2. HEALTH PROTECTION AGENCY UPDATE ON INFECTIOUS DISEASES

2.1 Introduction

Although many people have considered infectious diseases a beaten problem it is increasingly apparent that this is not the case. Infectious diseases are responsible for over 10% of deaths each year, largely due to pneumonia, a potentially vaccine preventable disease. Measles and pertussis are also vaccine preventable diseases and are included in this chapter as there has been a significant rise in the number of cases in recent years. Tuberculosis is included as, although contained, it is requiring more effort to maintain control of this disease.

The other three sections include sexually transmitted diseases which continue to be a major public health concern and antibiotic resistance in gonococci which threatens to return the disease back to the early parts of the 20th century when chronic infection resulted in significant morbidity such as infertility. HIV is also increasing. There is good news with the introduction of HPV vaccine that will substantially reduce infection with anogenital warts and cervical cancers. Finally hepatitis C has been described as a ticking time bomb with many of the people infected decades earlier progressing to cirrhosis, end stage liver disease and liver cancer. However, new drugs for hepatitis which have recently been developed will increase treatment options and result in more people successfully cured.

2.2 Tuberculosis (TB)

Introduction

Although infectious diseases have been considered as the problem of previous generations, tuberculosis is slowly increasing in the West Midlands and remains one of the main organisms of public health priority. There are large variations in rates of TB between Primary Care Trusts (PCTs) and local authorities across the region. Most of this can be explained by the factors known to increase the risk of tuberculosis.

Treatment for TB requires six months of treatment and the drugs are usually well tolerated and although treatment is long compared to most infections it is once daily so the regime is easy to follow. One of the major issues is that many people have difficulties in being able to complete treatment. A number of key factors are well recognised and these include drug use, alcohol abuse, homelessness and prison which put people at increased risk of disease and increased rate of failed treatment. Preventing treatment failures is a key policy objective. Non-compliance with medication results in people remaining infectious and therefore able to spread disease, but there is also a significant risk of inducing drug resistance. Drug resistance is a major threat to public health as treatment requires more complex and longer drug regimes making treatment harder. Recently extremely drug resistant TB bacteria [XDR-TB] have been identified further complicating control as the drug options are very limited and much longer therapy is required. Currently drug resistance of TB bacteria in the West Midlands remains low and is similar to the national picture.

The expansion of genetic analysis of TB isolates has greatly facilitated better investigation of links between cases; in particular identifying previously unrecognised links and excluding others.

Data sources

Tuberculosis is a statutory notifiable disease and the combination of clinician reports and laboratory notifications means that virtually all cases of tuberculosis infection get notified - so the data provide a very good picture of what is occurring in the community. In addition, TB is one of the diseases where

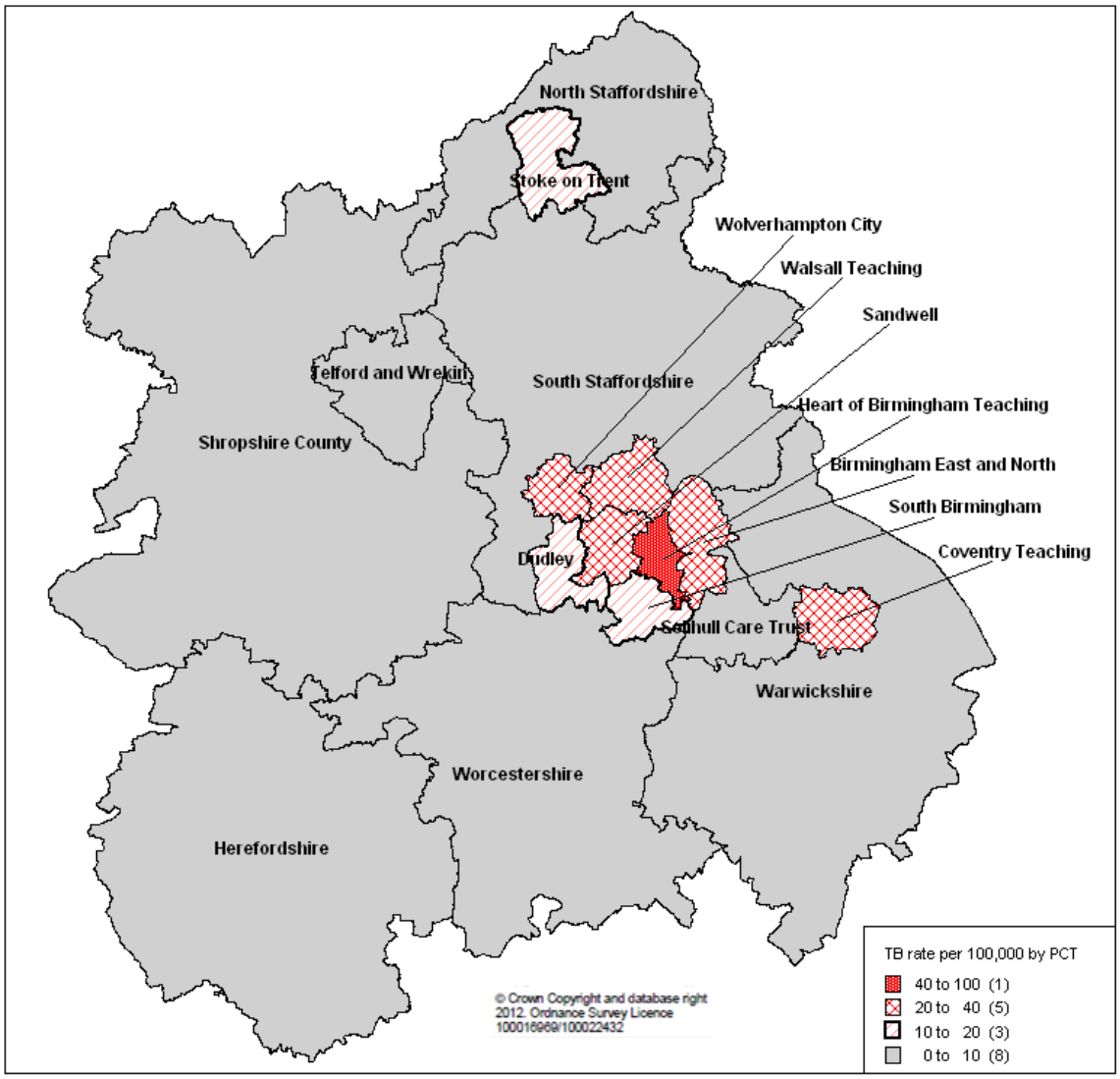
there is a national programme of enhanced data collection which allows a much better picture of the public health impact of TB to be seen.[1] These data allow detailed epidemiological and clinical information to be linked to improve our knowledge of the local patterns of disease and also the national and international picture of transmission. Statistics in this report reflect 2011 data from the Enhanced TB Surveillance Database.

Results

The number of cases fluctuates from year to year although over the past 10 years there has been a small increasing trend in the number of cases identified. The national CMO action plan has a number of targets for TB reduction with West Midlands meeting the reduction in cases amongst people who entered the UK in the previous 5 years but not amongst UK born residents.

TB is very unevenly distributed across the West Midlands with Birmingham followed by the Black Country having the highest rates. Inner city areas generally have the highest rates with Heart of Birmingham PCT having a rate of 75 per 100,000, a rate statistically significantly higher than anywhere else in the West Midlands (Figure 2.1).

Figure 2.1: TB rates per 100,000 population by PCT, West Midlands 2011

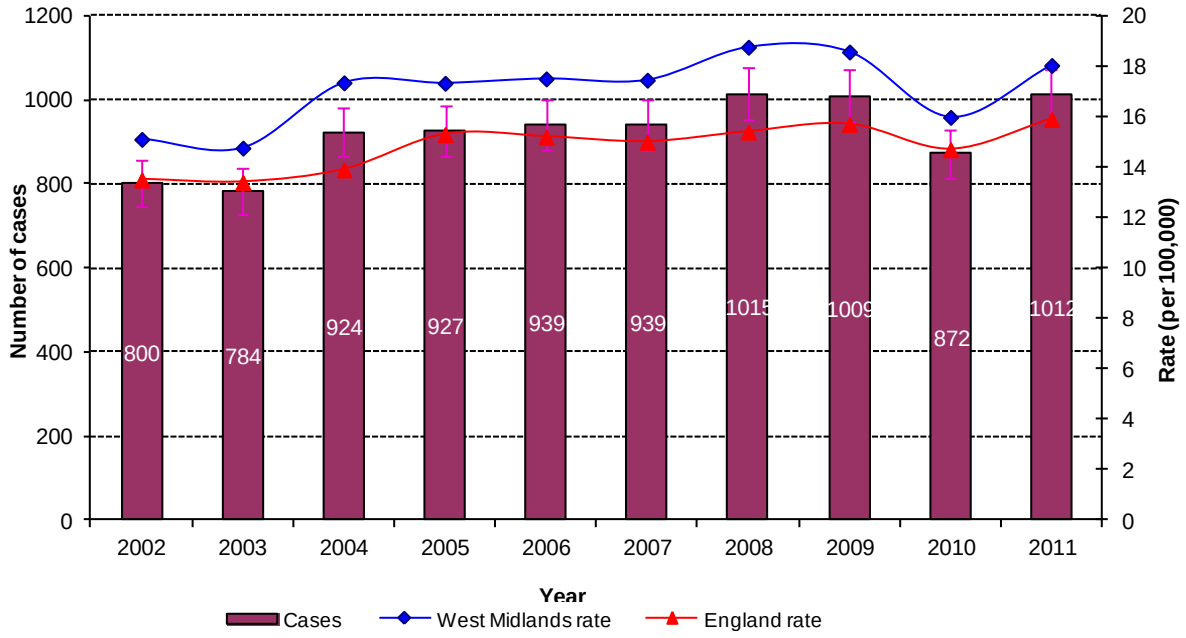


Source: CFI dataset, Health Protection Agency; Mid-year population estimates, Office for National Statistics.

The main reasons for this are a combination of the ethnic make-up of the populations and homelessness. Despite this, no local authority area had a rate above 40 per 100,000 which is the national threshold for implementing universal neonatal BCG. Even if the number was exceeded for one year the majority of these cases would be occurring in populations already targeted for BCG vaccination at birth. Given this, and the inter-year variability in TB rates, the decision to implement neonatal BCG could wait to see if the rate remains above the threshold in the subsequent year(s).

Disease rates have shown a small upward trend over the past 10 years (Figure 2.2).

Figure 2.2: TB cases and rates, West Midlands and England, 2002 to 2011 (with 95% CIs)



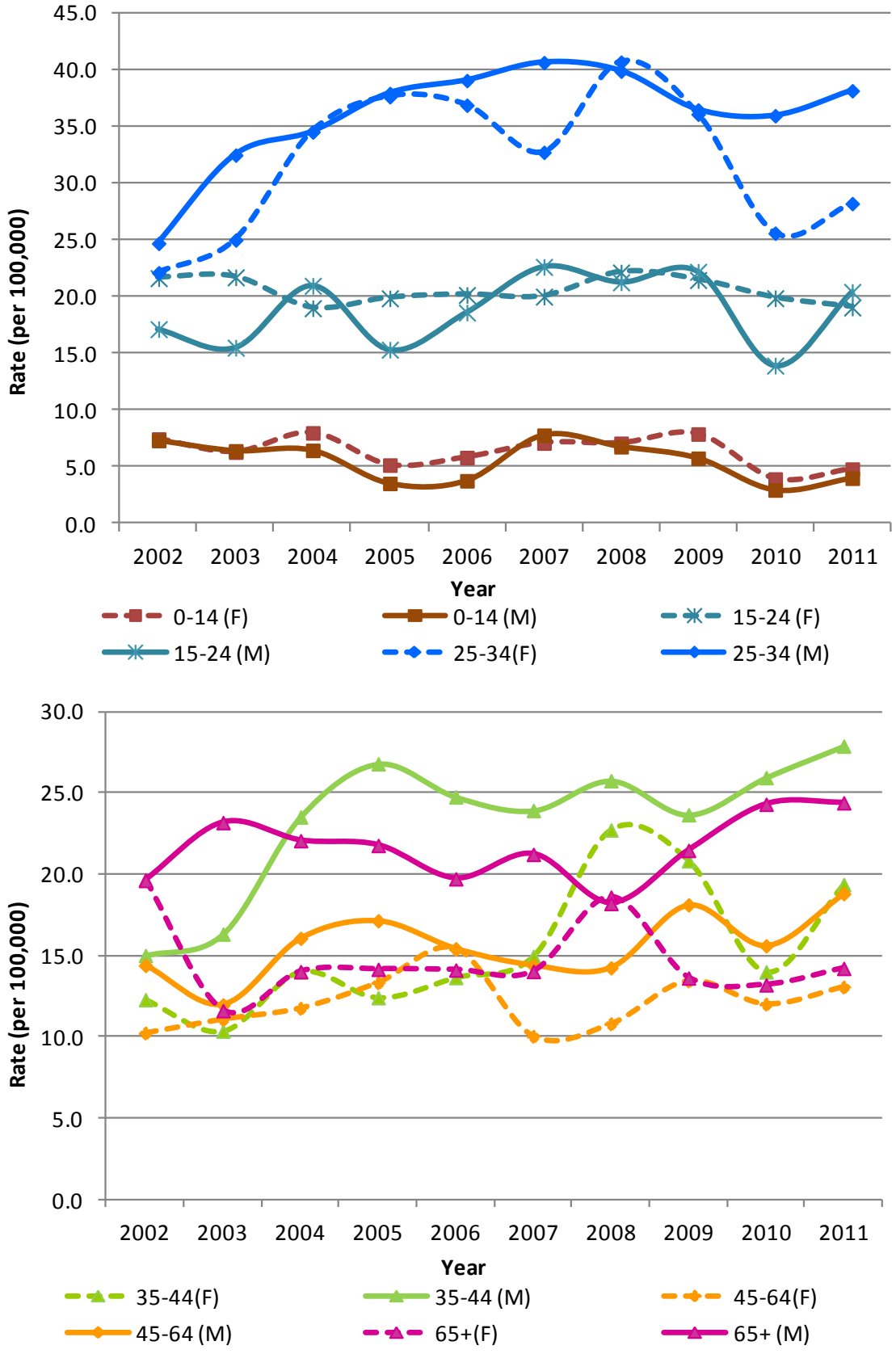
Source: Health Protection Agency; Mid-year population estimates, Office for National Statistics.

Cases are more common in males than females and most cases occur in the 15-54 age group although rates are equally high in the over 75s. Importantly within the 15-54 age groups, 25-34s have the highest rate followed by 15-24 and 35-44 having similar rates. The lowest rates are seen in the under 15s (Figure 2.3).

Rates are also higher in all non-white ethnic groups (Figure 2.4) but also noteworthy are those born outside the UK who have much higher rates than the same ethnic group born within the UK (Figure 2.5). This is most apparent in people born in sub-Saharan Africa where the impact of HIV and AIDS on TB epidemiology is most marked. People of ethnic groups from these high prevalence countries, despite being born in the UK are also at a higher risk.

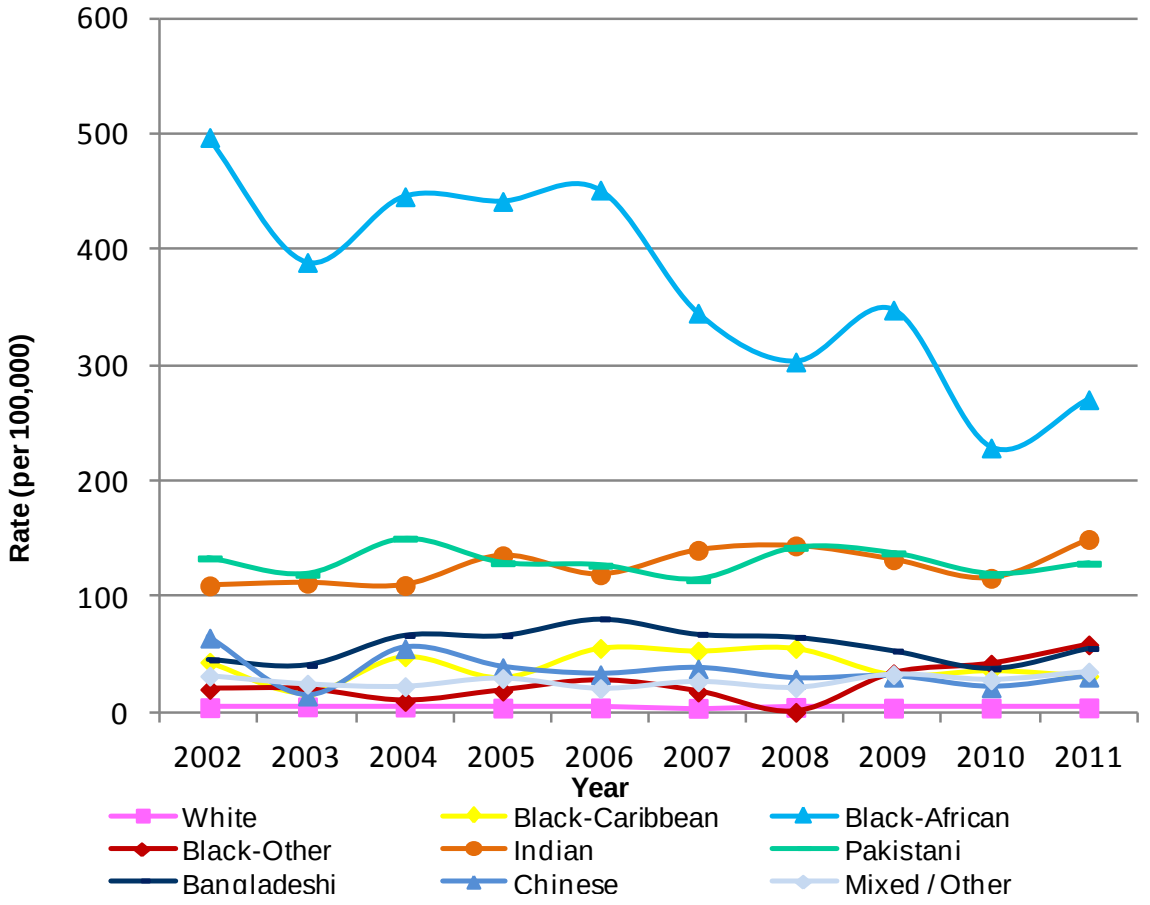
Although TB is most common in the 15-54 age groups, in the areas with lower overall rates of infection, typically the more rural areas, a greater proportion of cases are aged 55 and older. This reflects the fact that many of the cases in these areas are due to re-activation of old TB infections rather than from new infections. These areas also have a predominant number of cases in the white ethnic groups and born within the UK. Amongst cases born outside these are predominantly from South Asia (435/656, 66.3%) and sub-Saharan Africa (139/656, 21.2%) reflecting the high disease rates in these countries.

Figure 2.3: TB rates by age group, West Midlands, 2002 to 2011



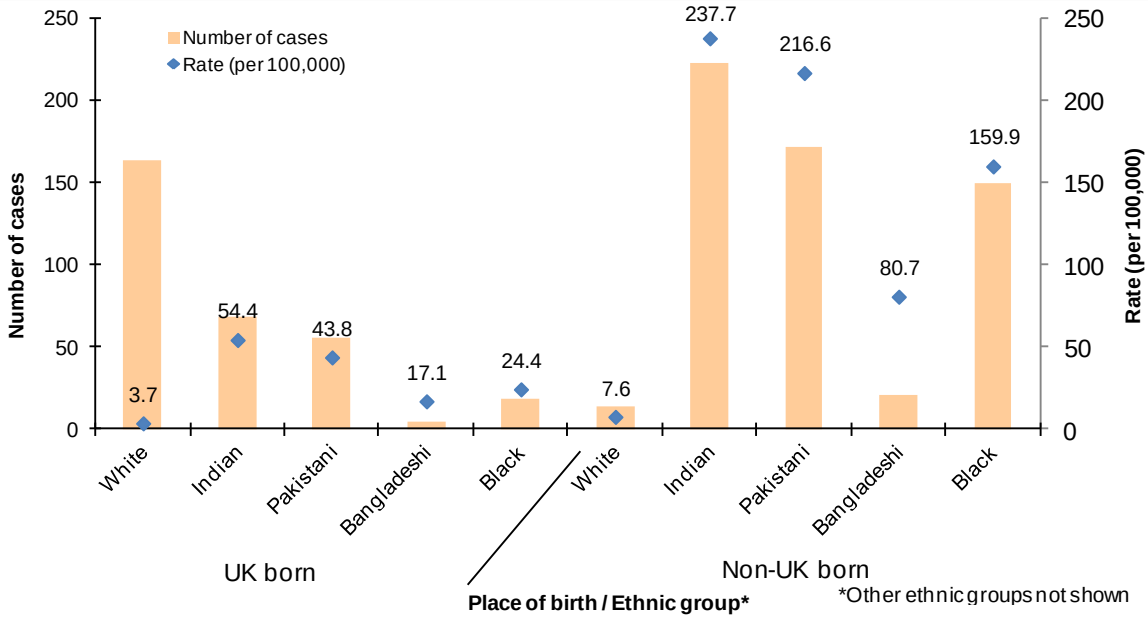
Source: CFI dataset, Health Protection Agency; Mid-year population estimates, Office for National Statistics - 2009 estimates were used for 2010 and 2011 rates.

Figure 2.4: TB rates by ethnic group, West Midlands, 2002 to 2011



Source: CFI dataset, Health Protection Agency; Mid-year population estimates, Office for National Statistics - 2009 estimates were used for 2010 and 2011 rates.

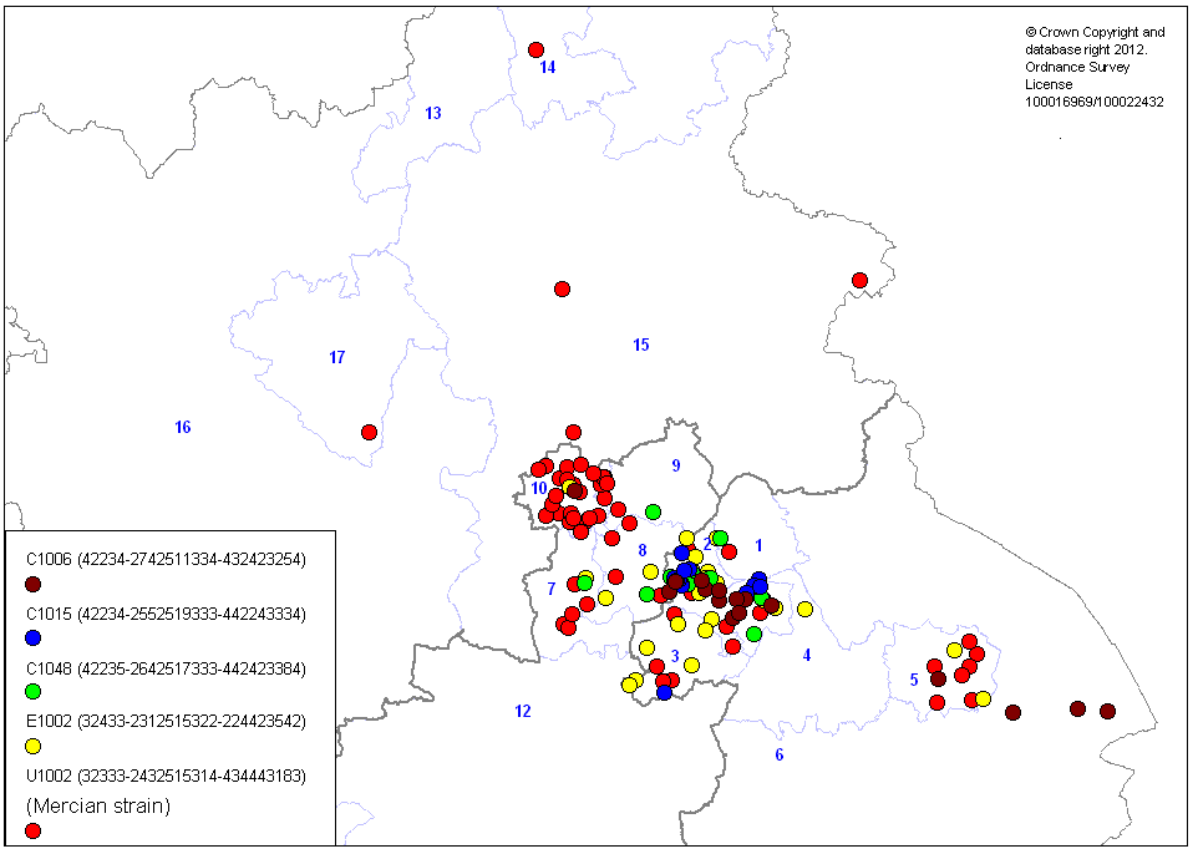
Figure 2.5: TB cases and rates by place of birth and ethnic group, West Midlands, 2011



Source: Health Protection Agency; 2011 Labour Force Survey population estimates, Office for National Statistics.

Advances in the genetic testing of TB bacteria have allowed the spread of a particular clone to be followed. Often links that were not originally suspected are identified, or cases that appear to be linked are shown not to be related which contribute to better control. It can also rule out transmission links in circumstances where there are different strains. This can also be particularly useful in investigation of transmission. It also shows how problematical control can be in some situations. People who are infected with the same strain are part of an outbreak related to that strain. The links may not be direct and it is certain there are unidentified links. Some of the local clones are particularly widespread, particularly the Mercian strain shown in red (Figure 2.6).

Figure 2.6: Selected current clusters of TB



No.	PCT	No.	PCT
1	Birmingham East and North	10	Wolverhampton City PCT
2	Heart of Birmingham Teaching PCT	11	Herefordshire PCT
3	South Birmingham PCT	12	Worcestershire PCT
4	Solihull Care Trust	13	North Staffordshire PCT
5	Coventry Teaching PCT	14	Stoke on Trent PCT
6	Warwickshire PCT	15	South Staffordshire PCT
7	Dudley PCT	16	Shropshire County PCT
8	Sandwell PCT	17	Telford and Wrekin PCT
9	Walsall Teaching PCT		

Source: Health Protection Agency.

Future

Improved identification of cases and latent cases of TB in people newly arrived from high prevalence counties would identify cases before people became infectious and infected other people.

Advances in genome sequencing are improving our understanding of TB infection patterns[2] and much of this work has been done in the West Midlands.

2.3 Human Immunodeficiency Virus (HIV)

Introduction

Significant advances in the management of HIV have meant that the current focus is on chronic disease management. However, there still remain areas of concern. These include: late diagnosis of HIV infection, which makes clinical management more difficult and is associated with a poorer outcome; large numbers of new infections, particularly among men who have sex with men; and new infections occurring with drug resistant HIV strains. It is estimated that one quarter of people with HIV in the UK are unaware of their infection.[3] These people will contribute to the disease burden for many years to come and are likely to present later with attendant increased morbidity and mortality.

Data sources

The Health Protection Agency (HPA) collects data from laboratories, Genito-Urinary Medicine (GUM) clinics and other physicians about HIV infections. Particular uses of these data include:

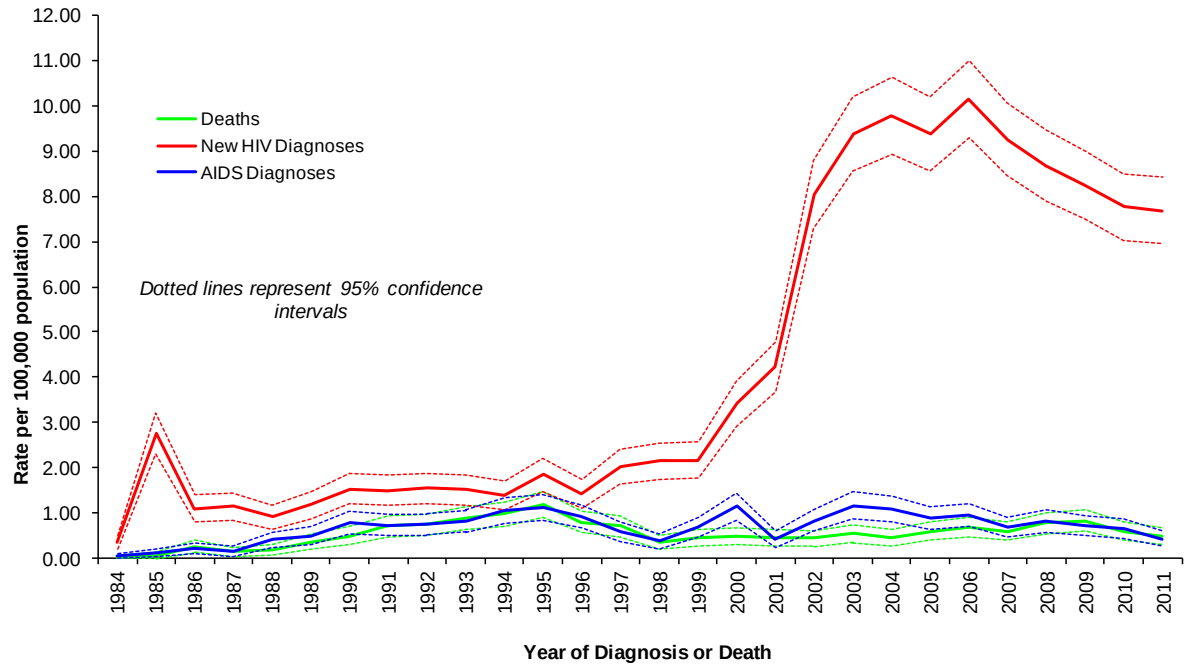
- Identifying the number of new infections and the likely sources of infection
- Identifying the number of people on treatment and those likely to benefit from treatment to assist commissioning and planning of services

As much of the data are anonymised, this dataset is not the easiest to maintain but nevertheless it is accurate for the data presented here, with estimates of undiagnosed HIV positive people being the least accurate.

New diagnoses

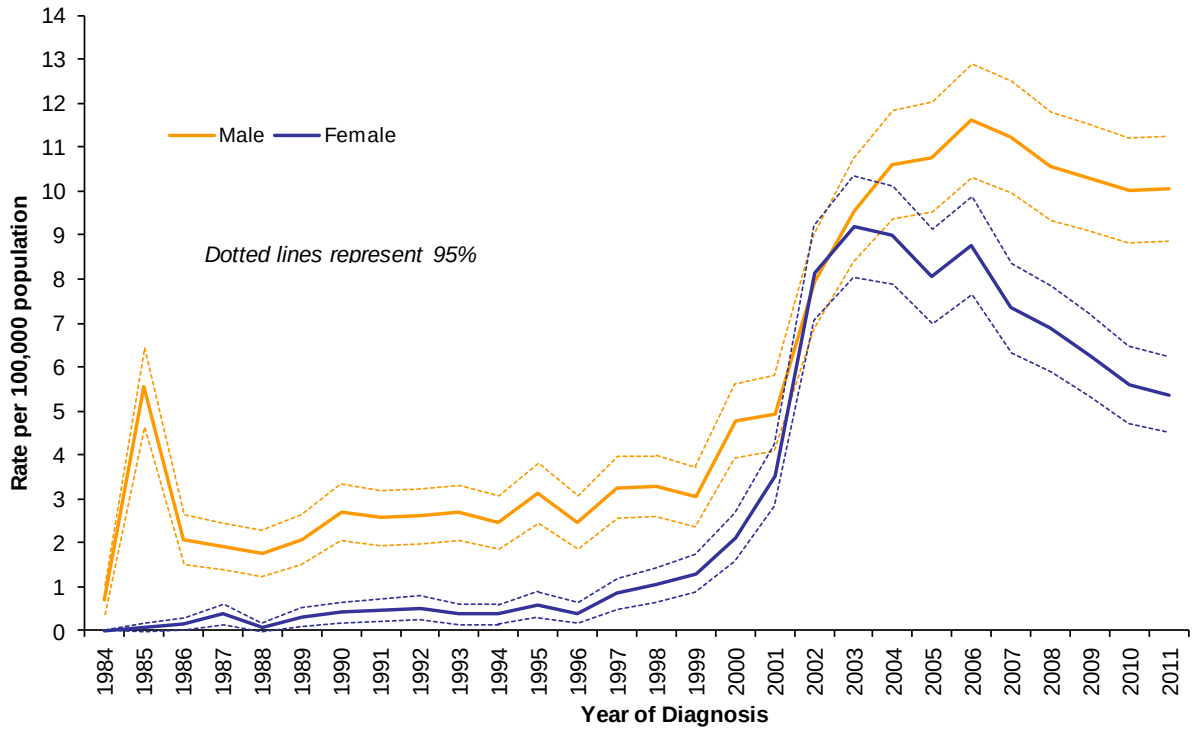
The annual number of new diagnoses rose rapidly in the 5 years from 1999 to 2004 peaking in 2006, following which there has been a steady decline (Figure 2.7). The rate of new infections is currently of the order of 7 cases per 100,000 population. There has been a greater decline seen in females in comparison to males (Figure 2.8).

Figure 2.7: New HIV and AIDS diagnosis and death rates per 100,000, West Midlands 1984-2011



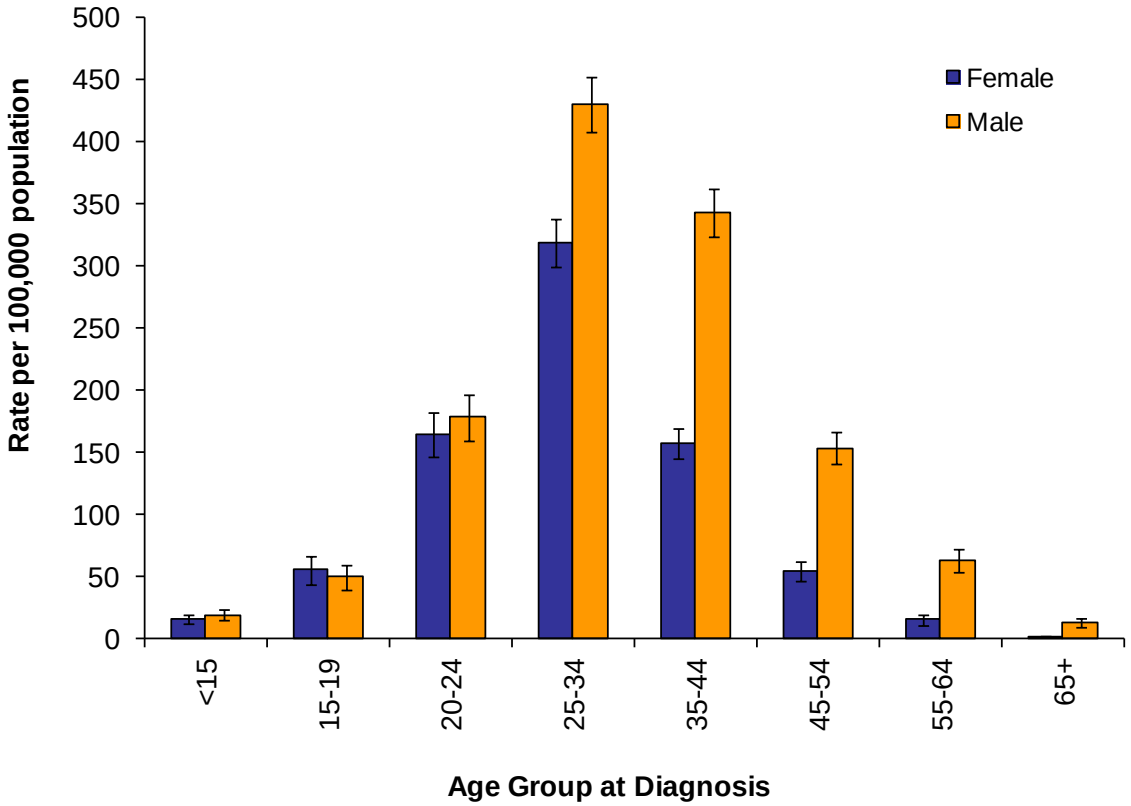
Source: West Midlands HIV Surveillance Project, Health Protection Agency; Mid-year population estimates, Office for National Statistics.

Figure 2.8: New HIV diagnosis rates per 100,000 by year of diagnosis and gender, West Midlands 1984-2011



Source: West Midlands HIV Surveillance Project, Health Protection Agency; Mid-year population estimates, Office for National Statistics.

Figure 2.9: New HIV diagnoses by age at diagnosis and gender (cumulative cases) Rate per 100,000, West Midlands 1981-2011



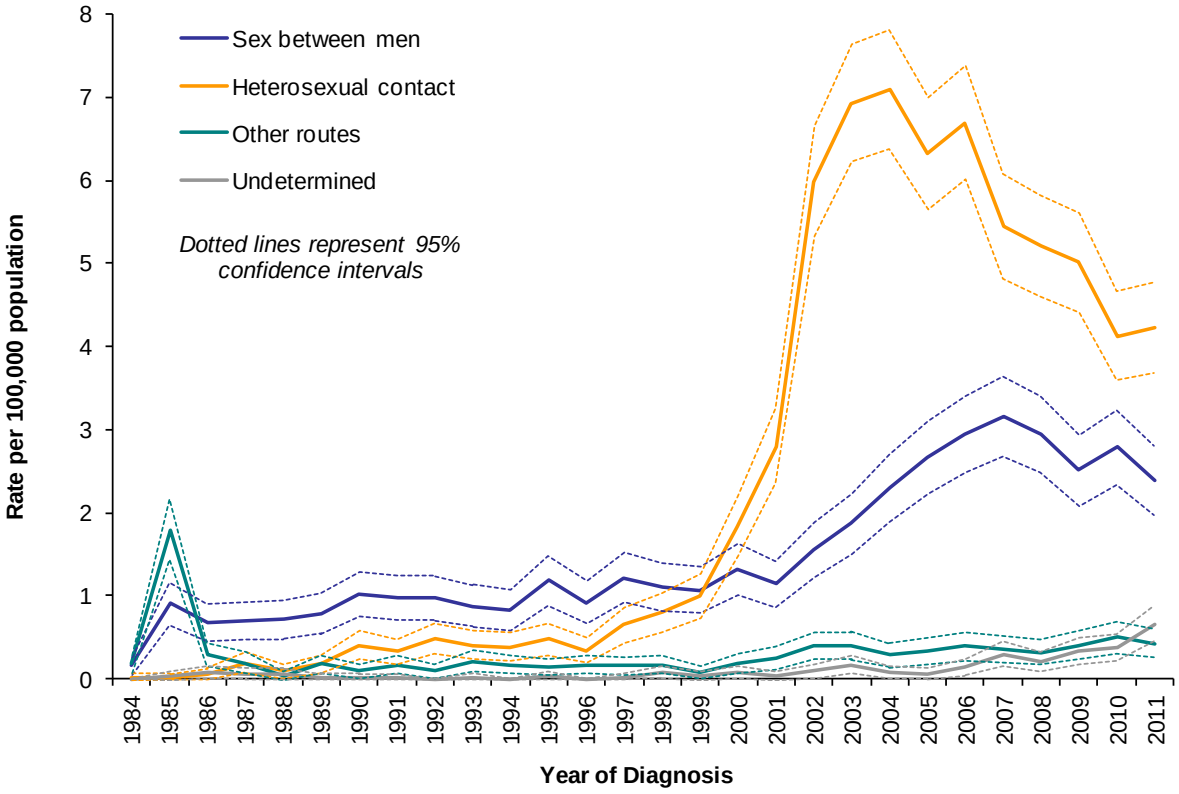
Source: West Midlands HIV Surveillance Project, Health Protection Agency; Mid-year population estimates, Office for National Statistics.

More males are being diagnosed with HIV and at an older age than females (Figure 2.9). Much of this reflects the epidemiology in sub-Saharan Africa, where many of the cases have been acquired, and some of the older males are men who have sex with men.

Routes of infection

From the first recognition of the pandemic in the early 1980s to 1999 men who had sex with men provided the largest number of new infections. Since 2000, sex between men and women has been the predominant route of infection (Figure 2.10). Most of these infections are thought to have occurred in sub-Saharan Africa where people infected in these countries have migrated to the UK. Although these are classified as infected in their home countries, transmission within the UK, or on return trips to Africa, cannot be excluded and is almost certainly occurring. Unless newly arrived people are tested soon after arrival in the UK this cannot be evaluated. There are clear benefits to testing these people who come from countries with a high prevalence as early treatment improves outcome, effective treatment also reduces infectivity virtually preventing further infections with HIV which would otherwise occur if safe sex is not exclusively practiced.

Figure 2.10: New HIV diagnoses by year of diagnosis and probable exposure category, rate per 100,000, West Midlands 1984-2011



Source: West Midlands HIV Surveillance Project, Health Protection Agency; Mid-year population estimates, Office for National Statistics.

Table 2.1: New HIV diagnosis by group (cumulative cases), rates per 100,000, West Midlands 1981-2011

Ethnic Group	Number	Rate per 100,000
White	2,791	60
Black African	2,649	5,266
Black Caribbean	306	368
Other mixed	165	117
Black Other/unspecified	129	1,075
Indian/Pakistani/Bangladeshi	127	30
Other Asian	36	97
Chinese	12	36
Not known	228	-
Total	**6,443**	**119**

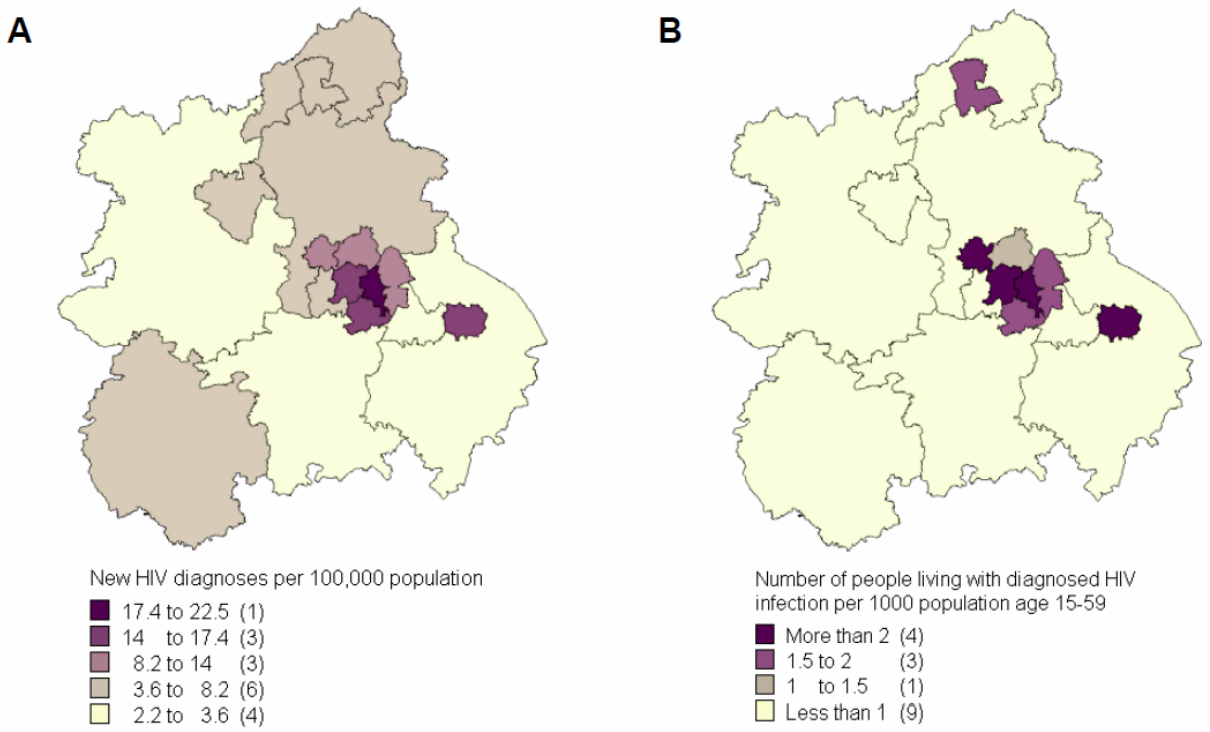
Source: West Midlands HIV Surveillance Project, Health Protection Agency; Mid-year population estimates, Office for National Statistics.

Unsurprisingly people from countries with a high prevalence of HIV infections have the highest rates when local data is described by ethnicity (Table 2.1). Although sub-Saharan Africa is well recognised as having high rates, this also applies to some of the islands in the Caribbean.[4] Any person travelling abroad should be aware of the health risks of this and this includes risks to sexual health.

Current infection rates

New cases and numbers of people diagnosed with HIV infection are clustered in city areas (Figure 2.11).

Figure 2.11: (A) New HIV diagnosis rates per 100,000 population, and (B) prevalence of diagnosed HIV infection per 1,000 population aged 15-59 by PCT of residence, West Midlands 2010)



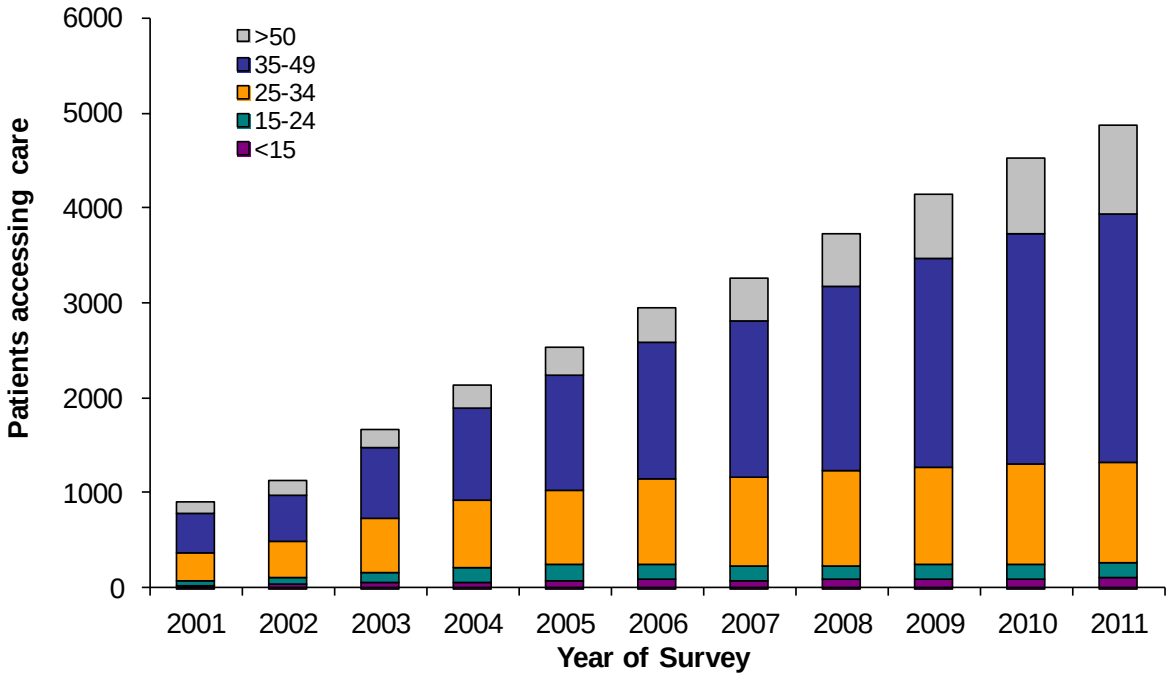
Source: (A) West Midlands HIV Surveillance Project, Health Protection Agency; (B) Survey of Prevalent HIV Infections Diagnosed (SOPHID), Health Protection Agency; Mid-year population estimates, Office for National Statistics.

The Department of Health has recommended testing of all general medical admissions when the prevalence of HIV exceeds 2 per 1,000 people age 15-59 in that local area. Currently this applies to four PCTs in the West Midlands: Coventry, Heart of Birmingham, Sandwell and Wolverhampton. Implementing how this is done will present challenges to commissioners and the staff delivering the service. In Leicester where testing has been evaluated it has shown to be achievable and effective.[5]

Number of people receiving treatment

Over the last 10 years the number of people in the West Midlands receiving HIV related care has more than quadrupled from under 1,000 in 2001 to over 4,000 in 2011 (Figure 2.12). This can be attributed to the effectiveness of HAART preventing and reversing HIV disease and increased numbers of patients being diagnosed. HIV is now much more of drug regimes and chronic disease management rather than treating a series of opportunistic infections.

Figure 2.12: Residents accessing HIV-related care by age group and year, West Midlands 2001-2011



Source: Survey of Prevalent HIV Infections Diagnosed (SOPHID), Health Protection Agency; Mid-year population estimates, Office for National Statistics.

Late diagnosis

The national figure for late diagnosis is 47%. Because of small numbers the confidence intervals on these data for the PCTs within the West Midlands are wide but the problem of late diagnosis is greater where there is a higher prevalence (Table 2.2). Reasons for this should be evaluated as outcome is improved.

Future

Unlike many countries in Europe (particularly Southern and Eastern Europe), injecting drug use is responsible for very few cases of HIV infection. This is due to effective needle exchange schemes, along with harm reduction strategies, dating back to the early years of the HIV pandemic, and the continued delivery of these schemes. This has also helped to control other blood borne viruses particularly hepatitis B where vaccination can be offered at needle exchange sites.

Earlier diagnosis of HIV in those infected can be achieved by targeting those most at risk. Not only will their disease outcomes be improved but identifying people as infected leads to marked reduction in transmission as those place on treatment lose virtually all their infectivity and also improves their compliance in the use of condoms, further lowering the risk of onwards transmission.

Table 2.2: Late diagnosis (CD4<350/mm3 within three months of diagnosis) by upper-tier local authority, West Midlands 2009-2011

Upper-tier Local Authority	Proportion diagnosed late %	95% Confidence interval %
Birmingham	50.0	44.9 - 55.1
Coventry	61.5	52.2 - 70.1
Dudley	36.7	19.9 - 56.1
Herefordshire, County of	59.1	36.4 - 79.3
Sandwell	62.9	52.0 - 72.9
Shropshire	47.1	23.0 - 72.2
Solihull	36.4	17.2 - 59.3
Staffordshire	64.6	53.3 - 74.9
Stoke on Trent	65.9	49.4 - 79.9
Telford and Wrekin	37.5	15.2 - 64.6
Walsall	58.9	45.0 - 71.9
Warwickshire	50.0	35.5 - 64.5
Wolverhampton	54.8	42.7 - 66.5
Worcestershire	37.0	23.2 - 52.5

Source: 2012 HIV annual report, Health Protection Agency.

2.4 Hepatitis

Introduction

There are a number of different hepatitis viruses: A, B, C. delta and E. This report focuses on B and C which are the main public health issues.

Hepatitis A is travel related and small outbreaks do occur. These are mainly associated with overcrowding, homelessness and drug use. There is an effective vaccine to protect against hepatitis A which gives long term protection. Delta virus is a very unusual agent which can only exist when hepatitis B is also present. Therefore control of hepatitis B will control delta. Hepatitis E is being diagnosed increasingly often and we are rapidly learning more about this infection. It is now recognised to be much more common than originally thought. Most cases in the UK are travel related but, increasingly, consumption of undercooked pork products and contact with pigs are being implicated in cases.[6]

Hepatitis B and C are referred to as blood borne viruses as this is a major transmission route. Hepatitis B can also be transmitted sexually and from mother to child, particularly at the time of delivery. These two viruses are important as chronic infection leads to continuous liver damage that may frequently progresses to cirrhosis and, later, the development of hepatocellular (liver) cancer in the cirrhotic liver. Once cirrhosis has occurred the changes are permanent and if infection persists, liver damage continues. Although recent evidence suggests that treatment with some of the newer drugs might allow damage to be repaired when the virus is well controlled in hepatitis B.

Hepatocellular cancer generally only develops within cirrhotic livers giving an opportunity to screen patients with cirrhosis to diagnose liver cancer whilst it can be surgically resected.

The rise in liver cancer is often portrayed as being due to alcohol; but a significant part of the epidemic of cirrhosis and liver cancer is the result of these hepatitis viruses, particularly hepatitis C in recent years. Importantly, alcohol potentiates the damage done by chronic viral hepatitis infections.

Hepatitis C kills more people than HIV in the UK and this is even more marked in the West Midlands.

Data sources

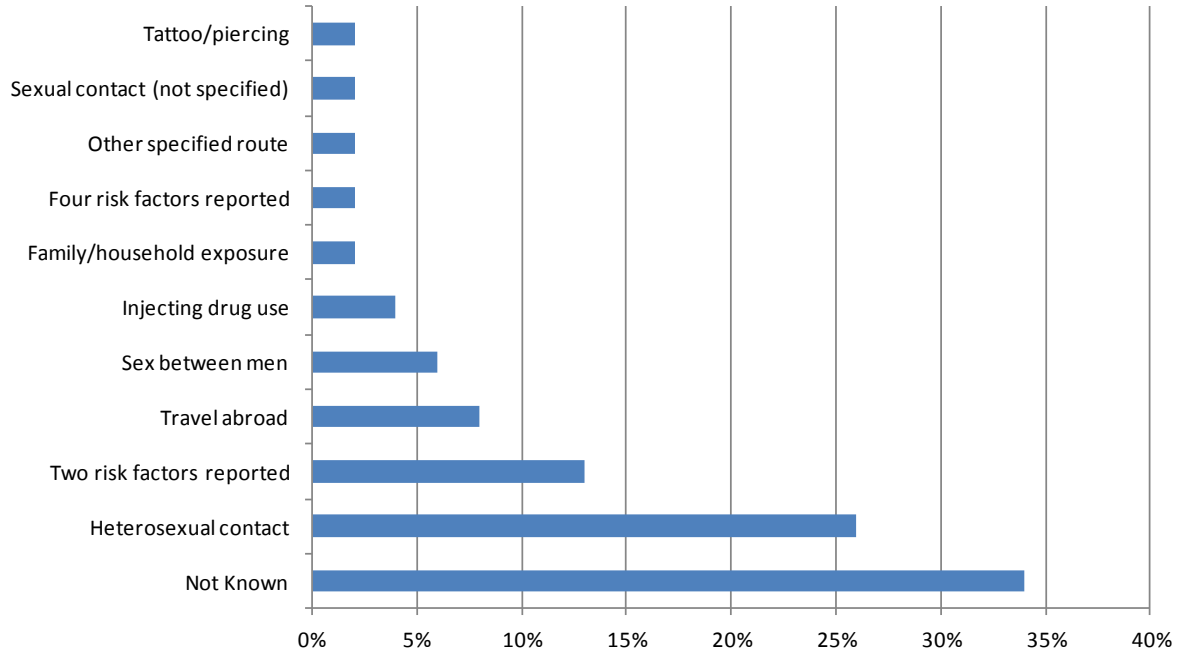
The data for this report have been collected from laboratory reports of hepatitis across the West Midlands. It is not possible to determine which hepatitis virus has caused the infection clinically so all data have to be derived from laboratory reports.

Epidemiology of Hepatitis B

Most people with chronic hepatitis B in the West Midlands will have acquired the infection in their country of birth. Rates of hepatitis B in the UK are amongst the lowest in the world. As chronic hepatitis B is invariably asymptomatic, until the late stages when severe liver disease has developed, people in high risk groups should be offered testing. These people who test positive need to be assessed to identify those who might benefit from treatment which can prevent or reduce the risk of progression to serious liver disease. Currently routine testing for hepatitis B takes place in ante-natal clinics, where all pregnant women are offered testing in order to prevent from mother to baby.

Acute hepatitis B infection is quite rare with only 49 reports in the West Midlands in 2011. There was an excess of males partly explained by men who have sex with men (MSM) but heterosexual spread was reported more commonly although some of this took place outside the UK. Injecting drug use and health care settings were very rare as a source of infection (Figure 2.13).

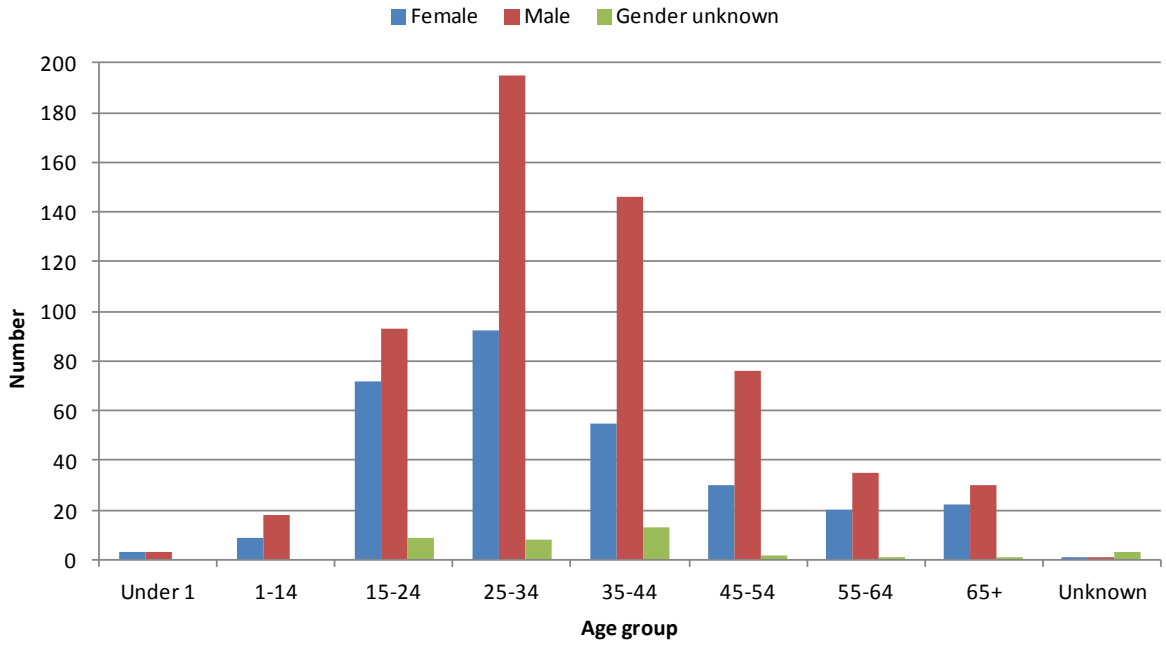
Figure 2.13: Risk factors for acute hepatitis B infection, West Midlands, 2011



Source: HP Zone, Health Protection Agency.

Rates of detection of hepatitis B (positive for HBsAg), mainly chronic infections, predominates in males with rates two-three fold higher than females depending on the age groups, and a peak aged 25-34 followed by the 35-44 age group (Figure 2.14). Some of the diagnosed cases in females are from the ante-natal screening programme which will identify women at a younger age group.

Figure 2.14: Age and sex distribution of individuals testing positive for HBsAg in the West Midlands sentinel laboratory (excluding antenatal screening), 2005-2011



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.

Source: West Midlands Sentinel Laboratory, Health Protection Agency.

Many of the chronic hepatitis B infections in the West Midlands are as a result of infection at birth or in early childhood in first generation immigrants from countries with significant rates of hepatitis B (Table 2.3). As these people can be readily identified, screening is warranted so that appropriate investigation and treatment can be offered to those infected. This will also help to reduce secondary transmission.

The prevalence of hepatitis B is higher in people with South Asian names. This largely reflects that countries in that region have a higher prevalence and first generation immigrants will have acquired their infection at birth or in childhood.

Table 2.3: Number of individuals tested and the proportion testing positive for HBsAg in the West Midlands sentinel laboratory by ethnicity (excluding antenatal screening), 2005-2011.

Year	No name available		Non-South Asian origin		South Asian origin		Total	
	Number tested	% positive	Number tested	% positive	Number tested	% positive	Number tested	% positive
2005	2,325	1.6	2,450	2.0	826	5.8	5,601	2.4
2006	2,034	1.8	2,046	1.3	730	4.0	4,810	1.9
2007	1,657	2.9	2,957	1.3	996	3.7	5,610	2.2
2008	1,553	3.3	3,254	1.4	1,169	3.7	5,976	2.4
2009	1,902	2.1	3,878	1.6	1,491	3.4	7,271	2.1
2010	2,468	1.4	4,019	1.4	1,542	3.1	8,029	1.7
2011	2,598	1.3	4,462	1.6	1,542	3.2	8,602	1.8
Total	**14,537**	**1.9**	**23,066**	**1.5**	**8,296**	**3.7**	**45,899**	**2.0**

NamPehchan was used to identify individuals of South Asian origin based on the patient's surname as ethnicity is not routinely available from the participating laboratory information systems.

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.

Source: West Midlands Sentinel Laboratory, Health Protection Agency.

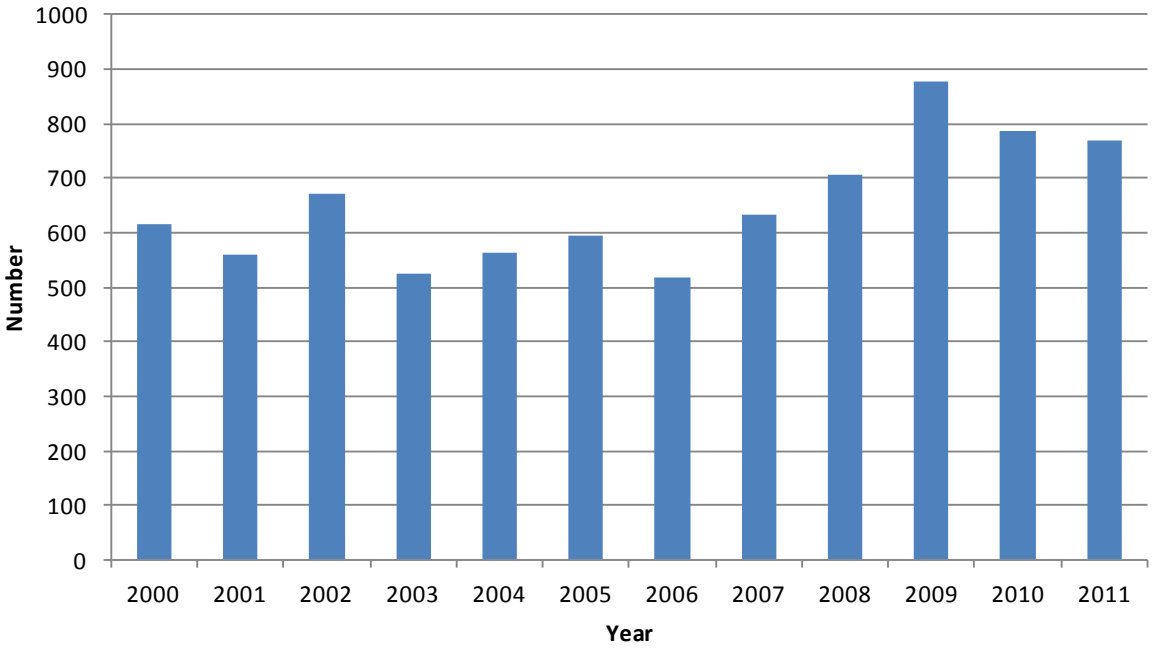
Epidemiology of Hepatitis C

Hepatitis C (HCV) was identified in 1988 as a result of identifying causes of post-transfusion hepatitis. In the UK, like most other countries, this risk has been virtually eliminated since the introduction of screening of all blood donors for hepatitis C infection when they donate. Transmission essentially only occurs in the UK amongst people who inject drugs (PWID). There are other possible risks such as self-tattooing and other unsterile practices where blood may be exchanged, but these remain rare as routes of infection within the UK. There is an increasing recognition that men who have sex with men (MSM), particularly if they are HIV positive, are at an increased risk of HCV infection.

The other populations with significant numbers of people chronically infected with HCV are people who were born in countries with a high prevalence (e.g. Pakistan) where re-use of needles, syringes and razors helps explain the high prevalence. These people often acquire their infection at a young age and are at increased risk of having developed significant liver damage. People staying for prolonged periods in high prevalence countries are also at potential risk when they seek health care services there.

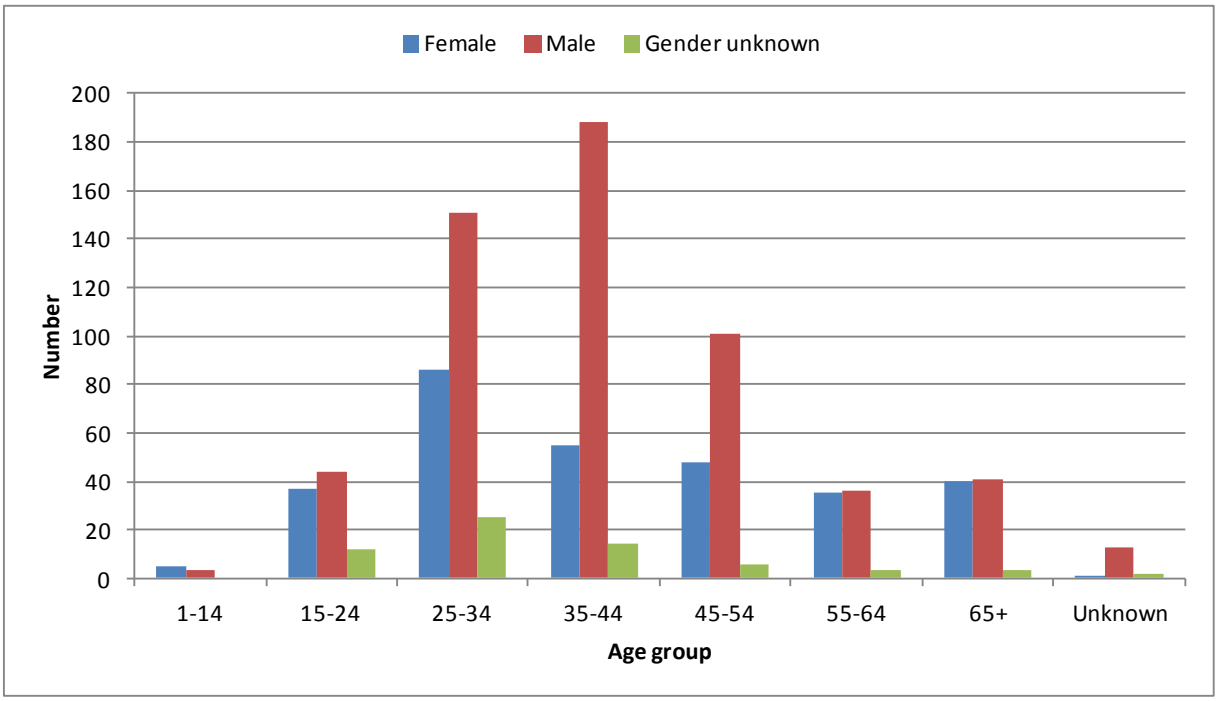
The prevalence in injecting drug users varies between 30% and 70% depending on which people are selected from testing and for how long they have been injecting. People born in high prevalence countries will have rates of chronic infection of between 1% and 5%.[7]

Figure 2.15: Laboratory reports of hepatitis C infection in the West Midlands, 2000-2011



Source: Health Protection Agency.

Figure 2.16: Individuals testing positive for anti-HCV by age group and gender in the West Midlands sentinel laboratory, 2005-2011

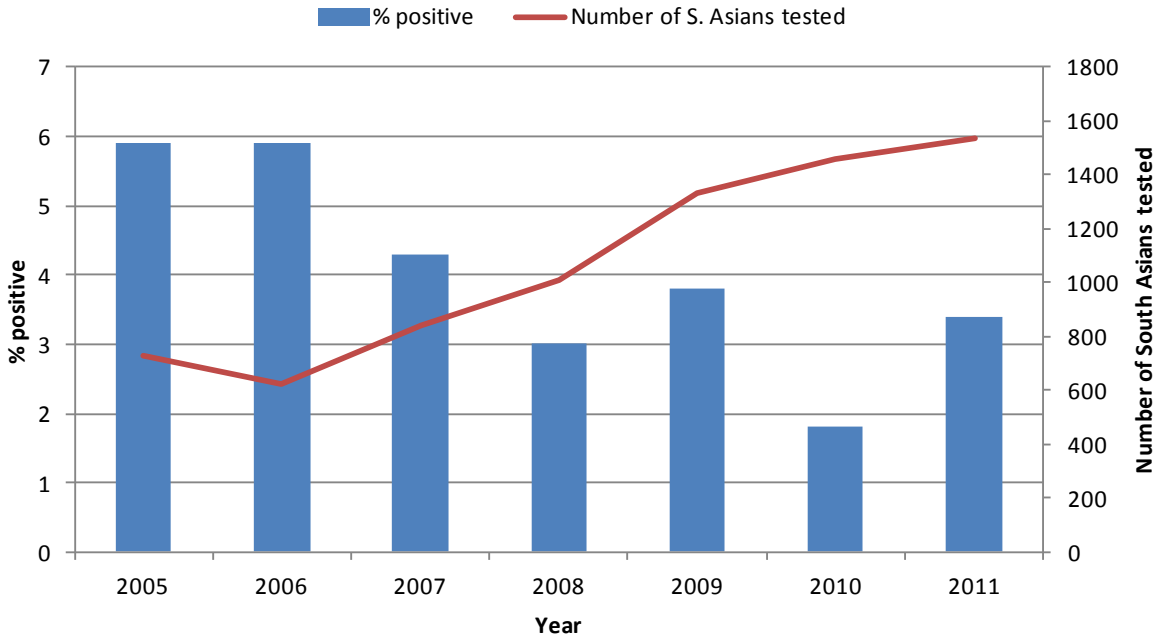


Excludes dried blood spot, oral fluid, reference testing, and testing from hospitals referring all samples. Data are de-duplicated subject to availability of date of birth, soundex and first initial. Excludes individuals aged less than one year, in whom positive tests may reflect the presence of passively-acquired maternal antibody rather than true infection. All data are provisional.

Source: West Midlands Sentinel Laboratory, Health Protection Agency.

The number of people testing positive for HCV has been steadily increasing since the introduction of testing (Figure 2.15). Males have higher rates, and the main age group is 35-44, followed by the 25-34 age group (Figure 2.16). There is also a strong association with inner city deprivation. These observations are a reflection on who injects drugs. The increased diagnoses in the 35-44 age group reflects people with previous injecting drug use who have come forward for testing, often when they are being considered for treatment following successful treatment for their addiction. There have been a number of campaigns encouraging past and current injecting drug users to come forward for testing but the impact of these campaigns in identifying infected persons has been difficult to determine accurately.

Figure 2.17: South Asians tested and % testing positive for anti-HCV in the West Midlands sentinel laboratory, 2005-2011*

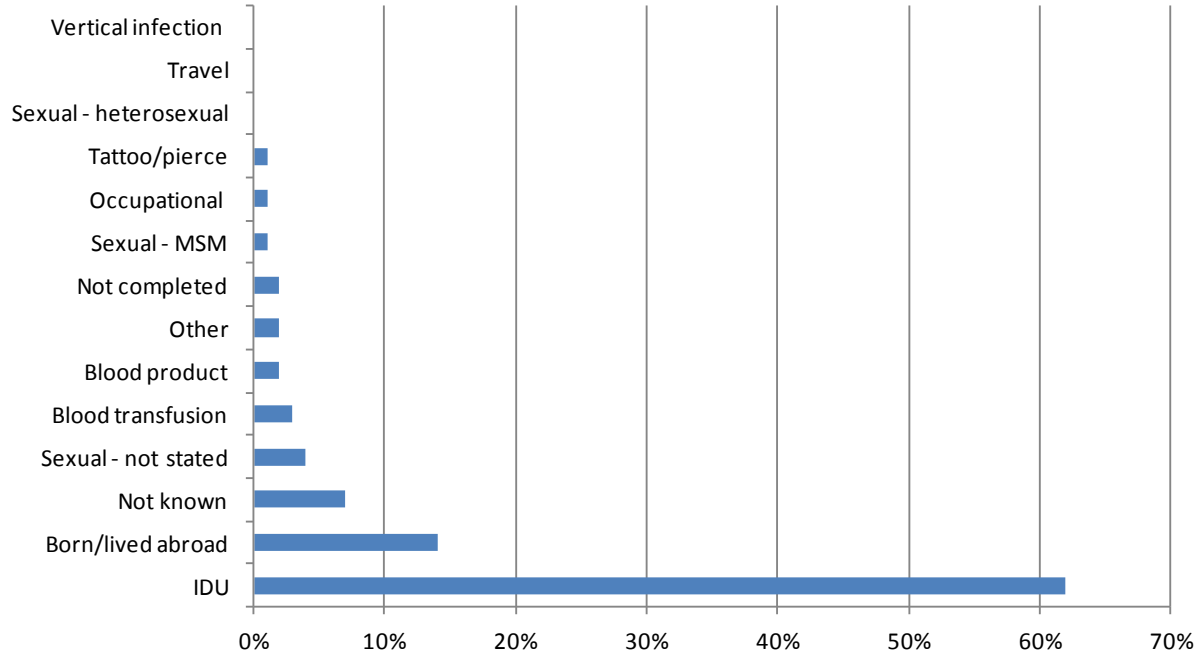


* *NamPehchan was used to identify individuals of South Asian origin as ethnicity is not routinely available from the participating laboratory information systems. Excludes dried blood spot, oral fluid, reference testing, and testing from hospitals referring all samples. Data are de-duplicated subject to availability of date of birth, soundex and first initial. 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.*

Source: West Midlands Sentinel Laboratory, Health Protection Agency.

The prevalence of hepatitis C is higher in people with South Asian names. This largely reflects that countries in that region have a higher prevalence and first generation immigrants will have acquired their infection most likely in childhood from contaminated medical equipment.

Figure 2.18: Risk exposures for individuals testing positive for anti-HCV in the West Midlands sentinel laboratory from questionnaire data, January 2002 to August 2006



Source: West Midlands Sentinel Laboratory, Health Protection Agency.

Recent estimates suggest that there are 15,000 people chronically infected with Hepatitis C in the West Midlands. Many of those who are infected but are unaware include the 'baby-boomer' generation who acquired infection as young adults through injecting drug use. This group has also had their infection for over 30 years and are at high risk of having developed, or soon to develop, cirrhosis of the liver. Of those identified with HCV the estimated treatment budget over the time course of the disease is £11 million, although recent additional drug options will increase this but also lead to more successful cures.

Across the region 33% of drug users tested as part of an anonymous testing programme were positive for HCV compared to the national figure of 45%. Also 62% of drug users have been tested for HCV in 2011.

Future

New drugs for the treatment of viral hepatitis, effective for B and C, have recently been licensed and there are more to come. These will improve the chances of treatment leading to a complete cure in some patients and reduction in virus levels in the others.

Needle exchange and other harm reduction projects need to be maintained to reduce on-going transmission of infection. Preventing one case by needle exchange will also reduce future transmission so amplifying the benefit of these programmes.

More people need to be identified and treatment initiated if indicated and deliverable. This will reduce long term costs as patients will not develop cirrhosis or hepatocellular cancer. These two conditions are very expensive to treat. HCV is already the leading indication for a liver transplant in the UK. The additional benefit is that by treating and eliminating infections there will be a reduction in the number of new infections as the number of potential source patients is reduced.

2.5 Sexually Transmitted Diseases (STIs)

Introduction

There are a number of different sexually transmitted infections which have significant personal and public health implications. Human papilloma viruses (HPV) are essentially the only cause of cervical cancer although co-factors alter the risk to the individual. Without HPV infection cervical cancer essentially never occurs. Chlamydia, one of the commonest chronic bacterial infections in the developed world, is a leading cause of female infertility. Gonorrhoea is approaching the status of a *superbug* with fewer and fewer antibiotics remaining for effective treatment. In some parts of the world there is only one effective antibiotic with decreasing antibiotic sensitivity, the first steps to complete resistance.

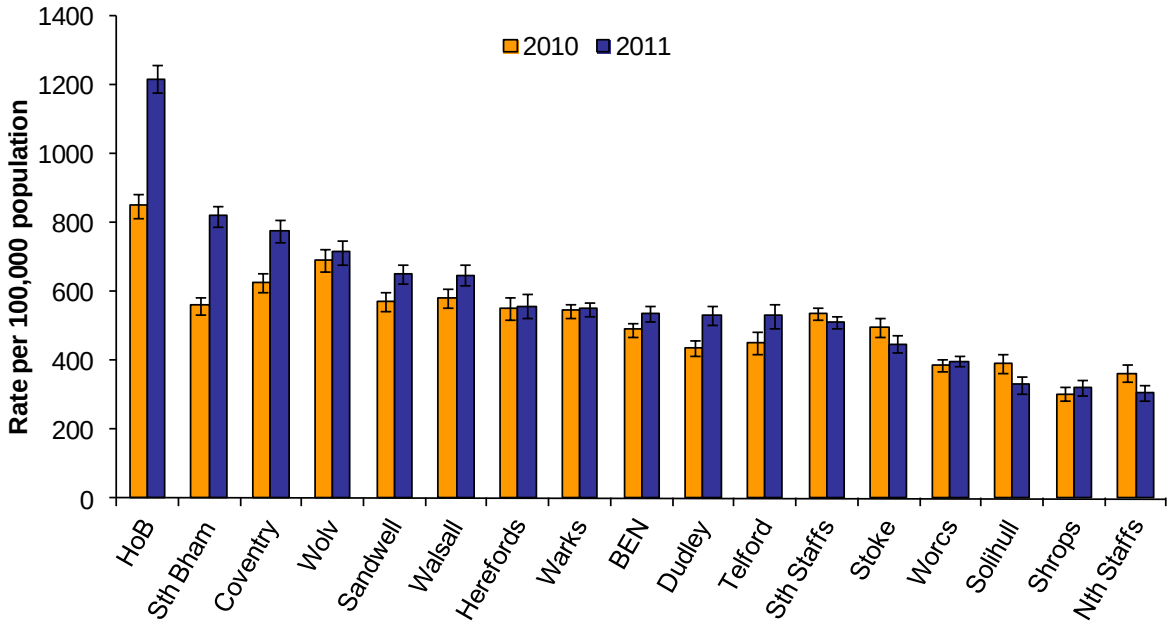
Data sources

The data for this report are sourced from the anonymised returns of activity from Genito-Urinary medicine (GUM) clinics. This is known as the GUMCAD report. It does not include data from the chlamydia screening programme unless specifically mentioned.

Epidemiology of STIs

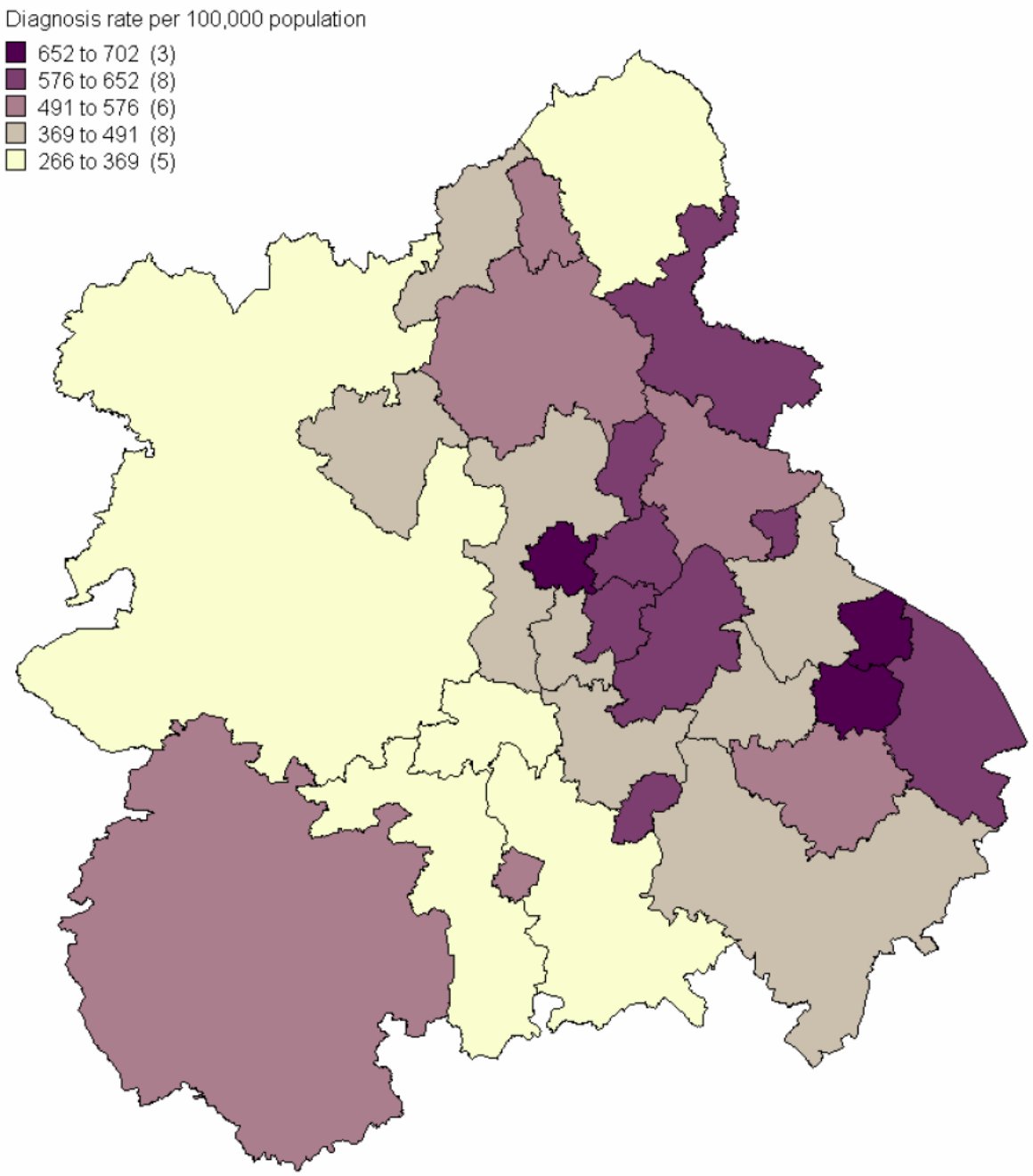
Overall acute STIs increased by 4% across the West Midlands from 2010 to 2011. Unlike most other diseases STIs predominantly affect young people with peak rates in females in the age group 15-24 and in males 20-24. People who report their ethnicity as black (both African and Caribbean) also have higher rates for all STIs. Higher rates of infection are also seen in inner city areas (Figure 2.19 and Figure 2.20) with Heart of Birmingham having the highest followed by South Birmingham and Coventry. Additionally men who have sex with men also have significantly higher rates of infections.

Figure 2.19: New STI diagnoses by PCT of residence, rate per 100,000, West Midlands 2010 and 2011 (GUM diagnoses only)



Source: GUMCAD (GUM Clinic Activity Dataset), Health Protection Agency; Mid-year population estimates, Office for National Statistics.

Figure 2.20: New STI diagnoses by Local Authority of residence, rate per 100,000, West Midlands 2010 (GUM diagnoses only)



Source: GUMCAD (GUM Clinic Activity Dataset), Health Protection Agency; Mid-year population estimates, Office for National Statistics.

Chlamydia

From 2010 to 2011 there was a slight fall in the number of cases of Chlamydia diagnosed. Although total diagnoses fell by 3% overall there were increases of 15% in females and 7% in males diagnosed in GUM clinics; there were marked declines in community diagnosed cases of 11% in females and 18% in females.

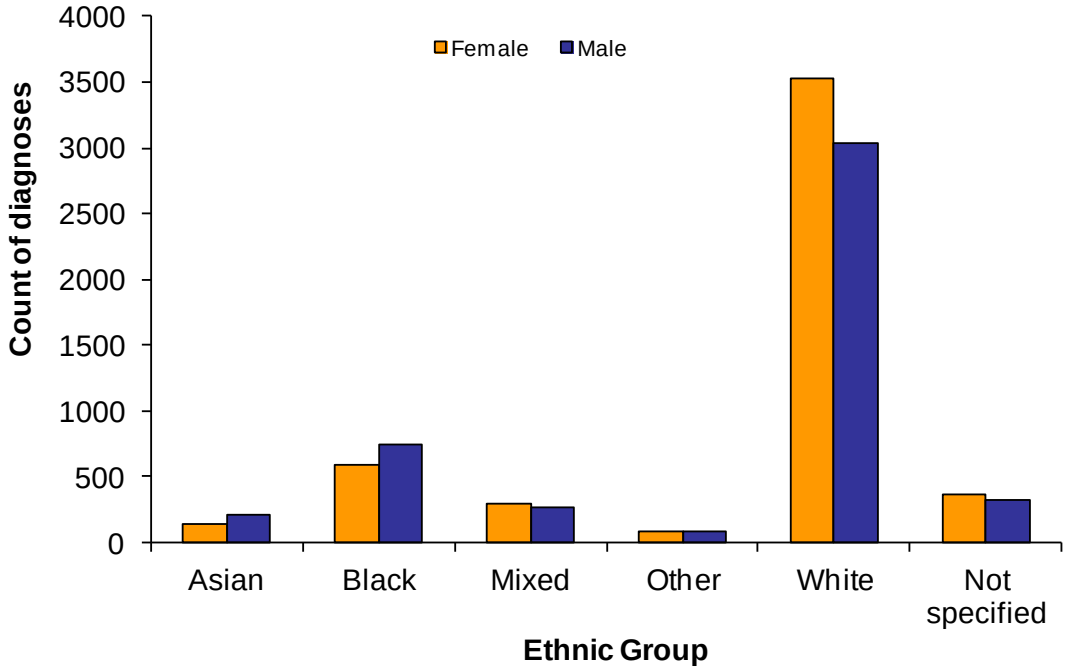
Most of the data in this report are derived from GUM clinic attendances. Chlamydia is less symptomatic in females than males so females would be less likely to attend if they have an infection. Some of the cases will be those identified by home or community self-testing for Chlamydia where females are more likely to have tests than males.

Being the commonest STI the pattern of Chlamydia infection is also that seen for all STIs. Infections are 3 times more common in females aged 15-19 compared to males, with gender equality in the 20-24 age group and a small predominance amongst males in the older age groups (Table 2.4).

In contrast higher rates are seen in the black ethnic group with a male predominance compared to a female predominance in all other groups (Figure 2.22). Although rates are higher in inner city areas (Figure 2.23 and Figure 2.24) some more rural areas also have high rates although some of this can be explained by how patients who are positive on self-testing are managed.

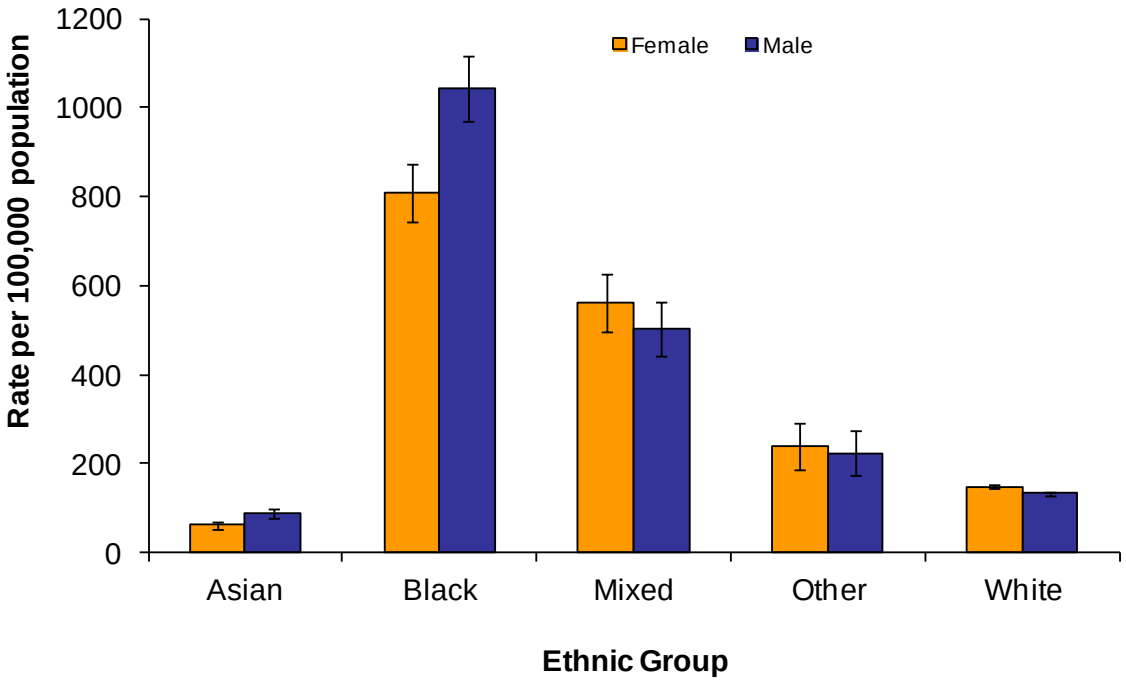
Rates of Chlamydia have increased over the past 15 years. Over the past two years this trend has reversed except for the over 25 age group of both sexes (Figure 2.25 and Figure 2.26). Similar trends are seen for each of the different sexually transmitted diseases; gonorrhoea, syphilis, anogenital herpes and anogenital warts.

Figure 2.21: Chlamydia (complicated and uncomplicated) diagnoses by ethnic group, West Midlands residents 2011 (GUM diagnoses only)



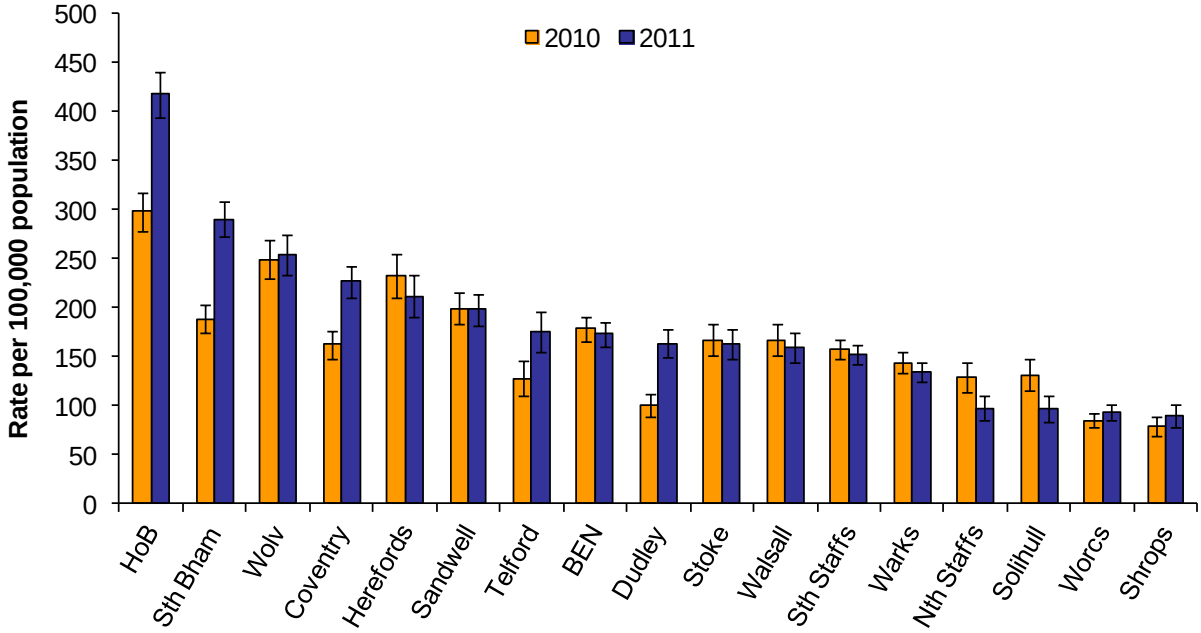
Source: GUMCAD (GUM Clinic Activity Dataset), Health Protection Agency.

Figure 2.22: Chlamydia (complicated and uncomplicated) diagnoses by ethnic group, rate per 100,000, West Midlands residents 2011 (GUM diagnoses only)



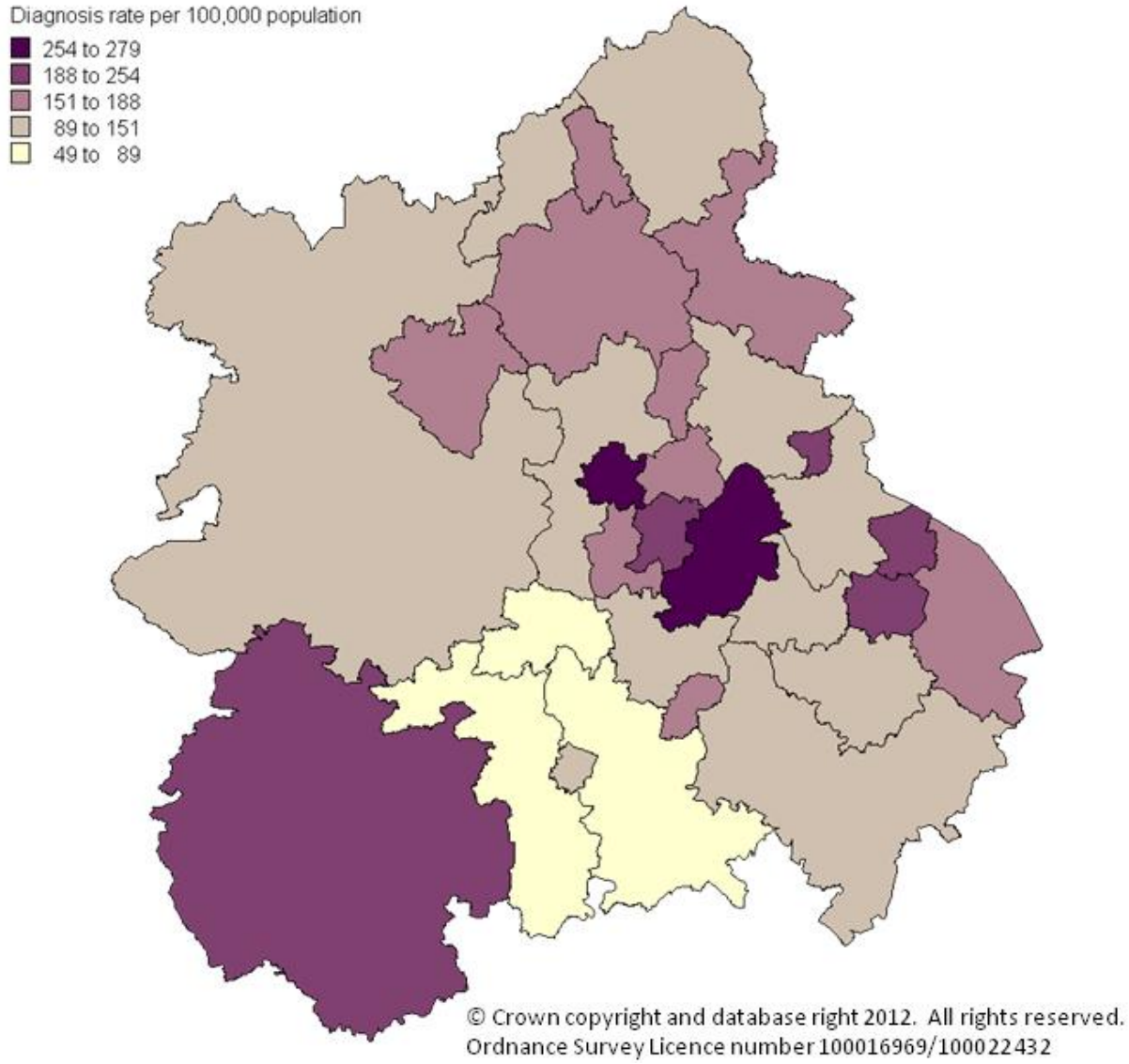
Source: GUMCAD (GUM Clinic Activity Dataset), Health Protection Agency; Mid-year population estimates, Office for National Statistics.

Figure 2.23: Chlamydia (complicated and uncomplicated) diagnoses by PCT of residence, rate per 100,000, West Midlands 2010 and 2011 (GUM diagnoses only)



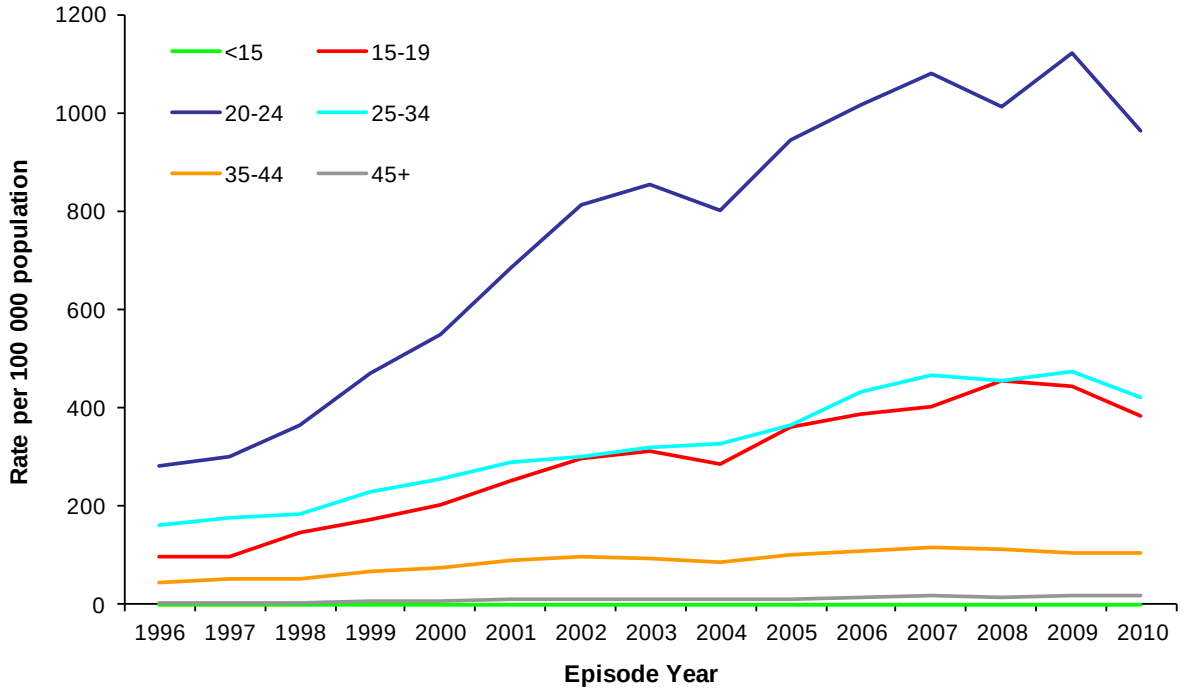
Source: GUMCAD (GUM Clinic Activity Dataset), Health Protection Agency; Mid-year population estimates, Office for National Statistics.

Figure 2.24: Chlamydia (complicated and uncomplicated) diagnoses by Local Authority of residence, rate per 100,000, West Midlands 2011 (GUM diagnoses only)



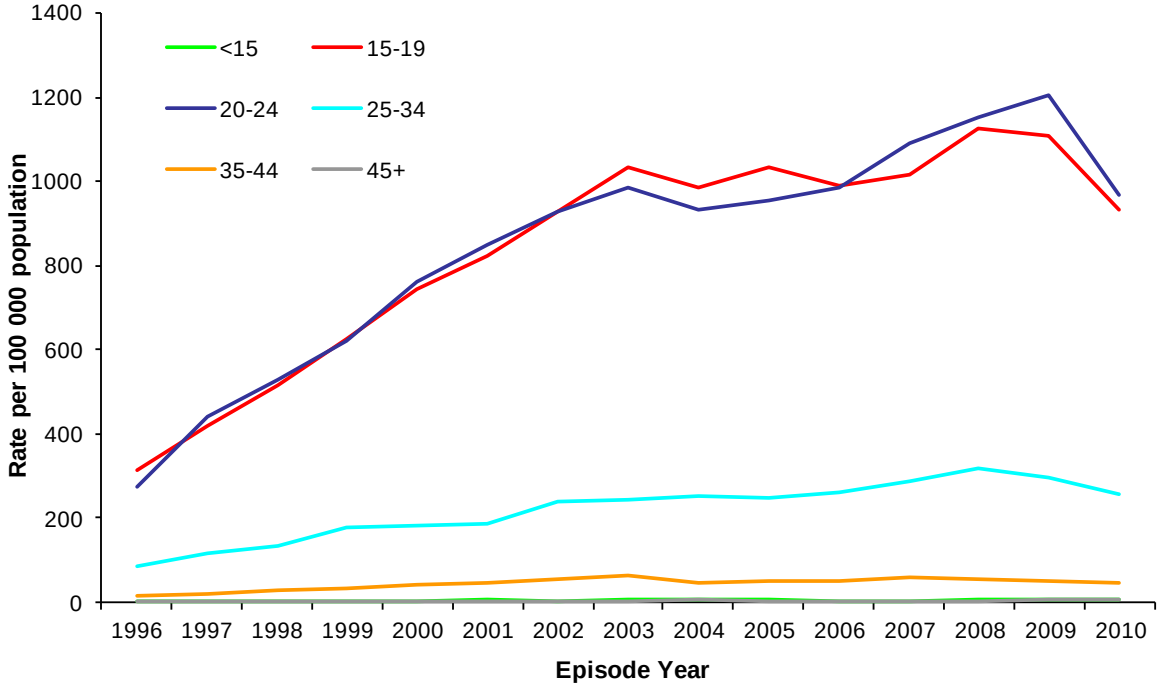
Source: GUMCAD (GUM Clinic Activity Dataset), Health Protection Agency; Mid-year population estimates, Office for National Statistics.

Figure 2.25: Chlamydia (complicated and uncomplicated) diagnoses in males at West Midlands GUM clinics, rate per 100,000 population, 1996-2010



Source: GUMCAD (GUM Clinic Activity Dataset), Health Protection Agency; Mid-year population estimates, Office for National Statistics.

Figure 2.26: Chlamydia (complicated and uncomplicated) diagnoses in females at West Midlands GUM clinics, rate per 100,000 population, 1996-2010



Source: GUMCAD (GUM Clinic Activity Dataset), Health Protection Agency; Mid-year population estimates, Office for National Statistics.

Table 2.4: Chlamydia diagnosis by gender, age group and year, rates per 100,000, West Midlands residents, 1996-2011

Age Group	Year															
	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Females																
<15	1.4	2.2	1.8	3.9	2.4	4.8	3.4	4.3	4.7	4.8	3.3	4.0	4.8	4.6	5.8	3.9
15-19	263.5	362.3	452.3	552.7	658.9	730.0	800.4	889.9	831.7	816.7	794.3	831.8	858.8	1061.0	901.3	935.4
20-24	229.6	370.8	470.9	547.0	673.1	764.0	801.5	848.2	777.1	798.6	835.6	926.5	904.6	1172.4	927.1	1054.4
25-34	74.6	103.0	117.5	156.5	160.5	167.8	205.0	208.4	218.3	212.1	229.5	246.1	253.2	287.9	245.5	337.3
35-44	13.4	18.8	25.9	29.6	36.6	41.0	48.9	52.4	41.6	44.7	41.7	53.6	43.2	47.9	44.1	55.8
45+	1.0	1.5	1.2	1.1	1.6	2.4	2.6	3.3	4.1	3.6	2.6	3.7	2.8	4.9	4.8	6.0
Males																
<15	0.4	0.2	0.2	0.2	0.2	0.0	0.2	0.2	0.8	0.4	0.8	0.6	0.2	0.4	0.4	0.4
15-19	84.9	84.3	122.4	151.4	170.4	216.7	246.9	248.9	224.3	284.7	321.9	318.7	336.0	418.3	372.1	386.3
20-24	230.1	250.9	303.5	402.2	476.2	585.2	676.1	697.4	640.2	761.9	826.5	885.1	735.9	1060.5	918.2	975.9
25-34	133.1	147.5	157.9	197.9	221.8	254.8	258.2	268.8	269.9	299.1	366.3	398.0	338.5	447.0	410.1	445.2
35-44	36.0	44.0	41.9	56.9	63.2	76.4	80.1	76.4	68.3	78.4	94.1	101.3	87.0	99.1	98.5	109.7
45+	3.1	2.7	3.7	4.8	6.3	7.3	7.8	8.0	7.3	7.7	12.0	13.3	11.0	15.7	17.3	15.9

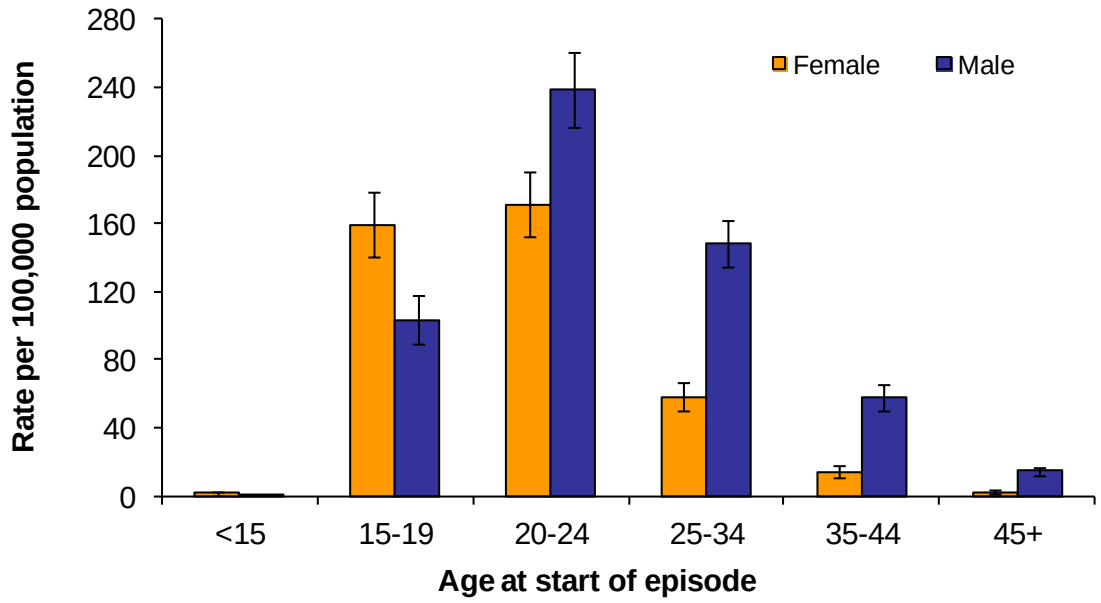
Source: GUMCAD (GUM Clinic Activity Dataset), Health Protection Agency; Mid-year population estimates, Office for National Statistics.

Gonorrhoea

There was a 37% increase in the number of confirmed cases of gonorrhoea between 2010 and 2011. Some of this increase is as a result of expanding molecular methods rather than traditional microbiology. The increase was similar in both males and females. Rates of diagnosed gonorrhoea in males is twice that in females (Figure 2.27); although some of this can be explained by the fact that males are more likely to develop symptoms after infection and therefore seek treatment. The other important differences are a 10 fold higher diagnoses rates amongst the black ethnic group (Figure 2.29) and marked urban - rural differences of over five-fold. Much of the increase in the overall number of cases across the West Midlands occurred in just two PCT areas: Heart of Birmingham and South Birmingham.

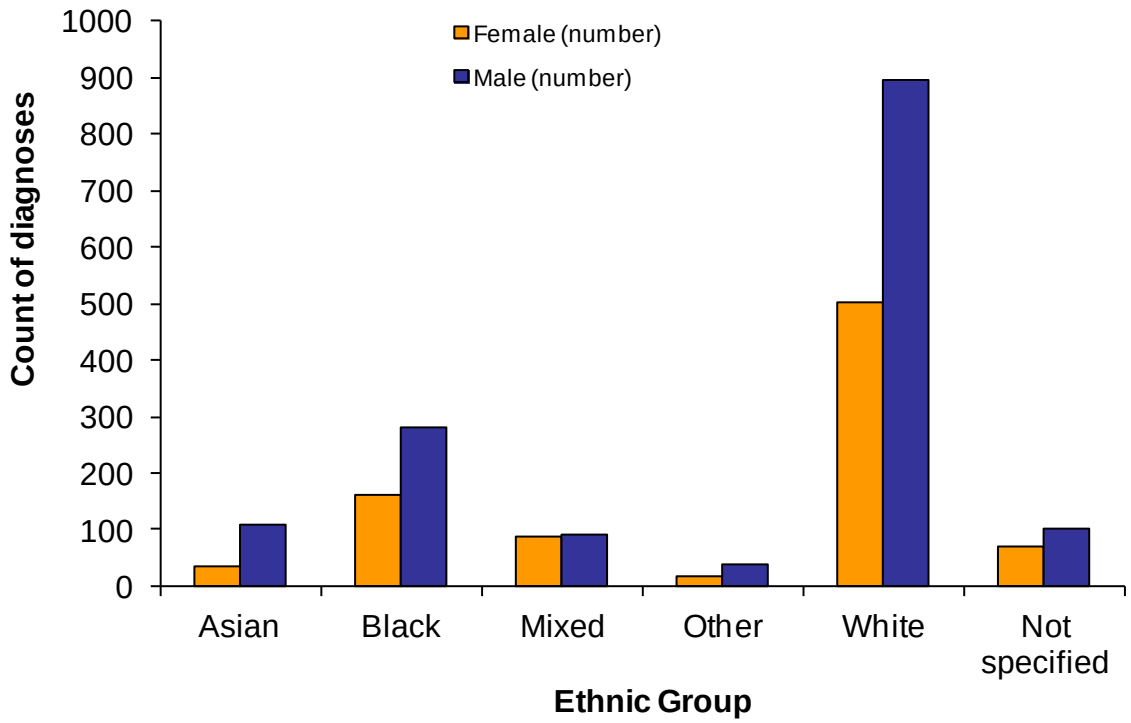
Of particular concern is the increasing antibiotic resistance being seen in gonococci. There are no parts of the world where the infection can only be treated by a single agent which has to be injected. Locally there is good news in that the West Midlands had the best compliance of any region for the recommended treatment regime for gonorrhoea and the lowest rate of clinically important antibiotic resistance. In 2011 all 160 tested strains were sensitive to one of the antibiotics in the preferred schedule and 159 sensitive to both antibiotics. Two antibiotics are used to reduce the possibility of developing resistance to antibiotics.

Figure 2.27: Gonorrhoea (complicated and uncomplicated) diagnoses by age group and gender, rate per 100,000, West Midlands residents 2011 (GUM diagnoses only)



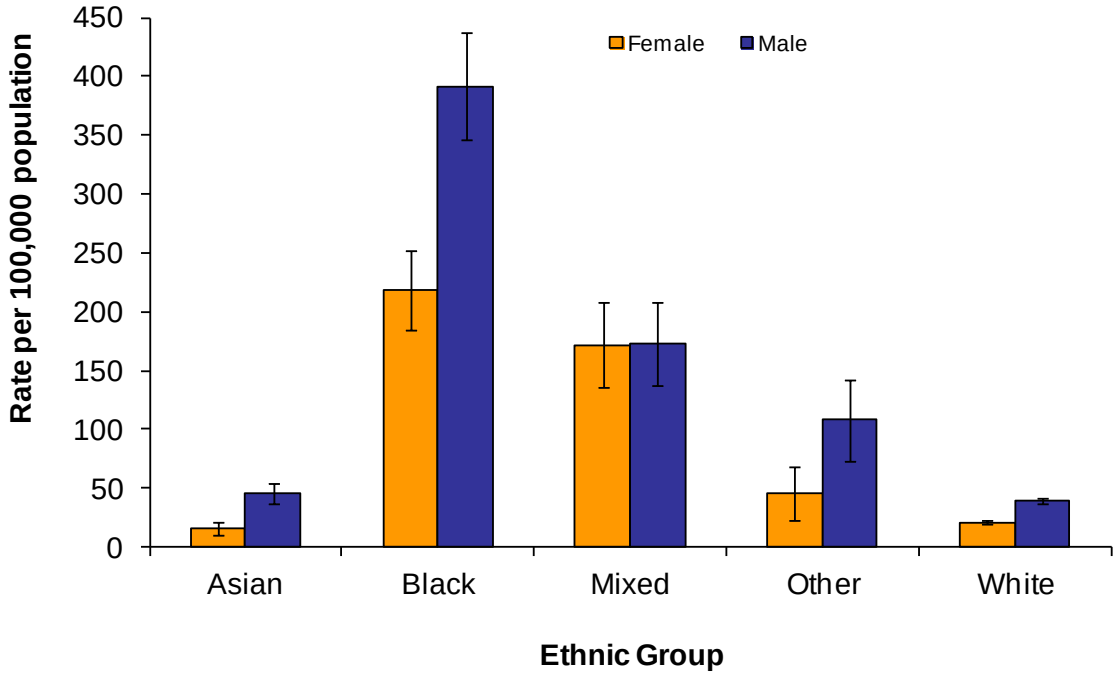
Source: GUMCAD (GUM Clinic Activity Dataset), Health Protection Agency; Mid-year population estimates, Office for National Statistics.

Figure 2.28: Gonorrhoea (complicated and uncomplicated) diagnoses by ethnic group and gender, West Midlands residents 2011 (GUM diagnoses only)



Source: GUMCAD (GUM Clinic Activity Dataset), Health Protection Agency.

Figure 2.29: Gonorrhoea (complicated and uncomplicated) diagnoses by ethnic group and gender, rate per 100,000, West Midlands residents 2011 (GUM diagnoses only)



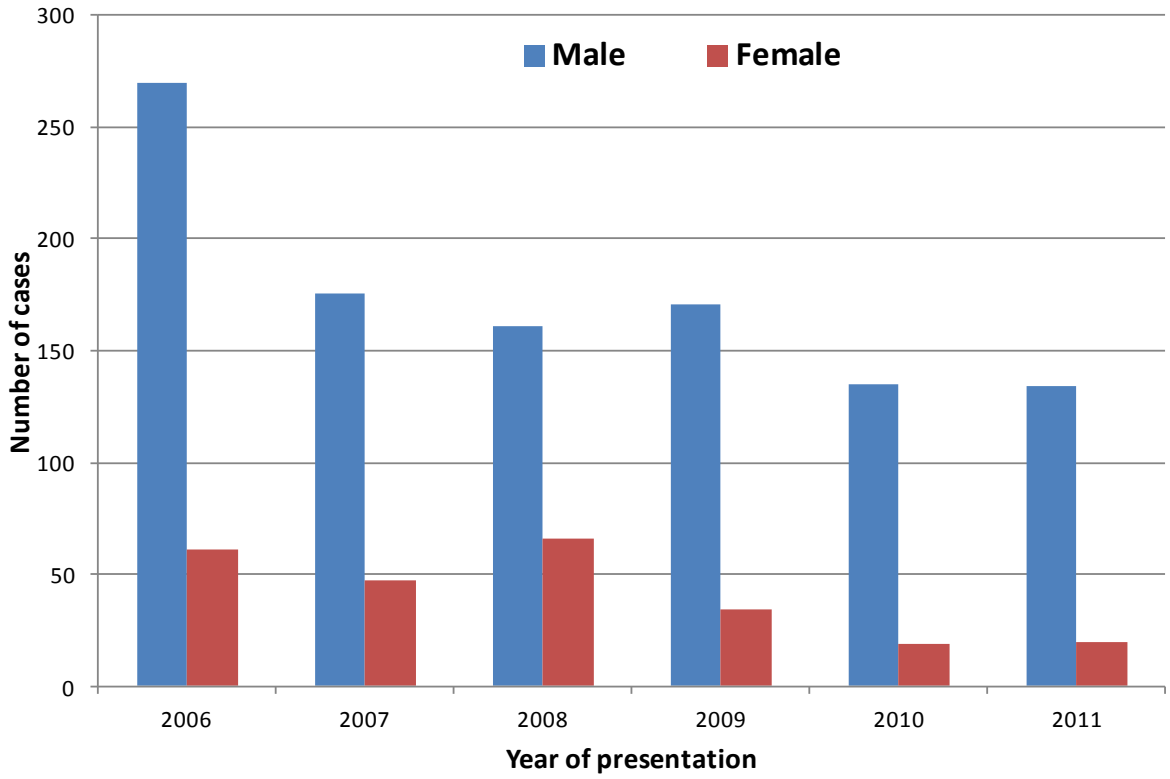
Source: GUMCAD (GUM Clinic Activity Dataset), Health Protection Agency; Mid-year population estimates, Office for National Statistics.

Syphilis

Syphilis was once one of the major causes of death and morbidity up to about the 1900s prior to the introduction or arsenic based medicines. Nationally in the past decade there have been changes in the epidemiology of syphilis with MSM still having significantly high rates but a disproportionate number of cases being diagnosed in people from Eastern European countries who have higher rates of infection.

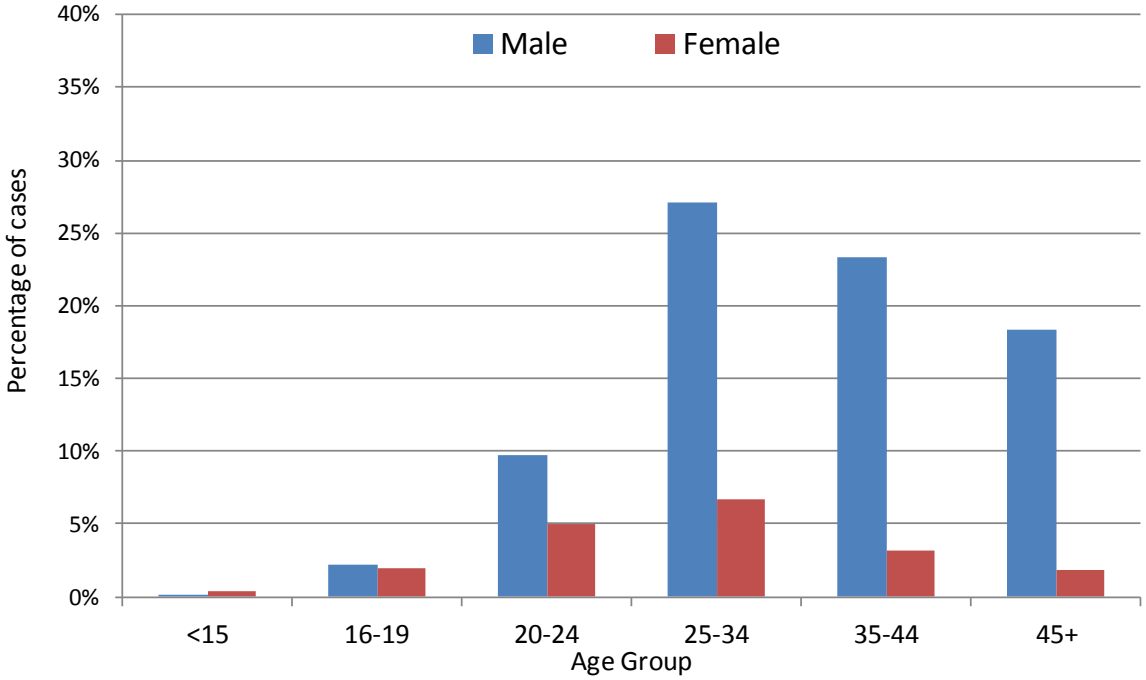
Within the West Midlands we have seen a decline in syphilis cases over the past 5 years (Figure 2.30) and also very few cases linked to Eastern Europe. There are also differences in who gets syphilis compared to other STIs. Men are much more affected than women at a ratio of 5:1 (Figure 2.31), compared to nearer 1:1 for other STIs. This is mainly a result of 70% of cases being in MSM. In addition the age distribution of syphilis cases is shifted to older age groups compared to other STIs, with nearly 50% of the cases in the 35 and over age group.

Figure 2.30: Infectious syphilis cases by year of presentation and gender, 2006-2011



Source: West Midlands Enhanced Surveillance of Syphilis Scheme, Health Protection Agency.

Figure 2.31: Infectious syphilis cases by age group and gender, 2006-2011



Source: West Midlands Enhanced Surveillance of Syphilis Scheme, Health Protection Agency.

Human Papilloma Virus (HPV)

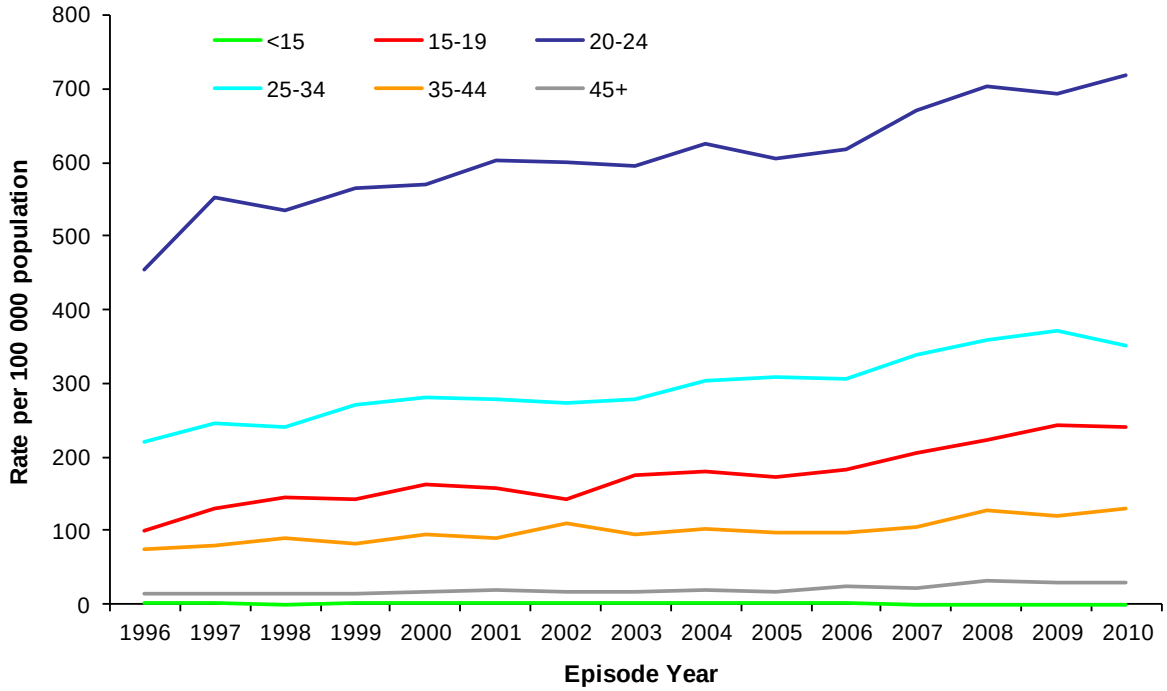
Genital warts are one of the commonest STIs and are of importance to GUM clinics as there is a much greater workload associated with managing warts where there is the need for multiple treatments to clear them and significant psychological morbidity associated with the condition.

The most important development in genital warts has been the switch to Gardasil as the HPV vaccine of choice. This also protects against HPV types 6 and 11 which are responsible for 90% of all genital wart infections. In countries like Australia which used this version of the vaccine, infections with genital warts fell significantly within the first year in the vaccinated age group. Although males were not included in the vaccine campaign, the decline was also rapid but to a smaller degree.[8]

HPV is also important as it is a factor in virtually all cases of cervical cancer, this being the disease targeted in the original HPV vaccine programme. The addition to include two more genotypes (HPV 6 and 11) will not only decrease genital warts but also decrease further the number of changes found at cervical cytology screening. This is because the wart strains also induce mild abnormalities in the cervix that do not progress but these cannot easily be distinguished from those that might progress.

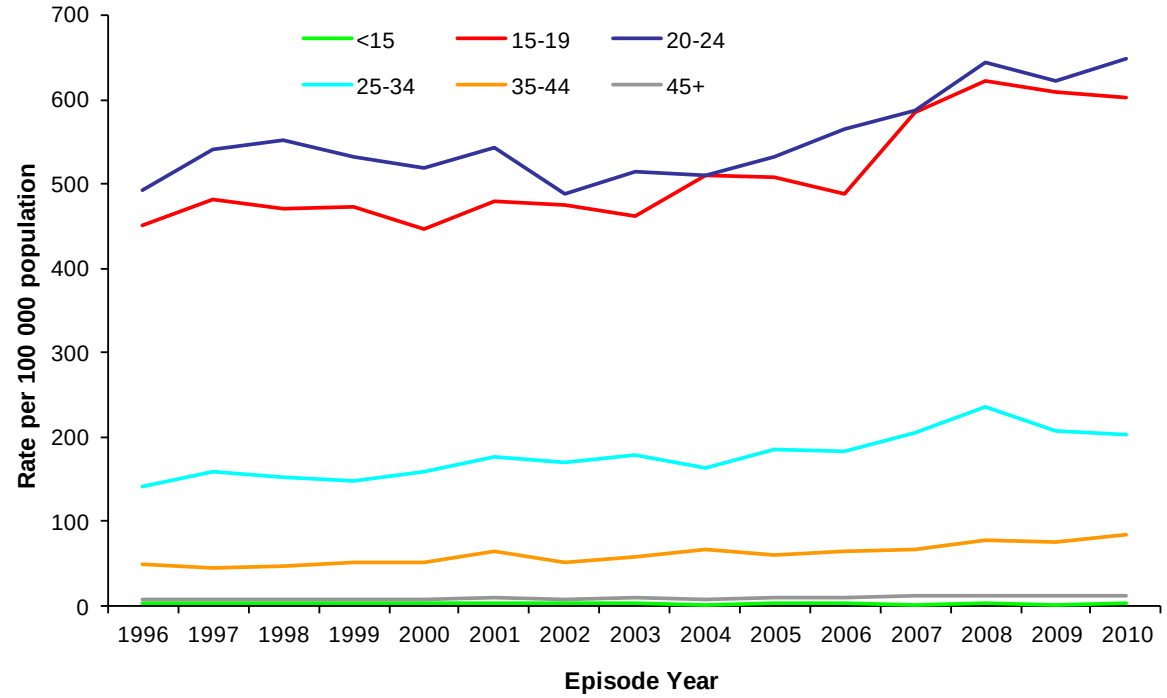
Anogenital wart infections show the same pattern as other STIs with 20-24 year old males (Figure 2.32) and 15-24 year old females (Figure 2.33) most likely to present with first infections. This reflects the general pattern of STIs.

Figure 2.32: Rates of genital warts (first episode) diagnoses per 100,000 males at West Midlands GUM clinics by age, 1996-2010



Source: GUMCAD (GUM Clinic Activity Dataset), Health Protection Agency; Mid-year population estimates, Office for National Statistics.

Figure 2.33: Rates of genital warts (first episode) diagnoses per 100,000 females at West Midlands GUM clinics by age, 1996-2010



Source: GUMCAD (GUM Clinic Activity Dataset), Health Protection Agency; Mid-year population estimates, Office for National Statistics.

Future

The main predictions are that we will see:

A decline in genital warts in people born after 2000 with the switch to the Gardasil vaccine.

A decline in abnormalities in young women at their first cervical smear at the age of 25 and in those tested at younger age as infection rates with HPV 16 and 18 fall.

In the next few years extremely drug resistant gonococci will be identified within the UK, these will probably be imported initially.

Rates of positivity in self-testing for Chlamydia will fall to below the target level as the self-testing programme leads to reductions in the number of asymptomatic infections which reduces the number of infectious people leading to lower disease rates. This is particularly likely to occur first in smaller communities with above average socio-economic levels.

2.6 Measles

Introduction

Measles is a highly infectious systemic viral disease caused by a paramyxovirus. In most European countries, it remains an important public health problem and is preventable by a vaccine that provides lifelong immunity to over 99% of recipients. In the pre-vaccination era, most of the population would have been infected in childhood resulting in a significant number of deaths in childhood. In the United Kingdom, since the introduction of measles vaccination, measles related deaths are a rare occurrence but complications still occur with pneumonia and deafness occurring most frequently.

Cases of measles infection still continue to be reported mostly in unvaccinated individuals with the majority of cases related to clusters and outbreaks in population sub-groups with low vaccine uptake.

The UK along with other European Union (EU) Member States and international partners has made a commitment to eliminate measles in the EU and the World Health Organisation (WHO) region of Europe by 2015. The elimination target for measles is less than one confirmed case per million population per year. Over a twelve month period (October 2011 to September 2012), the UK, France, Italy, Romania and Spain accounted for the majority (93%) of all cases reported in the EU with most of these cases linked to outbreaks in a variety of settings/population sub-groups. Over this same period, the EU observed a rate of 15.9 cases per million of the population while the UK reported 24.2 cases per million of population.[9] This target for measles elimination has been achieved in other parts of the world.[10]

To support the attainment of the elimination goal, the UK undertakes epidemic intelligence and enhanced surveillance of measles infection to detect outbreaks as well as monitor progress towards interruption of endemic transmission. These combined with the routine delivery of measles-mumps-rubella (MMR) vaccine as part of the childhood immunisation programme and a co-ordinated health protection and health service response to clusters and outbreaks form part of the multi-pronged approach to eliminating measles in the UK.

Data sources

The data presented in this report were obtained from laboratory surveillance systems operated by the Health Protection Agency (HPA) which operates at local level across the country and at regional and national levels.

There is a statutory duty on all doctors to notify the local Health Protection Unit (HPU) if they see a patient, usually a child or young adult, who they suspect may have measles. These notifications usually come from general practitioners and paediatricians. The HPU will arrange for a special saliva test be carried out to confirm the diagnosis. This allows confirmation of the diagnosis to be made and can also provide data of the genetic makeup of the virus, particularly useful in identifying and following outbreaks of measles.

The identification of possible measles cases allows the HPU to take action to reduce ongoing transmission. The targets for this prevention are mainly members of the same household and other children that attend the same nursery or school as the child with measles. In most circumstances those who have not been given two doses of the MMR vaccine would be offered one, even if this was earlier than the routine schedule. Persons at further risk would also be offered an immunoglobulin injection which contains protective antibodies against measles infection.

Epidemiology

Provisional data for 2012 show that with a rate of 2.14 cases per 100,000 the West Midlands has one of the lowest rates of measles in the UK. Based on findings from the investigation of reported cases, a significant proportion of cases in the West Midlands are linked to small clusters of measles in other parts of the country and unvaccinated traveller communities. Sustained measles transmission is not occurring in the West Midlands.

Nationally, over the last two years, the number of laboratory confirmed cases of measles has increased (Table 2.5). Provisional data for 2012 shows that the largest increase has been in the North West and South East regions, both of which have been dealing with large outbreaks.[11] These outbreaks have occurred in communities with low MMR vaccination rates.

Very few cases of measles occur in the older population as they generally caught measles when there were high levels of circulating virus in their youth (Table 2.6). Since the introduction of MMR in 1988, large numbers of people under the age of 25 have now been vaccinated against measles and the low number of cases is a reflection of the success of the introduction of MMR.

Vaccination rates against measles (MMR) remain high across the West Midlands, hence explaining why there is no sustained transmission of measles within the region (Figure 2.34 and Figure 2.35). The WHO has recommended a target of over 95% uptake for two doses which we do not meet. Five PCTs achieve a 95% level for one dose at 2 years but none for the second dose, although three PCTs are above 93% for MMR2 (Table 2.7). Usually rural areas have a better uptake than urban areas but there is still disparity within urban area PCTs demonstrating that high rates of vaccine uptake can also be achieved in predominantly urban areas.

Future

New strategies need to be implemented in order to target vaccination against the small groups who remain at increased risk of infection due to low uptake of vaccination.

Catch up of MMR vaccine for older children who have missed one of both doses of MMR needs to be considered.

Table 2.5: Laboratory confirmed cases of measles infection by year 2000 to 2012

Year	West Midlands		England & Wales	
	Count	Rate per 100,000	Count	Rate per 100,000
2000	9	0.17	100	0.19
2001	1	0.02	70	0.13
2002	5	0.09	308	0.59
2003	4	0.08	438	0.83
2004	8	0.15	191	0.36
2005	2	0.04	77	0.14
2006	41	0.76	740	1.38
2007	26	0.48	990	1.83
2008	113	2.09	1,370	2.52
2009	95	1.75	1,144	2.09
2010	14	0.26	380	0.68
2011	40	0.07	1,086	1.93
2012*	120	2.14	2,016	3.59

**2012 data are provisional*

Source: Health Protection Agency. Mid-year population estimates, Office for National Statistics.

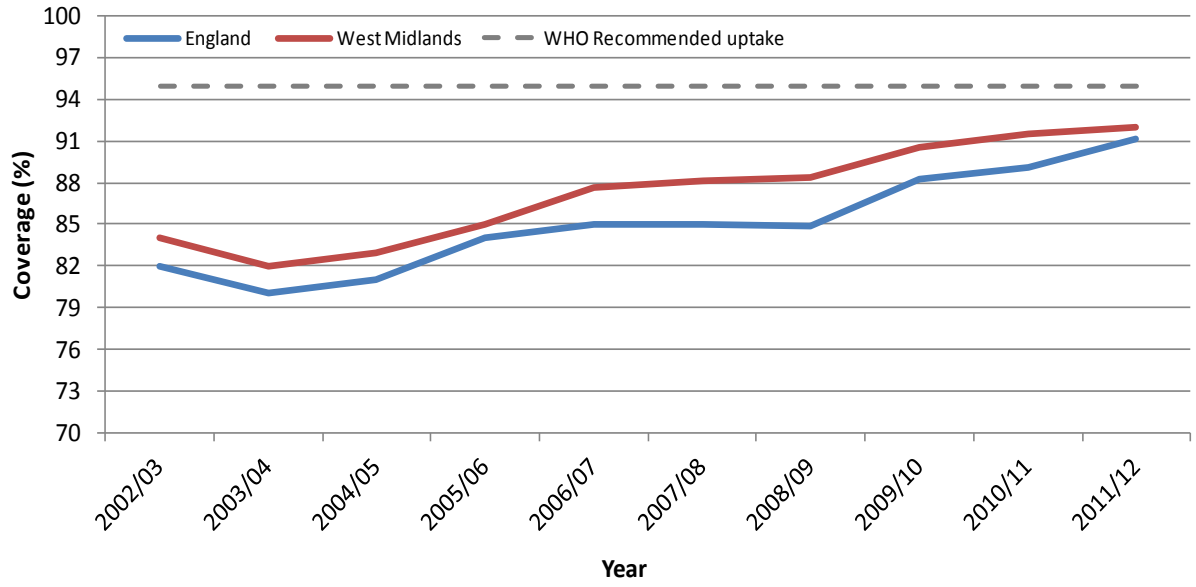
Table 2.6: Laboratory confirmed cases of measles infection by age group, West Midlands 2008-12

Age	Year				
	2008	2009	2010	2011	2012*
less than 1 year	8	10	0	6	6
1-4 years	25	23	4	4	28
5-9 years	30	21	3	7	25
10-14 years	17	20	1	9	18
15-19 years	9	9	2	5	14
20-24 years	4	6	2	5	8
25-29 years	7	2	2	0	3
30-34 years	5	3	0	2	3
≥35 years	8	1	0	2	15
Total	**113**	**95**	**14**	**40**	**120**

**2012 data are provisional*

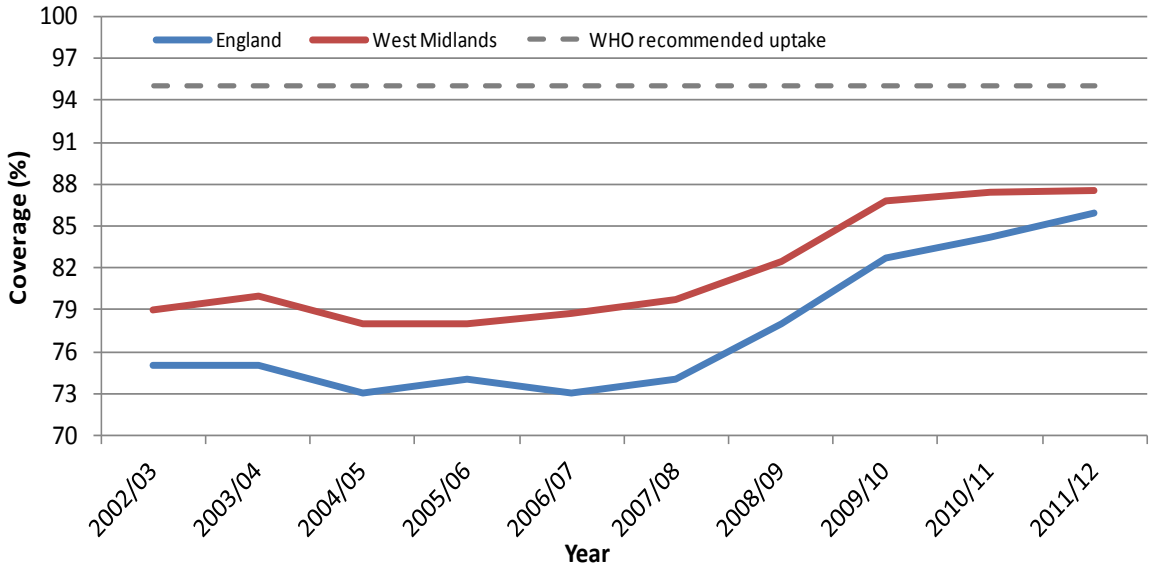
Source: Health Protection Agency.

Figure 2.34: MMR1 coverage (%) at 24 months (1 dose) in the West Midlands and England, 2002/03 to 2011/12 (Apr-Mar)



Source: Health Protection Agency/Cover of Vaccination Evaluated Rapidly (COVER) data.

Figure 2.35: MMR1&2 coverage (%) at 5 years (2 doses) in the West Midlands and England, 2002/03 to 2011/12 (Apr-Mar)



Source: Health Protection Agency/Cover of Vaccination Evaluated Rapidly (COVER) data.

Table 2.7: Coverage (%) of MMR1 and MMR2 by PCT, West Midlands Apr 2011- Mar 2012

Primary Care Trust	24 months (MMR) (%)	5 years (MMR 1 dose) (%)	5 years (MMR 2 doses) (%)
Birmingham East & North PCT	86.8	92.8	80.0
Coventry Teaching PCT	94.6	97.3	93.3
Dudley PCT	94.4	95.5	89.6
Heart of Birmingham Teaching PCT	91.5	94.9	89.3
Herefordshire PCT	87.7	92.4	82.5
North Staffordshire PCT	95.7	96.5	92.9
Sandwell PCT	89.7	93.8	86.4
Shropshire County PCT	95.4	95.5	91.1
Solihull PCT	91.0	91.2	86.3
South Birmingham PCT	87.6	92.3	79.6
South Staffordshire PCT	91.0	93.7	87.6
Stoke on Trent PCT	94.6	96.5	91.9
Telford & Wrekin PCT	96.5	95.4	91.2
Walsall Teaching PCT	95.6	96.5	93.7
Warwickshire PCT	95.6	96.1	93.7
Wolverhampton City PCT	89.5	92.3	80.6
Worcestershire PCT	93.1	92.9	85.4
West Midlands	**92.0**	**94.3**	**87.5**
England	**91.2**	**92.9**	**86.0**

Source: Health Protection Agency/Cover of Vaccination Evaluated Rapidly (COVER) data.

2.7 Pertussis

Introduction

Pertussis, also known as whooping cough, is an acute bacterial infection of the respiratory tract caused by *Bordetella pertussis*. It is an important public health disease that is responsible for serious illness in infants particularly in those who are unimmunised or partially immunised against pertussis. The disease is preventable by vaccination and the current immunisation schedule in the United Kingdom (UK) is designed to provide optimal protection in the first few years of life, when the risk of serious disease and poor outcomes is highest.

Immunity against pertussis infection, after vaccination or natural infection, is not life-long so individuals can get re-infected and spread the disease to others. Vaccinated people can still get a mild infection, particularly as immunity wanes in late adolescence and adulthood, and these people may act as a source of infection to those children who are too young to be vaccinated. There is an increasing recognition that pertussis frequently infects adults during epidemics.

Although pertussis vaccine coverage levels remain relatively high in the UK, the disease still displays a cyclical pattern with epidemics occurring at 3 to 4 yearly intervals. In the UK, the number of pertussis cases were at a historic low level for over two decades but since the third quarter of 2011 pertussis activity has increased to epidemic levels and is currently at an all-time high relative to levels observed in recent epidemic years.

Nationally, 14 children have died in the UK from pertussis in this outbreak; about 1 in 50,000 of all children born in this period (number accurate as of 14th January 2013).[12] A similar increase has been reported in other Western countries such as the United States, Canada, Australia, Norway and The Netherlands. The reasons for this increase remain unclear and are currently being investigated.

In the UK a number of measures have been implemented to investigate and control this recent increase and these include a national case control study (ongoing), salivary testing for the under 16s, changes to health protection guidance,[13] health promotion activities and a temporary vaccination programme aimed at boosting immunity in pregnant women so as to optimise passive immunity in unvaccinated infants in the first few months of life until the pertussis vaccine can be administered.[14]

Data sources

The data presented in this report were obtained from laboratory surveillance systems operated by the Health Protection Agency (HPA) which operates at local level across the country and at regional and national levels.

There is a statutory duty on all doctors to notify the local Health Protection Unit (HPU) if they see a patient they suspect may have pertussis. These notifications usually come from general practitioners and paediatricians. Depending on the circumstances the HPU will try and confirm the diagnosis. This can be done by a nasal swab for culture or PCR, serology looking for a rise in antibodies post-infection and introduced recently in order to obtain more data on pertussis in England, a special saliva test avoiding the need for a blood specimen.

Because of the nature of the clinical course of pertussis infection, it is only one of a number of infections that can cause a cough. It is only the late onset of the 'whoop' that distinguishes pertussis from other respiratory infections along with the duration. Pertussis in China is known as the 100 day cough. Not all cases develop the classic whoop, particularly in adults and confirmatory microbiological testing late in the illness requires blood tests.

Microbiological testing is much more likely to be positive early in the illness but in the absence of an epidemic may not be considered as a diagnosis. Relying only on microbiological testing will under

report the number of cases substantially, whilst clinical diagnosis may miss cases but also risk over diagnosis, especially during an epidemic as many illnesses get called pertussis which are due to other causes of cough. Laboratory confirmed cases are the best method for showing trends in infection rates.

Epidemiology

Cases of pertussis in the West Midlands increased three to four fold between 2010 and 2011 (Table 2.8) and in the first half of 2012 case numbers were twice the number reported for the whole of 2011 (Table 2.9). Provisional figures for 2012 (Jan to Dec), show that there have been 9,741 laboratory confirmed cases in England with the West Midlands accounting for 8% (n=755) of these cases. The increase in pertussis activity has been observed across all regions in England and Wales. The highest numbers of confirmed cases in 2012 have been in the South East and the South West regions.[15]

Table 2.8: Laboratory confirmed cases of Pertussis infection by year, West Midlands & England, 2000 to 2012* (confirmed by culture, PCR and/or serology).

Year	West Midlands		England & Wales	
	Count	Rate per 100,000	Count	Rate per 100,000
2000	22	0.41	200	0.38
2001	38	0.72	291	0.56
2002	47	0.89	354	0.67
2003	15	0.28	209	0.40
2004	19	0.36	288	0.54
2005	57	1.07	385	0.72
2006	23	0.43	412	0.77
2007	39	0.73	625	1.16
2008	89	1.65	902	1.66
2009	50	0.92	719	1.31
2010	20	0.37	422	0.76
2011	73	1.30	1,118	1.99
2012*	755	13.48	9,741	17.34

** Data for 2012 are provisional*

Source: Health Protection Agency; Mid-year population estimates, Office for National Statistics.

The reasons for the particularly high epidemic this year is still unclear but it is likely that some of the high levels of reporting may, in part, be due to increased awareness amongst health professionals improving case ascertainment in older age groups – at least up to 2008. This is reflected by the increased demand for serology testing which is the predominant method of confirmation in adolescents and adults who typically present with milder features late in the course of the illness. However, it is also considered that the observed increases reflect a real change in pertussis activity with waning immunity following vaccination and/or natural infection likely to be important contributory factors.[16] This is supported by the high number of confirmed cases in infants under three months of age in whom ascertainment has been more consistent through time. Deaths in young children are

invariably investigated so the increase in deaths from pertussis clearly demonstrates that this is a significant epidemic.

The apparent increase in number of laboratory confirmed cases up to 2008 corresponds with the availability of enhanced diagnostic methods; since mid-2006 there has been greater awareness and use of these testing methods compared to previous years, as illustrated by the increasing proportion of reports diagnosed by PCR and or serology.

Table 2.9: Laboratory confirmed cases of Pertussis infection by specimen date in the West Midlands & England; Jan-Dec 2012 (confirmed by culture, PCR and/or serology).

Month	West Midlands	England & Wales
Jan	7	228
Feb	8	217
Mar	12	277
Apr	18	370
May	53	708
Jun	42	684
Jul	69	1,062
Aug	109	1,230
Sep	117	1,332
Oct	147	1,633
Nov	N/A	1,168
Dec	N/A	832
2012*	**582**	**7,728**

** 2012 data are provisional.*
Monthly breakdown for West Midlands only available for Jan-Oct.

Source: Health Protection Agency.

The high numbers in children under 3 months (Table 2.10) reflects more testing in this age group compared to other ages as this age group is usually the sickest, frequently requiring hospital admission where testing will be carried out. The cases in the age groups 10 to 14 and 15 and above reflect waning immunity and spread within secondary schools and the community and that this age group has borne the brunt of the epidemic. It is also easier, and a greater readiness, to collect blood in older people but the introduction of saliva testing for children less than 16 years of age should improve case ascertainment in 2013. The pattern of age distribution of cases is replicated nationally.

There is significant variation within areas across the West Midlands (Figure 2.36). Direct comparisons are difficult because of the small numbers involved in some areas. A small number of general practitioners testing a lot of patients can readily increase the figures within that area.

Table 2.10: Laboratory confirmed cases of Pertussis infection by age group, West Midlands, 2008 to 2012 (Jan-Oct) (confirmed by culture, PCR and/or serology)

Age	Year				
	2008	2009	2010	2011	2012* (Jan-Oct)
<3 months	38	12	5	22	52
3-5 months	7	2	0	3	9
6-11 months	0	2	1	2	1
1-4 years	3	1	1	2	11
5-9 years	2	0	0	2	12
10-14 years	7	3	1	3	52
15+ years	32	30	12	39	445
Total	**89**	**50**	**20**	**73**	**582**

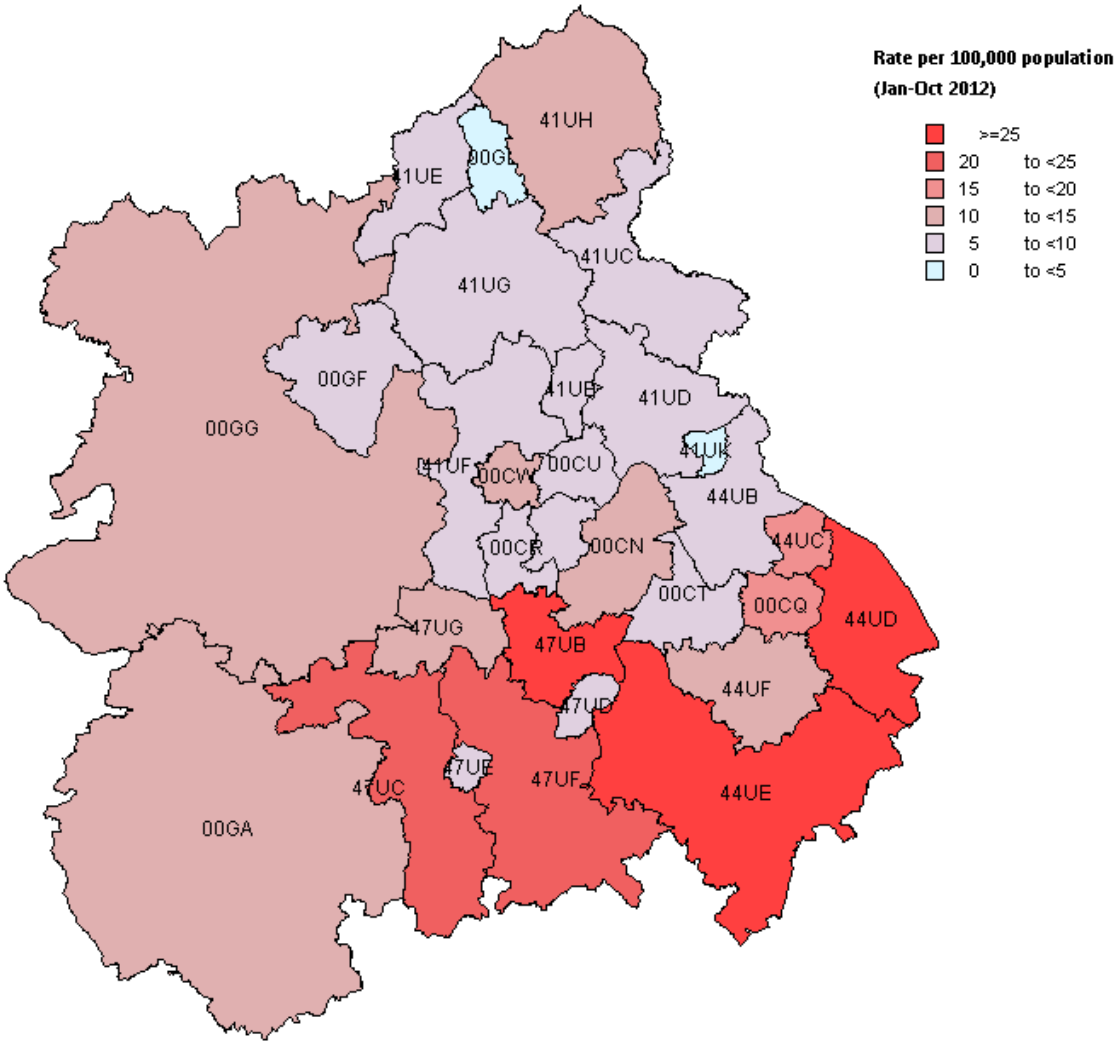
**Data for 2012 are provisional*
Source: Health Protection Agency.

Future

The vaccination of pregnant women was introduced as a temporary measure whilst pertussis disease levels remain high. Currently disease activity is above the levels of disease when the decision to introduce the vaccination was taken so the policy will remain in place for some time.

The HPA has just made salivary testing for children under the age of 16 available to enable more precision in diagnosis to be made. This will help our understanding of the nature of the current pertussis epidemic.

Figure 2.36: Laboratory confirmed cases of pertussis by Local Authority, rate per 100,000 population, West Midlands, Jan-Oct 2012.



LA Code	LA						
44UE	Stratford-on-Avon District	00CQ	Coventry District	00GA	County of Herefordshire	41UE	Newcastle-under-Lyme District
44UD	Rugby District	44UC	Nuneaton and Bedworth District	41UF	Staffordshire Moorlands District	41UD	Lichfield District
47UB	Bromsgrove District	00CN	Birmingham District	00GG	Shropshire	00GF	Telford and Wrekin
47UF	Wychavon District	47UG	Wyre Forest District	44UF	Warwick District	41UG	Stafford District
47UC	Malvern Hills District	00CW	City of Wolverhampton District	41UB	Cannock Chase District	00CT	Solihull District
00CR	Dudley District	47UD	Redditch District	47UE	Worcester District	44UB	North Warwickshire District
00CU	Walsall District	41UF	South Staffordshire District	00CS	Sandwell District	41UC	East Staffordshire District

Source: Health Protection Agency. Mid-year population estimates, Office for National Statistics.

2.8 References

1 Health Protection Agency. *Enhanced TB surveillance*. http://www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/Tuberculosis/TBUKSurveillanceData/EnhancedTuberculosisSurveillance/ (accessed 6 Feb 2013).

2 Walker TM, Ip CLC, Harrell RH, et al. Whole-genome sequencing to delineate *Mycobacterium tuberculosis* outbreaks: a retrospective observational study. *Lancet Infect Dis* 2013;13:137–46.

3 Health Protection Agency. *HIV in the United Kingdom: 2012 Report*. London: Health Protection Services, Colindale. Nov 2012. Available at: http://www.hpa.org.uk/Publications/InfectiousDiseases/HIVAndSTIs/1211HIVintheUK2012/.

4 UNAIDS. *The status of HIV in the Caribbean*. Port of Spain: UNAIDS Caribbean Regional Support Team, 2010. Available at: http://www.unaids.org/en/media/unaids/contentassets/documents/countryreport/2010/2010_HIVInCaribbean_en.pdf (accessed 6 Feb 2013).

5 Palfreeman A, McNally P, Nyatsanza F, Farn H, McKinnon G, Schober P. Short report: HIV testing for acute medical admissions: evaluation of a pilot study in Leicester, England. *Sex Transm Infect* sextrans-2011-050401 Published Online First: 7 Nov 2012. Available at: http://sti.bmj.com/content/early/2012/11/06/sextrans-2011-050401.full.pdf+html?sid=428279db-81ea-46f6-85a5-000d87512582. (accessed 5 Feb 2013).

6 Berto A, Martelli F, Grierson S, Banks M. Hepatitis E virus in pork food chain, United Kingdom, 2009–10. *Emerg Infect Dis* 2012;8:1358-1960.

7 Health Protection Agency. *Hepatitis C in the UK 2011*. London: Health Protection Agency, Colindale, Jul 2011. Available at: http://www.hpa.org.uk/webc/HPAwebFile/HPAweb_C/1309969906418. (accessed 5 Feb 2013).

8 Read TRH, Hocking JS, Chen MY, Donovan B, Bradshaw CS, Fairley CK. The near disappearance of genital warts in young women 4 years after commencing a national human papillomavirus (HPV) vaccination programme. *Sex Transm Infect* 2011;87:544-547.

9 European Centre for Disease Prevention and Control. *Surveillance report: Measles and rubella monitoring*. Stockholm: European Centre for Disease Prevention and Control, Nov 2012. Available at: http://ecdc.europa.eu/en/publications/Publications/Forms/ECDC_DispForm.aspx?ID=1004. (accessed 27 Jan 2013).

10 WHO. *Measles deaths decline, but elimination progress stalls in some regions*. http://www.who.int/mediacentre/news/notes/2013/measles_20130117/en/index.html (accessed 31 Jan 2013).

11 Health Protection Agency. Confirmed measles and rubella cases in England and Wales: update to end-June 2012. *Health Protection Report* 2012;6(34). Available at: http://www.hpa.org.uk/hpr/archives/2012/hpr3412.pdf . (accessed 31 Jan 2013).

12 Health Protection Agency .Confirmed pertussis in England and Wales: data to end-December 2012. *Health Protection Report* 2013;7(5). Available at: http://www.hpa.org.uk/hpr/archives/2013/news0513.htm#prtsss. (accessed 4 Feb 2013).

13 Health Protection Agency. *HPA Guidelines for the Public Health Management of Pertussis (updated October 2012)*.London: Health Protection Agency, Colindale, Oct 2012. Available at: http://www.hpa.org.uk/webc/HPAwebFile/HPAweb_C/1287142671506. (accessed 1 Feb 2013).

14 Healy CM, Rench MA, Baker CJ. Importance of Timing of Maternal Combined Tetanus, Diphtheria, and Acellular Pertussis (Tdap) Immunization and Protection of Young Infants. *Clin Infect Dis*. 2013;56(4):539-544.

15 Health Protection Agency. Table 2: Laboratory confirmed cases of Pertussis infection, England and Wales, by region and age group, 2008 to 2012 Q1-2 (confirmed by culture, PCR and/or serology). *Enhanced Pertussis Surveillance* 17 Jul 2012. Available at: http://www.hpa.org.uk/webc/HPAwebFile/HPAweb_C/1317133571498. (accessed 1 Feb 2013).

16 Campbell H, Amirthalingam G, Andrews N, Fry NK, George RC, Harrison TG, Miller E. Accelerating control of pertussis in England and Wales. *Emerging Infectious Diseases* 2012; 18(1): 38-47.

2.9 Further information

HPA web site**:** http://www.hpa.org.uk/

2.10 Authors

Health Protection Agency West Midlands:

Tuberculosis
Professor Keith Neal, Locum Regional Epidemiologist
Jianxia Sun, Information Officer
Dr Jeremy Hawker, Regional Epidemiologist

HIV/ Hepatitis & STIs
Professor Keith Neal, Locum Regional Epidemiologist
Rehman Teagle, Information Scientist
Yasmin Rehman, Epidemiological Scientist

Measles & Pertussis
Professor Keith Neal, Locum Regional Epidemiologist
Laura Bayliss, Information Officer
Dr Obaghe Edeghere, Locum Regional Epidemiologist

Version 1.0
18 March 2013