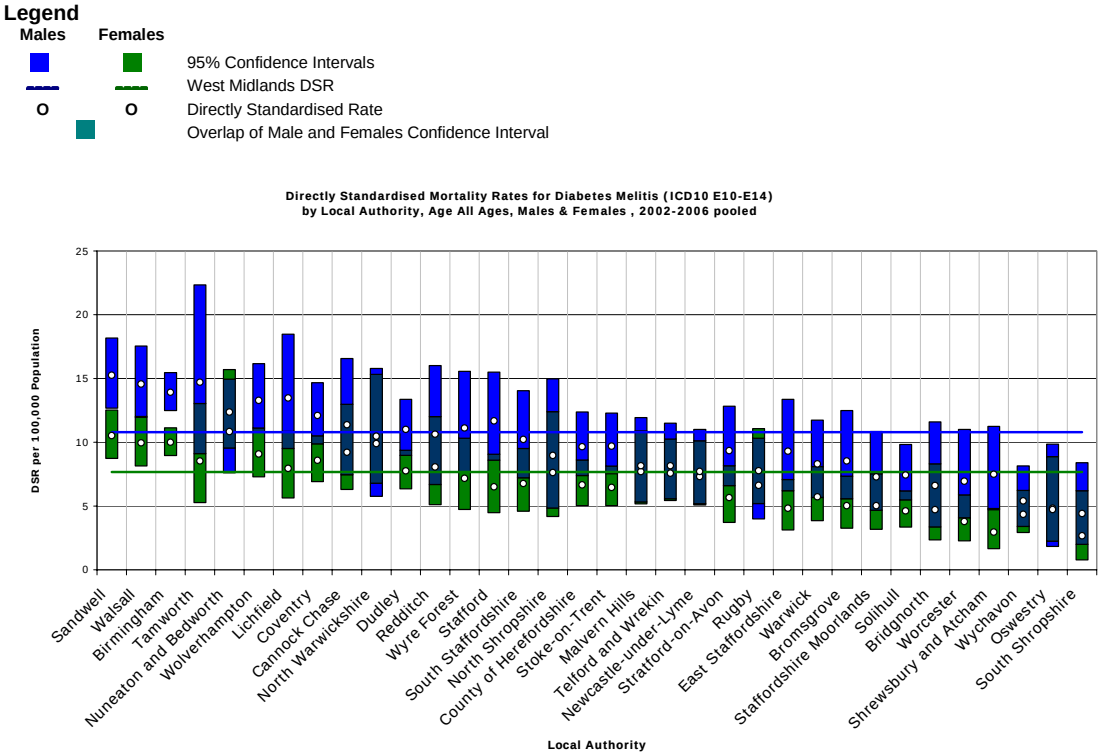
Table 8.4: Directly Standardised Mortality Rates and numbers for Diabetes (ICD10 E10-E14) All ages, Males & Females, 2002-2006

West Midlands	Males				Females			
	No.	DSR Per 100,000	95%CI LL	95%CI UL	No.	DSR Per 100,000	95%CI LL	95%CI UL
2002	364	11.6	10.4	12.9	398	7.9	7.0	8.7
2003	369	11.3	10.2	12.6	427	8.6	7.7	9.5
2004	370	11.1	9.9	12.3	391	7.5	6.7	8.3
2005	346	10.3	9.2	11.5	407	7.5	6.8	8.4
2006	336	9.6	8.6	10.8	379	6.8	6.1	7.6

England	Males				Females			
	No.	DSR Per 100,000	95%CI LL	95%CI UL	No.	DSR Per 100,000	95%CI LL	95%CI UL
2002	2702	9.0	8.7	9.4	3043	6.4	6.1	6.6
2003	2743	9.1	8.7	9.4	3136	6.5	6.3	6.8
2004	2497	8.1	7.7	8.4	2896	5.9	5.7	6.2
2005	2473	7.8	7.5	8.1	2809	5.6	5.4	5.9
2006	2354	7.2	6.9	7.5	2661	5.2	5.0	5.4

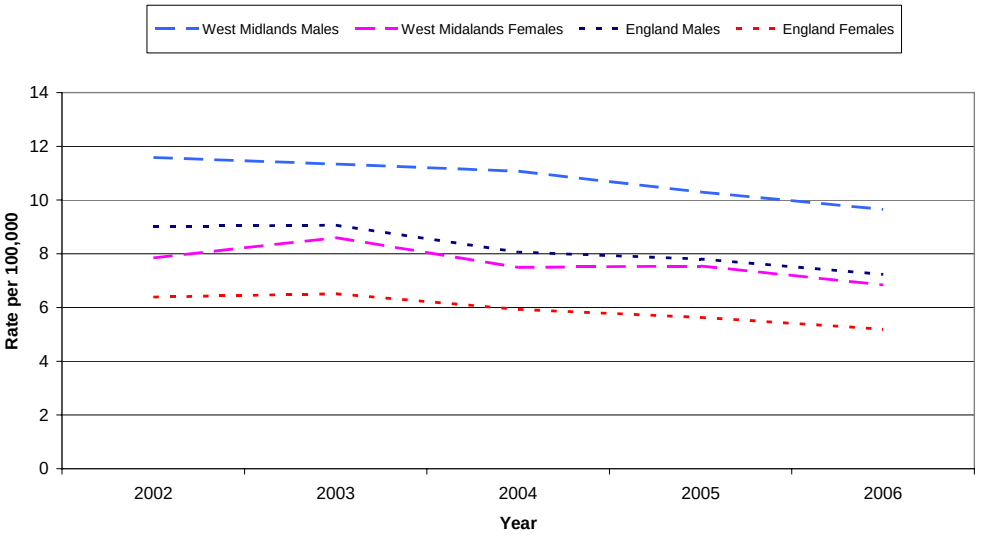
Source: ONS mortality files, experimental mid year PCT population estimates
Note: The above tables only include deaths where the underlying cause was coded as Diabetes Mellitus (E10 – E14).

Figure 8.16: Directly Standardised Mortality Rates for Diabetes Mellitus (ICD10 E10-E14) by Local Authority, All ages, Males and Females, 2002-2006 pooled.



Source: ONS mortality files, Experimental mid year PCT population estimates
Note: The above tables only include deaths where the underlying cause was coded as Diabetes Mellitus (E10 – E14).

Figure 8.17: Directly Standardised Mortality Rates for Diabetes (ICD10 E10 – E14), All ages, Males and Females, 2002 – 2006



Source: ONS mortality files, Experimental mid year PCT population estimates
Note: The above tables only include deaths where the underlying cause was coded as Diabetes Mellitus (E10 – E14).

Figure 8.17 shows that the death rate from diabetes has been reduced at a regional level as well as nationally.

8.12 Where are we now data highlights for the West Midlands from the YHPHO tool

Table 8.5: Summary of diabetes measures data

	England	West Midlands SHA
Diabetics offered Retinal screening	89%	88%
% of patients who have attended an education or training programme	11%	7%
% Diabetics with record of micro-albuminuria testing	86%	86%
% Diabetics with proteinuria or micro-albuminuria treated with ACE inhibitors or A2 antagonists	89%	89%
% Diabetics with record of presence/absence of peripheral pulse	91%	91%
% patients with diabetes with record of neuropathy testing	90%	91%
% Diabetics who have a record of HbA1c	97%	97%
% Diabetics who have a HbA1c of less than 7.5	68%	67%
% Diabetics who have a HbA1c of 10.0 or less	93%	92%
% Diabetics with record of total cholesterol	96%	96%
% Diabetics whose last measured total cholesterol of 5 or less	83%	84%
% Diabetics with record of blood pressure	99%	99%
% Diabetics with record of blood pressure of 145/85 or less	79%	77%
% of patients that almost always discuss goals for their diabetes management	39%	37%
Number of items prescribed per registered person with diabetes	4	4
Net ingredient cost of diabetic items per person with diabetes	£76.32	£80.62

Source: Where are we now? YHPHO commissioning toolkit for diabetes

Data source come from: Compendium of Clinical and Health Indicators, Health and Social Care Information Centre, Health Surveys for England, The Information Centre for health and social care, Prescribing Support Unit, Healthcare Commission Survey of People with Diabetes 2006

Acknowledgment: George Fowajuh

APPENDIX 1 – Definitions used to look at complications

The question our data has answered is the number of in year admissions with diabetic as a primary cause and complications as a secondary cause or diabetic as secondary cause and complications as a primary cause.

		ICD10
Macrovascular	Cerebrovascular disease	I60-I69
	Ischaemic HD	I20-I25
	Peripheral arterial disease	I79.2 as Primary diagnosis with, E10.5, E11.5, E12.5, E14.5 as secondary diagnosis, plus E10.5, E11.5, E12.5, E14.5, as Primary diagnosis with, I79.2 as a secondary diagnosis.
Microvascular	Retinopathy	H360 as Primary diagnosis with, E10.3, E11.3, E12.3, E14.3 as secondary diagnosis, plus E10.3, E11.3, E12.3, E14.3, as Primary diagnosis with, H360 as a secondary diagnosis.
	Nephropathy	N289 or N083 as Primary diagnosis with, E10.2, E11.2, E12.2, E14.2 as secondary diagnosis, plus E10.2, E11.2, E12.2, E14.2, as Primary diagnosis with, N289 or N083 as a secondary diagnosis.
	Neuropathy	G590 as Primary diagnosis with, E10.4, E11.4, E12.4, E14.4 as secondary diagnosis, plus E10.4, E11.4, E12.4, E14.4, as Primary diagnosis with, G590 as a secondary diagnosis. ALSO M146 as Primary diagnosis with, E10.6, E11.6, E12.6, E14.6 as secondary diagnosis, plus E10.6, E11.6, E12.6, E14.6, as Primary diagnosis with, M146 as a secondary diagnosis.
Other	Depression	F32 as Primary diagnosis with E10-E14 as a secondary diagnosis, plus E10-E14 as a Primary diagnosis with F32 as a Secondary diagnosis.
	Amputations	OPCS - X07 – X11
	Problems in pregnancy	O24 (exc. O244)

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Stacey Croft: West Midlands Public Health Observatory
Dr Kristina Routh: Department of Health (West Midlands)
Dr Helen Carter: NHS (West Midlands)

CHAPTER NINE: STROKE IN THE WEST MIDLANDS

9.1 Introduction

Stroke is the third largest cause of death in England with more than 110,000 people experiencing a stroke each year. Between 20 and 30 per cent of people who have a stroke die within a month. Stroke causes considerable morbidity with approximately half of the individuals who have had a stroke relying upon others for activities of daily living and it is the single biggest cause of severe disability in the UK.[1,2]

A stroke occurs when the blood supply to the brain is disrupted. There are two main types of stroke:

- Ischaemic, where the blood supply is blocked as a result of a clot or a narrowing of the blood vessel
- Haemorrhagic, where there is a bleed inside the brain.

The onset of a stroke is sudden and symptoms can include numbness, weakness or paralysis of limbs, slurred speech, loss of vision and alteration of level of consciousness. A transient ischaemic attack (TIA or 'mini-stroke') occurs when the symptoms of the stroke last less than 24 hours.

Stroke, like many other vascular diseases is, to some extent, preventable. A major risk factor is increasing age, but a quarter of strokes occur in those aged under 65. Other risk factors include hypertension (high blood pressure), smoking, lack of exercise, obesity, high alcohol intake, high cholesterol, atrial fibrillation (irregular heart beat), diabetes and a previous TIA. It is more common in African-Caribbean males and in South Asians. People in socio-economic group V (unskilled manual workers) have a 60% higher stroke risk than those in group I (professionals).[3]

Stroke was included in the National Service Framework for Older People with the aim of reducing the incidence of stroke in the population and ensuring that those who have had a stroke have prompt access to integrated stroke care services.[4] The National Stroke Strategy was released in 2007. One of the aims of this strategy is to alter the perception of stroke from an inevitable consequence of aging to a condition that is preventable and, if diagnosed early enough, treatable through advances in modern medicine such as thrombolysis. The strategy contains 20 quality markers encompassing prevention, first contact, treatment, rehabilitation and long-term support. It also aims to increase the public's awareness to encourage early recognition of the signs of stroke and improvement in access to the appropriate services.[2]

This chapter aims to describe the pattern of mortality and morbidity of stroke across the West Midlands. We include data on hospital admissions together with some indicators of quality of care in the region from Primary and Secondary Care.

9.2 Mortality

In early 2008 the West Midlands Public Health Observatory, on behalf of the Association of Public Health Observatories, produced a report *Indications of Public Health in the Regions: Older people* which included information on stroke.[5] This report showed that the West Midlands has the highest mortality for stroke in England in people over 65.

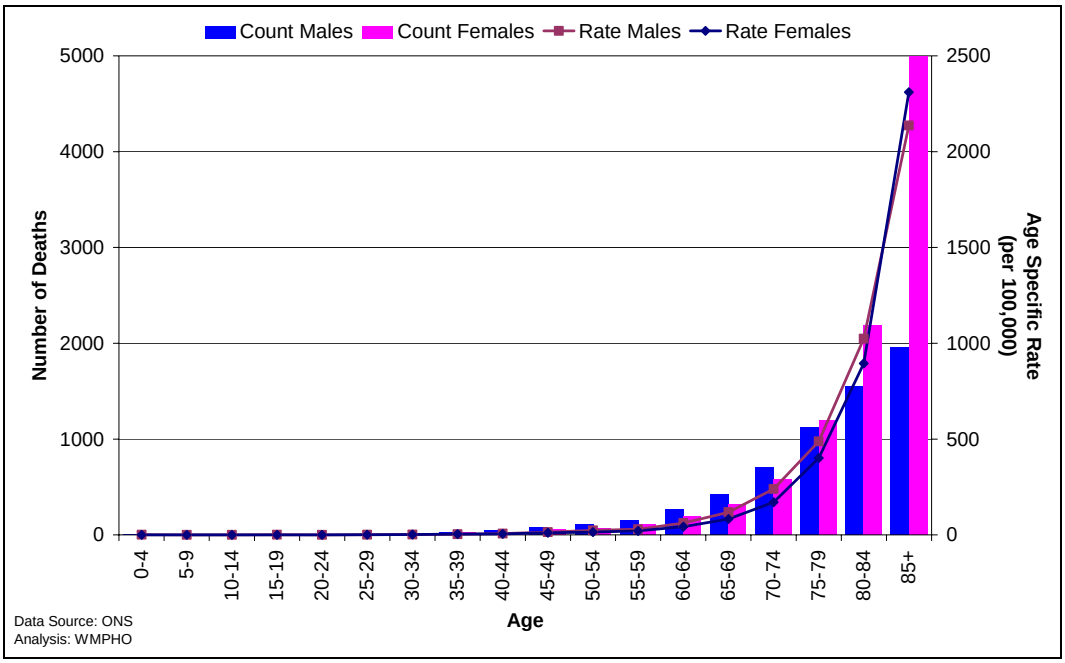
Mortality rates are associated with both incidence and survival rates, hence variations in these rates will cause variation in mortality. Differences in incidence of stroke are the result of differences in the prevalence of underlying risk factors including lifestyle (e.g. smoking, poor diet and obesity) and the demography of the population such as age, ethnicity and socio-economic make up. Survival rates may be influenced by variations in the case-mix (e.g. age, severity and other illnesses) and also by the quality of care stroke patients receive. Differences in the ways data is recorded, its completeness and accuracy may result in

perceived differences which are not necessarily correct. In all these instances there is also the play of chance, leading to inherent natural variation.[6]

Information about mortality from stroke is publicly available from the National Centre for Health Outcomes Development (NCHOD, www.NCHOD.nhs.uk). NCHOD was created in 1998 as a national repository for health information using data from ONS. For this chapter mortality data has been sourced from ONS and analysis produced by the West Midlands Public Health Observatory. Stroke has been identified by the International Classification of Diseases tenth edition (ICD-10 I60-I69), this may differ to definitions used elsewhere.

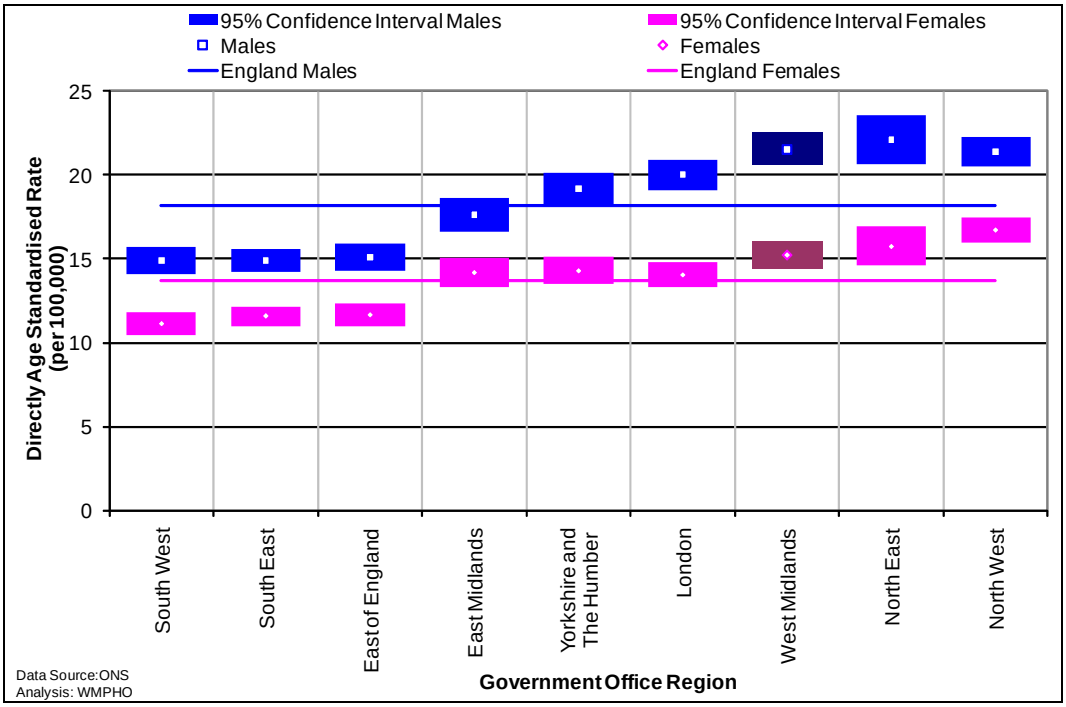
Mortality from stroke increases dramatically with increasing age. For England the overall mortality rate from stroke in 2004-2006 was 53 per 100,000, the rate in people aged over 75 (949 per 100,000) is nearly 60 times greater than in under 75's (16 per 100,000). In terms of potential years of life lost the under 75 years age group are a very important group. For the purposes of this chapter we will be mainly concentrating on those aged under 75 years.

Figure 9.1: Age Profile of Stroke (ICD10 I60-I69) Mortality in the West Midlands, deaths registered 2004-06



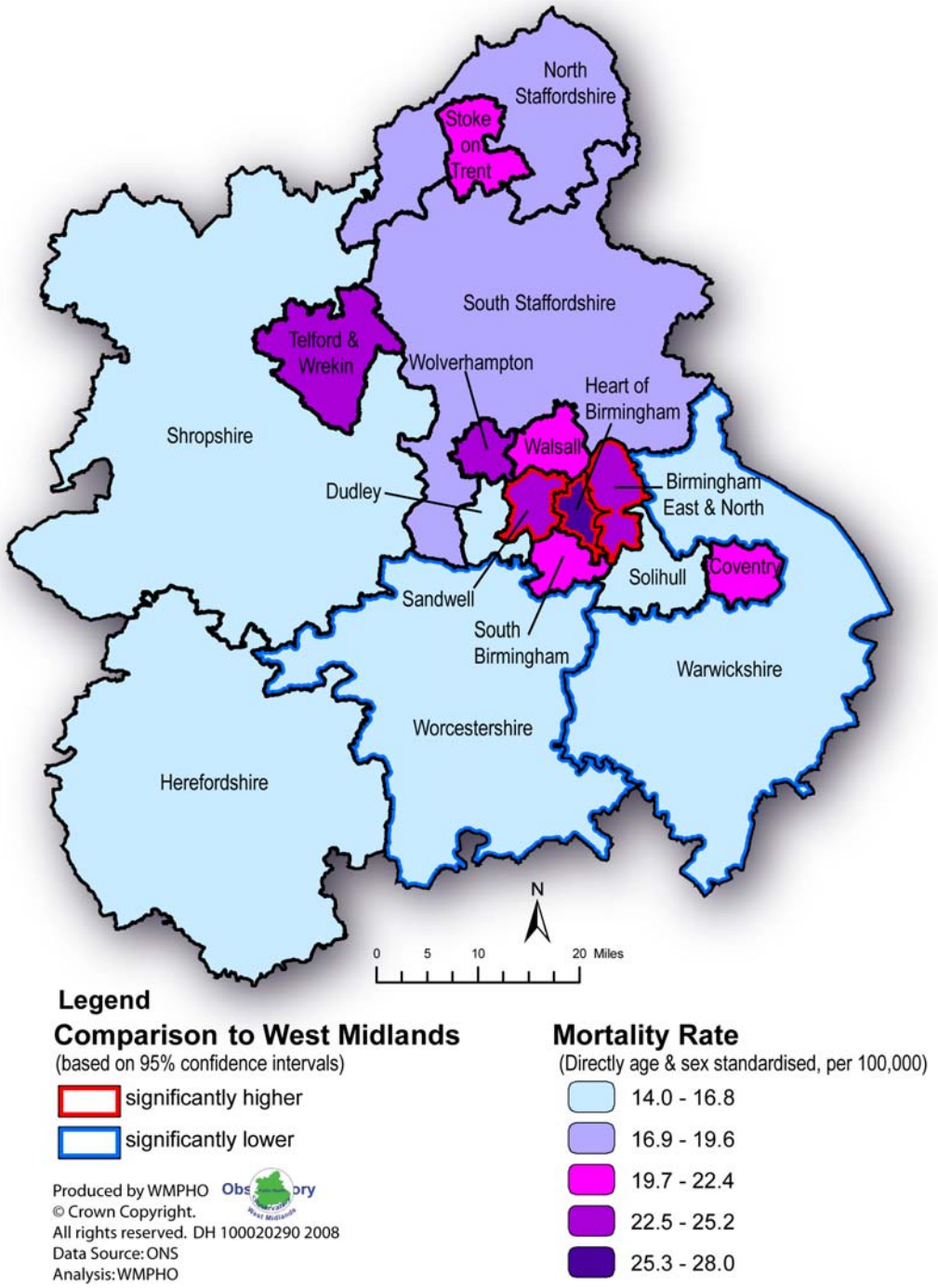
Mortality for all ages in the West Midlands was 58.4 per 100,000, the 3rd highest of nine Government Office Regions (GOR) in 2004-06. For the under 75 years age group the West Midlands is also 3rd highest region in terms of mortality. Directly Standardised Rates by GOR show that there is a clear north-south gradient when comparing mortality for stroke, as shown in figure 9.2. Mortality rates for men aged under 75 are significantly higher than the corresponding rates in women, for the West Midlands males have a rate of 21.5 per 100,000 and females 15.2 per 100,000. Consequently, where possible, persons rates used in this chapter have been age and sex standardised.

Figure 9.2: Under 75's Stroke (ICD10 I60-I69) Mortality Rates by Government Office Region, deaths registered 2004-06



Directly Standardised Mortality Rates (DSRs) are also available by Primary Care Trust (PCT) for the West Midlands, Map 9.1 shows a map of these rates in the under 75s. Heart of Birmingham, Sandwell and Birmingham East & North PCTs (27.8, 25.8 and 23.4 per 100,000 respectively), are statistically significantly higher in comparison to the West Midlands rate. In comparison Worcestershire and Warwickshire have significantly lower rates in the under 75s (14.3 and 14.5 per 100,000).

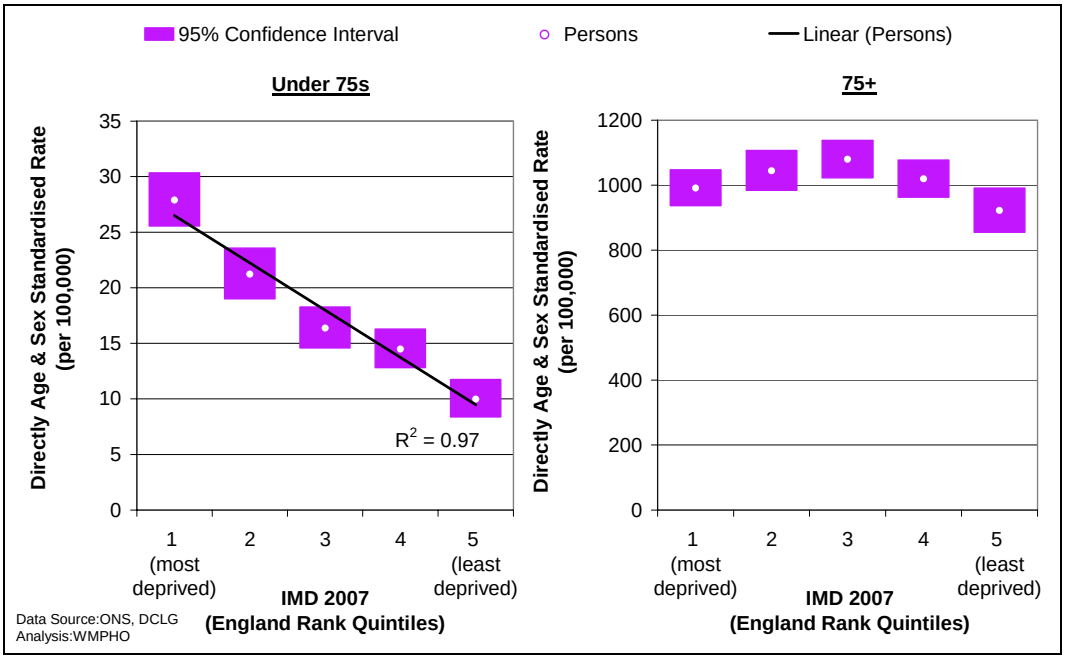
Map 9.1: Under 75's Stroke (ICD10 I60-I69) Mortality Rates in the West Midlands by Primary Care Organisation, deaths registered 2004-06



The DSRs reported here do not take into account the differing ethnicity and socio-economic demography of the PCTs and regions which could account for some of the observed variation of rates because of the prevalence of underlying risk factors.

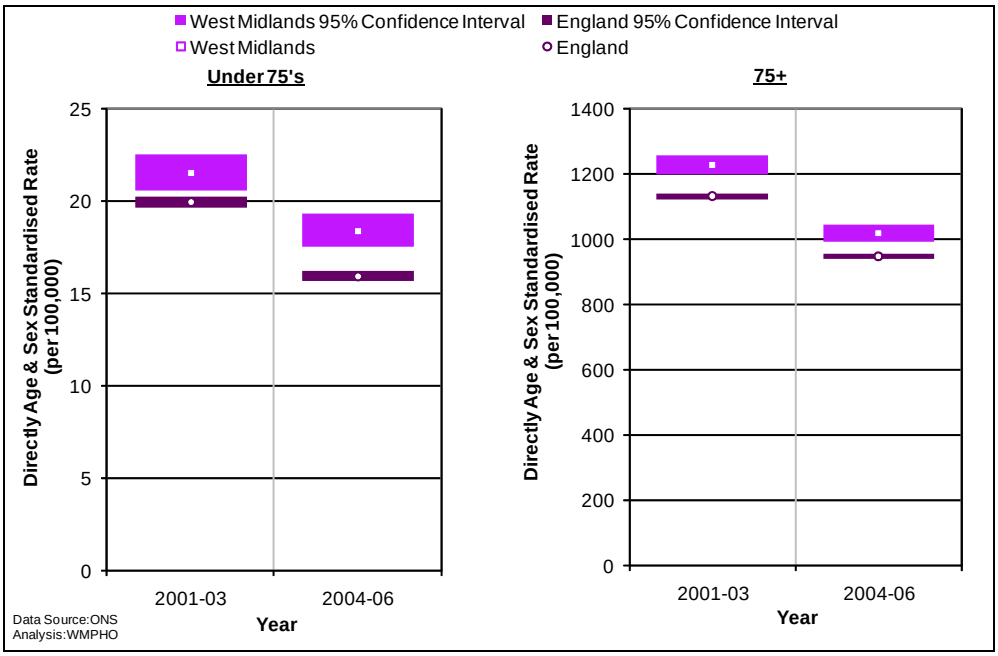
Mortality due to stroke in the West Midlands shows a strong association with deprivation in the under 75 years age group (R^2=0.97). Rates in the most deprived areas of the West Midlands are nearly 3 times higher than those in the least deprived areas. This relationship is clearly absent in the over 75 year age group (see Figure 9.3). This pattern is observed in both males and females.

Figure 9.3: Stroke (ICD10 I60-I69) Mortality Rates in the West Midlands by Deprivation, deaths registered 2004-06



Comparison of stroke mortality rates for under 75's in 2001-03 to 2004-06, shows that the gap between the West Midlands and England has widened slightly to 2.4 per 100,000. Conversely for mortality in the over 75s the gap has narrowed from 96.0 per 100,000 in 2001-03 to a difference of 69.5 per 100,000 in 2004-06 (Figure 9.4).

Figure 9.4: Stroke (ICD10 I60-I69) Mortality Rates in the West Midlands, deaths registered 2001-03 vs. 2004-06



Mortality from stroke has been decreasing over the last 30 years in developed countries and Carroll et al suggest that mortality is no longer a good marker to measure the burden of the disease.[3]

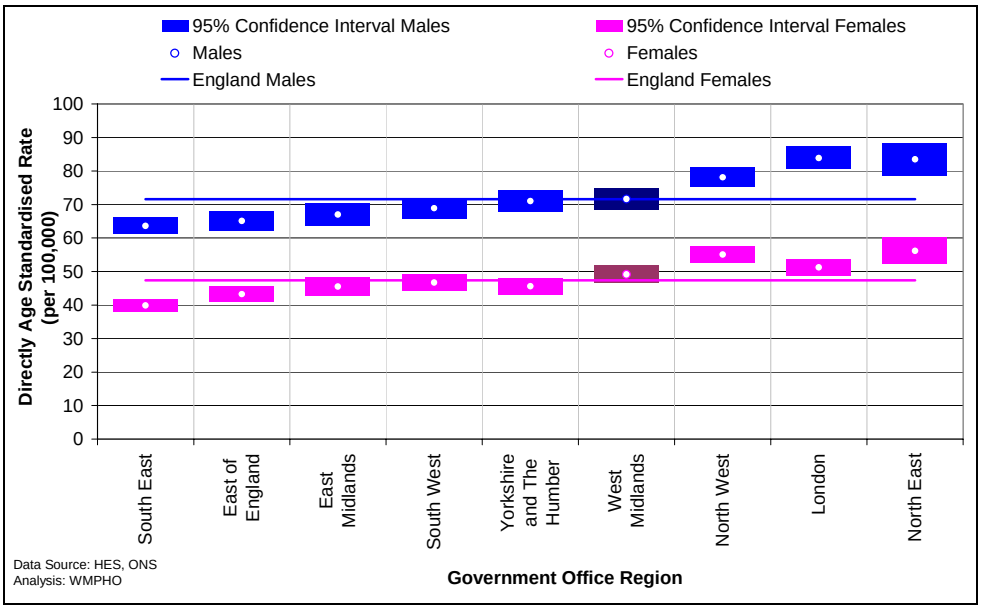
9.3 Morbidity - Hospital data

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.

Stroke has been defined by ICD10 I60-I69, for consistency with the mortality data shown earlier. The admissions data presented in this chapter is for counts of first finished consultant episodes, in financial year 2006/07. This is a crude proxy for the number of patients with a diagnosis, although patients may be admitted more than once.

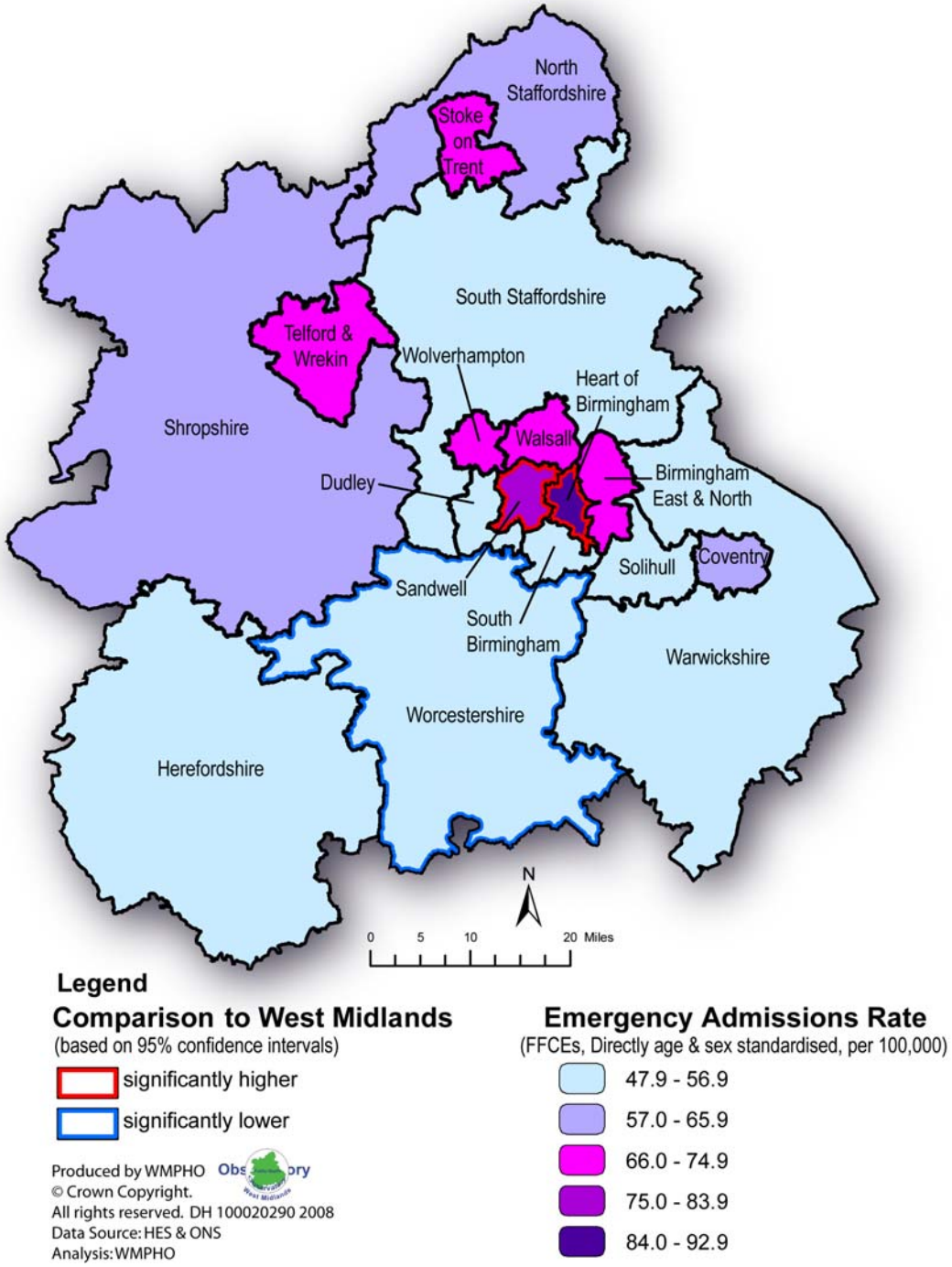
Looking at emergency admissions for stroke helps us to gain some information about incidence, as these admissions are most likely to be associated with the onset of a new stroke. However, we know that not all who suffer from a stroke will be admitted to hospital – some will be managed in primary care with outpatient secondary care and so will not appear in HES data.

Figure 9.5: Under 75's Stroke (ICD10 I60-I69) Emergency Admission Rates by Government Office Region, financial year 2006/07



Whilst the West Midlands mortality rate in the under 75s is above the England average, the West Midlands emergency admissions are not dissimilar to England as a whole. The region is fourth highest of the GORs for both all ages and under 75's. Similar to mortality, emergency admission rates for stroke are higher in men than women. In the West Midlands men under 75 have an emergency admission rate of 71.7 per 100,000, the rate for women under 75 is 49.1 per 100,000.

Map 9.2: Under 75's Stroke (ICD10 I60-I69) Emergency Admission Rates in the West Midlands by Primary Care Organisation, financial year 2006/07



The rates of stroke emergency admissions in the under 75's by PCT are similar in distribution to mortality rates; Sandwell (82.0 per 100,000) and Heart of Birmingham (92.9 per 100,000) PCTs were significantly higher whilst Worcestershire PCT (48.0 per 100,000) was significantly lower than the West Midlands average. These admission rates show a strong correlation with deprivation (R^2=0.97) (Figure 9.6). In 2006/07 the most deprived fifth of areas in the West Midlands, by IMD 2007 England rank, had an emergency admission rate of 78.4 per 100,000, nearly double the rate in the least deprived fifth of areas (42.8 per 100,000).

Figure 9.6: Stroke (ICD10 I60-I69) Emergency Admission Rates in the West Midlands by Deprivation, financial year 2006/07

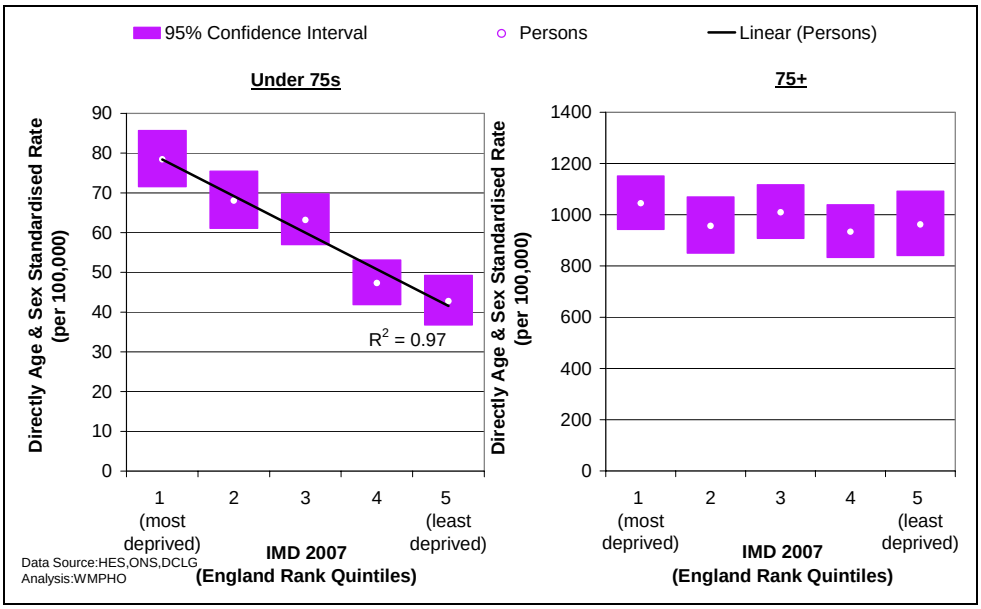
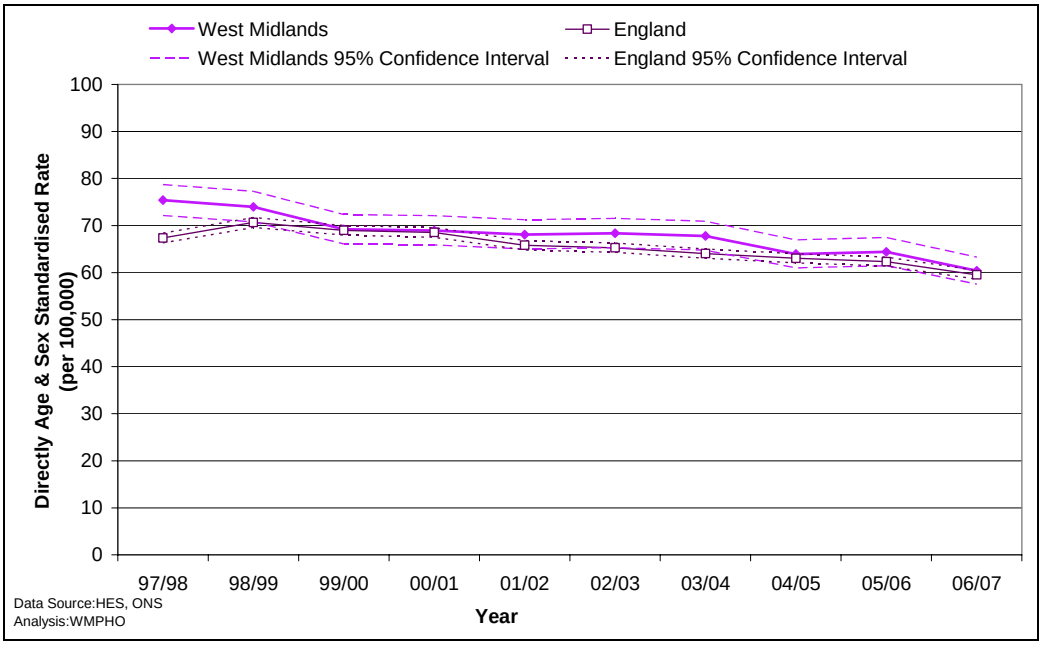


Figure 9.7 shows the decreasing trend in emergency admissions in the under 75's between 1997/98 to 2006/07, for the West Midlands and England. The West Midlands has experienced a reduction of 20% over this time, from 75.4 per 100,000 to 60.4 per 100,000.

Figure 9.7: Under 75's Stroke (ICD10 I60-I69) Emergency Admission Rates in the West Midlands and England, financial years 1997/98 – 2006/07



A more timely source of HES data is the Commissioning Business Support Agency (CBSA, http://www.wmcbsa.nhs.uk/), established in the West Midlands in April 2007. It supports PCTs' commissioning processes through providing accurate and timely contract management information. The CBSA have a data warehouse that holds HES data with only approximately 2 weeks time delay. Data held by the CBSA is for people registered with GPs in the West Midlands. It therefore differs from the data presented in this chapter which is for residents, as well as by the methods used to extract, clean and process these data.

Historically, individuals with an acute stroke may not have been referred to hospital but cared for within the community or nursing homes. Following the release of the stroke strategy this practice should change with stroke being viewed as a "brain attack" calling for rapid access to hospitals for assessment for thrombolysis. This may lead to an increase in the numbers of stroke patients being admitted to hospitals, and thus an apparent increase in incidence of stroke if gauged by this measure.

Stroke patients may also be seen in outpatient clinics rather than be admitted to hospital following their first stroke. This data will not be captured in the HES inpatient data. Stroke care can come under the remit of general physicians, geriatricians, neurologists and vascular surgeons.

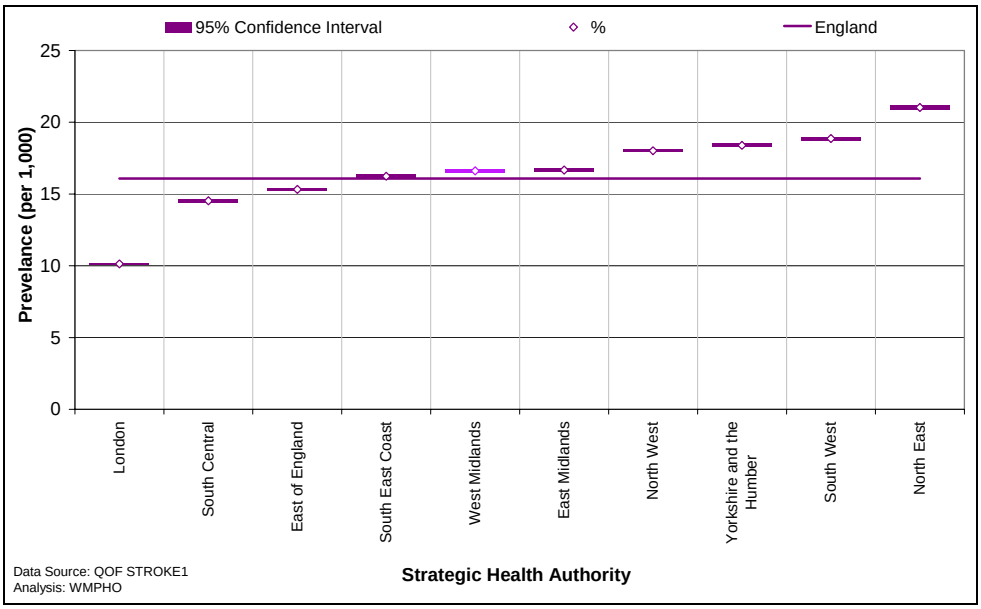
Data previously available from aggregate returns has been released as an 'experimental' HES outpatient dataset available from 2003/04 (www.HESonline.org.uk). Many of the items in this dataset form part of the national Commissioning Data Set (CDS). Unlike HES inpatient data, which can currently record up to 14 diagnostic codes, the current version of the Outpatient Attendance CDS cannot carry more than two diagnosis codes per patient attendance. Diagnosis is not a mandatory item in the Outpatient CDS.[8] Stroke outpatient care is therefore incompletely recorded so we are unable to determine the number of individuals seen in outpatients if not admitted as an inpatient for investigation following a stroke.

9.4 Morbidity - Prevalence

Information relating to the prevalence of stroke and TIA can be obtained from registers held by each General Practice in England through the Quality and Outcomes Framework (QOF). The Quality Management and Analysis System (QMAS) is the national system used to calculate QOF achievement for each practice. QOF data is publically available from the Information Centre for Health and Social Care (http://www.ic.nhs.uk) and supplies QOF data for use on the NCHOD website.

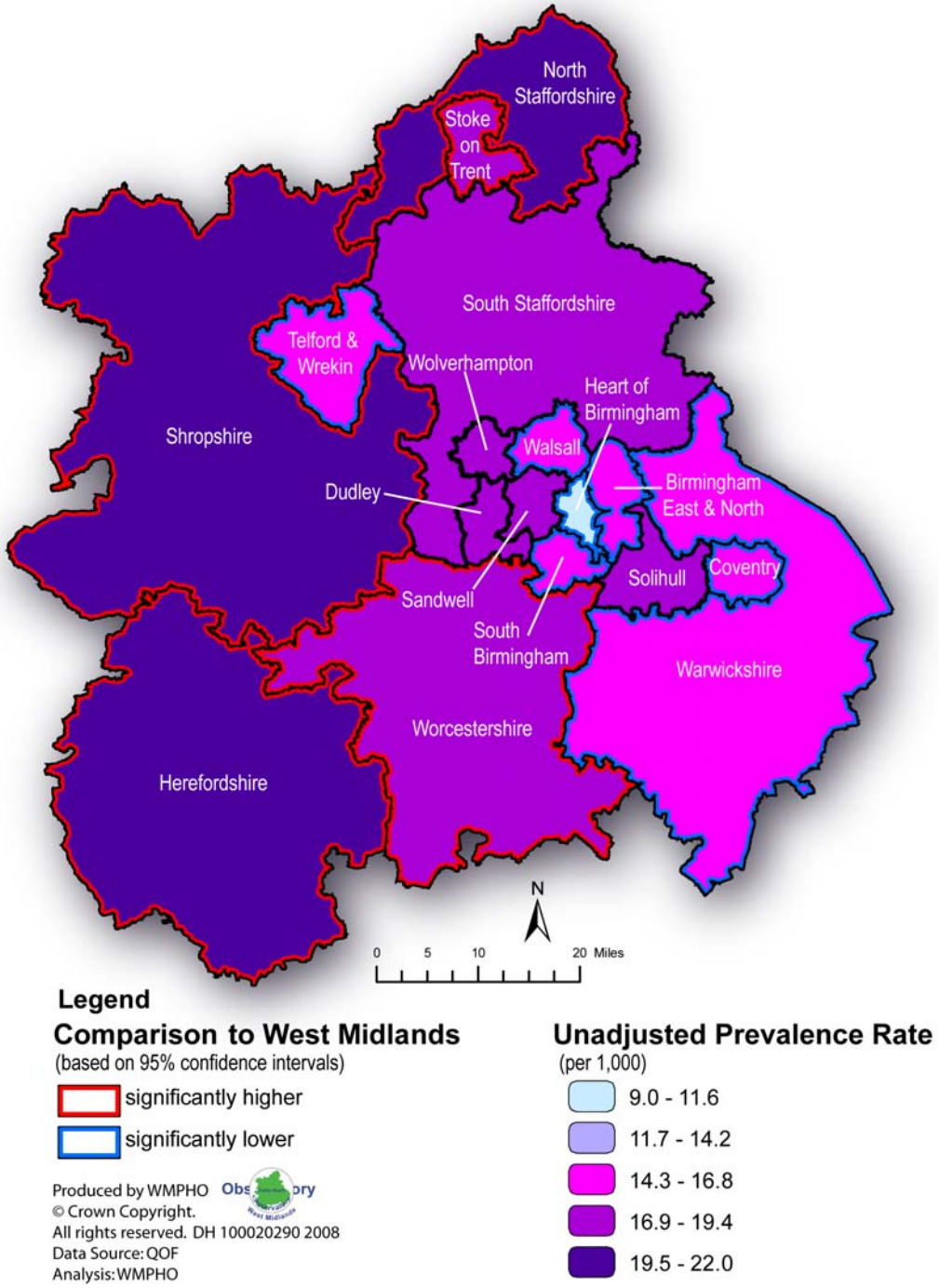
The reliability and validity of this information depends upon a number of factors including the individual's (or their carers) health seeking behaviour, stroke and TIA being recognised and diagnosed by the health professional and the data being recorded accurately. It must be remembered that QOF data is collected for the purposes of measurement and improvement of quality of care, not for the study of the population's health. Limitations include the lack of a standardised disease definition, underlying differences in demography of the practice population and the variation between practices in the diagnosis and treatment recording and coding using the practice clinical information system. A previous chapter of Key Health Data has highlighted the fact that prevalence of disease (in that case coronary heart disease) as measured by QOF, may be much lower than expected from other clinical indicators such as mortality rates.[9]

Figure 9.8: Stroke and TIA prevalence (STR1) by Strategic Health Authority, financial year 2006/07



Prevalence of stroke and TIA for 2006/07 in the West Midlands Strategic Health Authority with a rate of 16.6 per 1,000, was the 6th highest of the 10 SHAs. However, the West Midlands is still very similar to the England average (16.1 per 1,000). This differs from mortality for which the West Midlands region was 3rd highest, however mortality includes only stroke (ICD10 I60-I69) whilst QOF prevalence includes both stroke and TIA. The prevalence of stroke and TIA by QOF does not show the clear north south gradient observed for mortality.

Map 9.3: Unadjusted Prevalence Rates of Stroke and TIA (STR1), in the West Midlands by Primary Care Organisation, Financial Year 2007/08



QOF data is available regionally for 2007/08 directly from the Quality Management and Analysis System (QMAS). With a prevalence of 16.7 per 1,000 the West Midlands has remained very similar to the previous year (16.6 per 1,000). The quality of the QOF data appears to be variable across the region. North Staffordshire, Shropshire County, and Herefordshire ranked highest in terms of QOF prevalence. The prevalence rate in Heart of Birmingham PCT is the lowest in the region, being an extreme contrast to both emergency admissions and mortality rates for all ages and under 75's. Although this may be a result of greater access to services and lower survival, it is unlikely to represent a true picture, and may be due to under recording in the QOF data.

It must be noted that if the National Stroke Strategy is successful in achieving it's aims of increasing the public's awareness of stroke and TIAs then this may be captured in the QOF data showing an apparent increase in stroke occurring nationally.

9.5 Outcomes

The West Midlands has above average mortality for stroke for both all ages and under 75's. Patients in the West Midlands appear to have poor survival from stroke. NCHOD data for all ages from 2005/06 ranks the West Midlands 2nd highest, after the East Midlands, for deaths within 30 days of emergency admission for stroke (indirectly age & sex standardised rate 24831.1 per 100,000), higher than but not statistically significant from the England average (23657.4 per 100,000). The region also has the lowest percentage of patients returning to their usual place of residence 52.3%, significantly lower than England average of 56.7% (indirectly age and sex standardised).[7] Although it should be noted this data is defined differently to earlier presented data, in terms of age group, year and ICD10 codes, and that it may not reflect long term outcomes. These data may indicate a need to examine the standard of care in the region.

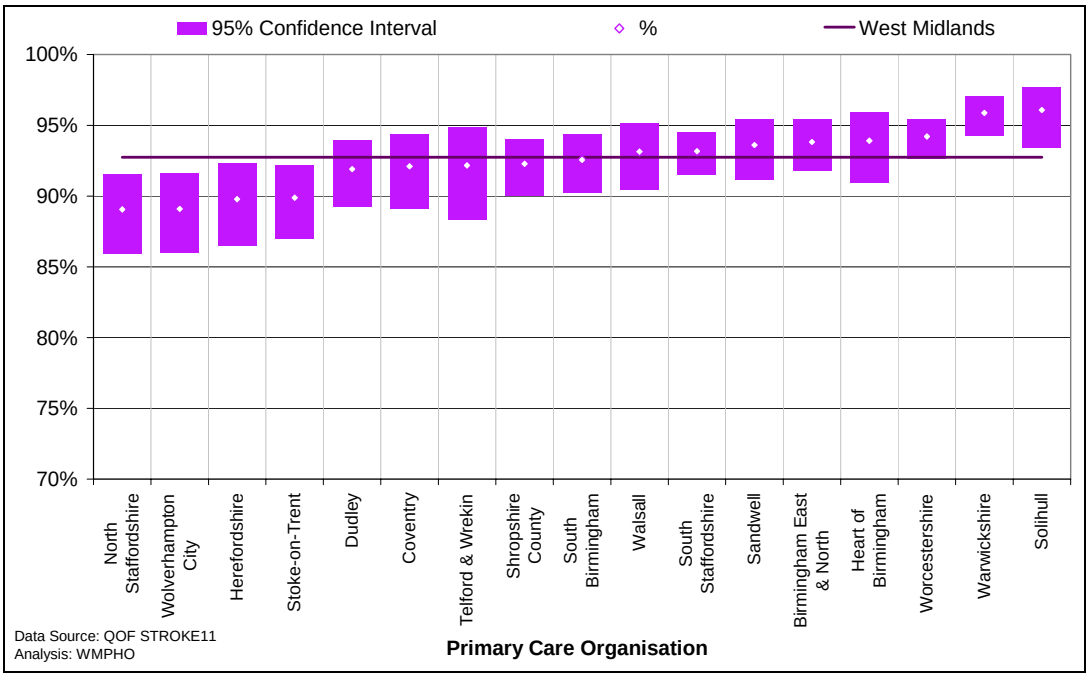
9.6 Standard of Care - Primary Care

Quality of care for stroke in primary care can be assessed by looking at QOF data for treatment following initial diagnosis for those not admitted to hospital, and also levels of appropriate preventative care for those with previous stroke and TIA.

Please note previous caveats for QOF data. A further issue to take into account here is that practices are allowed, under certain circumstances, to remove patients from these returns – so called 'exceptions'. The level of exceptions varies between practices.

Patients who have suffered a stroke require further investigation including imaging to determine if the stroke is haemorrhagic (due to a bleed) or ischaemic (due to a clot) because this has a major influence on future treatment with anti-coagulants. Figure 9.9 shows the results for the relevant QOF indicator by PCT in the West Midlands.

Figure 9.9: % of new patients with a stroke who have been referred for further investigation (STR11), in the West Midlands by Primary Care Organisation, financial year 2007/08



The percentage of stroke and TIA patients referred for further investigation ranges by 7 percentage points. North Staffordshire and Wolverhampton (89.1%) and Stoke on Trent (89.9%) were statistically significantly lower than the West Midlands average whilst Warwickshire (95.9%) and Solihull (96.1%) were significantly higher.

Preventative care involves preventing further strokes in those who have already suffered one by managing their risk factors. Those that are recorded through the QOF are blood pressure control, lowering of cholesterol and usage of anti-coagulation for non-haemorrhagic strokes (see Figures 9.10, 9.11 and 9.12).

Figure 9.10: % of patients with TIA or stroke in whom the last blood pressure reading (measured in the previous 15 months) is 150/90 or less (STR6), in the West Midlands by Primary Care Organisation, financial year 2007/08

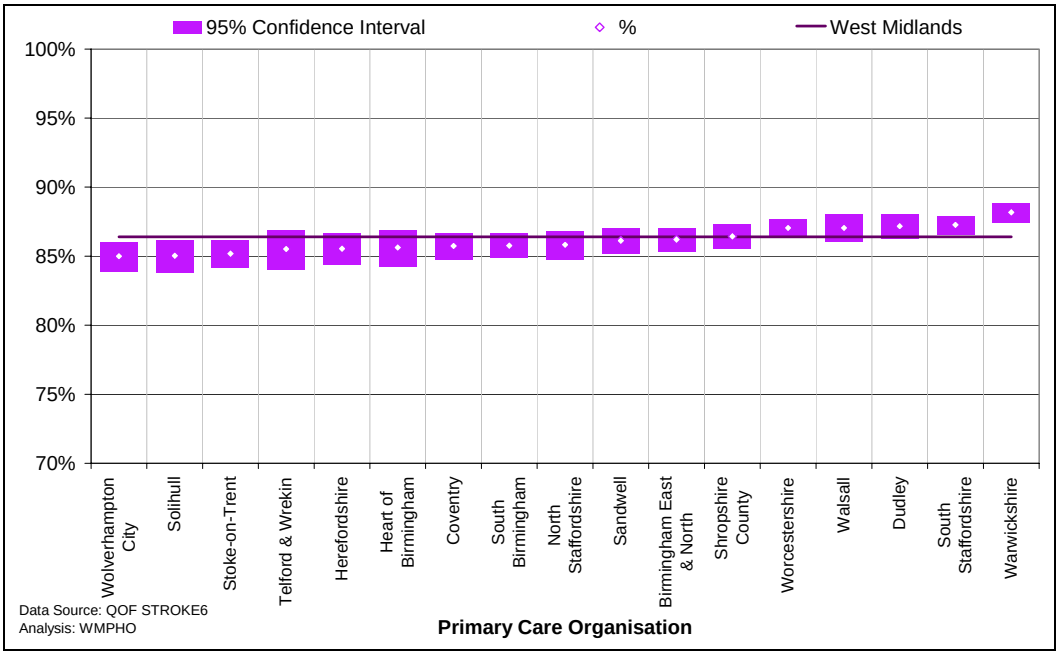


Figure 9.11: % of patients with TIA or stroke whose last measured total cholesterol (measured in the previous 15 months) is 5mmol/l or less (STR8), in the West Midlands by Primary Care Organisation, financial year 2007/08

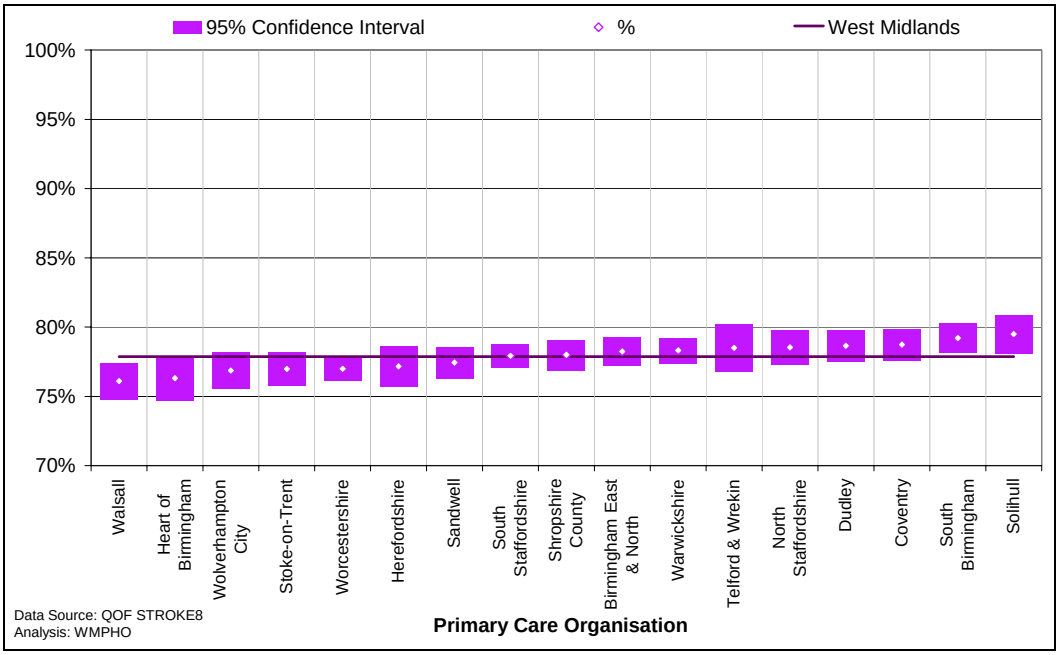
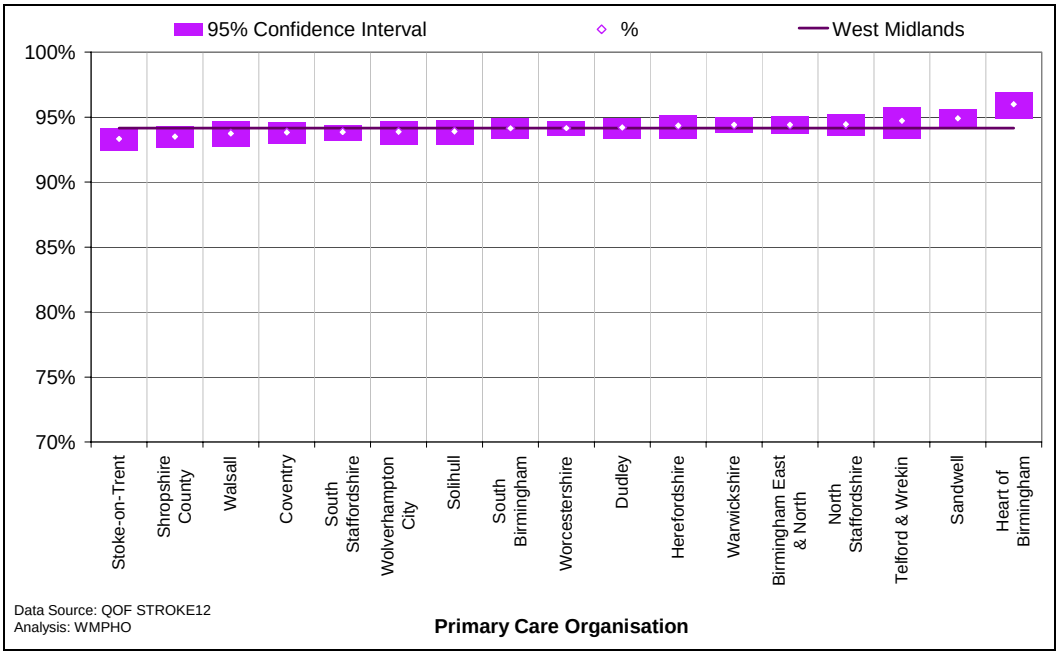


Figure 9.12: % of new patients with a stroke shown to be non-haemorrhagic, or a history of TIA, who have a record that an anti-platelet agent*, or an anti-coagulant+ is being taken (STR12), in the West Midlands by Primary Care Organisation, financial year 2007/08

+ unless a contraindication or side-effects are recorded
* aspirin, clopidogrel, dipyridamole or a combination



Adequate control of blood pressure in those with stroke or TIA (Figure 9.10) varies across the West Midlands region from 85.0% in Wolverhampton and Solihull to 88.2% in Warwickshire, all significantly different to the regional average (86.4%). The only PCT significantly different from the West Midlands average for control of cholesterol was Walsall with 76.1%, significantly lower than the regional average (77.9%) (Figure 9.11).

Long-term anti-platelet therapy is prescribed as secondary prevention of recurrent stroke, reducing the risk of future serious vascular events. Little variation was seen across the region, with nearly all patients (excluding those subject to exception reporting) receiving this. Heart of Birmingham (96.0%) was significantly higher than the West Midlands average of 94.1% (Figure 9.12).

9.7 Standard of Care - Secondary Care

The Royal College of Physicians National Sentinel Audit of stroke[10] has taken place on a two-year cycle since 1998. The aim of the programme is to support local providers in the development of clinical audit as a tool for improving the quality of patient care. It contains two phases: organisation of care (Phase I) and process of care (clinical Phase II). The audit defined a site in the following way: “Lead clinicians were asked to collect data on the basis of a unified service within a Trust. For most Trusts the ‘site’ was the Trust. For some Trusts there were several ‘sites’ each offering a distinct service. A few other ‘sites’ were combinations of Trusts. There are some differences in configuration between the organisational audit (Phase I conducted in April 2006) and the clinical audit (Phase II).”[10]

Phase I – organisation of care - has evolved over time and now contains 10 domains:

1. Acute stroke care
2. Organisation of care
3. Interdisciplinary services (overall service)
4. Interdisciplinary services (stroke unit)
5. TIA/neurovascular services
6. Continuing education in stroke
7. Team working-multidisciplinary records
8. Team working-team meetings
9. Agreed assessment measures
10. Communications with patients and carers.

Phase II - process of care - consists of a retrospective audit of patient records. Each hospital is required to review and submit data on at least 80 consecutive patients admitted with a diagnosis of stroke during a specified time period. The data collected allows comparisons of delivery of care with standards derived from critically appraised research evidence and agreed by experts in all disciplines involved with the management of stroke.

The 12 key standards are:

1. More than 50% of stay on a stroke unit
2. Screening for swallowing disorders within first 24 hours of admission
3. Brain scan within 24 hours of stroke
4. Commenced aspirin by 48 hours after stroke
5. Physiotherapy assessment within first 72 hours of admission
6. Assessment by an Occupational Therapist within 7 days of admission
7. Weighed at least once during admission
8. Mood assessed by discharge
9. On antithrombotic therapy by discharge
10. Rehabilitation goals agreed by the multi-disciplinary team
11. Home visit performed before discharge
12. Treated in a stroke unit during their stay

The report, National Sentinel Stroke Audit Phase I (organisational audit) 2006 Phase II (clinical audit) 2006 is available from the website of the Royal College of Physicians. Please note that the 2008 audit report will be available from February 2009.[10]

Six of the twenty-one sites in the West Midlands were reported as being in the top quartile for phase I of the audit (organisation of care) in 2006. These were the Heart of England NHS Foundation Trust, Mid Staffordshire General Hospitals NHS Trust, Royal Wolverhampton Hospitals NHS Trust jointly with Wolverhampton Health Care NHS Trust, University Hospital Birmingham NHS Foundation Trust, University Hospitals Coventry and Warwickshire (Walsgrave Hospital) and Walsall Hospitals NHS Trust.

Scores for phase II of the audit represent the average percentage compliance with the 12 key standards. Scores for Strategic Health Authorities in England ranged from 58 to 72% with an average of 65%. The West Midlands, at 63%, was below the national average and had the third lowest score.

Twenty sites in the West Midlands participated in Phase II. Table 9.1 gives an example of the kind of data that is obtained through the audit, showing the percentage compliance with the phase II 12 key standards for sites within the West Midlands, organised by Stroke Network.

The authors of the audit report conclude:

“Stroke clinicians, managers and politicians can feel proud of the advances that have been made over the last ten years - there are few other conditions that have progressed as rapidly. However there are still many areas of care that need to be improved and some hospitals that have failed to recognise that their stroke patients need 21st century management.”

Table 9.1: Royal College of Physicians Stroke Sentinel audit - the percentage compliance with the phase II 12 key stroke standards for sites within the West Midlands, organised by Stroke Network, 2006.

	Number of cases in the audit	Patients treated in a stroke unit (%)	Patients treated for >50% of stay in stroke unit (%)	Screening for swallowing disorders <24 hours after admission (%)	Brain scan within 24 hours (%)	Aspirin by 48 hours after stroke (%)	Physiotherapist assessment within 72 hours of admission (%)	Occupational therapy assessment within 7 days of admission (%)	Patient weighed during admission (%)	Patient's mood assessed by discharge (%)	Patient on antithrombotic therapy by discharge (%)	Rehabilitation goals agreed by MDT (%)	Home visit performed before discharge (%)	2004 key 12 indicator score (%)	2006 12 key indicator score (%)	Average % score for the trust excluding 2004 and 2006 key indicators	min score	max score
Birmingham, Solihull, Sandwell																		
Good Hope Hospital	76	70	58	48	51	61	80	49	4	25	100	84	29	63	55	55	4	100
Heart of England Foundation Trust	79	65	61	83	38	65	90	76	74	63	100	87	75	59	73	73	38	100
Sandwell and West Birmingham Hospitals (City)	67	70	45	46	34	48	74	55	13	55	100	88	75	68	59	59	13	100
Sandwell and West Birmingham Hospitals (Sandwell District Hospital)	71	86	83	69	26	73	90	96	76	54	100	89	74	59	76	76	26	100
South Birmingham PCT with University of Birmingham NHS Foundation Trust	70	77	67	52	28	71	76	79	70	16	100	15	42	N/A	58	58	15	100
Black Country																		
Dudley Group of Hospitals	77	86	66	74	24	81	77	79	57	69	100	66	39	53	68	68	24	100
Royal Wolverhampton Hospitals with Wolverhampton Healthcare NHS Trust	80	69	66	89	58	80	72	78	79	75	100	84	100	70	79	79	58	100
Walsall Hospital	79	73	67	55	33	69	65	50	61	44	100	78	69	35	64	64	33	100
Hereford and Worcester																		
Hereford Hospital	60	38	33	57	38	44	85	24	22	17	100	73	15	46	45	46	15	100
Worcestershire Acute Hospitals (Alexandra Hospital, Redditch)	48	31	25	67	54	65	50	85	5	17	100	91	N/A	61	54	54	5	100
Worcestershire Acute Hospitals Worcester Royal Hospital)	79	70	32	38	56	60	76	53	6	32	100	84	43	62	55	54	6	100
South Worcester PCT	8	100	88	14	N/A	57	71	71	100	25	100	100	88	62	74	74	14	100
Shropshire and Staffordshire																		
Mid-Staffordshire General Hospitals	70	66	34	65	37	76	54	50	25	26	100	53	80	39	55	56	25	100
Shrewsbury and Telford	80	74	63	23	33	61	41	77	37	16	100	53	75	N/A	54	54	16	100
University Hospital North Staffordshire and North Staffordshire Combined Healthcare Trust	80	91	73	81	40	32	76	90	75	68	100	90	100	N/A	76	76	32	100
Burton Hospitals	80	45	38	45	30	81	80	94	13	76	100	80	61	51	62	62	13	100
Coventry and Warwickshire																		
South Warwickshire General Hospitals	51	73	67	65	47	90	91	89	29	41	100	76	46	62	68	68	29	100
University Hospital Coventry and Warwickshire (St Cross Hospital, Rugby)	21	67	67	86	5	38	71	67	38	44	100	62	60	59	70	59	5	100
University Hospital of Coventry and Warwickshire (Walsgrave Hosital)	80	58	48	52	35	67	27	36	25	43	100	75	25	46	49	49	25	100
George Eliot Hospital	72	64	63	93	44	77	96	88	72	74	100	82	44	44	75	75	44	100

9.8 Summary of findings in the West Midlands

Mortality due to stroke in the West Midlands is the third highest of all the nine Government Office Regions in the under 75s and in all ages. Mortality rates rise steeply with increasing age. In the West Midlands rates of emergency admission to hospital due to stroke in the under 75s are similar to those of England, even though mortality rates are higher in the region. In males, emergency admissions and mortality rates are 40% higher than in females in the West Midlands, in line with the rest of the country.

Mortality from stroke in the under 75s varies across West Midlands PCTs, with rates in Heart of Birmingham, Sandwell and Birmingham East & North being statistically significantly higher than the regional average, and Worcestershire and Warwickshire having rates which are significantly lower. These rates are, of course, influenced by the prevalence of underlying risk factors for stroke. Emergency admissions in PCTs across the region show a similar pattern to mortality rates, with Heart of Birmingham and Sandwell showing statistically significantly higher rates, and Worcestershire significantly lower.

In those under 75 both mortality and emergency admission rates show a correlation with deprivation. The most deprived fifth of the region having mortality rates nearly three times greater and emergency admissions rates nearly double that of the least deprived fifth. This relationship was absent for the over 75 age group.

Over the course of the last decade there was a reduction in emergency admissions to hospital nationally and in this region. The West Midlands saw a 20% reduction over this period.

Prevalence of stroke and TIA, as determined by the Quality and Outcome Framework (QOF) data, is 16.6 per 1,000 in the West Midlands. This is similar to the England average. Note that no north-south gradient is seen in QOF derived prevalence, unlike that seen in mortality due to stroke.

Across the region QOF derived prevalence varies significantly with North Staffordshire, Shropshire County and Herefordshire showing the highest rates. Heart of Birmingham has an extremely low prevalence of stroke and TIA reported through QOF, in contrast to their relatively high mortality and emergency admission rate.

The region has the lowest percentage of patients returning to their usual place of residence, and this is statistically significantly lower than the England average. For deaths within 30 days of admission the West Midlands has the second highest rate in England, although not statistically different from the England average.

Primary care quality of care for stroke patients as reported through the QOF varies across the region. The percentage of stroke and TIA patients referred for further investigation varies significantly from 89.1% in North Staffordshire and Wolverhampton to 96.1% in Solihull. Less variation is seen for the other QOF stroke and TIA indicators. Adequate control of blood pressure in those with stroke or TIA ranges from 85.0% in Wolverhampton and Solihull to 88.2% in Warwickshire, and successful lowering of cholesterol reporting ranges from 76.1% in Walsall to 79.5% in Solihull.

Information around the quality of secondary care for stroke in the region is available through, the two yearly, Royal College of Physicians Stroke Sentinel Audit. In the most recent audit, 2006, compliance with the 12 key standards varied between sites in the West Midlands and between standards. The West Midlands had six trusts in the top quartile for ‘organisation of care’, but had the third lowest score nationally for ‘process of care’.

9.9 Conclusions

Although emergency admissions in the under 75s for the West Midlands are in keeping with the national average, deaths from stroke in the West Midlands are higher than the England average. It is not clear whether this is due to the fact that more strokes are occurring in this

age group with fewer than expected admitted to hospital or just that people who have strokes in the West Midlands are more likely to die.

Recording of data on the management of stroke in primary care requires some caution in interpretation and would benefit from improved quality of recording. However, current data from QOF and the Royal College of Physicians Stroke Sentinel Audit indicates that there is capacity for improvement in the management of stroke and TIA in primary and secondary care.

Twenty quality markers with which services can assess the quality of stroke, prevention, treatment, care and support and patient reported outcome measures have been suggested by the National Stroke Strategy.[2] It is hoped that this strategy will increase prevention, improve services and reduce mortality from stroke in the future.

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Acknowledgements:
Ian Herring, Commissioning Business Support Agency (CBSA)
Paulette Myers, Consultant in Public Health, Walsall Teaching Primary Care Trust

APPENDIX 1

Quality Outcomes Framework Stroke Indicators Publically Available Data Sources for 2006/07

* http://www.ic.nhs.uk/our-services/improving-patient-care/the-quality-and-outcomes-framework-qof-2006/07/qof-2006-07-data-tables
† Practice level: http://www.qof.ic.nhs.uk/, PCT and SHA data may be available upon request
‡ http://www.nchod.nhs.uk

Current QOF Definitions Indicators 2006/07[3,4]	**Information Centre for Health & Social Care (IC)**	**National Centre for Health Outcomes Development (NCHOD)**	**Previous QOF Definitions Introduced April 2004[1,2]**	**Future Changes to QOF Definitions 2008/09[5]**
STROKE 1 The practice can produce a register of patients with Stroke or TIA	Y* (prevalence)	Y‡ (prevalence)	Same as current	National Prevalence Day move to March 31
STROKE 11 The percentage of new patients with a stroke who have been referred for further investigation	Y†	Y‡	STROKE 2 The percentage of new patients with presumptive stroke (presenting after 1 April 2003) who have been referred for confirmation of the diagnosis by CT or MRI scan	STROKE 13 The percentage of new patients with a stroke **or TIA** who have been referred for further investigation. (Guidance clarifies referral should be within one month of diagnosis of presumptive stroke or TIA rather than 12 months that the previous guidance stated.)
SMOKING 1 The percentage of patients with any or any combination of the following conditions: coronary heart disease, stroke or TIA, hypertension, diabetes, COPD or asthma whose notes record smoking status in the previous 15 months. Except those who have never smoked where smoking status need only be recorded once since diagnosis	Y†	Y‡	STROKE 3 The percentage of patients with TIA or stroke who have a record of smoking status in the last 15 months, except those who have never smoked where smoking status need be recorded only once since diagnosis	SMOKING 3 The percentage of patients with any or any combination of the following conditions: coronary heart disease, stroke or TIA, hypertension, diabetes, COPD, **CKD,** asthma, **schizophrenia, bipolar affective disorder or other psychoses** whose notes record smoking status in the previous 15 months.

Current QOF Definitions Indicators 2006/07[3,4]	**Information Centre for Health & Social Care (IC)**	**National Centre for Health Outcomes Development (NCHOD)**	**Previous QOF Definitions Introduced April 2004[1,2]**	**Future Changes to QOF Definitions 2008/09[5]**
SMOKING 2 The percentage of patients with any or any combination of the following conditions: coronary heart disease, stroke or TIA, hypertension, diabetes, COPD or asthma who smoke whose notes contain a record that smoking cessation advice or referral to a specialist service, where available, has been offered within the previous 15 months	Y†	N	STROKE 4 The percentage of patients with a history of TIA or stroke who smoke and whose notes contain a record that smoking cessation advice or referral to a specialist service, if available, has been offered in the last 15 months	SMOKING 4 The percentage of patients with any or any combination of the following conditions: coronary heart disease, stroke or TIA, hypertension, diabetes, COPD, **CKD**, asthma, **schizophrenia, bipolar affective disorder or other psychoses** who smoke whose notes contain a record that smoking cessation advice or referral to a specialist service, where available, has been offered within the previous 15 months.
STROKE 5 The percentage of patients with TIA or stroke who have a record of blood pressure in the notes in the preceding 15 months	Y†	N	Same as current	
STROKE 6 The percentage of patients with a history of TIA or stroke in whom the last blood pressure reading (measured in last 15 months) is 150/90 or less	Y†	Y‡	Same as current	
STROKE 7 The percentage of patients with TIA or stroke who have a record of total cholesterol in the last 15 months	Y†	N	Same as current	
STROKE 8 The percentage of patients with TIA or stroke whose last measured total cholesterol (measured in last 15 months) is 5 mmol/l or less	Y†	Y‡	Same as current	

Current QOF Definitions Indicators 2006/07[3,4]	Information Centre for Health & Social Care (IC)	National Centre for Health Outcomes Development (NCHOD)	Previous QOF Definitions Introduced April 2004[1,2]	Future Changes to QOF Definitions 2008/09[5]
STROKE 12 The percentage of patients with a stroke 4 40–90% shown to be non-haemorrhagic, or a history of TIA, who have a record that an anti-platelet agent (aspirin, clopidogrel, dipyridamole or a combination), or an anti-coagulant is being taken (unless a contraindication or side-effects are recorded)	Y†	Y‡	STROKE 9 The percentage of patients with a stroke shown to be non-haemorrhagic, or a history of TIA, who have a record that aspirin, an alternative anti-platelet therapy, or an anti-coagulant is being taken (unless a contraindication or side-effects are recorded)	
STROKE 10 The percentage of patients with TIA or stroke who have had influenza immunisation in the preceding 1 September to 31 March	Y†	Y‡	Same as current	

1. Department of Health (August 2004) Quality and outcomes framework Guidance, http://www.dh.gov.uk/en/Healthcare/Primarycare/Primarycarecontracting/QOF/DH_4125653?IdcService=GET_FILE&dID=8581&Rendition=Web (accessed 04/08/2008)
2. Department of Health (June 2003) GMS contract 2003 Annex A: Quality indicators, http://www.dh.gov.uk/en/Healthcare/Primarycare/Primarycarecontracting/GMS/DH_4125637 accessed (04/08/2008)
3. NHS employers (2006) Revisions to the GMS contract 2006/07 Annex 1: Quality and Outcomes Framework guidance 2006/07 http://www.nhsemployers.org/restricted/downloads/download.asp?ref=766&hash=9dc005d2008b12439c50d25b8b49d3c9&itemplate=e_pay_conditions_3col_primary-890 accessed (04/08/2008)
4. NHS employers (2006) Annex 2: Summary of changes to QOF indicators for 2006/07 by domain and indicator set Revisions to the GMS contract 2006/07 http://www.nhsemployers.org/restricted/downloads/download.asp?ref=765&hash=5ec2417887a3cc9e260ff7dfc9558fe6&itemplate=e_pay_conditions_3col_primary-890 accessed (04/08/2008)
5. NHS employers (2008) Quality and Outcomes Framework 2008/09 http://www.nhsemployers.org/restricted/downloads/download.asp?ref=3704&hash=aa5aa969a2df5c190631a5f66a611053&itemplate=e_pay_conditions_3col_primary-890 accessed (04/08/2008)

APPENDIX 2

Additional stroke indicators publically available from the National Centre for Health Outcomes Development (NCHOD)
www.nchod.nhs.uk
(data may not exactly match that from other sources for a number of reasons; due to different releases of datasets, populations, hospital episode statistics currency e.g. counts of continuous inpatient spells vs. first finished admissions, methods used for calculations and ICD10 definition of stroke)

Indicator	Statistic	Year	Gender	Age Groups	ICD10
Mortality	Average age-specific death rates	2004-06	MFP	1+, 1-4, 5-14, 15-34, 35-64, 65-74, 75+	I60-I69 (adjusted ICD-9 430-438) and ages 35-64 hypertensive disease and stroke I10-I15 + I60-I69
Mortality	Directly standardised rate	2004-06	MFP	All ages, <65, <75, 35-64, 65-74	I60-I69 (adjusted ICD-9 430-438) and ages 35-64 hypertensive disease and stroke I10-I15 + I60-I69
Mortality	Directly standardised rate	1993-2006	MFP	All ages, <65, <75, 65-74	I60-I69 (adjusted ICD-9 430-438) and ages 35-64 hypertensive disease and stroke I10-I15 + I60-I69
Mortality	Indirectly standardised ratio (SMR)	2004-06	MFP	All ages, <65, <75, 35-64, 65-74	I60-I69 (adjusted ICD-9 430-438) and ages 35-64 hypertensive disease and stroke I10-I15 + I60-I69
Mortality	Indirectly standardised ratio (SMR)	1993-2006	MFP	All ages, <65, <75, 65-74	I60-I69 (adjusted ICD-9 430-438) and ages 35-64 hypertensive disease and stroke I10-I15 + I60-I69

Indicator	Statistic	Year	Gender	Age Groups	ICD10
Mortality	Number	2006	MFP	1+, 1-4, 5-14, 15-34, 35-64, 65-74, 75+	I60-I69 (adjusted ICD-9 430-438) and ages 35-64 hypertensive disease and stroke I10-I15 + I60-I69
Years of life lost due to mortality from stroke	Crude rate per 10,000 population and number of years of life lost	2004-06	MFP	<75	I60-I69
Years of life lost due to mortality from stroke	Directly age-standardised rate per 10,000 population and number of deaths	2004-06	MFP	<75	I60-I69
Deaths within 30 days of emergency admission to hospital: stroke	Indirectly age and sex-standardised rate per 100,000 (standardised to 2002/03)	Financial Years 1998/99 - 2005/06	MFP	All ages	I61-I64
Emergency hospital admissions: stroke	Indirectly age and sex-standardised rate per 100,000 (standardised to FY 2004/05)	Financial Years 2002/03 - 2006/07	MFP	All ages	I61-I64
Emergency readmissions to hospital within 28 days of discharge: stroke	Indirectly age and sex-standardised percent (standardised to 2002/03)	Financial Years 2000/01 - 2005/06	MFP	All ages	I61-I64
Returning to usual place of residence following hospital treatment: stroke	Indirectly age and sex-standardised percent (standardised to FY 2002/03)	Financial Years 1998/99 - 2005/06	MFP	All ages	I61-I64

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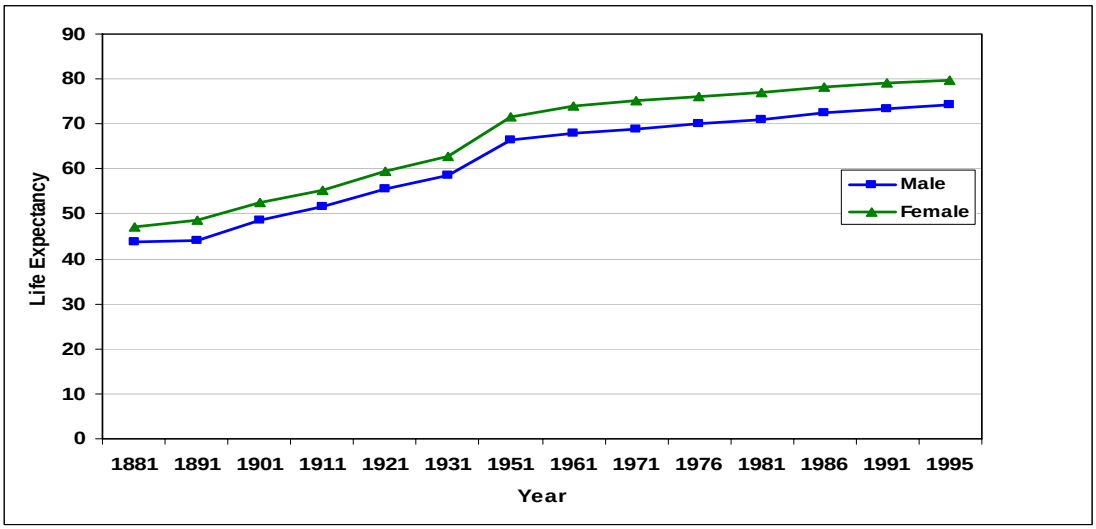
CHAPTER TEN: INEQUALITIES IN LIFE EXPECTANCIES IN THE WEST MIDLANDS

10.1 Introduction

Life expectancy at birth in England has increased dramatically in the past 100 years and is continuing to increase (Figure 10.1). A female child born in 2006 can expect to live 81.5 years and a male child 77.2 years [1]. Although social and environmental conditions have been very important in contributing to this lengthening of life, improvements in medical care have also played their part. Some diseases can now be detected early and cured or controlled either by medicine or surgery.

Despite this progress, large disparities in life expectancy between men and women between different, socio ethnic and economic groups and between people living in different places have persisted and even widened. The report *"Health inequality target monitoring: update to include data for 2006"* [2] for England noted that although the gaps between England and England Spearhead authorities in infant mortality and mortality from cancer and all circulatory mortality have reduced, the gaps in male and female life expectancy at birth have widened since the 1997-1999 baseline year. A list of spearhead primary care trusts in the West Midlands is shown in Table 10.1.

Figure 10.1:Trend in life expectancy in England



Source: ONS

Spearhead Group
The fifth of local authorities or primary care trusts with the worst health and deprivation indicators are called Spearhead Local authorities and Primary Care Trusts [3] respectively and they are defined as those which fall into the worst fifth for three out of five of the following indicators; male life expectancy at birth, female life expectancy at birth, cancer mortality, cardiovascular disease mortality and index of multiple deprivation (IMD2004).

Inequalities* in life expectancy between different groups indicate differences in health experiences and these are unacceptable (inequitable**) where they arise from unequal access to opportunities for health or access to care. Reducing these inequalities is an

* Health inequality describes difference in health status and outcome across groups of people or places such as those from different socio-economic groups, geographical locations and ethnic groups

** Health inequity describes differences which are unacceptable and unfair because they are avoidable and arise from difference in access to opportunities for health or differences in access to care

important public health concern as evident in the numerous policy documents of the current government [4, 5, 6, 7, 8, and 9].

This chapter looks at:

- Trends in life expectancy
- Differences in life expectancy between England average and the West Midlands Spearhead and Non- Spearhead primary care trusts
- The contribution of different diseases to those differences
- The contribution of death in different age groups to those differences

The chapter aims to guide the interventions which are needed in order to reduce inequalities and reduce the gap in life expectancy between Spearhead Primary Care Trusts in the West Midlands and the England average. Analysis by Spearhead local authorities can be found in a separate West Midlands Public Health Observatory publication [10].

Table 10.1: West Midlands Primary Care Trusts

Spearhead PCTs	Non Spearhead PCTs
Birmingham East & North	Dudley
Coventry	Herefordshire
Heart of Birmingham	North Staffordshire
Sandwell	Shropshire County
South Birmingham	Solihull
South Staffordshire	Telford & Wrekin
Stoke on Trent	Worcestershire
Walsall	
Warwickshire	
Wolverhampton	

Source: DH

10.2 National health inequality target for life expectancy

Public Service Agreements (PSA) specify the achievements that the departments of state undertake to make. The Department of Health PSA incorporates the national targets for reducing health inequalities announced by the government in 2001[11].

The target is to reduce inequalities by ten percent by 2010 as measured by infant mortality and life expectancy at birth from 1995-1997 baseline. This is supported by the following two specific targets:

- *"Starting with children under one year, by 2010 to reduce the gap in mortality by at least 10% between "routine and manual" groups and the population as a whole*".
- "*Starting with Local Authorities, by 2010 to reduce by at least 10% the life expectancy gap between the fifth of areas with the worst health and deprivation indicators and the population as a whole".*

10.3 Life expectancy in the West Midlands compared to England

Life expectancy at birth for 2004-2006 is shown in Table 10.2. This shows that for males, life expectancy in the West Midlands Spearhead Group was 76 .3 years compared with 77.6 years in England and 76.9 years for the whole of the West Midlands. For females the West Midlands Spearhead Group was 80.8 years compared with 81.7 years in England and 81.3 years for the whole of the West Midlands. To achieve the life expectancy target, the absolute gaps* at 1995-1997 baseline between the spearhead group and the England average have to be reduced by ten percent.

Table 10.2: Life expectancy, 2004-2006, England, the West Midlands

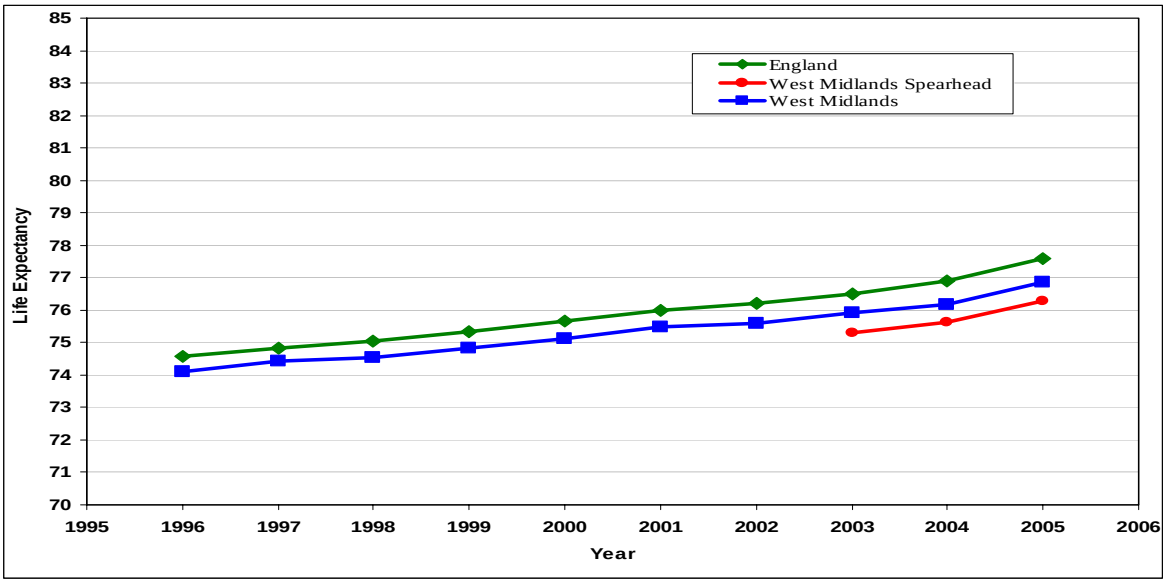
	Male		Female	
	1995-1997	2004-2006	1995-1997	2004-2006
England	74.6	77.6	79.7	81.7
The West Midlands	74.1	76.9	79.4	81.3
The West Midlands Spearhead Group	*	76.3	*	80.8

Source: ONS, analysis by WMPHO

* ***Absolute gap:*** This is the difference between health outcome indicator values for the disadvantage group and the reference group. For life expectancy, this is measured in years.

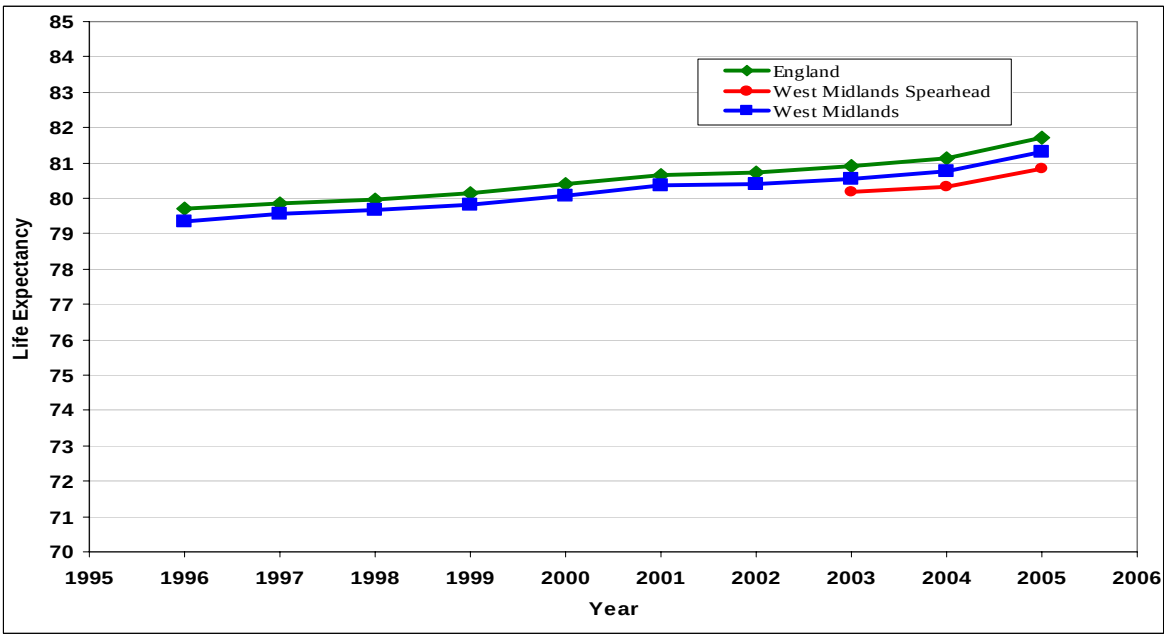
The trend in life expectancy is shown in Figures 10.2. The lack of PCTs' population data prior to 2002 prevented derivation of life expectancy for these periods. The trends in males and females life expectancy in the West Midlands paint an optimistic picture of continuously rising life expectancy and give an impression of steady improvement in health over the years. Life expectancy for males in the West Midlands has increased by 3.8% in 2004-2006 from baseline year 1995-1996 and by 2.4% for females in the same period.

Figure 10.2a: Trend in male life expectancy, England, the West Midlands and the West Midlands Spearhead Group



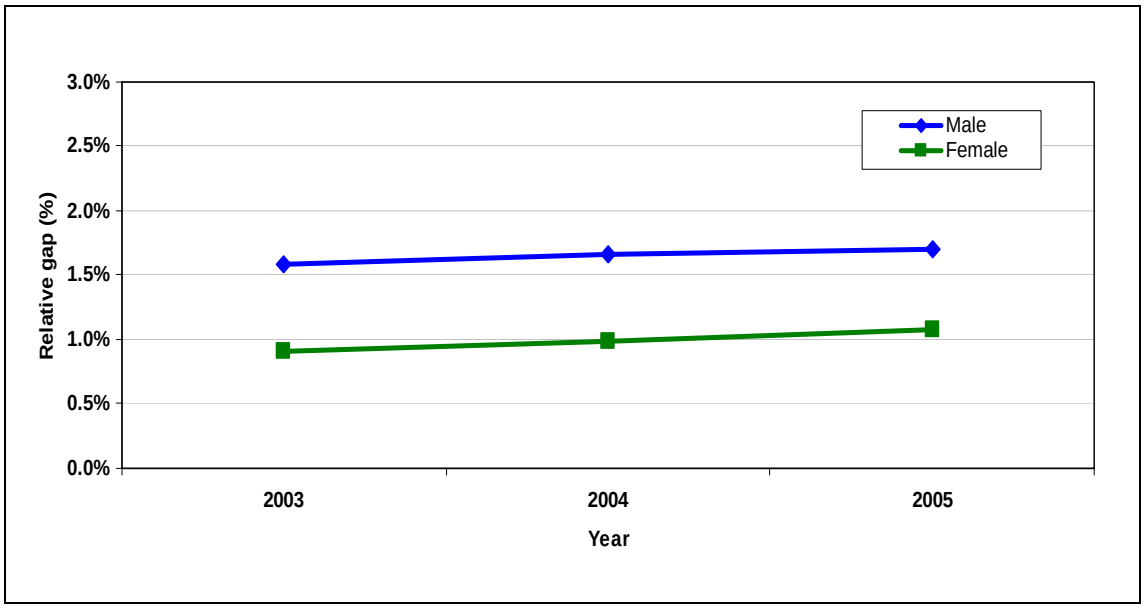
Source: ONS, analysis by WMPHO

Figure 10.2b: Trend in female life expectancy, England, the West Midlands and the West Midlands Spearhead Group



Source: ONS, analysis by WMPHO

Figure 10.3: Trend in relative gap in life expectancy, England, the West Midlands and the West Midlands Spearhead group



Source: ONS, analysis by WMPHO

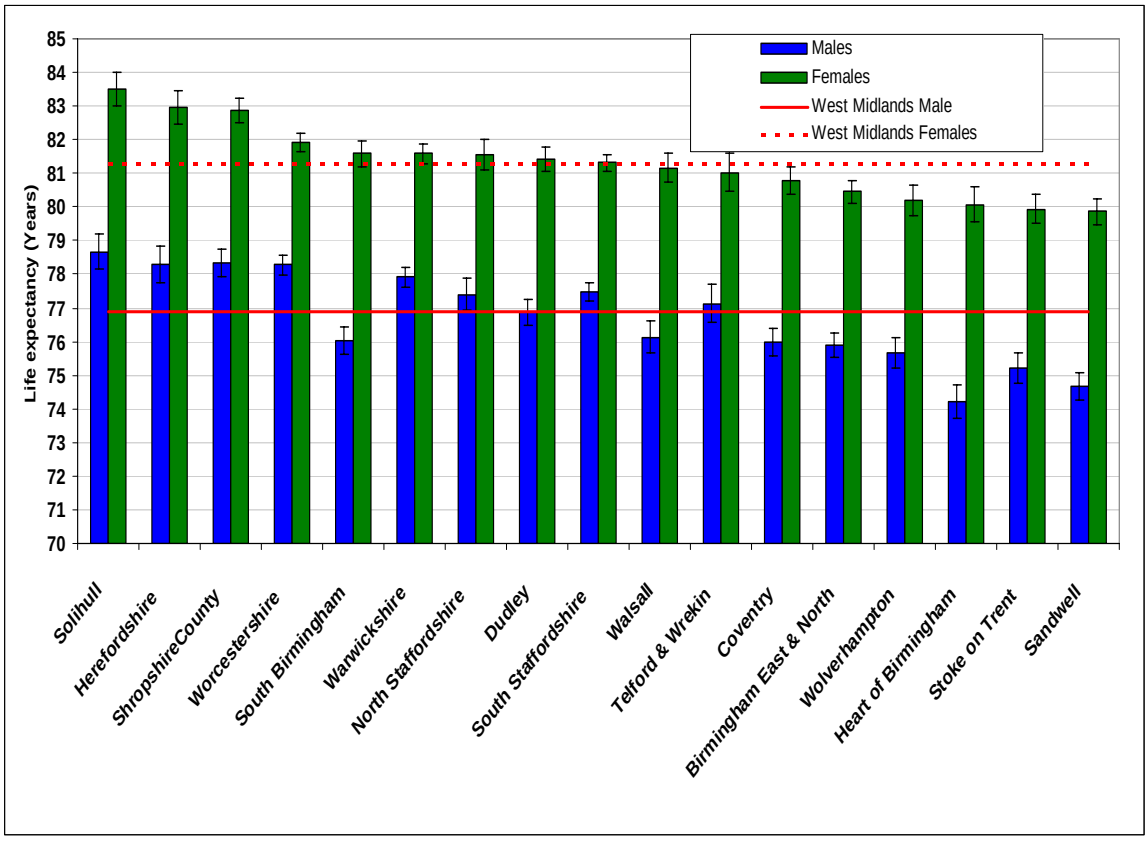
However comparison of figures for men and women in the West Midlands spearhead primary care trusts (the West Midlands Spearhead Group) and the West Midlands as a whole and all England shows that although life expectancy has increased for all groups the gap in life expectancies between the areas has hardly changed. Figure 10.3 shows the trend in the relative gap* in life expectancy between the West Midlands Spearhead Group and England from 2002-2004 to 2004-2006. This reveals that far from closing, the gap between the West Midlands Spearhead primary care trusts and the England average has continued to widen especially for men. The relative gap in life expectancy between Spearheads in the West Midlands and England currently stands at 1.7% for males and 1.08% for females. If the current trend continues, the target to reduce the gap between the Spearhead Group and England by ten percent by 2010 will not be achieved.

* ***Relative gap:*** This is the difference in indicator value between the disadvantaged group and the reference group expressed as a percentage of the value in the reference group.

The overall picture for the whole of the West Midlands and the West Midlands Spearhead primary care trusts mask variations that exist between the PCTs as shown in Figure 10.4. As expected the Spearhead primary care trusts have the lowest life expectancy for both males and females. Current patterns suggest that a baby boy born in Solihull PCT can expect to live 4.4 years more than a baby boy born in Heart of Birmingham PCT and a baby girl 3.4 years more.

All the Figures shown thus far confirm that while life expectancy is increasing in the region, it is still lower than the national average and inequalities remain between Spearhead primary care trusts and the West Midlands region as a whole and between the region and England.

Figure 10.4: Life expectancy at birth by primary care trust in the West Midlands, 2004-2006



Source: ONS, analysis by WMPHO

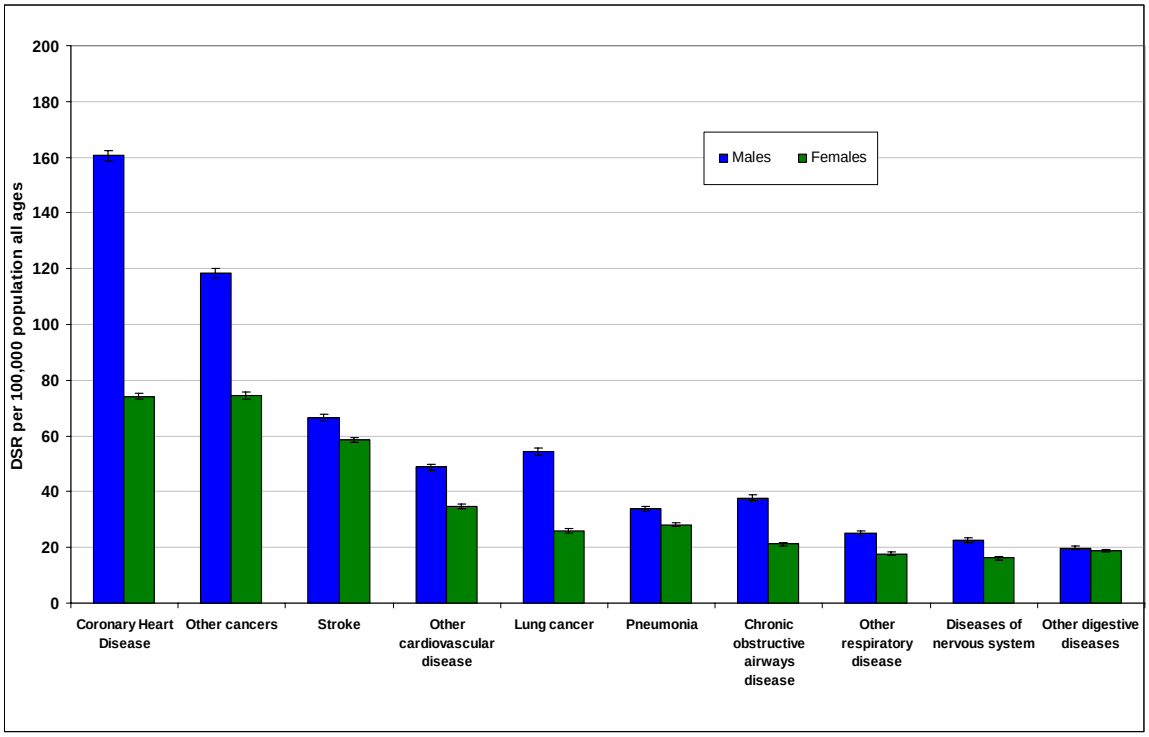
10.4 Identifying priorities for increasing life expectancy at birth in the West Midlands

Understanding the causes of health inequalities within the West Midlands is essential in order to identify the specific diseases and particular age groups at which relevant interventions should be directed. Local Delivery Plans can then be developed to reduce inequalities and improve the health of the whole population.

10.5 Main causes of death in the West Midlands and the Spearhead Group

Age standardised death rates for top ten causes for the whole of the West Midlands region and for the West Midlands Spearhead primary care trusts are shown in Figures 10.5 and10.6. A separate analysis of the age-standardised death rates for smoking and alcohol attributable deaths is shown in Table 10.3. It can be seen that the relative importance of different causes of death is similar in the two groups. The Figures show that coronary heart diseases (CHD) are the biggest cause of death both in the West Midlands region overall and in the Spearhead Group. Other cancers[a] and stroke are respectively the second and third largest causes of death in both groups. Lung cancer, other cardiovascular disease, pneumonia and chronic obstructive pulmonary disease are also major causes of death in both groups.

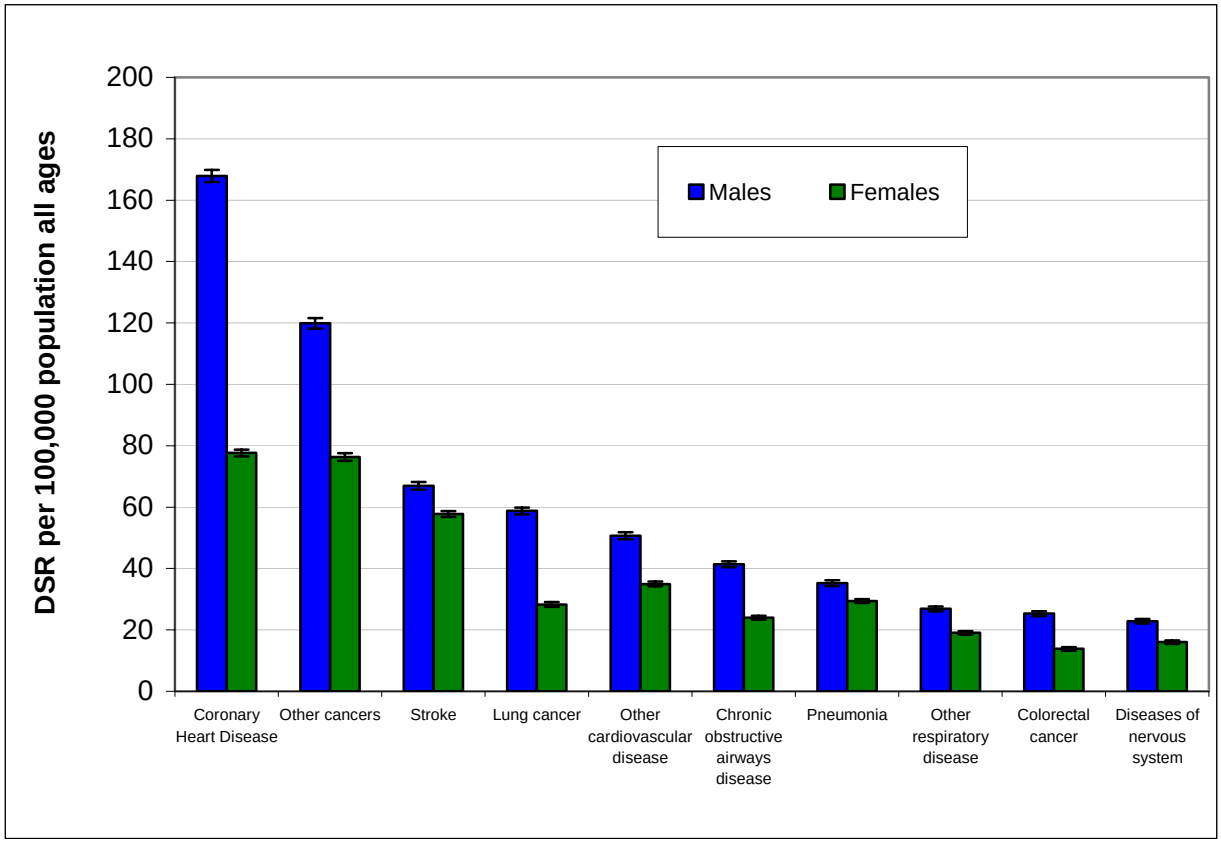
Figure 10.5: Directly age standardised death rates for top ten selected causes of death in the West Midlands, all ages, males & females, 2002-2006



Source: ONS, analysis by WMPHO

[a] All cancers less the following cancers: Lung, colorectal, breast, oesophageal and stomach

Figure 10.6: Directly age standardised death rates for top ten selected causes of death in the West Midlands Spearhead PCTs



Source: ONS, analysis by WMPHO

Table 10.3: Directly age standardised death rates per 100,000 for smoking and alcohol attributable deaths (2002-2006)

	Smoking attributable		Alcohol attributable	
	Male	Female	Male	Female
West Midlands Region	172	73	46	25
West Midlands Spearhead PCTs	184	79	49	26

Source: ONS, analysis by WMPHO

10.6 The gap in life expectancy between the West Midlands Spearhead Group and England

Table 10.4 shows the difference in life expectancy between England and the West Midlands (Spearhead primary care trusts and Non-Spearhead primary care trusts). A negative figure indicates that life expectancy is greater than the England average. This table thus shows the years of life that would be gained (or lost) if each area were to have the England average mortality rate.

Table 10.4: Total life expectancy gap in years between the West Midlands and England, 2002-2006

	Male	Female
The West Midlands Region	0.69	0.37
The West Midlands Spearhead PCT Group	1.30	0.82
The West Midlands Non-Spearhead Group	-0.38	-0.41

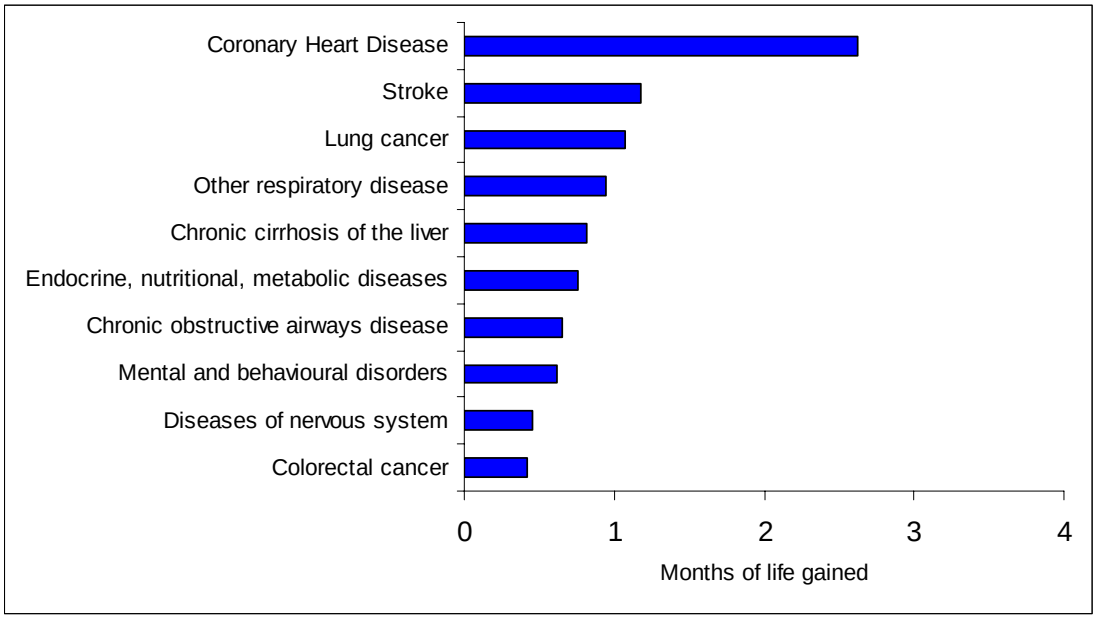
Source: ONS, analysis by WMPHO

10.7 Contribution of different causes to the gap in life expectancy

This section analyses how life expectancy might change if the mortality rate from various diseases (cause specific mortality rate) in Spearhead primary care trusts were to change from its current value to the average value for England (see appendix A for definition of disease groups).

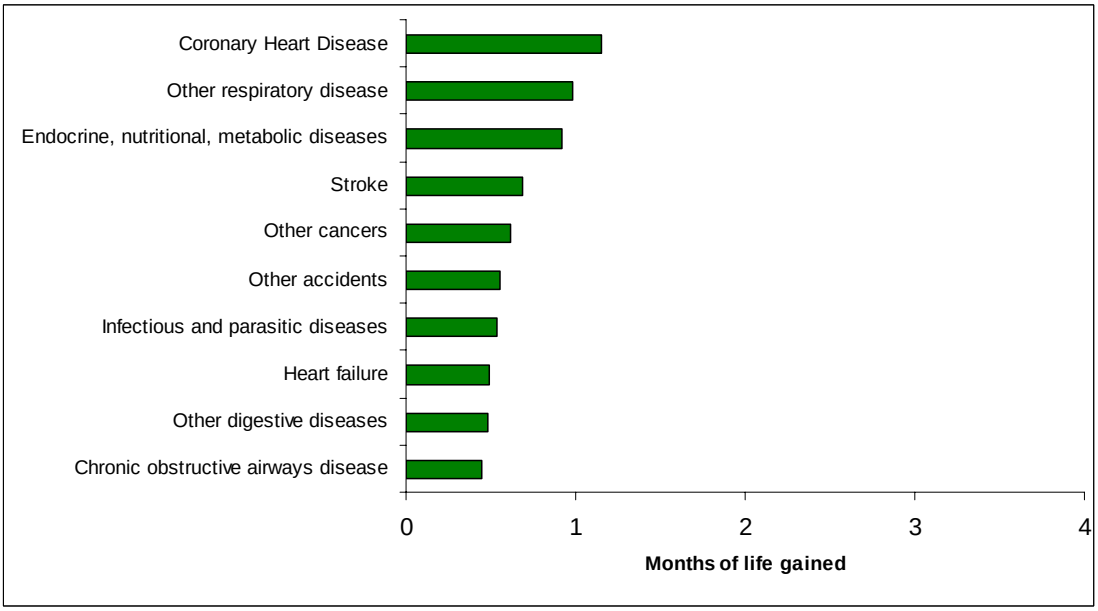
The top ten causes of death which would make the greatest contribution to reducing the gap in life expectancy between the West Midlands Spearhead Primary Care Trust and England is shown for males in Figure 10.7 and for females in Figure 10.8. It can be noted that these top ten causes are not identical to the ten commonest causes of death shown in Figure 10.6. They are included in Figures 10.7 and 10.8 because there is a large difference between the Spearhead and England not because they are necessarily the largest causes. For example other cancers is the second highest in rank order for mortality rates in both males and females but it is not one of the 10 most important diseases contributing to the gap in life expectancy in males and is only the fifth most important disease contributing to the gap in females.

Figure 10.7: Conditions contributing the most to the gap in life expectancy in males in the West Midlands PCTs Spearhead Group



Source: ONS, analysis by WMPHO

Figure 10.8: Conditions contributing the most to the gap in life expectancy in females in the West Midlands Spearhead Group



Source: ONS, analysis by WMPHO

Deaths in coronary heart disease are responsible for the biggest gaps in life expectancy between the West Midlands Spearhead Group and England in males and females. Other conditions that contribute most to the gap in life expectancy between males in the West Midlands Spearhead Group and England are stroke, lung cancer, other respiratory diseases and chronic liver disease. For females they are other respiratory diseases, endocrine, nutritional metabolic diseases, stroke and other cancers. The gap in life expectancy would reduce by about 25% in males and about 19% in females if death rates from coronary heart disease and stroke reduced to England average rates.

10.8 Deaths attributable to smoking and alcohol

Smoking and alcohol contribute to a wide range of causes of death [12, 13]. These deaths are referred to as smoking and alcohol attributable deaths. The directly standardised mortality rate for smoking attributable deaths in males and females is 172 and 73 deaths per 100,000 respectively for the whole of the West Midlands and 184 and 79 per 100,000 for the West Midland Spearhead Group (Table 10.3). These Figures are comparable to the rates of deaths caused by coronary heart disease.

Table 10.5 shows how many extra years of life would be gained if the rate of smoking attributable deaths and alcohol attributable deaths in different areas were to be made equal to the England average. It can be seen that the higher smoking attributable death rate in the West Midlands Spearhead PCTs accounts for about 3 months of the life expectancy gap in males and about 1 month in females. Figures 10.9 and 10.10 show the contribution of smoking and alcohol attributable deaths to loss of life expectancy in the different spearhead primary care trusts.

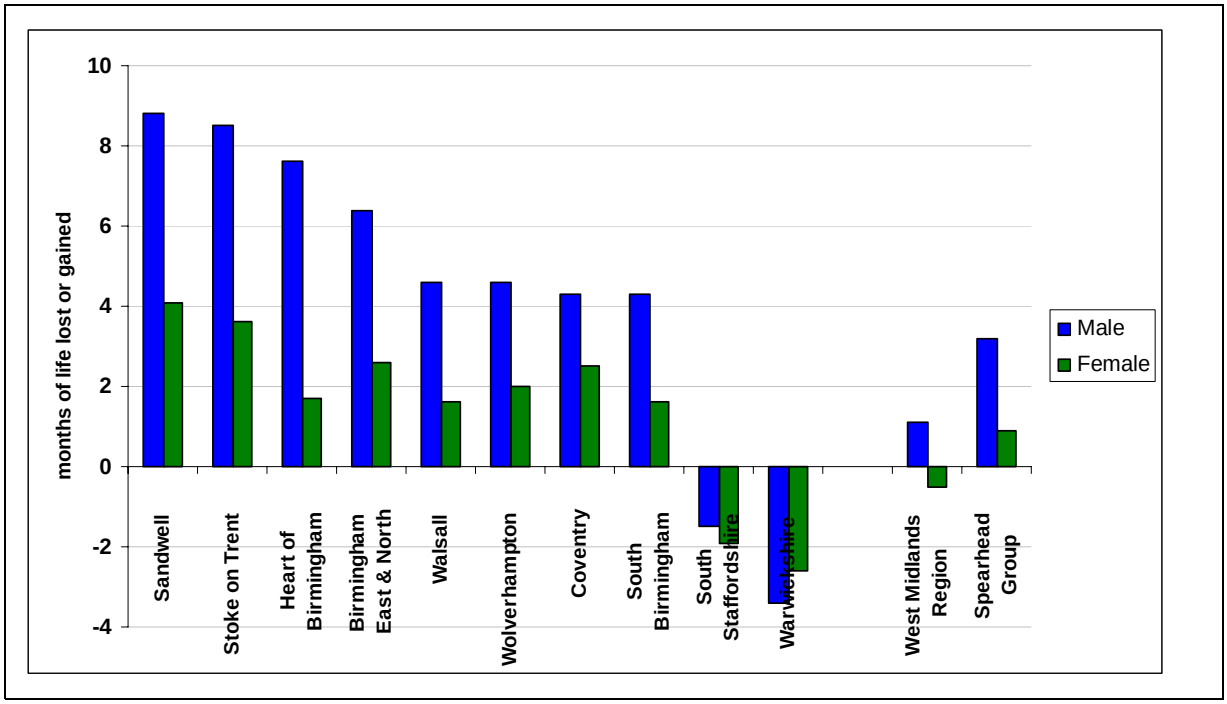
Table 10.5: Contribution in months of smoking and alcohol attributable deaths (2002-2006) to the gap in life expectancy in the West Midlands

	Smoking Attributable		Alcohol Attributable	
	Male	Female	Male	Female
West Midlands Region	1.1	-0.5	1.2	0.5
West Midlands Spearhead	3.2	0.9	1.7	0.8
West Midlands Non-Spearhead	*-2.5*	*-2.8*	*0.2*	*0.1*

Source: ONS, analysis by WMPHO

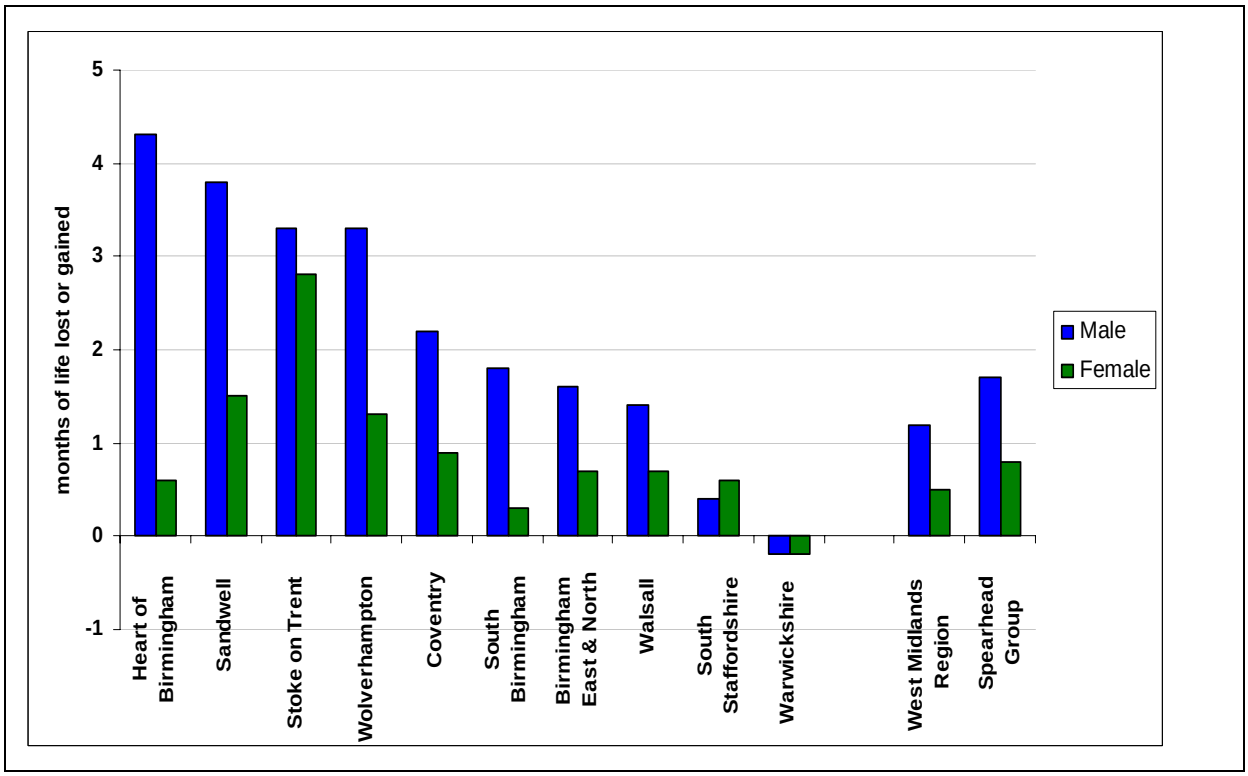
The analysis shows that the life expectancy gap might be reduced by about 21% and 9% in males and females respectively if smoking attributable death rates in the West Midlands Spearhead Group were reduced to the England average and by about 10% and 8% in males and females respectively if alcohol attributable deaths were reduced to the England average. Most of the deaths due to heart disease, stroke and cancer can be attributed to smoking. Thus smoking more than any other identifiable factor contributes to the gap in life expectancy between the West Midlands Spearhead Group and England.

Figure 10.9: Contribution of smoking attributable deaths (2002-2006) to the gap in life expectancy in the West Midlands Spearhead PCTs



Source: ONS, analysis by WMPHO

Figure 10.10: Contribution of alcohol attributable deaths (2002-2006) to the gap in life expectancy in the West Midlands Spearhead PCTs

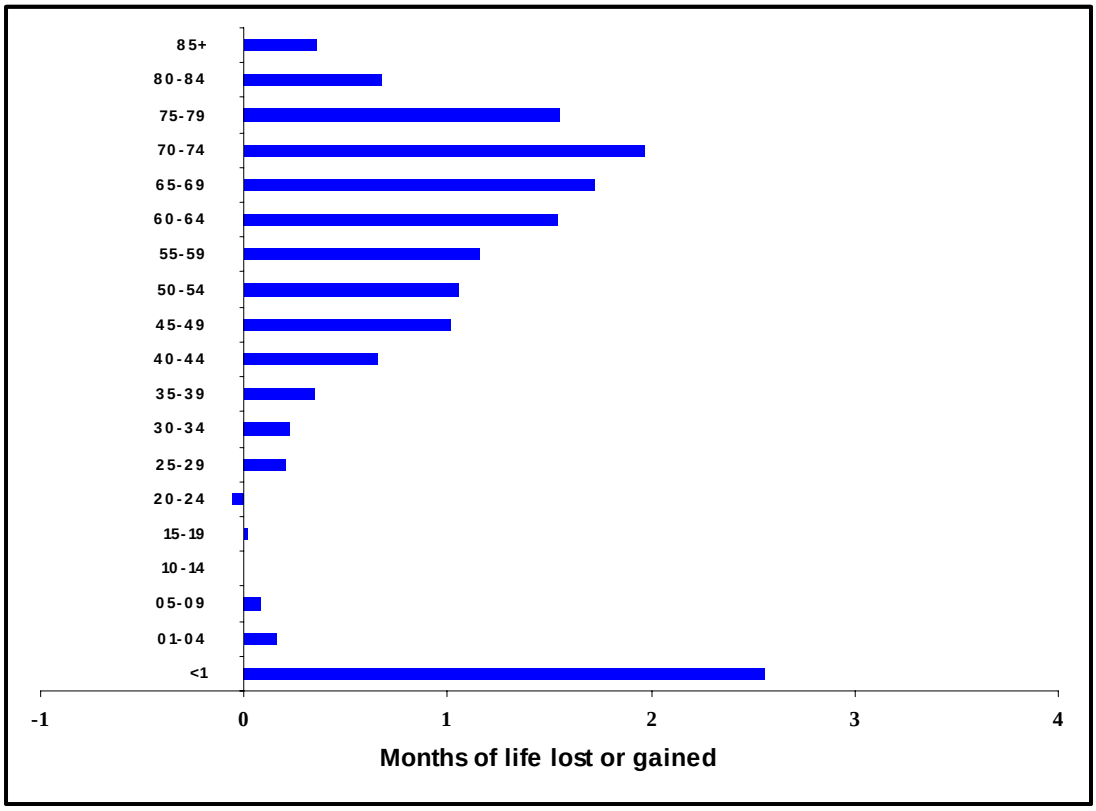


Source: ONS, analysis by WMPHO

10.9 Contribution of age groups to the gap in life expectancy in the West Midlands Spearhead Group

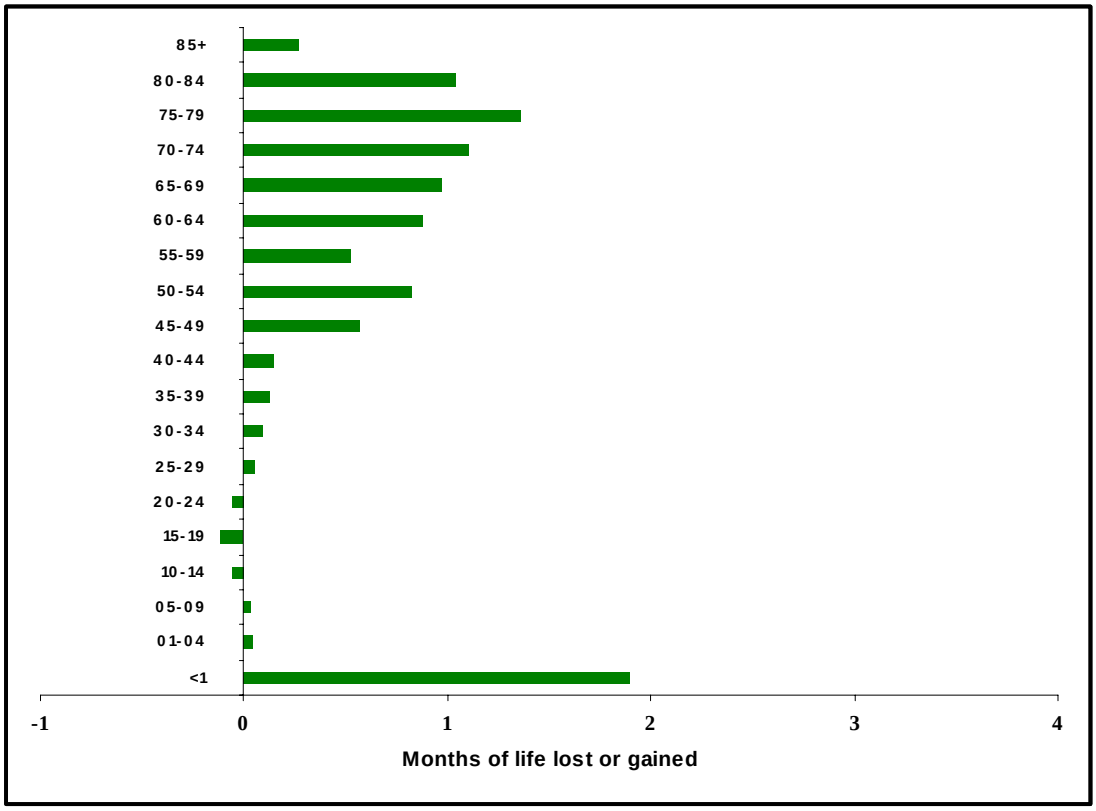
Life expectancy calculations are heavily influenced by a relatively small number of deaths in the younger age group (because each death represents a large number of years lost) and by deaths in the older age group (because a very large number of deaths occur in this group). Saving a small number of lives in the younger age groups and / or adding a few months of life to a large number of people in the older age groups will result in appreciably longer life expectancy. Figure 10.11 (Males) and Figure 10.12 (Females) demonstrate how reducing age specific death rates in the West Midlands Spearhead primary care trusts to the England average would contribute to reducing the gap in life expectancy.

Figure 10.11: Age groups contribution to the gap in life expectancy in males in the West Midlands Spearhead Group (2002-2006)



Source: ONS, analysis by WMPHO

Figure 10.12: Age groups contribution to the gap in life expectancy in females in the West Midlands Spearhead Group (2002-2006)



Source: ONS, analysis by WMPHO

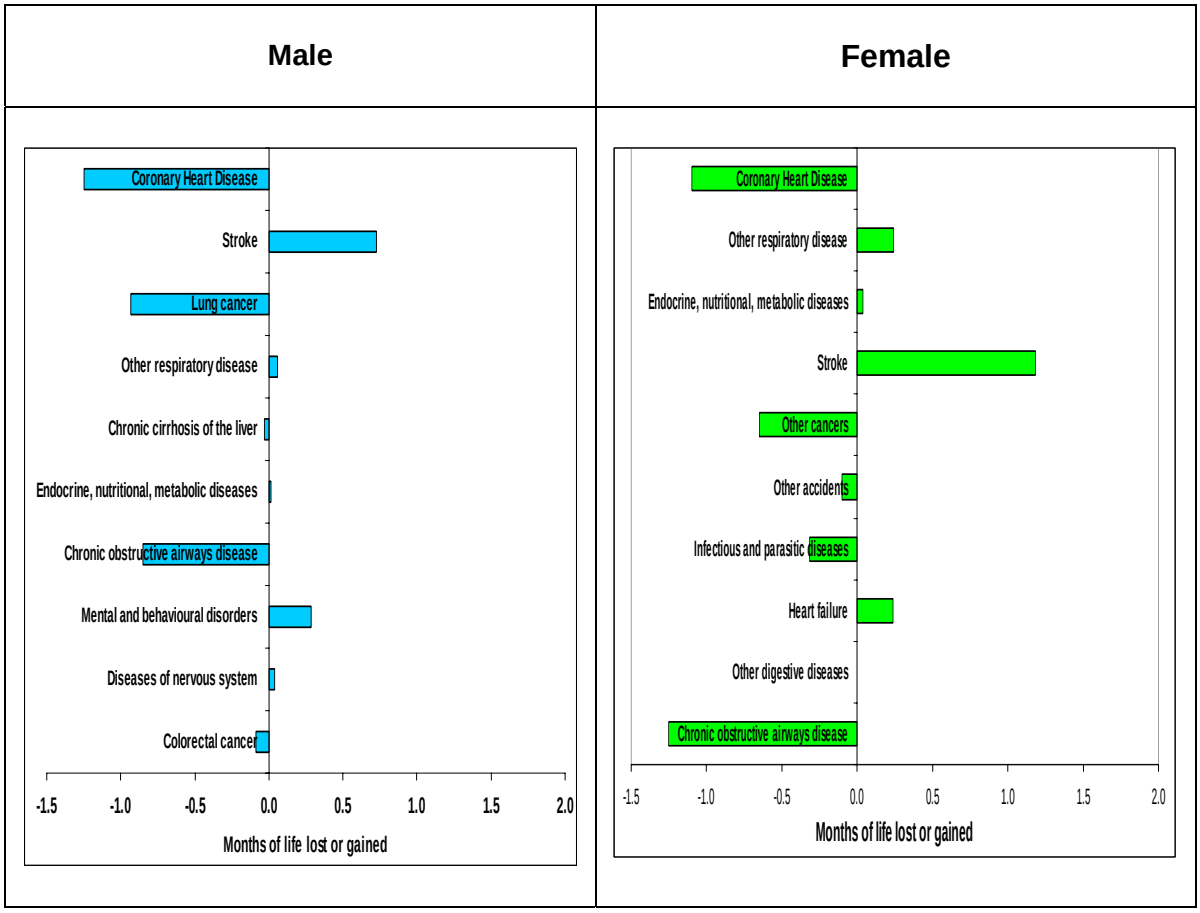
Figures 10.11 and 10.12 show that the death rates in the very young and in older people (60-79 years in male, 65-84 years in females) account for the largest part of the gap in life expectancy. The problem of perinatal (deaths around time of birth) and infant (deaths before first birthday) mortality in the West Midlands is well known with both being consistently higher than the England average as well as varying widely across the region. This prompted the Chief Medical Officer to highlight it as a particular concern in 2004 [14]. If death rates in the under 5 years old were reduced to the England average it would contribute to about 17% reduction of the gap in life expectancy in males and about 20% in females. Over 93% of this reduction would be attributable to the under one year olds.

10.10 The West Midlands Non-Spearhead Group

This chapter so far has asked the question what would happen to life expectancy if death rates in the West Midland Spearhead Primary Care Crusts were to be made equal to the England average. An equally interesting question is what would happen to life expectancy if death rates in West Midland Non-Spearhead PCTs were equal to the England average.

Figure 10.13 shows what would happen to life expectancy if death rates from various diseases were to be made equal to that of England. For many diseases the death rates in the Non-Spearhead PCTs are actually lower than the England average. Making them equal to the England average would therefore reduce life expectancy. It can be seen that making death rates for stroke and mental & behavioural disorders in men and death rates for stroke and heart failure in women equal to the England average would marginally increase life expectancy in West Midland Non-Spearhead PCTs. However for coronary heart disease and chronic obstructive airways disease making the death rates in the West Midlands Non-Spearhead primary care trusts equal to the England average would reduce life expectancy in both males and females.

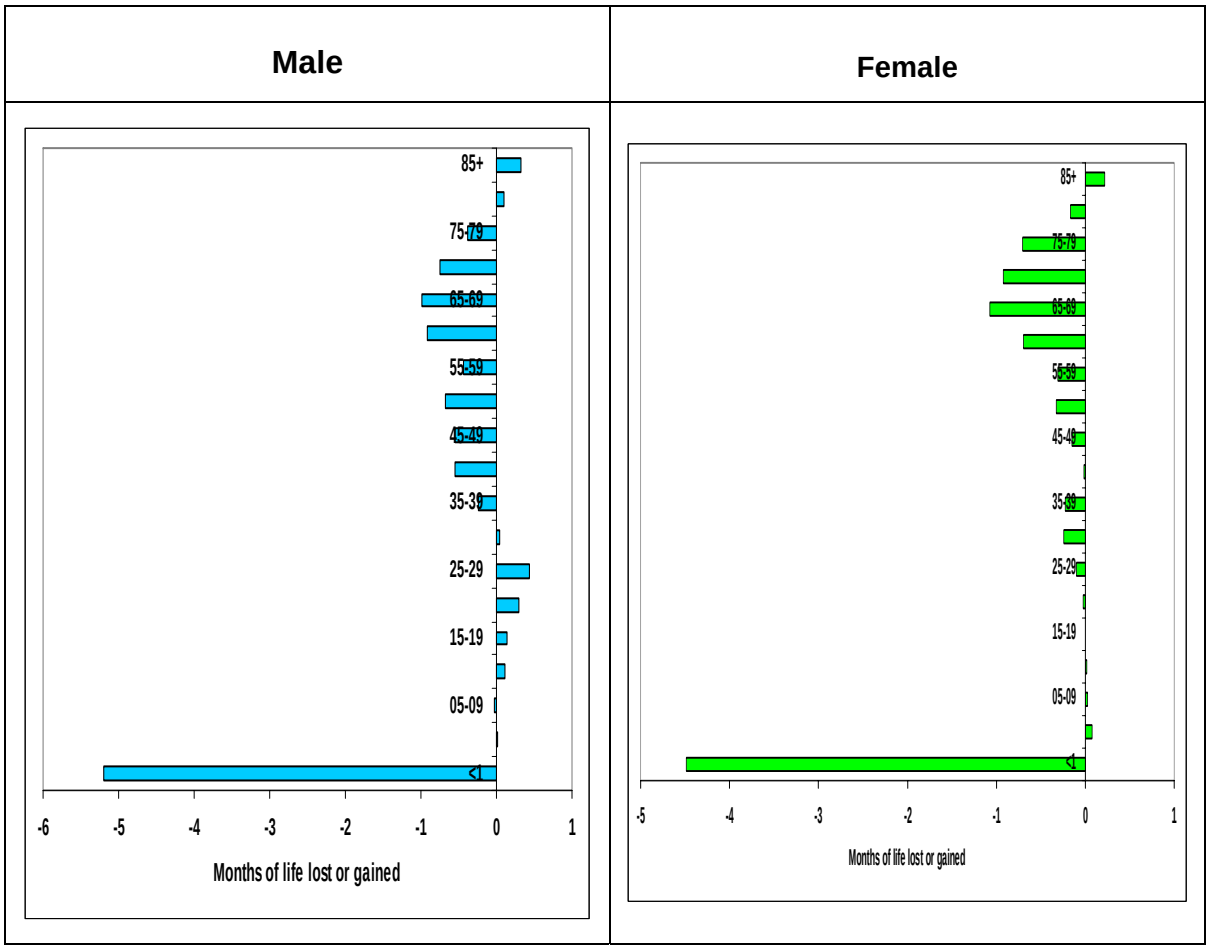
Figure 10.13: Selected conditions and their contributions to the gap in life expectancy in the West Midlands Non-Spearhead Group



Source: ONS, analysis by WMPHO

Figure 10.14 applies a similar analysis to deaths at different ages. It shows that if death rates in those aged 80 and over as well as the 10-29 age group (males) in the West Midland Non-Spearhead primary care trusts were to equal the England average, there would be a marginal increase in life expectancy. On the other hand better than England average death rates in the rest of the age groups contribute to the longer life expectancy.

Figure 10.14: Age groups contribution to the gap in life expectancy in the West Midlands Non-Spearhead



Source: ONS, analysis by WMPHO

10.11 Conditions and age groups contributing to the gap in life expectancy in the West Midlands Spearhead primary care trusts

Looking at life expectancy in the West Midland Spearhead Primary Care Trusts as a group hides the fact that considerable variation exists between these primary care trusts. For example the gap in life expectancy between Heart of Birmingham PCT and England is five times that of the West Midlands region and England and over twice that between the West Midlands Spearhead Group and England (Table 10.6). Generally the gaps for males are greater than those for females except in South Staffordshire PCT where the reverse is true.

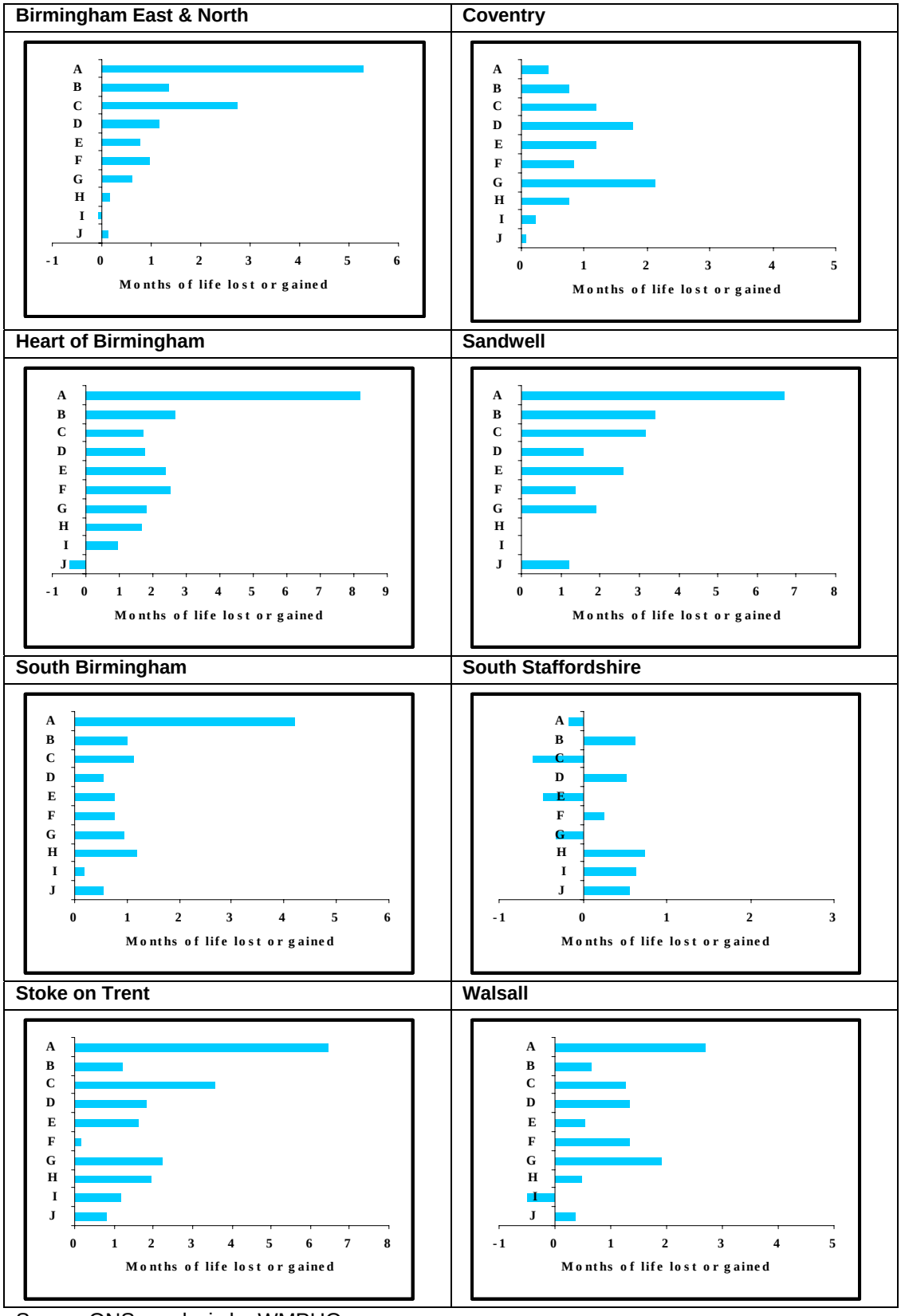
Table 10.6: Total life expectancy gap in years in the West Midlands

Primary Care Trusts	Male	Female
Birmingham East & North	1.86	1.21
Coventry	1.32	0.73
Heart of Birmingham	3.50	1.59
Sandwell	2.73	1.76
South Birmingham	1.57	0.35
South Staffordshire	0.13	0.26
Stoke-on-Trent	2.75	1.82
Walsall	1.18	0.58
Warwickshire	-0.51	-0.05
Wolverhampton	1.95	1.18
The West Midlands Region	0.70	0.38
The West Midlands Region Spearhead PCTs	1.30	0.82
The West Midlands Region Non-Spearhead PCTs	-0.38	-0.41

Source: ONS, analysis by WMPHO

The contribution to the life expectancy gap in the 10 individual Spearhead primary care trusts in the West Midlands are shown in Figure 10.15 (Males) and Figure 10.16 (Females). It can be seen that the patterns differ between primary care trusts. CHD accounts for the largest proportion of the gap in most PCTs except in Coventry, Warwickshire and South Staffordshire PCTs where it is less important.

Figure 10.15: Contributions of different diseases to life expectancy gap in men in the West Midlands Spearhead primary care trusts

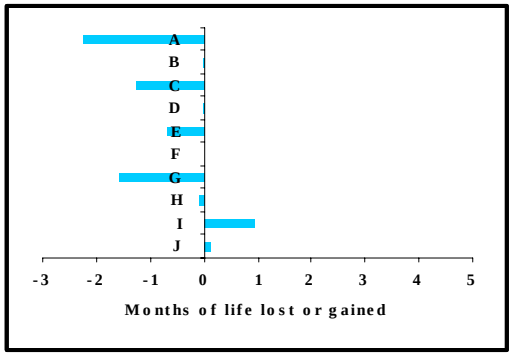


Source ONS, analysis by WMPHO

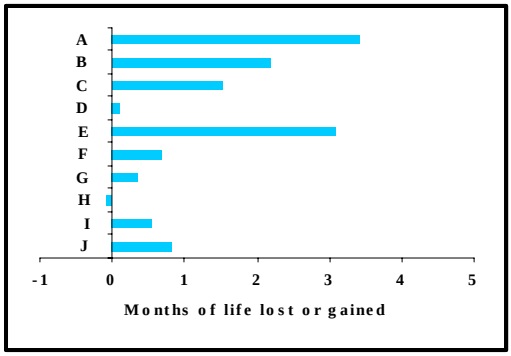
A = Coronary Heart Disease, **B** = Stroke, **C** =, Lung cancer **D** = Other respiratory disease, **E** = Chronic cirrhosis of the liver, **F** = Endocrine, nutritional, metabolic diseases, **G** = Chronic obstructive airways disease, **H** = Mental and behavioural disorders, **I** = Diseases of nervous system, **J** = Colorectal cancer

Figure 10.15 (cont.): Contributions of different diseases to life expectancy gap in men in the West Midlands Spearhead primary care trusts

Warwickshire



Wolverhampton

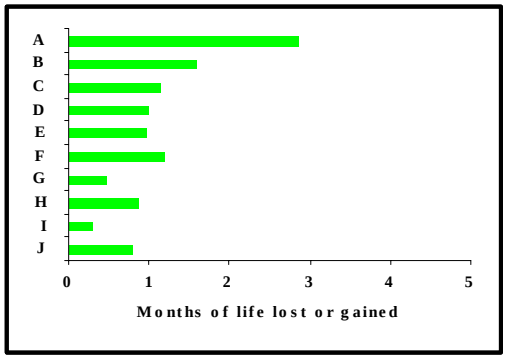


Source ONS, analysis by WMPHO

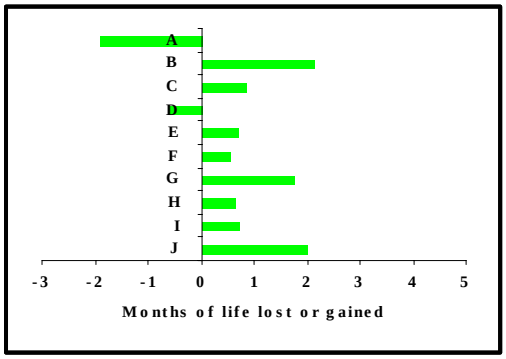
A = Coronary Heart Disease, **B** = Stroke, **C** =, Lung cancer **D** = Other respiratory disease, **E** = Chronic cirrhosis of the liver, **F** = Endocrine, nutritional, metabolic diseases, **G** = Chronic obstructive airways disease, **H** = Mental and behavioural disorders, **I** = Diseases of nervous system, **J** = Colorectal cancer

Figure 10.16: Contributions of different diseases to life expectancy gap in female in the West Midlands Spearhead primary care trusts

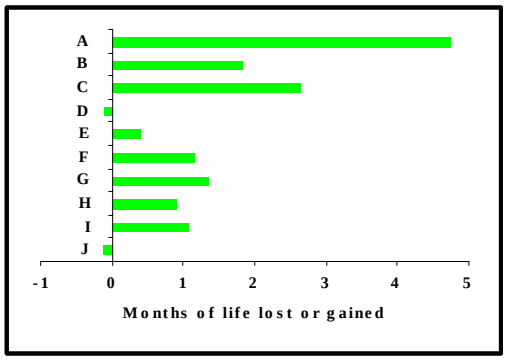
Birmingham East & North



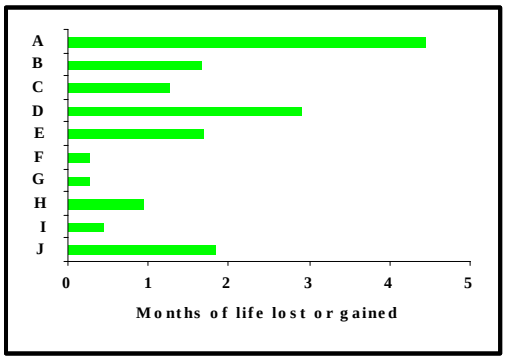
Coventry



Heart of Birmingham

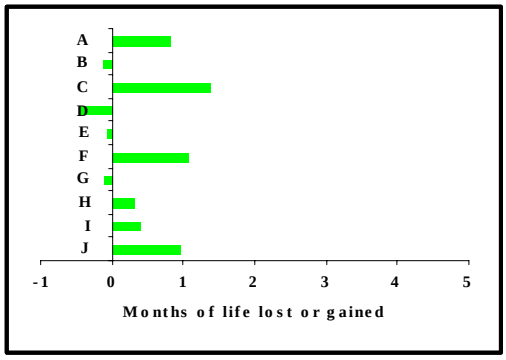


Sandwell

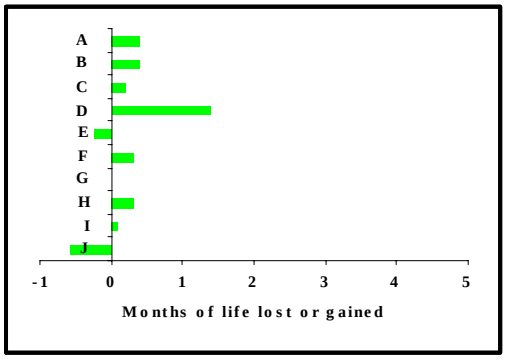


A = Coronary Heart Disease, **B** = Other respiratory disease, **C** = Endocrine, nutritional, metabolic diseases, **D** = Stroke, **E** =Other cancers, **F** = Other accidents, **G** = Infectious and parasitic diseases, **H** = Heart failure, **I** = Other digestive disease, **J =** Chronic obstructive airways disease

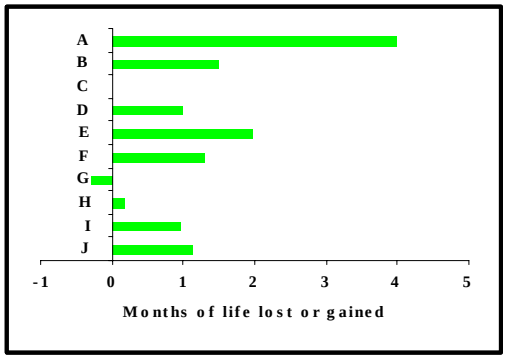
South Birmingham



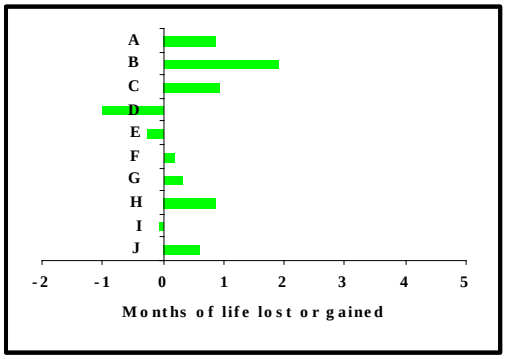
South Staffordshire



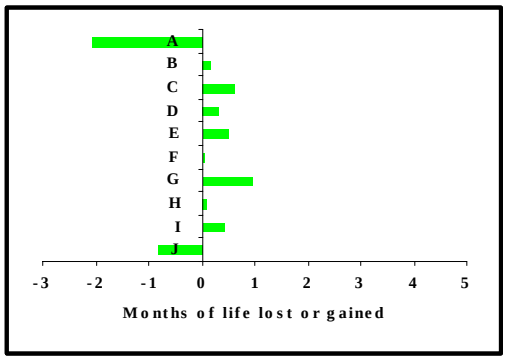
Stoke-on-Trent



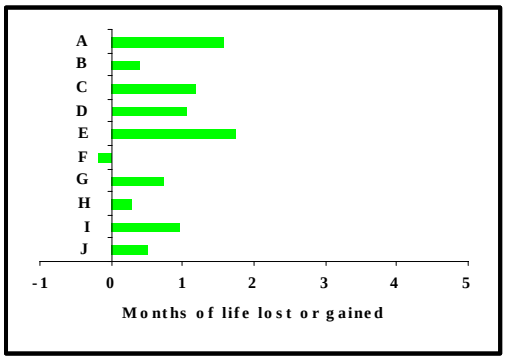
Walsall



Warwickshire



Wolverhampton



Source ONS, analysis by WMPHO

A = Coronary Heart Disease, **B** = Other respiratory disease, **C** = Endocrine, nutritional, metabolic diseases, **D** = Stroke, **E** =Other cancers, **F** = Other accidents, **G** = Infectious and parasitic diseases, **H** = Heart failure, **I** = Other digestive disease, **J =** Chronic obstructive airways disease

Results of a separate analysis for deaths attributable to smoking and alcohol in the West Midlands Spearhead PCTs are shown in Figures 10.9 and 10.10. The absolute reduction in the gap in life expectancy as a result of smoking attributable deaths is greatest in Sandwell and Stoke-on-Trent where it accounts to a reduction in life expectancy of about 9 months for males and 4 months for females in both PCTs. However the relative reduction is greatest in Walsall and South Birmingham PCTs where it contributes to about 32% of total gap in males and about 38% of total gap in females respectively. The effect of smoking attributable death is minimal in South Staffordshire and Warwickshire PCTs where deaths in smoking were lower than the England average.

For deaths attributable to alcohol, the highest absolute reduction in the gap in males (4.5 months) is in Heart of Birmingham and for females (3 months) in Stoke-on-Trent PCTs but relative reduction is greatest in South Staffordshire PCT where it accounts for about 26% of total gap in males and about 19 of total gap in females. The effect of alcohol attributable

death is minimal in Warwickshire PCT where deaths in alcohol were lower than the England average.

Analysis of mortality by age groups and their effect on the gap in life expectancy shows variation between the Spearhead Primary Care Trusts. The patterns are generally similar for different PCTs with higher death rates in the 55-75 age bands accounting for a large part of the gap. In most Spearhead PCTs higher perinatal death rates also made a substantial contribution to the gap but in Warwickshire (males and females) and Coventry (females only) this was not the case.

10.12 Main determinants contributing to the gap in life expectancy

In order to reduce the gap in life expectancy, a clear understanding of the risk factors for the conditions that contributes the most months of life lost in the Spearhead Group and primary care trusts over and above what is experienced across the whole of England is needed.

Determinants can be either amenable to change by the individual such as lifestyle (e.g. smoking, drinking or eating a diet high in fat), adaptable by society (e.g. economic and environmental conditions) or fixed such as ethnicity, age and sex. While it is not possible to change predetermined factors, there is a lot that can be done to alter the modifiable ones which will ultimately impact on the life expectancy in an area.

Table 10.7: Primary determinants contributing to the cause for the gap in life expectancy between the West Midlands Spearheads and England

Cause	**Risk factor**
Coronary heart diseases (CHD) and Stroke	Smoking including second hand smoke Diet Physical inactivity
Infant Mortality	Smoking Low birth weight Diet/breast feeding Poverty
Lung cancer	Smoking Occupational exposure to asbestos
Respiratory Diseases	Smoking

10.13 Key messages

This chapter indicates that in order to reduce the gap in life expectancy between the West Midlands Spearhead primary care trusts and the England average the greatest return will be gained by concentrating on certain areas.

- Interventions that reduce deaths from coronary heart disease
- Interventions that reduce deaths from chronic obstructive pulmonary disease
- Interventions that reduce deaths from stroke
- Interventions to reduce the numbers who smoke
- Interventions to reduce the numbers who drink at hazardous levels
- Interventions that reduce deaths in infants (under one year)
- Interventions that reduce deaths in 60-74 year olds

APPENDIX A: Disease Groups and ICD10 codes

Disease	ICD 10
Infectious and parasitic diseases	A00-B99
Oesophageal cancer	C15
Stomach cancer	C16
Colorectal cancer	C18-C21
Lung cancer	C33-C34
Breast cancer	C50
Other cancers	C00-C99 (excluding C15-C16, C18-C21, C33-C34 & C50)
Endocrine, nutritional, metabolic diseases	E00-E90
Mental and behavioural disorders	F00-F99
Diseases of nervous system	G00-G99
Coronary Heart Disease (CHD)	I20-I25
Heart failure	I50
Stroke	I60-I69
Other cardiovascular disease	I00-I99 (excluding I20-I25, I60-I69 & I50)
Pneumonia	J12-J18
Chronic obstructive airways disease	J40-J44
Other respiratory disease	J00-J99 (excluding J12-J18 & J40-J44)
Stomach/duodenum ulcer	K25-K27
Chronic cirrhosis of the liver	K70, K73-K74
Other digestive diseases	K00-K93 (excluding K25-K26, K70, K73-K74)
Musculoskeletal diseases	M00-M99
Genitourinary diseases	N00-N99
Ill defined conditions	R00-R99
Road traffic accidents	V01-V99,Y85
Other accidents	W00-X59
Suicide and undetermined injury	X60-X84,Y10-Y34
Other external causes	X85-Y09, Y35-Y84, Y86-Y98
All Causes <1	All deaths in under 1 year old
Smoking	Using attributable fraction as defined in http://www.nice.org.uk/niceMedia/documents/smoking_epidemic.pdf
Alcohol	Using attributable fraction as defined in http://www.nwph.net/nwpho/Publications/Alcohol_Indications.pdf

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CHAPTER ELEVEN: DEMENTIA PREVALENCE IN THE WEST MIDLANDS PCTS, HOW DOES THIS RELATE TO PBR, AND THE EFFECTS OF AN AGING POPULATION

11.1 Introduction

The purpose of this chapter is to provide PCT commissioners with estimated dementia prevalence data for their registrant populations as defined at April 2008. In addition, commentary on how this compares with Payment by Results (PbR) spend and the implications of an ageing population are described and discussed.

11.2 Methods

Age specific dementia prevalence rates were applied to PCT registrant populations as at 1st April 2008. This was obtained from a file created by the Commissioning Business Support Agency (CBSA) data warehouse from the NHS Strategic Tracing Service (NSTS) database. NB these are not gender specific, and registrants over the age of 84 were grouped into an 85+ category.

The populations were projected using the latest (2004 based) population projections from Office of National Statistics (ONS)[1] for the next 20 years. It should be noted that there are no PCT specific population projections available from ONS. The author used synthetic estimates of projections from local authorities associated with the PCTs. This is not an exact match for two reasons:

- The resident population of a local authority that is coterminous with a PCT is not the same as the registrant population of the PCT. This is because some patients registered to the PCT may live outside the PCT and local authority boundaries.
- Some local authorities have a number of constituent PCTs. An example of this is Birmingham where 3 PCTs are found within the local authority boundary.

As can be seen, the use of population projections based on local authorities cannot be described as in anyway accurate, however for the purposes of this chapter, they give an indication of the magnitude of the effect the demographic changes are due to have in the next 20 years.

PbR expenditure was defined as all those hospital admissions with a diagnosis of dementia found in diagnosis fields 1 to 8 in the Hospital Episodes Statistics (HES) file. The codes used are for all forms of dementia including Alzheimers, Vascular, Picks and other rarer forms of dementia. The ICD codes used were G30, G31, G32 and F00, F01, F02 and F03. Please note that Outpatient, A&E and Mental Health Trust admissions were not included in the costings as the level of coding in these datasets is inadequate. The costs described are for a 9-month period (April 2007 - December 2007)

Prevalence for young onset dementia (i.e. below 65 years) patients was not calculated and will be a subject of another report.

11.3 Results

There are marked differences between PCTs and their estimated populations of people living with dementia.

Table 11.1: Estimates of Prevalence of dementia based on 5-year Age Specific Rates being applied to PCT Registrant populations as at 1st April 2008

	2008
Telford and Wrekin	1354
HoBT PCT	1645
North Staffordshire PCT	2418
Herefordshire PCT	2486
Solihull CT	2599
Walsall t PCT	2720
Wolverhampton PCT	2860
Sandwell PCT	3421
Coventry PCT	3496
Dudley PCT	3521
S Birmingham PCT	3794
Shropshire PCT	3814
BEN PCT	4523
Warwickshire PCT	5988
South Staffordshire PCT	6080
Worcestershire PCT	6467
West Midlands SHA	59692

11.4 How does this relate to PbR Spend?

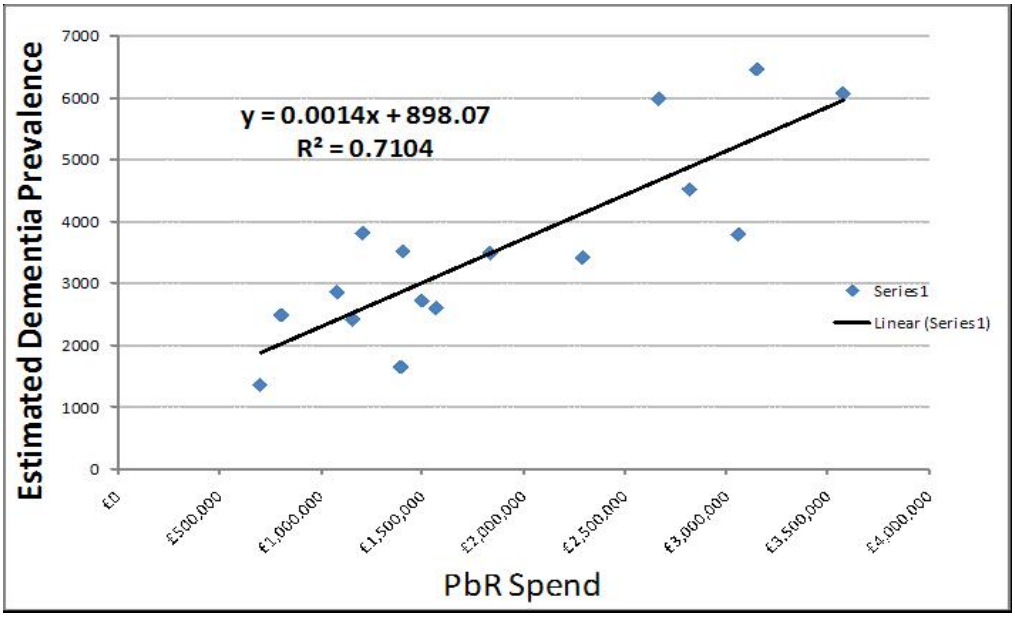
The table below displays PCT PbR 9 month expenditure, Number of admissions and estimated prevalence.

Table 11.2: Admissions & PbR Costs for People with a Diagnosis of Dementia by PCT and Estimated Dementia Prevalence (9 month period April 2007 - December 2007)

Purchaser	Sum of Total Cost	Number of admissions	Estimated Prevalence
SOUTH STAFFORDSHIRE PCT	£3,577,569	1152	6080
WORCESTERSHIRE PCT	£3,153,067	1012	6467
SOUTH BIRMINGHAM PCT	£3,061,747	1071	3794
BIRMINGHAM EAST AND NORTH PCT	£2,821,272	836	4523
WARWICKSHIRE PCT	£2,668,300	860	5988
SANDWELL PCT	£2,293,993	761	3421
COVENTRY TEACHING PCT	£1,837,920	627	3496
SOLIHULL CARE TRUST	£1,573,570	464	2599
WALSALL TEACHING PCT	£1,501,943	497	2720
DUDLEY PCT	£1,409,610	480	3521
HEART OF BIRMINGHAM TEACHING PCT	£1,399,946	408	1645
SHROPSHIRE COUNTY PCT	£1,211,892	369	3814
NORTH STAFFORDSHIRE PCT	£1,162,945	389	2418
WOLVERHAMPTON CITY PCT	£1,085,052	356	2860
HEREFORDSHIRE PCT	£810,316	255	2486
TELFORD AND WREKIN PCT	£704,256	229	1354

Figure 11.1 below shows the association between PbR expenditure and prevalence (accounting for 71% of the variation).

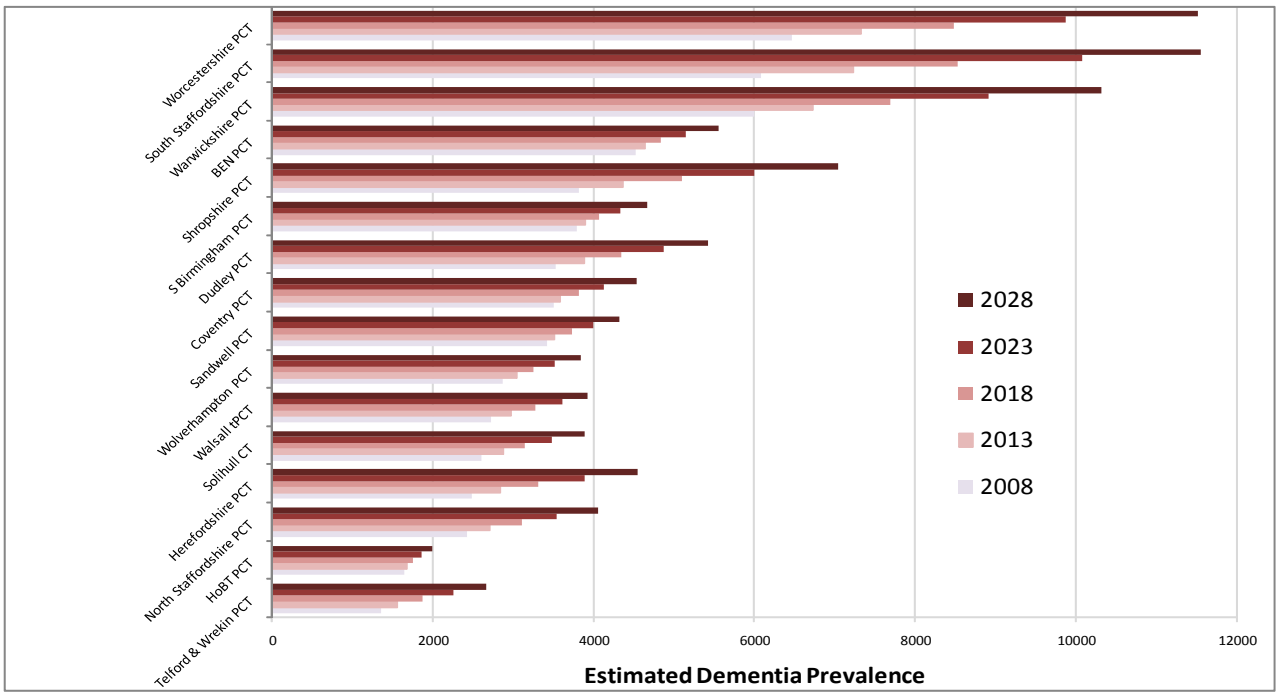
Figure 11.1: April 2007 - December 2007 PbR costs for People with Dementia against Estimated Prevalence by PCT



11.5 What will be the effect of demographic drift over the next 20 years?

Based on the extrapolations described above, it appears that the PCTs with the largest numbers of estimated dementia patients are going to experience the largest numerical rises in populations of people with dementia. The figure 11.2 below is ordered in size of estimated population of registrants living with dementia over the next 20 years.

Figure 11.2: Effect of Demographic drift over next 20 years



A number of observations can be made:

- The three PCTs with the largest numbers of estimated dementia patients are those that have the largest increases projected increases in the next 20 years (Worcestershire, South Staffordshire and Warwickshire).
- Close scrutiny of the PCTs in general indicate that the proportional rise in numbers of cases is particularly high amongst rural PCTs and can be seen in Herefordshire, North Staffordshire, & Shropshire as well as the three largest PCTs (Worcestershire, South Staffordshire and Warwickshire). The exception to this is Dudley PCT.
- HoBt PCT has an unusually young population compared to most PCTs in the West Midlands and so has a small number of estimated cases and the rise in the future is estimated to be small. It should be noted that the projections for Birmingham City as a whole had been applied to HoBt PCT. This is probably the least accurate projection of all.
- Telford & Wrekin also have a "youngish" population, but the overall population size is small and hence the estimated prevalence is small as well.

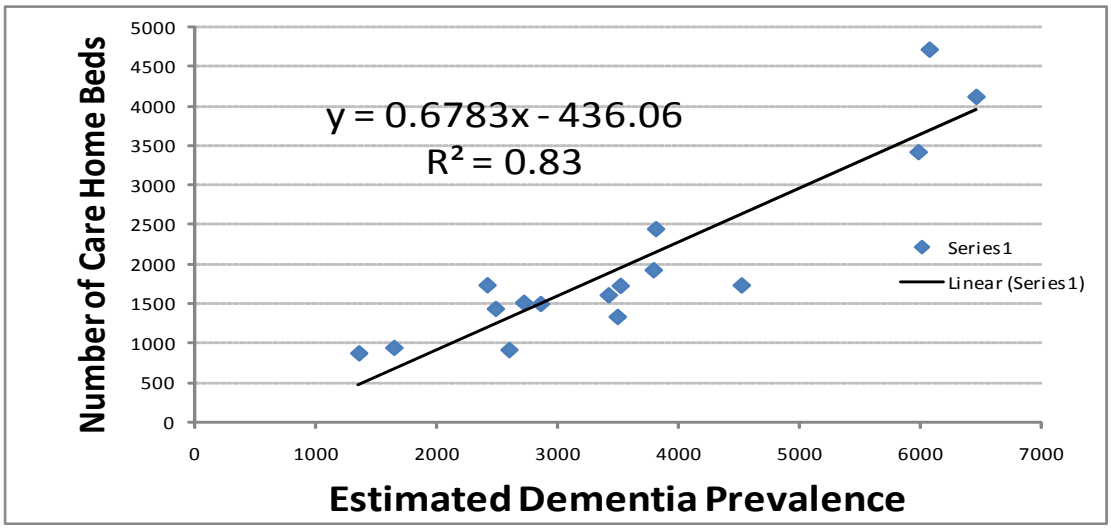
11.6 Discussion

There is a clear relationship between estimated dementia prevalence and PbR costs for PCTs. It does not seem unreasonable to assume that this association is causal. If this is the case, then future rises in dementia prevalence will also result in a rise in PbR spend purely due to demographic drift.

This will be exacerbated by a number of factors:

1. The onset of Dementia is increasingly being linked to lifestyle. The population of elderly residents of the West Midlands had in some perspectives healthier lifestyles than their children. Obesity, lack of exercise, smoking, alcohol, poor diet, cardiovascular risk and diabetes risk, are all associated with increased lifetime risks of developing dementia. As a result, it may be that the prevalence of dementia rises due to these factors alone.
2. Family structure changes also means that there will be fewer carers to look after people with dementia at home and hence there will be an increased propensity to admit people with dementia into care homes as domiciliary care becomes not viable for large populations of people with dementia.
3. The current provision of care homes in PCTs is closely matched to estimated populations of people with dementia.

Figure 11.3: PCT specific Estimated Dementia Prevalence against number of care home beds registered in each PCT (Source CSCI)



The level of domiciliary care and institutional care will need to rise in the future to look after the rising numbers of dementia patients. If this doesn't occur, then there will be more vulnerable people with dementia living at home and having emergency admissions into hospitals. This will further inflate the PbR spend.
The estimated PCT populations of people with dementia in 2008 and projections are found in Appendix A below.

Reference

1. www.ons.gov.uk

APPENDIX A
WM PCT Apr 2008 Estimated Registrant Dementia Prevalence with synthetic Projections extrapolated from 2004 Based ONS Projections

Dementia Prevalence								Increase from 2008				
AREA NAME	**AGE GROUP**	**Prevalence**	**2008**	**2013**	**2018**	**2023**	**2028**	**2008**	**2013**	**2018**	**2023**	**2028**
West Midlands	65-69	1.3%	3,319	4021	3818	3806	4272	0	702	499	488	953
West Midlands	70-74	2.9%	6,366	6809	8311	7932	7943	0	444	1946	1566	1578
West Midlands	75-79	5.9%	10,579	11222	12201	15039	14431	0	643	1623	4460	3853
West Midlands	80-84	12.2%	15,982	17031	18764	20777	25913	0	1049	2782	4795	9931
West Midlands	85+	20.3%	23,447	26410	30064	35200	41229	0	2964	6618	11754	17783
Shropshire	65-69	1.3%	210	271	257	258	292	0	62	47	48	83
Shropshire	70-74	2.9%	391	445	579	552	555	0	55	189	161	164
Shropshire	75-79	5.9%	666	741	855	1114	1068	0	75	189	448	402
Shropshire	80-84	12.2%	1,010	1132	1302	1521	2008	0	122	292	511	998
Shropshire	85+	20.3%	1,537	1780	2103	2548	3115	0	243	566	1011	1578
Warwickshire	65-69	1.3%	328	424	392	388	441	0	96	63	60	113
Warwickshire	70-74	2.9%	616	688	891	824	824	0	72	276	209	209
Warwickshire	75-79	5.9%	1,044	1143	1288	1676	1566	0	99	244	632	522
Warwickshire	80-84	12.2%	1,600	1747	1979	2272	2980	0	147	379	672	1380
Warwickshire	85+	20.3%	2,400	2726	3133	3743	4495	0	325	732	1343	2095
Worcestershire	65-69	1.3%	359	470	446	431	479	0	111	87	72	120
Worcestershire	70-74	2.9%	666	749	984	935	910	0	82	318	269	244
Worcestershire	75-79	5.9%	1,124	1239	1404	1855	1775	0	114	280	731	651
Worcestershire	80-84	12.2%	1,738	1906	2181	2505	3332	0	168	443	767	1594
Worcestershire	85+	20.3%	2,580	2962	3458	4146	5006	0	382	879	1567	2427
Herefordshire, County of	65-69	1.3%	128	168	164	168	186	0	40	36	40	57
Herefordshire, County of	70-74	2.9%	254	290	379	370	379	0	36	124	116	124
Herefordshire, County of	75-79	5.9%	434	486	554	726	714	0	51	120	291	280
Herefordshire, County of	80-84	12.2%	683	742	848	990	1296	0	59	165	306	613
Herefordshire, County of	85+	20.3%	986	1157	1366	1631	1973	0	171	379	645	986
BEN PCT	65-69	1.3%	220	241	235	239	267	0	21	15	19	47
BEN PCT	70-74	2.9%	463	446	494	484	494	0	-17	31	21	31
BEN PCT	75-79	5.9%	811	805	791	887	873	0	-6	-20	76	61
BEN PCT	80-84	12.2%	1,228	1228	1264	1270	1453	0	0	35	41	224
BEN PCT	85+	20.3%	1,801	1915	2048	2267	2458	0	114	248	467	657
HoBT PCT	65-69	1.3%	109	119	116	118	132	0	10	7	9	23
HoBT PCT	70-74	2.9%	219	211	234	229	234	0	-8	15	10	15
HoBT PCT	75-79	5.9%	344	341	335	376	370	0	-2	-9	32	26
HoBT PCT	80-84	12.2%	427	427	439	441	505	0	0	12	14	78
HoBT PCT	85+	20.3%	547	582	622	689	747	0	35	75	142	200
S Birmingham PCT	65-69	1.3%	184	202	197	200	224	0	17	12	16	39
S Birmingham PCT	70-74	2.9%	360	347	384	377	384	0	-13	24	16	24
S Birmingham PCT	75-79	5.9%	651	647	635	712	701	0	-5	-16	61	49
S Birmingham PCT	80-84	12.2%	1,033	1033	1063	1068	1222	0	0	30	35	189
S Birmingham PCT	85+	20.3%	1,565	1664	1780	1971	2136	0	99	215	406	571
Coventry	65-69	1.3%	173	194	182	189	210	0	21	10	17	38
Coventry	70-74	2.9%	338	338	384	362	381	0	0	46	25	43
Coventry	75-79	5.9%	586	606	619	710	677	0	20	33	124	91
Coventry	80-84	12.2%	955	941	1011	1052	1232	0	-14	55	97	277
Coventry	85+	20.3%	1,444	1510	1619	1816	2035	0	66	175	372	591
Dudley	65-69	1.3%	204	236	221	214	237	0	32	18	10	33
Dudley	70-74	2.9%	390	407	477	449	435	0	17	87	59	45

Dudley	75-79	5.9%	659	713	755	893	845	0	54	96	234	186
Dudley	80-84	12.2%	939	1026	1150	1248	1496	0	87	210	309	556
Dudley	85+	20.3%	1,329	1500	1736	2058	2400	0	171	407	729	1072
Sandwell	65-69	1.3%	184	196	190	194	222	0	12	6	10	38
Sandwell	70-74	2.9%	361	358	386	377	386	0	-3	26	16	26
Sandwell	75-79	5.9%	627	640	654	709	695	0	14	27	82	68
Sandwell	80-84	12.2%	928	928	996	1023	1132	0	0	68	95	205
Sandwell	85+	20.3%	1,322	1392	1507	1693	1879	0	70	186	371	557
Solihull	65-69	1.3%	131	167	146	145	171	0	36	15	13	40
Solihull	70-74	2.9%	256	268	344	305	302	0	12	87	48	45
Solihull	75-79	5.9%	469	469	494	638	569	0	0	25	169	100
Solihull	80-84	12.2%	732	758	783	848	1092	0	26	51	116	360
Solihull	85+	20.3%	1,011	1217	1378	1539	1745	0	207	367	528	735
Walsall	65-69	1.3%	162	174	165	164	184	0	13	4	3	23
Walsall	70-74	2.9%	306	314	345	328	328	0	8	39	22	22
Walsall	75-79	5.9%	532	556	579	638	615	0	24	47	106	83
Walsall	80-84	12.2%	724	795	866	926	1032	0	71	142	202	309
Walsall	85+	20.3%	997	1131	1323	1553	1764	0	134	326	556	767
Wolverhampton	65-69	1.3%	146	160	161	161	179	0	14	15	15	33
Wolverhampton	70-74	2.9%	291	288	315	321	321	0	-3	24	30	30
Wolverhampton	75-79	5.9%	524	518	518	580	593	0	-6	-6	56	69
Wolverhampton	80-84	12.2%	786	824	836	862	976	0	38	51	76	190
Wolverhampton	85+	20.3%	1,113	1257	1422	1587	1773	0	144	309	474	660
South Staffordshire	65-69	1.3%	380	458	428	422	470	0	77	48	42	89
South Staffordshire	70-74	2.9%	684	789	947	894	881	0	105	263	210	197
South Staffordshire	75-79	5.9%	1,120	1288	1484	1792	1708	0	168	364	672	588
South Staffordshire	80-84	12.2%	1,621	1853	2258	2606	3185	0	232	637	984	1563
South Staffordshire	85+	20.3%	2,274	2843	3411	4359	5306	0	569	1137	2085	3032
Telford & Wrekin	65-69	1.3%	93	116	120	120	136	0	24	27	27	43
Telford & Wrekin	70-74	2.9%	158	185	236	242	244	0	27	78	83	86
Telford & Wrekin	75-79	5.9%	250	291	349	448	459	0	41	99	198	209
Telford & Wrekin	80-84	12.2%	358	394	490	597	765	0	36	131	239	406
Telford & Wrekin	85+	20.3%	494	568	677	842	1062	0	73	183	348	568
North Staffordshire	65-69	1.3%	136	178	165	159	179	0	42	29	23	43
North Staffordshire	70-74	2.9%	262	278	363	340	332	0	15	100	77	69
North Staffordshire	75-79	5.9%	431	462	504	662	625	0	32	74	231	194
North Staffordshire	80-84	12.2%	649	704	792	870	1156	0	55	143	220	506
North Staffordshire	85+	20.3%	939	1090	1277	1503	1766	0	150	338	564	827

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Population Projections							Absolute Difference					Relative Difference				
AREA NAME	AGE GROUP	2008	2013	2018	2023	2028	2008	2013	2018	2023	2028	2008	2013	2018	2023	2028
West Midlands	65-69	255.3	309.3	293.7	292.8	328.6	100%	121%	115%	115%	129%	0%	21%	15%	15%	29%
West Midlands	70-74	219.5	234.8	286.6	273.5	273.9	100%	107%	131%	125%	125%	0%	7%	31%	25%	25%
West Midlands	75-79	179.3	190.2	206.8	254.9	244.6	100%	106%	115%	142%	136%	0%	6%	15%	42%	36%
West Midlands	80-84	131.0	139.6	153.8	170.3	212.4	100%	107%	117%	130%	162%	0%	7%	17%	30%	62%
West Midlands	85+	115.5	130.1	148.1	173.4	203.1	100%	113%	128%	150%	176%	0%	13%	28%	50%	76%
Shropshire	65-69	16.1	20.9	19.7	19.8	22.5	100%	129%	122%	123%	139%	0%	29%	22%	23%	39%
Shropshire	70-74	13.5	15.4	20.0	19.0	19.1	100%	114%	148%	141%	142%	0%	14%	48%	41%	42%
Shropshire	75-79	11.3	12.6	14.5	18.9	18.1	100%	111%	128%	167%	160%	0%	11%	28%	67%	60%
Shropshire	80-84	8.3	9.3	10.7	12.5	16.5	100%	112%	129%	151%	199%	0%	12%	29%	51%	99%
Shropshire	85+	7.6	8.8	10.4	12.6	15.3	100%	116%	137%	166%	203%	0%	16%	37%	66%	103%
Warwickshire	65-69	25.2	32.6	30.1	29.8	33.9	100%	129%	119%	118%	134%	0%	29%	19%	18%	34%
Warwickshire	70-74	21.2	23.7	30.7	28.4	28.4	100%	112%	145%	134%	134%	0%	12%	45%	34%	34%
Warwickshire	75-79	17.7	19.4	21.8	28.4	26.5	100%	109%	123%	161%	150%	0%	9%	23%	61%	50%
Warwickshire	80-84	13.1	14.3	16.2	18.6	24.4	100%	109%	124%	142%	186%	0%	9%	24%	42%	86%
Warwickshire	85+	11.8	13.4	15.4	18.4	22.1	100%	114%	131%	156%	187%	0%	14%	31%	56%	87%
Worcestershire	65-69	27.6	36.2	34.3	33.1	36.8	100%	131%	124%	120%	133%	0%	31%	24%	20%	33%
Worcestershire	70-74	23.0	25.8	33.9	32.2	31.4	100%	112%	148%	140%	137%	0%	12%	48%	40%	37%
Worcestershire	75-79	19.1	21.0	23.8	31.4	30.1	100%	110%	125%	165%	158%	0%	10%	25%	65%	58%
Worcestershire	80-84	14.2	15.6	17.9	20.5	27.3	100%	110%	126%	144%	192%	0%	10%	26%	44%	92%
Worcestershire	85+	12.7	14.6	17.0	20.4	24.7	100%	115%	134%	161%	194%	0%	15%	34%	61%	94%
Herefordshire, County of	65-69	9.9	12.9	12.6	12.9	14.3	100%	131%	128%	131%	145%	0%	31%	28%	31%	45%
Herefordshire, County of	70-74	8.8	10.0	13.1	12.8	13.1	100%	114%	149%	146%	149%	0%	14%	49%	46%	49%
Herefordshire, County of	75-79	7.4	8.2	9.4	12.3	12.1	100%	112%	128%	167%	164%	0%	12%	28%	67%	64%
Herefordshire, County of	80-84	5.6	6.1	7.0	8.1	10.6	100%	109%	124%	145%	190%	0%	9%	24%	45%	90%
Herefordshire, County of	85+	4.9	5.7	6.7	8.0	9.7	100%	117%	138%	165%	200%	0%	17%	38%	65%	100%
BEN PCT	65-69	16.9	18.5	18.1	18.4	20.6	100%	109%	107%	109%	121%	0%	9%	7%	9%	21%
BEN PCT	70-74	16.0	15.4	17.0	16.7	17.0	100%	96%	107%	105%	107%	0%	-4%	7%	5%	7%
BEN PCT	75-79	13.7	13.6	13.4	15.0	14.8	100%	99%	97%	109%	108%	0%	-1%	-3%	9%	8%
BEN PCT	80-84	10.1	10.1	10.4	10.4	11.9	100%	100%	103%	103%	118%	0%	0%	3%	3%	18%
BEN PCT	85+	8.9	9.4	10.1	11.2	12.1	100%	106%	114%	126%	137%	0%	6%	14%	26%	37%
HoBT PCT	65-69	8.4	9.2	8.9	9.1	10.2	100%	109%	107%	109%	121%	0%	9%	7%	9%	21%
HoBT PCT	70-74	7.5	7.3	8.1	7.9	8.1	100%	96%	107%	105%	107%	0%	-4%	7%	5%	7%
HoBT PCT	75-79	5.8	5.8	5.7	6.4	6.3	100%	99%	97%	109%	108%	0%	-1%	-3%	9%	8%

HoBT PCT	80-84	3.5	3.5	3.6	3.6	4.1	100%	100%	103%	103%	118%	0%	0%	3%	3%	18%
HoBT PCT	85+	2.7	2.9	3.1	3.4	3.7	100%	106%	114%	126%	137%	0%	6%	14%	26%	37%
S Birmingham PCT	65-69	14.2	15.5	15.1	15.4	17.2	100%	109%	107%	109%	121%	0%	9%	7%	9%	21%
S Birmingham PCT	70-74	12.4	12.0	13.3	13.0	13.3	100%	96%	107%	105%	107%	0%	-4%	7%	5%	7%
S Birmingham PCT	75-79	11.0	11.0	10.8	12.1	11.9	100%	99%	97%	109%	108%	0%	-1%	-3%	9%	8%
S Birmingham PCT	80-84	8.5	8.5	8.7	8.8	10.0	100%	100%	103%	103%	118%	0%	0%	3%	3%	18%
S Birmingham PCT	85+	7.7	8.2	8.8	9.7	10.5	100%	106%	114%	126%	137%	0%	6%	14%	26%	37%
Coventry	65-69	13.3	14.9	14.0	14.6	16.2	100%	112%	106%	110%	122%	0%	12%	6%	10%	22%
Coventry	70-74	11.6	11.6	13.2	12.5	13.1	100%	100%	114%	107%	113%	0%	0%	14%	7%	13%
Coventry	75-79	9.9	10.3	10.5	12.0	11.5	100%	103%	106%	121%	116%	0%	3%	6%	21%	16%
Coventry	80-84	7.8	7.7	8.3	8.6	10.1	100%	99%	106%	110%	129%	0%	-1%	6%	10%	29%
Coventry	85+	7.1	7.4	8.0	8.9	10.0	100%	105%	112%	126%	141%	0%	5%	12%	26%	41%
Dudley	65-69	15.7	18.1	17.0	16.4	18.2	100%	116%	109%	105%	116%	0%	16%	9%	5%	16%
Dudley	70-74	13.4	14.0	16.4	15.5	15.0	100%	104%	122%	115%	112%	0%	4%	22%	15%	12%
Dudley	75-79	11.2	12.1	12.8	15.1	14.3	100%	108%	115%	135%	128%	0%	8%	15%	35%	28%
Dudley	80-84	7.7	8.4	9.4	10.2	12.3	100%	109%	122%	133%	159%	0%	9%	22%	33%	59%
Dudley	85+	6.5	7.4	8.6	10.1	11.8	100%	113%	131%	155%	181%	0%	13%	31%	55%	81%
Sandwell	65-69	14.2	15.0	14.6	14.9	17.1	100%	106%	103%	106%	120%	0%	6%	3%	6%	20%
Sandwell	70-74	12.4	12.3	13.3	13.0	13.3	100%	99%	107%	104%	107%	0%	-1%	7%	4%	7%
Sandwell	75-79	10.6	10.9	11.1	12.0	11.8	100%	102%	104%	113%	111%	0%	2%	4%	13%	11%
Sandwell	80-84	7.6	7.6	8.2	8.4	9.3	100%	100%	107%	110%	122%	0%	0%	7%	10%	22%
Sandwell	85+	6.5	6.9	7.4	8.3	9.3	100%	105%	114%	128%	142%	0%	5%	14%	28%	42%
Solihull	65-69	10.1	12.9	11.2	11.1	13.2	100%	128%	111%	110%	131%	0%	28%	11%	10%	31%
Solihull	70-74	8.8	9.3	11.9	10.5	10.4	100%	105%	134%	119%	118%	0%	5%	34%	19%	18%
Solihull	75-79	7.9	7.9	8.4	10.8	9.6	100%	100%	105%	136%	121%	0%	0%	5%	36%	21%
Solihull	80-84	6.0	6.2	6.4	6.9	8.9	100%	104%	107%	116%	149%	0%	4%	7%	16%	49%
Solihull	85+	5.0	6.0	6.8	7.6	8.6	100%	120%	136%	152%	173%	0%	20%	36%	52%	73%
Walsall	65-69	12.4	13.4	12.7	12.6	14.2	100%	108%	102%	102%	114%	0%	8%	2%	2%	14%
Walsall	70-74	10.6	10.8	11.9	11.3	11.3	100%	103%	113%	107%	107%	0%	3%	13%	7%	7%
Walsall	75-79	9.0	9.4	9.8	10.8	10.4	100%	104%	109%	120%	116%	0%	4%	9%	20%	16%
Walsall	80-84	5.9	6.5	7.1	7.6	8.5	100%	110%	120%	128%	143%	0%	10%	20%	28%	43%
Walsall	85+	4.9	5.6	6.5	7.6	8.7	100%	113%	133%	156%	177%	0%	13%	33%	56%	77%
Wolverhampton	65-69	11.2	12.3	12.4	12.4	13.8	100%	110%	110%	110%	123%	0%	10%	10%	10%	23%
Wolverhampton	70-74	10.0	9.9	10.9	11.1	11.1	100%	99%	108%	110%	110%	0%	-1%	8%	10%	10%
Wolverhampton	75-79	8.9	8.8	8.8	9.8	10.0	100%	99%	99%	111%	113%	0%	-1%	-1%	11%	13%
Wolverhampton	80-84	6.4	6.8	6.9	7.1	8.0	100%	105%	106%	110%	124%	0%	5%	6%	10%	24%

Wolverhampton	85+	5.5	6.2	7.0	7.8	8.7	100%	113%	128%	143%	159%	0%	13%	28%	43%	59%
South Staffordshire	65-69	29.3	35.2	32.9	32.5	36.1	100%	120%	113%	111%	123%	0%	20%	13%	11%	23%
South Staffordshire	70-74	23.6	27.2	32.6	30.8	30.4	100%	115%	138%	131%	129%	0%	15%	38%	31%	29%
South Staffordshire	75-79	19.0	21.8	25.1	30.4	28.9	100%	115%	133%	160%	153%	0%	15%	33%	60%	53%
South Staffordshire	80-84	13.3	15.2	18.5	21.4	26.1	100%	114%	139%	161%	196%	0%	14%	39%	61%	96%
South Staffordshire	85+	11.2	14.0	16.8	21.5	26.1	100%	125%	150%	192%	233%	0%	25%	50%	92%	133%
Telford & Wrekin	65-69	7.1	8.9	9.2	9.2	10.5	100%	125%	129%	129%	147%	0%	25%	29%	29%	47%
Telford & Wrekin	70-74	5.5	6.4	8.1	8.3	8.4	100%	117%	149%	153%	154%	0%	17%	49%	53%	54%
Telford & Wrekin	75-79	4.2	4.9	5.9	7.6	7.8	100%	116%	140%	179%	184%	0%	16%	40%	79%	84%
Telford & Wrekin	80-84	2.9	3.2	4.0	4.9	6.3	100%	110%	137%	167%	213%	0%	10%	37%	67%	113%
Telford & Wrekin	85+	2.4	2.8	3.3	4.1	5.2	100%	115%	137%	170%	215%	0%	15%	37%	70%	115%
North Staffordshire	65-69	10.4	13.7	12.7	12.2	13.8	100%	131%	122%	117%	132%	0%	31%	22%	17%	32%
North Staffordshire	70-74	9.0	9.6	12.5	11.7	11.4	100%	106%	138%	129%	126%	0%	6%	38%	29%	26%
North Staffordshire	75-79	7.3	7.8	8.5	11.2	10.6	100%	107%	117%	154%	145%	0%	7%	17%	54%	45%
North Staffordshire	80-84	5.3	5.8	6.5	7.1	9.5	100%	108%	122%	134%	178%	0%	8%	22%	34%	78%
North Staffordshire	85+	4.6	5.4	6.3	7.4	8.7	100%	116%	136%	160%	188%	0%	16%	36%	60%	88%

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CHAPTER TWELVE: PAEDIATRIC PALLIATIVE CARE IN THE WEST MIDLANDS

12.1 Introduction

The Darzi Next Stage Review[1] has highlighted palliative care as one of the main areas of focus in 2008, the 60th anniversary of the founding of the NHS. Palliative Care often has connotations of death amongst cancer patients and the elderly. However, the Local Darzi reviews have brought into wider focus the palliative care needs of non-cancer patients and in particular Paediatric Palliative Care.

This chapter presents data on deaths amongst children under the age of 17 years over a 5-year time frame. In addition, it quantifies the numbers of deaths, types of conditions and the numbers found in each PCT (further data is available on the accompanying CD-ROM).

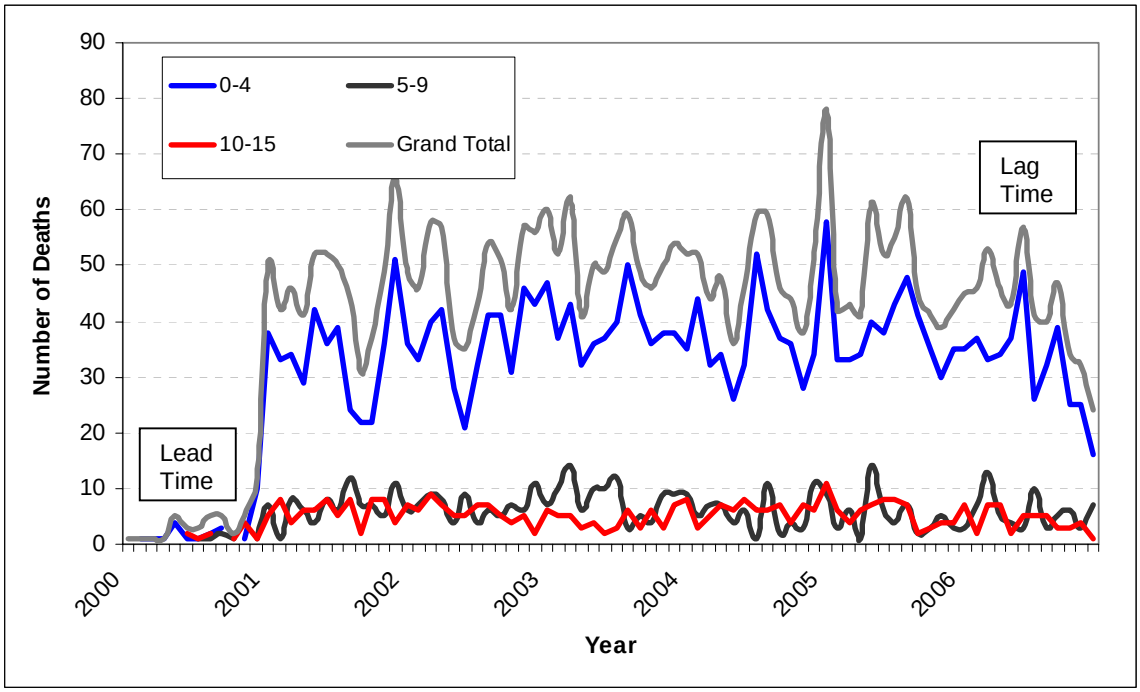
12.2 Methods

Death certificate data was obtained from the West Midlands Public Health Observatory subject to confidentiality rules. This was for the time frame 1st January 2001 – 31st December 2006 inclusive and for children whose age at time of death was 16 or below.

12.3 Results

There were some lead and lag time records in the dataset. These are deaths that appeared on the dataset probably due to time of registration despite the actual date of death preceding the time frame (lead time). Lag time deaths are deaths that occurred late in the period in question BUT the death certificates were registered after. This can be observed at the beginning and end of time series seen in Figure 12.1.

Figure 12.1: Deaths Amongst West Midlands Children under 16 years 2001 – 2006



The majority of deaths are amongst children under the age of 5 years. The relatively small numbers of deaths over the age of 5 should be noted.

Table 12.1 describes the primary cause of deaths by ICD (International Classification of Disease) chapters of the main diagnosis on the death certificate. There are age related causes of deaths (e.g. certain conditions originating in the perinatal period and congenital malformations). However just under half of all deaths are associated with other ICD chapters. It should be noted that a significant number of death certificate data had no diagnoses recorded at all.

Table 12.1: ICD Chapter of Primary Cause of Death Amongst West Midlands Children under 16 years 2001 – 2006

Numbers of Deaths	**Age**			
ICD Chapter	**0-4**	**5-9**	**10-15**	**Grand Total**
Certain conditions originating in the perinatal period	1262	47	3	1312
Congenital malformations, deformations and chromosomal abnormalities	381	77	33	491
No Diagnosis	301	11	-	312
External causes of morbidity and mortality	94	50	118	262
Diseases of the nervous system	117	57	67	241
Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	167	27	9	203
Neoplasms	40	51	72	163
Diseases of the respiratory system	80	45	30	155
Certain infectious and parasitic diseases	57	30	14	101
Endocrine, nutritional and metabolic diseases	40	27	13	80
Diseases of the circulatory system	37	19	18	74
Diseases of the digestive system	30	18	8	56
Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	9	5	4	18
Diseases of the genitourinary system	7	2	3	12
Mental and behavioural disorders		2	6	8
Injury, poisoning and certain other consequences of external causes	5	2		7
Diseases of the musculoskeletal system and connective tissue	1	1	3	5
Pregnancy, childbirth and the puerperium	3			3
Diseases of the ear and mastoid process		2		2
Diseases of the eye and adnexa		1		1
Diseases of the skin and subcutaneous tissue		1		1
Grand Total	**2631**	**475**	**401**	**3507**

The deaths described are for the entire West Midlands. Table 12.2 describes deaths amongst PCTs for the same time period.

Table 12.2: Death Amongst West Midlands Children under 16 years 2001 – 2006 by PCT

PCT	0-4	5-9	10-15	Grand Total
BIRMINGHAM EAST AND NORTH PCT	334	69	25	428
COVENTRY TEACHING PCT	163	25	16	204
DUDLEY PCT	105	27	19	151
HEART OF BIRMINGHAM TEACHING PCT	354	50	28	432
HEREFORDSHIRE PCT	45	17	16	78
NORTH STAFFORDSHIRE PCT	55	6	18	79
SANDWELL PCT	186	29	28	243
SHROPSHIRE COUNTY PCT	84	10	23	117
SOLIHULL CARE TRUST	60	8	11	79
SOUTH BIRMINGHAM PCT	172	26	26	224
SOUTH STAFFORDSHIRE PCT	230	44	44	318
STOKE ON TRENT PCT	158	25	24	207
TELFORD AND WREKIN PCT	69	19	17	105
WALSALL TEACHING PCT	144	32	18	194
WARWICKSHIRE PCT	149	28	32	209
WOLVERHAMPTON CITY PCT	136	17	15	168
WORCESTERSHIRE PCT	187	43	41	271
Grand Total	**2631**	**475**	**401**	**3507**

These deaths should ideally be calculated as death rates, however the author was unable to obtain synthetic denominator populations for the time period to calculate rates. One observation that immediately springs to mind is the relatively large number of deaths in Birmingham East and North (BEN) PCT and Heart of Birmingham Teaching (HoBT) PCT. This is in part a reflection of the youngish population found in these PCTs, however this may need further investigation.

There are slight preponderances amongst male children or female children amongst various ICD chapters.

Table 12.3: Death Amongst West Midlands Children under 16 years 2001 – 2006 by Gender

Numbers of Deaths		Age			
Sex	Final ICD2	0-4	5-9	10-15	Grand Total
Male	Certain conditions originating in the perinatal period	727	25	1	753
	Congenital malformations, deformations and chromosomal abnormalities	210	45	14	269
	No Diagnosis	164	6		170
	External causes of morbidity and mortality	50	30	80	160
	Diseases of the nervous system	68	26	51	145
	Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	107	11	6	124
	Neoplasms	22	27	47	96
	Diseases of the respiratory system	48	21	17	86
	Certain infectious and parasitic diseases	31	18	6	55
	Endocrine, nutritional and metabolic diseases	17	12	7	36
	Diseases of the circulatory system	27	8	11	46
	Diseases of the digestive system	16	7	4	27
	Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	5	4	1	10
	Diseases of the genitourinary system	5	2		7
	Mental and behavioural disorders		1	3	4
	Injury, poisoning and certain other consequences of external causes	2			2
	Diseases of the musculoskeletal system and connective tissue		1	2	3
	Pregnancy, childbirth and the puerperium	1			1
	Diseases of the ear and mastoid process		2		2
	Diseases of the eye and adnexa		1		1
Male Total		**1500**	**247**	**250**	**1997**
Female	Certain conditions originating in the perinatal period	535	22	2	559
	Congenital malformations, deformations and chromosomal abnormalities	171	32	19	222
	No Diagnosis	137	5		142
	External causes of morbidity and mortality	44	20	38	102
	Diseases of the nervous system	49	31	16	96
	Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	60	16	3	79
	Neoplasms	18	24	25	67
	Diseases of the respiratory system	32	24	13	69
	Certain infectious and parasitic diseases	26	12	8	46
	Endocrine, nutritional and metabolic diseases	23	15	6	44
	Diseases of the circulatory system	10	11	7	28
	Diseases of the digestive system	14	11	4	29
	Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	4	1	3	8
	Diseases of the genitourinary system	2		3	5
	Mental and behavioural disorders		1	3	4
	Injury, poisoning and certain other consequences of external causes	3	2		5
	Diseases of the musculoskeletal system and connective tissue	1		1	2
	Pregnancy, childbirth and the puerperium	2			2
	Diseases of the skin and subcutaneous tissue		1		1
Female Total		**1131**	**228**	**151**	**1510**
Grand Total		**2631**	**475**	**401**	**3507**

12.4 Discussion

This chapter describes in fairly simplistic terms the numbers of deaths amongst children across the West Midlands. It should be seen as a first tentative step for planning purposes of paediatric palliative care networks. Further work is needed on a condition specific analysis of various causes of deaths. In addition, most activity that relates to paediatric palliative care is either in an outpatient setting or in the community. This makes quantifying the health care service interventions very difficult.

The reader should note that the small numbers of deaths over the age of 5 years would make planning for paediatric palliative care amongst this group difficult and subject to small number variation. This makes commissioning across PCTs a more viable form of service provision.

Relatively large numbers of deaths in BEN PCT and HoBT PCT are apparent. This is, in part, a reflection of the relatively young population found in these PCTs. Nevertheless, this may need further investigation and looking at comparisons of deaths by ethnicity, deprivation, perinatal deaths etc to have a greater understanding of the epidemiology to inform public health and PCT commissioning. An ICD chapter by PCT breakdown for 2001 – 2006 is found in Appendix A (on the accompanying CD-ROM).

12.5 Recommendations

- Further investigation of the deaths by specific conditions is undertaken as directed by the West Midlands Paediatric Palliative Care Network.
- Directors of Public Health to consider whether further analysis of deaths within their PCTs is needed.
- WMPHO to identify why there are so many uncoded death records.
- West Midlands Paediatric Palliative Care Network to consider the best way of capturing health service activity for paediatric palliative care patients.

Reference

1. NHS Next stage review http://www.ournhs.nhs.uk/