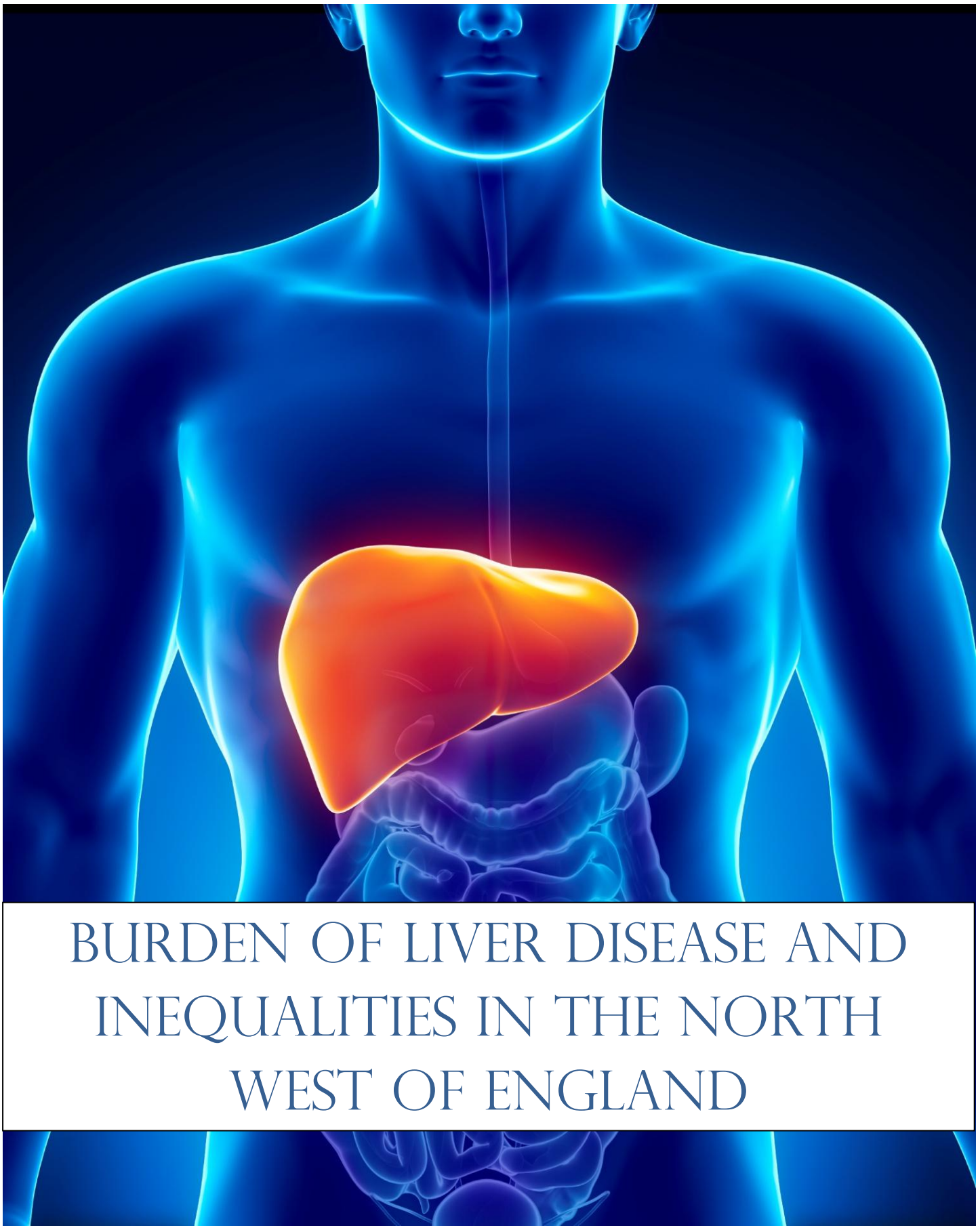


BURDEN OF LIVER DISEASE AND INEQUALITIES IN THE NORTH WEST OF ENGLAND

NHS National Treatment Agency for Substance Misuse
NHS North West
NHS North West Cancer Intelligence Service
Hosted by The Christie NHS Foundation Trust
Health Protection Agency
Health Protection Agency North West
NorthWest Public Health Observatory
Liverpool JMU Centre for Public Health

Foreword

Liver disease causes approximately 2% of all deaths in England. While other major causes of death are falling, the number of people who die from liver disease is rising and younger age groups are disproportionately affected.

This report collates routinely available data on the burden of liver disease and describes its relationship with inequalities. We hope that it will be a useful resource for Directors of Public Health, health and wellbeing boards, commissioners and providers of services as well as others involved in or with an interest in liver disease. We realise that there are gaps in the information where data are not routinely available. However, we hope the report serves as an important baseline to measure progress on reducing ill health caused by liver disease.

Before embarking on this report, we knew that mortality from liver disease and prevalence of certain causes, including alcohol-related liver disease and hepatitis C, were higher in the North West than in any other English region. This report adds important depth to this picture and identifies that several other indicators are higher in the North West than the national average. Overall it indicates the extent of the burden liver disease represents and the challenge we face tackling it.

Public Health England, which will be established in April 2013, will provide strategic leadership and vision for the protection and improvement of the nation's health. We are delighted that each of our organisations has collaborated on this important topic during transition into the new service. The teamwork involved in producing this report bodes well for the way we will continue to work together in Public Health England.

Many people have contributed to this report but we are especially indebted to Professor Martin Lombard, National Clinical Director for Liver Disease for his advice and support in the production of this report.

Professor Mark Bellis

Director, North West Public Health Observatory

Mr Phil Conley

Regional Manager, National Treatment Agency

Dr Ann Hoskins

Interim Regional Director of Public Health

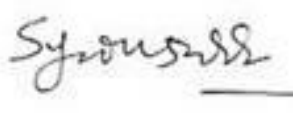
NHS North West

Mr Stephen Raynor, General Manager

North West Cancer Intelligence Service

Professor Qutub Syed

Regional Director, Health Protection Agency



Principal Authors:
Caryl Beynon (North West Public Health Observatory)
Dan Hungerford (Health Protection Agency North West)

Co Authors:
North West Public Health Observatory: Clare Perkins, Sacha Wyke, Martin Chandler, Ayesha Hurst, Mark Bellis
Health Protection Agency North West: Catherine Quigley
Department of Health North West: Tom Hennell
North West Cancer Intelligence Service: Catherine O'Hara, Tony Moran

Lead Contributors:
North West Public Health Observatory: Caryl Beynon, Clare Perkins
Health Protection Agency North West: Kathy Chandler, Evdokia Dardamissis, Richard Dunn, Dan Hungerford, Michelle Mann, Catherine Quigley
Health Protection Agency Colindale: Annastella Costella, Sam Lattimore, Pauline Kaye, Mary Ramsay
Department of Health North West: Tom Hennell
North West Cancer Intelligence Service: Tony Moran, Catherine O'Hara, Sabrina Sandhu, Busani Ndlela
National Treatment Agency North West: Mark Harris
National Clinical Director for Liver Disease: Martin Lombard

Acknowledgements:
North West Public Health Observatory: Mark Robinson, Mark O'Keefe, Nicola Leckenby, David Nolan, Alyson Jones, Julia Humphreys
Health Protection Agency North West: Debbie Anderson
North West Cancer Intelligence Service: Debasree Purkayastha, Maria Khan, Lucy Francis

Contents

Foreword....3
Executive Summary....11
General Glossary....15
Liver Disease Glossary....16
1.0 Introduction....17
1.1 Inequalities in the North West....18
2.0 Data Sources and Methods....21
2.1 Hospital Admissions....21
2.2 Mortality....21
2.3 Cancer Incidence....22
2.4 Cancer Survival....22
2.5 Alcohol Treatment Data....22
2.6 Drug Treatment Data....23
2.7 Big Drink Debate....23
2.8 Obesity Profiles....24
2.9 Needle and Syringe Programmes....24
2.10 Unlinked Anonymised Prevalence Monitoring Survey....25
2.11 Routine Laboratory Surveillance....25
2.12 Sentinel Laboratory Surveillance....25
2.13 Transplant Data....25
2.14 Confidence Intervals....25
3.0 The Burden of Liver Disease....26
3.1 All Liver Disease....27
3.1.1 Mortality....27
3.1.2 Hospital Admissions....30
3.2 Hepatocellular Cancer....35
3.2.1 Mortality....35
3.2.2 Incidence....38
3.2.2 Survival....41
3.3 Alcohol-Related Liver Disease....43
3.3.1 Mortality....43
3.3.2 Hospital Admissions....46
3.3.3 Alcohol Treatment....52
3.4 Fatty Liver Disease....54
3.4.1 Mortality....54

3.4.2 Hospital Admissions 57
3.5 Hepatitis C 63
3.5.1 Mortality 63
3.5.2 Hospital Admissions 64
3.5.3 Laboratory Reports of Diagnosed Infection and Sentinel Surveillance of Laboratory Testing for HCV 69
3.5.4 Proxy Incidence – Diagnoses in 15 to 24 Year Olds 73
3.5.5 Future Burden 75
3.5.6 Hepatitis C in Injecting Drug Users 76
3.6 Hepatitis B 78
3.6.1 Hospital Admissions 78
3.6.2 Acute Infection/Incidence 80
3.6.3 Chronic Infection/Prevalence 83
3.6.4 Case study: Country of Birth for Hepatitis B Cases Recorded Locally by Greater Manchester Health Protection Unit (HPU), April 2010 to March 2012 87
3.6.5 Hepatitis B Prevalence in Injecting Drug Users 88
3.7 Liver Transplants 89
3.8 Trends and Dimensions of Liver Disease Risk in the North West; Findings from the Health Survey for England 2010 92
3.8.1 Characteristics Associated with Liver Disease Risk Factors 94
3.8.2 Risk Factors for Liver Disease 104
3.8.3 Recovery Factors for Liver Disease 104
3.9 Prevention and Harm Reduction 106
3.9.1 Needle and Syringe Programmes 106
3.9.2 Uptake of Hepatitis B Vaccine: Prisons, Injecting Drug Users and Babies Born to Positive Mothers 107
4.0 Conclusions and Recommendations 111
4.1 Conclusions 111
4.2 Recommendations 111
5.0 Data Sources 113
6.0 References 114
Appendix 1: Supplementary Tables 117
Appendix 2: Participating Sentinel laboratories 134

Table of Figures

Figure 1: Rate of all-cause mortality, North West and England, 1995 to 2010 18
Figure 2: Rate of liver disease mortality in persons aged <75 years, North West and England, 1995 to 2010 19
Figure 3: Components of the <75 gap in mortality by broad category of death, North West and England, 1995 to 2010 . 20

Figure 4: Liver disease mortality (underlying cause) by broad category of liver disease and gender, North West and England, 2010 26
Figure 5: All liver disease mortality (underlying cause) by gender, North West, 2005 to 2010 27
Figure 6: All liver disease mortality (underlying cause) by age and gender, North West, 2010 28
Figure 7: Mortality rates for all liver disease (underlying cause) by local authority, North West, 2006 to 2010 29
Figure 8: Mortality rate for all liver disease (underlying cause) by local authority and IMD score, North West, 2006 to 2010 30
Figure 9: Hospital admissions for all liver disease (primary diagnosis) by gender, North West, 2005/06 to 2010/11 30
Figure 10: Hospital admissions for all liver disease (all diagnoses) by gender, North West, 2005/06 to 2010/11 31
Figure 11: Hospital admissions for all liver disease by age and gender, North West, 2010/11 31
Figure 12: Hospital admission rates for all liver disease (primary diagnosis) by local authority, North West, 2010/11 32
Figure 13: Hospital admission rates for all liver disease (all diagnoses) by local authority, North West, 2010/11 33
Figure 14: Hospital admission rates for all liver disease (primary diagnosis) by local authority and IMD score, North West, 2010/11 34
Figure 15: Hospital admission rates for all liver disease (all diagnoses) by local authority and IMD score, North West, 2010/11 34
Figure 16: Hepatocellular cancer mortality (underlying cause) by gender, North West, 2005 to 2010 35
Figure 17: Hepatocellular cancer mortality (underlying cause) by age and gender, North West, 2010 36
Figure 18: Mortality rates for hepatocellular cancer (underlying cause) by local authority, North West, 2006 to 2010 37
Figure 19: Mortality rates for hepatocellular cancer (underlying cause) by local authority and IMD score, North West, 2006 to 2010 38
Figure 20: Incidence of hepatocellular cancer by gender, North West, 2005 to 2010 38
Figure 21: Incidence of hepatocellular cancer by age and gender, North West, 2010 39
Figure 22: Incidence rate of hepatocellular cancer by local authority, North West, 2005 to 2009 40
Figure 23: Incidence rates of hepatocellular cancer by local authority and IMD score, North West, 2005 to 2009 41
Figure 24: One- to five-year relative survival for individuals diagnosed with hepatocellular cancer (2001 to 2005) by gender, North West and England 42
Figure 25: Mortality from alcohol-related liver disease (underlying cause) by gender, North West, 2005 to 2010 44
Figure 26: Mortality from alcohol-related liver disease (underlying cause) by age and gender, North West, 2010 44
Figure 27: Mortality rates for alcohol-related liver disease (underlying cause) by local authority, North West, 2006 to 2010 45
Figure 28: Mortality rates for alcohol-related liver disease (underlying cause) by local authority and IMD score, North West, 2006 to 2010 46
Figure 29: Hospital admissions for alcohol-related liver disease (primary diagnosis) by gender, North West, 2005/06 to 2010/11 47
Figure 30: Hospital admissions for alcohol-related liver disease (all diagnoses) by gender, North West, 2005/06 to 2010/11 47
Figure 31: Hospital admissions for alcohol-related liver disease by age and gender, North West, 2010/11 48
Figure 32: Hospital admission rate for alcohol-related liver disease (primary diagnosis) by local authority, North West, 2010/11 49
Figure 33: Hospital admission rate for alcohol-related liver disease (all diagnoses) by local authority, North West, 2010/11 50
Figure 34: Hospital admission rate for alcohol-related liver disease (primary diagnosis) by local authority and IMD score, North West, 2010/11 51
Figure 35: Hospital admission rate for alcohol-related liver disease (all diagnoses) by local authority and IMD score, North West, 2010/11 51
Figure 36: Alcohol treatment, ages 18 to 75 years by gender, North West, 2008/09 to 2009/10 52
Figure 37: Alcohol treatment, by age (ages 18 to 75 years) and gender, North West, 2009/10 52

Figure 38: Alcohol treatment rate by DAAT area, ages 18 to 75 years, North West, 2010/11 53
Figure 39: Mortality from fatty liver disease (underlying cause) by gender, North West, 2005 to 2010 54
Figure 40: Mortality from fatty liver disease (underlying cause) by age and gender, North West, 2008 to 2010..... 55
Figure 41: Mortality rates for fatty liver disease (underlying cause) by local authority, North West, 2006 to 2010 56
Figure 42: Mortality rates for fatty liver disease (underlying cause) by local authority and IMD score, North West, 2006 to 2010 57
Figure 43: Hospital admissions for fatty liver disease (primary diagnosis) by gender, North West, 2005/06 to 2010/11 58
Figure 44: Hospital admissions for fatty liver disease (all diagnoses) by gender, North West, 2005/06 to 2010/11 58
Figure 45: Hospital admissions for fatty liver disease by age and gender, North West, 2010/11 59
Figure 46: Hospital admission rates for fatty liver disease (primary diagnosis) by local authority, North West, 2008/09 to 2010/11 60
Figure 47: Hospital admission rates for fatty liver disease (all diagnoses) by local authority, North West, 2008/09 to 2010/11 61
Figure 48: Hospital admission rates for fatty liver disease (primary diagnosis) by local authority and IMD score, North West, 2008/09 to 2010/11 62
Figure 49: Hospital admission rates for fatty liver disease (all diagnoses) by local authority and IMD score, North West, 2008/09 to 2010/11 62
Figure 50: Mortality from hepatitis C (underlying cause) by gender, North West, 2005 to 2010 64
Figure 51: Mortality from hepatitis C (underlying cause) by age and gender, North West, 2008 to 2010 64
Figure 52: Hospital admissions for hepatitis C (primary diagnosis) by gender, North West, 2005/06 to 2010/11 65
Figure 53: Hospital admissions for hepatitis C (all diagnoses) by gender, North West, 2005/06 to 2010/11 66
Figure 54: Hospital admissions for hepatitis C by age and gender, North West, 2010/11 66
Figure 55: Hospital admission rates for hepatitis C (primary diagnosis) by local authority, North West, 2008/09 to 2010/11 67
Figure 56: Hospital admission rates for hepatitis C (all diagnoses) by local authority, North West, 2008/09 to 2010/11 pooled 68
Figure 57: Hospital admission rates for hepatitis C (primary diagnosis) by local authority and IMD score, North West, 2008/09 to 2010/11 pooled 69
Figure 58: Hospital admission rates for hepatitis C (all diagnoses) by local authority and IMD score, North West, 2008/09 to 2010/11 69
Figure 59: Rate and number of laboratory reports of hepatitis C infection, England and the North West, 2000 to 2010 70
Figure 60: Proportion of people testing positive for anti-HCV in five sentinel laboratories in the North West by age group and sex, 2005 to 2010 71
Figure 61: Ethnicity of individuals tested and testing positive for anti-HCV in five and 22 sentinel laboratories in the North West and in England, 2005 to 2010 72
Figure 62: Risk exposures for individuals testing positive for anti-HCV in five and 17 sentinel laboratories in the North West and England (from questionnaire data), January 2002 to August 2006 73
Figure 63: Number of 15 to 19 year olds tested and testing positive for anti-HCV in five and 19 sentinel laboratories in the North West and England, 2005 to 2010 74
Figure 64: Number of 20 to 24 year olds tested and testing positive for anti-HCV in five and 19 sentinel laboratories in the North West and England, 2005 to 2010 74
Figure 65: Anti-HCV prevalence amongst injecting drug users, North West and England, 2000 to 2010 76
Figure 66: Levels of sharing amongst injecting drug users, North West and England, 2000 to 2010 77
Figure 67: Proportion aware of infection and HCV test uptake, North West and England, 2000 to 2010 77
Figure 68: Hospital admissions for hepatitis B (primary diagnosis) by gender, North West, 2005/06 to 2010/11 79
Figure 69: Hospital admissions for hepatitis B (all diagnoses) by gender, North West, 2005/06 to 2010/11 79
Figure 70: Hospital admissions for hepatitis B by age and gender, North West, 2010/11 80
Figure 71: Acute hepatitis B cases, North West and England, 2008 to 2010 81

Figure 72: Acute hepatitis B cases by gender, North West, 2008 to 2010 81
Figure 73: Acute hepatitis B cases by age and gender, England, 2010 82
Figure 74: Acute hepatitis B cases by risk group, England, 2000 to 2010 83
Figure 75: Proportions of individuals testing positive (HBsAg), excluding antenatal testing in five and 19 sentinel laboratories in the North West and England, 2005 to 2010 84
Figure 76: Age and gender of individuals tested and testing positive for HBsAg in five sentinel laboratories in the North West (excluding antenatal screening), 2005 to 2010 85
Figure 77: Proportion of antenatal women testing positive for hepatitis B (HBsAg) in the North West and in England, 2005 to 2009 86
Figure 78: Ethnicity of individuals tested and testing positive for HBsAg in five and 22 sentinel laboratories in the North West and in England, 2005 to 2010 87
Figure 79: Country of birth of hepatitis B cases recorded by Greater Manchester HPU, by diagnosis, April 2010 to March 2012 88
Figure 80: Proportion of injecting drug users anti-HBc positive (ever infected), England and North West, 2000 to 2010 88
Figure 81: Number of transplants in the North West and England, 1996 to 2010 89
Figure 82: First registrations for transplant by gender, North West, 2006 to 2010 90
Figure 83: First registrations for transplant by age group (age at registration) and gender, North West, 2006 to 2010 91
Figure 84: All registrations for transplant by most common primary liver disease at registration, North West, 1996 to 2011 91
Figure 85: Trends in adult drinking over-limit, heaviest drinking day in last seven: <8 units (male), < 6 units (female), North West and England, 2006 to 2010 93
Figure 86: Trends in adult obesity, body mass index 30+, North West and England, 2006 to 2010 93
Figure 87: Trends in recent alcohol consumption, ages 14 and 15, last alcoholic drink (including alcopops), North West and England, 2006 to 2010 94
Figure 88: Adult drinking over-limits by age group, North West and England, 2010 96
Figure 89: Adult obesity by age group, North West and England, 2010 96
Figure 90: Recent alcoholic drinking amongst adolescents by age, most recent alcoholic drink (including alcopops), England, 2010 97
Figure 91: Adult drinking over-limits by household income, North West and England, 2010 98
Figure 92: Adult drinking over limits by household income and IMD quintile, England, 2010 98
Figure 93: Adult obesity by household income, North West and England, 2010 99
Figure 94: Recent adolescent drinking (including alcopops) by household income, England, 2010 100
Figure 95: Adults drinking over-limits by household type, England, 2010 100
Figure 96: Adult obesity (body mass index = 30+) by household type, England, 2010 101
Figure 97: Recent adolescent (ages 14 to 15 years) drinking by household type, England, 2010 101
Figure 98: Alcohol health risk by ethnicity, England, 2010 102
Figure 99: Adult obesity (body mass index = 30+) by ethnicity, England, 2010 102
Figure 100: Positive mental wellbeing in drinkers and non-drinkers, England, 2010 103
Figure 101: Positive mental wellbeing and body mass index in adults, England, 2010 104
Figure 102: Total number of people accessing needle and syringe programmes, Cheshire and Merseyside, 2002/03 to 2010/11 106
Figure 103: Number of people, excluding injectors of performance and image enhancing drugs, accessing needle and syringe programmes, Cheshire and Merseyside, 2002/03 to 2010/11 107
Figure 104: Hepatitis B immunisation coverage of three doses among babies born to positive mothers, at 12 months, England and North West, 2007/8 to 2010/11 108
Figure 105: Hepatitis B immunisation coverage of four doses among babies born to positive mothers, at 24 months, England and North West, 2007/8 to 2010/11 108

Figure 106: Reported uptake of hepatitis B vaccine among injecting drug users, England and North West, 2000 to 2010. 109

Table of Tables

Table 1: ICD10 codes for classifications of liver disease 21
Table 2: Estimates of hepatitis C prevalence, burden, treatment and cost of treatment by Drug and Alcohol Action Team area in the North West 75
Table 3: Hepatitis B vaccine coverage in prisons in the North West, 2006 to 2010.....110

Executive Summary

This report presents data on liver disease in the North West of England, describing the burden by age, sex, deprivation and geography. It explores routinely available data for the main causes of liver disease; alcohol, hepatitis B and C and fatty liver disease. It will be a useful resource for Directors of Public Health, health and wellbeing boards, commissioners and providers of services and others involved in liver disease. The work presented here has provided us with the opportunity to identify synergies across the public health intelligence systems, in light of the potential transfer to Public Health England. Key findings from the report are shown in Box 1:

Box 1: Key findings

Liver disease

- Premature mortality from liver disease is higher in the North West than England and is increasing at a faster rate in the North West than the rest of the country.
- In the North West in 2010 rates of premature mortality from liver disease were nearly double those in 1995.
- The rate of liver disease mortality in the North West was significantly higher among males than females and the gap has widened between 2005 and 2010.
- The peak ages of liver disease deaths are 55 to 64 years for both males and females, demonstrating the contribution of liver disease to premature mortality.
- The number of hospital admissions for liver disease in the North West has increased considerably.
- Across all liver disease categories there was great variation in mortality and hospital admission rates by local authority.

Alcohol-related liver disease

- Alcohol-related liver disease accounted for the greatest proportion of liver disease deaths in the North West during 2010; 47% of male liver disease deaths and 43% of female liver disease deaths.
- Hospital admissions for alcohol-related liver disease were significantly higher in the North West than England.
- Alcohol-related cirrhosis was the leading cause of registrations for liver transplants in the North West.
- North West adults continue to be more likely than average to drink over the recommended limits.
- There are more deaths from alcohol-related liver disease in the most deprived local authorities of the North West than the least deprived.

Hepatocellular cancer

- Hepatocellular cancer accounts for less than 1% of all reported cancers in the North West, though there are concerns regarding possible underreporting of this type of cancer nationally.
- Mortality from and incidence of hepatocellular cancer is higher among males than females; mortality and incidence rates appear to be increasing among males, therefore further widening the gap with females.
- One to five year survival for individuals with hepatocellular cancer is significantly lower in the North West than for England, with the largest gap at one year.

(Continued over the page).

Box 1: Key findings (continued)

Fatty liver disease

- There has been an almost threefold increase in the number of hospital admissions due to fatty liver disease (all diagnoses) from 913 in 2005/06 to 2,578 in 2010/11.

Hepatitis C

- Laboratory reports of hepatitis C have almost doubled in the North West between 2000 and 2010.
- In the North West hospital admissions for hepatitis C (all diagnoses) have increased from 2,929 in 2005 to 4,841 in 2010; admissions among males are double that of females.
- The main risk factor for transmission of the hepatitis C virus is sharing contaminated drug injecting equipment (almost 75% of cases in the North West). The prevalence of hepatitis C in injecting drug users in the North West was 65% in 2010, higher than the England average. Uptake of hepatitis C testing is increasing.

Hepatitis B

- In England in 2010 acute hepatitis B was more common in males (61%) and where known, sexual exposure accounted for most transmission.
- Most chronic hepatitis B infections are among migrants from a country with intermediate/high prevalence.

Conclusions

- The premature and avoidable mortality caused by liver disease, together with the gap between burden in the North West and England, indicate the scale and urgency of the problem.
- The burden of liver disease among middle aged men is striking.
- Alcohol is the biggest single cause of liver disease.
- While deprivation may explain a large proportion of the variability in mortality for alcohol-related liver disease, it does not account for all local authority level variation for other liver diseases.
- The percentage difference in survival rates between the North West and England is largest one-year after diagnosis. This suggests that proportionally more patients in this region are being diagnosed with advanced disease.
- Prevalence of hepatitis C among injecting drug users remains higher in the North West than the rest of England.
- Although the burden of liver disease currently affects middle aged men disproportionately, analysis of data from the Health Survey for England 2010 suggests other demographic groups, particularly females, are at risk of chronic liver disease in the future.
- Hospital admission data represent the most severe cases of liver disease and do not include people treated in primary care or outpatient departments where the majority of people with liver disease are treated. This will particularly effect interpretation of admissions for fatty liver disease and hepatitis C. The full burden of liver disease is therefore not fully reflected in the data presented here.

Recommendations

Universal

- Tackling liver disease should be a priority for North West commissioners of prevention and treatment services and for organisations that provide services to those at risk and/or affected.
- Organisations that commission and provide services should work collaboratively to reduce the burden of liver disease, learning from established networks.
- Commissioners should work with primary care and clinical commissioning groups to investigate local intelligence so that interventions are targeted at the populations most at risk.
- Commissioners and providers should work together to devise a strategy for early diagnosis.
- Surveillance systems should be developed further in order to address information gaps.
- Organisations should raise awareness of hepatitis B and C for those at risk or with past exposure.
- The North West needs an end of life strategy for liver disease patients.
- Further investigation of the causes of differences in liver disease burden between local authorities is needed in order to target interventions at populations most affected.
- This report brings together data from a number of sources but there are other sources and other analyses which could have been included. We hope that it will act as an exemplar for other areas and recommend that it be further developed in both the North West and elsewhere.

Prevention

- Policies that focus on reducing alcohol consumption should remain a priority.
- Policies should not only target those groups that currently have a high burden of chronic liver disease but also groups such as young females whose current behaviours put them at risk of progression to chronic liver disease.
- Strategies to prevent the transmission of hepatitis C, including needle and syringe programmes among injecting drug users should remain a priority.
- Hepatitis B immunisation rates in all at risk groups should be improved: including babies born to mothers with hepatitis B; injecting drug users; and individuals who change sexual partners frequently.
- Hepatitis B immunisation programmes for injecting and ex-injecting drug users in prisons should continue to be strengthened.

Treatment and care

- Early intervention is essential and primary care should play a key role in detecting early liver disease.
- More specifically, we recommend:
    - Early identification and early treatment of people with chronic hepatitis B and C, including active case finding of ex-injecting drug users, in order to reduce the long term complications of infection.
    - The strengthening of strategies which support the early identification of excessive alcohol use.
    - That the number of people being tested for chronic hepatitis B and C is increased and forthcoming National Institute for Health and Clinical Excellence (NICE) guidance on ways to offer and promote testing is followed.

- That consideration should be given to setting up a programme whereby individuals at high risk of developing hepatocellular cancer are offered an ultrasound examination in order to identify cancer at an earlier stage. Further work is required to examine the completeness of reporting and coding of liver cancers.

- Better outcome data on hepatitis C treatment are needed.

Recovery

- The recovery approach which is promoted for drug treatment recognises that many people in need of treatment have complex physical, mental and social problems requiring complex interventions. Elements of overall care include individual care planning, psychosocial interventions and integration with mutual aid and peer support. This approach should be explored in relation to other causes of liver disease.

General Glossary

Anti-HBc	Total antibody to hepatitis B core antigen (indicates resolving or resolved infection)
Anti-HBc IgM	Immunoglobulin M antibody to hepatitis B core antigen (indicates recent or acute infection)
Anti-HCV	Hepatitis C antibody
AOR	Adjusted odds ratio
APHO	Association of Public Health Observatory
CI	Confidence interval
CPH	Centre for Public Health, Liverpool John Moores University
CWT	Cancer waiting times
DH	Department of Health
DSR	Directly-standardised rate
EMPHO	East Midlands Public Health Observatory
FCE	Finished consultant episode
FFCE	First finished consultant episode
HBsAg	Hepatitis B surface antigen (detected during acute or chronic hepatitis B infection)
HBV	Hepatitis B virus
HES	Hospital Episode Statistics
HIV	Human Immunodeficiency Virus
HPA	Health Protection Agency
HPU	Health Protection Unit
ICD10	International Classification of Diseases Version 10
IDU	Injecting drug users
IMD	Index of multiple deprivation
Incidence	Number of new cases occurring/reported within a given time period
IVDU	Intra-venous drug user
LA	Local authority
LCI	Lower confidence interval
LPHO	London Public Health Observatory
LSOA	Lower Super Output Area
MSM	Men who have sex with men
NATMS	National Alcohol Treatment Monitoring System
NCDR	National Cancer Data Repository
NDTMS	National Drug Treatment Monitoring Service
NICE	National Institute for Health and Clinical Excellence
NHS	National Health Service
NHSBT	National Health Service Blood and Transplant
NTA	National Treatment Agency
NWCIS	North West Cancer Intelligence Service
ONS	Office for National Statistics
PCT	Primary Care Trust
PHE	Public Health England
PHO	Public Health Observatory
Prevalence	Number of cases with an existing condition at a specific time point
PSA	Public service agreement
R^2	How good one variable is at predicting another. If R^2=1 it is a perfect prediction or fit.
RDMD	Regional drug misuse databases
UCI	Upper confidence interval
VCT	Voluntary confidential testing
Viral RNA	Viral ribonucleic acid
WEMWBS	Warwick and Edinburgh Mental Wellbeing Scale

Liver Disease Glossary

The following gives brief definitions of the categorisations of liver disease referred to within this report.

Hepatocellular cancer

Hepatocellular cancer is a type of liver cancer known as primary liver cancer (as distinct from secondary liver cancer that starts in another part of the body such as the bowel before spreading to the liver). The main cause of hepatocellular cancer is cirrhosis of the liver where the tissue has become scarred as a result of damage over a long period of time. Certain causes of cirrhosis have a strong link with hepatocellular cancer: alcohol misuse, fatty liver disease and hepatitis C.

Alcohol-related liver disease

Alcohol-related liver disease refers to damage to the liver caused by alcohol misuse. One of the liver's functions is filtering alcohol and when this occurs some cells die but subsequently are capable of regeneration. However, prolonged alcohol misuse can prevent regeneration. The final stage of alcohol-related liver disease is cirrhosis of the liver.

Fatty liver disease

Fatty liver disease refers to a wide range of conditions which are caused by a build-up of fat within the liver cells. It is predominantly seen in people who are overweight or obese. A healthy liver should contain little or no fat. People who are: obese or overweight; have type 2 diabetes; are over the age of 50; have high blood pressure; high cholesterol; or have experienced rapid weight loss, are more likely to develop fatty liver disease.

Hepatitis

Hepatitis means inflammation of the liver. The most common causes of hepatitis are viral infections such as hepatitis B and C. Some types of hepatitis, hepatitis C in particular can persist and cause cirrhosis of the liver.

1.0 Introduction

In October 2011, Dr Ann Hoskins, Interim Regional Director of Public Health, organised a meeting for public health information and intelligence staff potentially destined for transfer to Public Health England. Staff that attended included representatives from the Health Protection Agency, the Public Health Observatory, the National Treatment Agency, the Cancer Intelligence Service, and Department of Health North West. One outcome of the meeting was a collective agreement for organisations to collaborate on delivering a specific piece of work. After discussion it was agreed that liver disease was an important topic and one that all organisations could contribute to. A working group with representatives from each organisation was convened to progress the work. During the transition of individual public health intelligence organisations to Public Health England, the collaboration has created an opportunity to identify synergies across the public health intelligence system.

Against a backdrop of falling mortality rates for other major causes of disease in the United Kingdom (UK), mortality from liver disease is increasing considerably, and accounts for approximately 2% of all deaths in England (1). The UK has experienced a rapid rise in levels of alcohol consumption over recent decades (2) and patterns of alcohol consumption are a key driver for the rise in liver disease (3). Indeed alcohol-related liver disease accounts for over a third (37%) of all liver deaths in England (1). Non-alcohol-related fatty liver disease is largely linked to obesity with an additional contribution from diabetes or metabolic syndrome (3). Rates of obesity in England have been rising and in 2008, almost a quarter of all adults and over 15% of children aged between two and 15 years were estimated to be obese (body mass index 30kg/m^2 or over; (4)). Drinkers who are overweight are at a particularly high risk of developing liver disease (5). It is estimated that approximately 216,000 people living in the UK are chronically infected with hepatitis C, and national data sources (hospital admissions for end stage liver disease, liver transplants and death notifications) all show that hepatitis C-related liver disease is continuing to rise (6). Chronic hepatitis B also leads to development of cirrhosis and liver cancer. Although prevalence of hepatitis B is estimated to be relatively low in this country, it varies for different ethnic groups and among those born in endemic countries. Rates of chronic infection, and therefore the largest burden of disease, are highest among people born in Africa and Asia (7).

Whilst rates of liver disease are on the rise in England, rates of liver disease are not equally distributed across the country, nor are they equally distributed across different sections of the population. The age standardised mortality rate for liver disease in the North West of England is, for example, twice the rate in the East of England (1). The number of deaths from liver disease among males exceeds the number of deaths among females in England; this is particularly evident for alcohol-related liver disease where the number of deaths among males between 2001 and 2009 were approximately double the number of deaths among females. While age is generally the biggest risk factor for most long term conditions, the average annual number of liver disease deaths in England is greatest among those aged 50 to 59 years (1). Consequently, in the Public Health Outcomes Framework, reducing mortality from liver disease will be a key indicator in domain four: healthcare public health and preventing premature mortality (8).

Levels of risky alcohol consumption and obesity, both risk factors for liver disease, are increasing, and therefore the current 2% contribution of liver disease to all deaths in England may signal the start of a liver disease epidemic. Consequently, health professionals have a responsibility to monitor the full burden of liver disease and its risk factors and ensure that public health service provision is fit for purpose to meet current needs and reduce and prevent future mortality and morbidity. Therefore, the aim of this work is to describe the burden of liver disease in the North West of England and to illustrate the variability in burden in relation to deprivation, age and gender. The first section of the report describes the burden of all liver disease, and then the report continues by detailing the burden for specific causes of liver disease, focusing on: alcohol-related liver disease; hepatitis B and C; fatty liver disease; and hepatocellular carcinoma. It is important to note that exploration of some other causes of liver disease e.g. autoimmune hepatitis and hereditary causes such as haemochromatosis, is beyond the scope of this report.

Liver disease morbidity and mortality are preventable (3) and we hope that this report provides a basis in the North West for stimulating further work to reduce this burden.

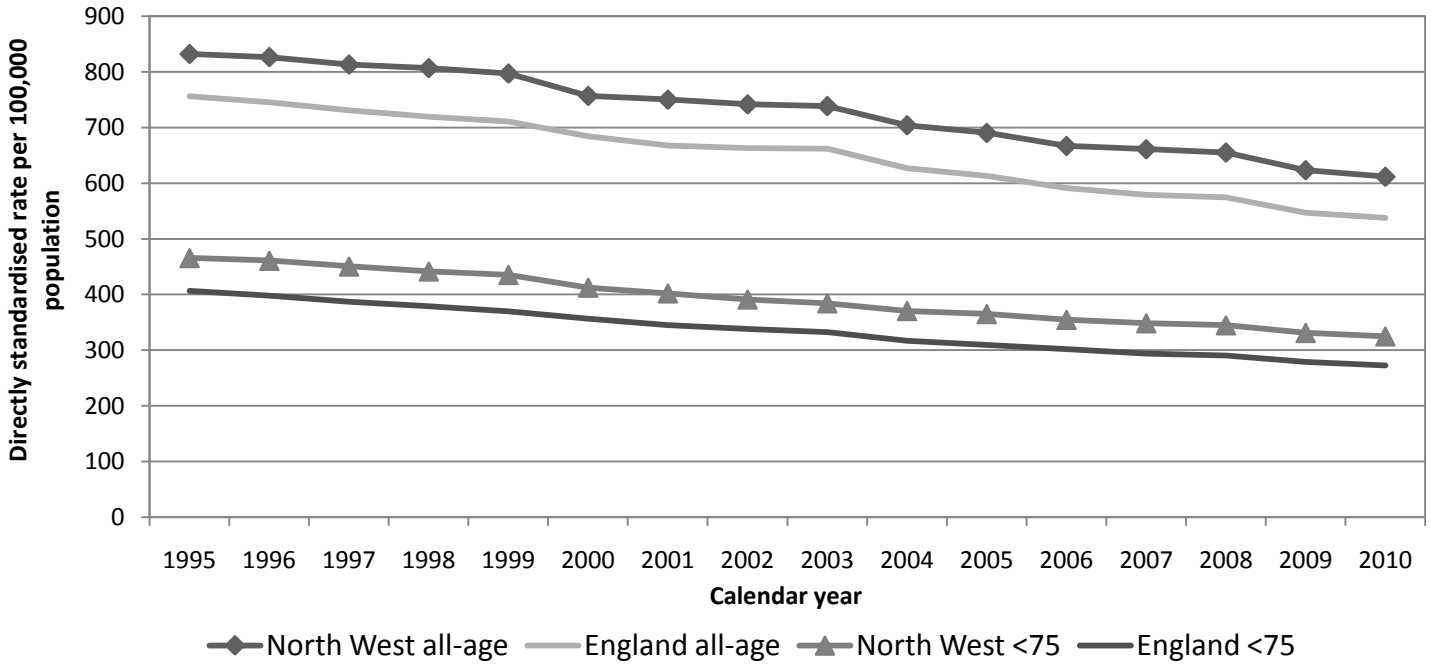
1.1 Inequalities in the North West

Summary

- **The excess in premature all-cause mortality in the North West relative to England widened from 15% in 1995 to 19% in 2010.**
- **The proportion of the excess accounted for by liver disease deaths increased from 0.06% to 2.6%.**

Although inequalities in health in England are less pronounced than in many countries they are still apparent, with people living in poorer neighbourhoods of England dying sooner and experiencing more years of life living with a disability (9). In the North West, life expectancy for both males and females is significantly lower than the England average (10). Inequalities in the North West have been shown to be associated with deaths from liver disease, with the most deprived areas of England having three times as many deaths from alcohol-related liver disease as the least deprived (1). This is particularly significant for the North West because nearly a third of the North West's local neighbourhoods (Lower Super Output Areas [LSOA]) are grouped within the most deprived quintile (11). As previously mentioned, obesity in England has been rising and recent child obesity figures show the estimated percentage of obese children in the North West region is significantly higher than the England average (12). If no action is taken to reduce/prevent obesity the costs of treating illnesses that result from inequality in the levels obesity are predicted to rise from £2 billion to £5 billion by 2025 (9).

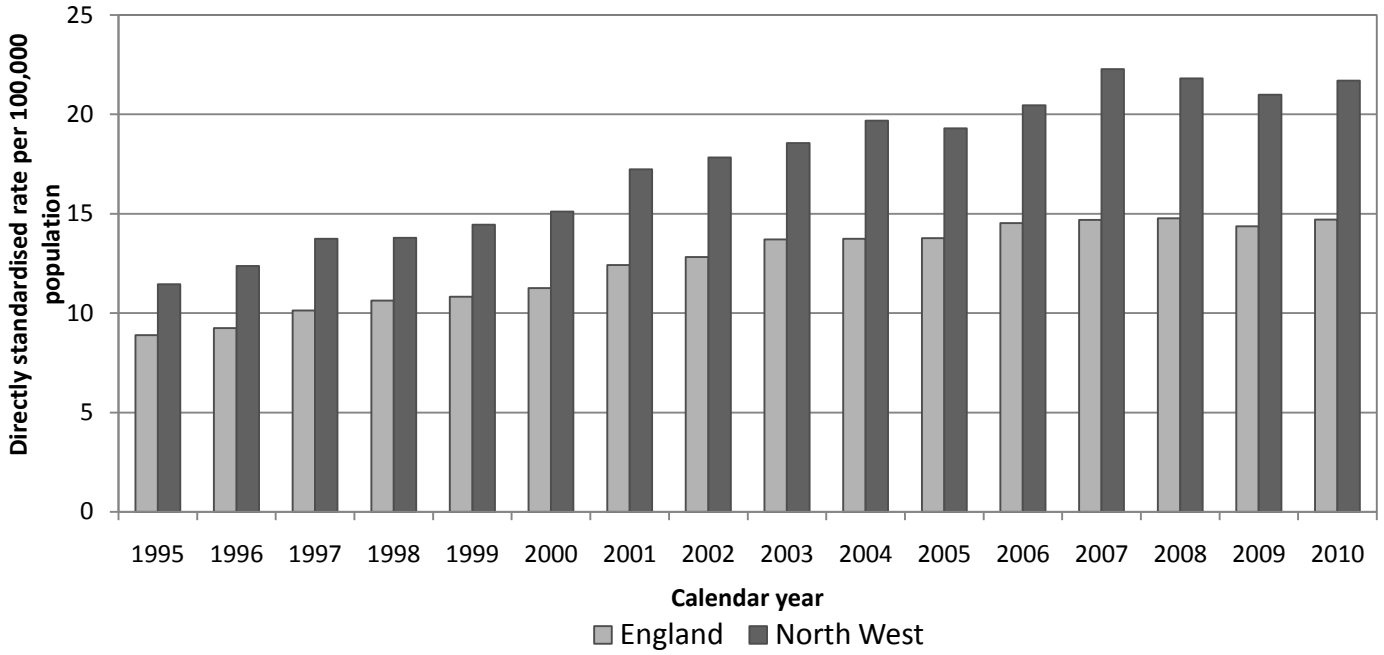
Over the last 15 years, all-cause mortality has been declining sharply in the North West, as it has in England as a whole. This pattern of reducing mortality is observed both for all-age mortality, and for 'premature' mortality (commonly measured as deaths under 75 years of age) these trends are shown in Figure 1. In 1995, all–age mortality was 10% higher in the North West, by 2010 the gap had widened to 14%. In 1995, under 75 years mortality was 15% higher in the North West, by 2010 the gap had widened to 19%.



Data source: Office for National Statistics

Figure 1: Rate of all-cause mortality, North West and England, 1995 to 2010

Contrary to the general trend, absolute mortality from liver disease has been increasing over the last 15 years and at a faster rate in the North West compared with England as a whole (Figure 2).



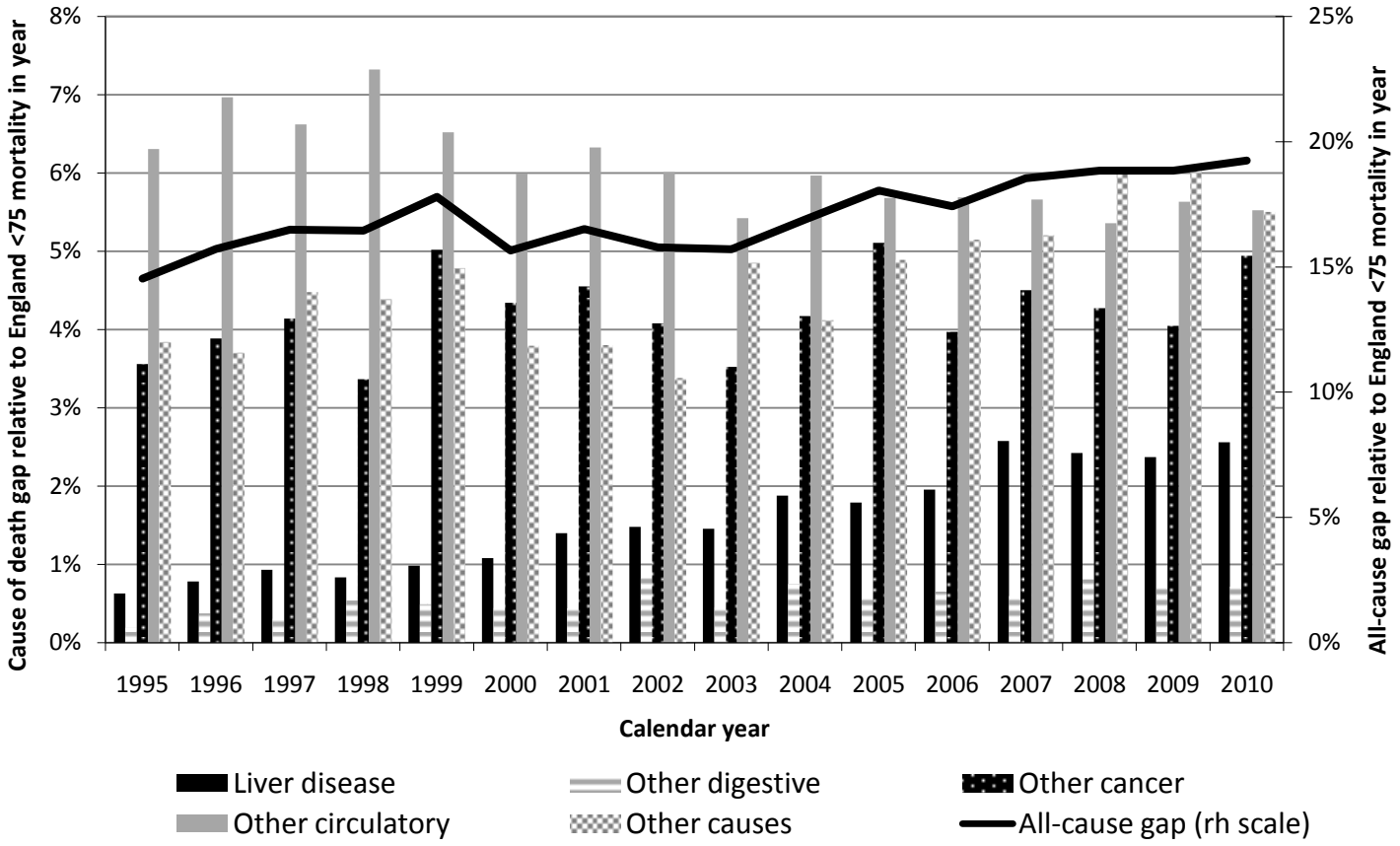
Data source: Office for National Statistics

Figure 2: Rate of liver disease mortality in persons aged <75 years, North West and England, 1995 to 2010

Whereas in 1995 premature mortality from liver disease was around 30% higher in the North West than in England as a whole, by 2010 excess liver disease mortality in the North West had increased to nearly 50%. Both in absolute terms, and relative to the national average, in the North West in 2007 liver disease mortality was at its highest, although there appears to have been a small improvement subsequently. Liver disease premature mortality rates in the North West remain nearly double what they were 15 years ago.

It is possible to quantify the contributions of particular causes of death to the observed trends in the excess in all-cause premature mortality rates between the North West and England. This is best presented by taking, for each high-level categorised cause (e.g. circulatory disease) the difference between the regional and national mortality rates in any one year and then dividing by the all-cause under 75 years mortality in that year.

The excess in premature all-cause mortality in the North West relative to the England rate has widened between 1995 and 2010 from 15% to 19% (Figure 3). It can be seen that circulatory causes formed by far the largest component of the excess in 1995; but that rapid improvement in circulatory mortality in the North West (especially in the early years of the last decade) tended substantially to reduce regional inequalities specific to these causes. Trend improvements in cancer mortality are less clear cut. However, the component of the premature mortality excess that was worsening most rapidly was deaths from liver disease. Whereas in 1995, deaths from liver disease represented just 0.06% of the excess all-cause premature mortality, by 2010 this had increased to 2.6%, over half of the observed 4.7 percentage point increase in excess premature mortality in the North West.



Data source: Office for National Statistics

Figure 3: Components of the <75 gap in mortality by broad category of death, North West and England, 1995 to 2010

Encouragingly, since 2007 the rate of excess liver disease deaths in the North West appears to have stabilised. Nevertheless, liver disease contributes significantly to excess premature mortality in the North West and without substantial improvements in reducing liver mortality it is unlikely that the overall health inequalities gap can be effectively narrowed.

2.0 Data Sources and Methods

The following section provides information on the data sources and methods used to generate the analysis of liver disease in the North West. Table 1 provides details of the International Statistical Classification of Diseases and Related Health Problems 10th Revision codes (ICD10) used for each particular liver disease category (13).

Table 1: ICD10 codes for classifications of liver disease

Liver Disease	ICD10 Codes
All liver disease	B15-B19, C22*, K70-K77*, I81, I85, T864
Hepatocellular cancer	C22.0
Alcohol-related liver disease	K70*
Fatty liver disease	K76.0
Acute hepatitis C; chronic hepatitis C	B17.1, B18.2
Acute hepatitis B; chronic hepatitis B	B16*, B18.0, B18.1

* 4th digit codes 0-9

2.1 Hospital Admissions

Data were extracted from the Hospital Episode Statistics (HES) dataset which records inpatient care from National Health Service (NHS) hospitals across England. Within this dataset, a unit of care (a finished consultant episode [FCE]) equates to the period a patient spends under the care of a single hospital consultant. Several FCEs may make up a continuous period of inpatient care, or spell. People admitted for a single day (for example to get a liver biopsy) are included here. The admission episode within a spell is also known as the first finished consultant episode or FFCE. The number of FFCEs were derived from HES records for residents of the North West and England over a six year-period 2005/06 to 2010/11 (using the patient's postcode of residence to assign each admission to a geographic area). Included were records where either the primary diagnosis field (which is the main reason for an admission), or any of the 19 subsequent secondary diagnosis fields, contained an ICD10 code from any of the following liver disease groups: all liver disease, alcohol-related liver disease, fatty liver disease, hepatitis C and hepatitis B (Table 1).

For each form of liver disease, the following were calculated: 1) Age standardised rates by local authority and gender for years 2005/06 to 2010/11 and 2) Crude rates broken down by age-band and gender for years 2005/06 to 2010/11. The corresponding mid-year population estimates from the Office for National Statistics (ONS) were used as the denominator. The Index of Multiple Deprivation (IMD) 2010 was added to create a measure of deprivation and inequalities at a local authority level.

It is important to note that the hospital admissions data do not include people treated in primary care or outpatient departments where the majority of people with liver disease are treated. Only severe cases of liver disease are admitted to hospital and are represented in hospital admission data.

2.2 Mortality

The Office for National Statistics compiles mortality statistics that are based on death certification. Numbers of deaths and mortality rates are calculated using the underlying cause of death, which are coded using ICD10. Similar to hospital admissions and cancer incidence, the number of deaths was derived for residents of the North West and England for years 2005 to 2010 (using the postcode of residence to assign each death to a geographic area). Included were records where the underlying cause of death contained an ICD10 code from any of the following liver disease groups: all liver disease, alcohol-related liver disease, fatty liver disease, hepatitis C and hepatitis B (Table 1).

Analyses were the same as those detailed in Section 2.1 for hospital admissions. Again, corresponding mid-year population estimates from the ONS were used as the denominator for rates and the IMD 2010 used to create a measure

of deprivation for each local authority. Directly age-standardised rates were calculated using the European standard population (14).

2.3 Cancer Incidence

Data for incidence of primary hepatocellular cancer (ICD10 C22.0) and other primary liver cancers (C22.1-22.9) were extracted from cancer registration data for the North West and for England. The UK is widely acknowledged as having one of the most comprehensive cancer registration systems in the world, consisting of population-based cancer data spanning more than 40 years. Cancer registration in England is conducted by eight regional registries, with Northern Ireland, Scotland and Wales each having their own national cancer registries. Cancer registrations are derived from a variety and combination of sources including hospitals, cancer centres, pathology laboratories, hospices, cancer screening programmes, general practices, death certificates, HES and Cancer Waiting Time (CWT) data. Data are then validated, linked and consolidated.

Cancer data for each region are held locally and used to support cancer services within the local area. The North West Cancer Intelligence Service (NWCIS) registers all individuals who are diagnosed with a cancer in the North West of England. Data from each region are also compiled together to produce a single national cancer dataset, known as the National Cancer Data Repository (NCDR).

Incidence data for diagnoses up to and including 2009, for the North West and England, are based on the NCDR. For 2010, diagnoses in the North West data have been extracted directly from the NWCIS's database. All residents of the North West are included regardless of where they were treated.

Analyses were the same as those detailed for all liver disease. Corresponding mid-year population estimates from the ONS were used as the denominator for rates and the IMD 2010 was used to create a measure of deprivation for each local authority. Directly age-standardised rates were calculated using the European standard population.

2.4 Cancer Survival

For survival analysis, data were extracted from the NCDR, including all diagnoses of primary hepatocellular cancer between 2001 and 2009. Diagnoses that were registered only as a result of a cancer being recorded on a death certificate (DCOs) were excluded as were individuals whose date of death was the same as date of diagnosis (zero survivors). Each case was censored at 31st December 2010 or at death (from any cause) if earlier. Relative survival was estimated using the STATA STRS programme (15) which estimates survival as the ratio of the observed survival of the patients (where all deaths are considered events) to the survival that would be expected if each cancer patient experienced the same survival (life expectancy) as observed in the general population. Using national life tables stratified by age, sex and time, expected survival was estimated using the Ederer II method (16).

2.5 Alcohol Treatment Data

The National Alcohol Strategy was published in March 2012. One of its principle aims is to challenge people to change their behaviour by giving them the information and support they need (2). The Strategy supports the recovery agenda announced within the Drug Strategy 2010, *Reducing Demand, Restricting Supply, Building Recovery: Supporting People to Live a Drug Free Life* (17). The focus is on the creation of a recovery system to support all drug and alcohol users in becoming free from dependence. The strategy states that recovery can only be delivered through working with education, training, employment, housing, family support services, wider health services and, where relevant, prison, probation and youth justice services to address the full gamete of issues faced by problem drinkers. Therefore, when building a recovery focused system, local areas are expected to jointly commission and deliver 'end to end' support,

building close links between community, inpatient and residential treatment and rehabilitation providers, who in turn need to forge close links with aftercare services.

Since 2008, a subset of the National Drug Treatment Monitoring System (NDTMS) has been utilised to monitor the performance of alcohol treatment in England. This subset is known as the National Alcohol Treatment Monitoring System (NATMS). The NATMS collects data on all clients in contact with structured alcohol treatment (i.e. high threshold tier 3 (community-based drug assessment and structured treatment including community prescribing, psychosocial interventions, and day programmes) and tier 4 (residential treatment, such as NHS inpatient units and voluntary sector rehabs) services as defined by *Models of Care* (18). This data collection enables national, regional and local-level reporting on alcohol treatment to support the alcohol strategy. Data reporting aids policy formulation and supports the development of efficient commissioning systems at a local level. The data collection does not, at present, include unstructured alcohol treatment (for example, Alcoholics Anonymous) or treatment in other parts of the NHS for secondary complications arising from the misuse of alcohol (such as treatment for liver disease). Data extracted from the NATMS and used here represent persons whose primary problematic substance is alcohol; data do not include those people who are treated in drugs services who also use alcohol as an adjunct to other substances.

2.6 Drug Treatment Data

The NDTMS was introduced by the National Treatment Agency (NTA) in 2001. The NDTMS is a development of the Regional Drug Misuse Databases (RDMDs), which have been in place since the late 1980s. The NDTMS collects data on all those in contact with structured drug treatment (i.e. high threshold tier 3 and tier 4 services [18]) and enables the monitoring of the progress of individuals entering treatment, along with assessment of outcomes and recovery. The NDTMS is also used to examine trends in patterns of drug use and the impact of drug treatment as a component of the wider public health service.

Since its inception, the NDTMS has been used to monitor the performance of drug treatment services against local and national targets. These targets have evolved since the introduction of NDTMS. Between 2004 and 2007, the principle aim was to monitor the number of individuals in contact with treatment and followed from the previous government's aim to double the number in treatment between 1997 and 2007 (19). In 2007, the government published a Public Service Agreement (PSA), *PSA Delivery Agreement 25: Reduce the harm caused by alcohol and drugs*. The performance indicator for the drug treatment element of this PSA was the commitment to increase the number of problematic drug users in effective treatment (20). In 2010, the new Drug Strategy 2010, *Reducing Demand, Restricting Supply, Building Recovery: Supporting People to Live a Drug Free Life* (17) was published. This places particular emphasis on the creation of a recovery system to support all drug and alcohol users in becoming free from dependence. Local areas are expected to jointly commission and deliver 'end to end' support for people with drug use problems.

The NDTMS system collects data on sharing needles and syringes which is useful here because sharing contaminated injecting equipment is the main route of transmission of the hepatitis C virus (6). However, the information on sharing is a local field and is not analysed or reported on a national basis so could not be included here.

2.7 Big Drink Debate

The Big Drink Debate, launched by Our Life in 2008 (21), was designed to raise alcohol awareness and seek possible solutions to alcohol use problems. A survey conducted by the North West Public Health Observatory/Centre for Public Health (NWPHO/CPH) was used to assess alcohol consumption levels, alcohol-related behaviours and opinions on alcohol use. In the North West, approximately 30,000 adults responded. Non-drinkers were those that answered 'never' to the question 'in general, how often do you drink?'. Sensible drinkers were men who reported drinking less than 22 units in the previous week and women who reported drinking less than 15 units. Hazardous drinkers were defined as

men who drank between 22 and 50 units and women who drank between 15 and 35 units in the previous week. Harmful drinkers were those who drank at levels recognised as causing harm: over 50 units for men and 35 units for women (21).

2.8 Obesity Profiles

Data on obesity are taken from Health Profiles which are produced by the network of Public Health Observatories (PHOs) and funded by the Department of Health (DH). Designed to support local decision making, Health Profiles are updated annually and present a set of important health indicators that show how the area compares to the national and regional average. Here, we present data on the estimated prevalence of obesity in children and adults separately.

For children, the estimated prevalence of obesity refers to year six pupils (ages 10 to 11 years) and is the proportion of school age children in year six who are reported as obese in 2010/11 school year out of the total number of children in year six. Children are classified as obese if their body max index is on or above the 95th centile of the British growth reference (UK 90) (22) according to age and sex. Data are taken from the National Child Measurement Programme (23).

For adults, the data refer to the number of adults (aged 16 years and over) estimated to be obese expressed as a percentage of the resident adult population in 2006 to 2008. Data are taken from the Health Survey for England. Obesity is defined as a body mass index (BMI) of more than 30kg/m^2.

Information on Health Profiles can be found at: www.apho.org.uk/default.aspx?QN=P_HEALTH_PROFILES. The Indicator Guide provides detailed methodological information on how each indicator is calculated.

2.9 Needle and Syringe Programmes

Needle and syringe programmes in the UK were introduced in 1986, in response to the then burgeoning HIV epidemic. Injecting drug users commonly shared used and infected injecting equipment, thereby spreading blood borne viruses such as HIV and hepatitis C. In 1986, three needle and syringe programmes started in the UK; at drug services in Peterborough and Liverpool and at a pharmacy in Sheffield. Today, Cheshire and Merseyside have 13 agency-based needle and syringe programmes (operated as part of a wider drug treatment service) and approximately 90 pharmacy-based programmes. Exchanges at both agency and pharmacy needle and syringe programmes are monitored by the Inter Agency Drug Misuse Database at the Centre for Public Health at Liverpool John Moores University. For agency-based needle and syringe programmes data are collected on each exchange, including; initials, date of birth and gender of the client, the primary injecting drug used and equipment taken and returned. Data are then held at the Centre for Public Health for research purposes.

For the analyses presented here, data relate to all agency-based needle and syringe programmes in Cheshire and Merseyside. Clients for whom the attributor code (a combination of initials, date of birth and gender) was incomplete or missing were excluded from analyses. Where data are presented by Drug and Alcohol Action Team (DAAT), a person may be reported more than once if they visited a needle and syringe programmes in two DAAT areas during the reporting period. Where data are presented by Cheshire and Merseyside, each person will be reported only once for each year. Two analyses were performed for each financial year; one incorporating all clients reported and one with clients reporting the use of performance and image enhancing drugs removed. Clients reporting performance and image enhancing drugs use do not typically share injecting equipment.

2.10 Unlinked Anonymised Prevalence Monitoring Survey

The HPA Unlinked Anonymised Prevalence Monitoring Survey measures prevalence of hepatitis B and C in current and former injecting drug users who are in contact with 60 specialist drug agencies in England, Wales and Northern Ireland (24). The survey also includes information on risk and protective behaviours, such as vaccination and needle sharing.

2.11 Routine Laboratory Surveillance

Reports of confirmed infections are received at the HPA from laboratories in England and Wales. The scheme has included voluntary reporting of newly confirmed hepatitis A, B, and C infections since 1995. The following case definitions apply for hepatitis B and C: acute hepatitis B: HBsAg positive and anti-HBc IgM positive and abnormal liver function tests with a pattern consistent with acute viral hepatitis; chronic hepatitis B: HBsAg positive twice at least six months apart or HBsAg positive and anti-HBc IgM negative and anti-HBc positive; hepatitis C: Anti-HCV positive or hepatitis C RNA positive. Since October 2010 reporting has been a statutory requirement on laboratories.

2.12 Sentinel Laboratory Surveillance

Sentinel laboratory surveillance was established by the HPA in 2002 to enhance routine laboratory surveillance of hepatitis B and C. It collects numbers tested as well as the number testing positive for HBsAg antigen for hepatitis B and for antibody to hepatitis C (anti-HCV) or hepatitis C RNA, along with additional demographic data for those tested. There are 24 sentinel laboratories across England covering approximately 40% of the population. In the North West there are five sentinel laboratories which are estimated to cover 60 to 79% of the population. Appendix 2 shows the location of the sentinel laboratories.

2.13 Transplant Data

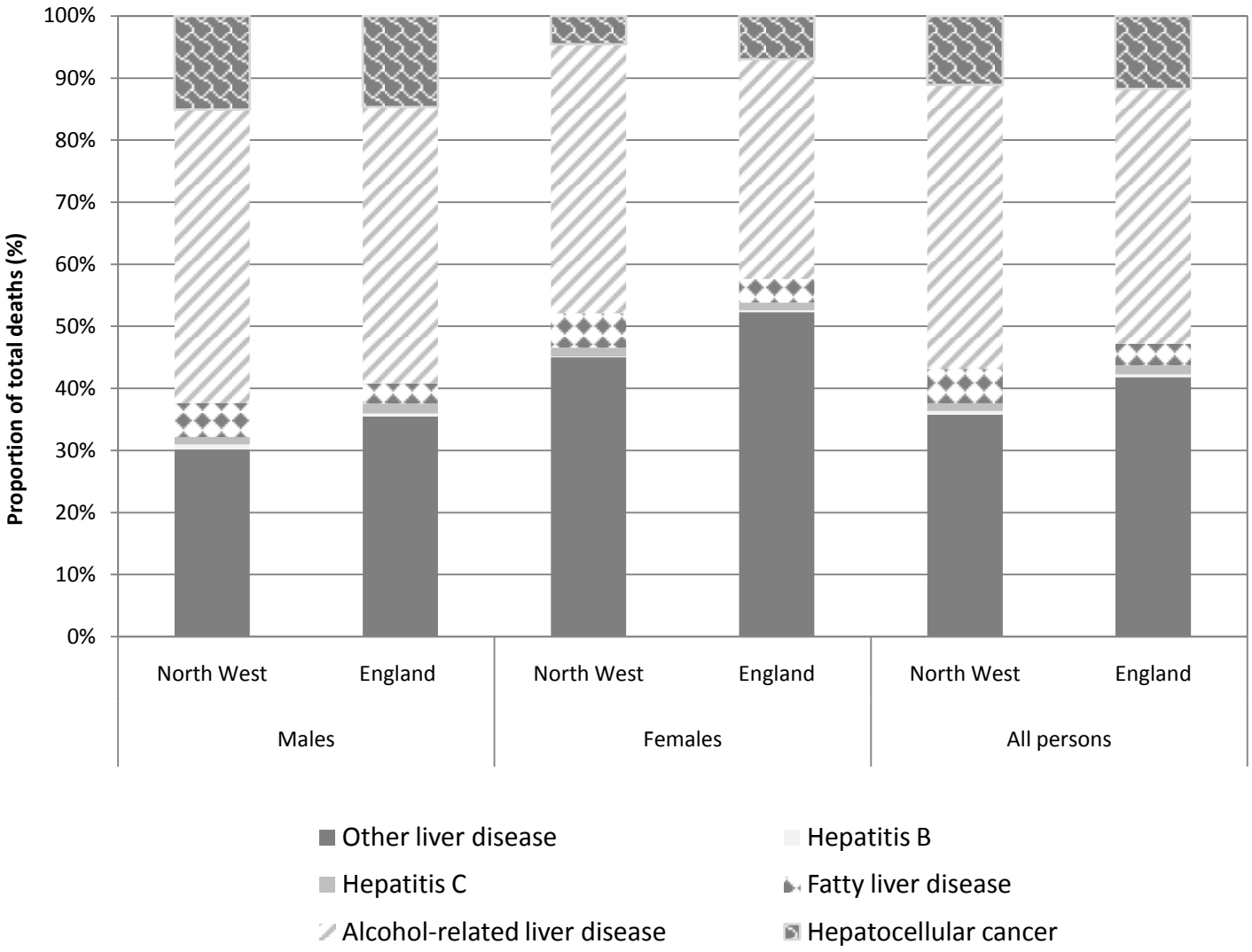
Data for liver transplant analysis were taken from the UK Transplant Registry maintained by NHS Blood and Transplant. These figures are based on registry data as at 9th May 2012. Data for North West region were extracted from the main dataset using local authority of residence for each patient. Figures for 'all' liver transplants include cases where some patients may have had more than one liver transplant. First registrations were extracted using the earliest date that a patient was registered for a liver transplant. In some cases, patients may have been registered for more than one liver transplant, however for the analysis, only the data of the first registration was used. The age of patients first registered for a liver transplant was calculated using the age of the patient at the time they were first registered for a liver transplant – this does not include age for any subsequent liver transplant registrations. The most common liver disease at registration was extracted using the primary liver disease for all registrations for a liver transplant.

2.14 Confidence Intervals

A confidence interval is a range of values which aims to quantify the imprecision that results from random variation, such as sampling or natural variation. A confidence interval allows benchmarking and comparisons of statistical significance a particular level of confidence. 95% confidence intervals were calculated using standard PHO operating procedures and are presented in figures in this report using error bars (25).

3.0 The Burden of Liver Disease

This section of the report presents data on the burden of liver disease in the North West; supplementary tables describing liver disease at local authority level are provided in Appendix 1. Figure 4 describes the contribution of specific types of liver disease to all liver disease deaths for the North West and for England. Alcohol-related liver disease accounts for the greatest proportion of liver disease deaths for both males and females in the North West; 47% and 43% respectively. Comparable figures for England are 45% for males and 35% for females. The second largest contributor to liver mortality in the North West during 2010 was hepatocellular cancer with 15% of males and 5% of females dying from this.



Data source: Office for National Statistics

Figure 4: Liver disease mortality (underlying cause) by broad category of liver disease and gender, North West and England, 2010

3.1 All Liver Disease

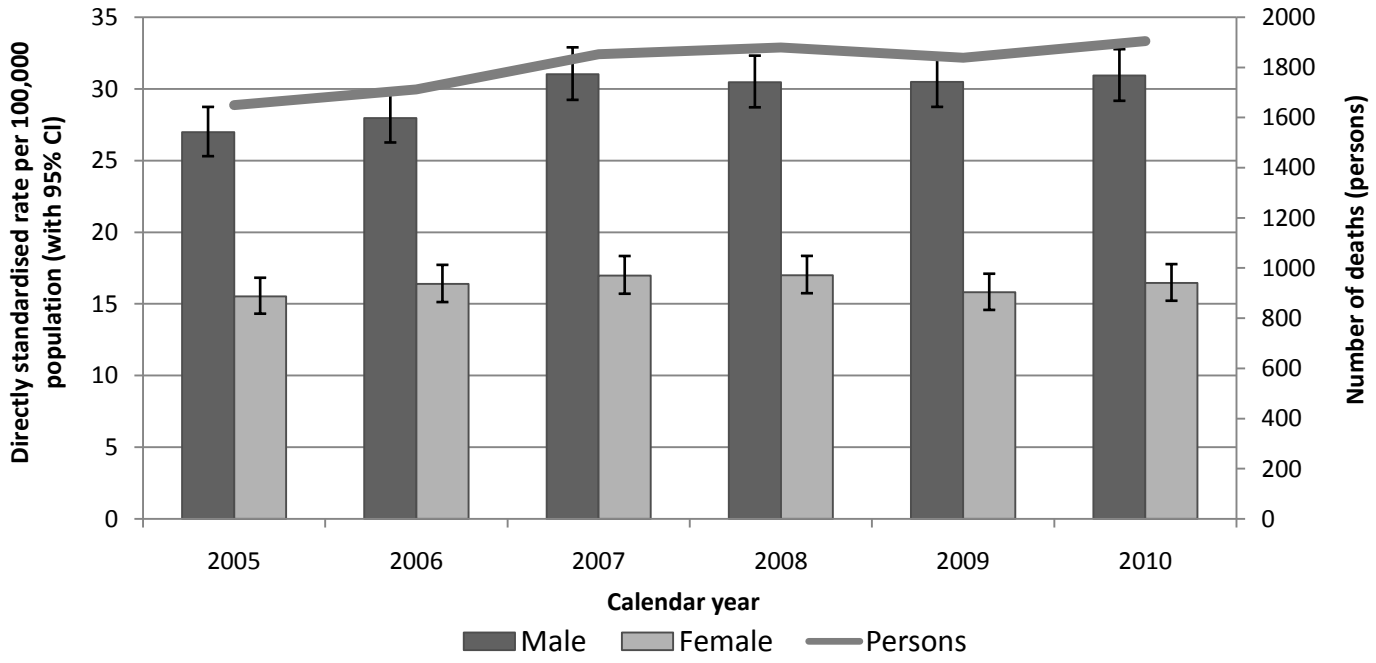
This section provides data on all liver disease. Supplementary tables are also provided in Appendix 1.

Summary

- **The rate of liver disease mortality and hospital admissions are significantly higher in the North West than in England.**
- **Alcohol-related liver disease accounts for 47% of liver disease mortality in males and 43% in females in the North West.**
- **The rate of liver disease deaths in the North West increased among males from 27.0 per 100,000 in 2005 to 30.9 per 100,000 in 2010; deaths in males are markedly higher around the ages of 55 to 64 years whereas for females over the age of 40, they are more evenly spread across age categories.**
- **The rate of liver disease deaths is highest in Blackpool (42.7 per 100,000 population) and lowest in Eden (8.2 per 100,000); over two thirds of the variability can be explained by deprivation.**
- **Hospital admissions for males and females increased significantly between 2005/6 and 2010/11; admissions were markedly higher among males aged 34 to 39 years in 2010/11.**
- **The rate of admissions for liver disease was highest in Manchester.**

3.1.1 Mortality

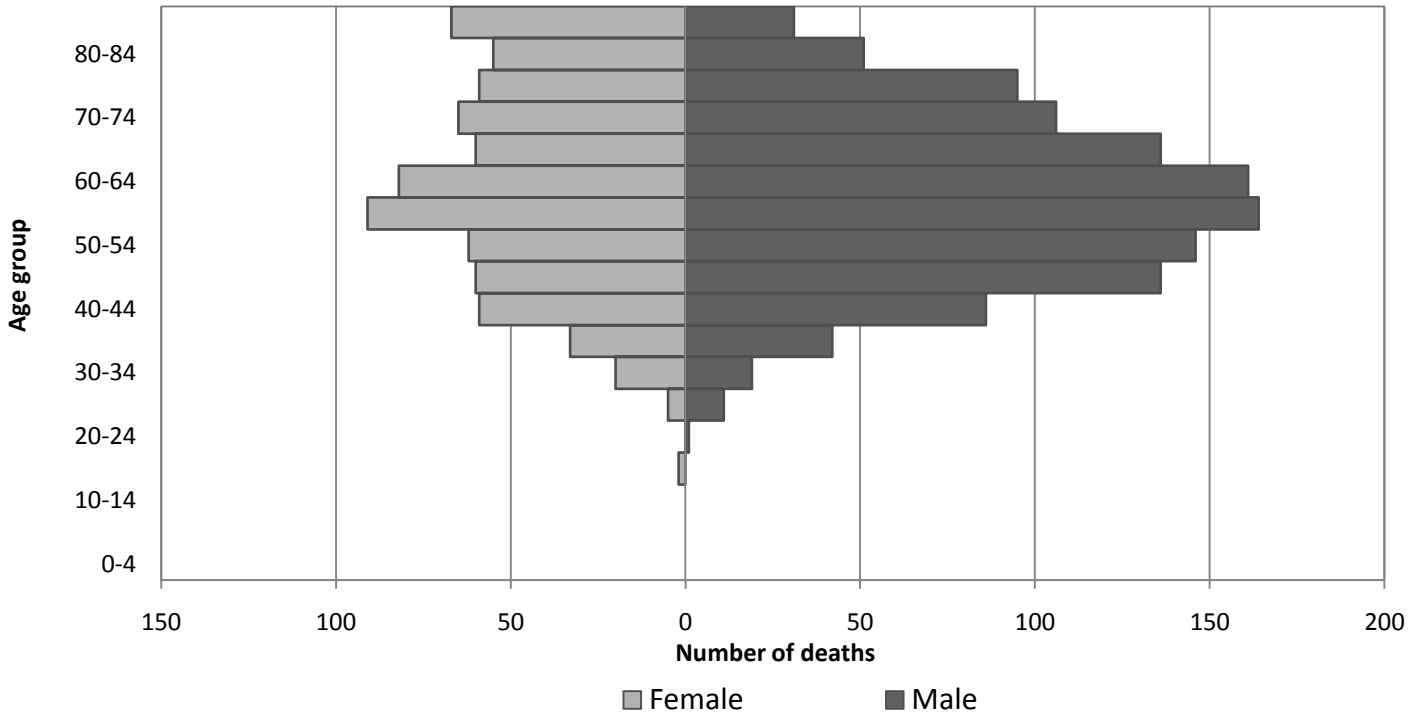
Against a backdrop of falling rates of other major causes of death, there has been a 25% increase in the number of liver disease deaths between 2001 and 2009 (1). In the North West, there has been a significant increase in the rate of liver disease deaths among males from 27.0 per 100,000 population (95% CIs 25.3 - 28.7) in 2005 to 30.9 per 100,000 population (95% CIs 29.2 - 32.8) in 2010 (Figure 5). The rate of liver disease deaths among females has not risen during this timeframe and remains significantly lower than that of males. Consequently, the gap between rates of liver disease deaths for males and females has increased between 2005 and 2010.



Data source: Office for National Statistics

Figure 5: All liver disease mortality (underlying cause) by gender, North West, 2005 to 2010

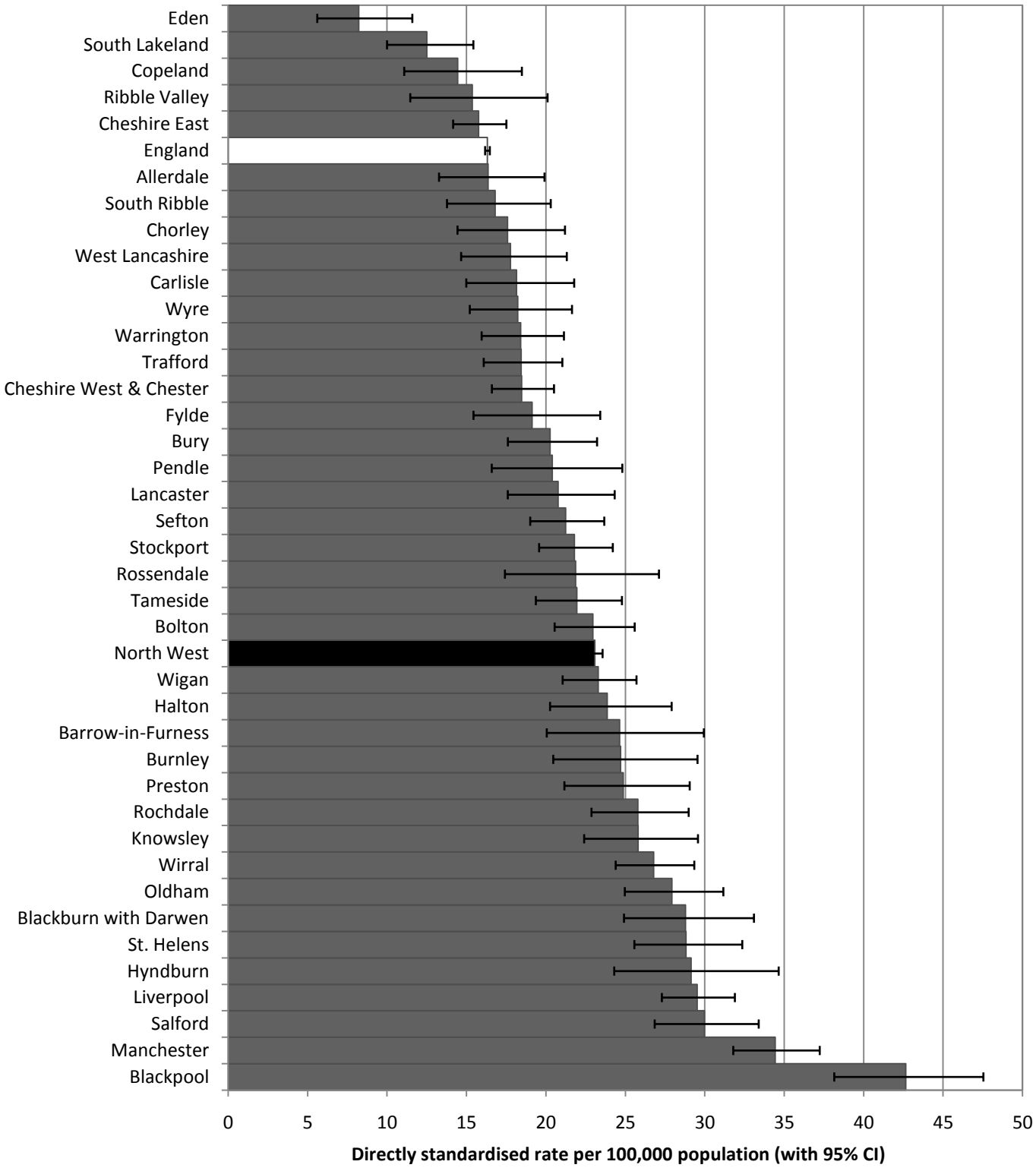
Further evidence for a gender difference in liver disease deaths is provided in Figure 6. For males, deaths from liver disease show a clear peak around the ages of 55 to 64 years, and taper away at the younger and older age groups. In contrast, deaths from all liver disease among women are more evenly spread across age categories from about age 40. Males in particular are dying from liver disease at a relatively young age explaining why reducing mortality of liver disease falls into domain four of the Government's Public Health Outcomes Framework: Healthcare public health and preventing premature mortality (8).



Data source: Office for National Statistics

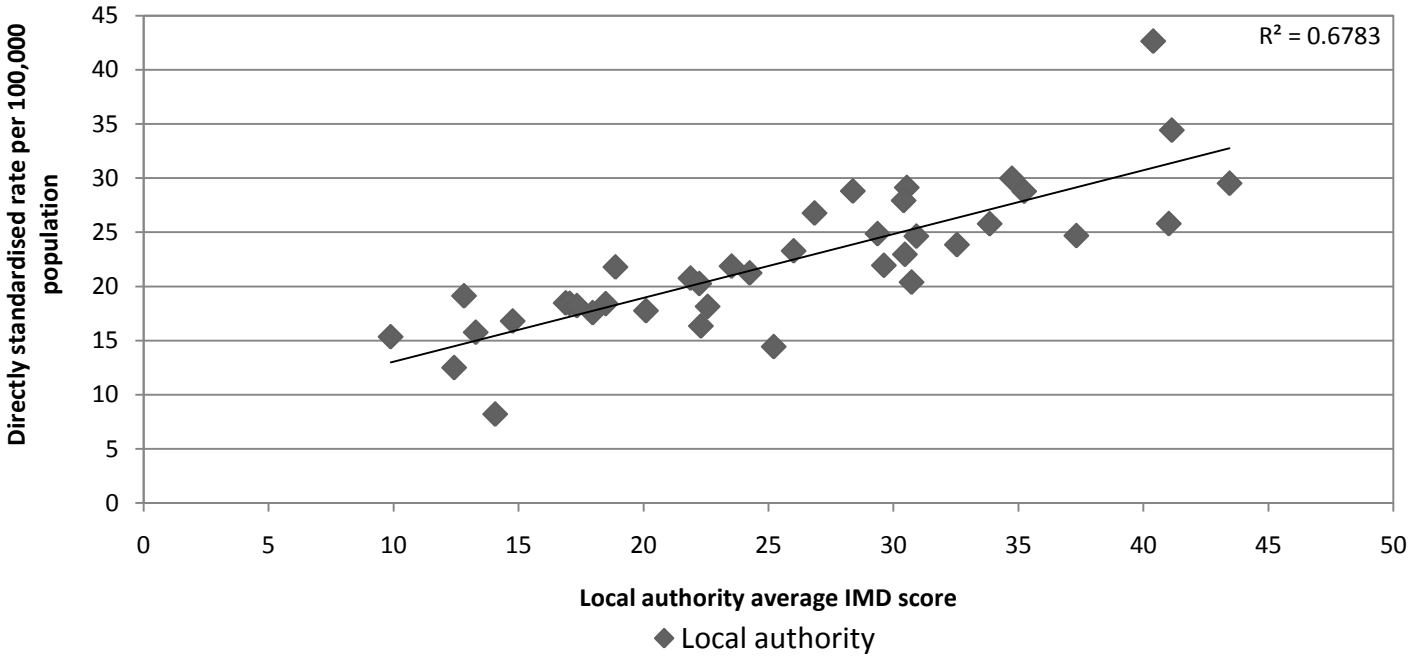
Figure 6: All liver disease mortality (underlying cause) by age and gender, North West, 2010

Figure 7 shows the considerable variation in the rate of liver disease mortality by local authorities in the North West. The rate in Blackpool (42.7 per 100,000 population) is over five times greater than the rate in Eden (8.2 per 100,000 population). This difference may be largely attributed to different levels of deprivation between these two local authorities; Eden has an IMD score of 14.1 compared to 40.4 for Blackpool. Figure 8 demonstrates a moderate correlation between deprivation and liver disease mortality and the R^2 value shows that 68% of the variability in deaths from all liver disease can be explained by deprivation.



Data source: Office for National Statistics

Figure 7: Mortality rates for all liver disease (underlying cause) by local authority, North West, 2006 to 2010

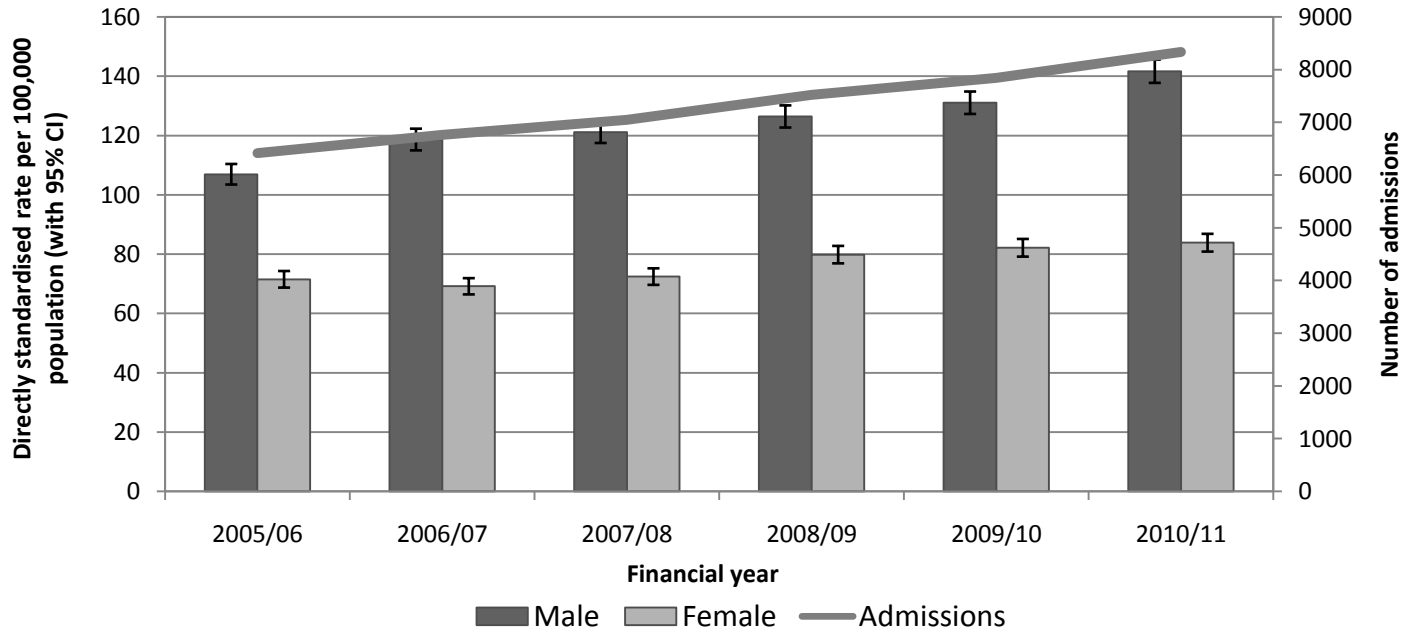


Data source: Office for National Statistics

Figure 8: Mortality rate for all liver disease (underlying cause) by local authority and IMD score, North West, 2006 to 2010

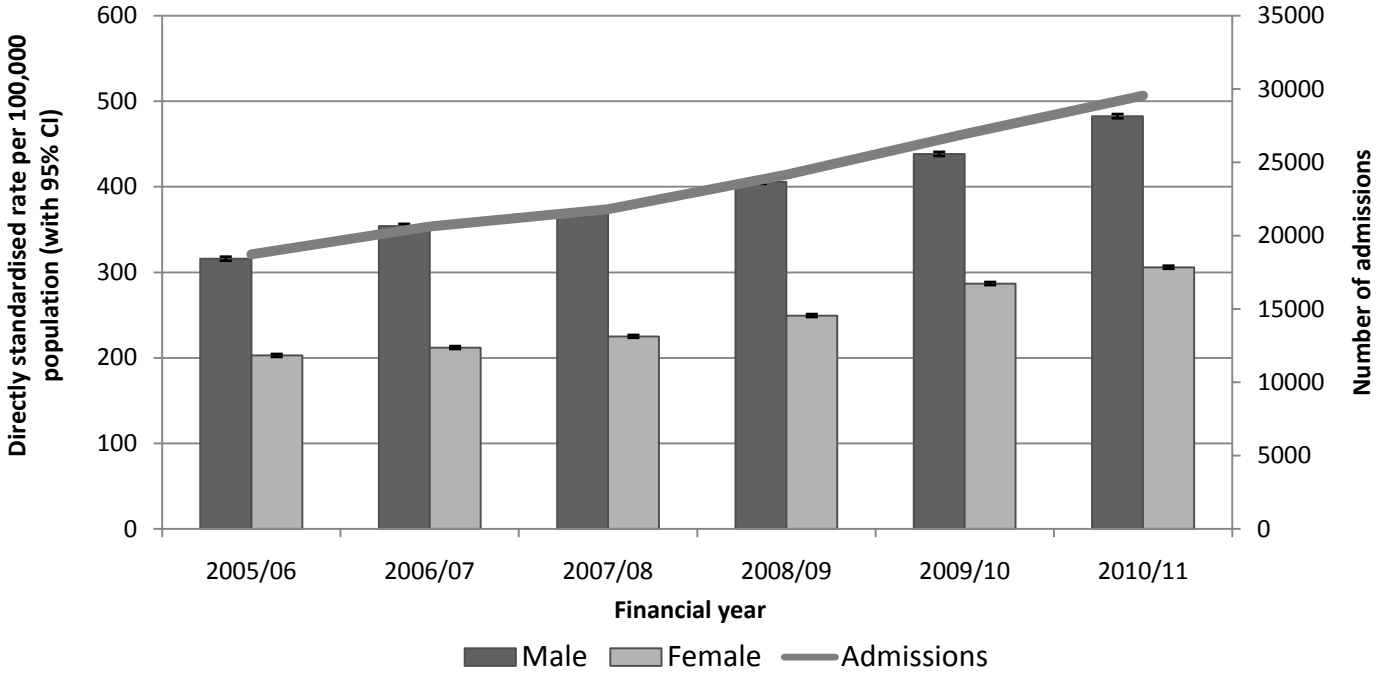
3.1.2 Hospital Admissions

Figures 9 and 10 report hospital episode admissions for liver disease as the primary diagnosis only and for all diagnoses. Both figures show a significant increase in the rate of admissions for males between 2005/06 and 2010/11. Unlike figures for mortality, hospital admission data also show a significant increase for liver disease among females. However, rates of hospital admissions for liver disease are higher among males and the gap between males and females has increased between 2005/06 and 2010/11.



Data source: Hospital Episode Statistics

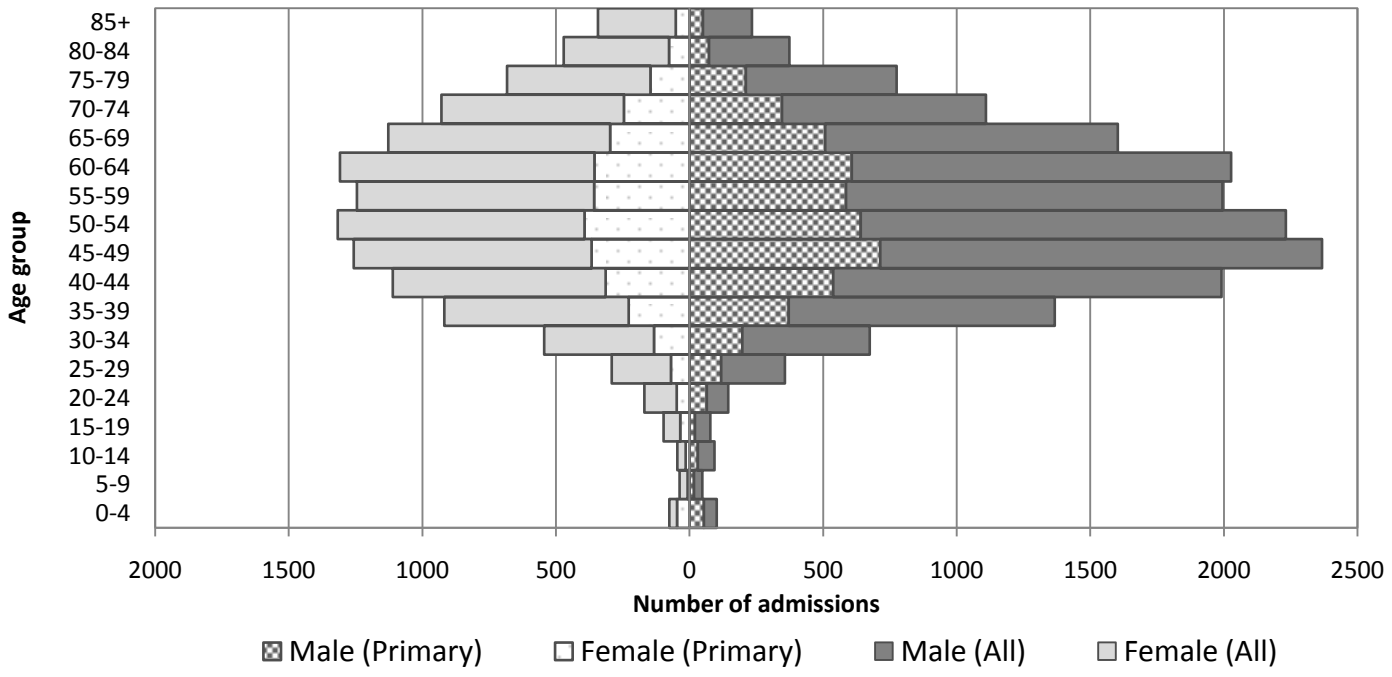
Figure 9: Hospital admissions for all liver disease (primary diagnosis) by gender, North West, 2005/06 to 2010/11



Data source: Hospital Episode Statistics

Figure 10: Hospital admissions for all liver disease (all diagnoses) by gender, North West, 2005/06 to 2010/11

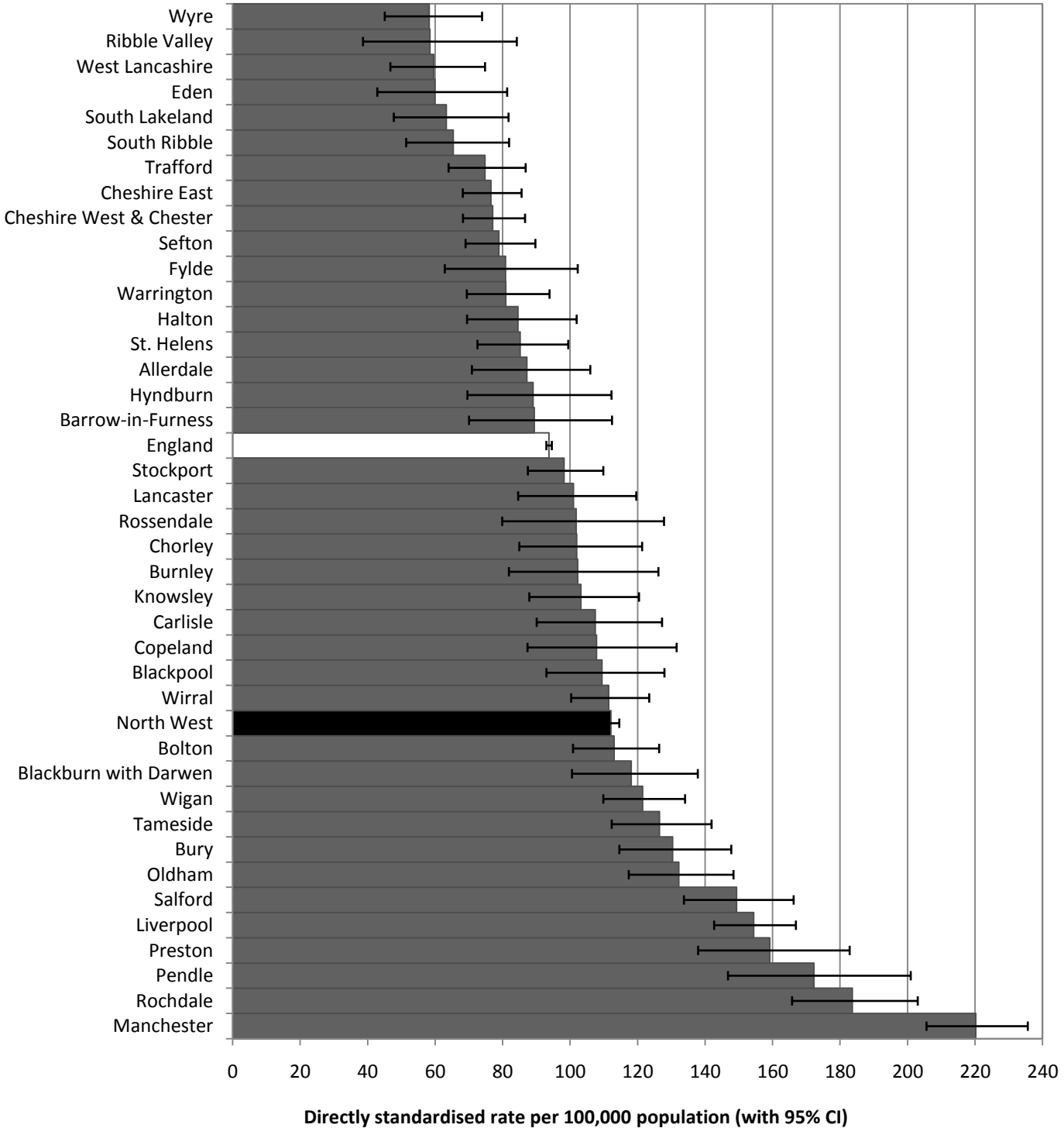
In 2010/11 the rate of hospital admissions for all diagnoses among males rose steeply from the 30 to 34 year age group and peaked in the 34 to 49 year age group where the rate of admissions was 2,367 per 100,000 population (Figure 11). There was less variability in the rate of admissions for females by age. In the older age groups, the difference in rates of admissions between males and females narrowed.



Data source: Hospital Episode Statistics

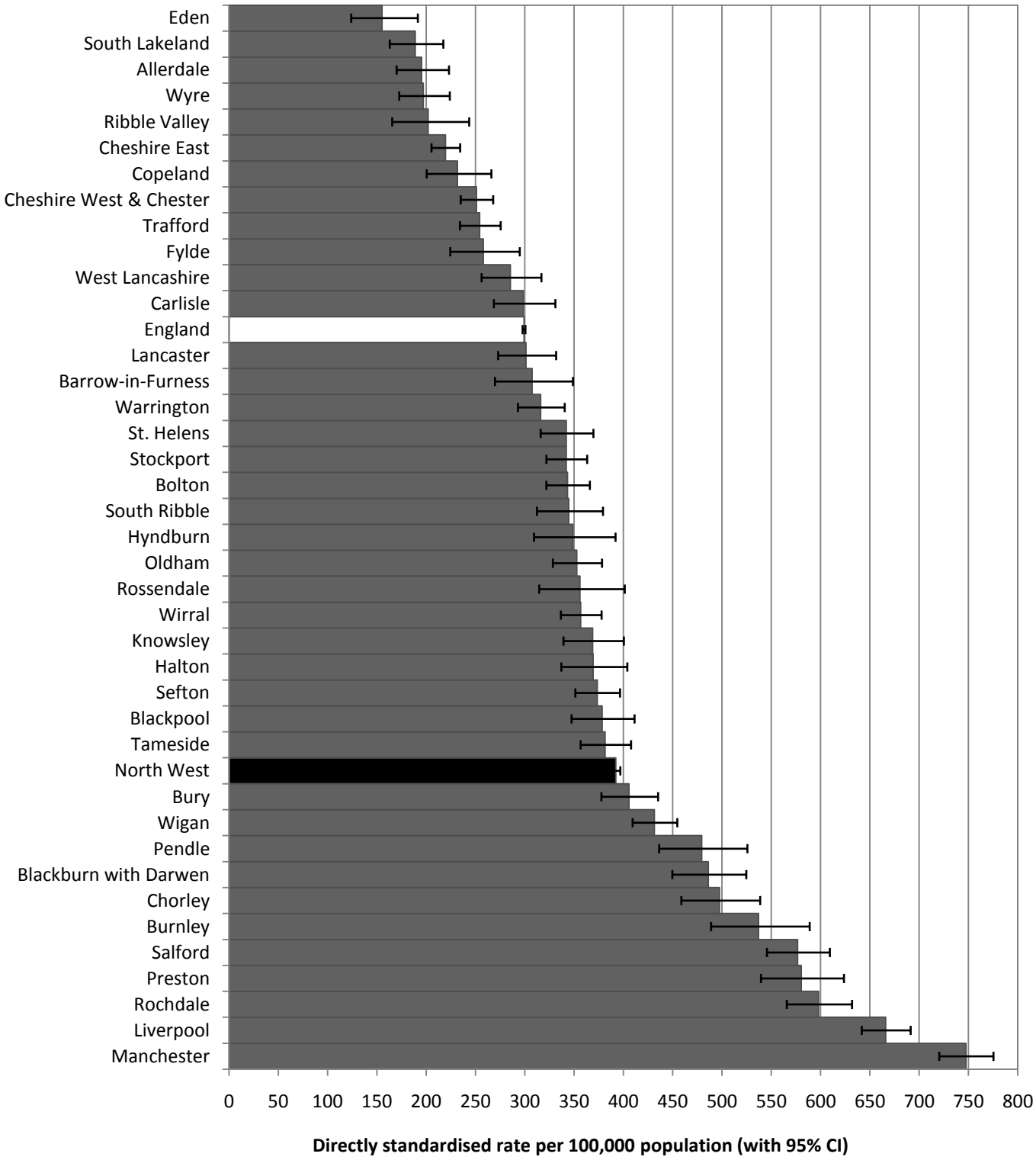
Figure 11: Hospital admissions for all liver disease by age and gender, North West, 2010/11

Local authority level data on hospital admissions for liver disease relating to primary diagnosis only and all diagnoses are presented in Figures 12 and 13. Considerable geographical variation is evident. For primary diagnosis only, the rate of hospital admissions for liver disease in Manchester (220.2 per 100,000 population) is almost four times the rate in Wyre (58.3 per 100,000 population). Figures 14 and 15 show the correlation between the rate of hospital admissions and deprivation for primary diagnosis and all diagnoses respectively; in general, local authorities with a more deprived population experience a higher rate of admission. Indeed the R^2 values show that approximately half (47% and 54% for primary and all diagnoses respectively) of the variation in admissions for all liver disease is explained by deprivation.



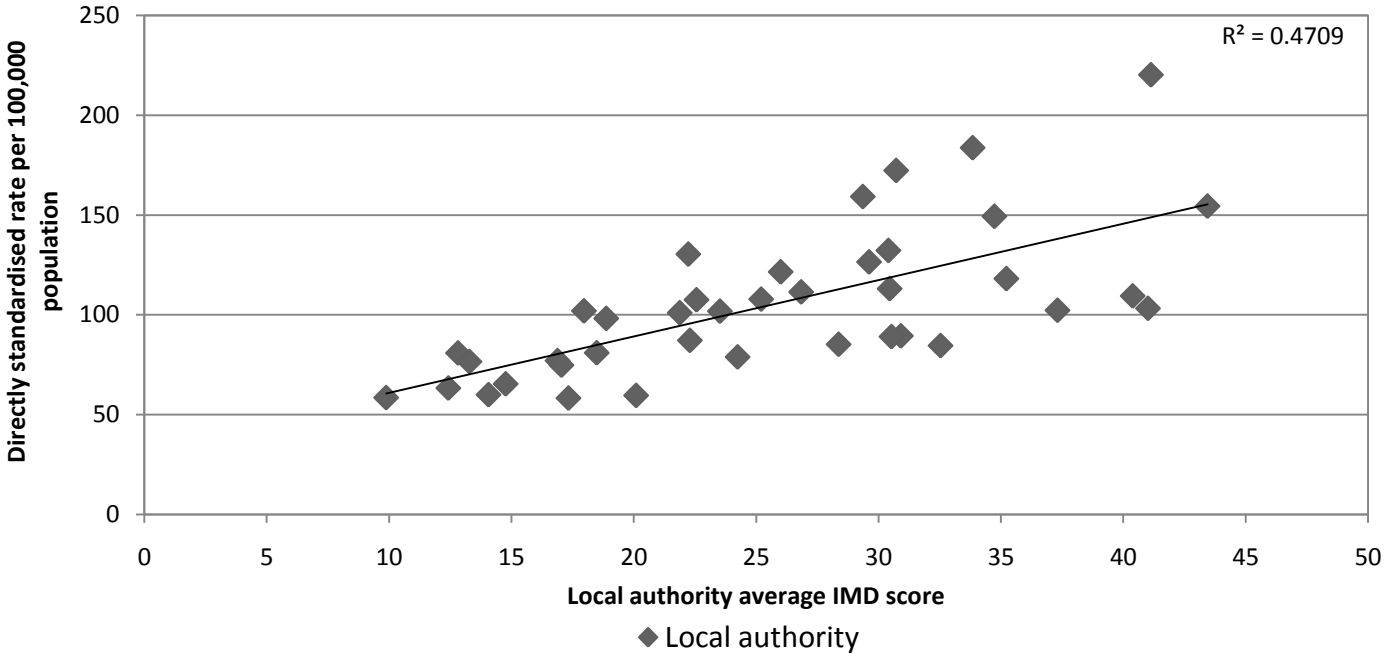
Data source: Hospital Episode Statistics

Figure 12: Hospital admission rates for all liver disease (primary diagnosis) by local authority, North West, 2010/11



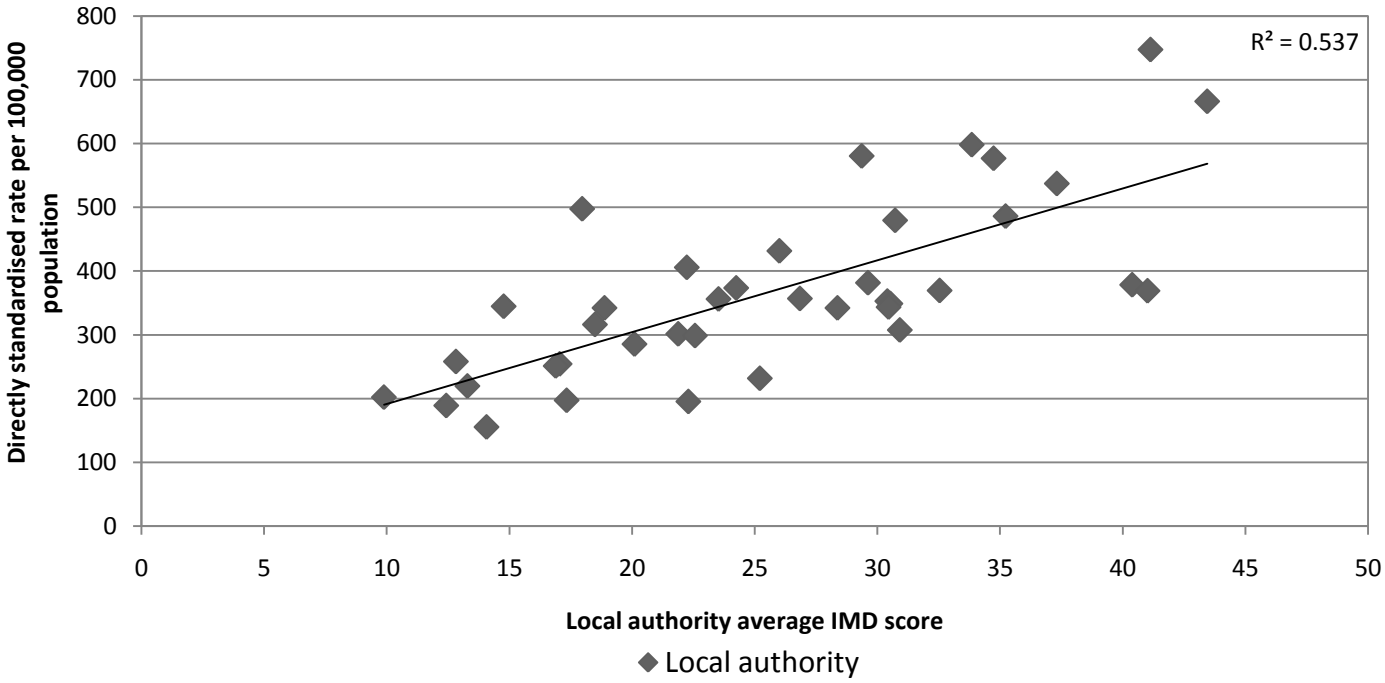
Data source: Hospital Episode Statistics

Figure 13: Hospital admission rates for all liver disease (all diagnoses) by local authority, North West, 2010/11



Data source: Hospital Episode Statistics

Figure 14: Hospital admission rates for all liver disease (primary diagnosis) by local authority and IMD score, North West, 2010/11



Data source: Hospital Episode Statistics

Figure 15: Hospital admission rates for all liver disease (all diagnoses) by local authority and IMD score, North West, 2010/11

3.2 Hepatocellular Cancer

Most cancers that occur in the liver are tumours that have spread from other parts of the body and are termed secondary cancers. Cancers that arise from the liver are termed primary liver cancers and are relatively uncommon in this part of the world, making up about 1% of all cancers. This section focuses on hepatocellular cancer, as it is the most common type of primary liver cancer and is causally related to hepatitis and alcohol misuse. Results are also provided for all liver cancers as a group. On average, there are 212 new cases and 165 deaths attributed to hepatocellular cancer in the North West every year. These figures should be taken as a minimum, as there are concerns that a proportion of the hepatocellular cancers diagnosed in England may not be reported to the local cancer registry.[1]

Summary

- **The rate of hepatocellular cancer mortality and incidence is significantly higher in the North West than England.**
- **Hepatocellular cancer accounts for less than 1% of all cancer in the North West.**
- **Incidence and mortality rates attributable to hepatocellular cancer are higher in males.**
- **Within the North West there is considerable geographic variation in mortality and incidence; both are highest in Manchester.**
- **One to five year relative survival for hepatocellular cancer is significantly lower in the North West than for England.**

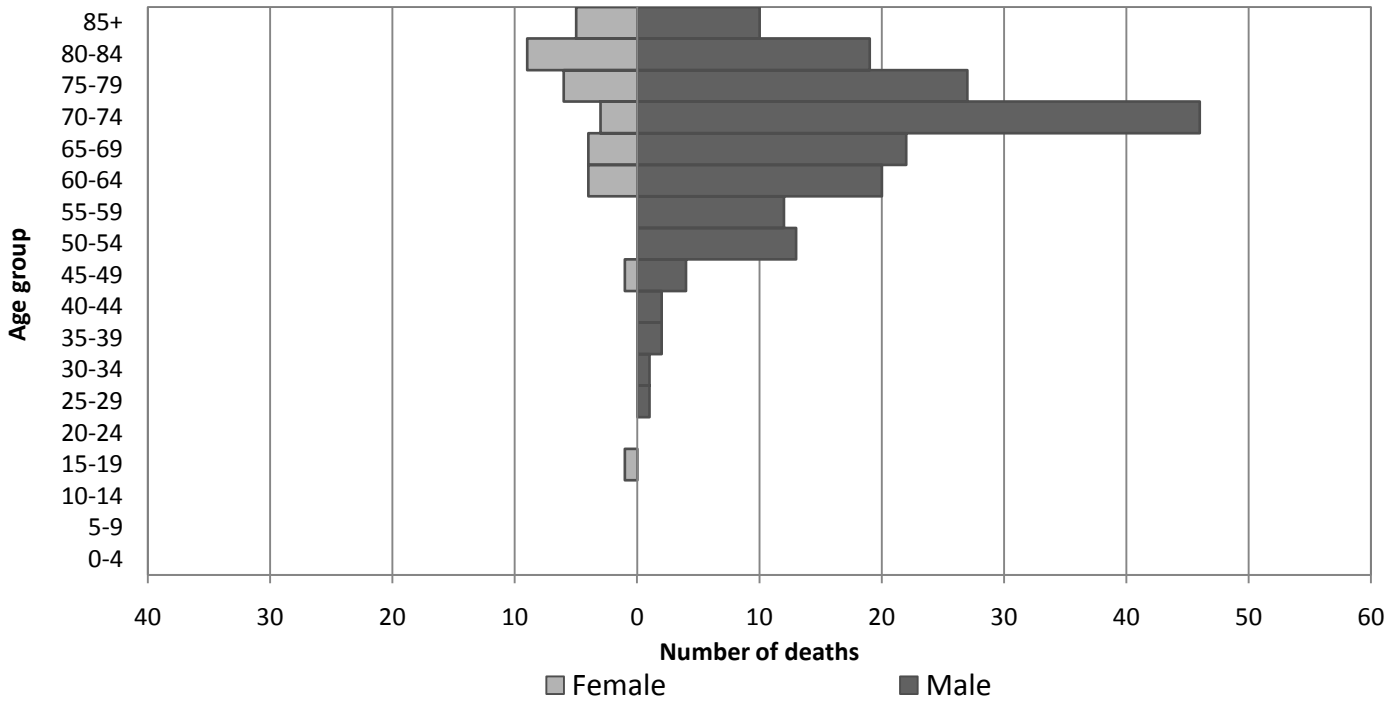
3.2.1 Mortality

Age-standardised mortality rates for hepatocellular cancer appear to have increased in the North West since 2005 (Figure 16), although the number of cases and deaths are small and trends over single year periods should be interpreted with caution. Rates are significantly higher in males (3.2 per 100,000 [95% CIs 3.0 - 3.5] than females (0.6 per 100,000 [95% CIs 0.5 - 0.8]) and the gap appears to be widening. In 2010 most deaths occurred in males aged 70 to 74 years (n = 46) compared to 80 to 84 year old females (Figure 17).

Data source: Office for National Statistics

Figure 16: Hepatocellular cancer mortality (underlying cause) by gender, North West, 2005 to 2010

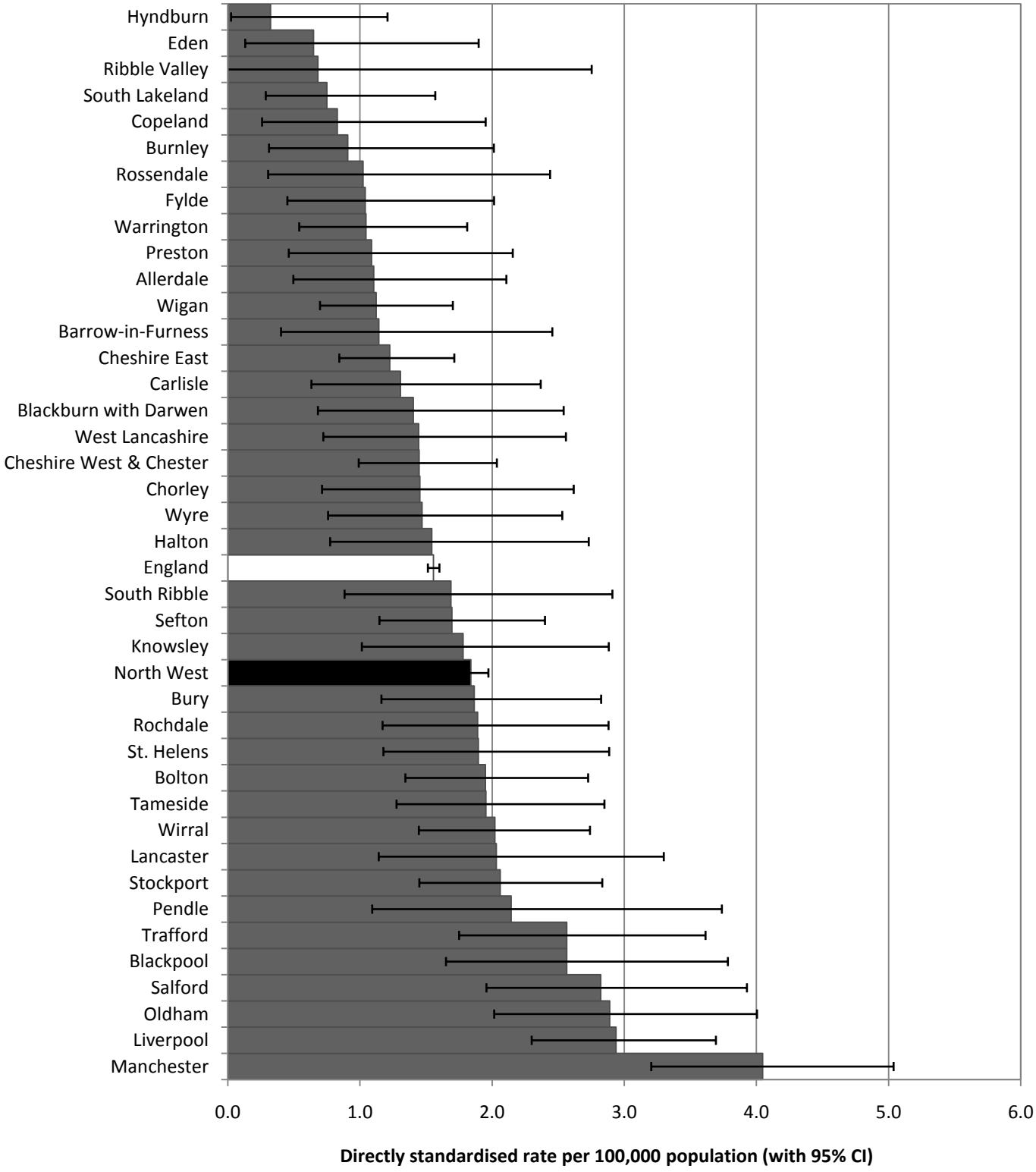
[1] The incidence ratio reported for England of hepatocellular cancers to other types of liver cancer is lower than the ratios quoted in the literature, which suggests underreporting. This issue is being investigated by the National Cancer Intelligence Network.



Data source: Office for National Statistics

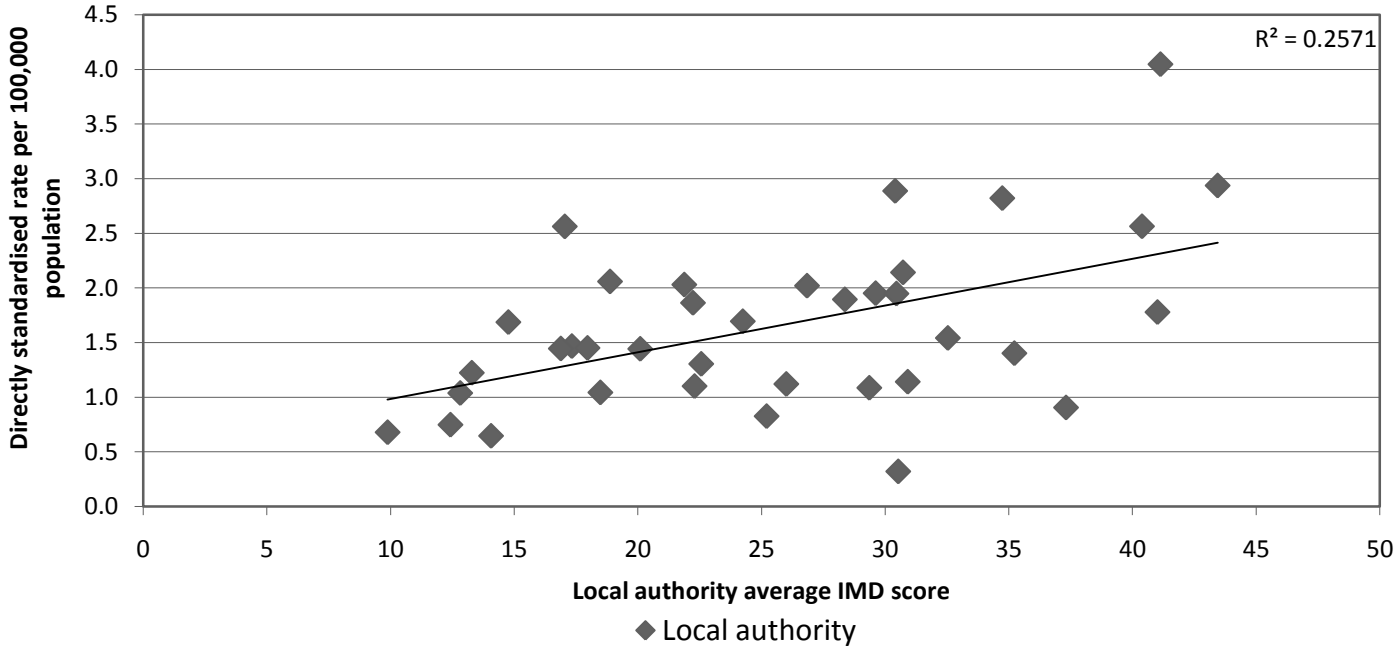
Figure 17: Hepatocellular cancer mortality (underlying cause) by age and gender, North West, 2010

Mortality rates attributable to hepatocellular cancer in the North West (1.8 per 100,000 [95% CIs 1.7 - 2.0]) are higher than in England (1.6 per 100,000 [95% CIs 1.5 - 1.6]), there are also clear differences between North West local authorities (Figure 18). The mortality rate for hepatocellular cancer in Manchester (4.0 deaths per 100,000 population) is more than ten times the rate in Hyndburn (0.3 per 100,000 population). Data for 2006 to 2010, suggest a weak positive correlation between mortality rates and deprivation (Figure 19).



Data source: Office for National Statistics

Figure 18: Mortality rates for hepatocellular cancer (underlying cause) by local authority, North West, 2006 to 2010

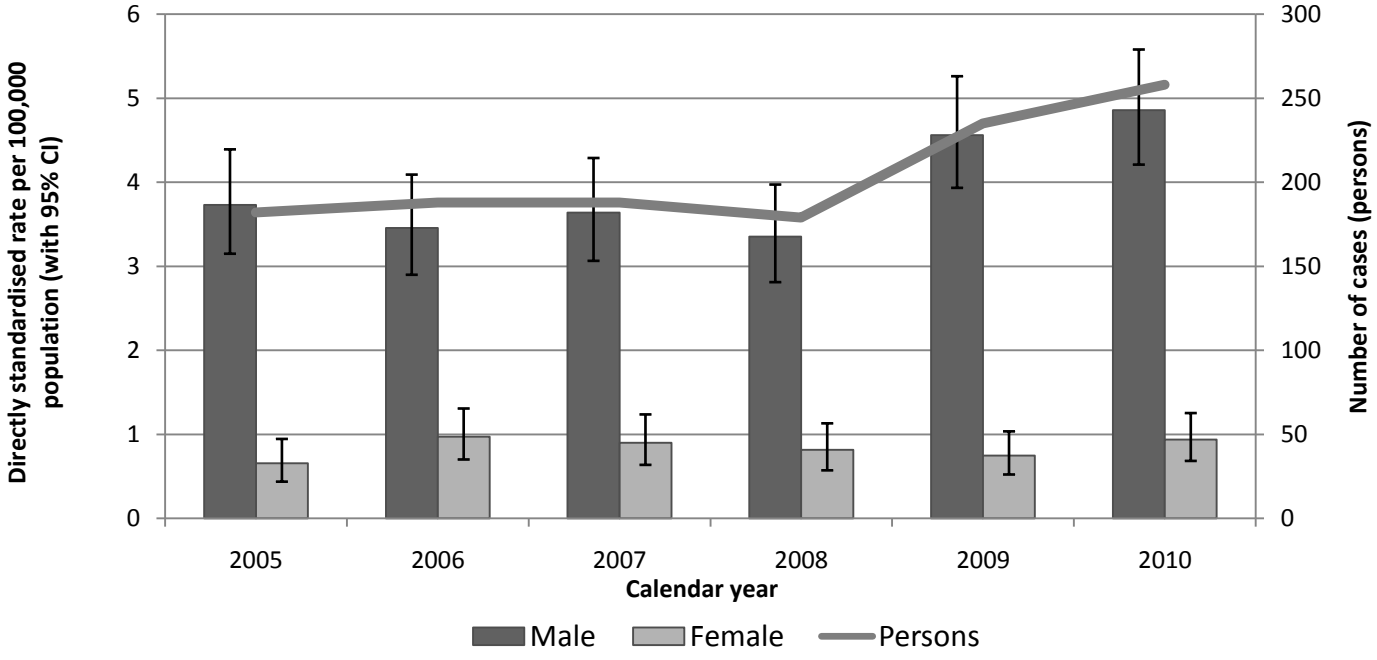


Data source: Office for National Statistics

Figure 19: Mortality rates for hepatocellular cancer (underlying cause) by local authority and IMD score, North West, 2006 to 2010

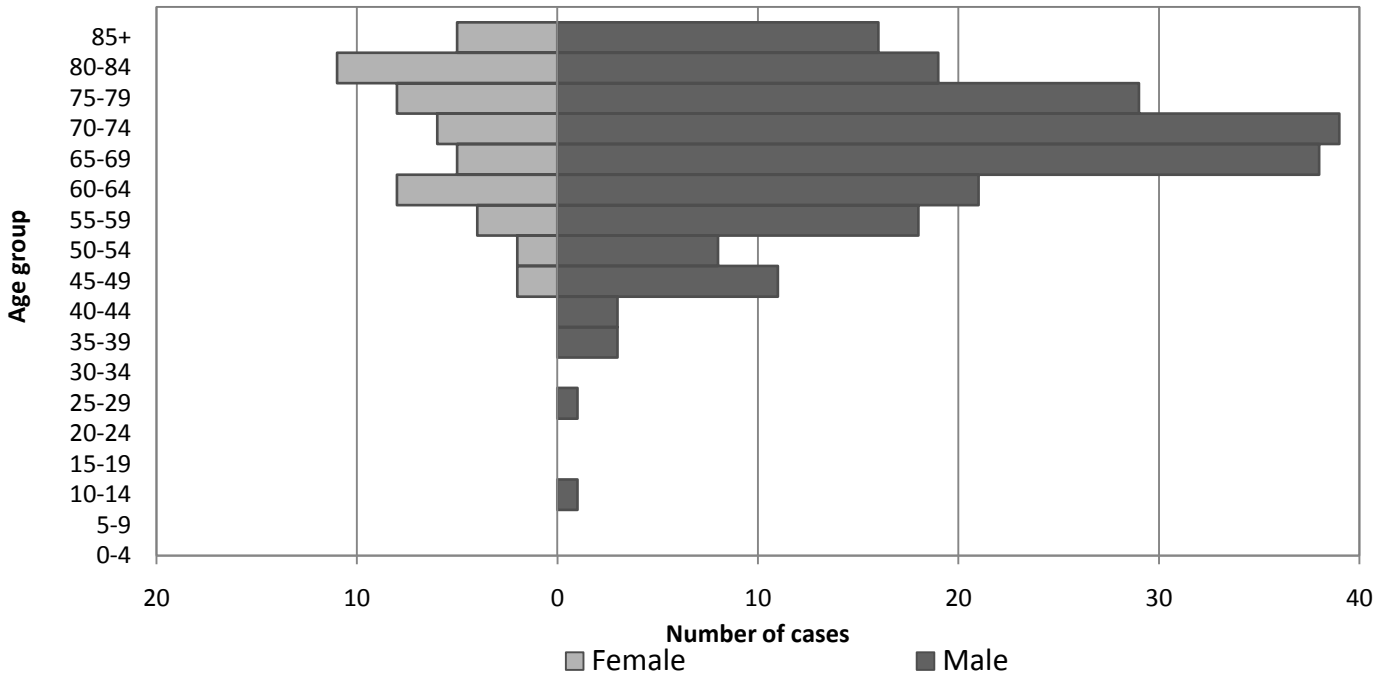
3.2.2 Incidence

Results for incidence generally mirror those for mortality. Age-standardised incidence rates for hepatocellular cancer between 2005 and 2009 in the North West are significantly higher for males than females; 3.9 (95% CIs 3.8 - 4.0) per 100,000 for males and 0.9 (95% CIs 0.9 - 1.0) per 100,000 for females (Figure 20). The incidence of hepatocellular cancer is highest for men aged 65 to 74 years and in women aged 75 to 84 years (Figure 21).



Data source: Cancer registrations, North West Cancer Intelligence Service and National Cancer Data Repository

Figure 20: Incidence of hepatocellular cancer by gender, North West, 2005 to 2010

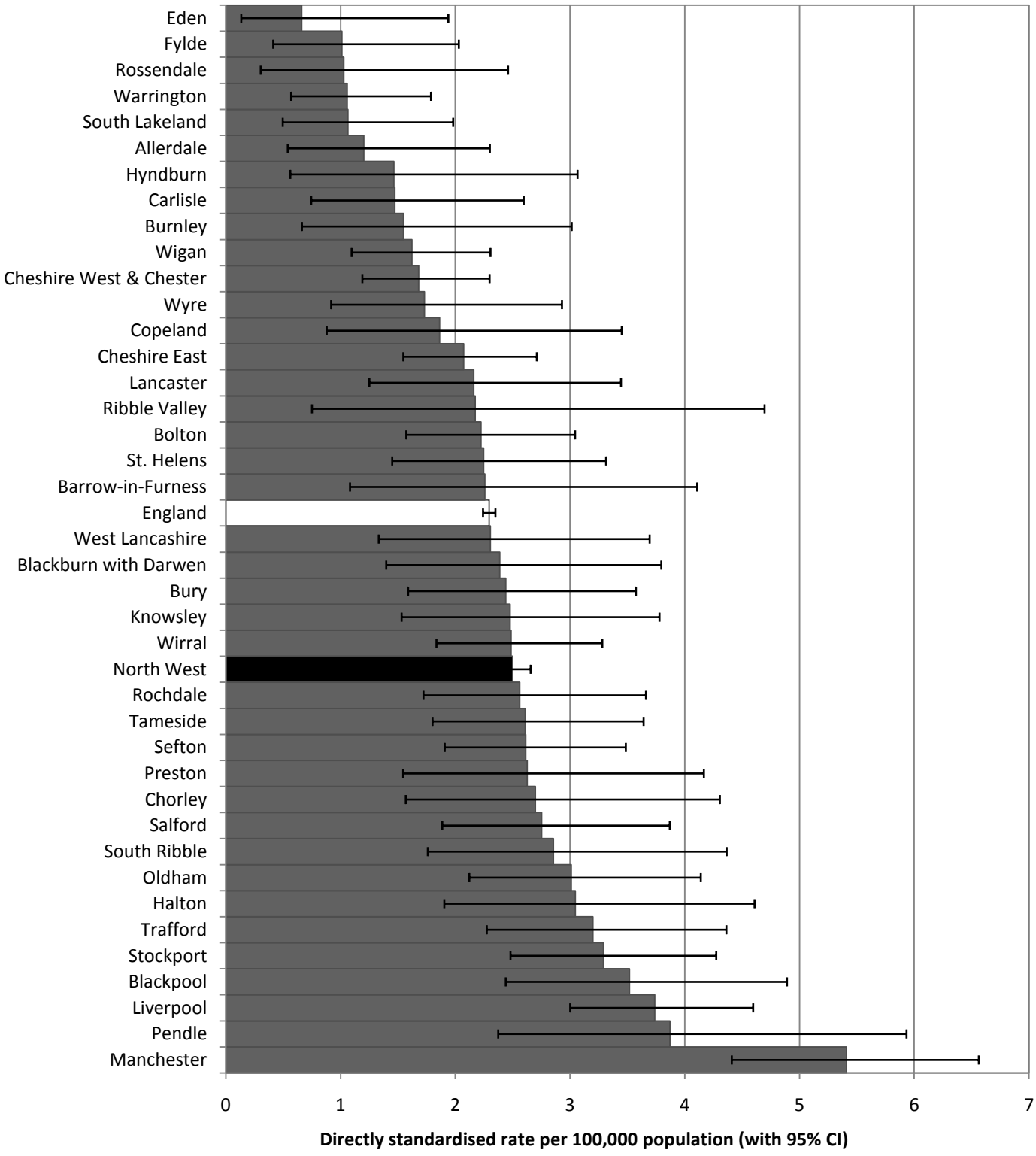


Data source: Cancer registrations, North West Cancer Intelligence Service and National Cancer Data Repository

Figure 21: Incidence of hepatocellular cancer by age and gender, North West, 2010

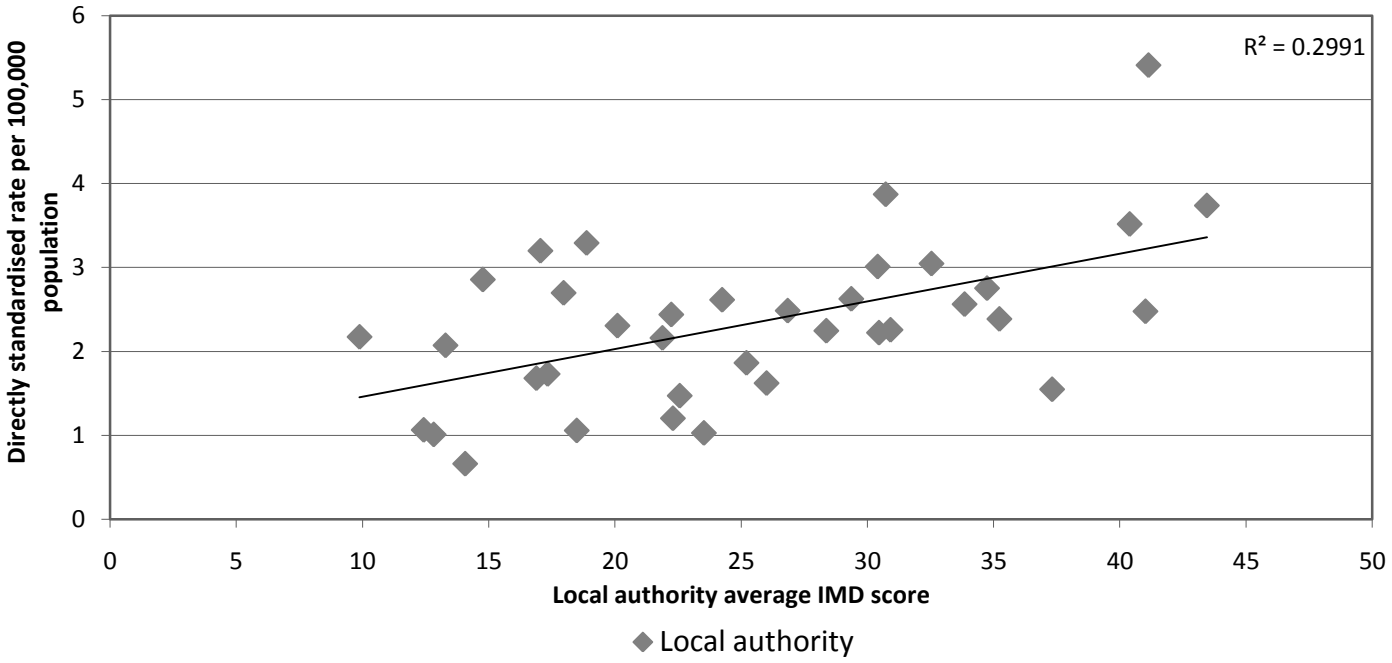
Rates for the North West are higher than those for England, with rates for persons of 2.5 (95% CIs 2.4 - 2.7) per 100,000 population in the North West compared with 2.3 (95% CIs 2.2 - 2.3) for England (Figure 22). There are also differences in coding which may mask even greater differences[2]. Rates by local authority of residence vary considerably within the North West. Manchester had a rate of 5.4 per 100,000 (95% CIs 4.4 - 6.6) compared with a rate of 0.7 (95% CIs 0.1 - 1.9) in Eden. Rate of incidence between 2005 and 2009 shows a relatively weak correlation between high incidence and increasing levels of deprivation (Figure 23).

[2] A proportion of liver cancers which are classified as other carcinomas by NWCIS are included as hepatocellular carcinomas by most other registries in England. This suggests that, if the same procedures were followed by all registries, the gap between the North West and England would be greater. This problem will be resolved within the next year as all registries move to the same software and coding practices.



Data source: Cancer registrations, North West Cancer Intelligence Service and National Cancer Data Repository

Figure 22: Incidence rate of hepatocellular cancer by local authority, North West, 2005 to 2009



Data source: Cancer registrations, North West Cancer Intelligence Service and National Cancer Data Repository

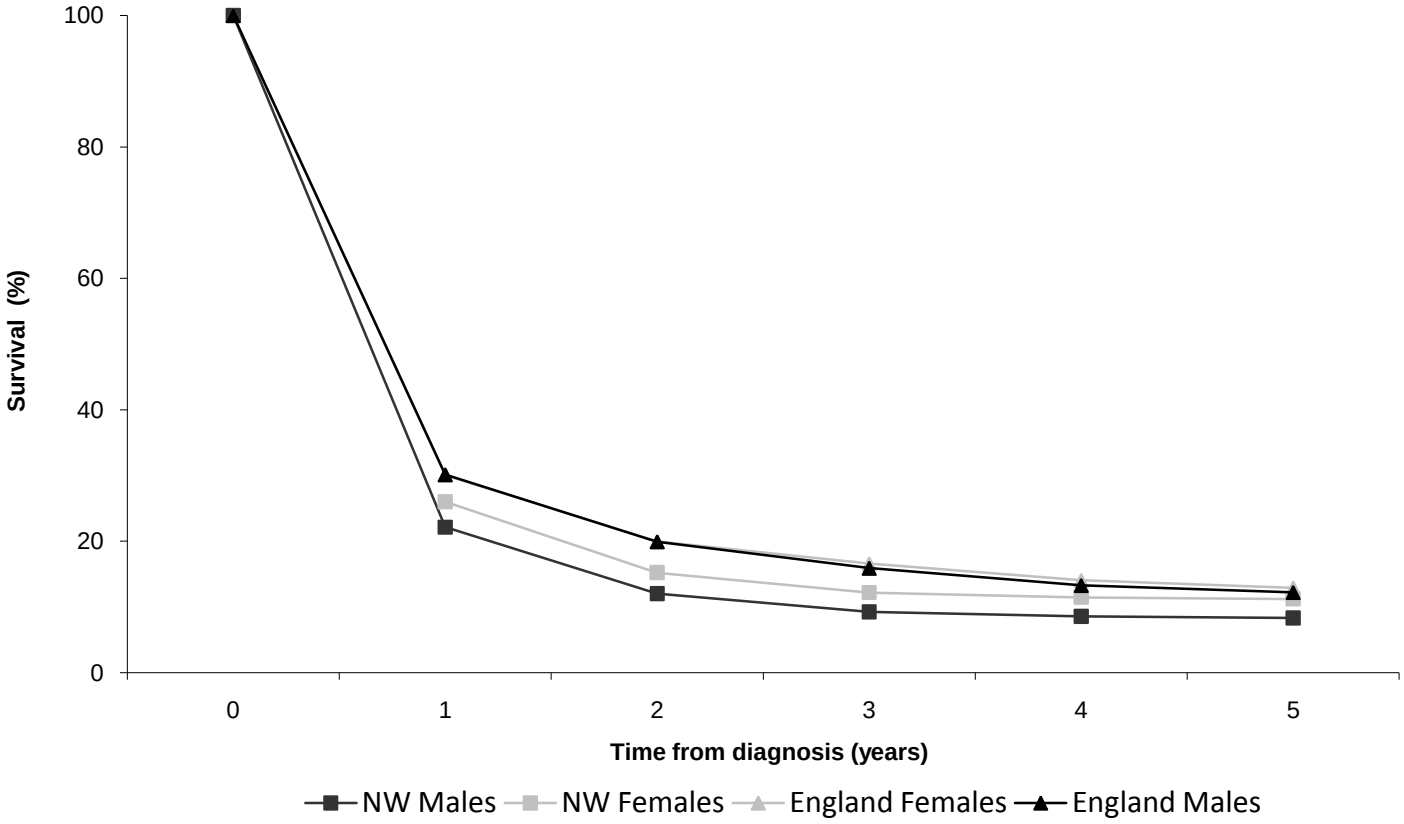
Figure 23: Incidence rates of hepatocellular cancer by local authority and IMD score, North West, 2005 to 2009

3.2.2 Survival

Survival rates measure how long patients live after being diagnosed with cancer. The percentage of patients still alive five years after diagnosis is used as a measure of the effectiveness of cancer treatment services. Low survival rates after one year of follow-up suggest a problem with delay in diagnosis and treatment. Relative survival rates are used to take account of deaths from causes other than liver cancer.

Five-year relative survival for patients diagnosed with hepatocellular cancer in the five-year period 2001 to 2005 was 8.3% (95% CIs 6.2–10.8) in the North West compared with 12.3% (95% CIs 11.3 - 13.4) for England – a statistically significant difference. One-year survival for patients diagnosed between 2001 and 2005 was 22.8% (95% CIs 19.6 - 26.2) for the North West and 30.1% (95% CIs 28.7 - 31.5) for England (Figure 24). For those diagnosed between 2005 and 2009 one-year survival did not change for the North West (22.8% [95% CIs 19.8 - 25.9]) but improved somewhat for England (31.7% [95% CIs 30.4 - 32.9]). There were no statistically significant differences in survival between males and females for either the North West or England, confirming that gender differences in mortality rates can be attributed to gender differences in incidence.

Survival rates for all primary liver cancers were also higher in England than in the North West but the gap was smaller. For those diagnosed between 2001 and 2005 five-year survival was 7.1% (95% CIs 5.8 - 8.6) for the North West and 9.1% (95% CIs 8.5 - 9.7) for England, and one-year survival was 22.1% (95% CIs 20.0 - 24.2) for the North West and 25.4% (95% CIs 24.5 - 26.3) for England.



Data source: Cancer registrations, North West Cancer Intelligence Service and National Cancer Data Repository

Figure 24: One- to five-year relative survival for individuals diagnosed with hepatocellular cancer (2001 to 2005) by gender, North West and England

3.3 Alcohol-Related Liver Disease

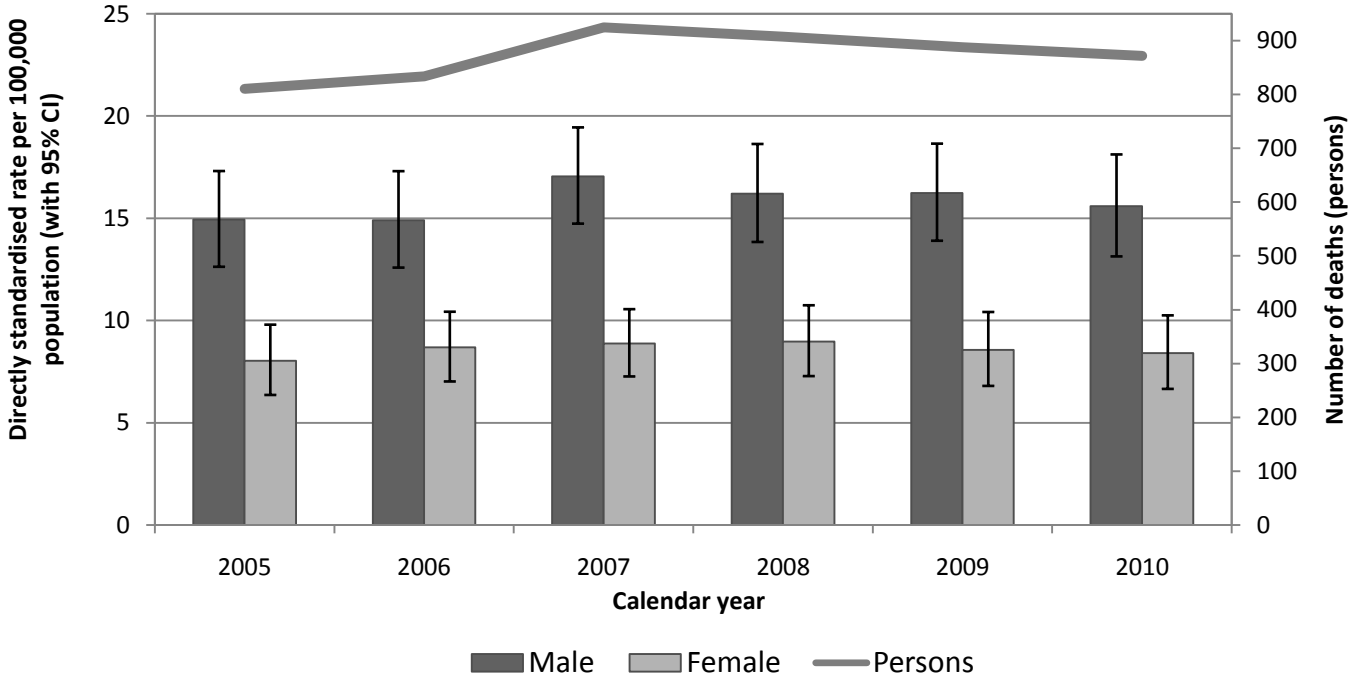
The UK is one of the few European countries where alcohol consumption has risen in the last 50 years and alcohol-related harms are increasing (2). Figure 4 in Section 3 shows alcohol-related liver disease accounts for a considerable proportion of all liver disease deaths in the North West. A recent ecological study comparing wards in England and Wales showed that alcohol-related mortality varied by age, gender, socioeconomic status and by rural/urban and concluded that such differences should be considered when designing interventions to reduce alcohol-related harm (26). This next section provides data on alcohol-related liver disease and describes differences by age, gender, geography and deprivation. Additional tables showing data at the local authority level are provided in Appendix 1.

Summary

- **The rate of alcohol-related mortality is significantly higher in the North West than England.**
- **Mortality for alcohol-related liver disease has been relatively stable in the North West between 2005 and 2010. Hospital admissions have increased significantly between 2005/6 and 2010/11.**
- **Mortality and hospital admissions are higher among males.**
- **The mortality rate in Blackpool (25.4 per 100,000) is almost nine times higher than the rate in Eden (2.9 per 100,000); rates of admission are highest in Preston.**
- **There is a stronger correlation between alcohol-related liver disease and deprivation than between other causes of liver disease in the report.**
- **There was a significant increase in the number of people accessing alcohol services between 2008/9 and 2009/10.**
- **The rate of alcohol treatment is higher in the North West than England and within the North West Blackpool had the highest treatment rate in 2010/11.**

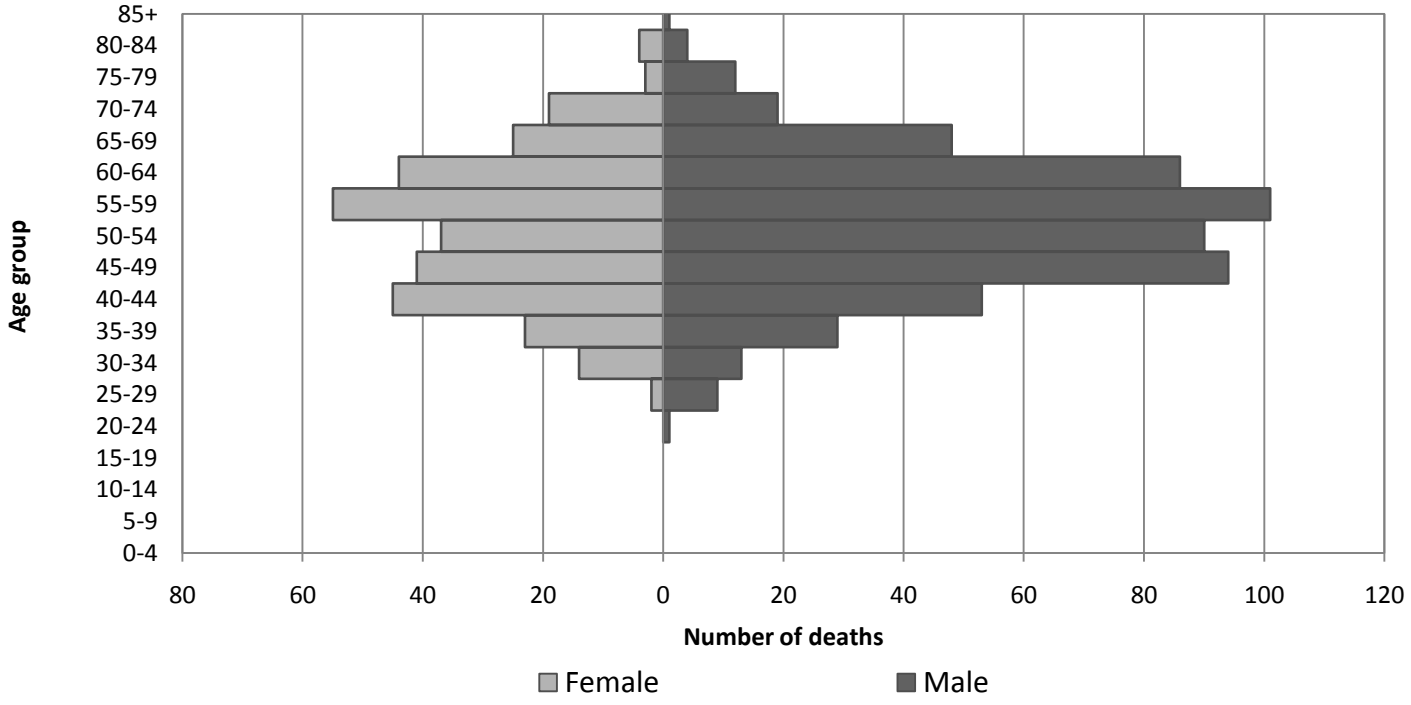
3.3.1 Mortality

In the North West between 2005 and 2010 mortality rates for alcohol-related liver disease were relatively stable for both males and females. The mortality rate among males was approximately twice the rate of mortality among females (Figure 25). Deaths from alcohol-related liver disease in the North West were highest among men aged 45 to 64 years (Figure 26). Rates of alcohol-related liver disease among females were more evenly distributed across a wider range (40 to 64 years). In the 30 to 34 age group the number of deaths for females exceed the number of deaths for males. While the numbers of deaths are too small to draw any solid conclusions, the narrowing of the mortality rate for males and females in the younger age categories perhaps reflects recent cultural changes in relation to excessive alcohol use among women.



Data source: Office for National Statistics

Figure 25: Mortality from alcohol-related liver disease (underlying cause) by gender, North West, 2005 to 2010

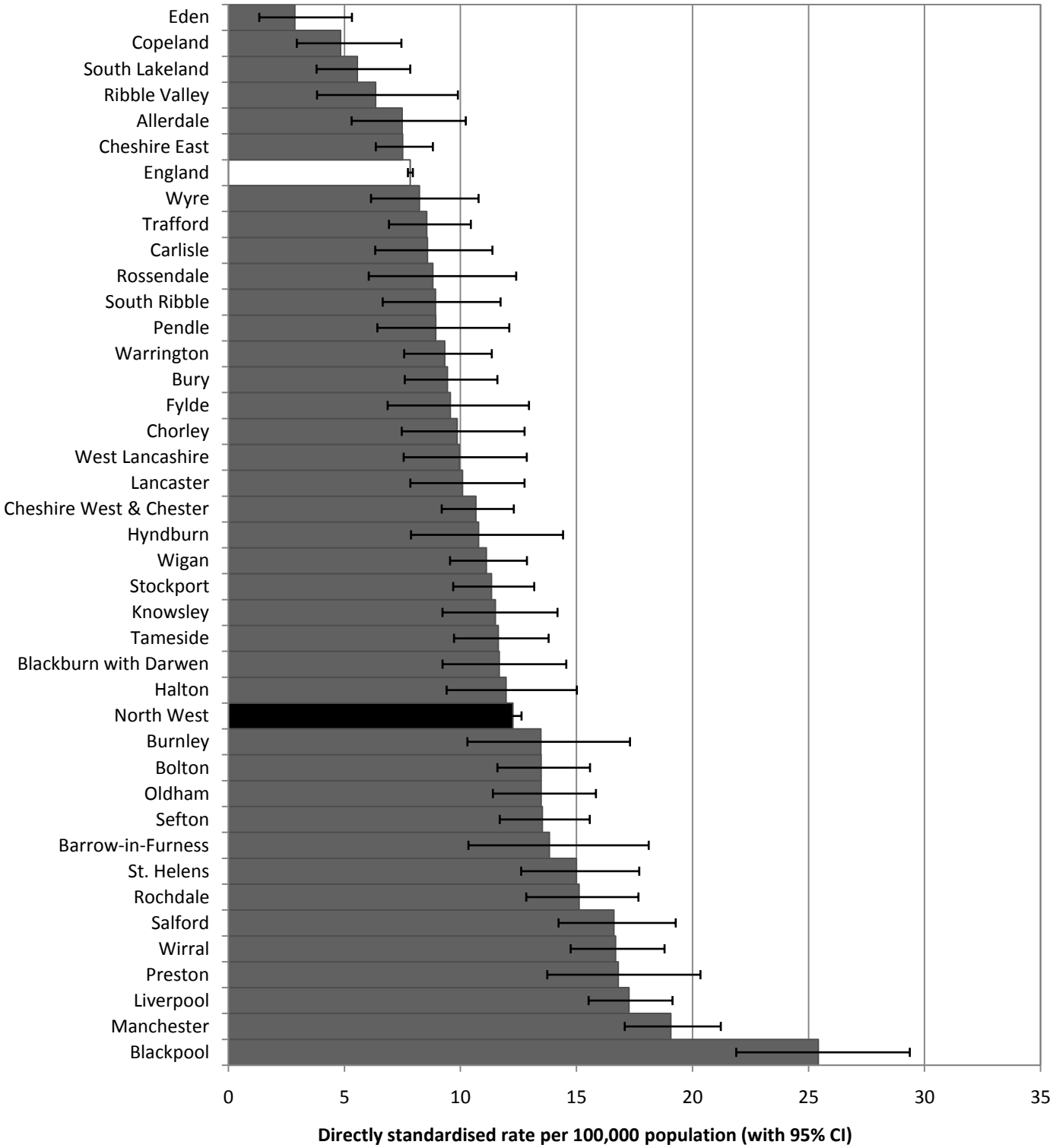


Data source: Office for National Statistics

Figure 26: Mortality from alcohol-related liver disease (underlying cause) by age and gender, North West, 2010

A local authority comparison of deaths due to alcohol-related liver disease is shown in Figure 27. There is considerable variation by local authority in the mortality rate for alcohol-related liver disease. The mortality rate in Blackpool (25.4 per 100,000 population [95% CIs 21.9 - 29.4]) is almost nine times higher than the mortality rate in Eden (2.9 per

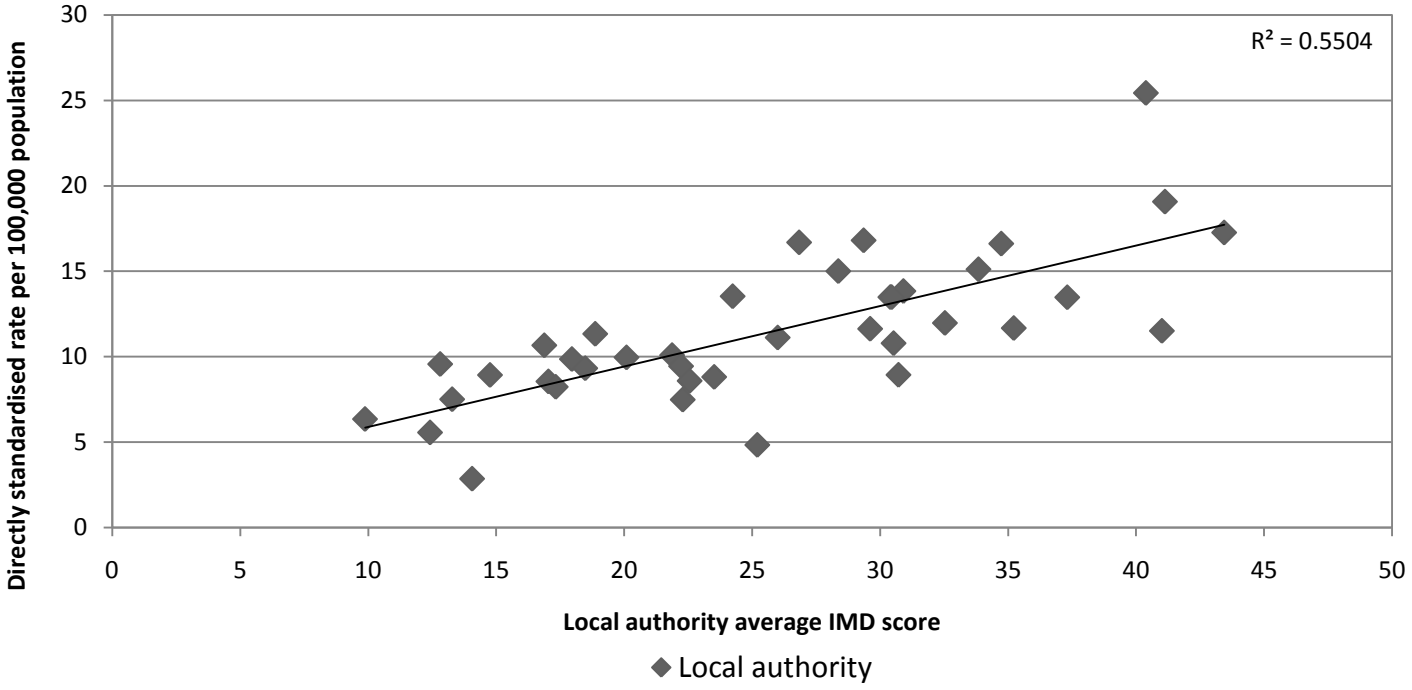
100,000 population [95% CIs 1.3 - 5.3]). Only six of the local authorities in the North West have a mortality rate from alcohol-related liver disease that is lower than the England average.



Data source: Office for National Statistics

Figure 27: Mortality rates for alcohol-related liver disease (underlying cause) by local authority, North West, 2006 to 2010

Figure 28 shows a moderate correlation between levels of deprivation and the rate of alcohol-related mortality. In general, local authorities with a more deprived population have a higher rate of mortality from alcohol-related liver disease. Just over half of the local authority level variation in mortality from alcohol-related liver disease can be explained by deprivation. The association between deprivation and deaths from alcohol-related liver disease is stronger than for the other liver disease groups. This supports research that shows it is the poorest communities that generally experience the highest rates of alcohol-related ill health, admissions to hospital and death (27, 28).

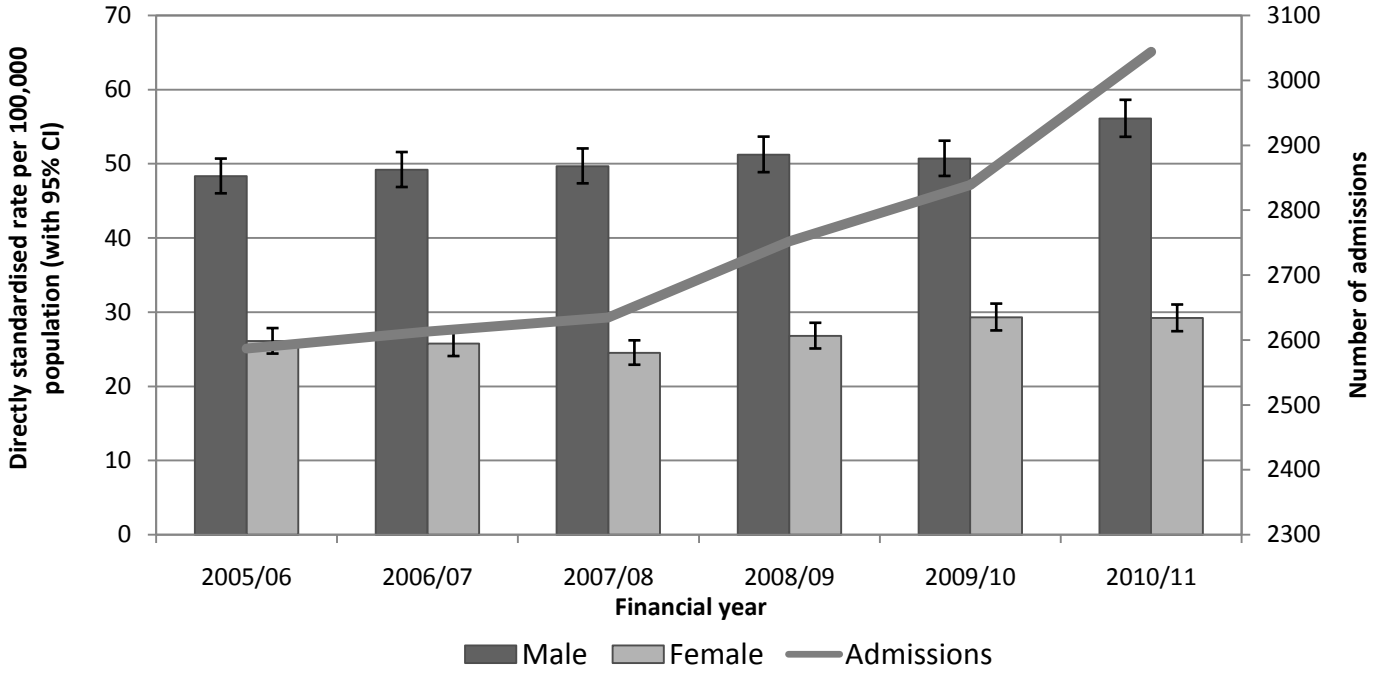


Data source: Office for National Statistics

Figure 28: Mortality rates for alcohol-related liver disease (underlying cause) by local authority and IMD score, North West, 2006 to 2010

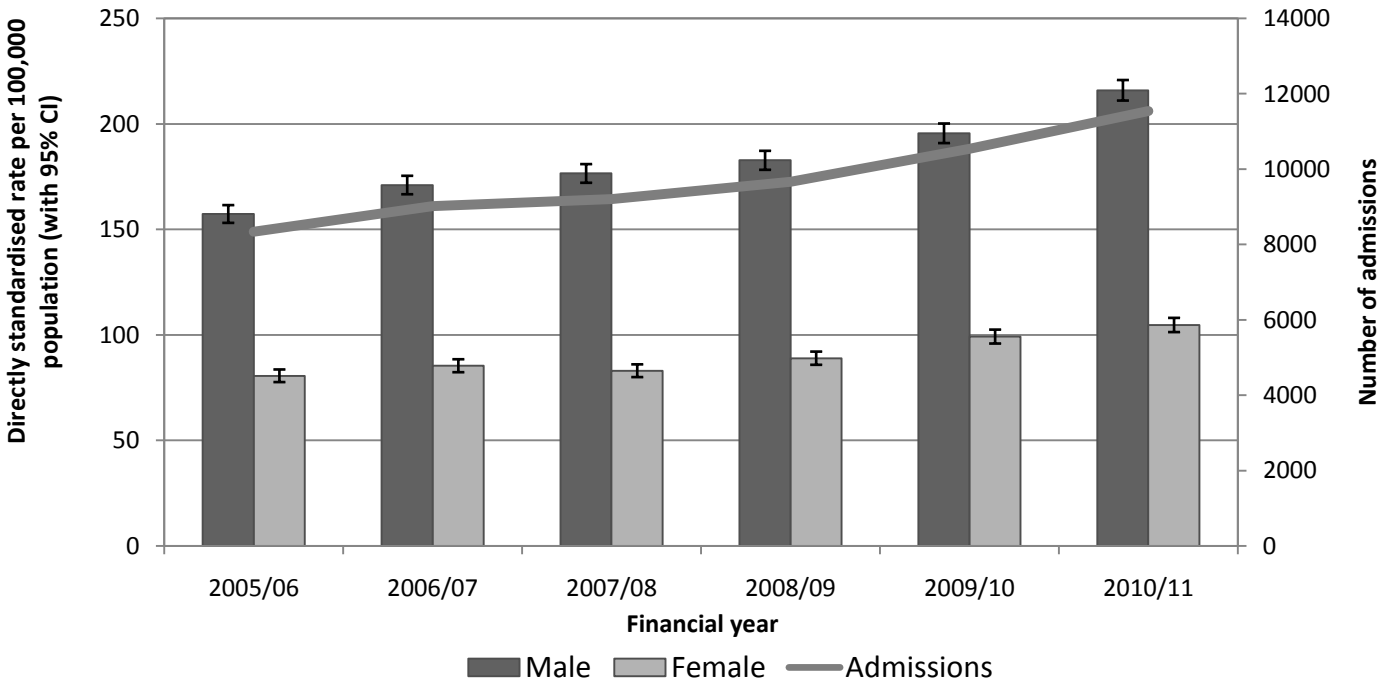
3.3.2 Hospital Admissions

In the North West rates of admissions for alcohol-related liver disease are considerably higher among males than females. Considering primary diagnosis only (Figure 29), there was a significant increase in the rate of admissions for males from 48.3 per 100,000 population (95% CIs 46.0 - 50.7) in 2005/06 to 56.1 per 100,000 population (95% CI 53.7 - 58.6) in 2010/11. There was also an increase in the rate of admissions for females during this time frame, from 26.1 per 100,000 population (95% CIs 24.4 - 27.9) to 29.2 per 100,000 population (95% CIs 27.4 - 31.0), although because the 95% confidence intervals overlap, this difference may not be significant. When all diagnoses are included (Figure 30), there has been a significant increase in admission rates between 2005/06 and 2010/11 for both males and females.



Data source: Hospital Episode Statistics

Figure 29: Hospital admissions for alcohol-related liver disease (primary diagnosis) by gender, North West, 2005/06 to 2010/11

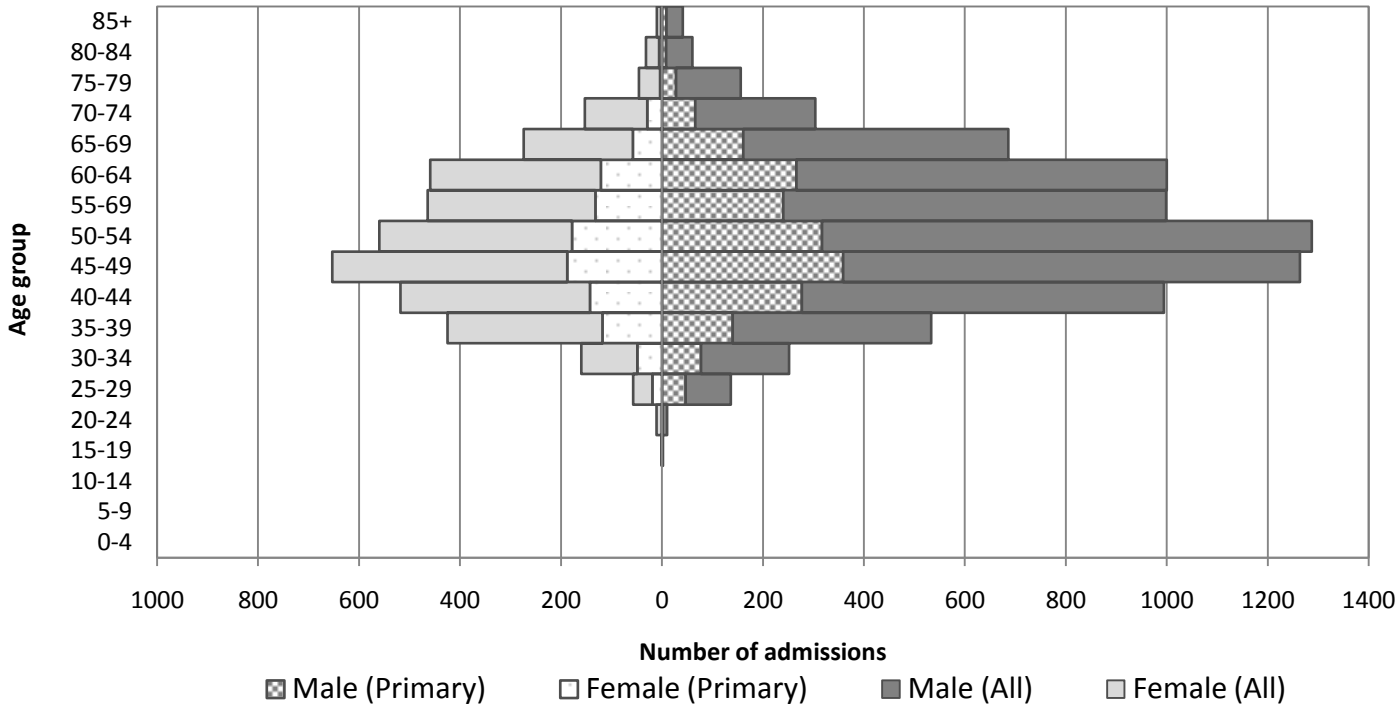


Data source: Hospital Episode Statistics

Figure 30: Hospital admissions for alcohol-related liver disease (all diagnoses) by gender, North West, 2005/06 to 2010/11

Figure 31 shows rates of hospital admissions for alcohol-related liver disease by age and gender for primary and all diagnoses; rates are higher among males then females for all ages. For all diagnoses, the rate of hospital admissions for both females and males peaks between the ages of 45 and 54 years. For both males and females, the youngest recorded

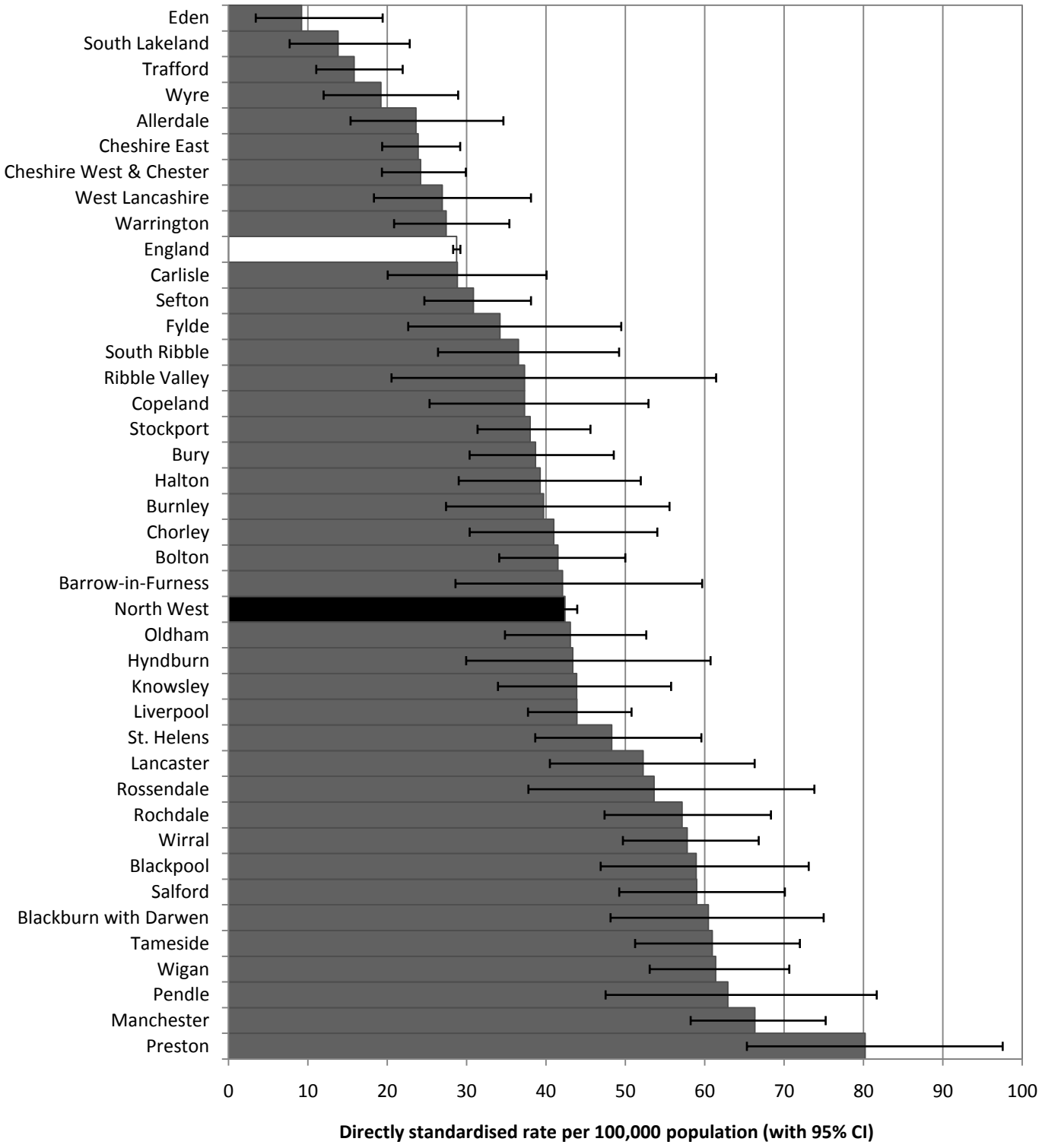
hospital admission for alcohol-related liver disease as a primary diagnosis was in the 20 to 24 age category and for all diagnoses it was in the 15 to 19 age category.



Data source: Hospital Episode Statistics

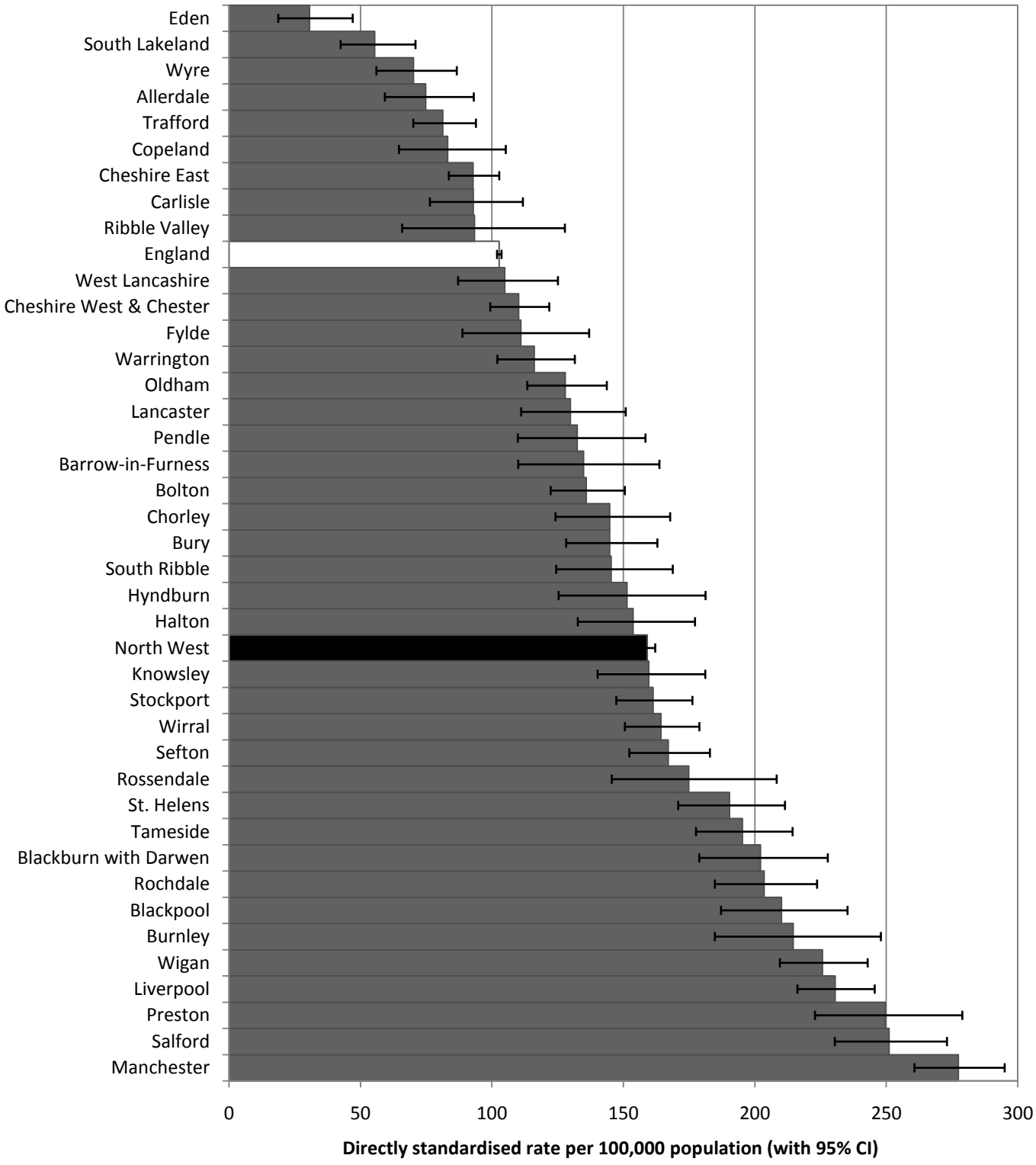
Figure 31: Hospital admissions for alcohol-related liver disease by age and gender, North West, 2010/11

Figures 32 and 33 report rates of alcohol-related liver disease hospital admission by local authority of residence. They both show that rates by local authority show a huge variation across the North West and that the rates of hospital admissions for most local authorities in the North West are worse than the England average.



Data source: Hospital Episode Statistics

Figure 32: Hospital admission rate for alcohol-related liver disease (primary diagnosis) by local authority, North West, 2010/11

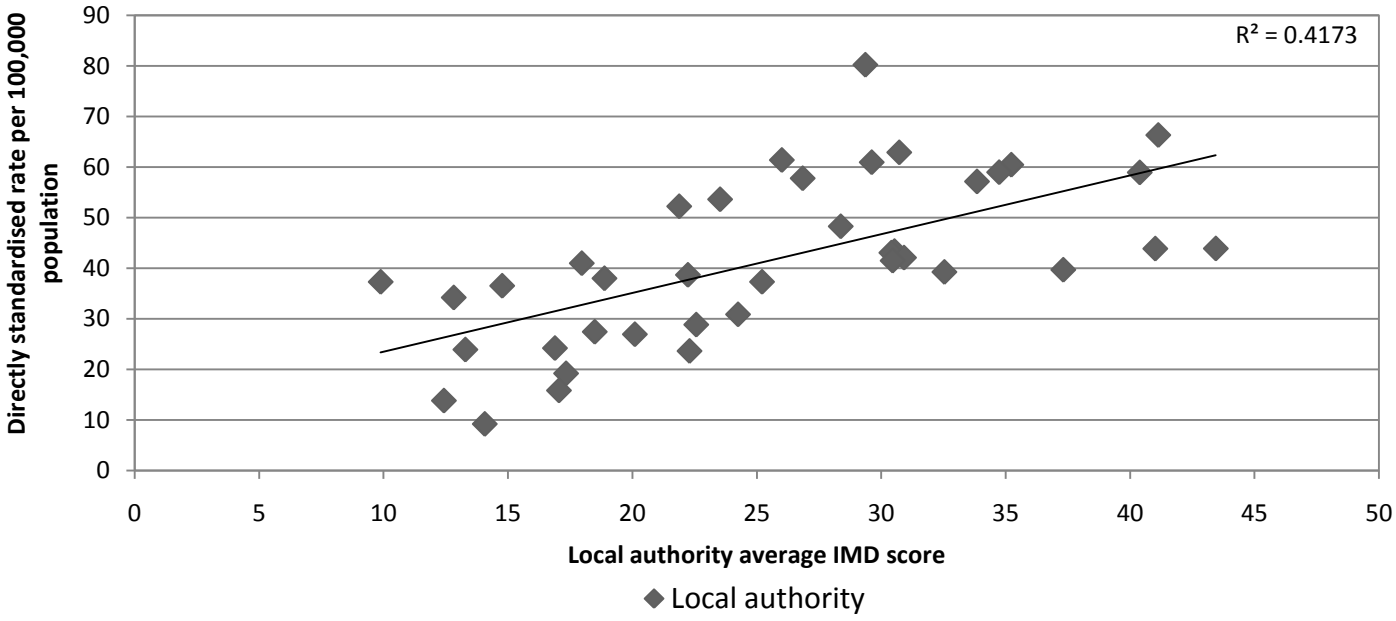


Data source: Hospital Episode Statistics

Figure 33: Hospital admission rate for alcohol-related liver disease (all diagnoses) by local authority, North West, 2010/11

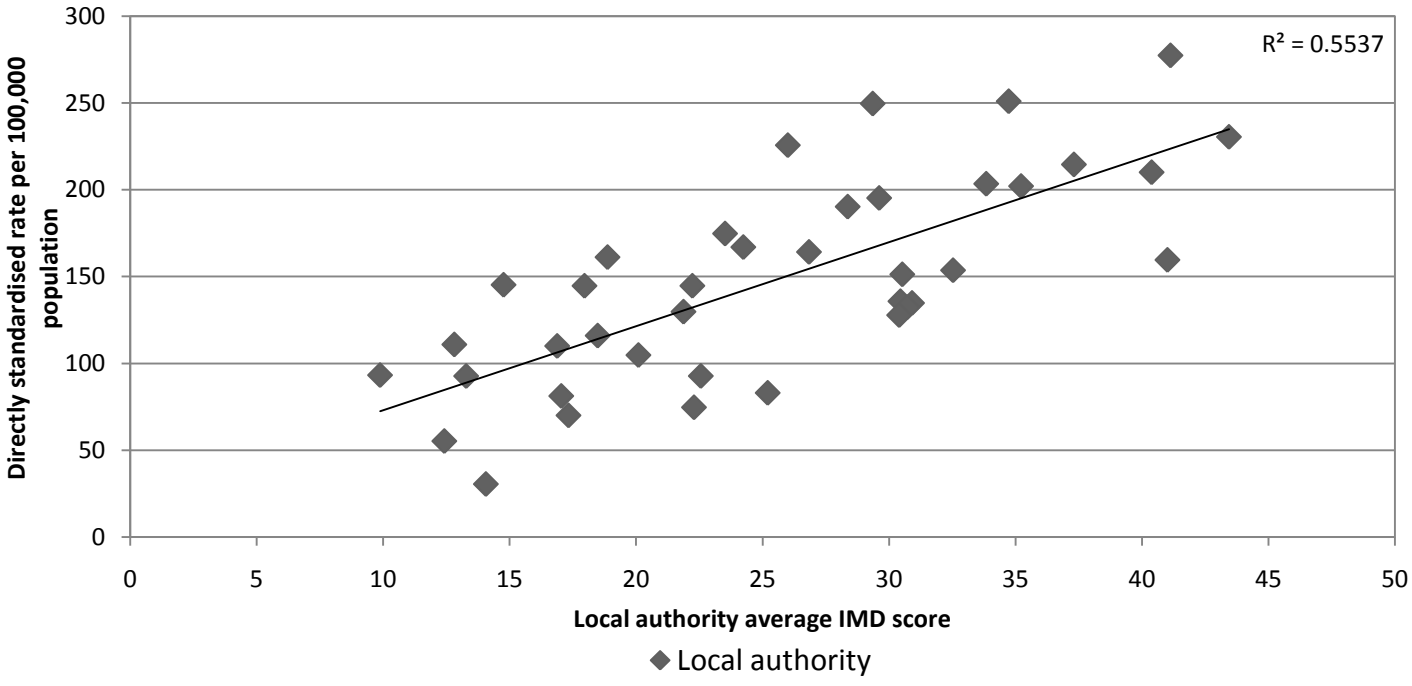
The moderate correlation between rates of hospital admissions for alcohol-related liver disease and deprivation is shown in Figures 34 for primary diagnosis and Figure 35 for all diagnoses. Where alcohol-related liver disease is the underlying cause, 42% of the variability between local authorities is due to deprivation. Where alcohol-related liver disease is under all diagnoses, the comparable figure for the association with deprivation is 55%. As with mortality, the

correlation between deprivation and alcohol-related liver disease is stronger than for the remaining liver disease categories detailed in this report.



Data source: Hospital Episode Statistics

Figure 34: Hospital admission rate for alcohol-related liver disease (primary diagnosis) by local authority and IMD score, North West, 2010/11

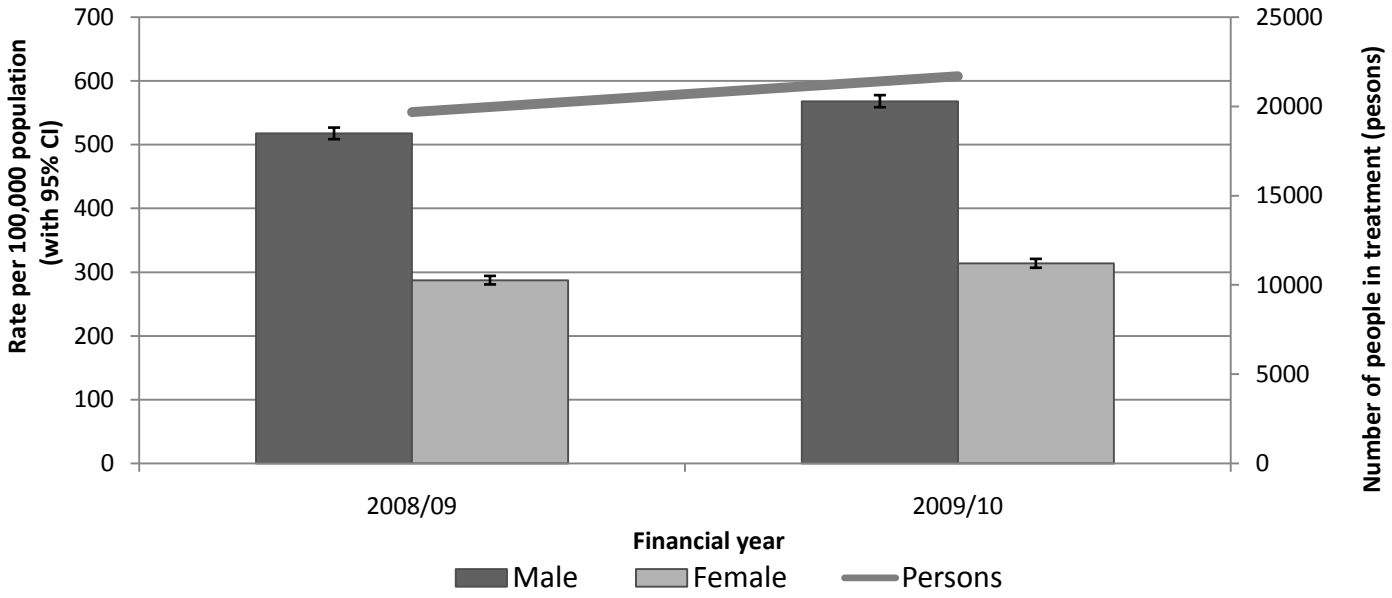


Data source: Hospital Episode Statistics

Figure 35: Hospital admission rate for alcohol-related liver disease (all diagnoses) by local authority and IMD score, North West, 2010/11

3.3.3 Alcohol Treatment

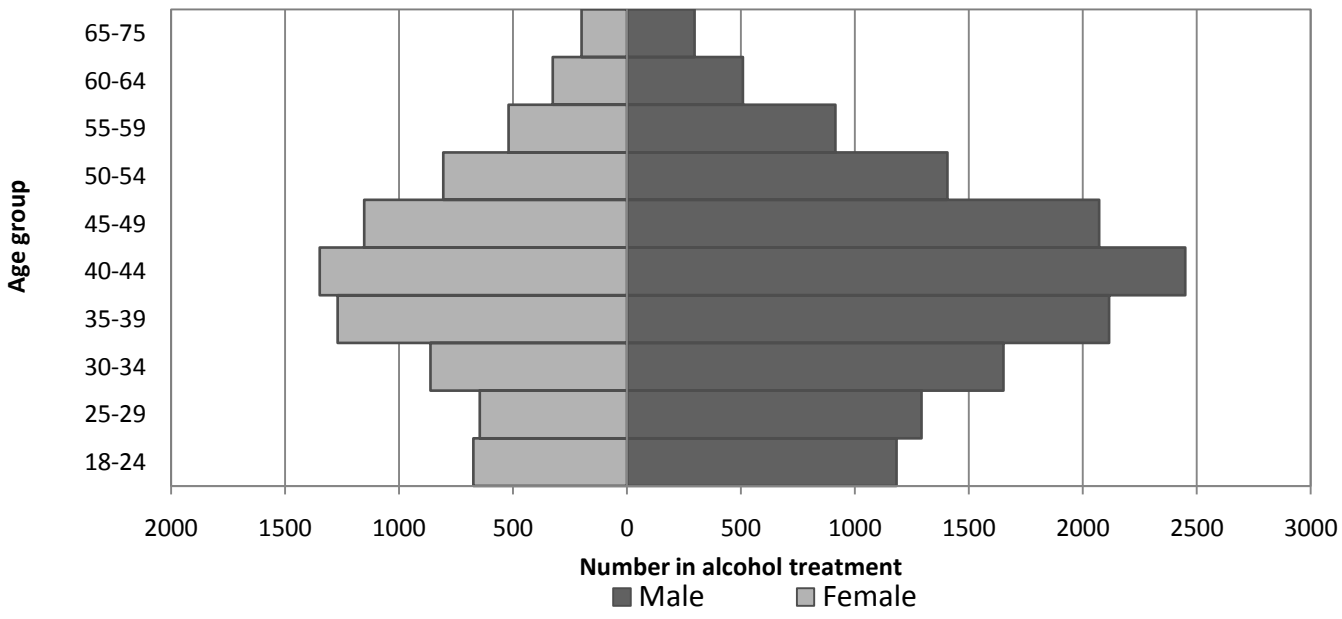
The number of people in contact with alcohol treatment services in the North West is reported in Figure 36. Between 2008/09 and 2009/10, there was a significant increase in the rate of people accessing alcohol services for both males and females. It is important to note that this increase could reflect expansion of service provision rather than any increase in the number of people drinking at problematic levels or the number requiring treatment.



Data source: National Alcohol Treatment Monitoring System

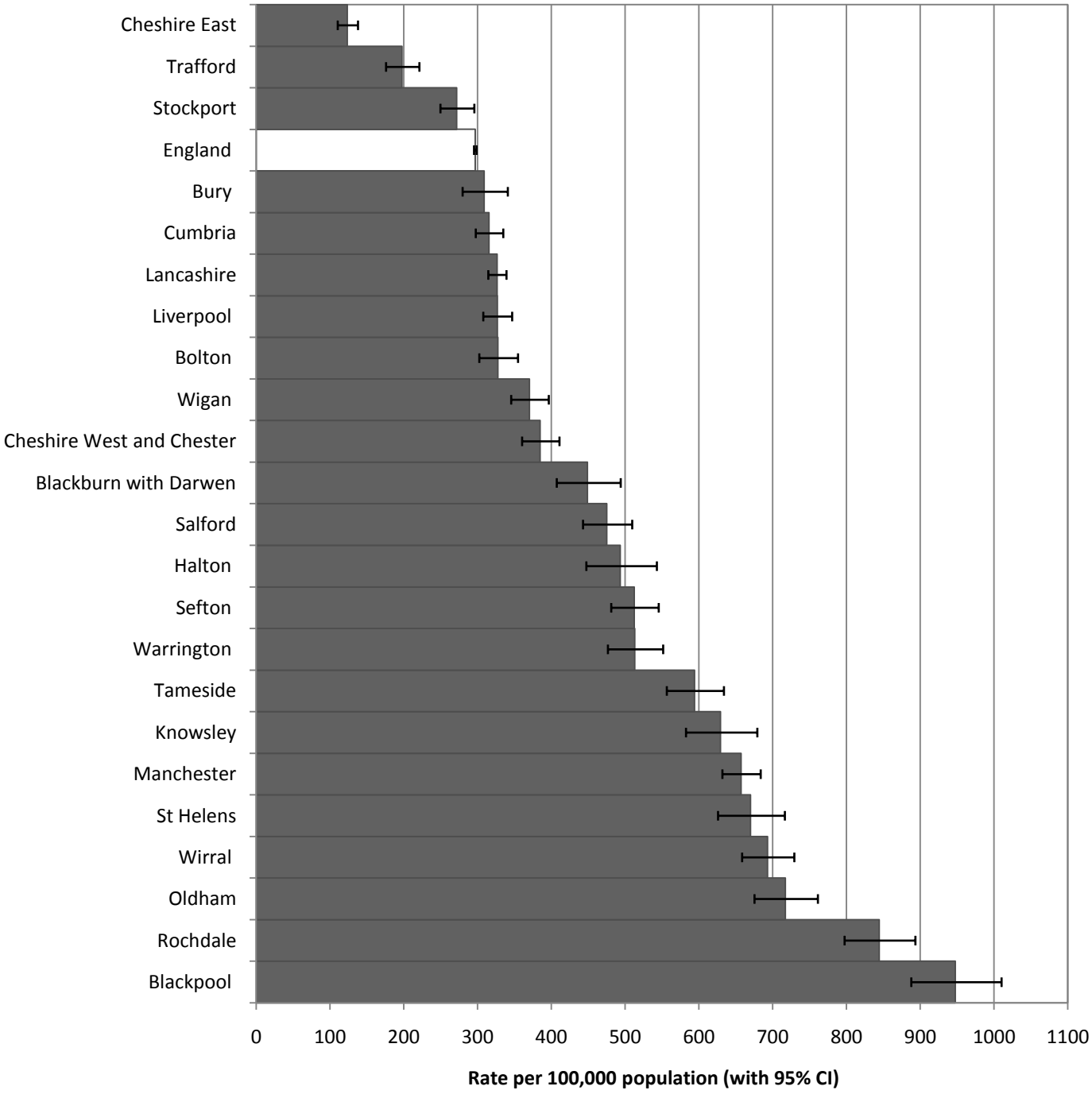
Figure 36: Alcohol treatment, ages 18 to 75 years by gender, North West, 2008/09 to 2009/10

The gender and age breakdown of people accessing alcohol services in the North West is described in Figure 37. The peak age of contact with alcohol services is 40 to 44 years for both males and females. In 2009/10 there were 674 females and 1,182 males aged 18 to 24 years accessing alcohol treatment services in the North West, demonstrating the young age that people experience alcohol-related problems.



Data source: National Alcohol Treatment Monitoring System

Figure 37: Alcohol treatment, by age (ages 18 to 75 years) and gender, North West, 2009/10



Data source: National Alcohol Treatment Monitoring System

Figure 38: Alcohol treatment rate by DAAT area, ages 18 to 75 years, North West, 2010/11

3.4 Fatty Liver Disease

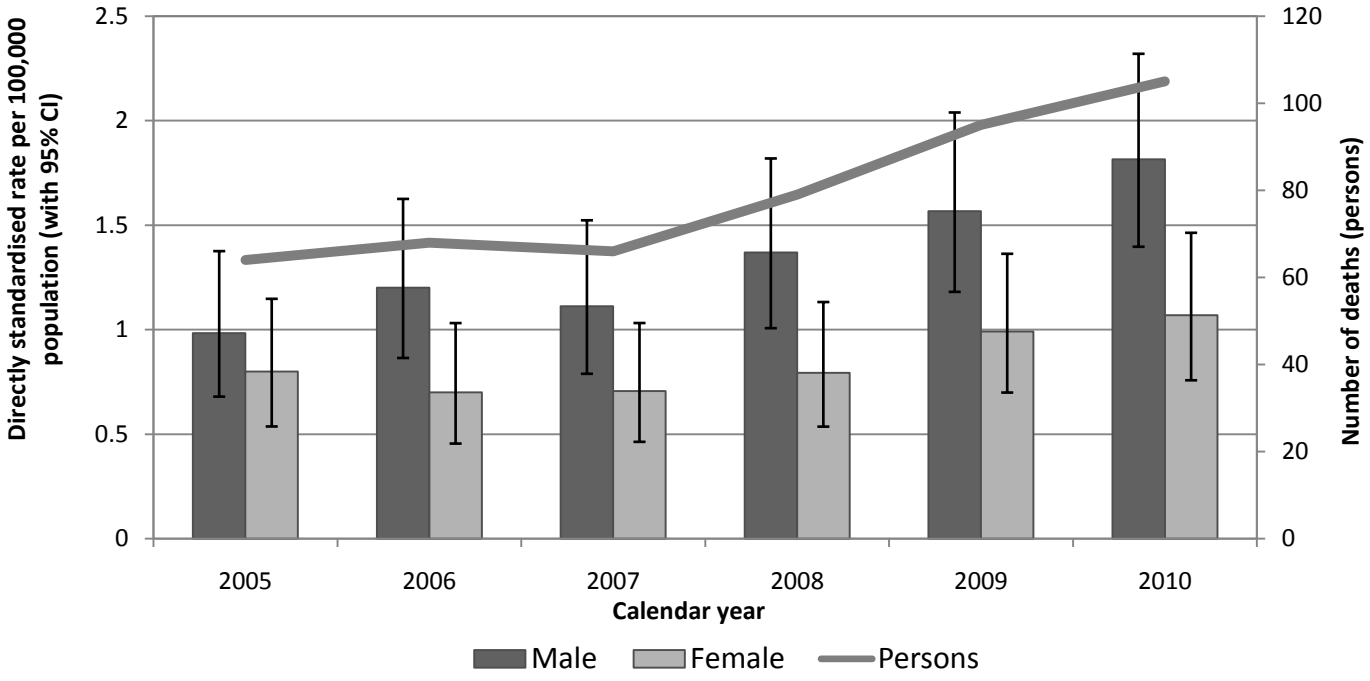
The next section of the report describes mortality and hospital admissions for fatty liver disease. The number of deaths and hospital admissions for fatty liver disease in the North West is relatively small and so caution should be exercised when drawing conclusions based on these data. Additional local authority level data are provided in Appendix 1, including obesity profiles for both adults and children.

Summary

- **While the number of deaths attributed to fatty liver disease is small, mortality rates have increased since 2007 as have admissions for fatty liver disease (all diagnoses) for males and females.**
- **Mortality rates are over six times higher in Blackburn and Darwen (6.5 per 100,000) and Hyndburn (7.0 per 100,000) local authority than the North West average (1.1 per 100,000).**
- **There is a poor correlation between fatty liver disease and deprivation.**

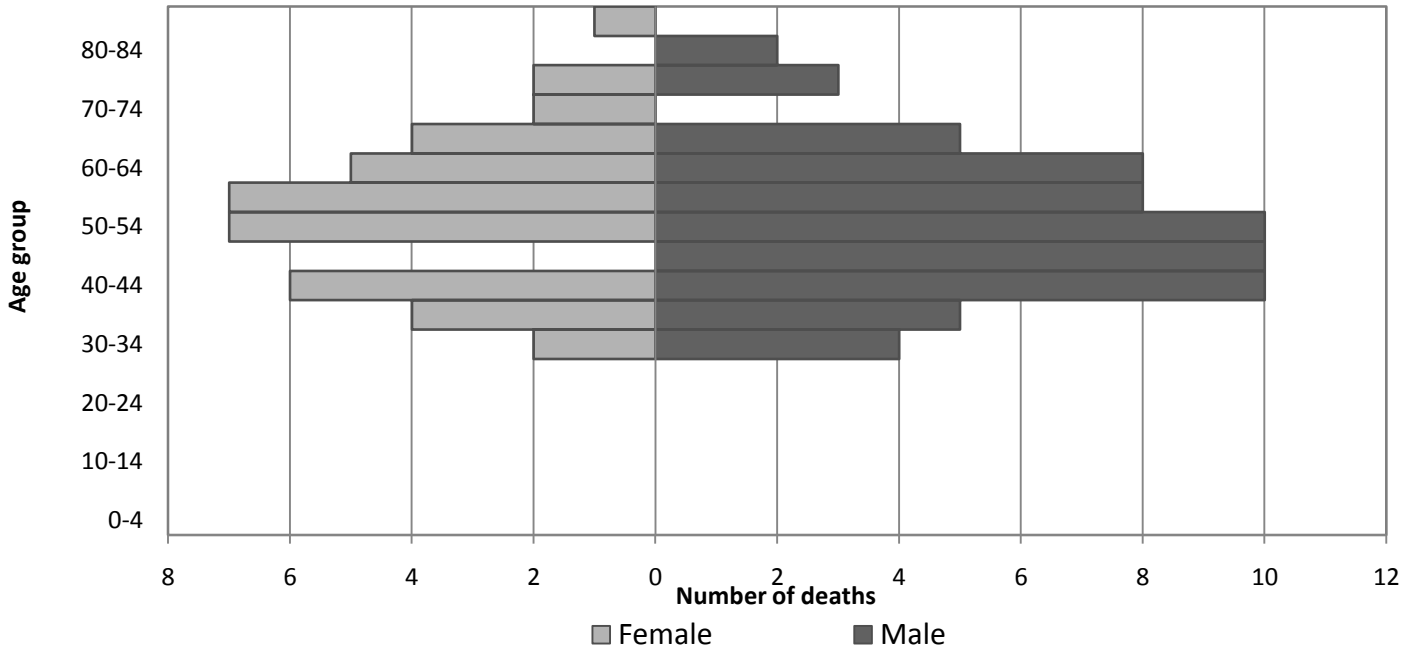
3.4.1 Mortality

In 2010, across the North West there were 65 male and 40 female deaths attributed to fatty liver disease (Figure 39). The mortality rate for fatty liver disease for both males and females is increasing. The rate of increase among men has been faster than among females and so the gap between males and females has widened. Deaths from this type of liver disease most commonly occur among people aged 40 to 59 years (Figure 40).



Data source: Office for National Statistics

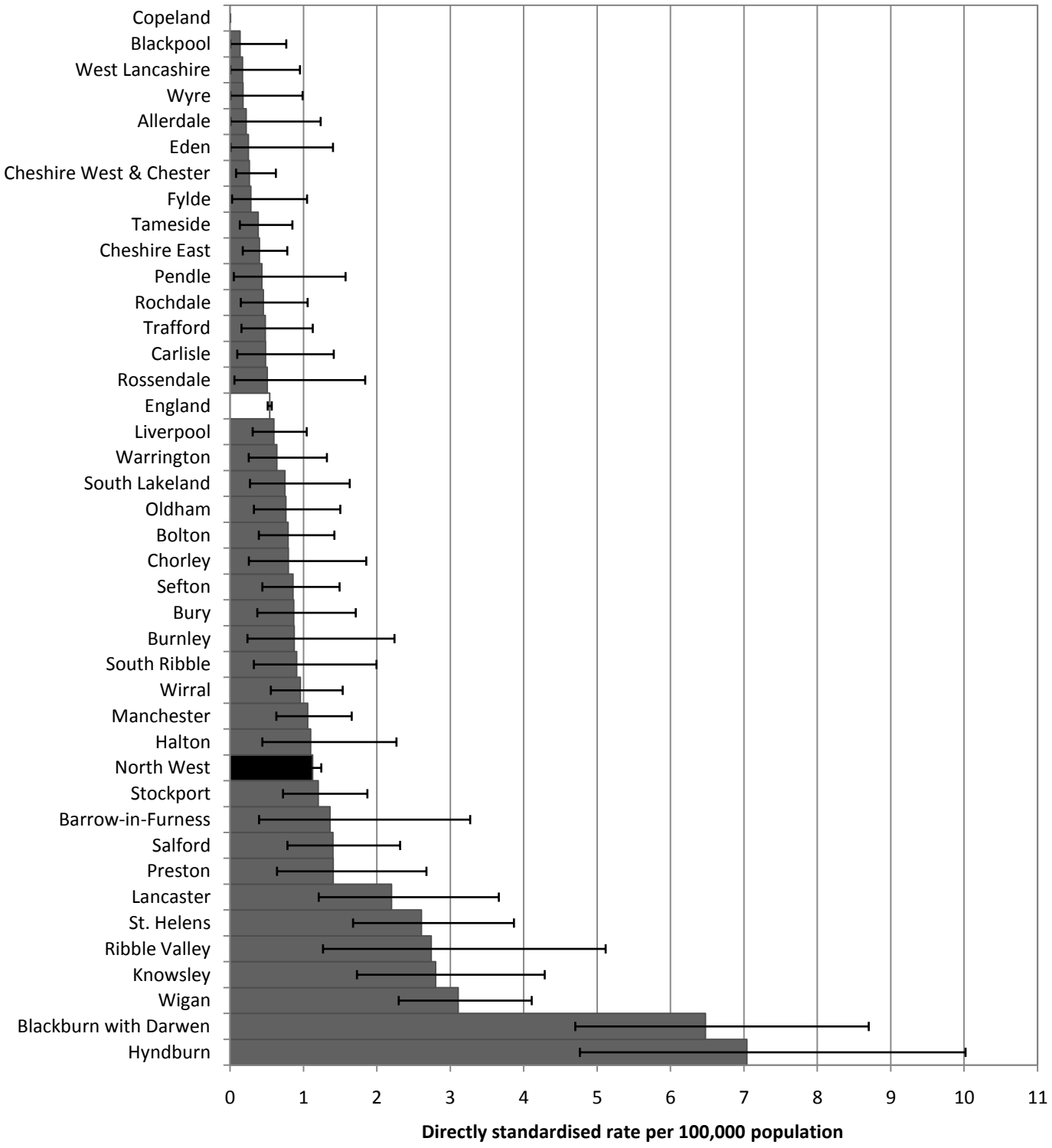
Figure 39: Mortality from fatty liver disease (underlying cause) by gender, North West, 2005 to 2010



Data source: Office for National Statistics

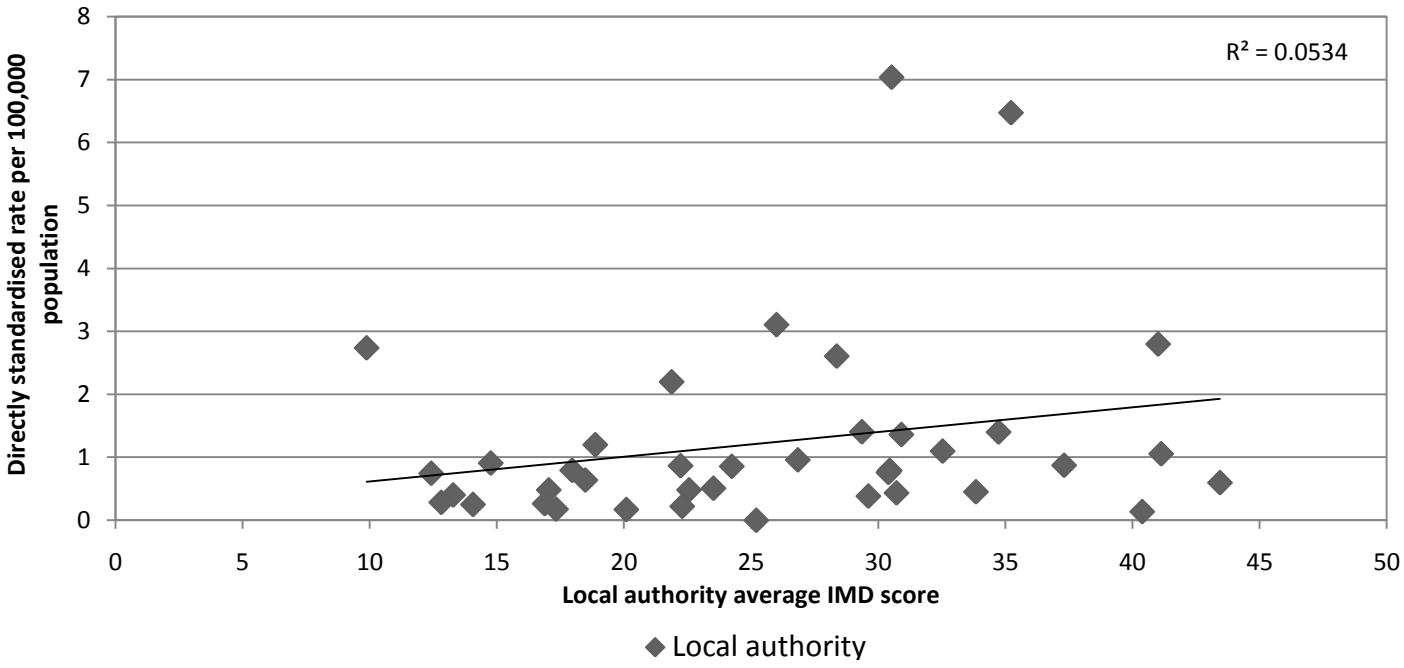
Figure 40: Mortality from fatty liver disease (underlying cause) by age and gender, North West, 2008 to 2010

Figure 41 describes differences by local authority in mortality rates for fatty liver disease. Due to the low number of deaths and the large confidence intervals, caution should be exercised in comparing local authorities. Figure 42 shows that the mortality rate for fatty liver disease does not correlate with deprivation, with only 5% of the variability between local authorities explained by differences in deprivation.



Data source: Office for National Statistics

Figure 41: Mortality rates for fatty liver disease (underlying cause) by local authority, North West, 2006 to 2010

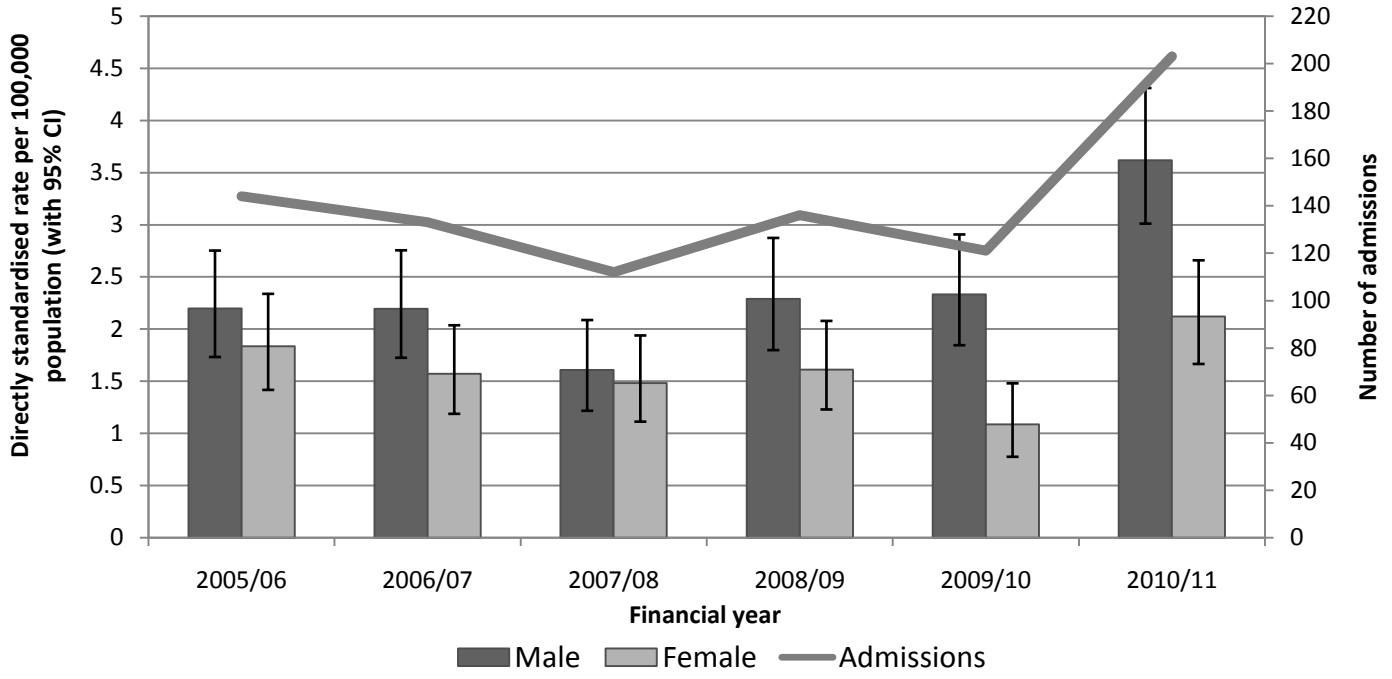


Data source: Office for National Statistics

Figure 42: Mortality rates for fatty liver disease (underlying cause) by local authority and IMD score, North West, 2006 to 2010

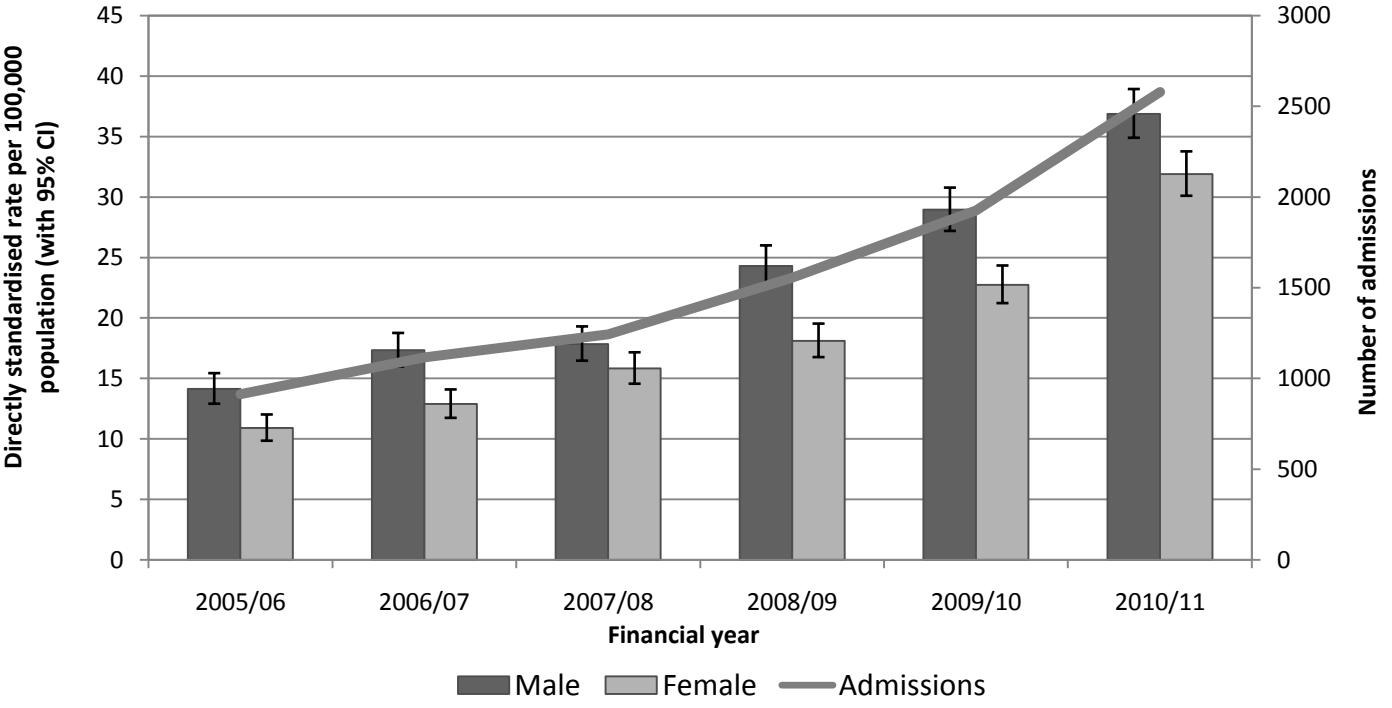
3.4.2 Hospital Admissions

In the North West, the rate of hospital admissions for females with fatty liver disease as the primary diagnosis has not significantly changed between 2005/06 and 2010/11 (Figure 43). For males the rate was relatively stable between 2005/06 and 2009/10 before increasing markedly in 2010/11. Consequently, the difference between males and females in the rate of hospital admissions for a primary diagnosis of fatty liver disease has widened. The picture is quite different when hospital admissions for all diagnoses of fatty liver disease are considered; each year has seen an increase in the number and rate of both males and females being admitted to hospital (Figure 44). Male rates of all cause diagnosis admissions for fatty liver disease have more than doubled from 14.1 per 100,000 population (95% CI 12.9 - 15.4) in 2005/06 to 36.9 per 100,000 population (95% CI 34.9 - 38.9) in 2010/11. Female rates have increased three fold over the same time period from 10.9 per 100,000 population (95% CI 9.9 - 12.0) to 31.9 per 100,000 population (95% CI 30.1 - 33.8). Together these figures show the considerable contribution of fatty liver disease as a secondary cause of admission to hospital.



Data source: Hospital Episode Statistics

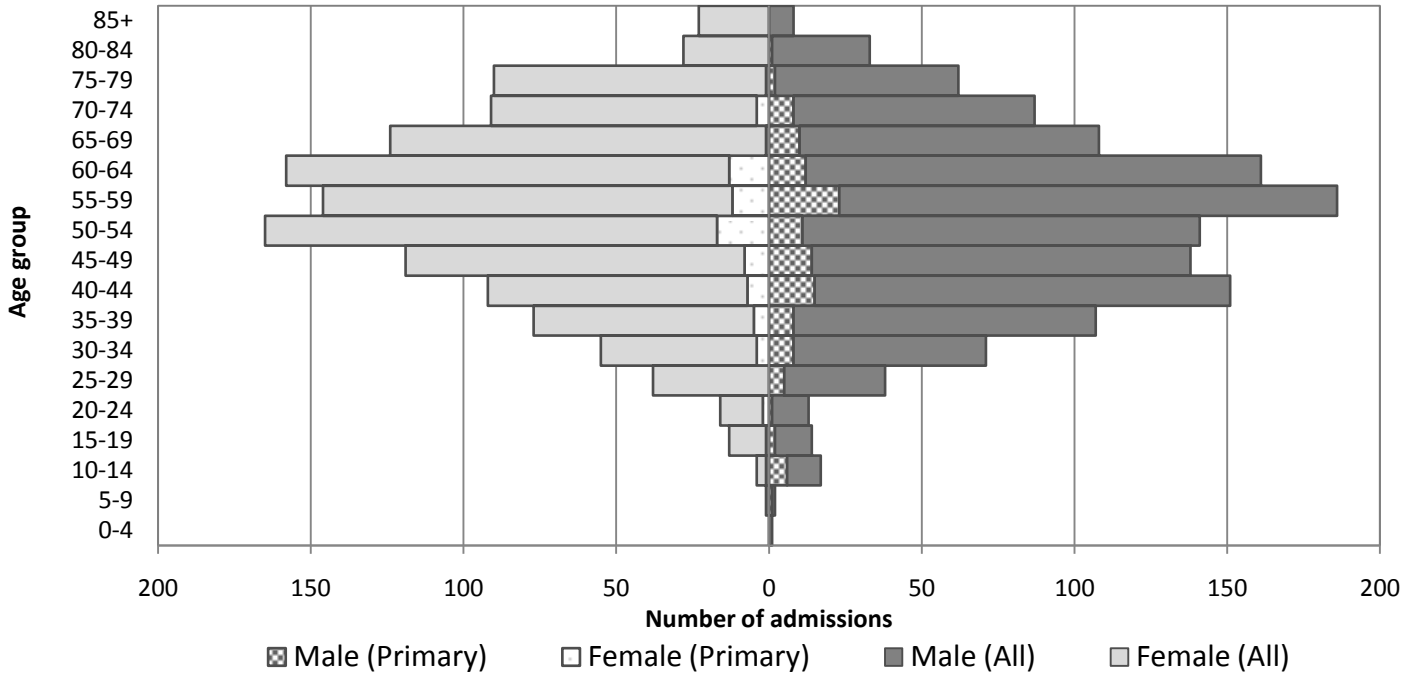
Figure 43: Hospital admissions for fatty liver disease (primary diagnosis) by gender, North West, 2005/06 to 2010/11



Data source: Hospital Episode Statistics

Figure 44: Hospital admissions for fatty liver disease (all diagnoses) by gender, North West, 2005/06 to 2010/11

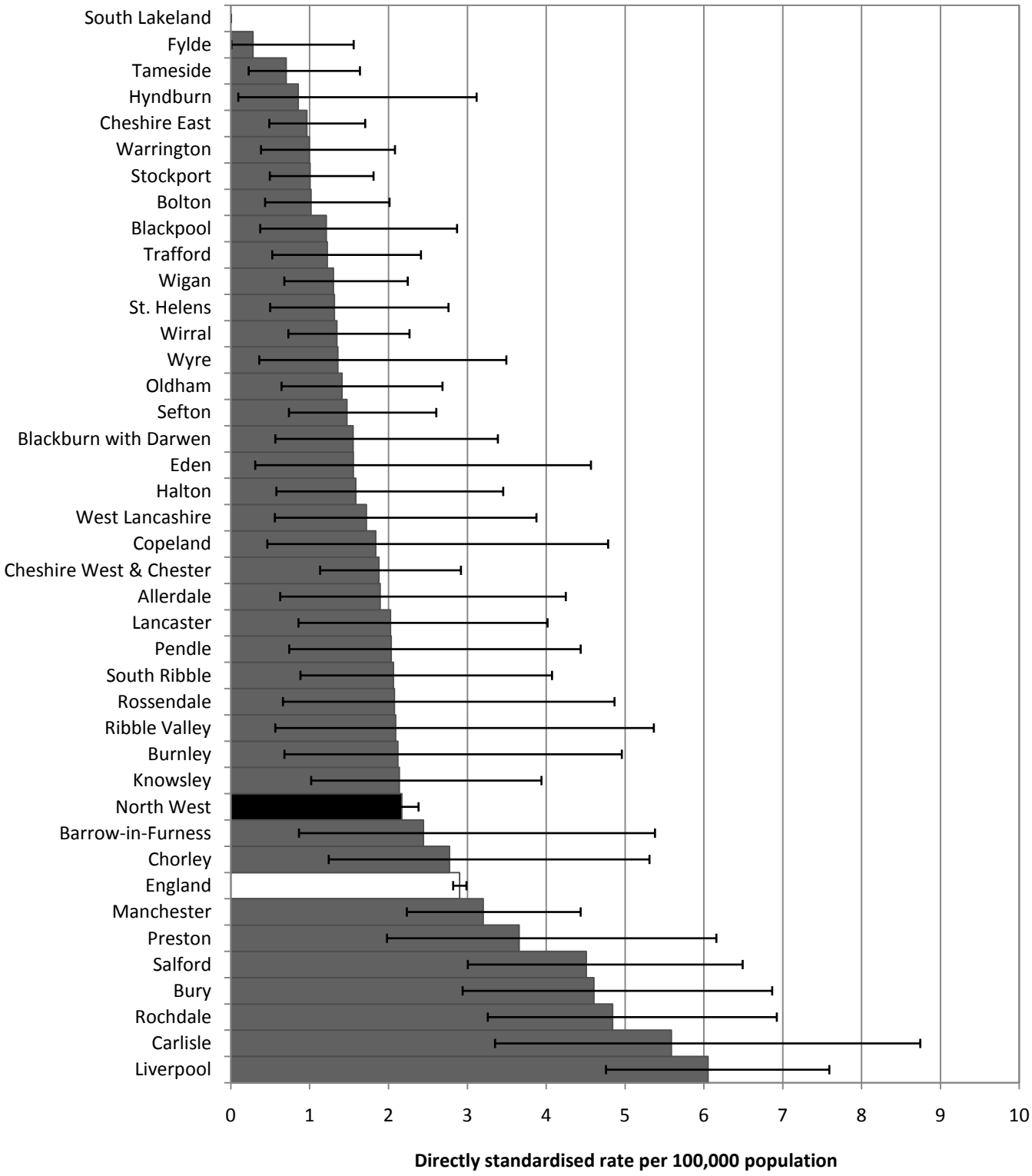
Figure 45 describes the number of hospital admissions for fatty liver disease in the North West by age and gender. In general, males are admitted to hospital for fatty liver disease at an earlier age than females. However, hospital admissions span the whole age range, starting with a small number of hospital admissions in those less than 10 years of age.



Data source: Hospital Episode Statistics

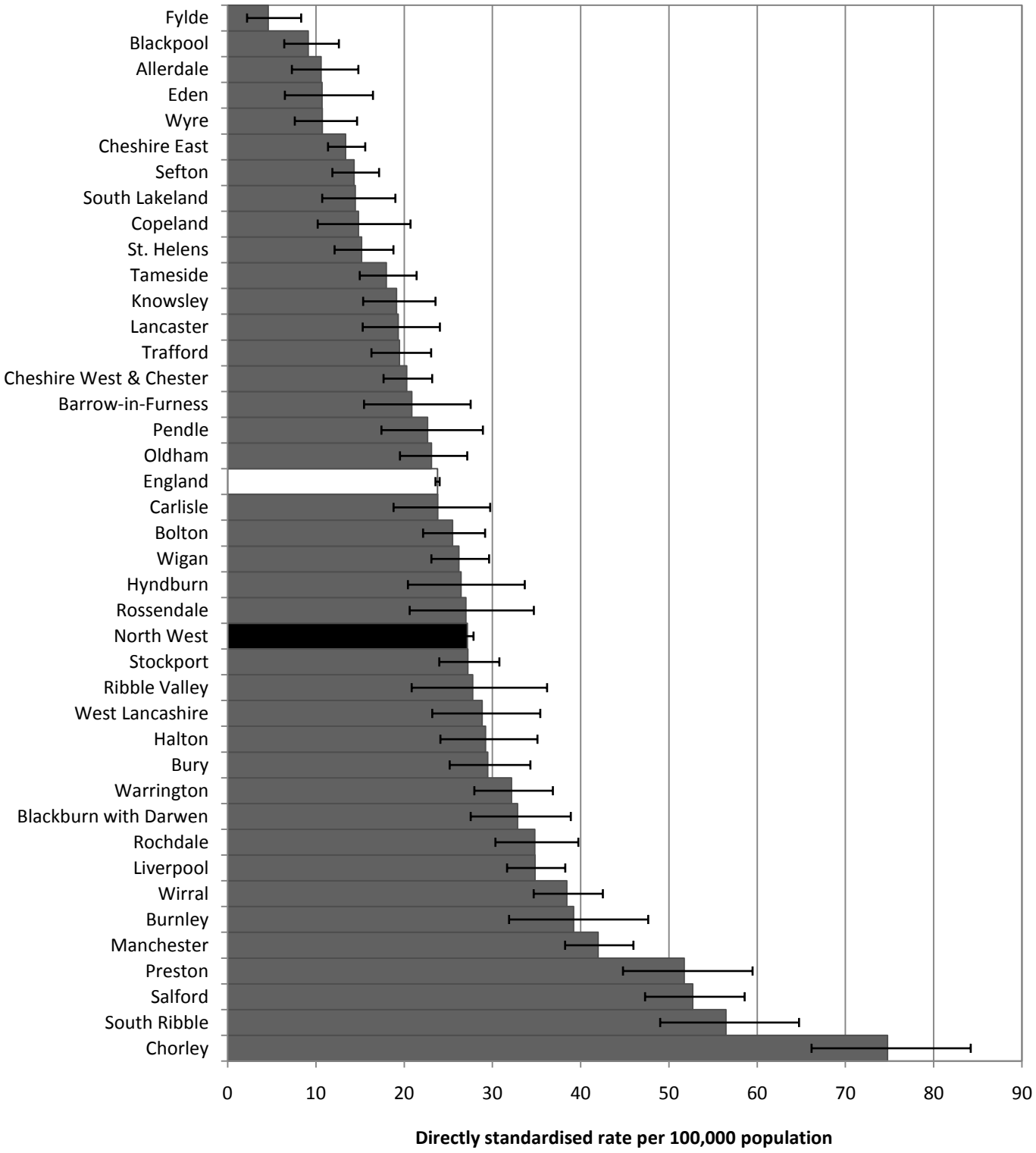
Figure 45: Hospital admissions for fatty liver disease by age and gender, North West, 2010/11

Figures 46 and 47 describe differences in the rate of hospital admissions for fatty liver disease by local authority by primary diagnosis and all diagnoses respectively. Like other liver disease indicators there are considerable differences between local authorities. In light of the small numbers and corresponding wide confidence intervals, local authority comparisons for primary diagnosis should be treated with caution.



Data source: Hospital Episode Statistics

Figure 46: Hospital admission rates for fatty liver disease (primary diagnosis) by local authority, North West, 2008/09 to 2010/11

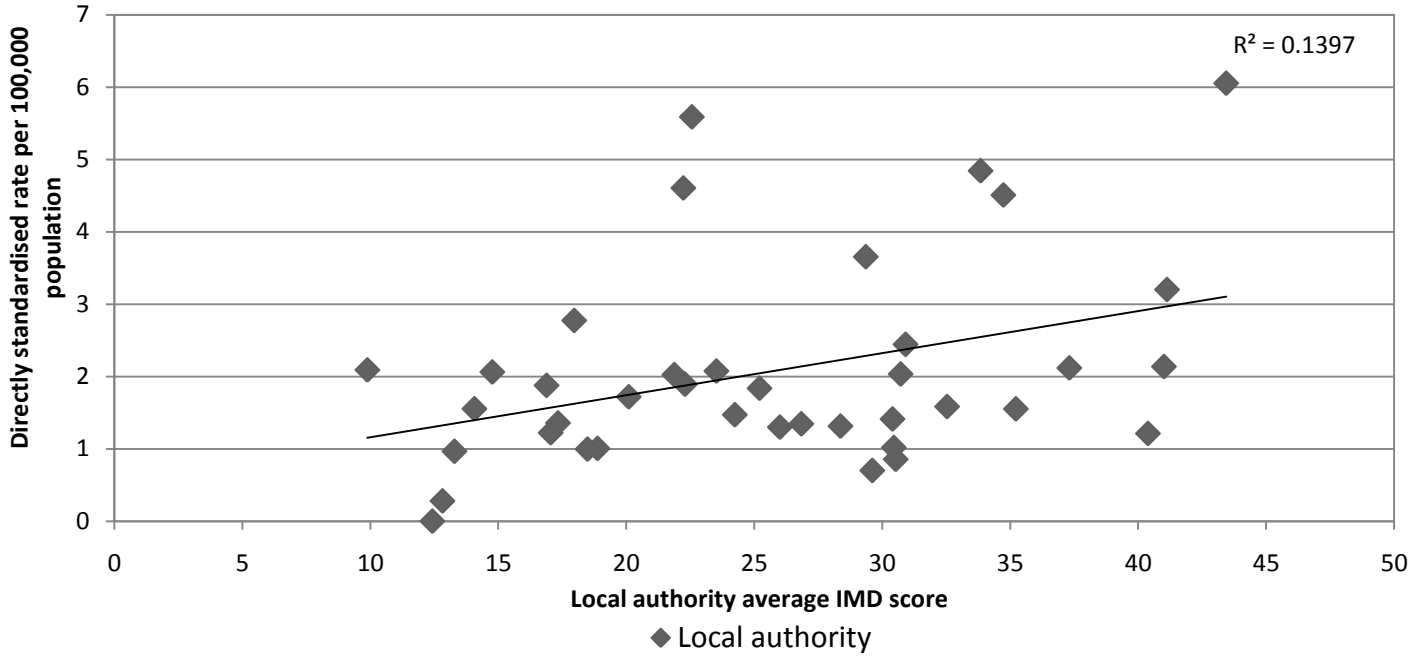


Data source: Hospital Episode Statistics

Figure 47: Hospital admission rates for fatty liver disease (all diagnoses) by local authority, North West, 2008/09 to 2010/11

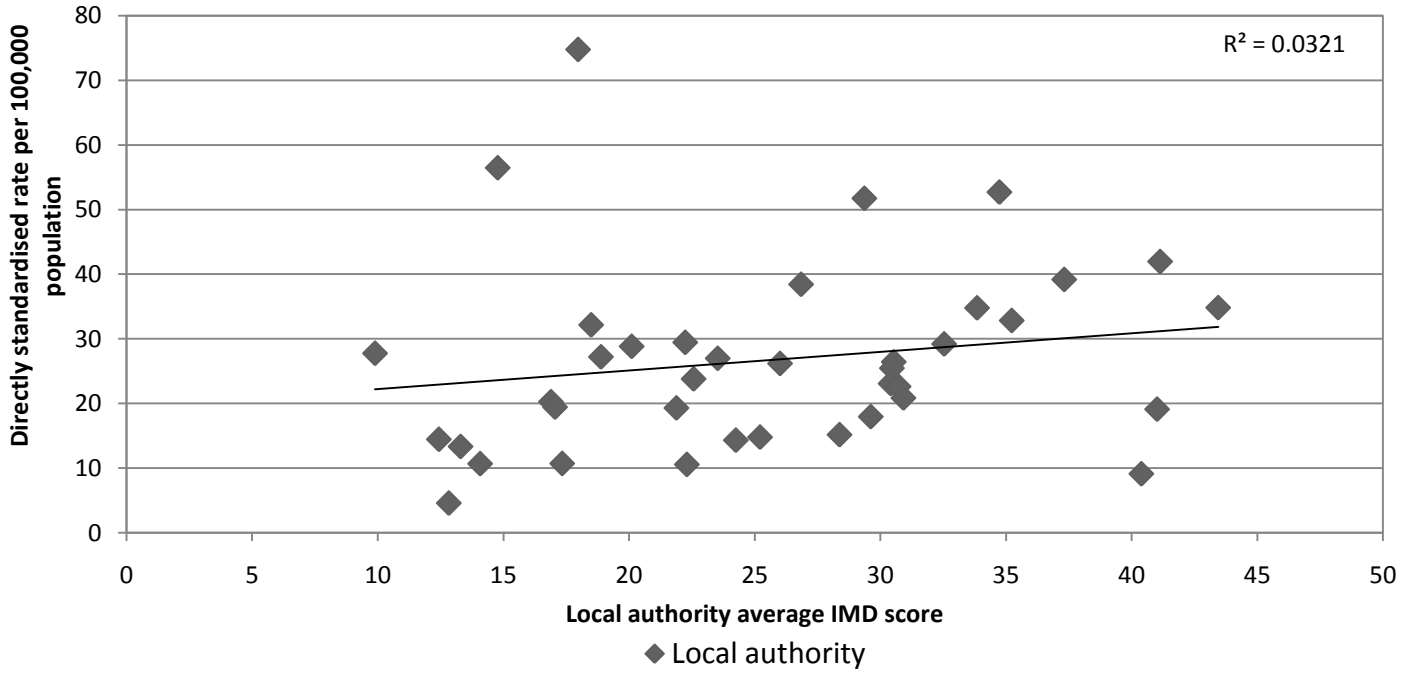
The relationships between hospital admissions for fatty liver disease and deprivation are described in Figures 48 and 49 for primary diagnosis and all diagnoses respectively. These figures show that admissions for fatty liver disease and deprivation are not well correlated. Where fatty liver disease is the primary diagnosis the R^2 value shows that 14% of the

variability between local authorities is explained by deprivation. For all diagnoses of fatty liver disease only 3% of the variability between local authorities is related to deprivation.



Data source: Hospital Episode Statistics

Figure 48: Hospital admission rates for fatty liver disease (primary diagnosis) by local authority and IMD score, North West, 2008/09 to 2010/11



Data source: Hospital Episode Statistics

Figure 49: Hospital admission rates for fatty liver disease (all diagnoses) by local authority and IMD score, North West, 2008/09 to 2010/11

3.5 Hepatitis C

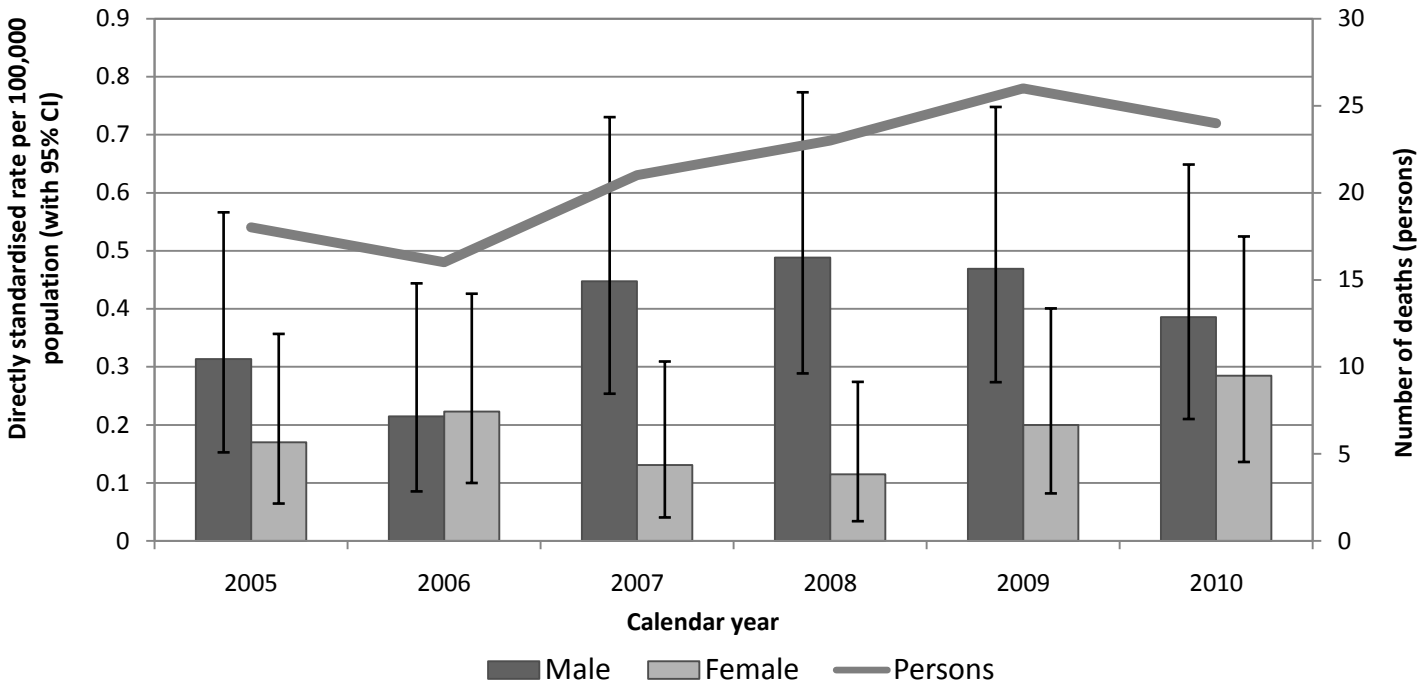
Hepatitis C is a blood borne virus which is transmitted via infected blood or less commonly via body fluid. Estimates suggest that there are approximately 216,000 people chronically infected with hepatitis C in the UK (6). The main risk factor for hepatitis C is sharing or use of contaminated equipment by injecting drug users (6). Acute hepatitis C is normally asymptomatic and if left untreated up to 25% of people clear the virus naturally (29). Those who remain infected after the first six months of infection are described as having chronic hepatitis C; the virus remains in the body for many years and may progress to cirrhosis, liver failure or cancer. Progression of liver disease is more likely in those who drink alcohol or are over the age of 40 years. In most cases hepatitis C infection has no symptoms and therefore many people can be unaware they are infected and because of this the incidence and prevalence of hepatitis C are not precisely known. However, it is estimated that in England, 0.4% (1 in 250) of the adult population are living with chronic infection (29). This section of the report describes the burden of, and risk factors for hepatitis C using a number of data sources, including: laboratory surveillance; survey of injecting drug users; hospital admissions and mortality.

Summary

- **The number of deaths attributed to hepatitis C in the North West is relatively low compared to other liver disease.**
- **Hospital admissions for hepatitis C (all diagnoses) have risen since 2005 and are higher among males than females.**
- **The rate of admission for hepatitis C is significantly higher in the North West compared to England.**
- **The rate of hospital admissions varies considerably between local authorities dependent on whether only primary diagnosis or all diagnoses is analysed. This may be due to differences in primary care/outpatient service provision.**
- **Approximately 5% of people undergoing diagnostic testing for hepatitis C were positive between 2005 and 2010 with the highest proportion of positive tests in males aged 35 to 44 years. There has been a decline in the proportion of young people testing positive since 2005.**
- **Estimates of the population prevalence of hepatitis C by DAAT area show the highest levels in Lancashire, Manchester and Liverpool, reflecting the higher prevalence of injecting drug use in these areas.**
- **Injecting drug use is by far the main risk exposure accounting for over 70% of positive individuals; 65% of injecting drug users tested in the North West were hepatitis C positive compared to the national average of 49%. Reported sharing of needles and other drug use equipment has decreased since 2000 and there has been an increase in the proportion of drug users aware of their hepatitis C infection.**

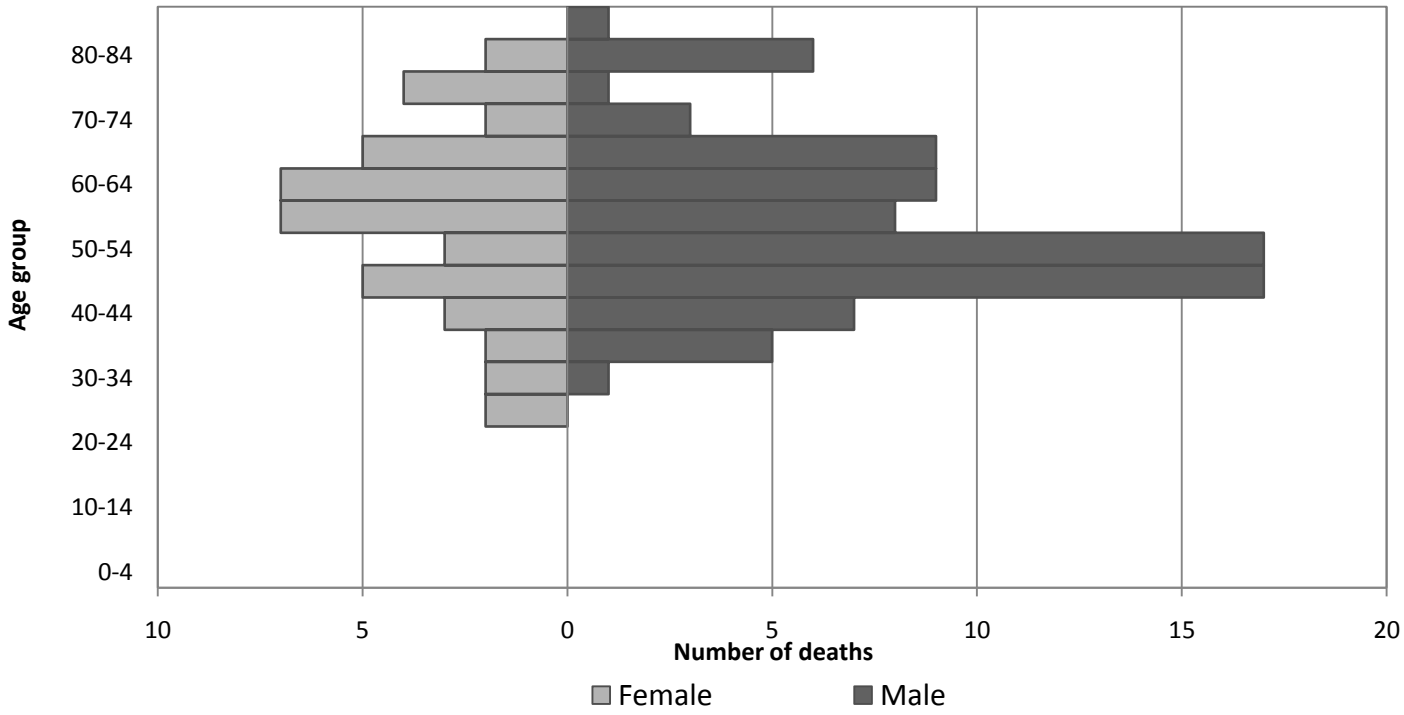
3.5.1 Mortality

In the North West the mortality from hepatitis C as an underlying cause, although relatively low compared to other liver disease, has been rising from 18 to 24 deaths between 2005 and 2010 (Figure 50). Although not statistically significant mortality from hepatitis C is higher in males than females. In males deaths are most common in those aged 45 to 54 years (n = 34) while for females it is more common in those aged 55 to 64 years (n = 14) (Figure 51). The low number of deaths due to hepatitis C should be interpreted with caution as death may be attributed to other co-factors such as alcohol-related liver disease.



Data source: Office of National Statistics

Figure 50: Mortality from hepatitis C (underlying cause) by gender, North West, 2005 to 2010



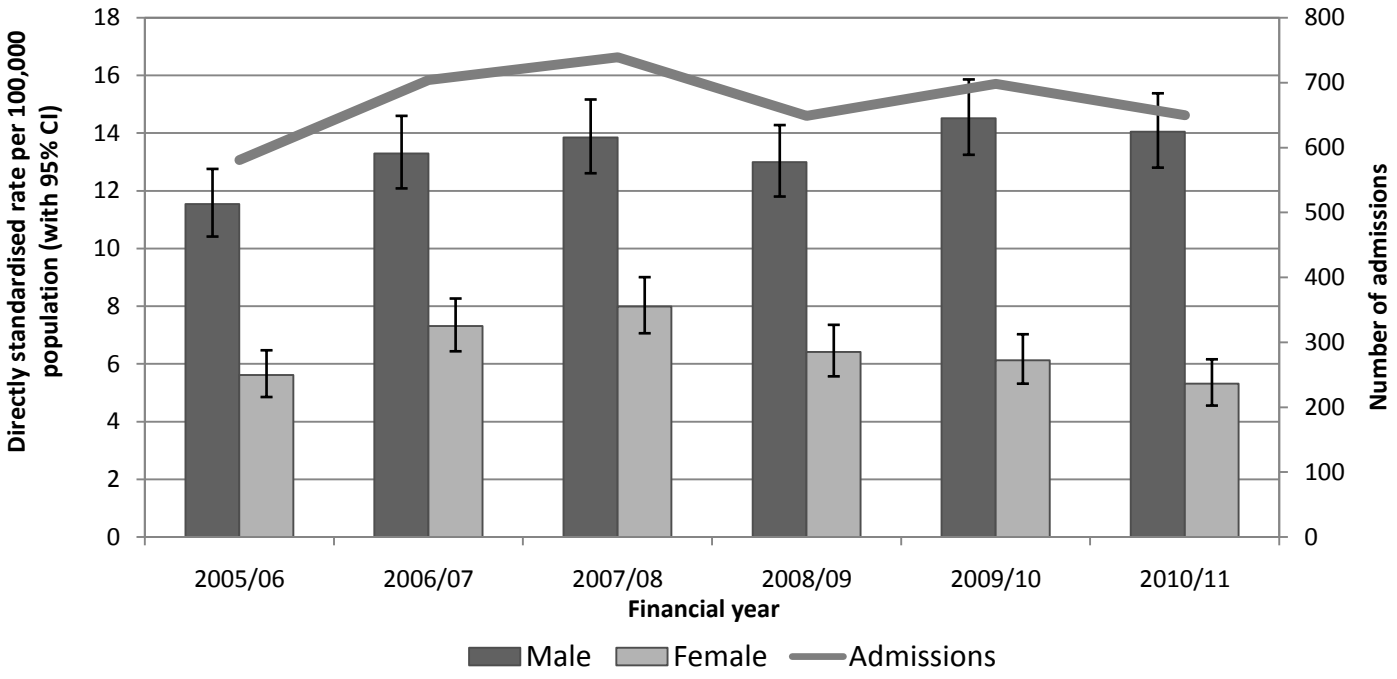
Data source: Office of National Statistics

Figure 51: Mortality from hepatitis C (underlying cause) by age and gender, North West, 2008 to 2010

3.5.2 Hospital Admissions

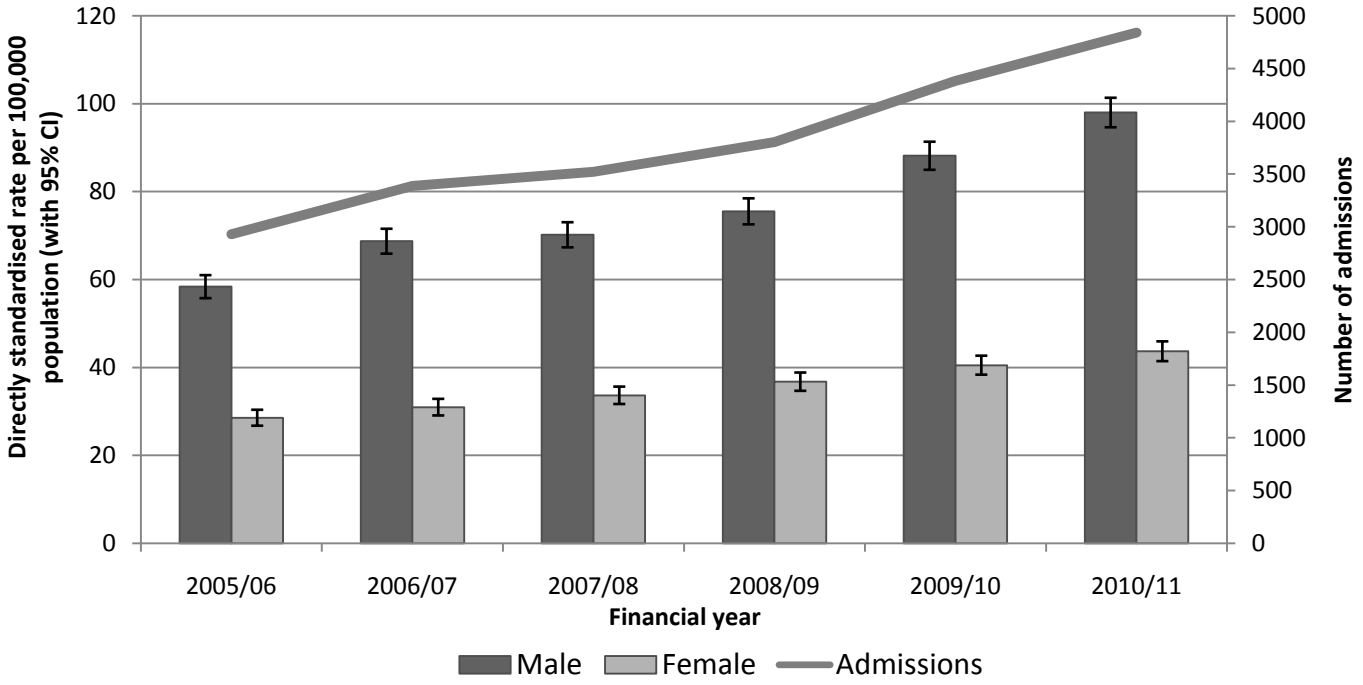
The number of primary diagnosis admissions for hepatitis C has fluctuated between 2005 and 2010; it was lowest in 2005 (n = 581) and at its highest in 2007 (n = 739) (Figure 52). In 2010 there was a significantly greater rate of hospital admissions for males (14.0 per 100,000 population) than females (5.3 per 100,000 population). All diagnoses includes

people who have been admitted for other reasons as a primary cause but also have hepatitis C infection as a diagnosis. The latter group may include admissions for complications of hepatitis C infection (such as cirrhosis) or those for unrelated conditions in people who are known to be infected. In the North West admissions for all diagnoses have risen since 2005 from 2,929 to 4,841 in 2010 (Figure 53). Again in 2010 males had a significantly greater rate of hospital admission (97.9 per 100,000 population) than females (43.7 per 100,000 population). All diagnoses admissions for hepatitis C are highest in males aged 40 to 49 years (n = 1,435) and females aged 35 to 44 years (n = 584) (Figure 54). The consistent increase in admissions for all diagnoses may be a reflection of better diagnosis of those with prevalent infections (see Section 3.5.3).



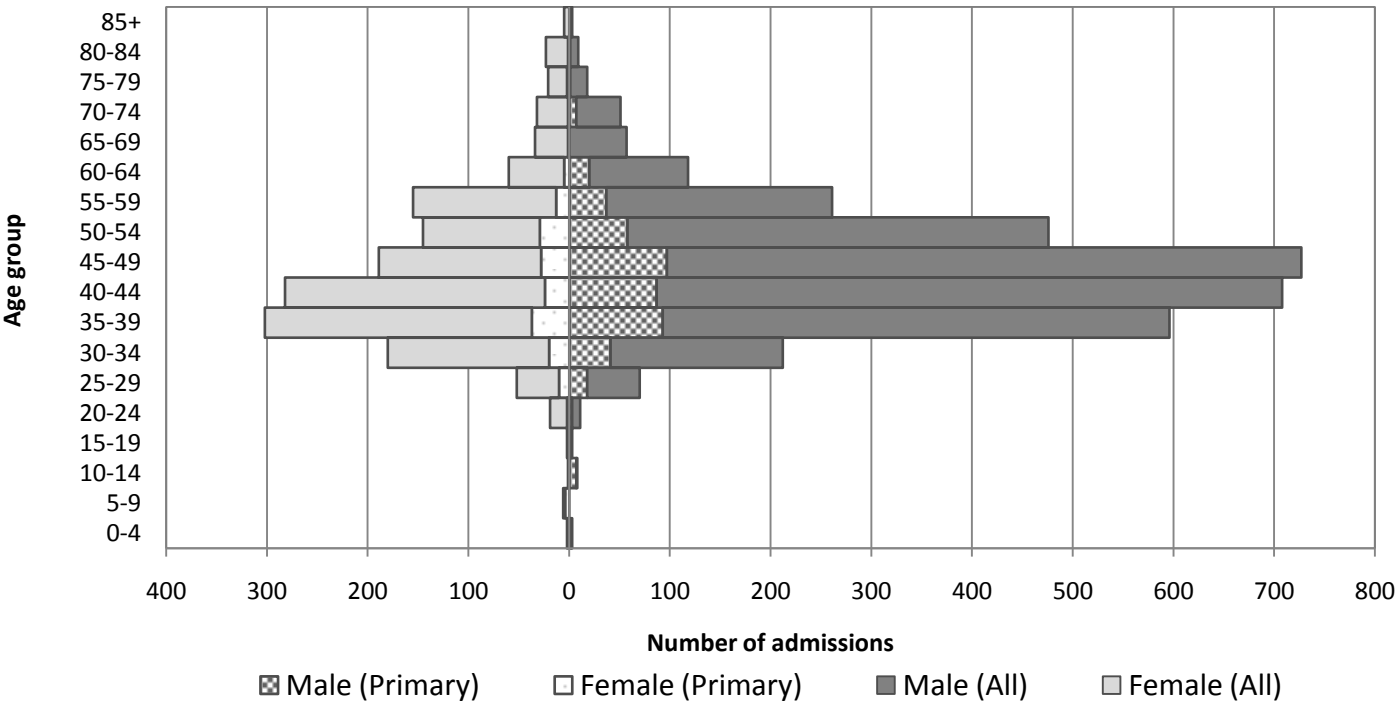
Data source: Hospital Episode Statistics

Figure 52: Hospital admissions for hepatitis C (primary diagnosis) by gender, North West, 2005/06 to 2010/11



Data source: Hospital Episode Statistics

Figure 53: Hospital admissions for hepatitis C (all diagnoses) by gender, North West, 2005/06 to 2010/11

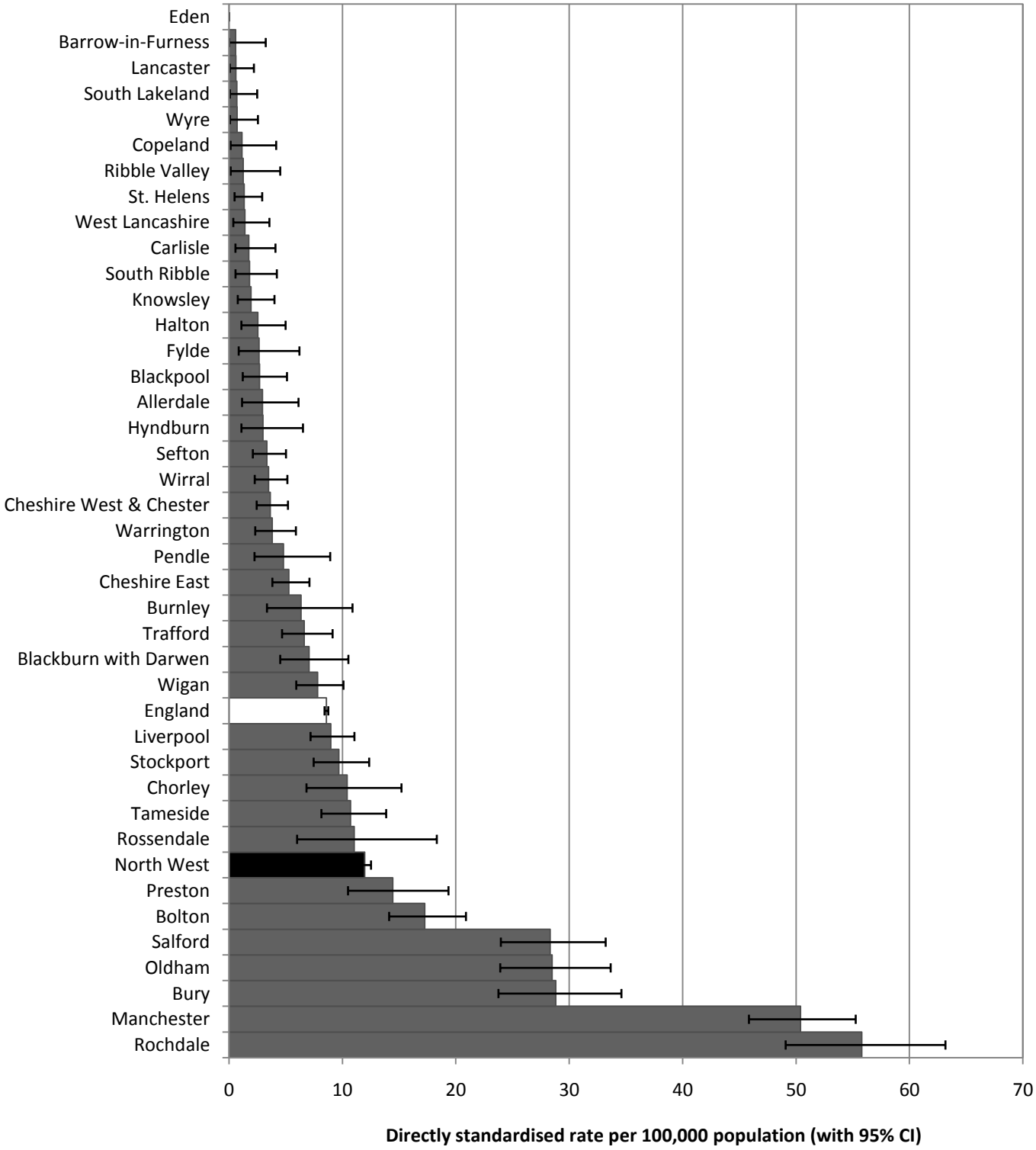


Data source: Hospital Episode Statistics

Figure 54: Hospital admissions for hepatitis C by age and gender, North West, 2010/11

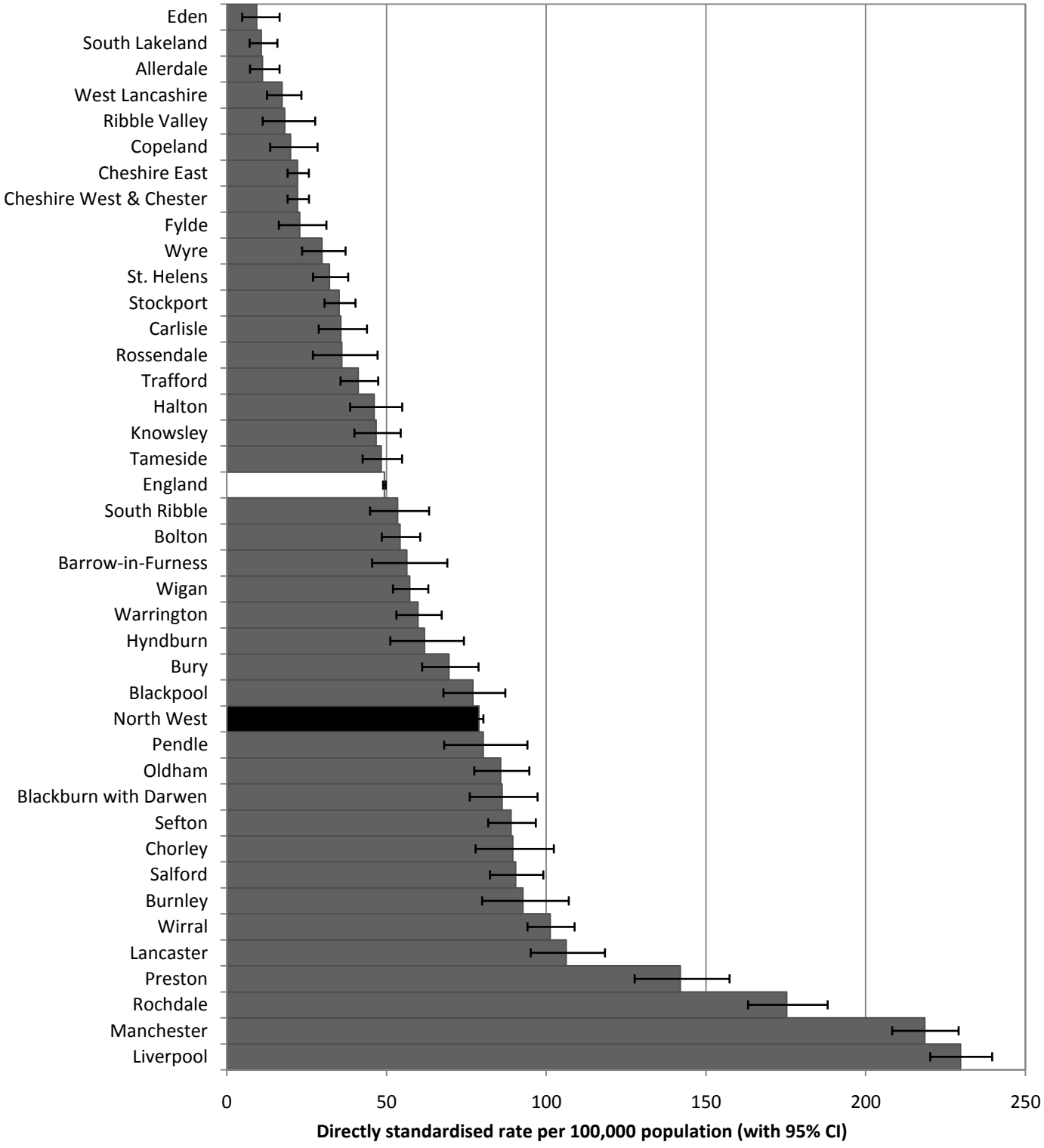
The North West has a significantly higher rate of admission for both hepatitis C as a primary diagnosis (11.9 per 100,000 population) and all diagnoses (78.9 per 100,000 population) than the England average (8.6 and 49.3 per 100,000 population respectively) (Figure 54 and 55). In the North West six local authorities had a higher rate of hospital admission for hepatitis C as a primary diagnosis than the North West average; rates in Rochdale (55.8 per 100,000

population) and Manchester (50.4 per 100,000 population) were significantly higher than any other local authority in the North West (Figure 55). Eight local authorities had a significantly higher rate of admission for hepatitis C all diagnoses than the North West average; rates in Liverpool (229.7 per 100,000 population) and Manchester (218.5 per 100,000 population) were significantly higher than any other local authority in the North West (Figure 56).



Data source: Hospital Episode Statistics

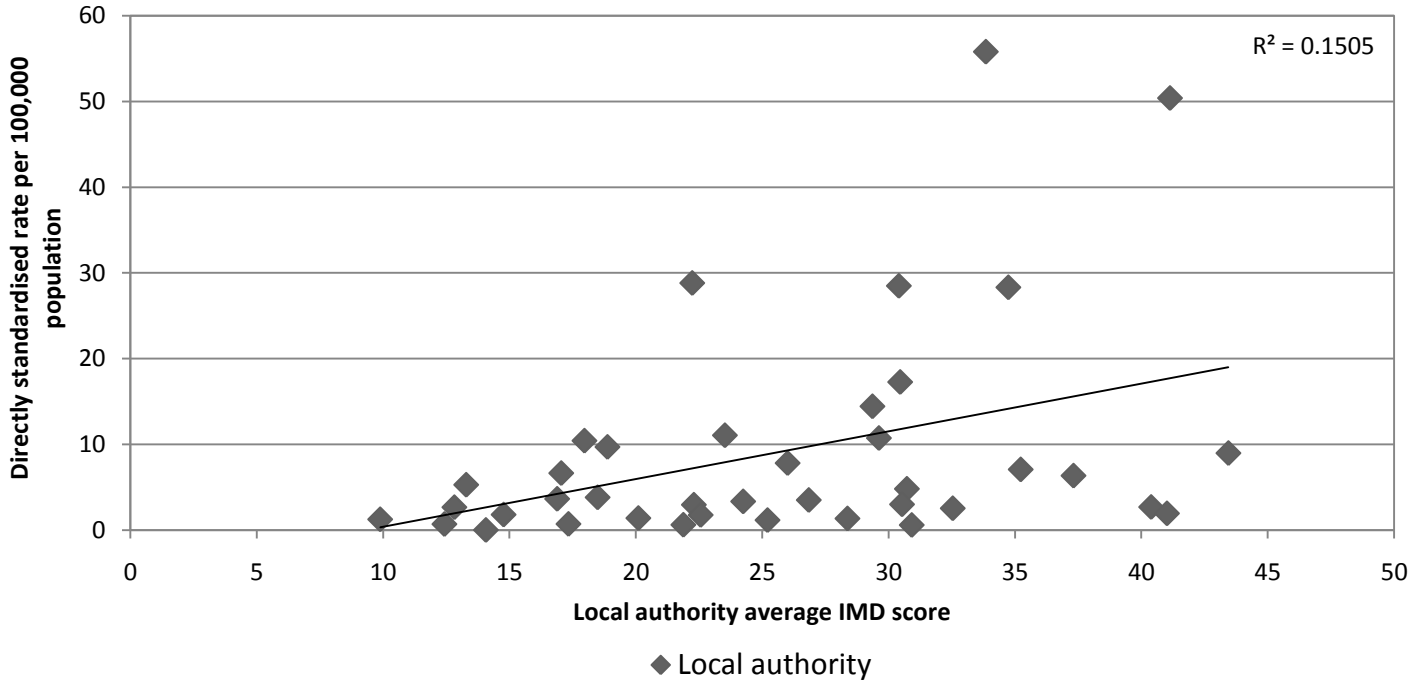
Figure 55: Hospital admission rates for hepatitis C (primary diagnosis) by local authority, North West, 2008/09 to 2010/11



Data source: Hospital Episode Statistics

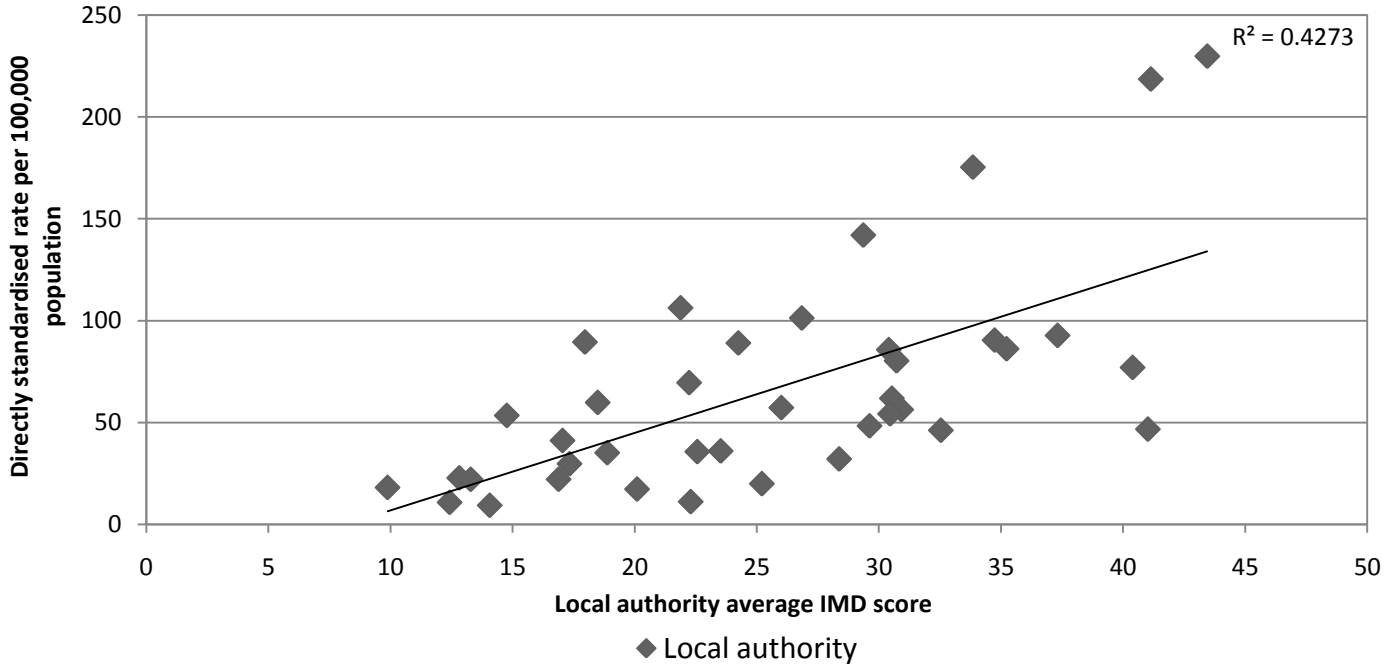
Figure 56: Hospital admission rates for hepatitis C (all diagnoses) by local authority, North West, 2008/09 to 2010/11 pooled

Figures 57 and 58 describe the relationship between deprivation and the number of hospital admissions for hepatitis C. For primary diagnosis, only 15% of the variability in hepatitis C admissions is explained by differences in deprivation. However, when all diagnoses are considered, the relationship between deprivation and hepatitis C admissions is stronger, with deprivation explaining 43% of the variability of admissions.



Data source: Hospital Episode Statistics

Figure 57: Hospital admission rates for hepatitis C (primary diagnosis) by local authority and IMD score, North West, 2008/09 to 2010/11 pooled



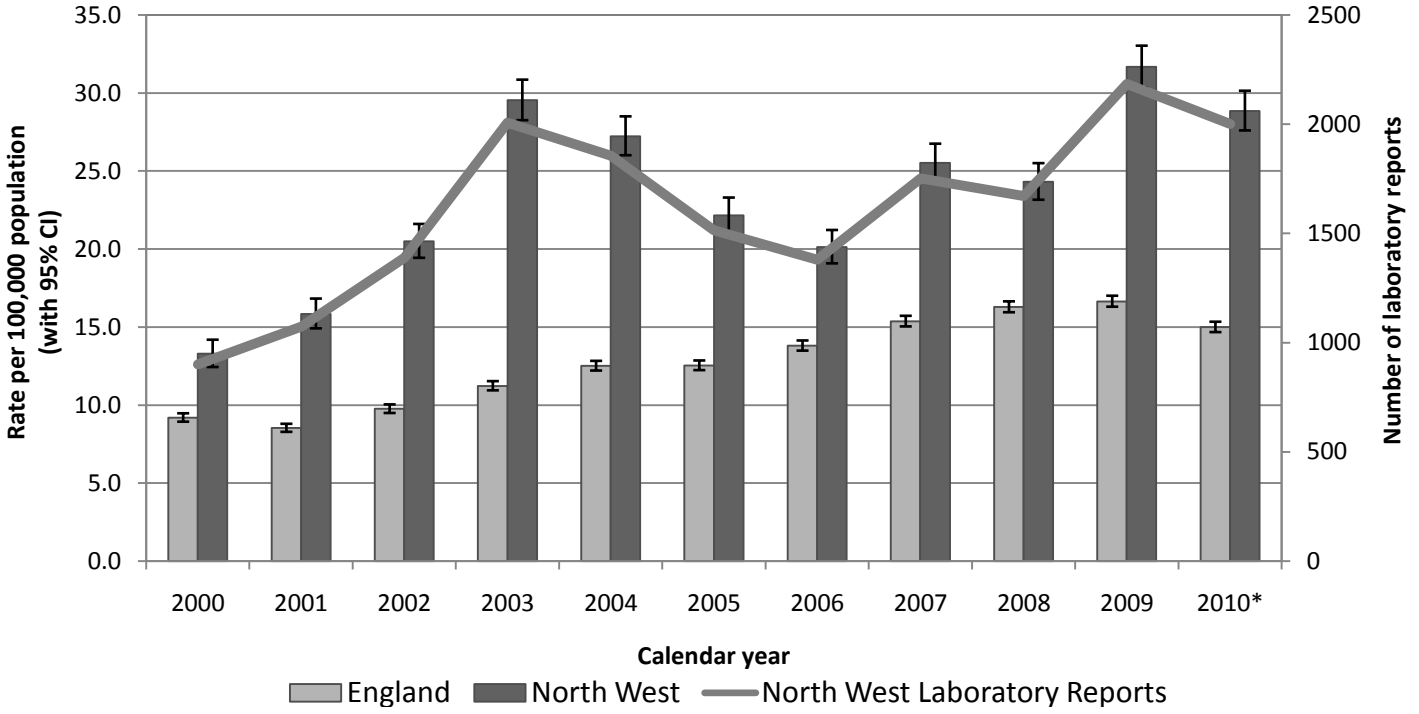
Data source: Hospital Episode Statistics

Figure 58: Hospital admission rates for hepatitis C (all diagnoses) by local authority and IMD score, North West, 2008/09 to 2010/11

3.5.3 Laboratory Reports of Diagnosed Infection and Sentinel Surveillance of Laboratory Testing for HCV

Between 2000 and 2010, laboratory reports of hepatitis C have almost doubled in England, and this was also the case in the North West. However, in line with national trends, confirmed laboratory reports of hepatitis C declined in 2010 by 8.4% compared to the previous year (falling from 2,185 to 2,001), suggesting that levels of diagnosis may have

plateaued. Figure 59 shows that since 2000 the North West has consistently had a significantly higher rate of hepatitis C laboratory reports compared to the England average. The North West has in fact had far greater numbers of laboratory reports of hepatitis C between 2000 and 2010 than any other region (6).

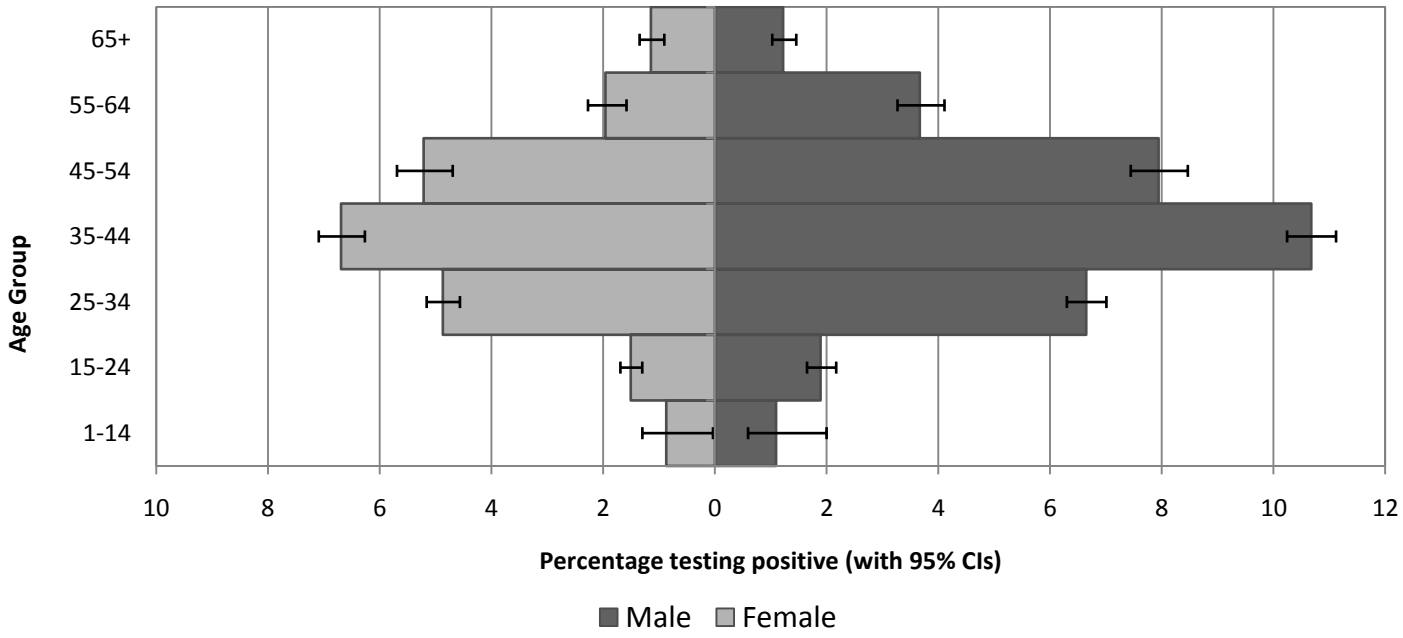


*Data for 2010 are provisional

Data source: Laboratory reports to Health Protection Agency, Centre for Infections

Figure 59: Rate and number of laboratory reports of hepatitis C infection, England and the North West, 2000 to 2010

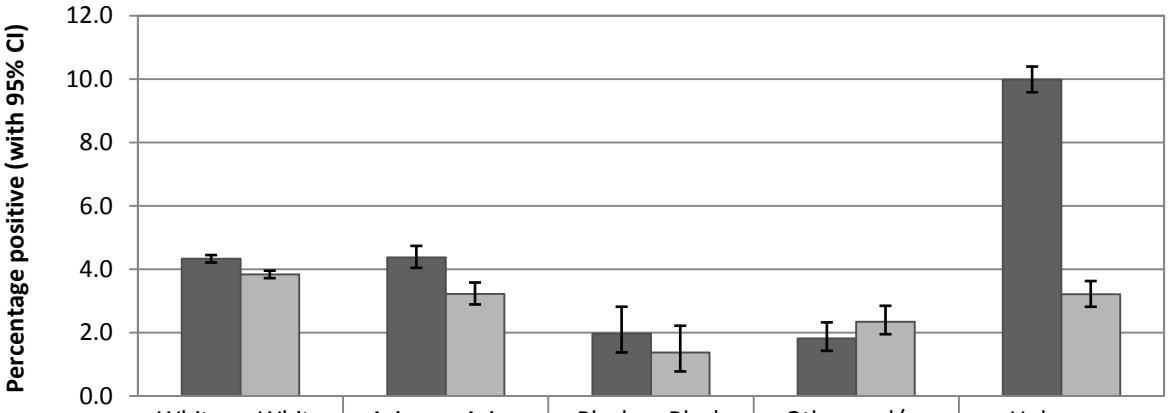
Laboratory sentinel surveillance identifies that between 2005 and 2010, 861,063 people in England were tested for hepatitis C infection of which 18% (154,076) were from the North West. In the North West approximately 5% (7,740) of tests were positive, this compares to 3.5% nationally. In the North West approximately equal numbers of men and women were tested but males contributed over three fifths (62%) of positive tests. Figure 60 shows that the highest proportion of positive tests was in males aged 35 to 44 years (10.7%). For females the highest proportion of positive tests was 35 to 44 year olds (6.7%). However, 25 to 34 year olds were the most tested group, accounting for 26% of tests in the North West.



Excludes individuals aged less than one year, in whom positive tests may reflect the presence of passively-acquired maternal antibody rather than true infection. All data are provisional.
Data Source: Sentinel surveillance of blood borne virus testing

Figure 60: Proportion of people testing positive for anti-HCV in five sentinel laboratories in the North West by age group and sex, 2005 to 2010

South Asians living in the UK are known to be at greater risk of hepatitis C, mainly due to infection in their country of origin before migrating to the UK. A combination of self-reported ethnicity, OnoMap (30) and NamPehchan (31) name analysis software were used to classify individuals tested for hepatitis C from sentinel laboratories as belonging to a broad ethnic group. Figure 61 shows that in both the North West and England, Asian or Asian British and White or White British ethnic group had a significantly greater proportion of positive tests compared to other ethnic groups. However, it should be noted that 14% of those tested in the North West and 22% of those tested in England were of unknown ethnicity.

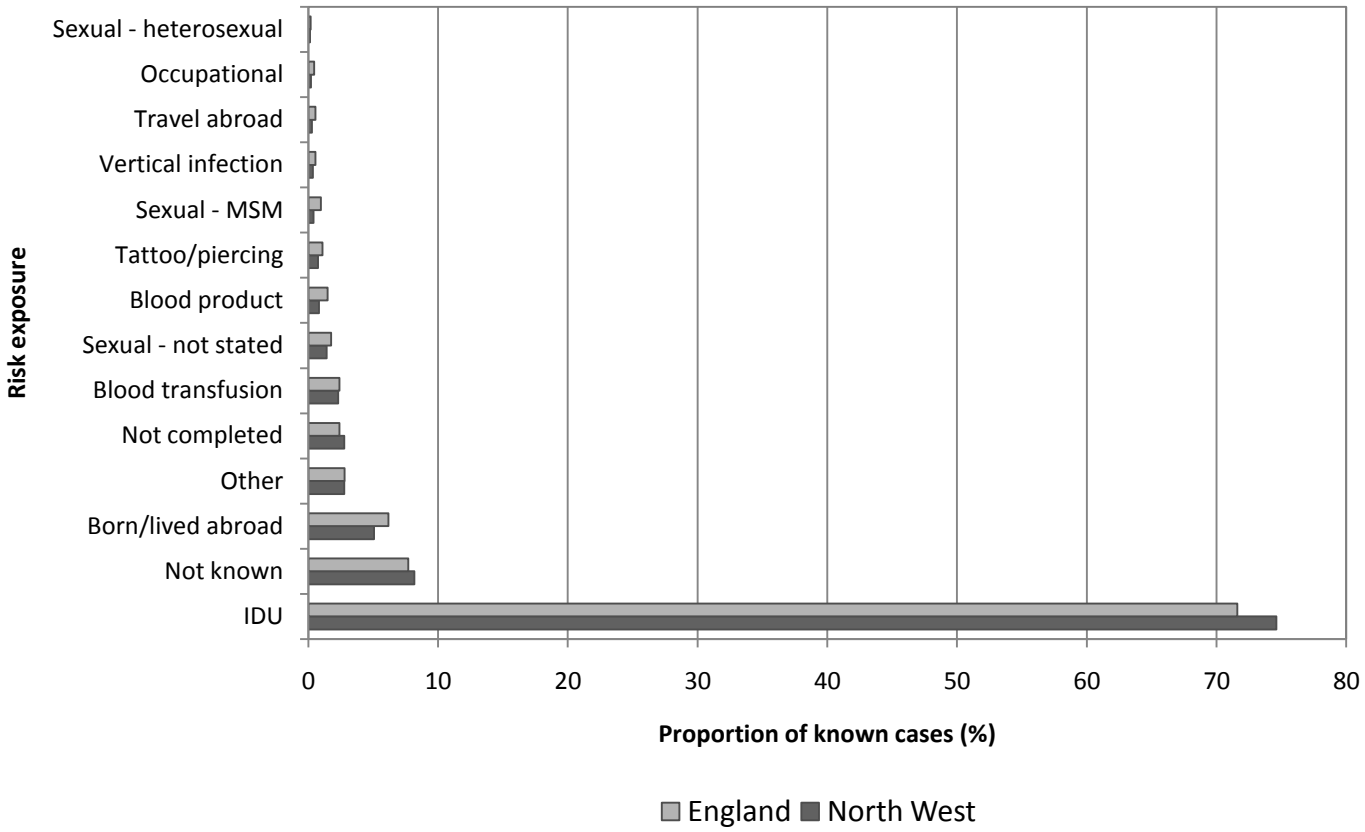


	White or White British	Asian or Asian British	Black or Black British	Other and/or Mixed ethnicity	Unknown ethnicity
North West % positive	4.3	4.4	2.0	1.8	10.0
England % positive	3.8	3.2	1.4	2.3	3.2
North West No. tested	114,795	13,408	1,470	3,458	20,945
England No. tested	539,585	90,719	16,390	21,570	192,799

Data for 2010 are provisional
Data Source: Sentinel surveillance of blood borne virus testing

Figure 61: Ethnicity of individuals tested and testing positive for anti-HCV in five and 22 sentinel laboratories in the North West and in England, 2005 to 2010

Sentinel questionnaire data shows that the main risk factor for transmission is unsafe sharing and use of injecting drug use equipment. This is particularly relevant for heroin users as they are more likely to inject than any other drug users (32). Figures for injecting drug use show that the North West had the highest estimated prevalence of opiate use across all regions in 2008/09 and was higher than the England average (33). Risk exposure data for England and the North West is available for relatively few individuals who tested positive for anti-HCV (n = 3,674; n = 1,481 respectively) between 2002 and 2006 (Figure 62). The data show that for both England and the North West injecting drug use was the main risk exposure (over 70%), this was slightly higher in the North West, perhaps representative of higher levels of opiate use.

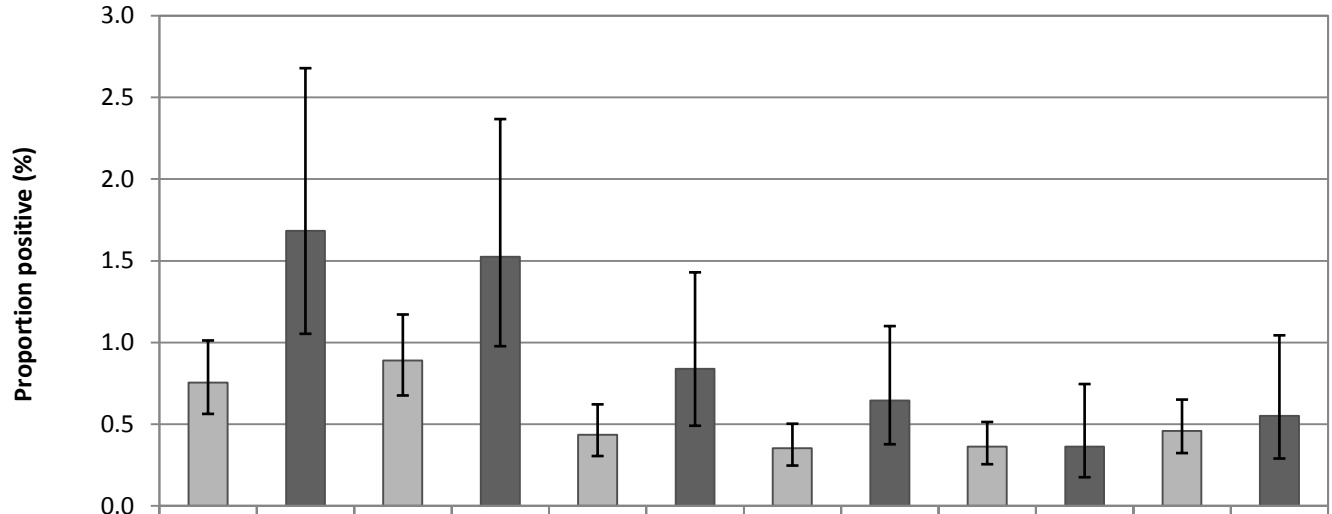


Data Source: Sentinel surveillance of blood borne virus testing – questionnaire data

Figure 62: Risk exposures for individuals testing positive for anti-HCV in five and 17 sentinel laboratories in the North West and England (from questionnaire data), January 2002 to August 2006

3.5.4 Proxy Incidence – Diagnoses in 15 to 24 Year Olds

There is no routine test for new hepatitis C infections and estimates of incidence are very difficult to obtain. Because most new infections are acquired via injecting drug use, which very often begins in early adulthood, the number of positive tests in young adults aged 15 to 24 years can be used as a proxy indicator of incidence (34). In the North West between 2005 and 2010 there has been a significant decline in young people aged 15 to 24 years testing positive for hepatitis C infection, decreasing from 1.1% to 0.6% in 15 to 19 year olds and 3.6% to 1.1% in 20 to 24 year olds (Figures 63 and 64). Over the same period there has been a marked increase in the number being tested in both England and the North West which may reflect an increase in awareness of hepatitis C and the need for being tested and a change in young people's drug use behaviour. In 2005 the North West had a significantly higher proportion of positive tests in young people compared to England, but the steep decline in the North West has meant that in 2010 the proportions were very similar, with no significant difference.



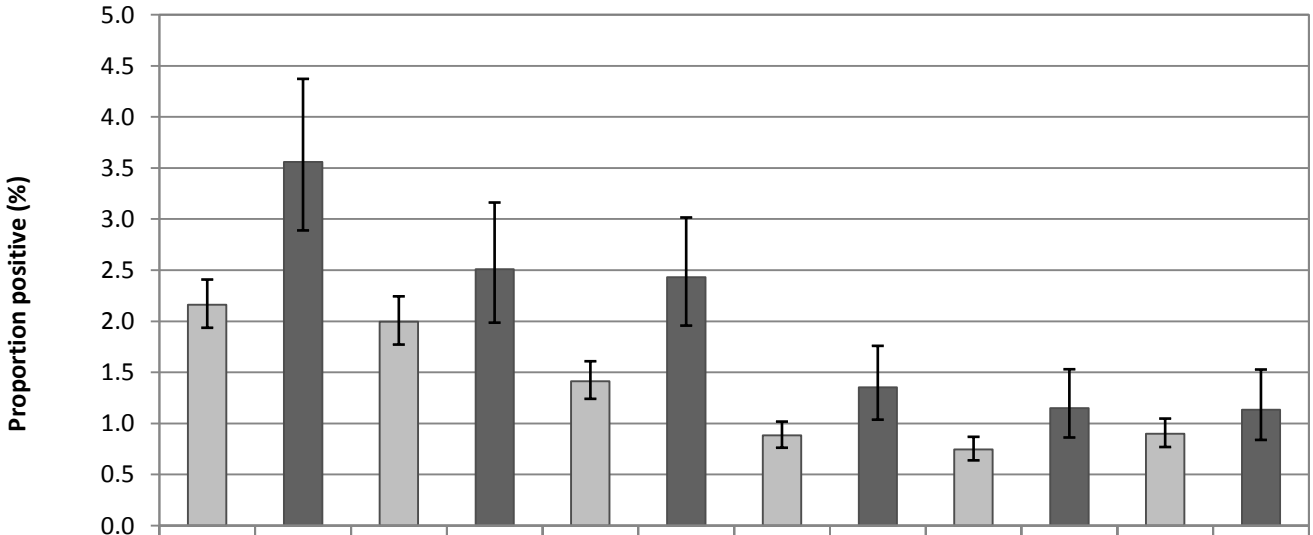
	England	North West	England	North West	England	North West	England	North West	England	North West	England	North West
	2005		2006		2007		2008		2009		2010	
Proportion positive	0.8	1.7	0.9	1.5	0.4	0.8	0.4	0.6	0.4	0.4	0.5	0.6
Number tested	5,824	1,010	5,616	1,247	6,882	1,550	8,505	2,015	8,555	1,932	6,753	1,633

*

Data for 2010 are provisional

Data Source: Sentinel surveillance of blood borne virus testing

Figure 63: Number of 15 to 19 year olds tested and testing positive for anti-HCV in five and 19 sentinel laboratories in the North West and England, 2005 to 2010



	England	North West	England	North West	England	North West	England	North West	England	North West	England	North West
	2005		2006		2007		2008		2009		2010	
Proportion positive	2.2	3.6	2.0	2.5	1.4	2.4	0.9	1.4	0.7	1.2	0.9	1.1
Number tested	14,622	2,417	13,530	2,750	15,909	3,289	20,625	3,992	21,567	3,997	17,792	3,704

Data for 2010 are provisional

Data Source: Sentinel surveillance of blood borne virus testing

Figure 64: Number of 20 to 24 year olds tested and testing positive for anti-HCV in five and 19 sentinel laboratories in the North West and England, 2005 to 2010

3.5.5 Future Burden

The HPA has used statistical modelling to estimate the future burden and the cost of treatment for hepatitis C (Table 2) (35). This information helps facilitate effective planning and commissioning of services. It is estimated that the number of people infected with hepatitis C in England is over 200,000, with the North West contributing 39,992 (20%). Lancashire Drug and Alcohol Action Team (DAAT) is estimated to have the greatest number of infected people (n = 5,711), followed by Manchester (n = 4,999) and Liverpool (n = 3,326). However, Lancashire DAAT covers over double the population of Manchester and Liverpool, areas where injecting drug use is higher. It is estimated that by 2015 almost 7% (n = 2,712) of the infected population in the North West will have died as a result of hepatitis C. The total cost of treating individuals already infected with hepatitis C is estimated at £29 million for the North West and £121 million for England. Additionally there is an estimated cost of £4 million for the North West and £20 million for England for treating cases that are not already receiving care.

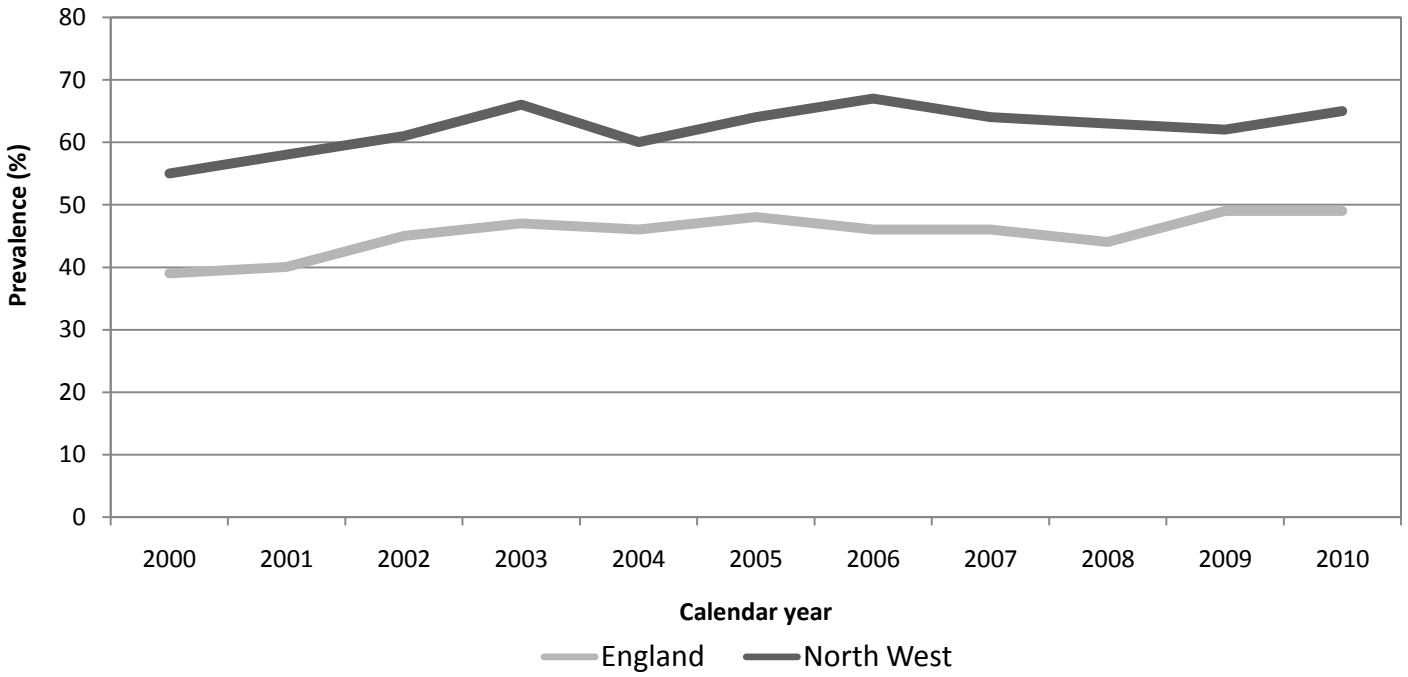
Table 2: Estimates of hepatitis C prevalence, burden, treatment and cost of treatment by Drug and Alcohol Action Team area in the North West

Drug and Alcohol Action Team area (DAAT)	Estimated total infected population	Estimated Burden in 2015			Estimated cost of treating those already identified	Estimated additional number requiring treatment	Estimated annual cost of treating additional cases
		Mild/ Moderate	Cirrhotic or end stage	Died			
Blackburn with Darwen	1,023	655	32	69	£742,728	11	£101,242
Blackpool	1,300	833	41	88	£943,758	14	£128,644
Bolton	1,838	1,177	58	125	£1,334,283	19	£181,877
Bury	822	527	26	56	£596,680	9	£81,334
Cheshire	2,608	1,671	82	177	£1,893,806	28	£258,146
Cumbria	2,578	1,652	81	175	£1,871,903	27	£255,160
Halton	631	404	20	43	£457,907	7	£62,418
Knowsley	817	523	26	55	£592,911	9	£80,820
Lancashire	5,711	3,659	180	387	£4,146,287	60	£565,183
Liverpool	3,326	2,131	105	226	£2,415,200	35	£329,218
Manchester	4,999	3,203	157	339	£3,629,544	53	£494,746
Oldham	1,365	874	43	93	£990,823	14	£135,060
Rochdale	1,473	944	46	100	£1,069,609	16	£145,799
Salford	1,345	862	42	91	£976,875	14	£133,158
Sefton	1,612	1,033	51	109	£1,170,438	17	£159,543
St. Helens	1,082	693	34	73	£785,671	11	£107,095
Stockport	1,135	728	36	77	£824,378	12	£112,372
Tameside	1,147	735	36	78	£833,080	12	£113,558
Trafford	891	571	28	60	£647,073	9	£88,203
Warrington	1,122	719	35	76	£814,271	12	£110,994
Wigan	1,510	968	48	102	£1,096,527	16	£149,468
Wirral	1,656	1,061	52	112	£1,202,224	17	£163,876
North West	**39,992**	**25,624**	**1,258**	**2,712**	**£29,035,977**	**422**	**£3,957,914**
England	**200,368**	**128,382**	**6,302**	**13,588**	**£121,445,201**	**2,116**	**£19,830,142**

Data Source: Commissioning template for estimating HCV prevalence by DAAT and numbers eligible for treatment, Health Protection Agency

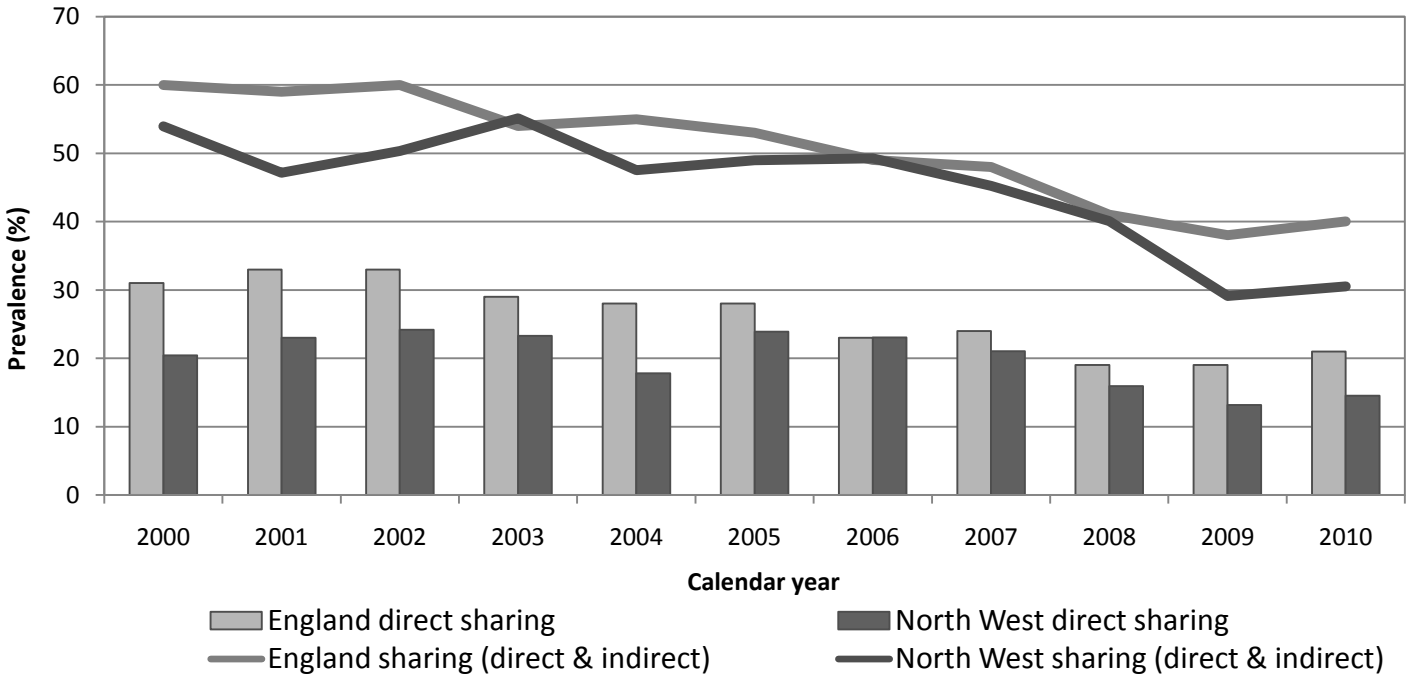
3.5.6 Hepatitis C in Injecting Drug Users

The HPA Unlinked Anonymised Monitoring Survey shows that the prevalence of anti-HCV infection in injecting drug users increased in both England (39% to 49%) and the North West (55% to 65%) between 2000 and 2010 (Figure 65). During the same time period there has been an indication that harm reduction interventions are beginning to take effect. Between 2000 and 2010 levels of direct sharing of needles had reduced in England (31 to 21%) and in the North West (20 to 15%) and all sharing (indirect sharing [containers, filters and water] combined with direct) has reduced from 60% to 40% in England and from 54% to 31% in the North West (Figure 66). Subsequently although sharing has decreased, prevalence has increased. This is likely to be due to the high prevalence prior to changes in sharing. Change in sharing behaviour may only have a marked impact on the incidence of new infections and therefore take some years to impact on prevalence.



Data Source: Unlinked Anonymous Monitoring Survey of people who inject drugs in contact with specialist services

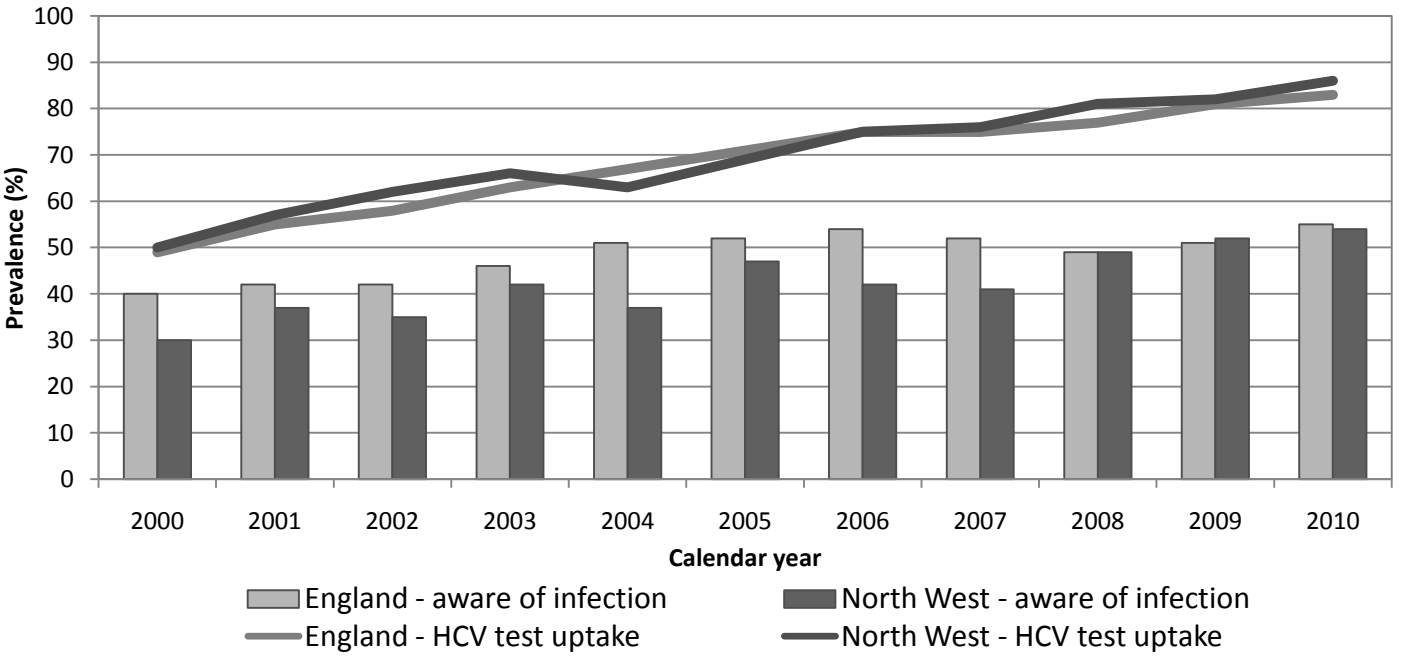
Figure 65: Anti-HCV prevalence amongst injecting drug users, North West and England, 2000 to 2010



Data Source: Unlinked Anonymous Monitoring Survey of people who inject drugs in contact with specialist services

Figure 66: Levels of sharing amongst injecting drug users, North West and England, 2000 to 2010

It is encouraging to see that between 2000 and 2010 there was an increase in voluntary confidential testing uptake both nationally (49% to 83%) and in the North West (50% to 86%), an indication that local drug intervention services are working (Figure 67).These services are also helping to increase the proportion of injecting drug users who are aware of their hepatitis C infection; rising from 40% to 55% nationally and 30% to 54% in the North West. Nevertheless there are still many injecting drug users in England and the North West (and many ex-injectors) who remain unaware of their infection.



Data Source: Unlinked Anonymous Monitoring Survey of people who inject drugs in contact with specialist services

Figure 67: Proportion aware of infection and HCV test uptake, North West and England, 2000 to 2010

3.6 Hepatitis B

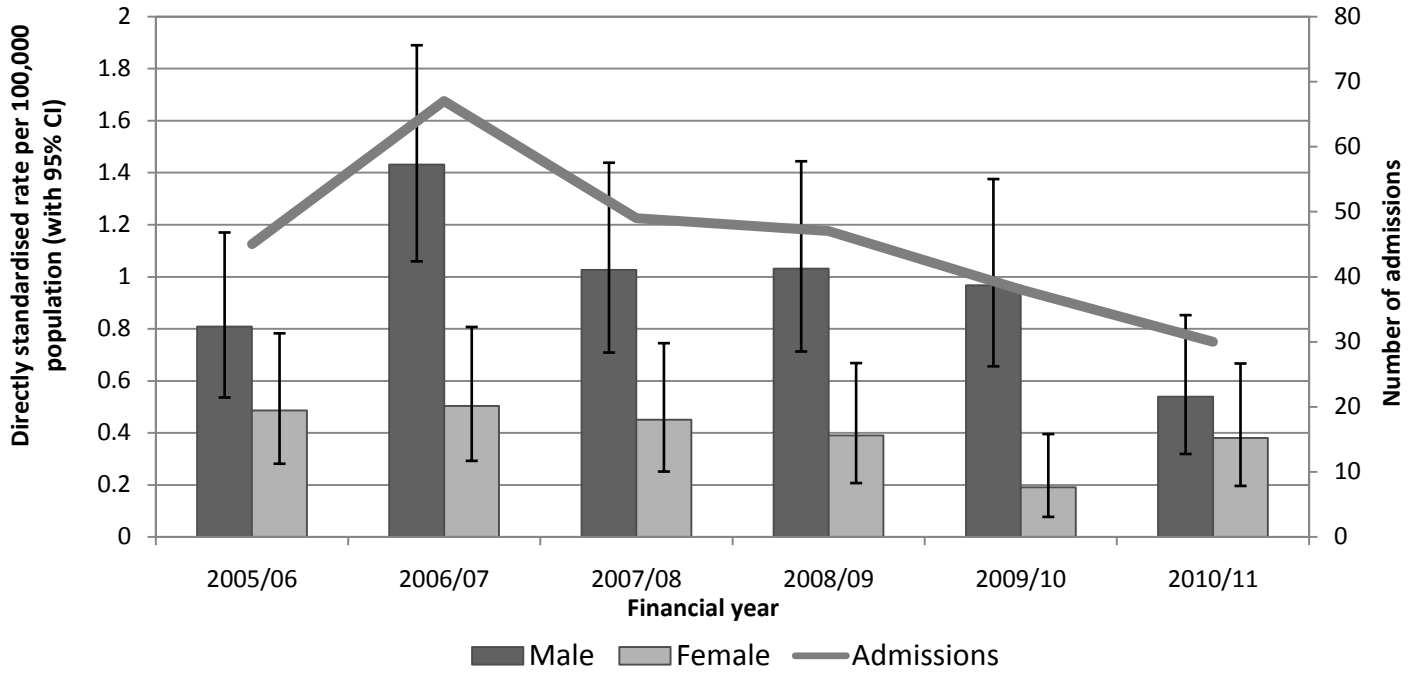
Hepatitis B is a blood borne viral infection which causes inflammation of the liver. It is transmitted through infected blood or body fluids by sharing needles or contaminated equipment during injecting drug use, by sexual contact with an infected person, by mother to baby (perinatal) transmission, by needle-stick injuries or by tattooing or body piercing (36). The first six months of infection is known as acute hepatitis B infection; failure to clear the virus after this leads to chronic infection. Most adults infected with hepatitis B virus fully recover and develop life-long immunity. However, infection in babies and young children is likely to result in chronic infection (90% of infants infected in the first year of life and 30% to 50% of children infected between one and four years of age) (37). Chronic infection can lead to liver cirrhosis and hepatocellular carcinoma (36). People with hepatitis B can often be asymptomatic and may therefore be unaware of their infection. Although hepatitis B is relatively uncommon in England prevalence is higher in those born in certain countries (South East Asia, China and Africa) many of whom will have acquired infection at birth or in early childhood (7, 36, 37). In the UK, hepatitis B vaccine is recommended for groups at risk of infection including injecting drug users and family contacts of an individual with hepatitis B infection (38). This section of the report describes the burden of, and risk factors for, hepatitis B using a number of data sources, including: laboratory surveillance; survey of injecting drug users; hospital admissions and mortality. No data on hepatitis B deaths are provided because the numbers are so small; in the North West in 2010 there were only 11 deaths reported with an underlying cause of hepatitis B.

Summary

- **Hospital admissions for hepatitis B in the North West have declined since 2006/7.**
- **Laboratory reports of acute infection declined between 2008 and 2010; most acute cases were among men aged 35-44 years.**
- **Limited data on risk factors suggest that sexual exposure accounts for most transmission of acute infection.**
- **Approximately 1.7% of people tested in the North West were hepatitis B positive between 2005 and 2010; the proportion of antenatal women tested who were positive has remained stable since 2005; the highest proportion of those positive was in Greater Manchester.**
- **The proportion of those tested who were positive in the North West between 2005 and 2010 were higher in people who were Other and/or Mixed Ethnicity (11.8%), Black or Black British ethnicity (8.5%) and Asian or Asian British ethnicity (2.8%) compared to White or White British ethnicity (0.9%).**

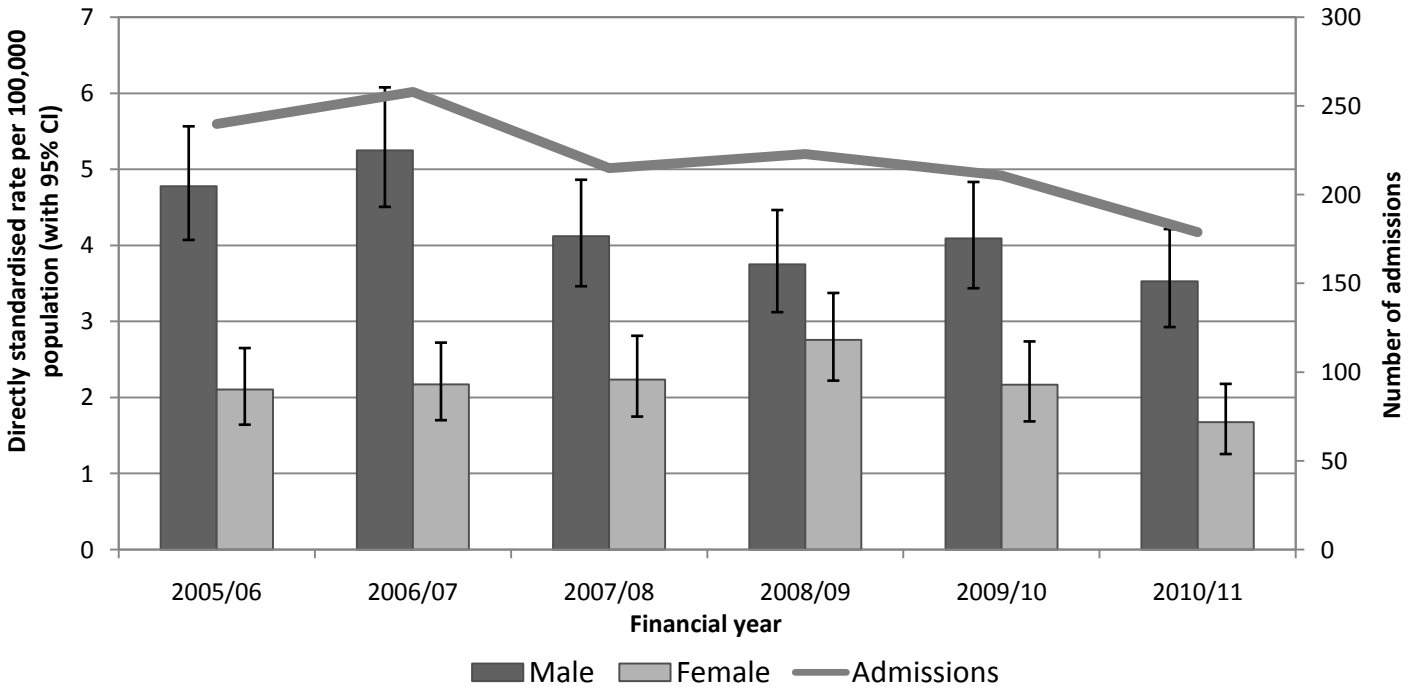
3.6.1 Hospital Admissions

Data on hospital admissions for hepatitis B are presented in Figures 68 and 69 for primary diagnosis and all diagnoses respectively. Taking into account the 95% confidence intervals, the rate of admissions for males has remained relatively stable between 2005/06 and 2010/11, following a rise between 2005/06 and 2006/07. The rate of admissions for females has also remained stable during this time. The number of admissions for hepatitis B as the primary diagnosis has fallen from 67 in 2006/07 to 30 in 2010/11. Similar patterns are observed in Figure 69. The total number of admissions with hepatitis B in all diagnoses also fell from 258 in 2006/07 to 179 in 2010/11.



Data source: Hospital Episode Statistics

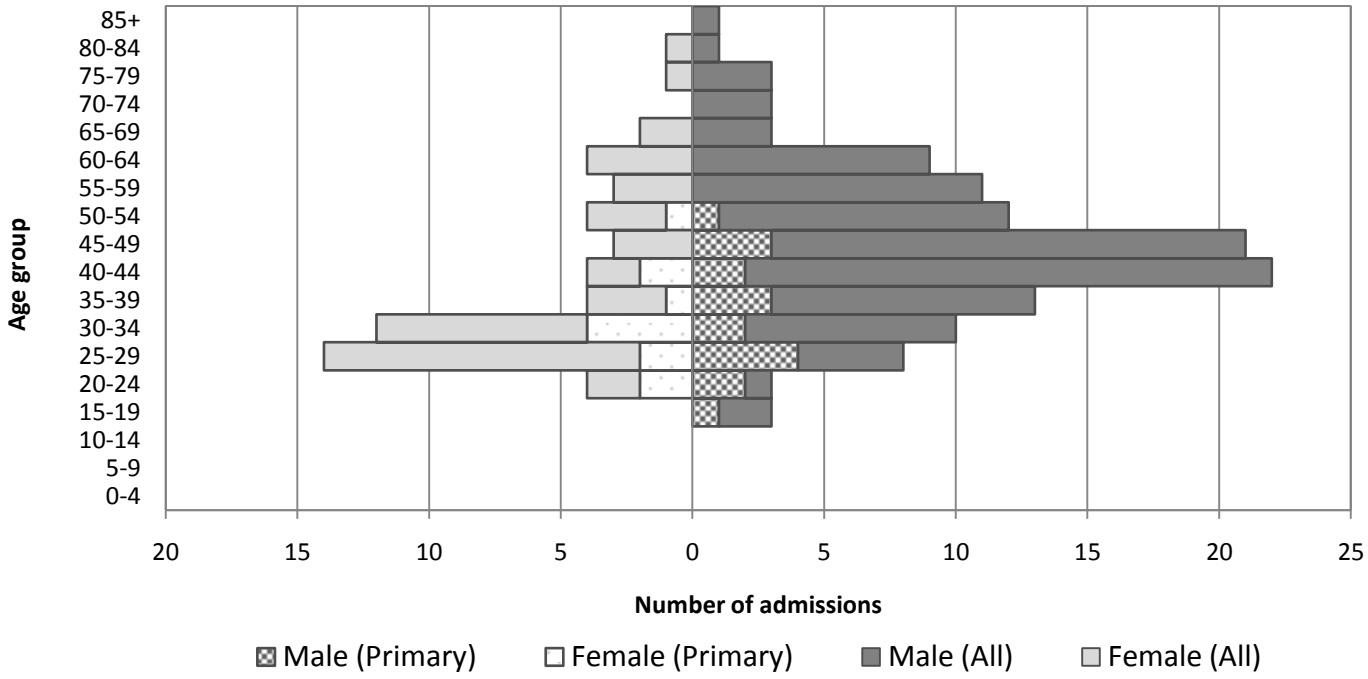
Figure 68: Hospital admissions for hepatitis B (primary diagnosis) by gender, North West, 2005/06 to 2010/11



Data source: Hospital Episode Statistics

Figure 69: Hospital admissions for hepatitis B (all diagnoses) by gender, North West, 2005/06 to 2010/11

A breakdown of hospital admissions for hepatitis B by age and gender is given in Figure 70. The peak in hospital admissions for hepatitis B occurs at a younger age among females than among males, although the small numbers means it is not possible to draw any strong conclusions.



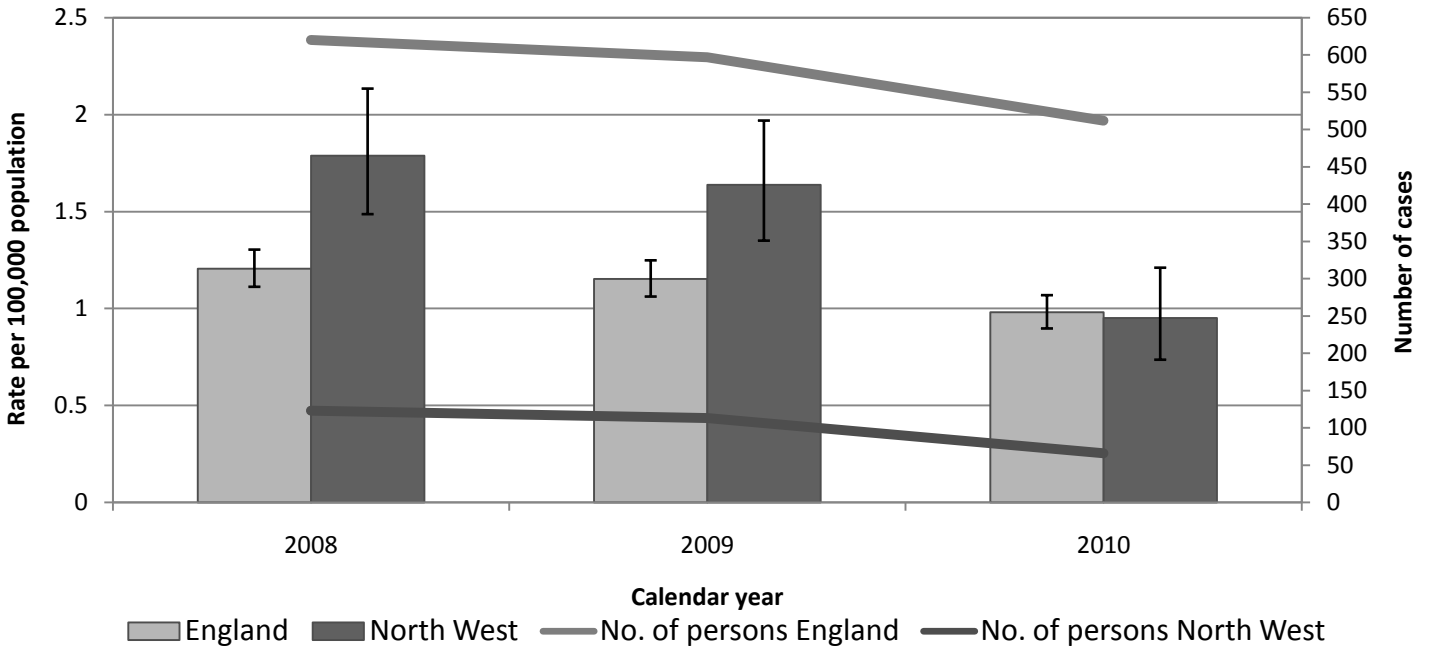
Data source: Hospital Episode Statistics

Figure 70: Hospital admissions for hepatitis B by age and gender, North West, 2010/11

3.6.2 Acute Infection/Incidence

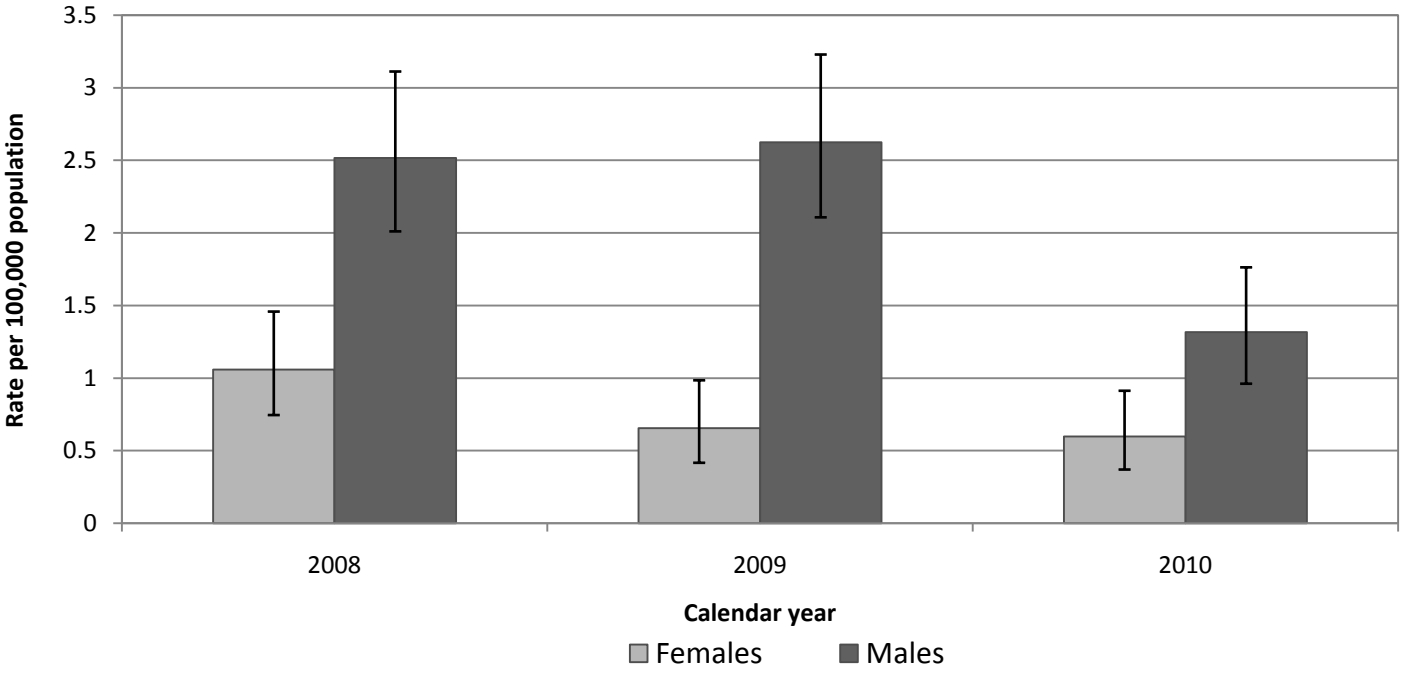
Reports of acute hepatitis B[3] to the HPA show that from 2008 to 2010 the number of acute cases fell by 17% (620 to 512) in England and 46% (123 to 66) in the North West (Figure 71). In the North West males were significantly more likely than females to be infected with acute hepatitis B (Figure 72).

[3] Data presented for acute hepatitis B include: laboratory confirmed acute cases; and a small proportion of probable acute cases (those classified as acute but without anti-HBc IgM results, or not classified but with positive anti-HBc IgM were assumed to be probable acute cases).



Data source: Laboratory reports to Health Protection Agency, Centre for Infections and reports through Health Protection Unit surveillance systems

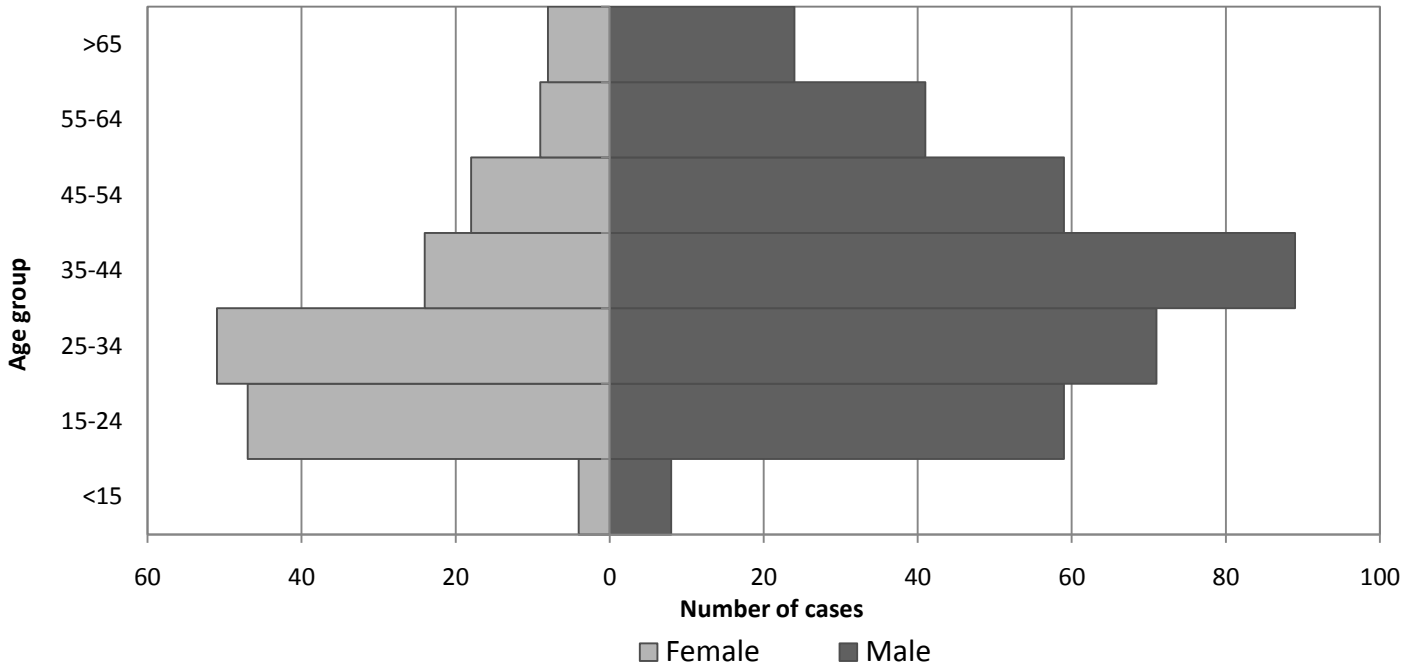
Figure 71: Acute hepatitis B cases, North West and England, 2008 to 2010



Data source: Laboratory reports to Health Protection Agency, Centre for Infections and reports through Health Protection Unit surveillance systems

Figure 72: Acute hepatitis B cases by gender, North West, 2008 to 2010

Due to low numbers of acute hepatitis B cases the North West age group analysis has been conducted at the England level for 2010. The majority of acute hepatitis B cases were men (69%; n = 351) and men aged 35 to 44 years had the highest number of cases (n = 89) (Figure 73). Acute hepatitis B in children remains at a low level with only 2% of cases among those under 15 years of age.

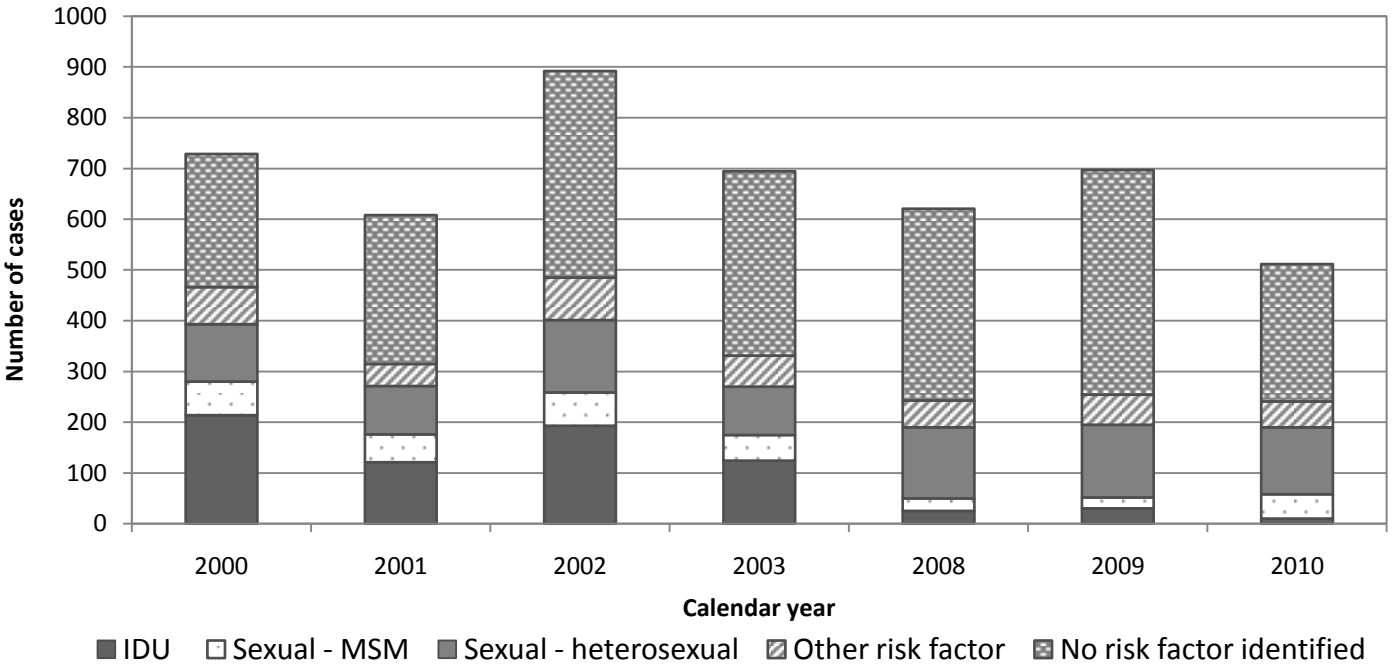


Data source: Laboratory reports to Health Protection Agency, Centre for Infections and reports through Health Protection Unit surveillance systems

Figure 73: Acute hepatitis B cases by age and gender, England, 2010

Ethnic group analysis shows that in England only 133/512 (26%) of acute hepatitis B cases had their ethnicity recorded. The majority of these were White (55%), followed by Black or Black British (14%) and Asian or Asian British (13%).

Risk factor information on acute hepatitis B cases should be interpreted with caution as in 2010 out of the total 512 acute and probable acute cases of hepatitis B in England, only 241 (47%) had associated exposure information. However, where information was available the commonest probable route of exposure was heterosexual exposure, implicated in 132 cases (55%), followed by men who have sex with men in another 48 (20%) (Figure 74). Only 10 (2%) of the cases with known exposure were attributed to injecting drug use. The implication of injecting drug use as an exposure route has decreased since 2000 when it was associated with 214 (46%) cases, but heterosexual exposure has increased from 113 (24%) cases in 2000. Risk factor information on acute hepatitis B cases for the North West shows similar exposure routes to England in 2010 but figures are too small to report here.



No information was collected 2003 to 2007.

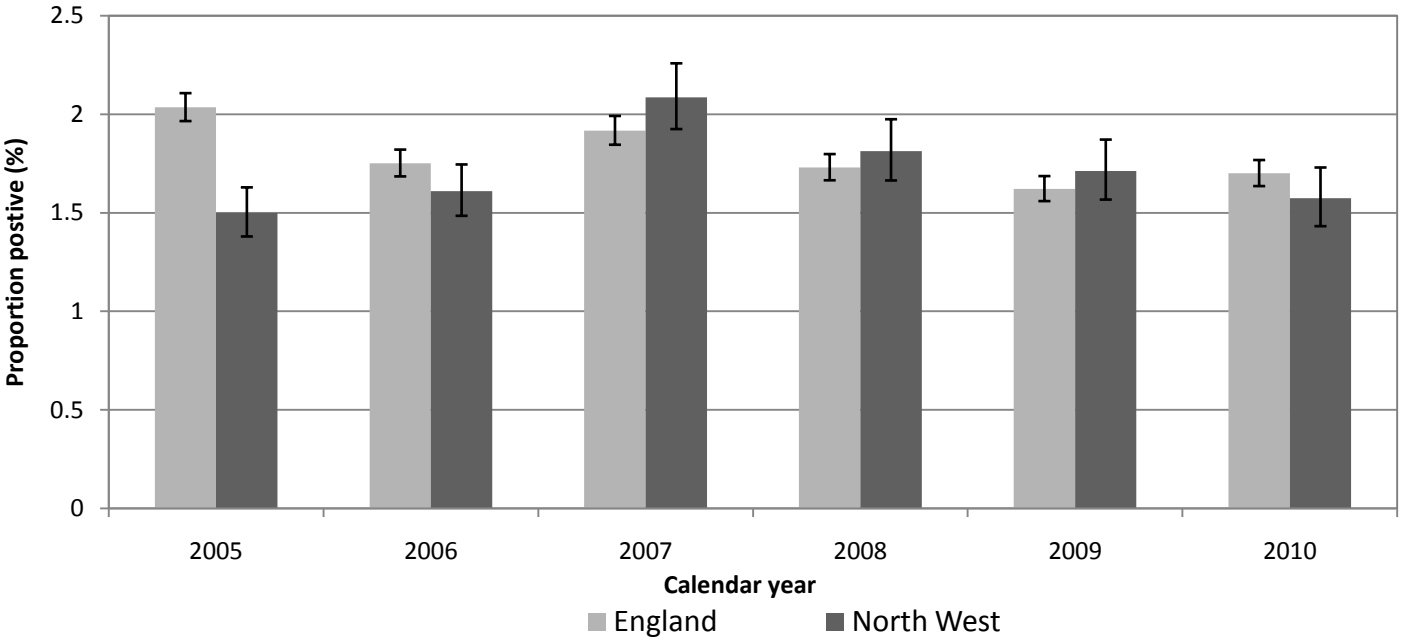
Data source: Laboratory reports to Health Protection Agency, Centre for Infections and reports through Health Protection Unit surveillance systems

Figure 74: Acute hepatitis B cases by risk group, England, 2000 to 2010

3.6.3 Chronic Infection/Prevalence

Distinction between acute and chronic infection via routine laboratory reports was problematic for several years; however classification has now improved, with the proportion with unknown diagnosis in the North West dropping from 65% in 2008 to 8% in 2010. In 2010 there were 168 laboratory reports of chronic hepatitis B infection in the North West. The majority of these reports were for males (61%), and 0.6% of total cases, were under 15 years of age.

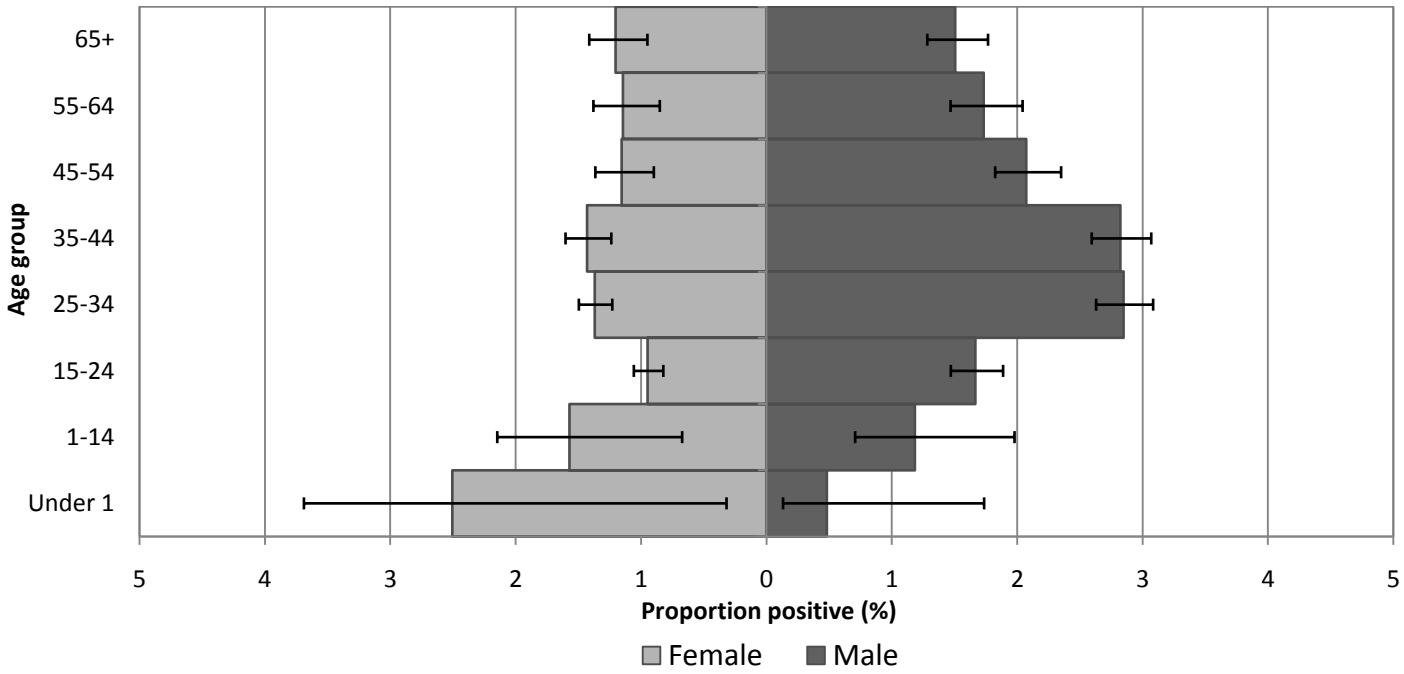
Laboratory sentinel surveillance identifies that in England between 2005 and 2010 878,054 people were tested for hepatitis B infection, the North West contributed 21% (n = 184,057) of these tests. In the North West approximately 1.7% (n = 3,134) of tests were (HBsAg) positive; this proportion was the same nationally. The proportions of those tested who were positive increased in the North West between 2005 and 2007 and subsequently decreased (Figure 75)



Data source: Sentinel surveillance of blood borne viruses

Figure 75: Proportions of individuals testing positive (HBsAg), excluding antenatal testing in five and 19 sentinel laboratories in the North West and England, 2005 to 2010

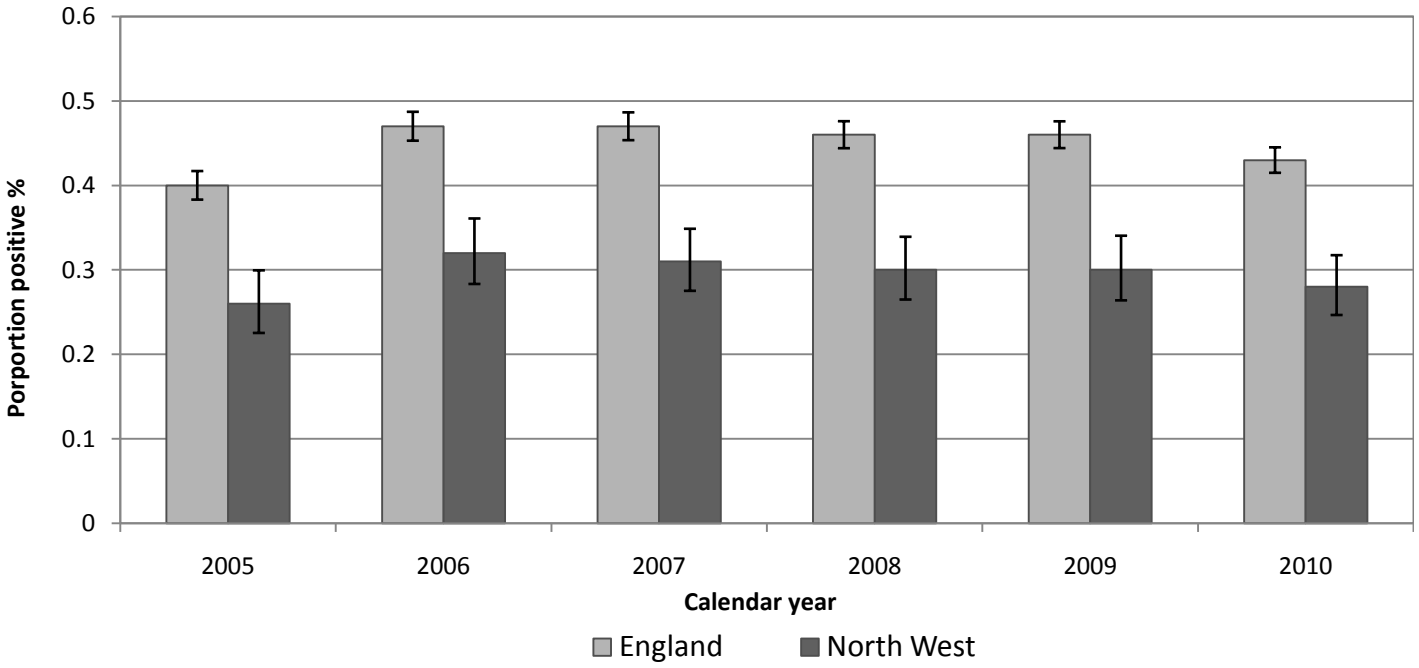
In the North West approximately equal numbers of men and women were tested between 2005 and 2010 but males contributed over three fifths (61%) of positive tests. Figure 76 shows that the highest proportion of positive tests were in males aged 25 to 34 years (2.8%). For females the greatest proportion of positive tests were in those aged under 1 years (2.5%) and 25 to 34 years (1.4%). The 25 to 34 age group was also the most tested group, accounting for 28% of tests in the North West.



Excludes dried blood spot, oral fluid, reference testing, and testing from hospitals referring all samples. Data are de-duplicated subject to availability of date of birth, soundex and first initial. All data are provisional.
Data source: Sentinel surveillance of blood borne viruses

Figure 76: Age and gender of individuals tested and testing positive for HBsAg in five sentinel laboratories in the North West (excluding antenatal screening), 2005 to 2010

Laboratory surveillance under-confirms cases because it may not identify asymptomatic infection; also numbers reported reflect medical practice and access to healthcare. Information from routine surveillance is combined with data from screening to better infer prevalence. All women receiving antenatal care are offered hepatitis B testing and Figure 77 shows that the proportions testing positive are lower in the North West than nationally and that they have remained stable in recent years. Within the North West, the proportion of women testing positive is highest in Greater Manchester (0.44% in 2010) (39).

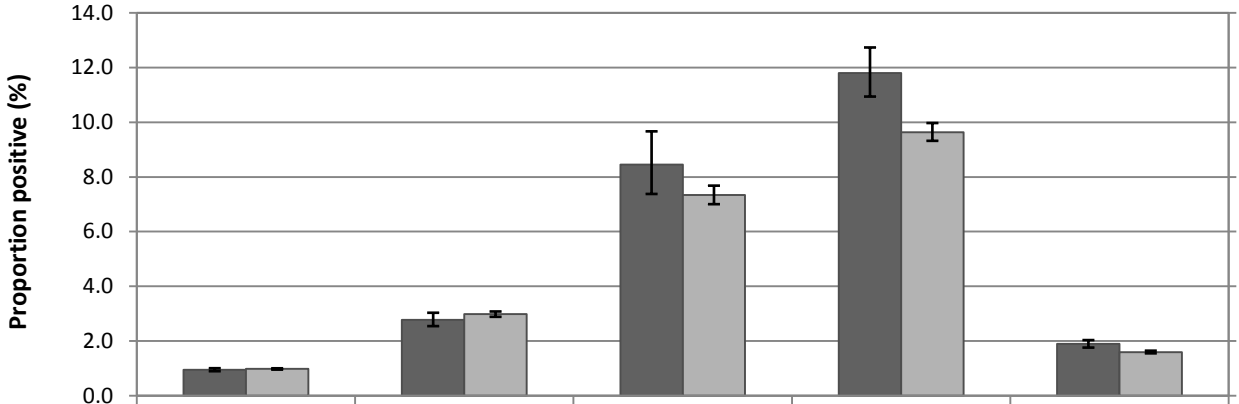


Data source: National Antenatal Screening Monitoring, Health Protection Agency

Figure 77: Proportion of antenatal women testing positive for hepatitis B (HBsAg) in the North West and in England, 2005 to 2009

The majority of chronic hepatitis B infections in the UK are among migrants from a country with an intermediate or high prevalence of chronic hepatitis B, who are likely to have acquired infection in childhood. Rates of chronic infection, and therefore the largest burden of disease, are highest among people born in Africa and Asia (7).

Data on ethnicity and/or country of birth among people with chronic hepatitis B infection are not routinely available. However, a combination of self-reported ethnicity, OnoMap (30) and NamPehchan (31) name analysis software were used to classify individuals reported as HBsAg positive from sentinel laboratories as belonging to a broad ethnic group. Figure 78 shows that in both the North West and England cases classified as Other and/or Mixed ethnicity and Black or Black British had a significantly greater proportion of positive tests compared to other ethnic groups. However, it should be noted that 20% of those tested in the North West and 24% of those tested in England were of unknown ethnicity.



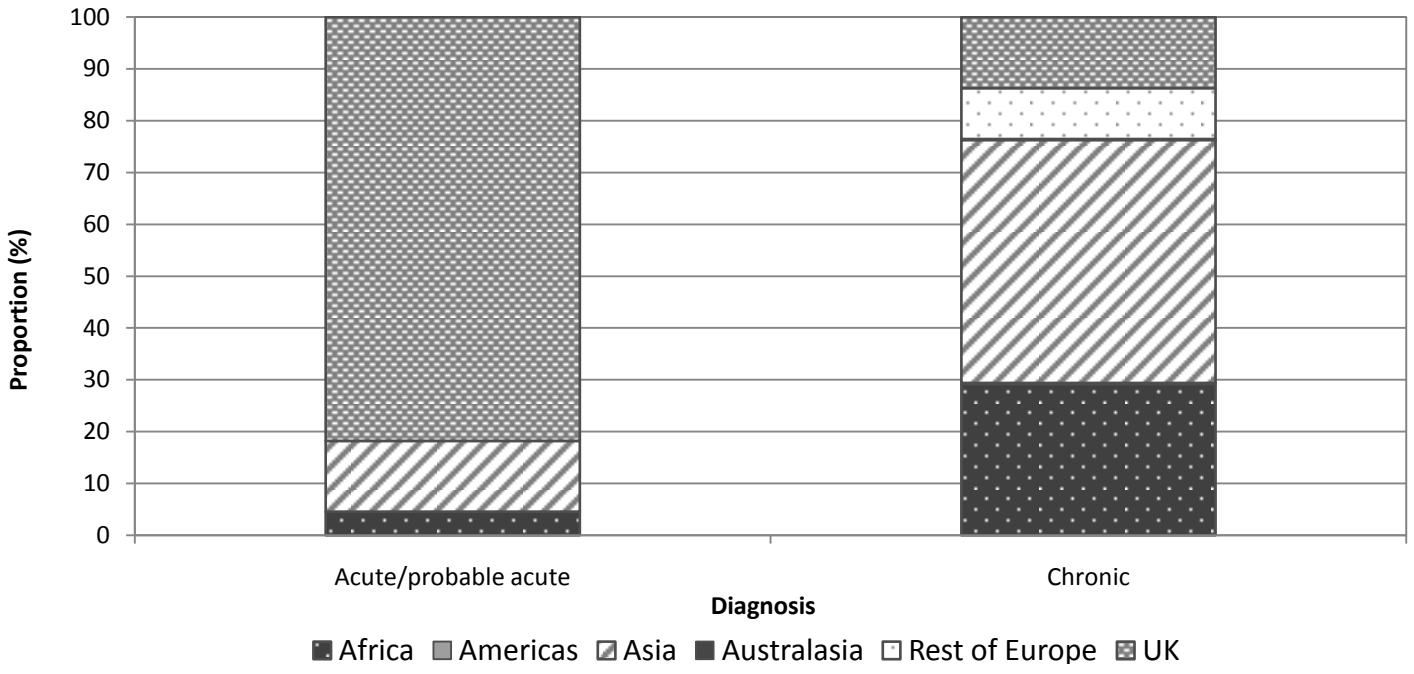
	White or White British	Asian or Asian British	Black or Black British	Other and/or Mixed ethnicity	Unknown ethnicity
North West % positive	0.9	2.8	8.5	11.8	1.9
England % positive	1.0	3.0	7.3	9.6	1.6
North West No. tested	121,264	17,386	2,272	4,964	38,171
England No. tested	631,501	117,279	22,742	31,589	255,636

Provisional data
Data source: Sentinel surveillance of blood borne viruses

Figure 78: Ethnicity of individuals tested and testing positive for HBsAg in five and 22 sentinel laboratories in the North West and in England, 2005 to 2010

3.6.4 Case study: Country of Birth for Hepatitis B Cases Recorded Locally by Greater Manchester Health Protection Unit (HPU), April 2010 to March 2012

Due to difficulty attaining country of birth data at a national or regional level for hepatitis B cases a case study of cases recorded by Greater Manchester HPU has been conducted. Between April 2010 and March 2012, 802 cases were recorded (53 acute/probable acute and 749 chronic) and of these country of birth information was available for 60% of cases. Where country of birth was known, data show that the majority of acute/probable acute cases were born in the UK (82%), compared to only 14% of chronic cases (Figure 79). Most chronic cases were stated as being born in Asia (47%) or Africa (29%). Although county of birth is not available for 40% of cases recorded by Greater Manchester HPU, the chronic hepatitis B findings in Greater Manchester are similar to those found in HBV-infected blood donors in the UK in 2010, where 34% were born in Asia and 24% Africa (7). As mentioned previously those migrants with chronic infection are from countries with a high prevalence of chronic hepatitis B infection and are therefore likely to have contracted infection in childhood.

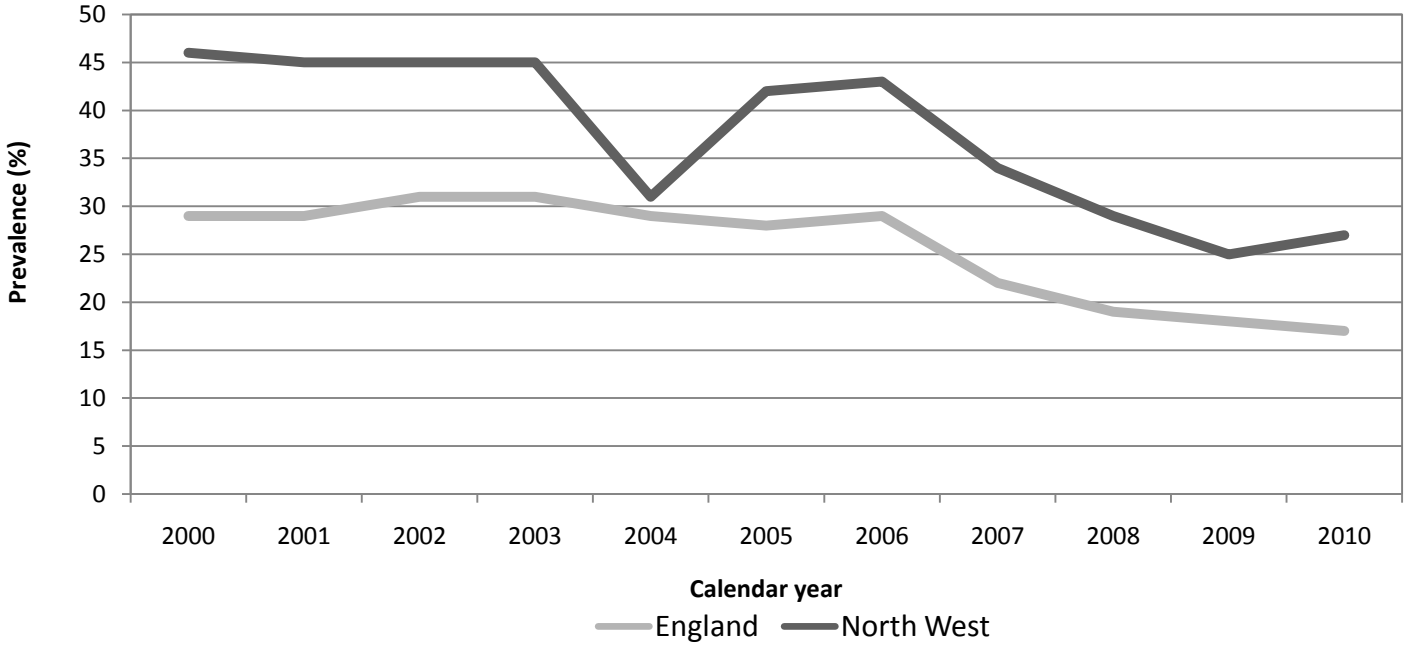


Data source: Greater Manchester Health Protection Unit, HPZONE

Figure 79: Country of birth of hepatitis B cases recorded by Greater Manchester HPU, by diagnosis, April 2010 to March 2012

3.6.5 Hepatitis B Prevalence in Injecting Drug Users

Transmission of hepatitis B continues among injecting drug users and the proportion of those tested via the unlinked anonymous monitoring survey and who had ever been infected (anti-HBc positive) is higher in the North West than nationally (Figure 80). However, the proportion ever infected has fallen both nationally and in the North West, especially since 2006. This is probably due to improved vaccine uptake among injecting drug users (see Section 3.8.2).



Data source: Unlinked Anonymous Monitoring Survey of people who inject drugs

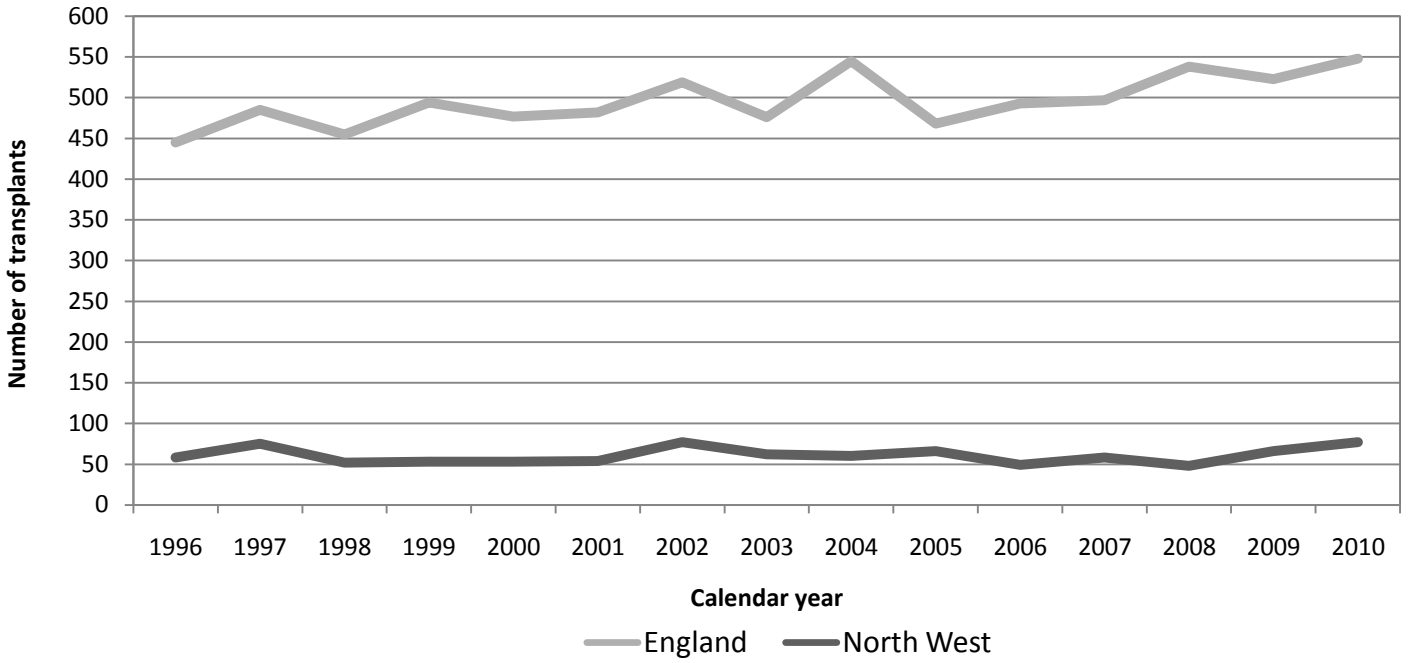
Figure 80: Proportion of injecting drug users anti-HBc positive (ever infected), England and North West, 2000 to 2010

3.7 Liver Transplants

Summary

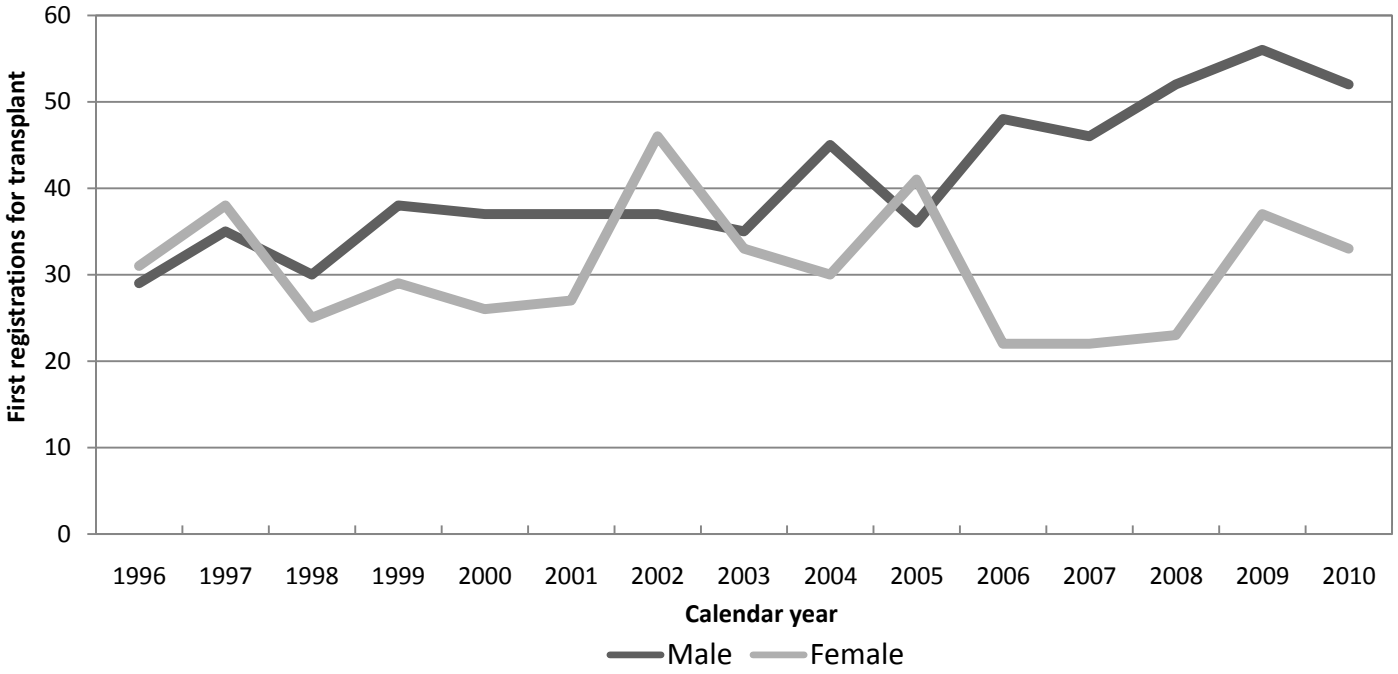
- **The number of liver transplants in the North West increased from 58 in 1996 to 77 in 2010.**
- **Alcohol-related cirrhosis was the most common primary liver disease at registration between 1996 and 2011.**

Liver transplants in England have increased by 23% from 445 in 1996 to 548 in 2010, while in the North West the number of transplants fluctuated year on year but increased by 33% from 58 in 1996 to 77 in 2010 (Figure 81). In the North West first registrations for transplant have increased since 2003 from 35 to 52 in 2010 for males, while transplants in females have remained relatively stable between 1996 and 2010 (Figure 82).



Data Source: NHS Blood and Transplant

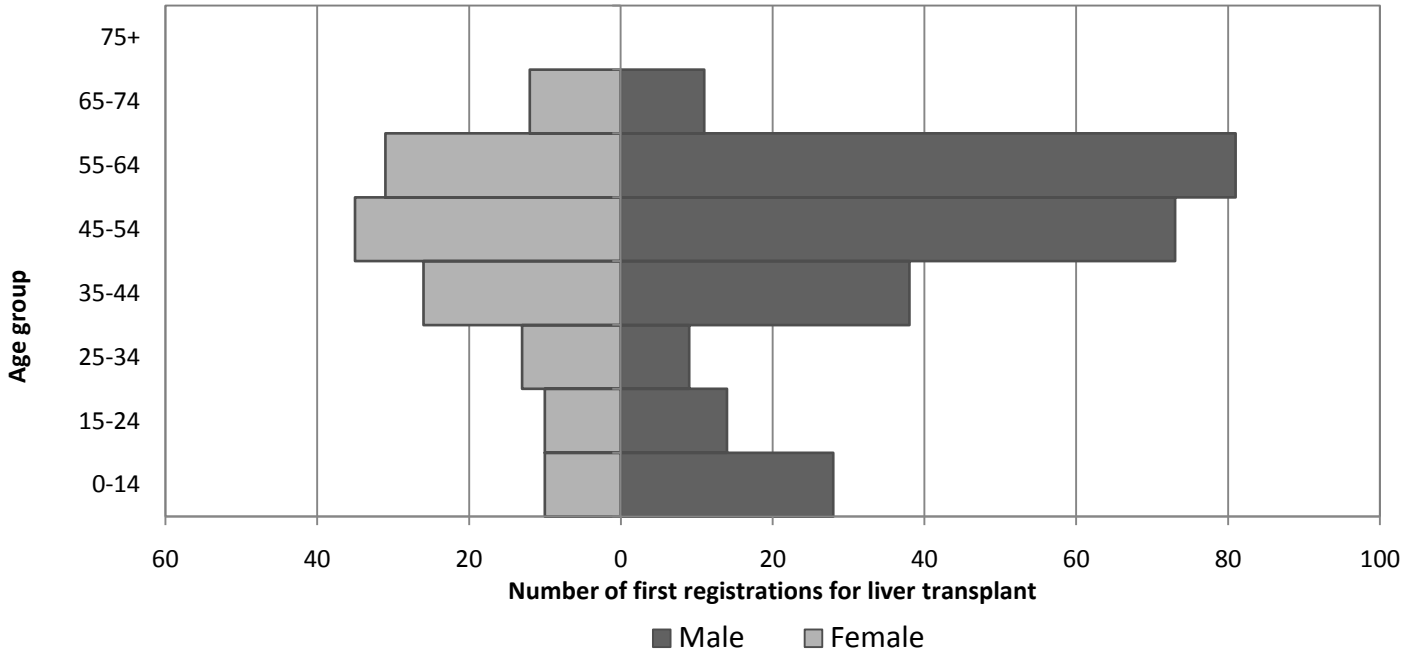
Figure 81: Number of transplants in the North West and England, 1996 to 2010



Data Source: NHS Blood and Transplant

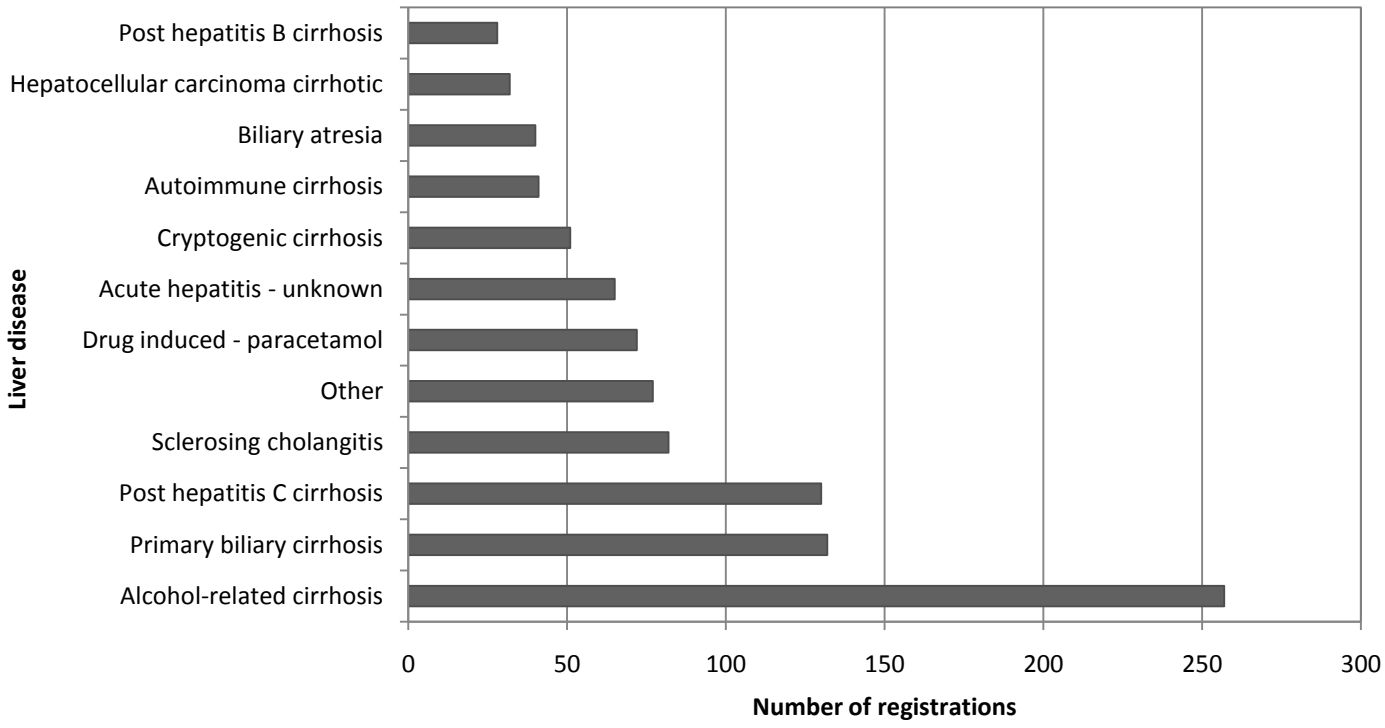
Figure 82: First registrations for transplant by gender, North West, 2006 to 2010

Over half (60%) of males registering for transplant for the first time are aged 45 to 64 years (2006 to 2010) (Figure 83). Figure 84 shows that between 1996 and 2011 alcohol-related cirrhosis was the most common primary liver disease at registration for all registrations.



Data Source: NHS Blood and Transplant

Figure 83: First registrations for transplant by age group (age at registration) and gender, North West, 2006 to 2010



Data Source: NHS Blood and Transplant

Figure 84: All registrations for transplant by most common primary liver disease at registration, North West, 1996 to 2011

3.8 Trends and Dimensions of Liver Disease Risk in the North West; Findings from the Health Survey for England 2010

The Health Survey for England is an annual structured interview survey of a representative sample of household residents. The 2010 survey collected data from 14,112 respondents: 8,420 were adults aged 16 and over; and 5,692 were young people under 16 years. Data from individuals were weighted for differential non-response by age and deprivation, so weighted proportional tabulations should reflect the age and deprivation characteristics of the total population.

Summary

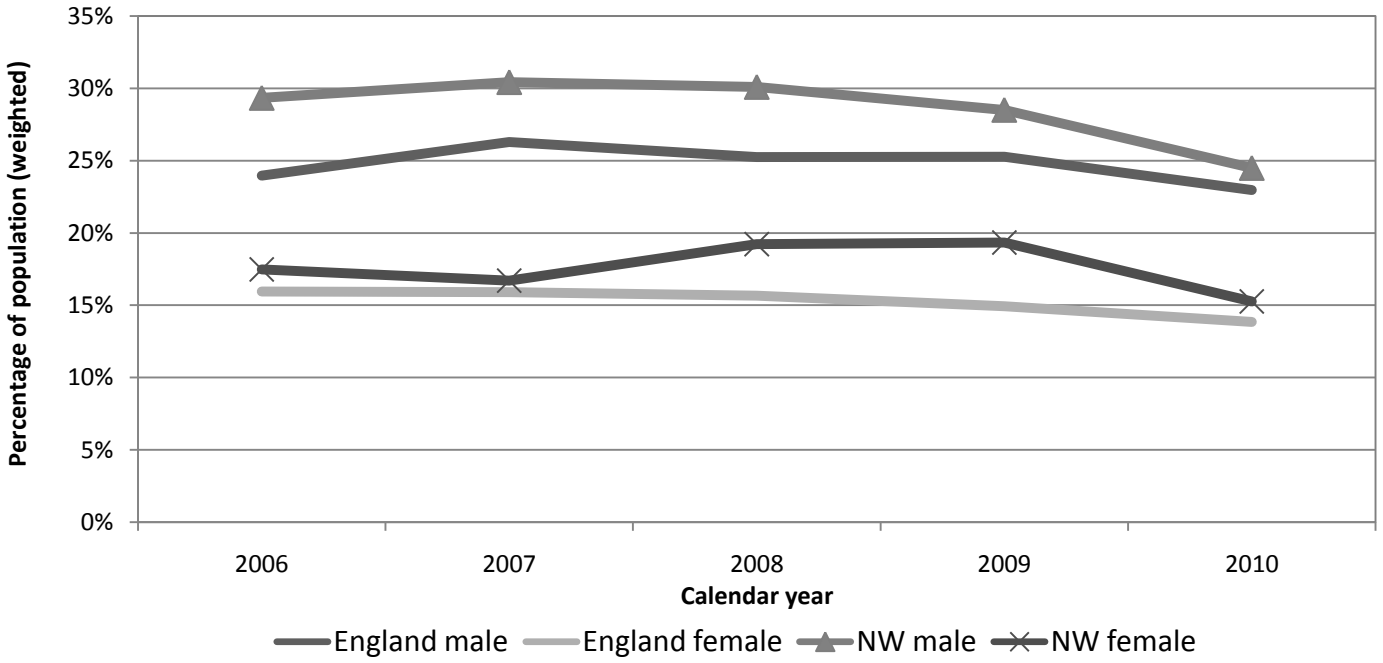
- **Adult over-limit drinking of alcohol continues to be higher in the North West than the England average but the gap is narrowing for both males and females.**
- **There has been a steady increase in the prevalence of obesity in adults in England from around 21% for both males and females ten years ago to around 25% now.**
- **The prevalence rates of over-limit drinking of alcohol among adults, obesity among adults and current drinking by adolescents are all significantly related to age, gender and income.**

For the purpose of assessing liver disease risks three characteristics were focused on:

- Adults (aged 16 and over) reporting drinking over the recommended daily limits on any of the last seven days (through a confidential self-completion questionnaire). These limits are: eight units for males and six for females.
- Adults (aged 16 and over) assessed (through nurse measurement) as having a body mass index of 30 or greater and hence defined as obese.
- Adolescents (aged 14 and 15) reporting recent drinking of alcohol, including alcopops (through a confidential self-completion questionnaire). For young people under 16, any regular exposure to alcohol is considered to be a health risk, but we concentrate on those reporting their most recent alcoholic drink as being within the last four weeks.

Health Survey for England assessments of units drunk are complicated by re-rating undertaken in 2006, to take better account of the trend towards larger measures and higher alcohol contents, especially for wine. Nevertheless, it is commonly concluded that over-limit drinking increased in prevalence throughout the 1990s and the early years of the last decade, peaking (in England) around the year 2007. The most recent years appear to show a slight reduction.

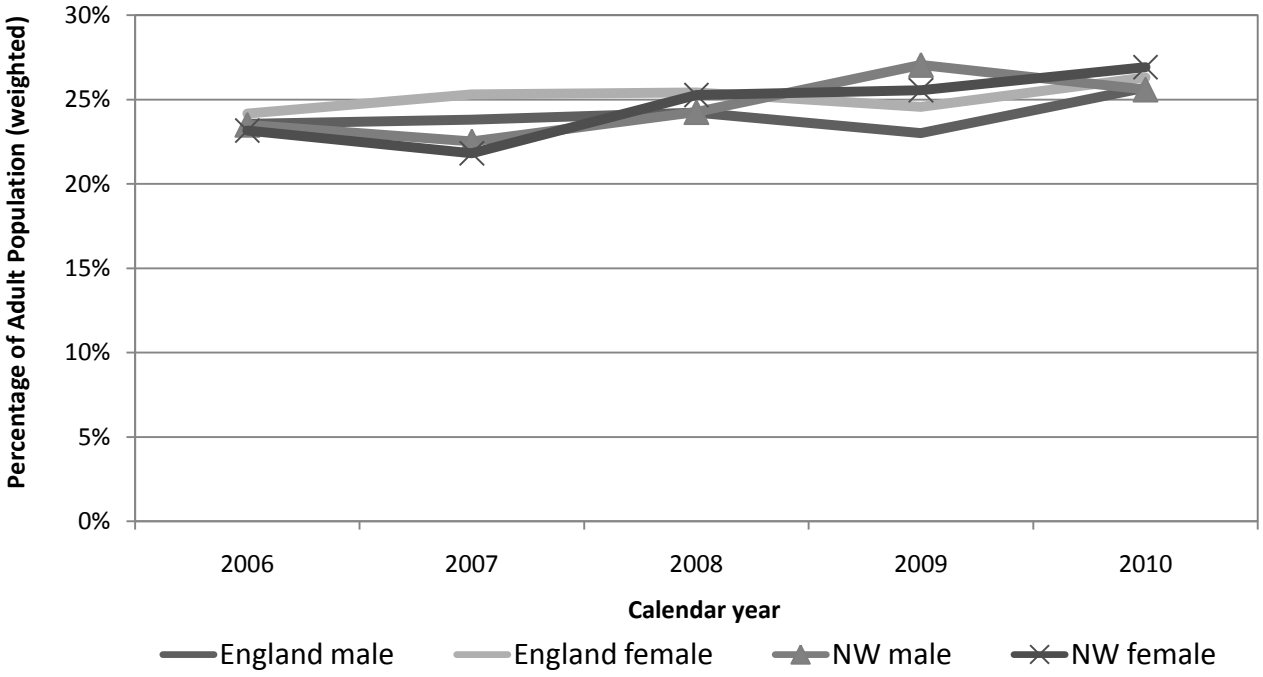
Historically, adult over-limit drinking has always been higher in the North West than the national average. However, the Health Survey for England for 2010 does show a marked narrowing of the excess drinking gap for both males and females. It remains to be seen whether this positive regional trend will continue in further years (Figure 85).



Data source: The Health Survey for England 2010

Figure 85: Trends in adult drinking over-limit, heaviest drinking day in last seven: <8 units (male), < 6 units (female), North West and England, 2006 to 2010

The Health Survey for England has reported a steady increase in the prevalence of obesity in adults in England, from around 21% both male and female ten years ago, to around 25% now (Figure 86). This trend appears to be continuing. Historically, adult obesity in the North West has usually been around, or just less than, the national average. In the most recent two years, the Health Survey for England finds obesity in the North West slightly above the national average.

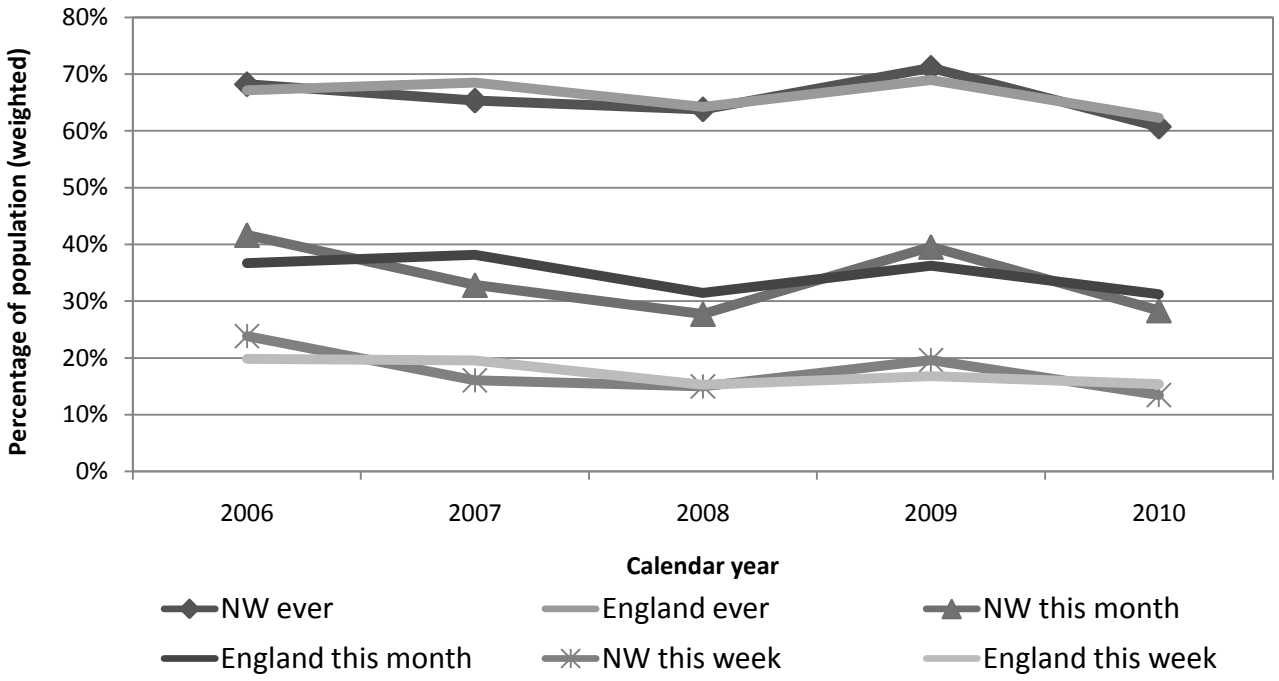


Data source: The Health Survey for England 2010

Figure 86: Trends in adult obesity, body mass index 30+, North West and England, 2006 to 2010

Adolescent exposure to alcohol increased rapidly in the 1990s, to the extent that in 2003, 90% of boys and girls aged 15 years self-reported as having had at least one alcoholic drink. Since then, there has been a consistent reducing trend in

reported drinking in adolescence, with counterpart current rates of 'ever' drinking being 67% for girls, and 59% for boys (Figure 87). We find equivalent reducing trends in 'recent' drinking. The numbers of young people surveyed at the regional level do not allow confident assessment of regional comparators, but the North West trend (for both boys and girls) does not appear to differ from the national trend.



Data source: The Health Survey for England 2010

Figure 87: Trends in recent alcohol consumption, ages 14 and 15, last alcoholic drink (including alcopops), North West and England, 2006 to 2010

3.8.1 Characteristics Associated with Liver Disease Risk Factors

Prevalence rates for all three of the specific risks on which we are concentrating, are significantly related to age, gender and income. Risk factors in women (but not men) are also related to household type. Risks in alcohol use, but not obesity, are related to ethnic origin. All these relationships are charted in detail below.

To explore further dimensions of associated characteristics, we analysed the distributions of our three risk factors using the method of binary logistic regression. We established a 'basic' model allowing for age, gender, deprivation quintile and region of residence (all as categorical variables), and then looked for further explanatory characteristics with significant statistical associations. We quantify the modelled odds of each risk factor associated with a characteristic, the Adjusted Odds Ratio (AOR), and determine whether this is significantly different from one another. It should be noted at the outset that no statistical association was found between adult over-limit drinking and obesity, either positive or negative (AOR for drinking if obese = 1.07 [95% CIs 0.93 - 1.23]) and neither obesity (AOR = 1.01 [95% CIs 0.764 - 1.32]) nor over-limit drinking (AOR = 0.95 [95% CIs 0.73 - 1.22]) was associated with being unemployed.

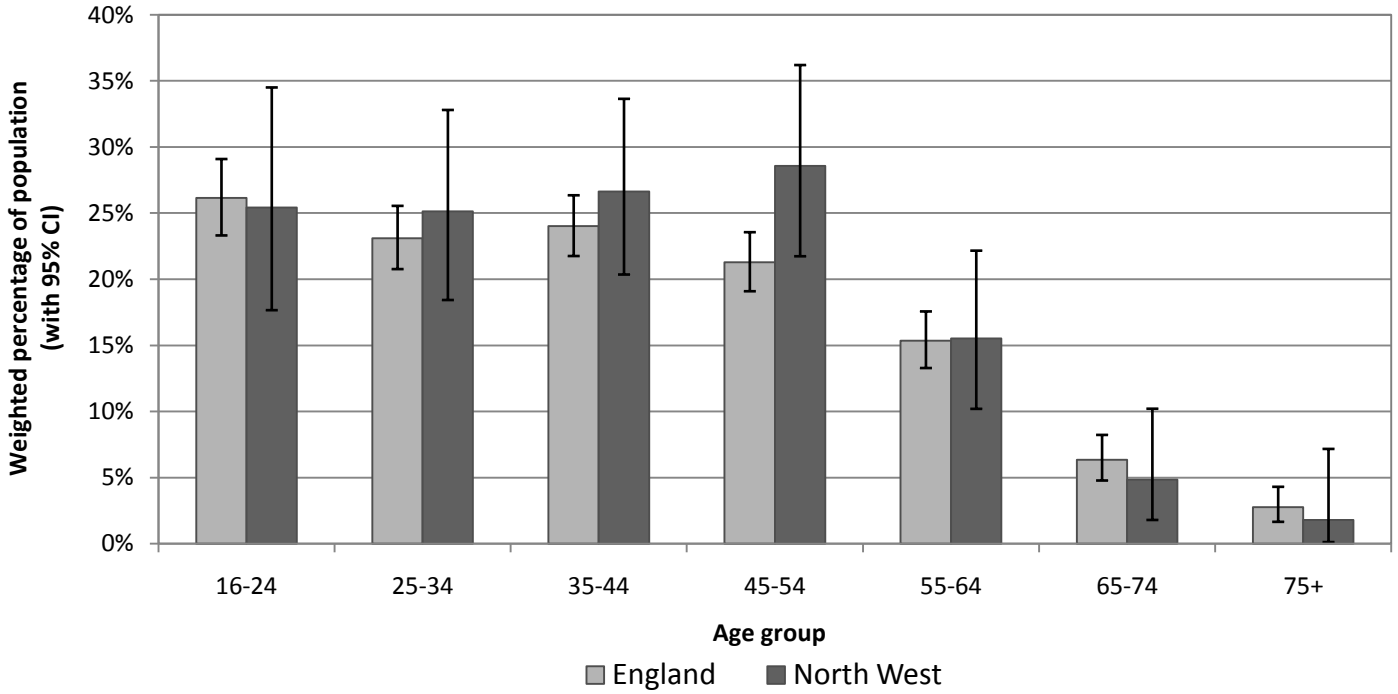
We found drinking over-limits to be less likely for both adults with no formal education (AOR = 0.70 [95% CIs 0.58 - 0.85]), and in adults reporting poor physical health (AOR = 0.70 [95% CIs 0.60 - 0.82]). In particular, adults reporting nervous (AOR = 0.44 [95% CIs 0.30 - 0.65]), endocrine (AOR = 0.65 [95% CIs 0.50 - 0.84]), digestive (AOR = 0.61 [95% CIs 0.43 - 0.86]), and genito-urinary diseases (AOR = 0.51 [95% CIs 0.29 - 0.89]) are less likely to drink over-limits. Drinking over-limits is more likely in adults with a poor quality diet; eating less than two portions of fruit and vegetables per day (AOR = 1.32 [95% CIs 1.16 - 1.51]), and much more likely in current smokers (AOR = 1.94 [95% CIs 1.67 - 1.25]). Ex-smokers are more likely to drink over-limits than non-smokers (AOR = 1.55 [95% CIs 1.33 - 1.80]). We found no association between over-limit drinking and mental illness (AOR = 0.95 [95% CIs 0.71 - 1.26]), but drinking over-limits is

associated with poorer assessments of self-worth [thinking of self as worthless (AOR = 1.51 [95% CIs 1.00 - 2.28]), not feeling useful (AOR = 1.36 [95% CIs 1.07 - 1.73]), not feeling good about myself (AOR = 1.38 [95% CIs 1.13 - 1.69]). Adults drinking over-limits are, however, more likely to report having energy to spare (AOR = 1.46 [95% CIs 1.08 - 1.99]), and enjoying everyday activities (AOR = 3.0 [95% CIs 1.44 - 6.26]).

We found obesity to be less likely in adults with a degree level of education (AOR = 0.71 [95% CIs 0.62 - 0.82]), and in adults with high consumption of fruit and vegetables (five or more portions per day, AOR = 0.88 [95% CIs 0.78 - 0.98]). Otherwise there is little association between obesity and dietary quality. Obesity is much more likely in adults reporting a whole range of chronic physical conditions; cardiac (AOR = 1.81 [95% CIs 1.56 - 2.01]), musculoskeletal (AOR = 1.42 [95% CIs 1.25 - 1.61]), endocrine (AOR = 1.51 [95% CIs 1.00 - 2.28]), digestive (AOR = 1.44 [95% CIs 1.16 - 1.79]), respiratory (AOR = 1.32 [95% CIs 1.11 - 1.56]), and is also more likely in adults reporting mental illness (AOR = 1.55 [95% CIs 1.23 - 1.96]). Being an ex-smoker is associated with increased obesity (AOR = 1.21 [95% CIs 1.07 - 1.37]), as is being a passive smoker only (AOR = 1.20 [95% CIs 1.06 - 1.34]); although being a current active smoker makes no difference (AOR = 0.90 [95% CIs 0.77 - 1.03]). As with drinking over-limit, there is an association between obesity and thinking of oneself as worthless (AOR = 1.52 [95% CIs 1.23 - 1.89]) and not feeling good about myself (AOR = 1.36 [95% CIs 1.09 - 1.67]). However (and in contrast to drinking over-limits), adult obesity is associated with being less likely to report having energy to spare (AOR = 0.53 [95% CIs 0.42 - 0.67]).

We found that drinking in the last four weeks was more common in young people aged 14 and 15 years who are current smokers (AOR = 10.10 [95% CIs 5.35 - 19.07]). Smoking is much less prevalent in this age group than is drinking alcohol, some 8% of boys and 13% of girls being regular smokers; but overwhelmingly smokers were also drinkers. We found no relationship either way with dietary quality, and nor with any indicators of mental or physical illness. However, recent adolescent drinkers were more likely to report feeling constantly under strain (AOR = 1.51 [95% CIs 1.04 - 2.20]).

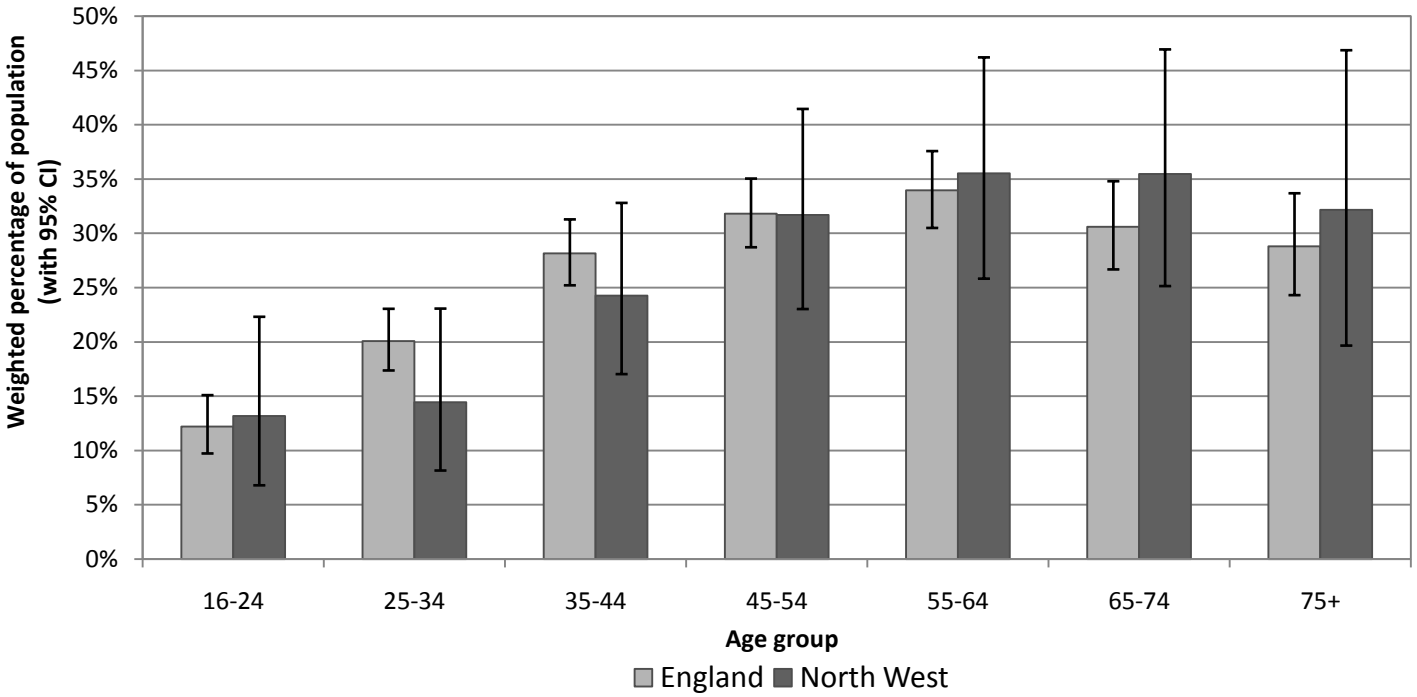
In England, drinking over-limits drops off markedly into middle age. We find, however, that over-limit drinking in the North West, for both males and females, is higher than England for those in their early fifties (AOR = 1.56 [95% CIs 1.08 - 2.25]) (Figure 88).



Data source: The Health Survey for England 2010

Figure 88: Adult drinking over-limits by age group, North West and England, 2010

The prevalence of obesity increases sharply into middle age and then drops off amongst older people. Characteristically it was observed that the North West had lower rates of obesity than the national average in younger adults, and higher rates of obesity in older people. Neither difference is, however, statistically significant (Figure 89).

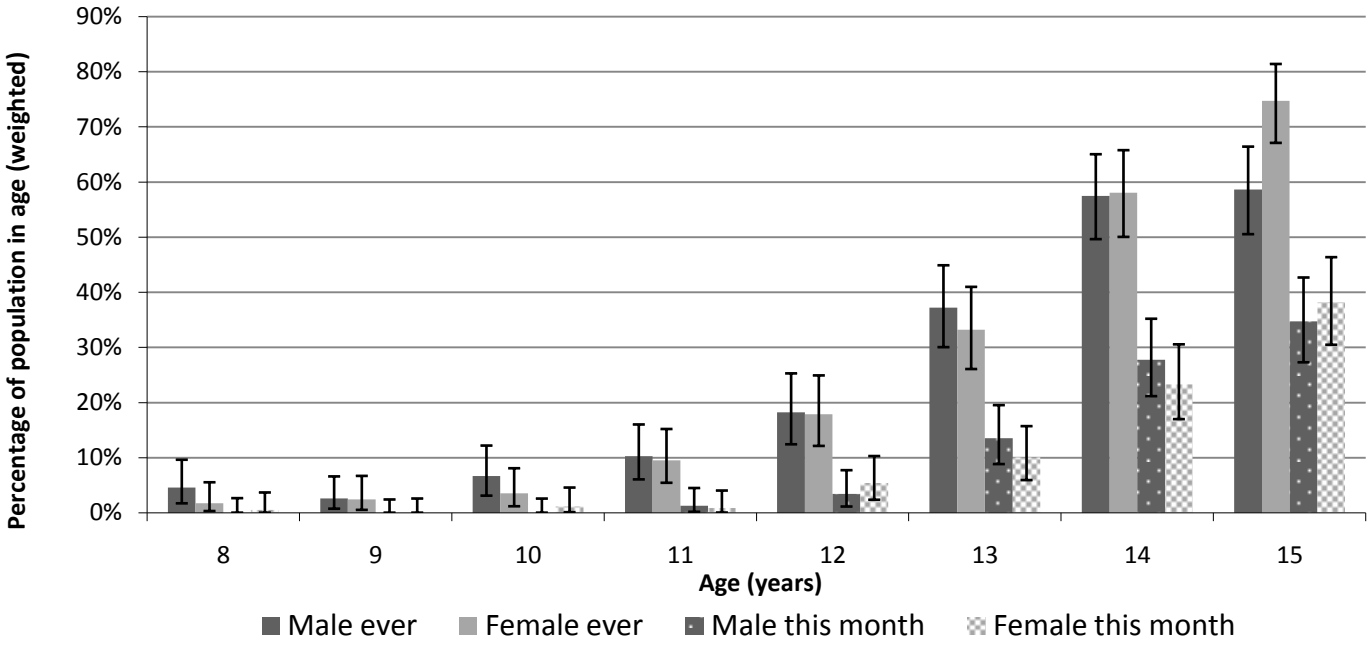


Data source: The Health Survey for England 2010

Figure 89: Adult obesity by age group, North West and England, 2010

Drinking alcohol among young people becomes apparent at ages above 10 years, but regular drinking is only reported in significant proportions at ages over 13 years. It is noticeable that, at 15 years, girls have a greater exposure to alcohol

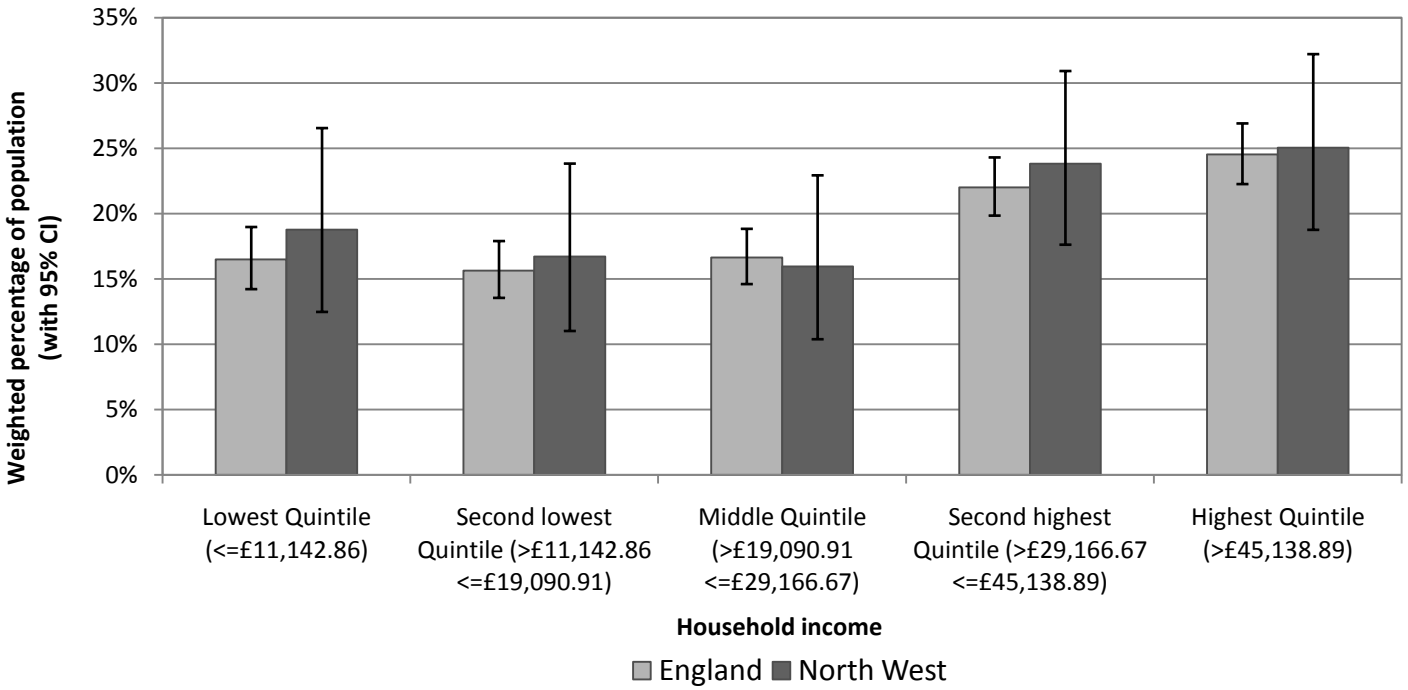
than boys; a gender difference that is now being found even more strongly in smoking and other health risk behaviours (Figure 90).



Data source: The Health Survey for England 2010

Figure 90: Recent alcoholic drinking amongst adolescents by age, most recent alcoholic drink (including alcopops), England, 2010

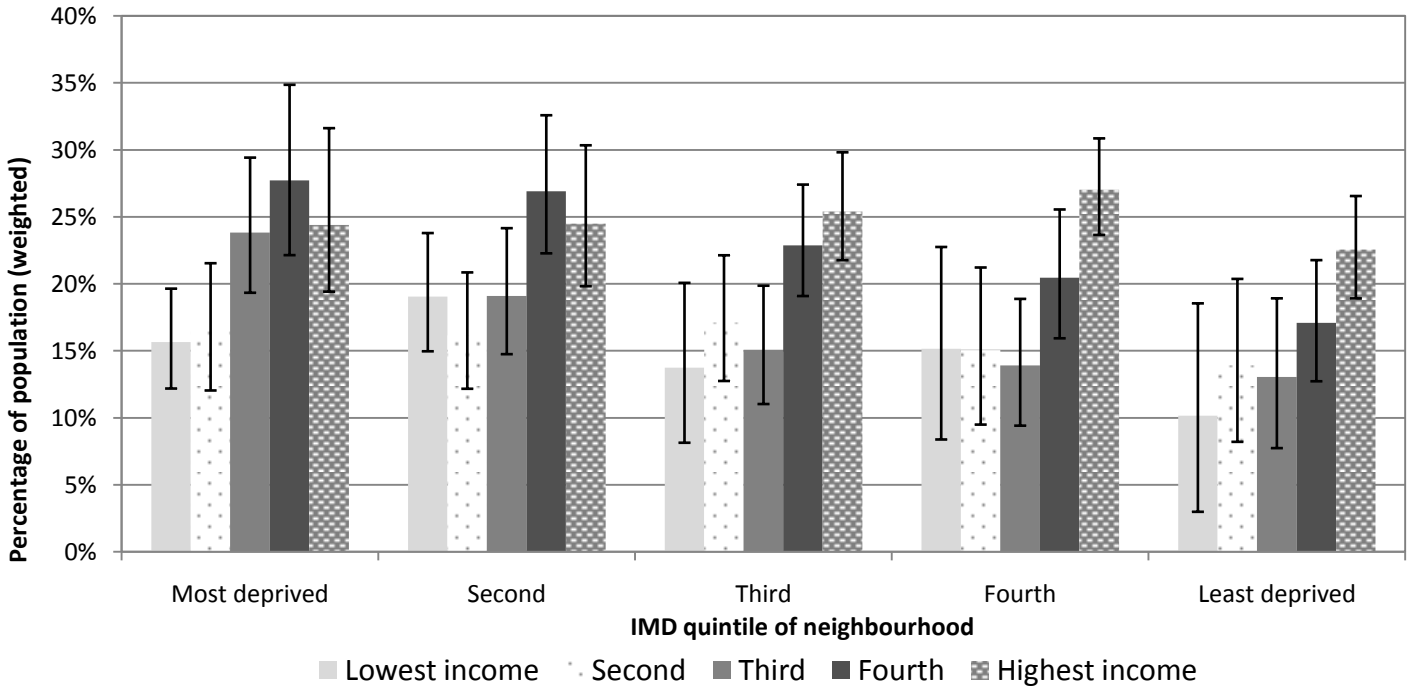
Adult drinking over-limits is strongly associated with being in the top two quintiles for household income, and this is found in the North West similarly to the national pattern. It is not surprising that populations with very low income are less likely to drink over-limits; but this also remains true for middle income households (Figure 91).



Data source: The Health Survey for England 2010

Figure 91: Adult drinking over-limits by household income, North West and England, 2010

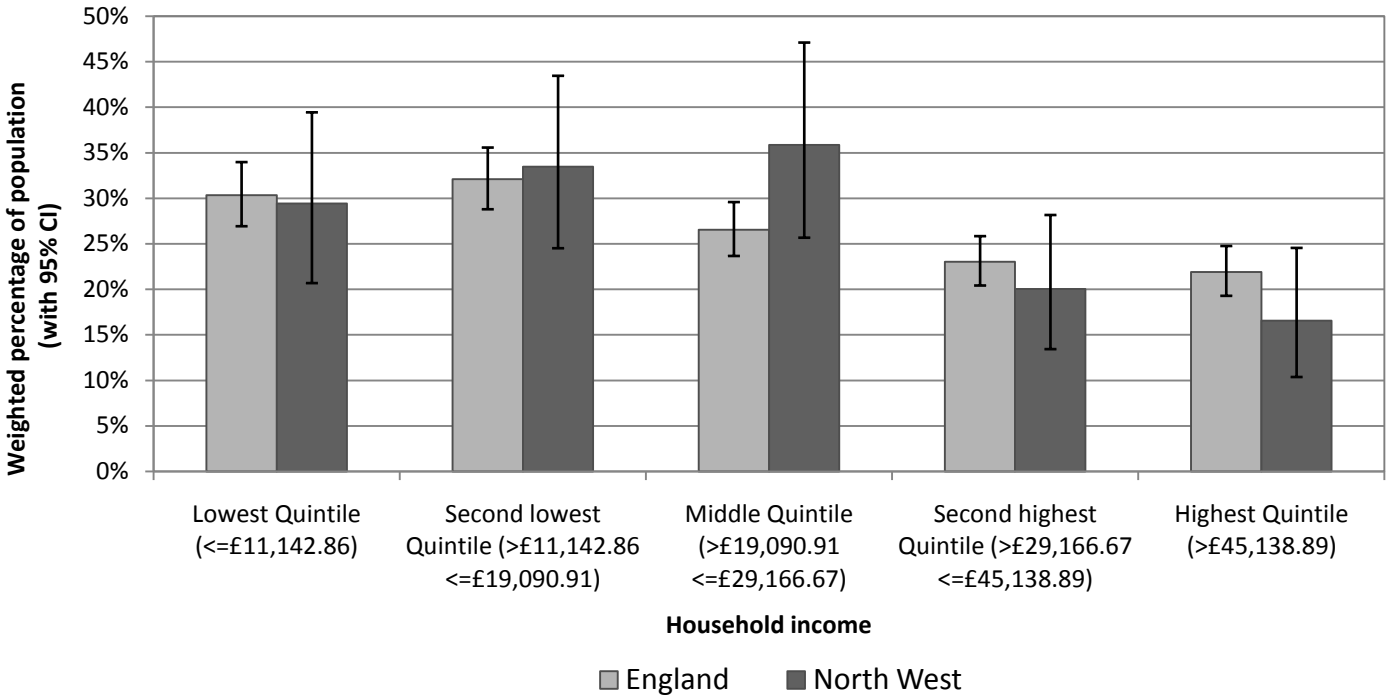
Drinking over-limits by income can be further disaggregated by IMD quintile of local neighbourhood (LSOA). It can be seen that, in all deprivation quintiles, affluent populations are more likely to drink over-limits than are lower income populations. There is, however, a contrary trend observable in relation to IMD; such that residents of more deprived localities tend to have higher levels of over-limit drinking (AOR = 1.38 [95% CIs 1.10 - 1.73]). Hence the lowest rate of over-limit drinking is observed within low income households in affluent neighbourhoods; while the highest levels of over-limit drinking are observed in higher income households within deprived neighbourhoods (Figure 92).



Data source: The Health Survey for England 2010

Figure 92: Adult drinking over limits by household income and IMD quintile, England, 2010

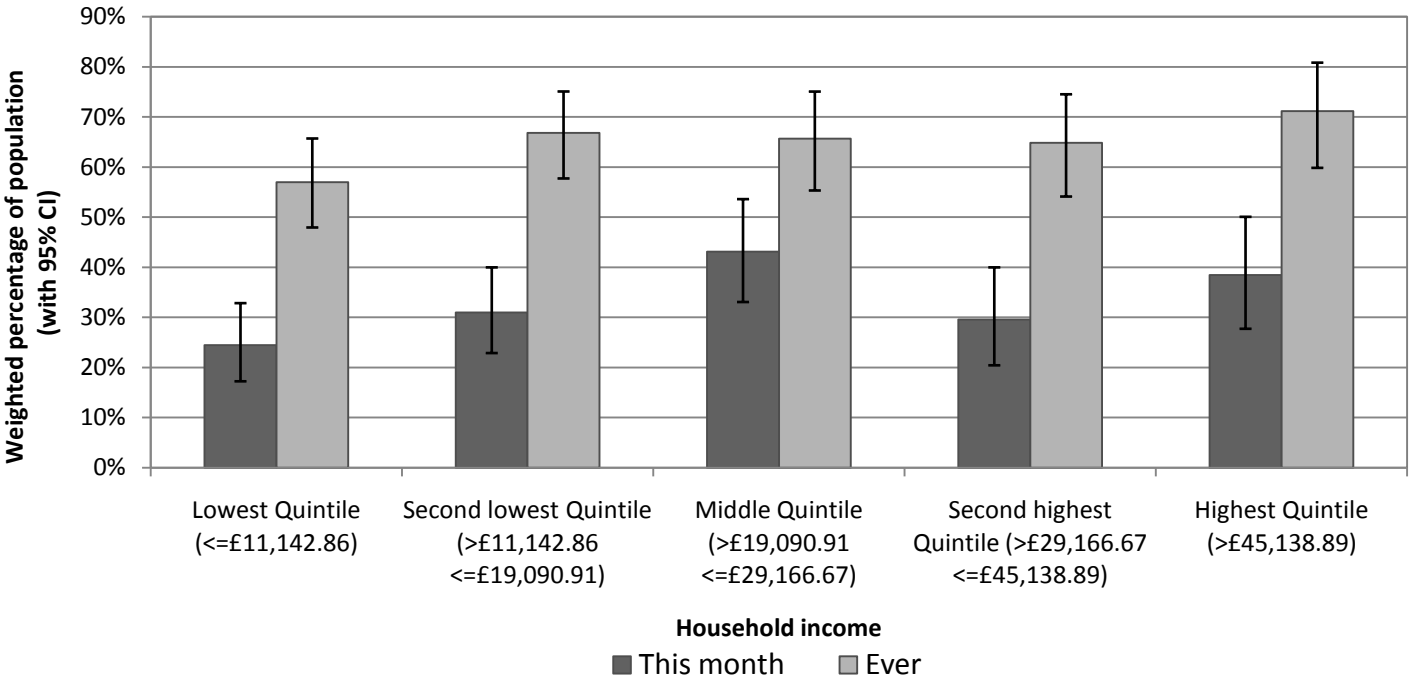
In the national data, obesity prevalence tends to reduce as household income increases. In the North West however, although the most affluent households have lower obesity, this is not the case for adults at middle income levels (Figure 93).



Data source: The Health Survey for England 2010

Figure 93: Adult obesity by household income, North West and England, 2010

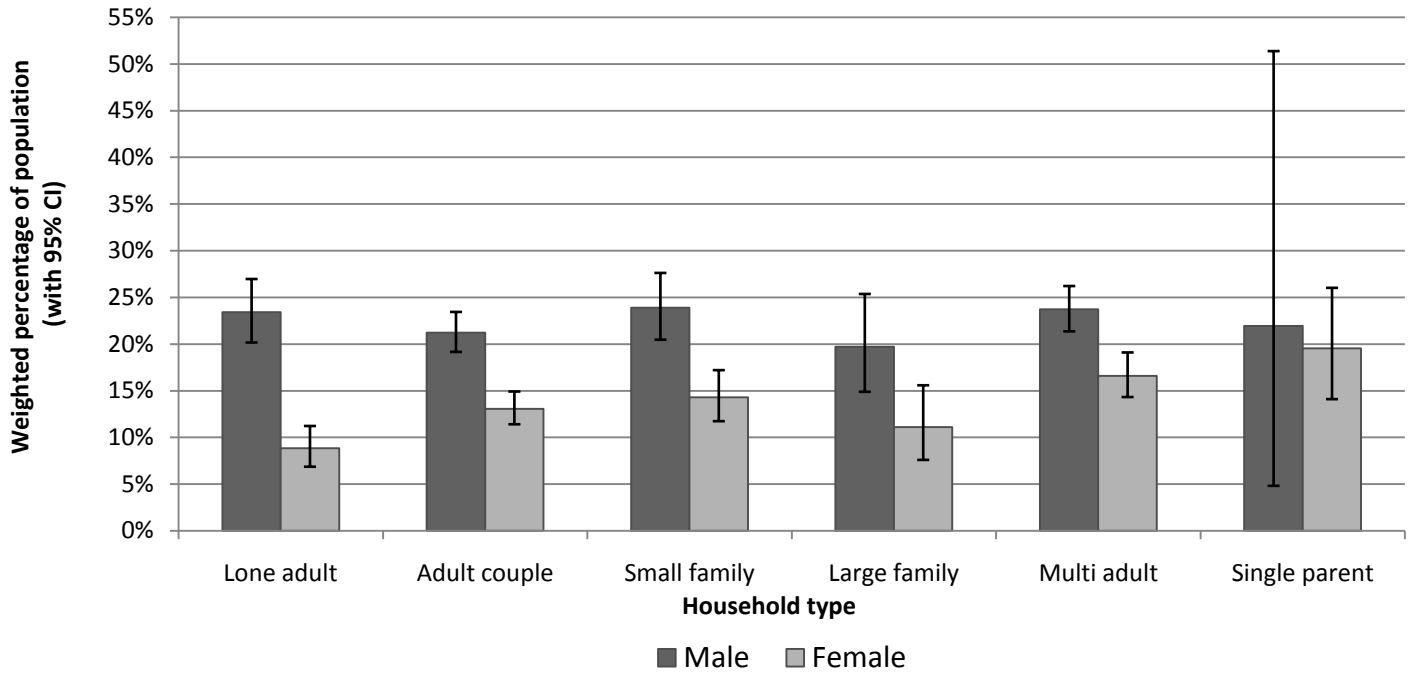
The association between income and alcohol consumption is much less strong for adolescents, though it remains the case that the highest rates of 'ever' drinking are in children from the most affluent quintile households, although the highest likelihood of recent drinking is in children of the middle income quintile households (AOR = 1.61 [95% 1.04 - 2.50]) (Figure 94).



Data source: The Health Survey for England 2010

Figure 94: Recent adolescent drinking (including alcopops) by household income, England, 2010

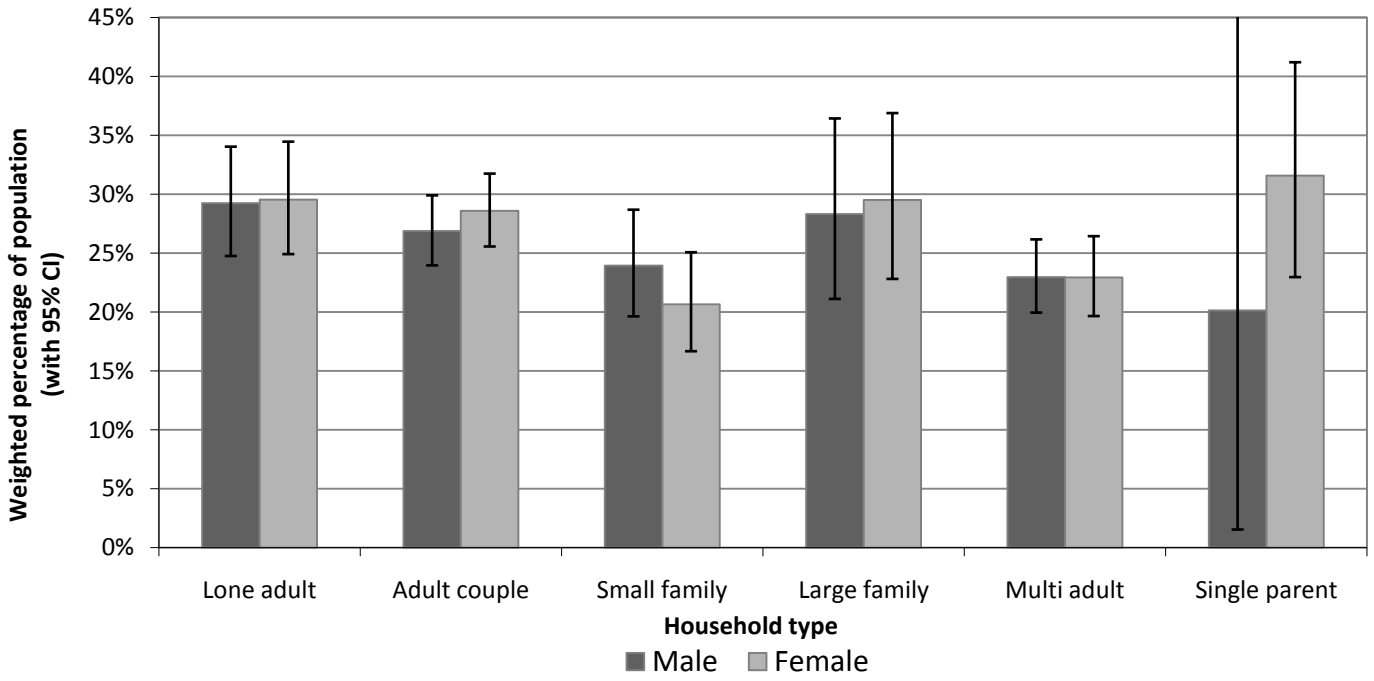
We found no apparent link between over-limit drinking and household type for men, but a strong association for women. It is not surprising that high levels of drinking are less common in single women, as many of these are older, but it is noticeable that female over-limit drinking is more common in single parent households than in couple-family households (AOR = 1.50 [95% 1.03 - 2.19]) (Figure 95).



Data source: The Health Survey for England 2010

Figure 95: Adults drinking over-limits by household type, England, 2010

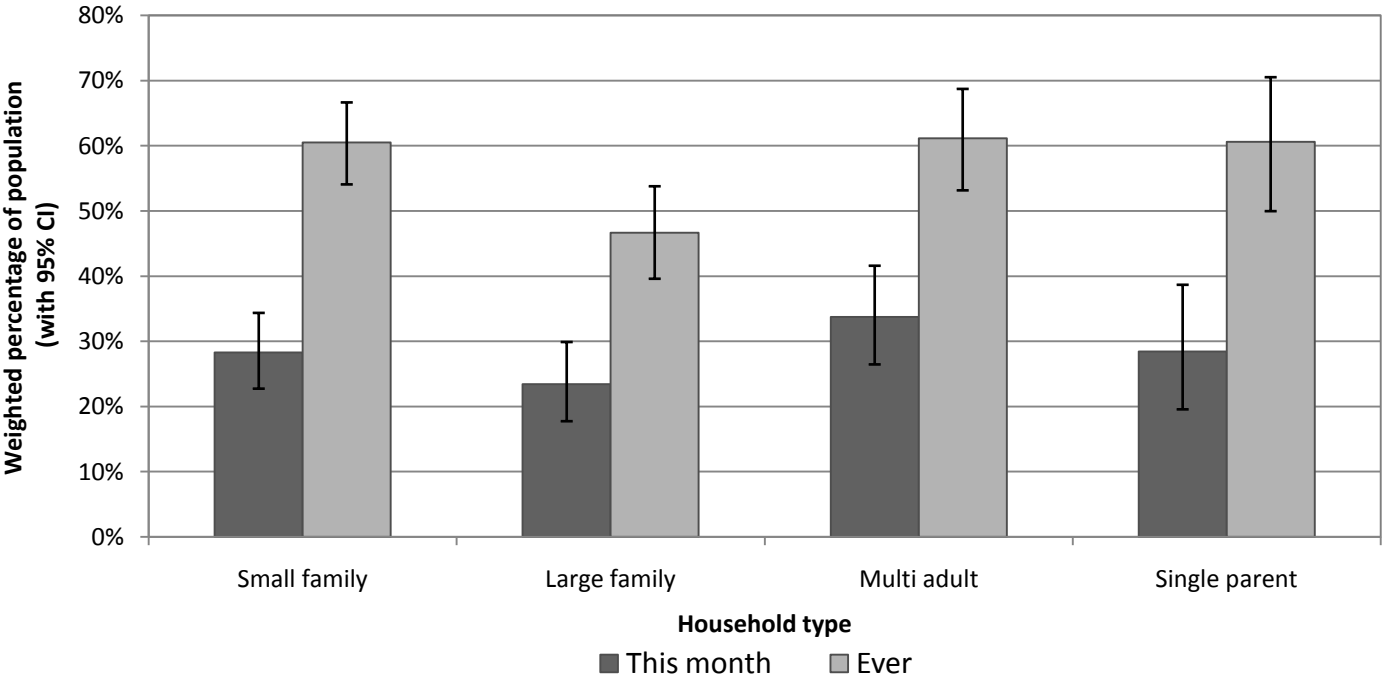
Once again, an association was found between women in families of increased obesity and being a single parent (AOR = 1.70 [95% CIs 1.22 - 2.36]) (Figure 96).



Data source: The Health Survey for England 2010

Figure 96: Adult obesity (body mass index = 30+) by household type, England, 2010

We found no relationship between household type and adolescent drinking this month. However, being a young person in a large family (2+ adults and 3+ children, or 3+ adults and 2+ children) was found to be protective in terms of 'ever' drinking (Figure 97).

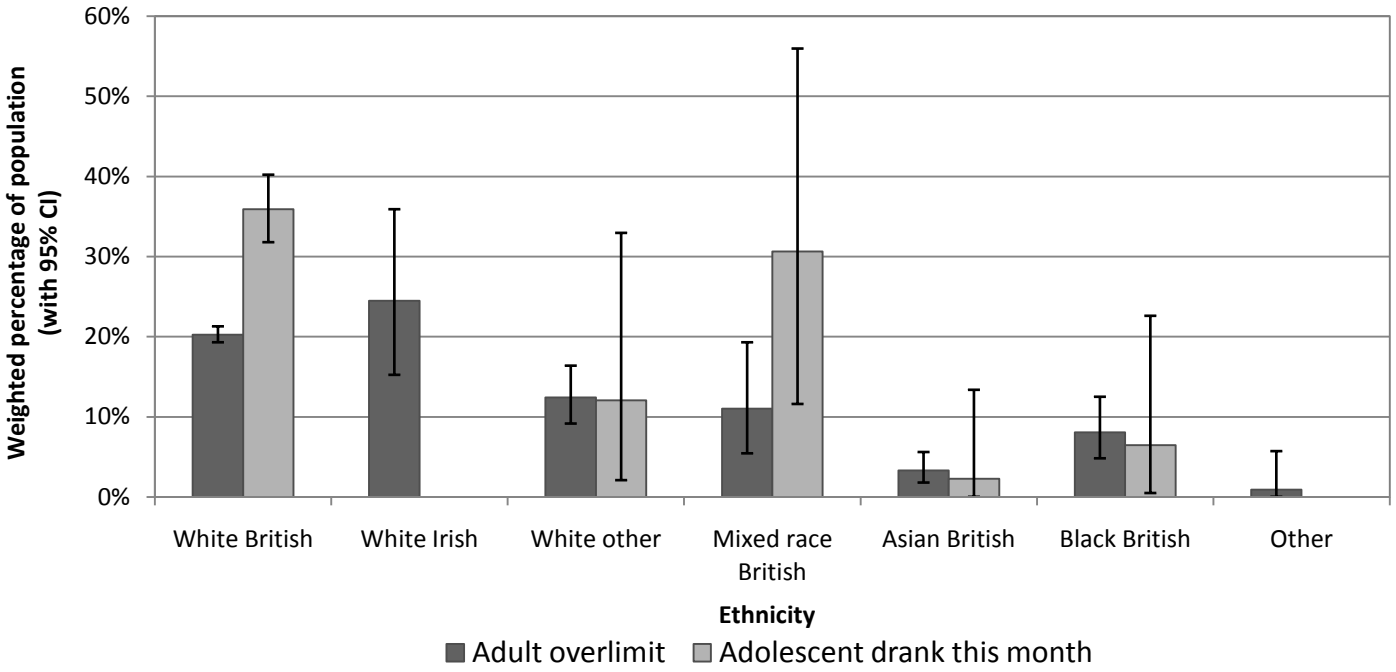


Data source: The Health Survey for England 2010

Figure 97: Recent adolescent (ages 14 to 15 years) drinking by household type, England, 2010

Alcohol risk for both adults and adolescents is strongly related to ethnic origin. We found the highest rates of adults drinking over-limits in the White Irish population (AOR = 2.0 [95% CIs 1.14 - 3.51]) while Asian British (AOR = 0.16 [95%

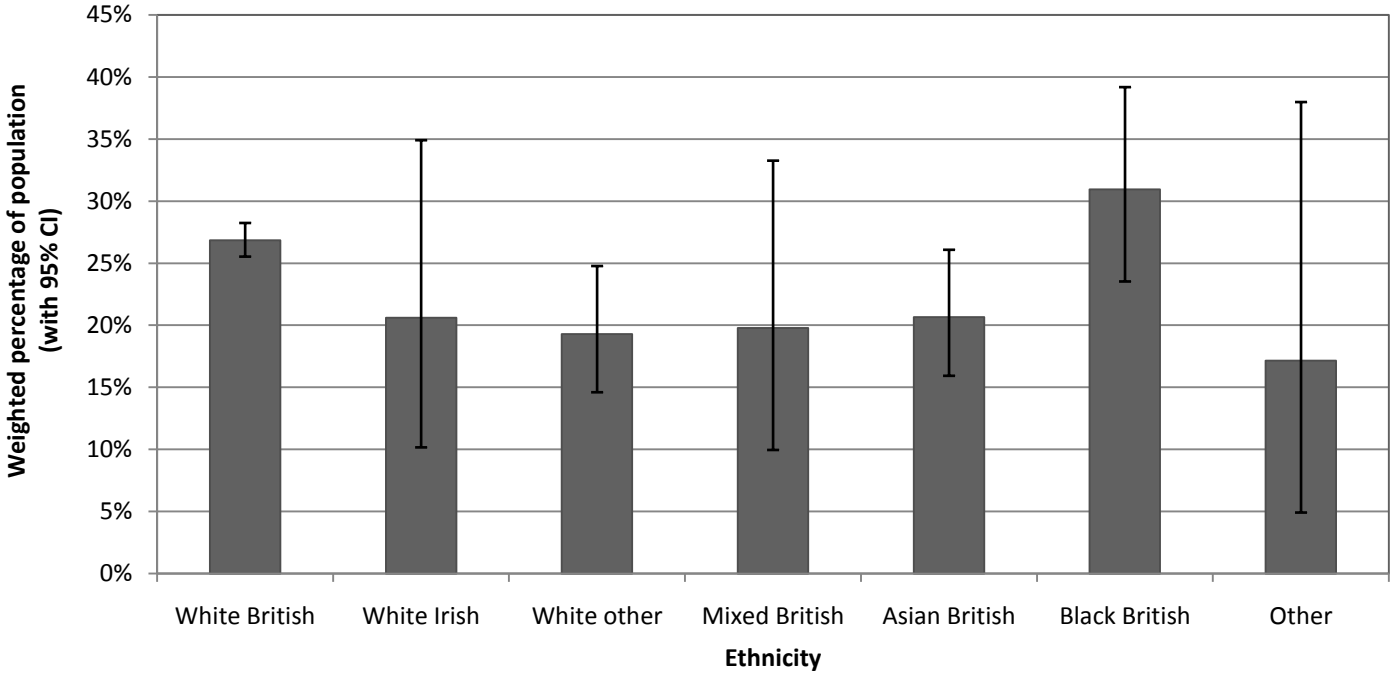
CIs 0.10 - 0.26]) and Black British (AOR = 0.23 [95% CIs 0.13 - 0.41]) populations demonstrate low rates in both categories of risk. Mixed race adults are found to have lower risk than their white neighbours (AOR = 0.47 [95% CIs 0.33 - 0.67]), but there is no difference in adolescent alcohol risk in persons of mixed ethnic origin (Figure 98).



Data source: The Health Survey for England 2010

Figure 98: Alcohol health risk by ethnicity, England, 2010

We found no significant association between ethnic origin and adult obesity (Figure 99).



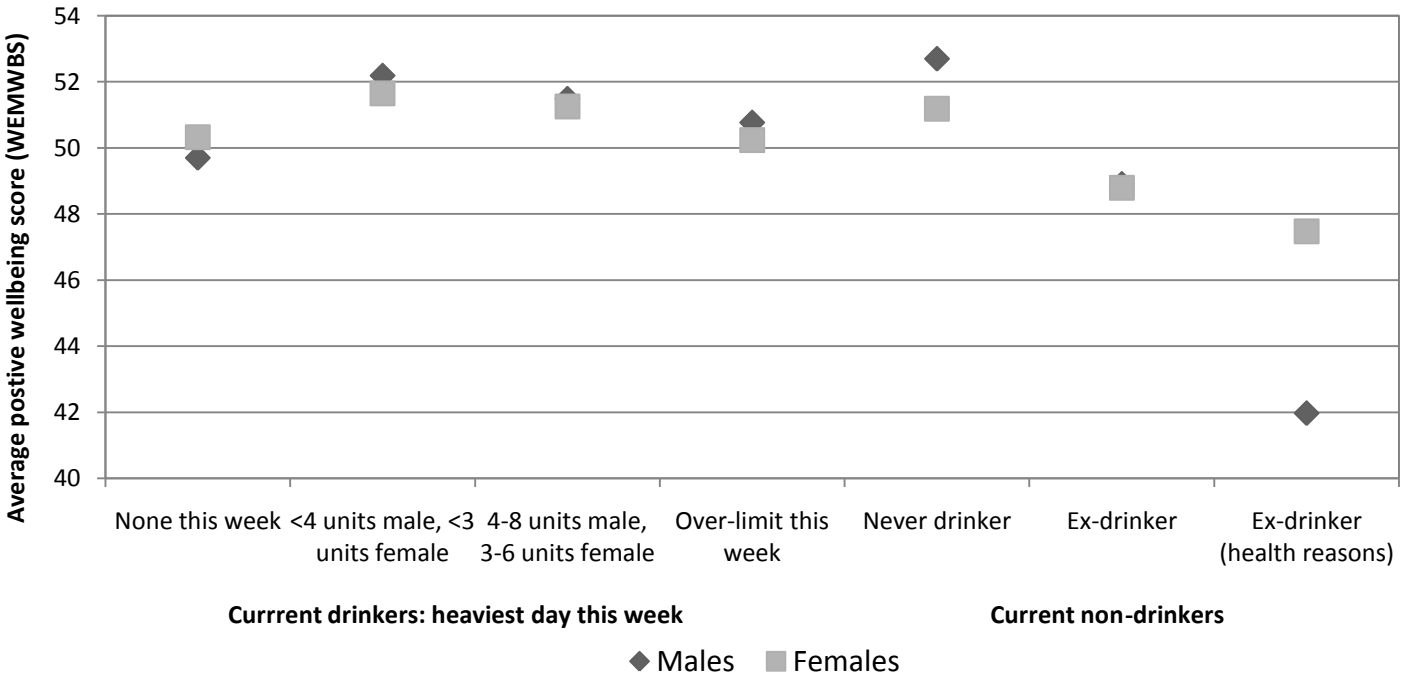
Data source: The Health Survey for England 2010

Figure 99: Adult obesity (body mass index = 30+) by ethnicity, England, 2010

In the 2010 Health Survey for England, positive wellbeing in adults (aged 16+ years) was assessed using the Warwick and Edinburgh Mental Wellbeing Scale (WEMWBS); a 14 question interview self-assessed instrument that is designed to capture and distinguish levels of positive mental wellbeing, as distinct from levels of poor mental health. Each question was marked on a five point scale, such that the maximum possible score was 70, and the minimum was 14. We plotted average scores for adults according to categories of alcohol consumption history, and body mass index. A reduced set of seven WEMWBS questions were asked in the North West Mental Wellbeing Survey of 2009, and comparisons can be drawn between the two sets of survey findings in respect of alcohol consumption status.

The profile of wellbeing by adult alcohol consumption revealed that the 2010 Health Survey for England corresponds closely with that observed in the North West Mental Wellbeing Survey. Amongst those who reported themselves as current drinkers, the highest wellbeing is found in adults drinking no more than four units in a day for males, and three units in a day for females (Figure 100). Greater alcohol consumption is associated with lower rates of wellbeing, but drinkers who did not report any drinking in the last week consistently had lower reported wellbeing. Amongst those who reported being current non-drinkers, we found high reported levels of wellbeing in adults who had never drank alcohol. It should be noted, however, that more than half of these never-drinkers were of Asian British or Black British ethnicity, populations who generally report higher levels of wellbeing in the WEMWBS instrument. The lowest reported wellbeing was found in those who had given up drinking for health reasons, but other ex-drinkers also reported lower wellbeing than any of the current-drinking groups.

The North West Mental Wellbeing Survey found current drinking to be strongly associated (within White British populations) with adults having higher levels of recreational and social activity, and with higher reported frequency of contact with adults outside their own household; both characteristics being strongly indicated as contributors to positive wellbeing within these populations.

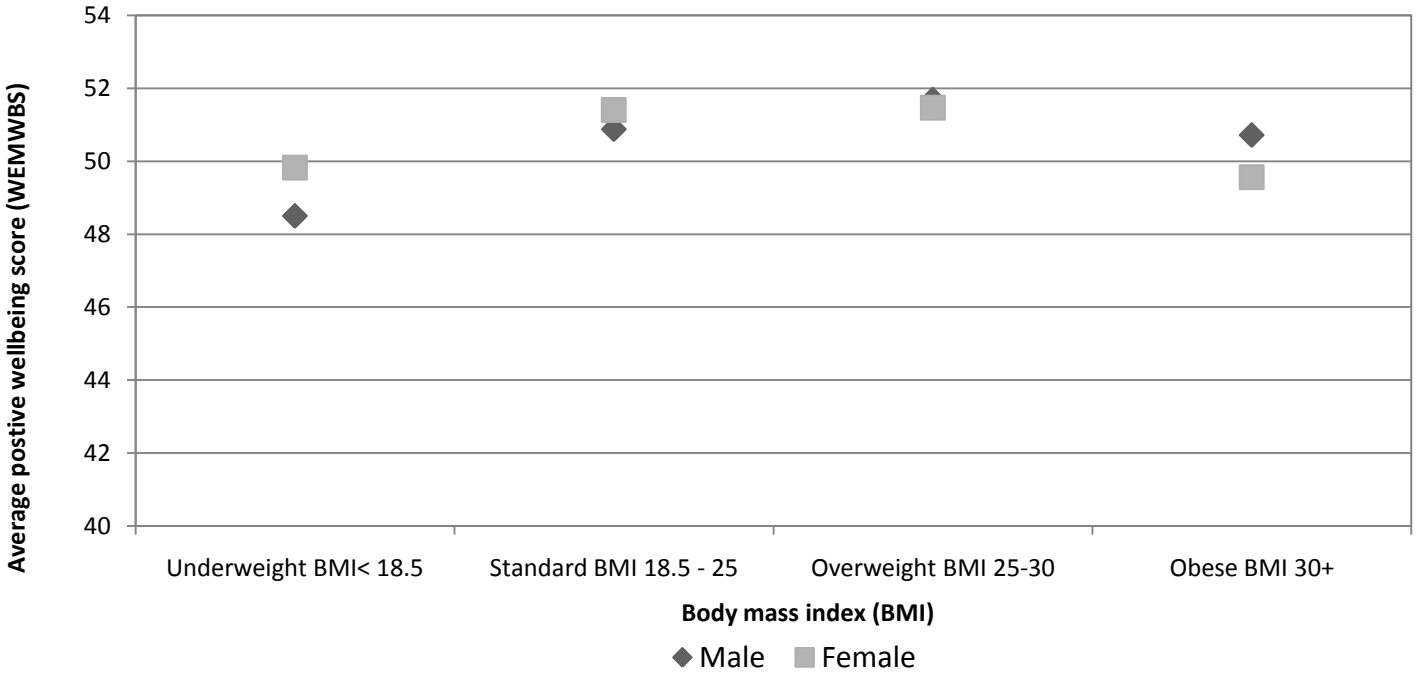


Data source: The Health Survey for England 2010, Warwick and Edinburgh Mental Wellbeing Scale (WEMWBS)

Figure 100: Positive mental wellbeing in drinkers and non-drinkers, England, 2010

As with alcohol, the association between body mass index and adult wellbeing is non-linear. Levels of reported wellbeing are consistently higher for adults who are overweight (but not obese) as compared with those of 'standard' weight (Figure 101). Obese adults report reduced levels of wellbeing but for males, the lowest level of reported wellbeing was among those who were underweight. Again, this finding is consistent with that observed in analysing

wellbeing indicators in previous surveys, especially the Health Survey for England 2006. In particular, being clinically overweight (but not obese) is consistently found to be associated with the highest levels of mental wellbeing.



Data source: The Health Survey for England 2010, Warwick and Edinburgh Mental Wellbeing Scale (WEMWBS)

Figure 101: Positive mental wellbeing and body mass index in adults, England, 2010

3.8.2 Risk Factors for Liver Disease

One major risk factor in liver disease is known to be drinking alcohol above recommended limits, therefore the recent reducing trends in over-limit drinking, both nationally and within the region, represent a hopeful development and should encourage maintained efforts at health promotion focussed on awareness of alcohol risk. Progress is not yet so apparent in reducing risks associated with obesity. The analyses presented in this section of the report highlight three population groups raising particular health risk concerns, potentially indicating special focus in communicating health messages:

- Teenage girls, especially in respect of alcohol and smoking risk.
- Early middle-aged adults in the North West, especially in respect of drinking over-limits.
- Single mothers, both in respect of over-limit drinking, and also obesity.

3.8.3 Recovery Factors for Liver Disease

Liver disease takes many years to develop so current outcomes such as mortality and hospitalisation are likely related to past, as well as current, behaviour. While Health Survey for England data show North West adult populations continue to be more likely than average to drink over-limits, the scale of this relative difference has reduced over the years in question. The association between risk factors such as alcohol consumption and obesity and liver disease is a complex one with outcomes being associated with a range of factors including genetic predisposition. The amount of alcohol a person consumes is, for example, clearly a risk factor for the development of alcohol-related liver disease but characteristics of drinking patterns have a mediating effect. Drinking alcohol with food over a long time period, for example, may be less detrimental than drinking the same amount of alcohol quickly and on an empty stomach. The findings presented here indicate that levels of alcohol use and obesity in the North West are now similar to other areas of England, yet the harm evident from higher mortality and hospitalisation suggests that the excess liver disease mortality and morbidity seen in the North West may be partially explained by variance in access to recovery. More

specifically, it is possible that the North West population: recovers more slowly, less well and less completely from liver disease; is more likely to be admitted to hospital and experience higher levels of treatment; and is more likely to suffer premature mortality. The emphasis in recent years on recovery-oriented drug treatment could well have a role in other aspects of health care including for liver disease. This approach emphasises that clinical treatment should not be detached and delivered in isolation from other components of effective treatment (40). Other elements of overall care also need to be considered, including individual recovery planning, psychosocial interventions and integration with mutual aid and peer support. All of these, in different combinations with different patients, and adjusted over time, can and do support recovery.

Public health in the North West has been striving to achieve a better systematic understanding of the characteristics and limitations of recovery (as observed in differences in incidence, prevalence and duration of certain conditions) through statistical analyses of longitudinal survey datasets (41), and through the self-reported experience of populations with direct experience of recovery; recovering alcoholics, drug users and former offenders. This ongoing work suggests four particular characteristics of recovery that may inform a general approach to 'getting ill better'[4]:

- Recovery is universal. Analyses of longitudinal datasets of limiting long-term illness confirm that everyone who does not die eventually recovers. Recovery is faster and more complete in those populations with better access to recovery assets, of which the most important is continued employment.
- Recovery is to be distinguished from the completion of acute treatment, and from the establishing of continuing clinical condition management. Excess clinical treatment is commonly a characteristic of delayed recovery; studies of patients self-reporting unmet need, commonly establish that these persons have experienced higher, not lower, utilisation of treatment (41).
- Recovery commonly requires access to the capacity to change social context. Whereas treatment interventions are conventionally framed with the objective of returning a patient as far as possible to their state before they became ill, recovery requires establishing in the patient the capability of functioning in a changed social context in which their condition is unlikely to recur. So for example, a person exiting from alcohol detoxification is less likely to achieve a sustained recovery from alcohol use if they return to a house inhabited by other alcohol users, cannot find employment and have little to occupy their time.

Recovery benefits individuals themselves as well as society at large and peer-led recovery (with greater reliance on peer-support and mutual aid) may be beneficial, at least for some individuals and at some particular stages of treatment and rehabilitation (40). It requires clinicians and others providing services to recognise the strengths brought by patients and their peers to enable one another to achieve and sustain recovery and to give them greater control over how and where treatment and recovery occur.

[4] Findings were reported by Tom Hennell: 'Getting ill Better - Developing a Systematic Understanding of Recovery from Emerging Perspectives within Public Health', presentation to 'Inside Government' seminar on 'Substance Dependence: Intervention, Prevention, Recovery' on 18th September 2012.

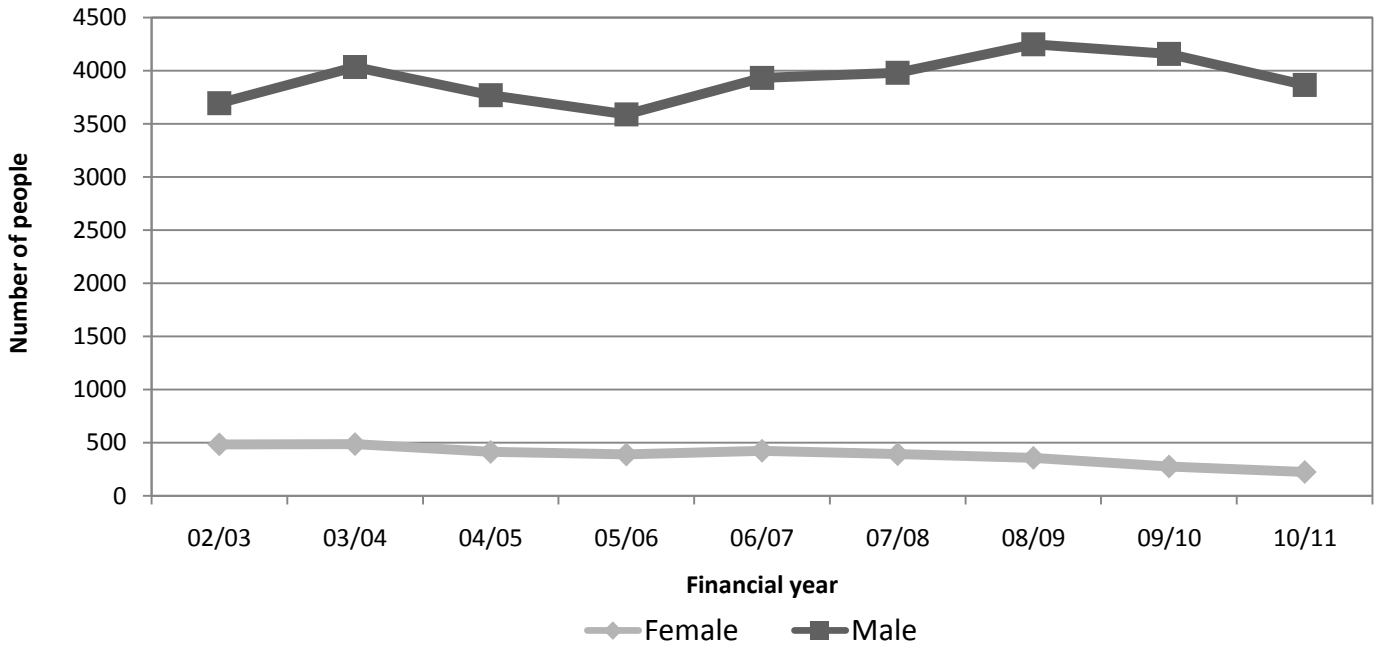
3.9 Prevention and Harm Reduction

The next section of this report describes some liver disease prevention and harm reduction activities occurring in the North West. Supplementary tables can be found in Appendix 1.

3.9.1 Needle and Syringe Programmes

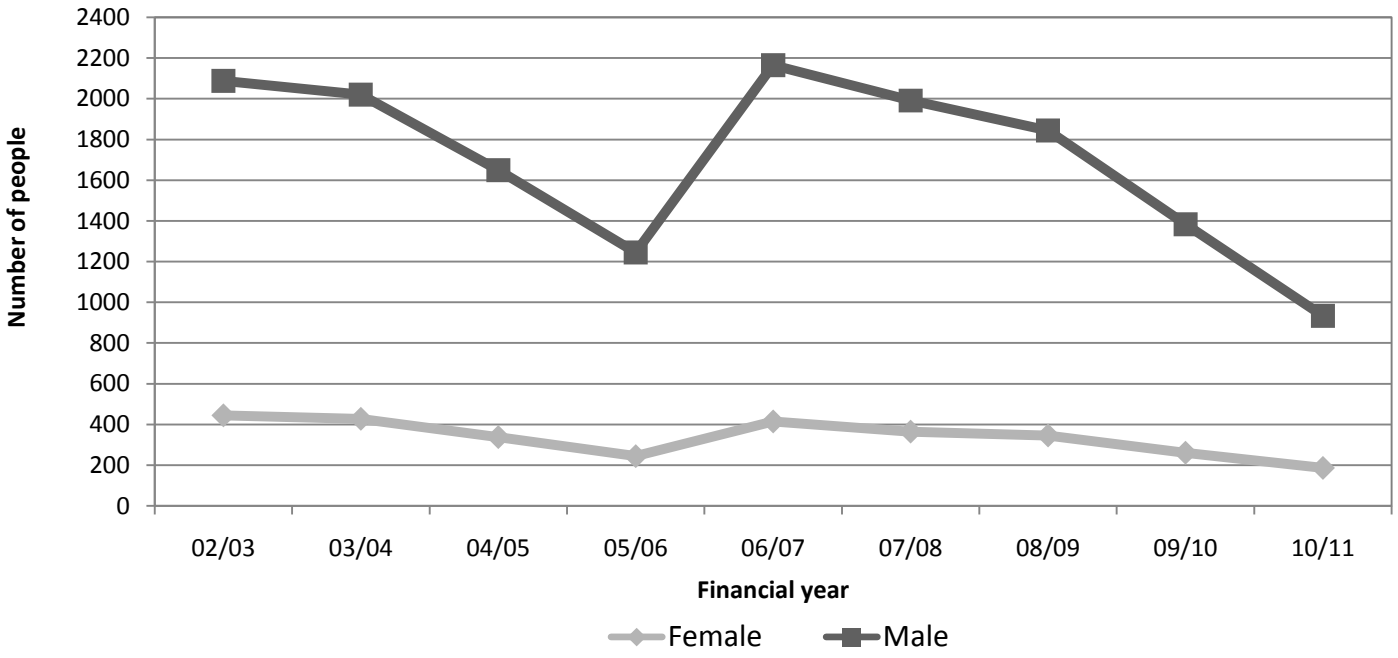
Blood borne viruses are transmitted between injecting drug users through the communal use of contaminated injecting equipment and data in Section 3.5.3 show that injecting drug use is the most common route of hepatitis C infection. The Advisory Council on the Misuse of Drugs recommends that a combination of opiate substitute therapy and needle and syringe programmes are the most effective way of reducing the spread of hepatitis C among those who inject drugs (42).

Figures 102 and 103 report the number of people accessing needle and syringe programmes in Cheshire and Merseyside including and excluding people attending the service as injectors of performance and image enhancing drugs respectively. Through the 1990s, needle and syringe programmes witnessed a rise in the number of people accessing services who injected performance and image enhancing drugs, and a decline in the number of attendees who were injecting other drugs (43); Figures 102 and 103 show this pattern has continued. Efforts to ensure that drug injectors are protected against the risk of the transmission of blood borne viruses, including the provision of clean injecting equipment, continue to be important public health initiatives. While injectors of performance and image enhancing drugs do so intramuscularly rather than intravenously, there have been calls that injectors of these drugs should not be excluded from efforts to prevent the spread of blood borne viruses (44).



Data source: Inter Agency Drug Misuse Database, Centre for Public Health, Liverpool John Moores University

Figure 102: Total number of people accessing needle and syringe programmes, Cheshire and Merseyside, 2002/03 to 2010/11



Data source: Inter Agency Drug Misuse Database, Centre for Public Health, Liverpool John Moores University

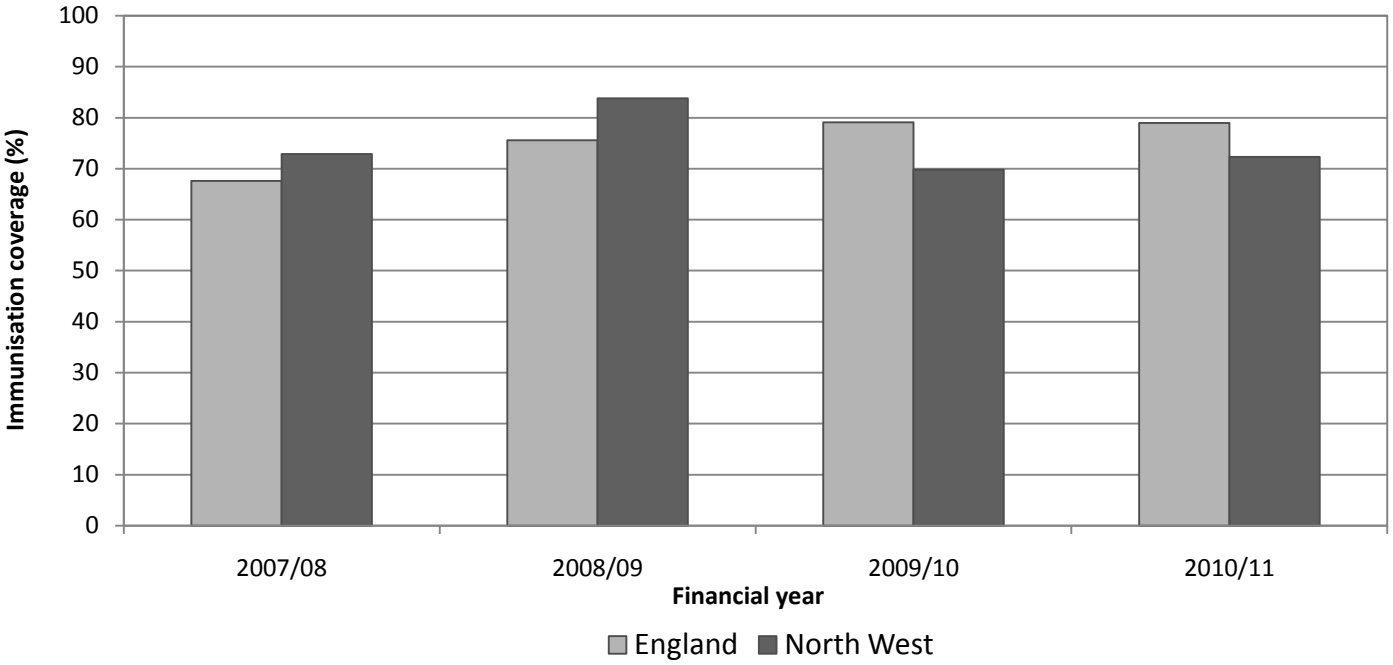
Figure 103: Number of people, excluding injectors of performance and image enhancing drugs, accessing needle and syringe programmes, Cheshire and Merseyside, 2002/03 to 2010/11

3.9.2 Uptake of Hepatitis B Vaccine: Prisons, Injecting Drug Users and Babies Born to Positive Mothers

In England the hepatitis B vaccine is not a routine vaccine but should be considered for those people that are at increased risk of being infected with the hepatitis B virus or could be at risk of serious complications; these include for example: injecting drug users; people who change their sexual partners frequently; men who have sex with men; babies born to infected mothers; prisoners; and a number of other risk groups.

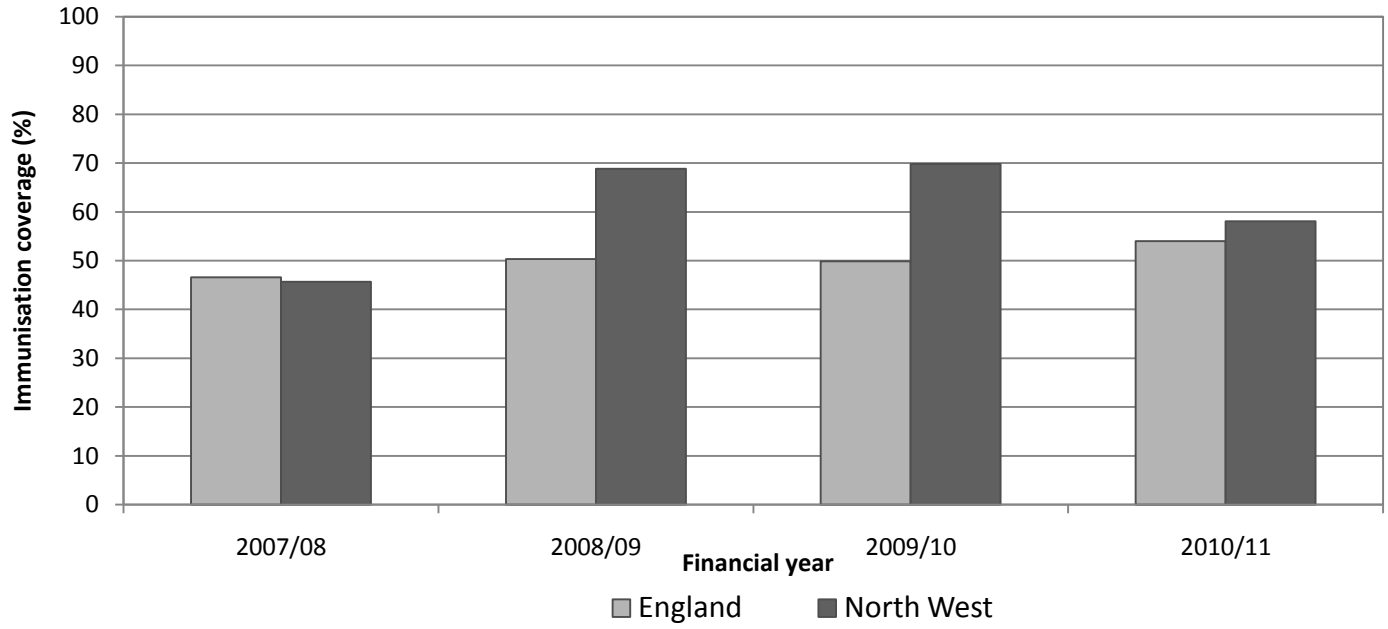
a) Among babies born to hepatitis B positive mothers

Babies born to hepatitis B positive mothers are given a dose of the vaccine at birth, followed by doses at one and two months and a booster dose is given 12 months after the third dose. Figures 104 and 105 show immunisation coverage at 12 months and 24 months after birth for babies born to hepatitis B positive mothers. In the North West and England, coverage of three doses at 12 months has remained relatively consistent between 2007/08 and 2010/11 averaging 75% coverage. In 2010/11 proportion coverage was higher for England (79%) compared to the North West (72%). However, at 24 months a greater proportion of babies in the North West have progressed to four doses than nationally between 2007/08 to 2010/11.



Data source: NHS immunisation statistics, The NHS Information Centre for Health and Social Care

Figure 104: Hepatitis B immunisation coverage of three doses among babies born to positive mothers, at 12 months, England and North West, 2007/8 to 2010/11

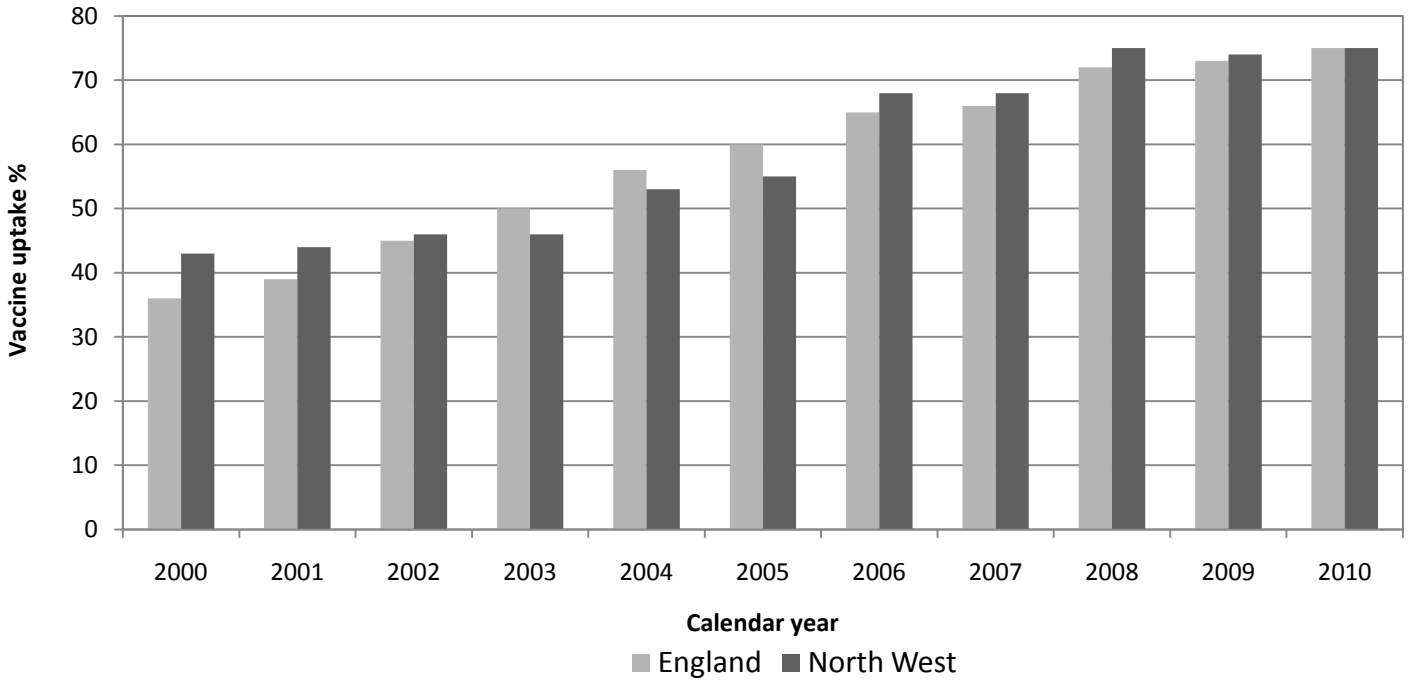


Data source: NHS immunisation statistics, The NHS Information Centre for Health and Social Care

Figure 105: Hepatitis B immunisation coverage of four doses among babies born to positive mothers, at 24 months, England and North West, 2007/8 to 2010/11

b) Among injecting drug users

The Unlinked Anonymous Monitoring Survey of Injecting Drug Users shows that from 2000 to 2010 the numbers reporting having been vaccinated has increased significantly both nationally (36% to 75%) and in the North West (43% to 75%) (Figure 106). This is likely to have contributed to the decline in hepatitis B infection in injecting drug users (24).



Data source: Unlinked Anonymous Monitoring Survey of injecting drug users

Figure 106: Reported uptake of hepatitis B vaccine among injecting drug users, England and North West, 2000 to 2010.

c) In prisons

Table 3 shows the uptake of the hepatitis B vaccine in prisons located within the North West. For the majority of prisons the proportion of coverage has increased since 2010. When interpreting this information please take into account the caveats below.

Table 3: Hepatitis B vaccine coverage in prisons in the North West, 2006 to 2010

HPU	Prison	2006	2007	2008	2009	2010
Cheshire & Merseyside	HMP Styal	1%	5%	38%	48%	67%
	HMP Risley	34%	51%	75%	80%	67%
	HMP Thorn Cross	19%	38%	68%	61%	71%
	HMP Liverpool	46%	32%	28%	17%	46%
	HMP Altcourse	7%	NA	NA	NA	NA
Cumbria & Lancashire	HMP Kennet	NA	NA	5%	49%	43%
	HMP Haverigg	2%	22%	47%	55%	51%
	HMP Lancaster Farms	33%	36%	23%	64%	21%
	HMP Lancaster Castle	69%	27%	98%	59%	80%
	HMP Kirkham	14%	39%	45%	57%	70%
	HMP Garth	61%	78%	36%	30%	12%
	HMP Preston	27%	44%	46%	54%	22%
	HMP Wymott	34%	40%	50%	22%	44%
Greater Manchester	HMP Manchester	15%	14%	35%	51%	56%
	HMP Hindley	146%	245%	63%	70%	NA
	HMP Buckley Hall	27%	36%	64%	90%	69%
	HMP Forest Bank	23%	44%	63%	40%	7%

Data source: Prison Infection and Protection team

2005 – Nov 2007:

Vaccine coverage = (Number of prisoners already vaccinated + Number of prisoners vaccinated within one month of reception) / Throughput for the month

Dec 2007 onwards:
Vaccine coverage = (Number of receptions vaccinated within one month of reception + Number of receptions vaccinated prior to reception) / Number of receptions for the month

Notes:

The Prison Infection and Protection team used fixed denominators provided by Offender Health, which were estimates of throughput for the month based on yearly, average throughput until December 2007. The Prisons Infection and Protection team then moved to ask each individual prison to report actual throughput together with the number of new receptions vaccinated that month. However from December 2007 a minority of prisons did not supply actual throughput figures so estimates have been used based on that year.

There are a small number of prisons where vaccine coverage is more than 100% even after December 2007. This is because in some cases the throughput figure was still an estimate.

NA – not available.

4.0 Conclusions and Recommendations

4.1 Conclusions

- The premature and avoidable mortality caused by liver disease, together with the gap between burden in the North West and England, indicate the scale and urgency of the problem.
- The burden of liver disease among middle aged men is striking.
- Alcohol is the biggest single cause of liver disease.
- While deprivation may explain a large proportion of the variability in mortality for alcohol-related liver disease, it does not account for all local authority level variation for other liver diseases.
- The percentage difference in survival rates between the North West and England is largest one-year after diagnosis. This suggests that proportionally more patients in this region are being diagnosed with advanced disease.
- Prevalence of hepatitis C among injecting drug users remains higher in the North West than the rest of England.
- Although the burden of liver disease currently affects middle aged men disproportionately, analysis of data from the Health Survey for England 2010 suggests other demographic groups, particularly females, are at risk of chronic liver disease in the future.
- Hospital admission data represent the most severe cases of liver disease and do not include people treated in primary care or outpatient departments where the majority of people with liver disease are treated. This will particularly effect interpretation of admissions for fatty liver disease and hepatitis C. The full burden of liver disease is therefore not fully reflected in the data presented here.

4.2 Recommendations

Universal

- Tackling liver disease should be a priority for North West commissioners of prevention and treatment services and for organisations that provide services to those at risk and/or affected.
- Organisations that commission and provide services should work collaboratively to reduce the burden of liver disease, learning from established networks.
- Commissioners should work with primary care and clinical commissioning groups to investigate local intelligence so that interventions are targeted at the populations most at risk.
- Commissioners and providers should work together to devise a strategy for early diagnosis.
- Surveillance systems should be developed further in order to address information gaps.
- Organisations should raise awareness of hepatitis B and C for those at risk or with past exposure.
- The North West needs an end of life strategy for liver disease patients.
- Further investigation of the causes of differences in liver disease burden between local authorities is needed in order to target interventions at populations most affected.
- This report brings together data from a number of sources but there are other sources and other analyses which could have been included. We hope that it will act as an exemplar for other areas and recommend that it be further developed in both the North West and elsewhere.

Prevention

- Policies that focus on reducing alcohol consumption should remain a priority.
- Policies should not only target those groups that currently have a high burden of chronic liver disease but also groups such as young females whose current behaviours put them at risk of progression to chronic liver disease.
- Strategies to prevent the transmission of hepatitis C, including needle and syringe programmes among injecting drug users should remain a priority.
- Hepatitis B immunisation rates in all at risk groups should be improved: including babies born to mothers with hepatitis B; injecting drug users; and individuals who change sexual partners frequently.
- Hepatitis B immunisation programmes for injecting and ex-injecting drug users in prisons should continue to be strengthened.

Treatment and care

- Early intervention is essential and primary care should play a key role in detecting early liver disease.
- More specifically, we recommend:
    - Early identification and early treatment of people with chronic hepatitis B and C, including active case finding of ex-injecting drug users, in order to reduce the long term complications of infection.
    - The strengthening of strategies which support the early identification of excessive alcohol use.
    - That the number of people being tested for chronic hepatitis B and C is increased and forthcoming National Institute for Health and Clinical Excellence (NICE) guidance on ways to offer and promote testing is followed.
    - That consideration should be given to setting up a programme whereby individuals at high risk of developing hepatocellular cancer are offered an ultrasound examination in order to identify cancer at an earlier stage. Further work is required to examine the completeness of reporting and coding of liver cancers.
- Better outcome data on hepatitis C treatment are needed.

Recovery

- The recovery approach which is promoted for drug treatment recognises that many people in need of treatment have complex physical, mental and social problems requiring complex interventions. Elements of overall care include individual care planning, psychosocial interventions and integration with mutual aid and peer support. This approach should be explored in relation to other causes of liver disease.

5.0 Data Sources

1. Mid-year population estimates, Office for National Statistics: www.ons.gov.uk/ons/datasets-and-tables/index.html

2. Indices of deprivation 2010, Communities and Local Government: www.communities.gov.uk/communities/research/indicesdeprivation/deprivation10/

3. Mortality statistics, Office for National Statistics: www.statistics.gov.uk/default.asp

4. Hospital Episode Statistics, The NHS Information Centre for Health and Social Care: www.hesonline.nhs.uk/Ease/servlet/ContentServer?siteID=1937&categoryID=537

5. Cancer registrations, North West Cancer Intelligence Service and National Cancer Data Repository: www.nwcis.nhs.uk/data/default.aspx

6. National Alcohol Treatment Monitoring System: www.nwph.net/nwpho/Publications/Forms/AllItems.html www.alcohollearningcentre.org.uk/Topics/Browse/Data/NATMS/?parent=5474&child=6043

7. National Drug Treatment Monitoring System: www.ndtms.net/Default.aspx

8. The Big Drink Debate North West, North West Public Health Observatory: www.nwph.net/nwpho/Publications/Forms/AllItems.html

9. Health Profiles obestity data, The Network of Public Health Observatories: www.apho.org.uk/default.aspx?QN=P_HEALTH_PROFILES

10. Inter Agency Drug Misuse Database, Centre for Public Health: www.cph.org.uk/substanceuse/iad/index.aspx?teamid=27

11. Unlinked Anonymous Monitoring survey of IDUs in contact with specialist drug services, Health Protection Agency: www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/InjectingDrugUsers/

12. Laboratory Reporting to Health Protection Services, Health Protection Agency, Colindale: www.hpa.org.uk/ProductsServices/InfectiousDiseases/ServicesActivities/Surveillance/SourcesOfSurveillanceData/survLaboratoryReporting/ www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/HepatitisC/EpidemiologicalData/hepcLabAge/

13. Sentinel Surveillance of Hepatitis C Testing, Health Protection Agency: www.hpa-bioinformatics.org.uk/hepc/home.php

14.Commissioning template for estimating HCV prevalence by DAT and numbers eligible for treatment, Health Protection Agency: www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/HepatitisC/EpidemiologicalData

15. UK Transplant Registry, NHS Blood and Transplant: www.organdonation.nhs.uk/ukt/default.jsp

16. Health Survey for England. The NHS Information Centre for Health and Social Care: www.ic.nhs.uk/statistics-and-data-collections/health-and-lifestyles-related-surveys/health-survey-for-england

17. North West Mental Wellbeing Survey 2009, North West Public Health Observatory: www.nwph.net/nwpho/Publications/Forms/AllItems.html

18. The Prison Infection Prevention (PIP) Team, Health Protection Agency: www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/PrisonInfectionPreventionTeam/

6.0 References

1. National end of life care intelligence network (2012). Deaths from liver disease. Implications for end of life care in England. Bristol: South West Public Health Observatory.

2. HM Government (2012). The Government's alcohol strategy. London: HM Government.

3. British Association for the Study of the Liver (BASL) and British Society of Gastroenterology (BSG, Liver Section) (2009). A time to act: improving liver health and outcomes in liver disease. A national plan for liver services U.K. 2009. Available at: www.bsg.org.uk/attachments/1004_National%20Liver%20Plan%202009.pdf, accessed May 2012.

4. The NHS Information Centre for Health and Social Care (2010). Statistics on obesity, physical activity and diet: England, 2010. Leeds: The NHS Information Centre for Health and Social Care.

5. Hart CL, Morrison DS, Batty GD, Mitchell RJ, Davey-Smith G (2010). Effect of body mass index and alcohol consumption on liver disease: analysis of data from two prospective cohort studies. *British Medical Journal*, 340; c1240.

6. Health Protection Agency (2011). Hepatitis C in the UK: 2011 Report. London: Health Protection Agency Centre for Infections. Available at: www.hpa.org.uk/web/HPAwebFile/HPAweb_C/1309969906418, accessed June 2012.

7. Health Protection Services (2011). Migrant Health: Infectious diseases in non-UK born populations in the United Kingdom. An update to the baseline report – 2011. London: Health Protection Agency. Available at: www.hpa.org.uk/webc/HPAwebFile/HPAweb_C/1317131998682, accessed June 2012

8. Department of Health (2012). Improving outcomes and supporting transparency. Part 1: A public health outcomes framework for England, 2013-2016. London: Department of Health.

9. The Marmot Review (2010). Fairer Society, Healthier Livers: London: The Marmot Review.

10. Office for National Statistics (2011). Life expectancy at birth and at age 65, England and Wales, 1991-1993 to 2008-2010. London: Office for National Statistics.

11. LPHO and EMPHO (2011). Allocation of Lower Super Output Areas (LSOAs) to Deciles/Quintiles/Quartiles. London: London Health Observatory. Available at: www.lho.org.uk/LHO_Topics/National_Lead_Areas/IMD2010.ASPX, accessed June 2012.

12. The Network of Public Health Observatories (2011). Health Profiles 2011. London: Department of Health. Available at: www.apho.org.uk/default.aspx?QN=P_HEALTH_PROFILES, accessed June 2012.

13. World Health Organization: International Statistical Classification of Diseases and Related Health Problems 10th Revision Version for 2007. Geneva: World Health Organization. Available at: http://apps.who.int/classifications/apps/icd/icd10online/, accessed June 2012

14. 1991 World Health Annual of Statistics - based on J Waterhouse et al (eds). Cancer Incidence in Five Continents. Lyon: International Agency for Research on Cancer, World Health Organization, 1976, 3, 456

15. Dickman PW, Sloggett A, Hills M, Hakulinen T (2004). Regression models for relative survival. *Statistics in Medicine*, 23, 51-64

16. Ederer, F, Heise, H (1959). Instructions to IBM 650 Programmers in Processing Survival Computations. Methodological note No. 10, End Results Evaluation Section. Bethesda, Maryland: National Cancer Institute.

17. Home Office, 2010. Drug Strategy 2010. Reducing demand, restricting supply, building recovery: supporting people to live a drug free life. London: The Stationery Office.

18. National Treatment Agency, 2006. Models of Care for treatment of adult drug misusers: update 2006. London: National Treatment Agency.

19. Home Office, 2002. Updated Drug Strategy. Home Office: London.

20. Home Office, 2008. Drugs: Protecting families and communities- 2008-18 strategy. Home Office: London.

21. Cook PA, Tocque K, Morleo M, Bellis MA (2008). Opinions on the impact of alcohol on individuals and communities: early summary findings from the North West Big Drink Debate. Liverpool: North West Public Health Observatory.

22. Preece M, Freeman J, Cole T (1996). Sex differences in weight in infancy: published centile charts have been updated. *British Medical Journal*, 313, 1486

23. The NHS Information Centre for Health and Social Care (2011). National Child Measurement Programme: England, 2010/11 school year. Leeds: The NHS Information Centre for Health and Social Care, Lifestyles Statistics.

24. Health Protection Agency (2011). Unlinked Anonymous Monitoring Survey of Injecting Drug Users in contact with specialist services. London, Health Protection Agency. Available at: www.hpa.org.uk/web/HPAweb&HPAwebStandard/HPAweb_C/1202115519183, accessed July 2012

25. The Network of Public Health Observatories (2008). Technical Briefing 3; commonly used public health statistics and their confidence intervals. Available at: http://www.apho.org.uk/resource/item.aspx?RID=48457, accessed May 2012

26. Erskine S, Maheswaran R, Pearson T, Gleeson D (2010). Socioeconomic deprivation, urban-rural location and alcohol-related mortality in England and Wales. *BMC Public Health*, 10, 99.

27. Department of Health (2008). Safe, Sensible, Social – Consultation on further action. London: Department of Health.

28. Morleo M, Spalding J, Carlin H, Deacon L, Cook PA, Tocque K, Perkins C, Bellis MA (2010). Alcohol pen portraits: Segmentation series report 4. Liverpool: North West Public Health Observatory.

29. Health Protection Agency (2009) Hepatitis C: general information. Available at: www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/HepatitisC/GeneralInformation/, accessed July 2012.

30. Onomap. Available at www.onomap.org/

31 Cummins C, Winter H, Cheng KK, Maric R, Silcocks P, Varghese C (1999). An assessment of the Nam Pehchan computer program for the identification of names of south Asian ethnic origin. *Journal of Public Health Medicine*, 21, 401–406.

32. National Treatment Agency. Injecting drug use in England: A declining trend. 2010. London: National Treatment Agency. Available at: www.nta.nhs.uk/uploads/injectingreportnov2010finala.pdf, accessed May 2012

33. The Centre for Drug Misuse Research and The National Drug Evidence Centre. Estimates of the prevalence of opiate use and/or crack cocaine use 2008/09: Sweep 5 report. London: National Treatment Agency. Available at: www.nta.nhs.uk/uploads/glasgowprevalencestudysweep5-technicalreport2008-09%5B0%5D.pdf , accessed May 2012

34. Health Protection Agency (2006). Hepatitis C in England: An Update 2006. Editors: Harris HE, Ramsay ME. London: Health Protection Agency.

35. Health Protection Agency (2011). Commissioning template for estimating HCV prevalence and numbers eligible for treatment by Drug Action Team Area. London: Health Protection Agency. Available at: www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/HepatitisC/EpidemiologicalData, accessed June 2012.

36. Health Protection Agency (2009). Hepatitis B: general information. Available at: www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/HepatitisB/GeneralInformationHepatitisB/hepbGeneralInfo, accessed July 2012.

37. World Health Organization (2012). Factsheet: Hepatitis B. Geneva: World Health Organization. Available at: www.who.int/mediacentre/factsheets/fs204/en/index.html, accessed July 2012

38. NHS Choices (2011). Hepatitis B- Prevention. London: Department Health Available at: www.nhs.uk/Conditions/Hepatitis-B/Pages/Prevention.aspx , accessed July 2012

39. Health Protection Agency (2012). Antenatal Screening of Infectious Diseases. Annual Report 2012. London: Health Protection Agency. Available at: www.hpa.org.uk/webc/HPAwebFile/HPAweb_C/1281953554899), accessed July 2012

40. Strang J, 2011. Recovery-oriented drug treatment: an interim report by Professor John Strang, chair of the expert group. London: National Treatment Agency. Available at: www.nta.nhs.uk/uploads/rodt_an_interim_report_july_2011.pdf, accessed July 2012

41. Bartley M, Sacker A, Clarke P (2004). Employment status, employment conditions, and limiting illness: prospective evidence from the British household panel survey 1991-2001. *Journal of Epidemiology and Community Health*, 58, 501-506.

42. Advisory Council on the Misuse of Drugs (2009). The primary prevention of hepatitis C among injecting drug users. London: Home Office.

43. McVeigh J, Beynon C, Bellis MA (2003). New challenges for agency based syringe exchange schemes: Analysis of 11 years of data (1991-2001) in Merseyside and Cheshire, United Kingdom. *International Journal of Drug Policy*, 14, 399-405.

44. Aitken C, Delalande C, Stanton K (2002). Pumping iron, risking infection? Exposure to hepatitis C, hepatitis B and HIV among anabolic–androgenic steroid injectors in Victoria, Australia. *Drug and Alcohol Dependence*, 65, 303–308.

Appendix 1: Supplementary Tables

Table 4: Deaths from all liver disease (underlying cause); directly standardised rates per 100,000 population, 2006 to 2010

Local Authority	Males			Females			Persons		
	Rate	LCI	UCI	Rate	LCI	UCI	Rate	LCI	UCI
Bolton	30.0	26.1	34.4	16.4	13.6	19.6	23.0	20.5	25.6
Bury	26.7	22.3	31.7	14.0	11.1	17.4	20.3	17.6	23.2
Manchester	47.0	42.6	51.7	22.3	19.4	25.6	34.4	31.8	37.2
Oldham	35.6	30.8	41.0	20.8	17.3	24.8	27.9	25.0	31.2
Rochdale	34.1	29.3	39.4	18.0	14.7	21.8	25.8	22.9	29.0
Salford	39.0	33.9	44.6	21.2	17.5	25.4	30.0	26.8	33.4
Stockport	28.7	25.0	32.7	15.6	13.0	18.5	21.8	19.6	24.2
Tameside	28.0	23.8	32.7	16.5	13.5	20.1	22.0	19.4	24.8
Trafford	24.8	20.9	29.2	12.7	10.0	15.7	18.4	16.1	21.0
Wigan	28.1	24.6	32.0	18.5	15.7	21.5	23.3	21.1	25.7
Knowsley	32.7	27.1	39.0	19.8	15.8	24.5	25.8	22.4	29.6
Liverpool	40.1	36.4	44.1	19.9	17.4	22.7	29.5	27.3	31.9
St Helens	35.2	30.1	40.9	22.5	18.6	27.0	28.8	25.6	32.4
Sefton	27.9	24.2	32.0	15.6	13.0	18.5	21.3	19.0	23.7
Wirral	37.0	32.9	41.4	17.9	15.3	20.9	26.8	24.4	29.3
Cheshire East	19.7	17.1	22.6	12.2	10.3	14.4	15.8	14.2	17.5
Halton	29.9	24.1	36.7	18.5	14.3	23.6	23.9	20.3	27.9
Warrington	23.1	19.2	27.5	13.9	11.0	17.4	18.4	16.0	21.1
Cheshire West and Chester	25.4	22.3	28.9	12.0	10.0	14.4	18.5	16.6	20.5
Blackburn with Darwen	38.0	31.7	45.2	19.7	15.3	24.8	28.8	24.9	33.1
Blackpool	58.4	51.0	66.6	27.4	22.4	33.2	42.7	38.1	47.5
Allerdale	20.5	15.7	26.4	12.6	8.9	17.3	16.4	13.3	19.9
Barrow-in-Furness District	33.4	25.9	42.4	16.5	11.4	23.1	24.6	20.1	29.9
Carlisle	23.6	18.5	29.7	13.5	9.8	18.2	18.2	15.0	21.8
Copeland	15.7	10.8	22.1	13.3	8.8	19.0	14.4	11.1	18.5
Eden	8.8	5.1	14.0	7.8	4.3	12.8	8.2	5.6	11.6
South Lakeland	14.3	10.5	19.0	10.8	7.6	14.7	12.5	10.0	15.4
Burnley	33.1	26.2	41.4	17.4	12.6	23.5	24.7	20.5	29.5
Chorley	22.8	17.7	28.8	12.9	9.2	17.6	17.6	14.4	21.2
Fylde	25.5	19.5	32.8	13.1	9.0	18.3	19.1	15.4	23.4
Hyndburn	41.8	33.5	51.5	16.8	12.0	22.9	29.1	24.3	34.6
Lancaster	24.6	19.8	30.2	17.5	13.5	22.4	20.8	17.6	24.3
Pendle	26.6	20.5	33.9	14.6	10.2	20.2	20.4	16.6	24.8
Preston	32.5	26.5	39.3	17.3	13.0	22.4	24.9	21.2	29.0
Ribble Valley	16.8	11.0	24.3	13.9	9.0	20.5	15.4	11.5	20.1
Rossendale	30.1	22.7	39.2	14.4	9.6	20.7	21.9	17.4	27.1
South Ribble	20.8	16.1	26.6	13.1	9.5	17.7	16.8	13.8	20.3
West Lancashire	22.3	17.3	28.3	13.7	10.1	18.2	17.8	14.7	21.3
Wyre	26.3	21.2	32.3	11.4	8.1	15.6	18.2	15.2	21.6
North West	**30.2**	**29.4**	**31.0**	**16.5**	**15.9**	**17.1**	**23.1**	**22.6**	**23.6**
England	**21.7**	**21.5**	**22.0**	**11.3**	**11.1**	**11.5**	**16.3**	**16.2**	**16.5**

LCI and UCI: 95% lower and upper confidence interval respectively.

Table 5: Hospital admissions for all liver disease (primary diagnosis); directly standardised rates per 100,000 population, 2010/11

Local Authority	Males			Females			Persons		
	Rate	LCI	UCI	Rate	LCI	UCI	Rate	LCI	UCI
Bolton	132.0	113.3	153.0	94.9	79.5	112.3	113.1	100.8	126.4
Bury	168.7	143.3	197.3	94.0	75.6	115.6	130.4	114.6	147.7
Manchester	293.6	269.9	318.7	144.9	128.0	163.3	220.2	205.6	235.6
Oldham	159.3	136.2	185.2	106.5	88.2	127.5	132.2	117.4	148.4
Rochdale	213.0	185.7	243.1	155.6	132.7	181.3	183.7	165.8	203.0
Salford	212.0	186.1	240.5	84.4	68.1	103.4	149.3	133.7	166.2
Stockport	118.7	102.0	137.2	79.4	66.0	94.5	98.2	87.5	109.8
Tameside	163.5	140.5	189.0	91.4	74.9	110.4	126.5	112.3	141.9
Trafford	97.7	80.1	118.0	52.3	40.2	66.6	74.8	64.0	86.8
Wigan	152.4	134.0	172.7	91.7	77.6	107.5	121.5	109.8	134.1
Knowsley	118.9	95.2	146.5	89.3	70.0	112.0	103.2	87.9	120.4
Liverpool	197.7	178.7	218.2	114.9	100.9	130.2	154.4	142.7	166.9
St Helens	103.5	83.8	126.5	67.5	52.1	85.9	85.2	72.5	99.4
Sefton	108.1	91.5	126.8	53.2	42.2	66.0	78.9	69.0	89.7
Wirral	148.8	130.3	169.1	78.4	65.6	92.9	111.4	100.3	123.4
Cheshire East	95.0	82.1	109.4	59.6	49.1	71.6	76.5	68.2	85.6
Halton	121.5	95.5	152.4	50.6	35.2	70.4	84.6	69.5	101.9
Warrington	92.2	74.8	112.3	70.2	55.3	87.7	81.0	69.4	93.9
Cheshire West and Chester	98.0	84.1	113.6	57.4	46.8	69.7	77.0	68.2	86.6
Blackburn with Darwen	155.3	127.1	187.9	80.1	60.3	104.2	118.1	100.5	137.8
Blackpool	137.9	112.5	167.2	82.5	62.0	107.3	109.4	93.0	127.9
Allerdale	89.7	67.0	117.5	85.7	62.9	113.8	87.2	70.9	106.0
Barrow-in-Furness District	113.8	83.3	151.8	64.8	42.3	94.5	89.4	70.1	112.4
Carlisle	152.1	122.6	186.4	65.3	47.0	88.0	107.5	90.1	127.2
Copeland	109.1	80.1	144.9	104.6	77.2	138.3	107.8	87.4	131.6
Eden	81.4	53.0	119.2	37.8	21.0	62.1	60.0	42.9	81.3
South Lakeland	48.4	32.7	68.5	80.0	53.6	113.6	63.3	47.7	81.7
Burnley	124.2	92.4	163.4	83.3	58.4	115.2	102.3	81.9	126.1
Chorley	117.9	92.3	148.4	90.4	68.1	117.5	102.0	84.9	121.3
Fylde	123.2	92.9	159.9	40.7	21.9	67.9	80.9	62.9	102.3
Hyndburn	103.9	73.9	141.8	74.7	51.0	105.4	89.1	69.6	112.3
Lancaster	136.9	110.0	168.2	67.6	49.3	90.4	101.0	84.6	119.6
Pendle	154.2	120.0	195.0	188.2	151.7	230.6	172.3	146.8	200.9
Preston	183.3	151.8	219.4	136.0	108.2	168.7	159.2	137.9	182.8
Ribble Valley	97.3	60.7	146.4	18.8	7.6	38.0	58.5	38.6	84.2
Rossendale	163.0	123.4	211.3	43.5	25.1	69.7	101.8	79.9	127.8
South Ribble	73.2	52.4	99.4	58.2	40.6	80.9	65.4	51.4	81.9
West Lancashire	63.5	45.2	86.6	55.8	38.7	77.6	59.6	46.7	74.8
Wyre	100.5	75.4	130.8	18.3	10.1	30.2	58.3	45.1	73.9
North West	**141.7**	**137.8**	**145.6**	**83.8**	**80.9**	**86.9**	**112.1**	**109.7**	**114.6**
England	**119.0**	**117.7**	**120.3**	**69.7**	**68.7**	**70.7**	**93.8**	**93.0**	**94.6**

LCI and UCI: 95% lower and upper confidence interval respectively.

Table 6: Hospital admissions for all liver disease (all diagnoses); directly standardised rates per 100,000 population, 2010/11

Local Authority	Males			Females			Persons		
	Rate	LCI	UCI	Rate	LCI	UCI	Rate	LCI	UCI
Bolton	401.0	367.9	436.2	290.5	262.9	320.1	343.4	321.8	366.0
Bury	482.2	438.5	529.0	332.4	297.5	370.2	405.7	377.7	435.2
Manchester	935.4	892.5	979.8	561.3	528.1	595.9	747.4	720.3	775.3
Oldham	423.9	385.9	464.5	286.2	255.8	319.0	352.7	328.5	378.3
Rochdale	744.0	692.6	798.3	462.6	422.8	505.1	598.1	565.7	631.9
Salford	760.5	710.0	813.6	386.9	351.1	425.2	576.8	545.5	609.4
Stockport	417.8	385.8	451.6	270.8	246.0	297.3	342.1	321.9	363.2
Tameside	487.7	447.6	530.4	281.3	251.5	313.6	381.5	356.6	407.8
Trafford	299.9	268.6	333.8	210.3	185.3	237.7	254.2	234.2	275.5
Wigan	503.8	469.5	539.9	359.5	331.5	389.3	431.6	409.3	454.7
Knowsley	396.2	352.1	444.4	348.2	308.5	391.4	368.9	339.3	400.5
Liverpool	848.6	809.0	889.6	494.9	465.7	525.5	666.2	641.7	691.3
St Helens	411.2	370.6	455.0	275.1	243.0	310.2	342.1	316.1	369.6
Sefton	508.2	470.7	547.9	254.3	229.5	281.0	373.4	351.2	396.6
Wirral	476.6	442.9	512.2	252.3	228.8	277.4	356.8	336.6	377.9
Cheshire East	272.0	249.7	295.8	169.8	152.2	188.7	219.6	205.3	234.5
Halton	464.8	412.0	522.6	280.5	242.8	322.2	369.4	337.1	404.0
Warrington	361.3	326.3	399.1	271.7	242.1	303.9	316.1	293.0	340.5
Cheshire West and Chester	297.9	273.1	324.4	206.3	185.9	228.1	251.0	234.9	267.9
Blackburn with Darwen	613.2	555.5	675.2	358.3	314.7	406.1	486.0	449.6	524.6
Blackpool	492.1	442.9	545.2	270.0	232.8	311.2	378.4	347.4	411.3
Allerdale	220.2	182.7	262.8	172.6	139.1	211.3	195.3	170.0	223.1
Barrow-in-Furness District	380.6	321.7	447.0	235.6	189.5	288.9	307.4	269.7	348.8
Carlisle	355.1	308.3	406.9	243.6	206.6	284.9	298.6	268.6	331.0
Copeland	215.0	173.0	264.0	246.4	201.6	297.8	231.6	200.5	266.1
Eden	202.5	152.2	263.0	106.2	72.0	149.8	155.3	123.9	191.5
South Lakeland	178.7	145.3	216.8	201.8	162.8	246.6	188.9	163.0	217.4
Burnley	666.5	589.4	750.8	419.0	360.5	484.0	537.2	488.9	588.9
Chorley	601.8	541.4	667.1	404.7	355.8	458.2	497.6	458.7	538.7
Fylde	331.8	279.1	391.2	184.7	144.2	231.8	258.0	224.4	294.9
Hyndburn	433.0	370.5	503.0	270.3	222.3	325.3	348.9	309.3	392.0
Lancaster	403.1	356.2	454.3	202.8	171.3	238.1	301.3	273.0	331.8
Pendle	462.5	402.6	528.7	494.9	433.7	562.1	479.5	436.2	525.8
Preston	711.7	648.1	779.9	447.7	397.1	502.8	580.5	539.5	623.7
Ribble Valley	269.0	206.8	342.7	131.1	97.3	172.3	202.0	165.5	243.6
Rossendale	498.4	428.3	576.7	218.9	175.0	270.2	356.0	314.6	401.4
South Ribble	404.3	354.2	459.3	290.3	249.7	335.5	344.6	312.3	379.3
West Lancashire	321.6	278.0	369.8	252.1	213.9	295.0	285.4	256.2	316.8
Wyre	281.0	238.5	328.5	116.2	91.9	144.5	197.1	172.6	223.9
North West	**482.5**	**475.3**	**489.8**	**305.9**	**300.3**	**311.6**	**392.2**	**387.7**	**396.8**
England	**368.1**	**365.8**	**370.3**	**233.9**	**232.1**	**235.7**	**299.2**	**297.7**	**300.6**

LCI and UCI: 95% lower and upper confidence interval respectively.

Table 7: Deaths from hepatocellular cancer (underlying cause); directly standardised rates per 100,000 population, 2006 to 2010

Local Authority	Males			Females			Persons		
	Rate	LCI	UCI	Rate	LCI	UCI	Rate	LCI	UCI
Bolton	3.3	2.1	4.8	0.8	0.4	1.6	1.9	1.3	2.7
Bury	3.2	1.9	5.2	0.8	0.2	1.7	1.9	1.2	2.8
Manchester	7.2	5.6	9.2	1.1	0.6	1.8	4.0	3.2	5.0
Oldham	5.5	3.7	7.8	0.6	0.2	1.4	2.9	2.0	4.0
Rochdale	3.0	1.7	4.8	0.9	0.3	2.1	1.9	1.2	2.9
Salford	5.3	3.6	7.5	0.6	0.2	1.5	2.8	2.0	3.9
Stockport	4.0	2.8	5.6	0.4	0.1	1.0	2.1	1.4	2.8
Tameside	3.2	2.0	5.0	0.9	0.3	1.7	2.0	1.3	2.9
Trafford	4.5	3.0	6.6	0.9	0.3	1.9	2.6	1.8	3.6
Wigan	1.6	0.9	2.7	0.7	0.2	1.4	1.1	0.7	1.7
Knowsley	3.7	2.0	6.1	0.3	0.0	0.9	1.8	1.0	2.9
Liverpool	5.4	4.1	6.9	0.9	0.5	1.6	2.9	2.3	3.7
St. Helens	3.8	2.3	5.8	0.2	0.0	1.2	1.9	1.2	2.9
Sefton	2.6	1.6	3.9	1.0	0.4	1.8	1.7	1.1	2.4
Wirral	3.4	2.3	4.8	0.9	0.4	1.6	2.0	1.4	2.7
Cheshire East	2.4	1.6	3.4	0.3	0.1	0.8	1.2	0.8	1.7
Halton	1.8	0.6	4.0	1.3	0.4	2.9	1.5	0.8	2.7
Warrington	1.7	0.8	3.2	0.5	0.1	1.5	1.0	0.5	1.8
Cheshire West and Chester	2.8	1.9	4.0	0.3	0.1	0.7	1.4	1.0	2.0
Blackburn with Darwen	1.8	0.7	4.0	1.1	0.3	2.8	1.4	0.7	2.5
Blackpool	4.9	3.1	7.3	0.6	0.1	1.7	2.6	1.7	3.8
Allerdale	2.1	0.9	4.1	0.2	0.0	1.4	1.1	0.5	2.1
Barrow-in-Furness District	2.0	0.6	4.9	0.3	0.0	1.1	1.1	0.4	2.5
Carlisle	2.3	1.0	4.5	0.6	0.1	1.9	1.3	0.6	2.4
Copeland	1.2	0.2	3.4	0.5	0.1	1.8	0.8	0.3	2.0
Eden	0.9	0.1	3.4	0.4	0.0	2.0	0.6	0.1	1.9
South Lakeland	1.2	0.4	2.8	0.4	0.0	1.4	0.7	0.3	1.6
Burnley	1.4	0.4	3.7	0.4	0.0	1.6	0.9	0.3	2.0
Chorley	3.0	1.4	5.6	0.2	0.0	0.9	1.5	0.7	2.6
Fylde	2.4	1.1	4.6	0.0	0.0	0.0	1.0	0.5	2.0
Hyndburn	0.7	0.1	2.6	0.0	0.0	0.0	0.3	0.0	1.2
Lancaster	2.8	1.4	5.0	1.5	0.5	3.4	2.0	1.1	3.3
Pendle	3.3	1.5	6.3	1.2	0.2	3.4	2.1	1.1	3.7
Preston	2.3	1.0	4.5	0.0	0.0	0.0	1.1	0.5	2.2
Ribble Valley	0.0	0.0	0.0	1.3	0.0	5.2	0.7	0.0	2.8
Rossendale	1.9	0.5	5.0	0.2	0.0	1.3	1.0	0.3	2.4
South Ribble	2.9	1.4	5.3	0.7	0.1	2.1	1.7	0.9	2.9
West Lancashire	2.1	0.9	4.1	0.9	0.2	2.3	1.4	0.7	2.6
Wyre	2.7	1.3	4.8	0.5	0.0	1.9	1.5	0.8	2.5
North West	**3.2**	**3.0**	**3.5**	**0.6**	**0.5**	**0.8**	**1.8**	**1.7**	**2.0**
England	**2.7**	**2.6**	**2.8**	**0.6**	**0.6**	**0.6**	**1.6**	**1.5**	**1.6**

LCI and UCI: 95% lower and upper confidence interval respectively.

Table 8: Incidence of hepatocellular cancer; directly standardised rates per 100,000 population, 2005 to 2009

Local Authority	Males			Females			Persons		
	Rate	LCI	UCI	Rate	LCI	UCI	Rate	LCI	UCI
Bolton	3.0	1.9	4.5	1.4	0.7	2.3	2.1	1.4	2.9
Bury	4.7	2.9	7.0	0.6	0.1	1.5	2.4	1.6	3.6
Manchester	8.6	6.8	10.7	2.1	1.3	3.2	5.2	4.2	6.3
Oldham	5.4	3.7	7.7	0.7	0.2	1.7	3.0	2.1	4.1
Rochdale	3.9	2.4	6.0	1.1	0.4	2.4	2.5	1.6	3.5
Salford	5.1	3.4	7.4	0.5	0.1	1.4	2.7	1.8	3.8
Stockport	5.4	3.9	7.2	1.2	0.5	2.2	3.1	2.3	4.1
Tameside	3.4	2.1	5.3	1.0	0.4	2.0	2.1	1.3	3.0
Trafford	5.8	4.0	8.1	1.0	0.3	2.1	3.2	2.3	4.4
Wigan	2.4	1.5	3.6	0.6	0.2	1.4	1.4	0.9	2.1
Knowsley	5.0	3.0	7.8	0.5	0.1	1.5	2.5	1.5	3.8
Liverpool	6.5	5.0	8.1	1.3	0.8	2.1	3.7	3.0	4.6
St Helens	4.3	2.8	6.5	0.2	0.0	1.1	2.2	1.4	3.2
Sefton	3.8	2.6	5.4	1.5	0.8	2.6	2.6	1.9	3.4
Wirral	4.2	2.9	5.7	1.0	0.5	1.8	2.4	1.8	3.2
Cheshire East	3.5	2.6	4.8	0.7	0.3	1.4	2.0	1.4	2.6
Halton	4.1	2.2	7.0	2.1	0.9	4.1	3.0	1.9	4.6
Warrington	1.9	1.0	3.5	0.3	0.0	1.1	1.0	0.5	1.7
Cheshire West and Chester	2.9	2.0	4.2	0.3	0.1	0.8	1.5	1.0	2.1
Blackburn with Darwen	4.2	2.3	7.1	0.4	0.1	1.6	2.2	1.2	3.5
Blackpool	5.5	3.6	8.1	1.1	0.3	2.6	3.1	2.1	4.4
Allerdale	1.9	0.8	3.9	0.6	0.1	2.3	1.2	0.5	2.3
Barrow-in-Furness District	3.1	1.2	6.5	1.0	0.1	3.1	2.0	0.9	3.8
Carlisle	2.8	1.3	5.2	0.4	0.0	1.5	1.5	0.7	2.6
Copeland	3.6	1.6	6.9	0.2	0.0	1.1	1.9	0.9	3.5
Eden	1.0	0.1	3.5	0.4	0.0	2.0	0.7	0.1	1.9
South Lakeland	1.4	0.5	3.1	0.5	0.1	1.6	0.9	0.4	1.8
Burnley	2.2	0.8	4.9	0.4	0.0	1.6	1.3	0.5	2.6
Chorley	5.6	3.2	8.9	0.2	0.0	0.8	2.7	1.6	4.3
Fylde	2.0	0.8	4.2	0.0	0.0	0.0	0.9	0.3	1.9
Hyndburn	2.0	0.6	4.7	0.5	0.0	2.8	1.2	0.4	2.6
Lancaster	3.0	1.6	5.3	1.5	0.5	3.4	2.2	1.3	3.4
Pendle	5.8	3.3	9.5	2.5	0.9	5.5	3.9	2.4	5.9
Preston	4.7	2.7	7.7	0.0	0.0	0.0	2.3	1.3	3.8
Ribble Valley	1.6	0.3	4.8	2.6	0.5	7.2	2.2	0.8	4.7
Rossendale	2.0	0.5	5.1	0.2	0.0	1.2	1.0	0.3	2.5
South Ribble	4.6	2.6	7.5	1.2	0.4	2.9	2.8	1.7	4.3
West Lancashire	3.0	1.5	5.4	1.6	0.5	3.6	2.2	1.3	3.6
Wyre	3.0	1.5	5.4	0.5	0.0	1.9	1.7	0.9	2.9
North West	4.1	3.8	4.4	0.9	0.8	1.0	2.4	2.2	2.5
England	3.9	3.8	4.0	0.9	0.9	0.9	2.3	2.2	2.3

LCI and UCI: 95% lower and upper confidence interval respectively.

Table 9: One to five year relative survival for hepatocellular cancer for individuals diagnosed, North West and England, 2001 to 2005

Time from diagnosis (years)	Persons			Males			Females		
	% survival	LCI	UCL	% survival	LCI	UCL	% survival	LCI	UCL
North West									
1	22.82	19.59	26.21	22.14	18.52	25.98	25.1	18.33	32.48
2	13.40	10.82	16.27	12.04	9.27	15.21	17.93	12.07	24.78
3	9.67	7.45	12.25	9.25	6.81	12.16	11.08	6.50	17.08
4	8.89	6.74	11.42	8.57	6.20	11.44	9.93	5.57	15.85
5	8.25	6.15	10.75	8.32	5.96	11.2	7.95	4.07	13.6
England									
1	30.05	28.66	31.45	30.06	28.48	31.66	30.00	27.13	32.94
2	19.86	18.65	21.11	19.87	18.49	21.3	19.82	17.33	22.44
3	15.98	14.86	17.15	15.84	14.57	17.17	16.45	14.13	18.94
4	13.38	12.33	14.48	13.22	12.03	14.47	13.91	11.74	16.28
5	12.33	11.30	13.41	12.20	11.03	13.43	12.76	10.65	15.08

LCI and UCI: 95% lower and upper confidence interval respectively.

Table 10: Deaths from alcohol-related liver disease (underlying cause); directly standardised rates per 100,000 population, 2006 to 2010

Local Authority	Males			Females			Persons		
	Rate	LCI	UCI	Rate	LCI	UCI	Rate	LCI	UCI
Bolton	16.7	13.7	20.1	10.3	8.0	13.0	13.5	11.6	15.6
Bury	12.5	9.5	16.1	6.5	4.4	9.1	9.4	7.6	11.6
Manchester	26.4	23.1	30.0	11.7	9.5	14.2	19.1	17.1	21.2
Oldham	17.0	13.7	20.9	10.1	7.6	13.1	13.5	11.4	15.8
Rochdale	19.2	15.6	23.4	11.2	8.5	14.5	15.1	12.8	17.7
Salford	20.5	16.8	24.7	12.6	9.7	16.1	16.6	14.2	19.3
Stockport	14.1	11.5	17.1	8.7	6.7	11.1	11.3	9.7	13.2
Tameside	15.4	12.3	19.1	8.0	5.9	10.6	11.6	9.7	13.8
Trafford	11.2	8.6	14.4	6.0	4.1	8.4	8.5	6.9	10.4
Wigan	13.5	11.0	16.3	8.8	6.9	11.1	11.1	9.6	12.9
Knowsley	14.6	10.9	19.1	8.8	6.1	12.2	11.5	9.2	14.2
Liverpool	24.7	21.7	27.9	10.3	8.5	12.4	17.3	15.5	19.1
St Helens	18.1	14.5	22.5	12.1	9.1	15.7	15.0	12.6	17.7
Sefton	17.7	14.7	21.1	9.9	7.7	12.4	13.5	11.7	15.6
Wirral	23.0	19.8	26.7	11.1	8.9	13.5	16.7	14.7	18.8
Cheshire East	9.5	7.6	11.6	5.6	4.2	7.3	7.5	6.4	8.8
Halton	15.5	11.3	20.6	8.7	5.8	12.6	12.0	9.4	15.0
Warrington	11.9	9.1	15.2	6.8	4.8	9.4	9.3	7.6	11.4
Cheshire West and Chester	14.6	12.1	17.3	7.0	5.4	8.9	10.7	9.2	12.3
Blackburn with Darwen	18.0	13.7	23.2	5.4	3.2	8.5	11.7	9.2	14.6
Blackpool	34.0	28.3	40.5	16.9	12.9	21.7	25.4	21.9	29.4
Allerdale	8.4	5.2	12.7	6.7	3.9	10.6	7.5	5.3	10.2
Barrow-in-Furness District	18.8	13.1	26.0	8.9	5.1	14.4	13.8	10.3	18.1
Carlisle	10.2	6.8	14.7	7.0	4.3	10.9	8.6	6.3	11.4
Copeland	5.9	3.0	10.4	3.8	1.6	7.3	4.8	2.9	7.5
Eden	2.7	0.8	6.5	3.1	1.0	7.2	2.9	1.3	5.3
South Lakeland	5.4	3.0	9.0	5.7	3.3	9.0	5.6	3.8	7.8
Burnley	16.4	11.5	22.7	10.8	7.0	16.1	13.5	10.3	17.3
Chorley	12.2	8.5	16.9	7.4	4.6	11.3	9.9	7.5	12.8
Fylde	12.2	7.9	17.8	6.9	3.9	11.3	9.6	6.9	13.0
Hyndburn	16.3	11.2	22.8	5.4	2.7	9.5	10.8	7.9	14.4
Lancaster	12.0	8.6	16.2	8.3	5.5	12.0	10.1	7.8	12.8
Pendle	11.9	7.9	17.2	6.1	3.3	10.3	8.9	6.4	12.1
Preston	22.4	17.5	28.3	10.9	7.6	15.3	16.8	13.7	20.3
Ribble Valley	8.1	4.1	14.3	4.7	2.0	9.3	6.3	3.8	9.9
Rossendale	11.9	7.4	18.1	5.8	2.9	10.4	8.8	6.0	12.4
South Ribble	9.9	6.6	14.3	8.0	5.0	12.0	8.9	6.6	11.7
West Lancashire	13.1	9.2	18.1	7.1	4.4	10.8	10.0	7.6	12.9
Wyre	11.9	8.3	16.4	5.0	2.8	8.1	8.2	6.1	10.8
North West	**16.0**	**15.4**	**16.6**	**8.7**	**8.3**	**9.1**	**12.3**	**11.9**	**12.6**
England	**10.7**	**10.5**	**10.9**	**5.1**	**5.0**	**5.2**	**7.8**	**7.7**	**7.9**

LCI and UCI: 95% lower and upper confidence interval respectively.

Table 11: Hospital admissions for alcohol-related liver disease (primary diagnosis); directly standardised rates per 100,000 population, North West, 2010/11

Local Authority	Males			Females			Persons		
	Rate	LCI	UCI	Rate	LCI	UCI	Rate	LCI	UCI
Bolton	44.8	34.0	57.9	38.3	28.6	50.2	41.5	34.1	50.0
Bury	49.2	36.1	65.4	28.6	18.9	41.5	38.7	30.4	48.5
Manchester	87.6	74.7	102.2	44.6	35.2	55.7	66.3	58.2	75.2
Oldham	63.8	49.5	81.0	23.8	15.8	34.4	43.1	34.8	52.6
Rochdale	68.0	53.0	85.8	46.5	34.5	61.4	57.1	47.4	68.3
Salford	83.2	67.2	101.8	33.8	23.5	47.0	59.0	49.2	70.1
Stockport	33.5	24.9	44.1	42.3	32.7	53.9	38.0	31.4	45.6
Tameside	86.5	70.1	105.5	36.3	26.1	49.2	61.0	51.2	72.0
Trafford	20.7	13.1	31.1	11.3	6.0	19.3	15.8	11.1	21.9
Wigan	81.6	68.1	97.1	41.5	32.2	52.6	61.4	53.1	70.6
Knowsley	42.6	28.8	60.7	45.3	31.7	62.6	43.9	33.9	55.8
Liverpool	60.1	49.8	71.8	29.3	22.4	37.7	43.9	37.7	50.8
St Helens	63.0	47.5	81.9	34.2	23.2	48.4	48.3	38.6	59.6
Sefton	46.6	35.7	59.6	16.7	10.7	24.7	30.9	24.7	38.1
Wirral	79.5	66.0	94.9	38.7	29.5	49.6	57.8	49.7	66.8
Cheshire East	34.1	26.4	43.3	14.0	9.3	20.0	23.9	19.4	29.2
Halton	58.3	40.6	81.1	21.8	11.8	36.7	39.3	29.0	51.9
Warrington	38.3	27.5	51.8	17.0	10.0	26.9	27.4	20.9	35.4
Cheshire West and Chester	34.1	26.0	43.9	14.7	9.5	21.6	24.2	19.3	29.9
Blackburn with Darwen	101.5	79.1	128.3	19.2	10.2	32.8	60.5	48.1	75.0
Blackpool	85.5	65.4	109.7	33.3	20.7	50.6	58.9	46.9	73.1
Allerdale	27.2	15.3	44.5	20.1	9.7	36.4	23.6	15.4	34.6
Barrow-in-Furness District	53.3	32.1	82.9	31.6	16.2	55.3	42.1	28.6	59.7
Carlisle	36.8	22.9	55.8	21.0	11.0	35.7	28.8	20.1	40.1
Copeland	58.2	37.3	86.5	15.8	6.3	32.7	37.3	25.3	52.9
Eden	14.3	4.1	34.4	4.3	0.5	15.4	9.2	3.4	19.4
South Lakeland	20.5	10.2	36.8	7.7	2.1	19.9	13.8	7.7	22.8
Burnley	48.1	29.3	74.6	32.7	17.8	55.0	39.7	27.4	55.6
Chorley	58.8	41.0	81.6	27.1	15.4	44.0	41.0	30.4	54.0
Fylde	50.4	31.3	76.6	18.2	6.7	38.5	34.2	22.6	49.5
Hyndburn	62.5	39.8	93.4	24.6	11.8	45.3	43.4	29.9	60.7
Lancaster	69.6	50.7	93.0	36.2	22.8	54.5	52.2	40.5	66.3
Pendle	58.4	37.9	85.9	67.6	45.9	96.1	62.9	47.5	81.7
Preston	96.8	74.2	124.2	63.3	45.0	86.6	80.2	65.3	97.5
Ribble Valley	62.9	32.1	109.6	10.3	2.5	26.8	37.3	20.5	61.4
Rossendale	89.7	60.5	127.9	19.0	7.6	39.2	53.6	37.8	73.8
South Ribble	37.5	23.3	57.1	36.0	22.4	54.6	36.5	26.4	49.2
West Lancashire	28.1	16.2	45.2	25.8	14.4	42.6	26.9	18.3	38.1
Wyre	36.6	22.4	56.0	2.8	0.3	10.3	19.2	12.0	28.9
North West	**56.1**	**53.7**	**58.6**	**29.2**	**27.4**	**31.0**	**42.4**	**40.9**	**43.9**
England	**40.0**	**39.2**	**40.7**	**18.0**	**17.5**	**18.5**	**28.8**	**28.3**	**29.2**

LCI and UCI: 95% lower and upper confidence interval respectively.

Table 12: Hospital admissions for alcohol-related liver disease (all diagnoses); directly standardised rates per 100,000 population, North West, 2010/11

Local Authority	Males			Females			Persons		
	Rate	LCI	UCI	Rate	LCI	UCI	Rate	LCI	UCI
Bolton	169.2	147.8	192.8	104.9	88.4	123.6	135.9	122.3	150.5
Bury	187.5	160.7	217.5	103.6	84.5	125.6	144.8	128.2	162.9
Manchester	384.2	356.4	413.6	171.6	153.0	191.8	277.4	260.7	295.0
Oldham	183.3	158.5	210.9	75.5	60.6	93.0	127.9	113.4	143.7
Rochdale	258.5	228.6	291.2	152.8	130.1	178.2	203.5	184.8	223.6
Salford	350.6	316.5	387.3	147.5	125.3	172.4	251.0	230.4	273.0
Stockport	205.2	182.6	229.7	118.9	102.5	137.1	161.3	147.3	176.2
Tameside	282.9	252.8	315.6	111.7	93.0	133.1	195.3	177.6	214.3
Trafford	130.8	110.4	153.8	35.5	25.4	48.2	81.3	70.1	93.9
Wigan	286.4	260.3	314.3	165.8	146.7	186.7	225.7	209.5	242.9
Knowsley	165.1	137.0	197.3	156.0	129.6	186.3	159.7	140.2	181.1
Liverpool	304.5	281.0	329.5	163.2	146.4	181.4	230.5	216.2	245.6
St Helens	227.4	197.2	260.9	154.5	130.2	181.9	190.3	170.8	211.4
Sefton	238.6	213.1	266.3	103.4	87.6	121.2	167.1	152.2	182.9
Wirral	236.9	213.3	262.4	100.4	85.5	117.1	164.3	150.6	178.9
Cheshire East	130.9	115.4	147.8	55.8	45.9	67.1	92.8	83.6	102.8
Halton	215.1	179.0	256.3	97.7	75.5	124.5	153.7	132.6	177.2
Warrington	160.8	137.6	186.7	72.5	57.1	90.7	116.1	102.1	131.5
Cheshire West and Chester	142.7	125.4	161.6	78.5	65.7	92.9	110.1	99.3	121.8
Blackburn with Darwen	315.4	274.5	360.8	88.3	67.1	114.0	202.2	178.8	227.7
Blackpool	306.6	267.9	349.2	116.1	91.7	144.9	210.2	187.1	235.2
Allerdale	100.8	75.7	131.5	49.4	32.3	72.3	74.8	59.3	93.1
Barrow-in-Furness District	191.2	149.4	241.0	80.5	54.5	114.5	134.9	110.0	163.7
Carlisle	133.6	105.5	166.8	53.1	36.4	74.3	92.9	76.4	111.8
Copeland	114.6	84.3	152.1	51.4	31.9	78.2	83.2	64.6	105.3
Eden	44.9	24.1	75.5	17.1	6.7	35.5	30.7	18.7	47.1
South Lakeland	64.7	45.5	89.1	47.9	31.0	70.3	55.4	42.5	70.9
Burnley	304.3	253.1	362.8	130.9	99.9	168.3	214.6	184.8	247.9
Chorley	215.4	179.7	256.0	87.0	64.9	114.1	144.8	124.2	167.8
Fylde	157.7	121.3	201.4	63.6	40.1	95.2	111.0	88.8	137.0
Hyndburn	234.0	187.9	287.8	71.1	47.6	102.2	151.4	125.3	181.2
Lancaster	180.7	149.5	216.5	81.3	61.0	106.2	129.9	111.1	150.9
Pendle	139.8	107.5	178.6	125.0	94.5	162.1	132.5	109.8	158.4
Preston	330.3	287.0	378.2	169.6	138.8	205.3	249.7	222.8	278.9
Ribble Valley	161.3	109.9	227.2	22.8	10.0	44.2	93.4	65.9	127.7
Rossendale	283.2	230.2	344.8	69.4	45.3	101.8	174.9	145.6	208.3
South Ribble	191.4	157.0	230.9	102.1	78.5	130.3	145.4	124.4	168.8
West Lancashire	138.5	110.4	171.4	74.7	53.4	101.4	104.9	87.1	125.1
Wyre	118.6	92.2	149.9	24.4	14.5	38.4	70.2	56.1	86.6
North West	**215.9**	**211.1**	**220.8**	**104.7**	**101.4**	**108.1**	**159.1**	**156.2**	**162.1**
England	**145.3**	**143.8**	**146.7**	**62.2**	**61.2**	**63.1**	**102.8**	**101.9**	**103.6**

LCI and UCI: 95% lower and upper confidence interval respectively.

Table 13: Self-reported alcohol consumption patterns, North West, 2008

Local Authority	Non drinkers			Sensible drinkers			Hazardous drinkers			Harmful drinkers		
	%	LCI	UCI	%	LCI	UCI	%	LCI	UCI	%	LCI	UCI
Bolton	13.8	11.0	16.7	50.7	46.6	54.8	27.2	23.6	30.9	8.3	6.0	10.5
Bury	11.4	8.8	14.1	62.7	58.6	66.7	19.8	16.5	23.2	5.7	3.8	7.7
Manchester	10.3	8.8	11.8	55.1	52.5	57.6	24.9	22.7	27.1	9.4	7.9	10.9
Oldham	12.1	9.4	14.9	60.5	56.5	64.6	18.8	15.5	22.1	8.5	6.2	10.9
Rochdale	16.6	12.7	20.6	51.8	46.6	57.1	25.6	21.0	30.3	5.9	3.4	8.4
Salford	10.3	8.2	12.4	60.0	56.6	63.3	22.8	19.9	25.7	7.0	5.2	8.8
Stockport	8.9	6.9	10.9	61.8	58.3	65.2	22.9	19.9	25.9	6.3	4.6	8.0
Tameside	7.6	5.7	9.6	62.2	58.6	65.8	21.3	18.3	24.4	8.7	6.6	10.7
Trafford	13.4	10.7	16.0	58.2	54.4	62.0	22.3	19.1	25.5	6.1	4.3	8.0
Wigan	14.2	11.9	16.5	60.3	57.0	63.5	19.6	17.0	22.2	5.9	4.4	7.5
Greater Manchester	11.2	10.5	11.9	58.8	57.7	59.9	22.4	21.5	23.4	7.5	6.9	8.1
Knowsley	9.1	6.2	12.1	69.5	64.9	74.2	15.2	11.5	18.8	6.2	3.7	8.6
Liverpool	12.1	10.8	13.4	60.4	58.4	62.3	20.8	19.2	22.4	6.7	5.7	7.7
Sefton	10.6	8.6	12.5	63.8	60.8	66.9	19.7	17.2	22.3	5.0	3.6	6.4
Wirral	7.7	5.4	10.0	63.1	58.9	67.3	23.2	19.5	26.8	6.0	4.0	8.1
Halton	7.8	5.8	9.8	63.6	60.1	67.2	23.5	20.4	26.7	4.9	3.3	6.5
Warrington	11.0	8.6	13.4	63.4	59.7	67.0	17.8	14.9	20.7	7.4	5.4	9.4
Chester	11.0	8.7	13.3	63.5	60.0	67.0	18.7	15.8	21.5	6.1	4.4	7.9
Congleton	13.3	9.1	17.6	68.9	63.0	74.7	15.1	10.6	19.7	2.7	0.6	4.7
Crewe and Nantwich	16.5	12.7	20.3	65.7	60.9	70.6	14.7	11.1	18.3	3.1	1.3	4.8
Ellesmere Port and Neston	11.0	7.8	14.2	61.4	56.4	66.4	21.4	17.2	25.6	5.8	3.4	8.1
Macclesfield	10.1	7.3	12.9	62.7	58.2	67.1	20.0	16.3	23.7	6.0	3.8	8.2
Vale Royal	13.7	10.3	17.0	63.2	58.5	68.0	18.5	14.7	22.4	4.5	2.4	6.5
Cheshire	11.4	10.4	12.4	64.1	62.6	65.7	18.7	17.4	19.9	5.3	4.6	6.0
Blackpool	10.9	9.0	12.7	64.3	61.4	67.1	17.9	15.7	20.2	6.5	5.0	8.0
Allerdale	4.9	1.9	8.0	65.7	59.0	72.4	26.0	19.8	32.2	3.5	0.9	6.0
Carlisle	18.1	14.4	21.7	60.8	56.2	65.4	16.0	12.6	19.5	4.9	2.9	6.9
South Lakeland	12.4	9.9	15.0	63.8	60.1	67.6	18.4	15.4	21.4	5.1	3.4	6.8
Burnley	14.9	11.4	18.4	60.2	55.4	65.0	15.3	11.7	18.8	9.6	6.8	12.5
Fylde	9.2	6.5	11.9	63.3	58.8	67.8	21.0	17.1	24.8	6.0	3.7	8.2
Hyndburn	11.4	8.6	14.1	58.6	54.3	62.9	19.3	15.9	22.7	8.2	5.8	10.6
Pendle	15.6	12.0	19.2	58.5	53.6	63.4	18.2	14.4	22.0	7.2	4.7	9.8
Preston	10.2	8.1	12.4	65.6	62.3	69.0	18.7	16.0	21.5	5.3	3.7	6.9
Ribble Valley	9.7	6.4	12.9	61.9	56.6	67.3	21.6	17.1	26.1	6.8	4.0	9.5
Rossendale	14.4	10.5	18.3	61.0	55.5	66.4	17.5	13.3	21.7	7.1	4.3	10.0
South Ribble	8.8	6.9	10.7	67.1	63.9	70.3	19.0	16.4	21.7	5.1	3.7	6.6
Wyre	11.3	8.9	13.7	64.2	60.6	67.9	17.7	14.8	20.6	6.2	4.4	8.0
Cumbria	11.4	9.8	13.0	63.9	61.6	66.3	19.6	17.6	21.6	4.8	3.8	5.9
Lancashire	10.9	10.2	11.7	62.7	61.6	63.8	19.7	18.8	20.6	6.3	5.7	6.9
North West	**11.2**	**10.8**	**11.6**	**61.7**	**61.1**	**62.3**	**20.4**	**19.9**	**20.9**	**6.4**	**6.1**	**6.7**

LCI and UCI: 95% lower and upper confidence interval respectively.

Table 14: People in alcohol treatment, crude rate per 100,000, ages 18-74 years, North West, 2010/11

Local Authority	Males			Females			Persons		
	Rate	LCI	UCI	Rate	LCI	UCI	Rate	LCI	UCI
Bolton	424.4	383.4	468.6	232.8	202.9	265.7	327.7	302.2	354.7
Bury	387.7	340.9	439.0	232.7	197.3	272.6	309.1	279.6	340.9
Manchester	857.5	817.1	899.3	438.5	408.5	470.1	657.3	631.7	683.7
Oldham	1016.9	946.0	1091.8	424.2	379.3	472.9	717.2	675.2	761.2
Rochdale	1102.9	1026.9	1182.9	589.3	534.5	648.1	844.3	797.4	893.3
Salford	616.6	565.2	671.4	325.9	287.9	367.6	475.3	442.8	509.5
Stockport	351.0	315.2	389.9	195.3	169.2	224.2	271.8	249.6	295.5
Tameside	787.5	725.8	853.1	406.9	363.5	454.0	594.2	556.4	633.8
Trafford	244.0	210.2	281.7	151.2	125.0	181.4	197.5	175.8	221.1
Wigan	414.8	377.7	454.5	326.2	293.6	361.4	370.3	345.4	396.4
Knowsley	886.4	805.8	972.8	397.0	346.3	453.1	629.3	582.4	679.1
Liverpool	404.2	374.1	436.1	250.7	227.3	275.8	326.8	307.6	346.8
St Helens	821.9	752.4	896.1	482.5	430.6	538.9	670.0	625.8	716.4
Sefton	636.3	586.0	689.8	398.2	360.1	439.2	512.5	481.1	545.4
Wirral	950.6	892.1	1011.9	455.5	416.8	496.8	693.2	658.5	729.2
Cheshire East	155.7	134.8	178.8	91.9	76.2	109.9	123.5	110.4	137.8
Halton	590.8	518.9	670.0	402.3	345.2	466.1	493.4	447.3	542.9
Warrington	617.0	560.7	677.3	409.4	364.0	459.0	513.0	476.6	551.4
Cheshire West and Chester	499.8	459.8	542.2	273.4	244.5	304.8	384.9	360.2	410.9
Blackburn with Darwen	618.6	549.7	693.8	278.7	233.0	330.7	449.0	407.2	493.9
Blackpool	1251.3	1154.8	1353.8	643.0	574.3	717.8	947.5	887.8	1010.1
Cumbria	388.6	360.1	418.7	243.3	220.9	267.3	315.7	297.5	334.7
Lancashire	409.9	390.7	429.9	244.3	229.6	259.8	326.6	314.4	339.1
England	**385.8**	**383.0**	**388.7**	**208.7**	**206.7**	**210.8**	**296.8**	**295.1**	**298.6**

LCI and UCI: 95% lower and upper confidence interval respectively.

Table 15: Deaths from fatty liver disease (underlying cause); directly standardised rates per 100,000 population, 2006 to 2010

Local Authority	Males			Females			Persons		
	Rate	LCI	UCI	Rate	LCI	UCI	Rate	LCI	UCI
Bolton	0.9	0.3	2.0	0.7	0.2	1.5	0.8	0.4	1.4
Bury	0.9	0.3	2.4	0.8	0.2	2.0	0.9	0.4	1.7
Manchester	1.1	0.5	2.1	1.0	0.5	1.9	1.1	0.6	1.7
Oldham	1.2	0.4	2.5	0.4	0.0	1.3	0.8	0.3	1.5
Rochdale	0.7	0.2	1.9	0.2	0.0	0.9	0.5	0.1	1.1
Salford	1.9	0.9	3.5	0.9	0.3	2.1	1.4	0.8	2.3
Stockport	1.5	0.7	2.6	1.0	0.4	1.9	1.2	0.7	1.9
Tameside	0.5	0.1	1.4	0.3	0.1	0.9	0.4	0.1	0.8
Trafford	0.8	0.2	2.0	0.2	0.0	1.1	0.5	0.2	1.1
Wigan	3.9	2.6	5.6	2.3	1.4	3.6	3.1	2.3	4.1
Knowsley	3.6	1.9	6.2	2.1	0.9	4.1	2.8	1.7	4.3
Liverpool	0.5	0.2	1.2	0.7	0.3	1.4	0.6	0.3	1.0
St Helens	3.2	1.8	5.4	2.0	0.9	3.7	2.6	1.7	3.9
Sefton	1.6	0.8	2.9	0.2	0.0	0.7	0.9	0.4	1.5
Wirral	1.1	0.5	2.0	0.9	0.4	1.7	1.0	0.6	1.5
Cheshire East	0.3	0.1	1.0	0.5	0.2	1.0	0.4	0.2	0.8
Halton	0.3	0.0	1.9	1.8	0.7	3.9	1.1	0.4	2.3
Warrington	0.6	0.1	1.7	0.7	0.2	1.8	0.6	0.3	1.3
Cheshire West and Chester	0.5	0.2	1.3	0.0	0.0	0.0	0.3	0.1	0.6
Blackburn with Darwen	9.2	6.2	13.0	3.8	2.0	6.5	6.5	4.7	8.7
Blackpool	0.3	0.0	1.5	0.0	0.0	0.0	0.1	0.0	0.8
Allerdale	0.5	0.0	2.6	0.0	0.0	0.0	0.2	0.0	1.2
Barrow-in-Furness District	1.2	0.1	4.2	1.5	0.2	4.7	1.4	0.4	3.3
Carlisle	0.0	0.0	0.0	0.9	0.2	2.8	0.5	0.1	1.4
Copeland	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
Eden	0.5	0.0	2.8	0.0	0.0	0.0	0.3	0.0	1.4
South Lakeland	0.5	0.1	2.0	1.0	0.3	2.4	0.7	0.3	1.6
Burnley	1.0	0.1	3.5	0.8	0.1	2.9	0.9	0.2	2.2
Chorley	1.3	0.3	3.2	0.3	0.0	1.9	0.8	0.3	1.9
Fylde	0.3	0.0	1.4	0.3	0.0	1.9	0.3	0.0	1.0
Hyndburn	12.0	7.8	17.6	2.3	0.7	5.4	7.0	4.8	10.0
Lancaster	2.0	0.8	4.2	2.5	1.1	4.9	2.2	1.2	3.7
Pendle	0.5	0.0	2.6	0.4	0.0	2.2	0.4	0.1	1.6
Preston	1.3	0.4	3.3	1.5	0.5	3.6	1.4	0.6	2.7
Ribble Valley	3.3	1.2	7.2	2.3	0.6	5.9	2.7	1.3	5.1
Rossendale	0.5	0.0	3.0	0.5	0.0	2.6	0.5	0.1	1.8
South Ribble	1.3	0.3	3.3	0.6	0.1	2.0	0.9	0.3	2.0
West Lancashire	0.4	0.0	2.0	0.0	0.0	0.0	0.2	0.0	1.0
Wyre	0.4	0.0	2.0	0.0	0.0	0.0	0.2	0.0	1.0
North West	**1.4**	**1.2**	**1.6**	**0.9**	**0.7**	**1.0**	**1.1**	**1.0**	**1.2**
England	**0.7**	**0.6**	**0.7**	**0.4**	**0.4**	**0.5**	**0.5**	**0.5**	**0.6**

LCI and UCI: 95% lower and upper confidence interval respectively.

Table 16: Hospital admissions for fatty liver disease (primary diagnosis); directly standardised rates per 100,000 population, 2008/09 to 2010/11

Local Authority	Males			Females			Persons		
	Rate	LCI	UCI	Rate	LCI	UCI	Rate	LCI	UCI
Bolton	0.8	0.2	2.3	1.3	0.4	3.0	1.0	0.4	2.0
Bury	8.0	4.9	12.3	1.2	0.3	3.2	4.6	2.9	6.9
Manchester	3.2	1.9	5.0	3.1	1.8	5.1	3.2	2.2	4.4
Oldham	1.9	0.7	4.2	0.9	0.2	2.7	1.4	0.6	2.7
Rochdale	7.0	4.3	10.7	2.6	1.2	5.0	4.8	3.3	6.9
Salford	5.6	3.3	8.7	3.3	1.6	6.1	4.5	3.0	6.5
Stockport	1.1	0.4	2.4	1.0	0.3	2.3	1.0	0.5	1.8
Tameside	0.9	0.2	2.5	0.6	0.1	2.0	0.7	0.2	1.6
Trafford	1.6	0.5	3.7	0.9	0.2	2.6	1.2	0.5	2.4
Wigan	1.5	0.6	3.2	1.1	0.4	2.4	1.3	0.7	2.2
Knowsley	2.2	0.7	5.2	2.1	0.7	5.0	2.1	1.0	3.9
Liverpool	7.8	5.7	10.4	4.3	2.8	6.2	6.1	4.8	7.6
St Helens	1.7	0.4	4.4	0.9	0.2	2.6	1.3	0.5	2.8
Sefton	1.9	0.8	3.7	1.1	0.3	2.8	1.5	0.7	2.6
Wirral	1.5	0.6	3.0	1.2	0.5	2.6	1.3	0.7	2.3
Cheshire East	1.3	0.5	2.6	0.6	0.2	1.6	1.0	0.5	1.7
Halton	1.2	0.1	4.2	2.0	0.5	5.1	1.6	0.6	3.5
Warrington	1.5	0.5	3.5	0.5	0.1	1.9	1.0	0.4	2.1
Cheshire West and Chester	3.2	1.8	5.2	0.6	0.1	1.8	1.9	1.1	2.9
Blackburn with Darwen	1.5	0.3	4.5	1.5	0.3	4.5	1.6	0.6	3.4
Blackpool	0.4	0.0	2.5	2.0	0.5	5.2	1.2	0.4	2.9
Allerdale	2.6	0.6	7.0	1.1	0.1	4.2	1.9	0.6	4.2
Barrow-in-Furness District	0.8	0.0	4.7	4.0	1.2	9.5	2.4	0.9	5.4
Carlisle	7.2	3.7	12.7	4.0	1.6	8.2	5.6	3.4	8.7
Copeland	1.7	0.2	6.1	2.1	0.2	7.8	1.8	0.5	4.8
Eden	2.3	0.3	8.2	0.8	0.0	4.7	1.6	0.3	4.6
South Lakeland	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Burnley	1.6	0.2	5.8	2.6	0.5	7.7	2.1	0.7	5.0
Chorley	3.1	1.0	7.3	2.3	0.6	6.1	2.8	1.2	5.3
Fylde	0.6	0.0	3.3	0.0	0.0	0.0	0.3	0.0	1.6
Hyndburn	1.0	0.0	5.7	0.7	0.0	3.9	0.9	0.1	3.1
Lancaster	1.7	0.3	4.8	2.4	0.7	5.6	2.0	0.9	4.0
Pendle	3.4	1.1	8.0	0.7	0.0	4.0	2.0	0.7	4.4
Preston	4.1	1.7	8.0	3.1	1.1	6.8	3.7	2.0	6.2
Ribble Valley	3.1	0.6	9.1	1.0	0.0	5.8	2.1	0.6	5.4
Rossendale	2.5	0.5	7.2	1.7	0.2	6.1	2.1	0.7	4.9
South Ribble	2.7	0.9	6.3	1.4	0.3	4.2	2.1	0.9	4.1
West Lancashire	2.1	0.3	6.4	1.4	0.3	4.1	1.7	0.6	3.9
Wyre	2.1	0.4	6.1	0.6	0.0	3.5	1.4	0.4	3.5
North West	**2.7**	**2.4**	**3.1**	**1.6**	**1.4**	**1.9**	**2.2**	**2.0**	**2.4**
England	**3.5**	**3.4**	**3.6**	**2.3**	**2.2**	**2.4**	**2.9**	**2.8**	**3.0**

LCI and UCI: 95% lower and upper confidence interval respectively.

Table 17: Hospital admissions for fatty liver disease (all diagnoses); directly standardised rates per 100,000 population, 2008/09 to 2010/11

Local Authority	Males			Females			Persons		
	Rate	LCI	UCI	Rate	LCI	UCI	Rate	LCI	UCI
Bolton	22.7	18.3	27.8	28.3	23.4	33.9	25.5	22.1	29.2
Bury	34.1	27.5	41.8	24.6	19.3	30.9	29.5	25.1	34.3
Manchester	44.1	38.7	50.0	39.6	34.5	45.3	42.0	38.2	46.0
Oldham	24.0	18.8	30.2	22.3	17.6	28.0	23.1	19.5	27.1
Rochdale	39.7	32.9	47.5	30.1	24.4	36.6	34.8	30.3	39.7
Salford	60.0	51.9	69.0	44.9	37.9	52.7	52.7	47.3	58.6
Stockport	28.8	24.1	34.2	25.8	21.4	30.8	27.2	24.0	30.8
Tameside	20.4	15.9	25.7	15.9	12.0	20.6	18.0	15.0	21.4
Trafford	18.3	14.0	23.6	20.7	16.2	26.1	19.5	16.3	23.1
Wigan	26.1	21.7	31.0	26.5	22.1	31.4	26.2	23.1	29.6
Knowsley	20.3	14.7	27.3	18.5	13.5	24.8	19.1	15.3	23.5
Liverpool	42.8	37.8	48.3	26.9	23.1	31.2	34.8	31.7	38.2
St Helens	17.2	12.6	22.9	13.1	9.2	18.0	15.2	12.1	18.8
Sefton	16.1	12.4	20.6	12.5	9.4	16.3	14.3	11.9	17.2
Wirral	57.7	51.1	65.0	20.7	17.0	25.0	38.4	34.7	42.5
Cheshire East	14.7	11.8	18.1	12.0	9.4	15.0	13.4	11.4	15.6
Halton	30.3	23.0	39.3	27.9	21.1	36.2	29.2	24.1	35.1
Warrington	35.3	29.0	42.5	29.3	23.7	35.7	32.2	27.9	36.8
Cheshire West and Chester	22.1	18.2	26.5	18.6	15.1	22.6	20.3	17.7	23.2
Blackburn with Darwen	25.4	19.0	33.2	40.0	31.8	49.7	32.8	27.5	38.9
Blackpool	4.5	2.1	8.3	13.8	9.1	20.1	9.1	6.4	12.6
Allerdale	12.4	7.5	19.4	8.8	4.8	14.6	10.6	7.3	14.8
Barrow-in-Furness District	25.1	16.9	35.9	16.8	10.2	25.9	20.9	15.4	27.5
Carlisle	23.5	16.7	32.3	24.2	17.2	33.1	23.8	18.8	29.7
Copeland	9.4	4.6	16.8	20.1	12.6	30.2	14.8	10.2	20.7
Eden	10.9	5.4	19.7	10.4	4.6	19.4	10.7	6.5	16.5
South Lakeland	17.2	11.7	24.4	12.5	7.5	19.1	14.5	10.7	19.0
Burnley	42.3	31.6	55.4	36.6	26.9	48.6	39.2	31.9	47.6
Chorley	83.0	70.3	97.2	65.5	54.3	78.4	74.8	66.2	84.2
Fylde	5.0	1.8	10.7	4.4	1.2	10.8	4.6	2.2	8.3
Hyndburn	26.8	18.3	37.8	26.4	18.2	36.8	26.4	20.4	33.7
Lancaster	25.0	18.5	33.0	13.7	9.2	19.5	19.3	15.3	24.0
Pendle	23.5	16.0	33.3	21.6	14.8	30.5	22.6	17.4	28.9
Preston	60.0	49.5	72.1	42.1	33.6	52.2	51.7	44.8	59.5
Ribble Valley	18.2	10.1	29.7	36.9	26.3	50.3	27.8	20.8	36.2
Rossendale	23.3	15.2	34.1	30.7	21.3	42.8	27.0	20.6	34.7
South Ribble	56.1	45.6	68.2	57.0	46.6	69.0	56.5	49.0	64.7
West Lancashire	38.9	29.3	50.5	19.3	13.5	26.8	28.8	23.2	35.4
Wyre	15.4	10.0	22.4	6.5	3.3	11.1	10.7	7.6	14.7
North West	**30.1**	**29.0**	**31.1**	**24.3**	**23.4**	**25.2**	**27.1**	**26.5**	**27.9**
England	**26.0**	**25.6**	**26.3**	**21.7**	**21.3**	**22.0**	**23.8**	**23.5**	**24.0**

LCI and UCI: 95% lower and upper confidence interval respectively.

Table 18: Estimated percentage of obesity in year six pupils, 2010/11

Local Authority	Persons		
	Rate	LCI	UCI
Bolton	21.2	19.8	22.7
Bury	20.2	18.4	22.0
Manchester	23.7	22.4	24.9
Oldham	17.3	15.9	18.8
Rochdale	20.7	19.1	22.3
Salford	23.1	21.4	24.9
Stockport	16.5	15.2	17.9
Tameside	19.7	18.1	21.3
Trafford	16.4	14.9	18.0
Wigan	19.3	17.9	20.8
Knowsley	24.3	22.2	26.5
Liverpool	22.1	20.9	23.5
St Helens	21.9	20.0	24.0
Sefton	20.7	19.2	22.2
Wirral	18.6	17.3	20.0
Cheshire East	17.2	16.0	18.4
Halton	23.8	21.6	26.3
Warrington	17.5	15.9	19.1
Cheshire West and Chester	19.9	18.5	21.3
Blackburn with Darwen	18.7	17.0	20.5
Blackpool	19.8	17.9	21.9
Allerdale	21.7	19.1	24.6
Barrow-in-Furness District	20.3	17.5	23.5
Carlisle	20.3	17.9	23.0
Copeland	23.9	20.6	27.5
Eden	23.0	19.5	26.9
South Lakeland	17.3	14.9	20.1
Burnley	20.3	17.8	23.1
Chorley	17.1	15.0	19.5
Fylde	16.0	13.2	19.2
Hyndburn	18.7	16.3	21.3
Lancaster	16.2	14.2	18.4
Pendle	17.2	15.0	19.8
Preston	18.6	16.5	20.8
Ribble Valley	12.2	9.9	15.0
Rossendale	16.5	14.1	19.4
South Ribble	16.2	14.1	18.6
West Lancashire	21.5	19.2	24.1
Wyre	18.5	16.1	21.1
North West	**19.7**	**19.4**	**20.0**
England	**19.0**	**18.9**	**19.1**

LCI and UCI: 95% lower and upper confidence interval respectively.

Data taken from Health Profiles: www.apho.org.uk/default.aspx?QN=P_HEALTH_PROFILES.

Table 19: Estimated prevalence of obese adults, 2006 to 2008

Local Authority	Persons		
	%	LCI	UCI
Bolton	23.4	22.3	24.6
Bury	22.7	21.4	24.0
Manchester	21.1	20.2	22.0
Oldham	25.7	24.5	27.0
Rochdale	24.9	23.5	26.4
Salford	23.5	22.3	24.8
Stockport	22.0	21.0	23.0
Tameside	26.5	25.2	27.9
Trafford	21.4	20.2	22.6
Wigan	25.8	24.7	27.0
Knowsley	25.5	23.9	27.2
Liverpool	22.9	22.0	23.8
St Helens	25.1	23.6	26.6
Sefton	23.9	22.8	25.0
Wirral	23.1	22.1	24.2
Cheshire East	21.6	20.6	22.5
Halton	25.9	24.1	27.8
Warrington	22.9	21.6	24.3
Cheshire West and Chester	22.7	21.7	23.7
Blackburn with Darwen	24.6	23.0	26.3
Blackpool	25.8	24.2	27.5
Allerdale	24.8	22.8	26.9
Barrow-in-Furness District	26.1	23.9	28.5
Carlisle	24.3	22.5	26.3
Copeland	25.7	23.2	28.4
Eden	23.8	21.2	26.6
South Lakeland	20.5	18.8	22.3
Burnley	24.5	22.6	26.5
Chorley	23.1	21.4	25.0
Fylde	20.9	18.9	23.1
Hyndburn	25.1	22.7	27.6
Lancaster	20.9	19.5	22.4
Pendle	24.3	22.4	26.4
Preston	20.8	19.3	22.4
Ribble Valley	21.4	19.2	23.7
Rossendale	23.5	21.3	25.8
South Ribble	21.3	19.8	23.0
West Lancashire	22.7	21.0	24.5
Wyre	22.9	21.1	24.7
North West	**23.4**	**22.1**	**24.6**
England	**24.2**	**23.6**	**24.7**

LCI and UCI: 95% lower and upper confidence interval respectively.

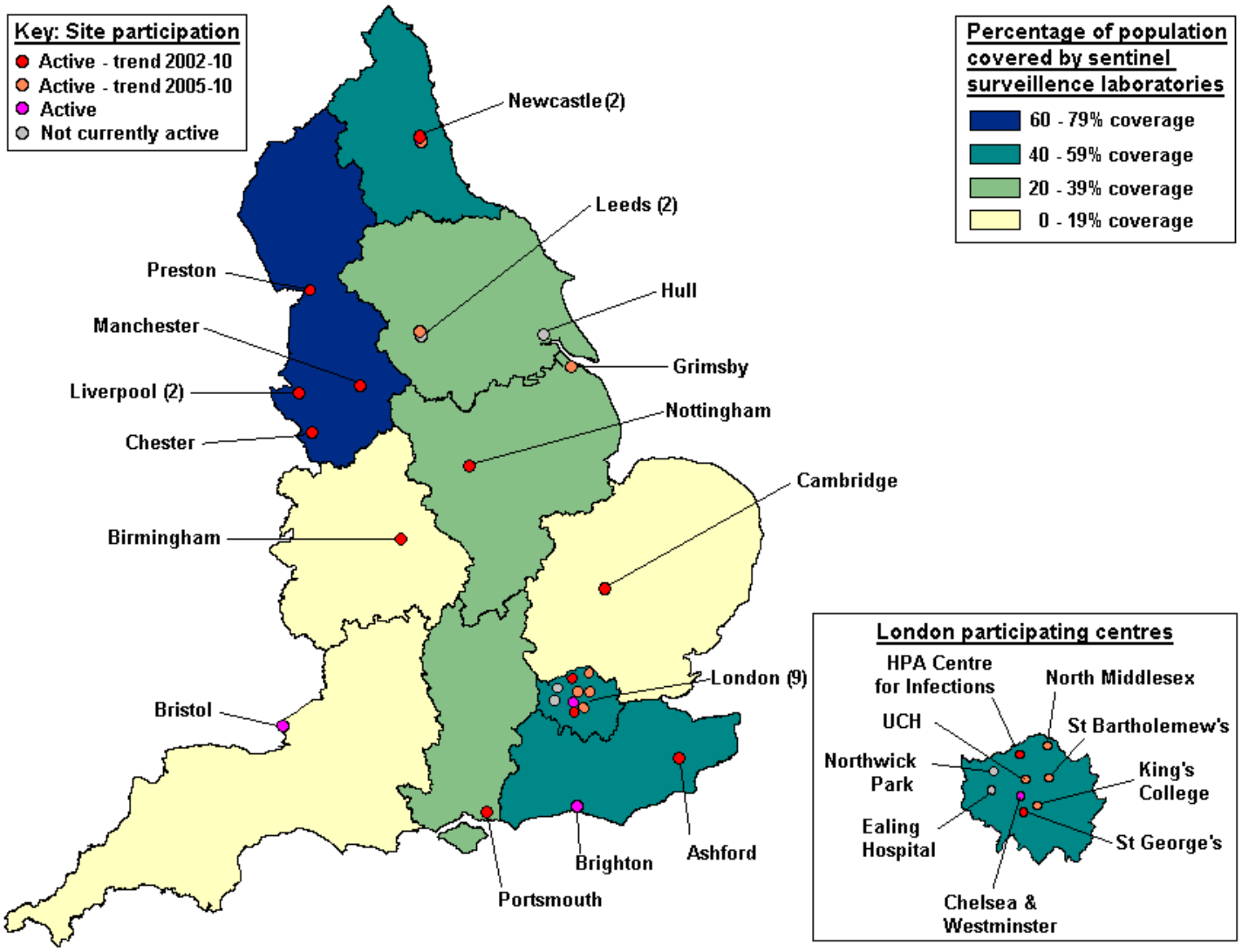
Data taken from Health Profiles: www.apho.org.uk/default.aspx?QN=P_HEALTH_PROFILES.

Table 20: Number of people accessing needle and syringe programmes, 2010/11

Drug and Alcohol Action Team	All drugs			Excluding anabolic steroid injectors		
	Males	Females	Persons	Males	Females	Persons
Cheshire	265	24	289	133	23	156
Halton	426	22	448	100	15	115
Knowsley	468	15	483	65	12	77
Liverpool	499	41	540	132	33	165
Sefton	204	16	220	85	15	100
St Helens	484	46	530	175	37	212
Warrington	391	12	403	44	12	56
Wirral	1158	49	1207	212	40	252
Cheshire and Merseyside	3868	224	4092	933	186	1119

An individual is counted only once in the Cheshire and Merseyside total but can be counted in more than one Drug and Alcohol Action Team.

Appendix 2: Participating Sentinel laboratories



North West laboratories

Chester HPA laboratory (via Manchester)
Liverpool HPA laboratory (via Manchester)
Manchester HPA laboratory
Preston HPA laboratory (via Manchester)
Royal Liverpool Hospital

North West Public Health Observatory

Centre for Public Health
Research Directorate
Faculty of Health and Applied Social Sciences
Liverpool John Moores University
2nd Floor, Henry Cotton Campus
15-21 Webster Street
Liverpool
L3 2ET

Tel: +44 (0) 151 231 4535
Fax: +44 (0) 151 231 4552
Email: nwpho-contact@ljmu.ac.uk
info@cph.org.uk

www.hpa.org.uk
www.northwest.nhs.uk
www.nta.nhs.uk
www.nwcis.nhs.uk
www.nwpho.org.uk

Published: September 2012

ISBN: 978-1-908929-15-0 (web)