



# Health Protection Report

weekly report

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## Current News

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- ▶ Increase in *Salmonella* Java in England
- ▶ *Lymphogranuloma venereum* (LGV) information campaign launched by Terrence Higgins Trust
- ▶ Confirmed measles cases in England and Wales in 2010: update to end-July
- ▶ Sixth annual review of infections in UK blood/tissue donors and transfusion recipients

## Infection Reports

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### HIV/ STIs

- ▶ Rise in new diagnoses of sexually transmitted infections (UK, 2009)
- ▶ Gonococcal Resistance to Antimicrobials Surveillance Programme in England and Wales (GRASP): report of 2009 data

### Immunisation

- ▶ Laboratory confirmed (culture, PCR, serology) cases of pertussis reported to the enhanced pertussis surveillance programme during January to March 2010
- ▶ Laboratory reports of *Haemophilus influenzae* by age group and serotype, England and Wales, April to June 2010
- ▶ Hepatitis in England and Wales: annual reports for 2009
- ▶ Annual report from the sentinel surveillance study of hepatitis testing in England: data for January to December 2009
- ▶ Laboratory confirmed cases of measles, mumps and rubella, England and Wales: April to June 2010

# News

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## Increase in *Salmonella* Java in England

The HPA Laboratory of Gastrointestinal Pathogens (LGP) has confirmed 67 fully-sensitive human cases of *Salmonella* Java phage type 3B variant 9 (PT3B Var9) infection in England (with LGP receipt dates between 27 July and 26 August 2010).

Those affected range from three to 98 years old with 48% of all cases aged between 20-39 years and 69% of cases female. Cases have occurred in seven of the 10 HPA regions in England and Wales, with most cases occurring in the East of England (43%), London (17%) and the South East (15%). At least nine cases have been admitted to hospital; no deaths have been reported.

*Salmonella enterica* Paratyphi B variation Java causes gastro-enteritis in humans through the consumption of contaminated food, but it can also be invasive, producing typhoid-like clinical symptoms, and lead to outbreaks.

In response to the increase in cases confirmed in recent weeks, the Gastrointestinal, Emerging and Zoonotic Infections group (GEZI) of the HPA Centre for Infections (CfI) is conducting epidemiological investigations to generate hypotheses for disease transmission.

Between 20 and 24 August, 12 confirmed cases were interviewed at length using a detailed standardised trawling questionnaire; analysis of the data collected identified a number of common (67%) exposures. On the basis of this evidence, a case-control study to examine the exposure to these risk factors is under way.

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## *Lymphogranuloma venereum* (LGV) information campaign launched by Terrence Higgins Trust

The substantial rise in diagnoses of LGV seen over the winter of 2009/10 [1] in United Kingdom and Republic of Ireland has been sustained into the first half of 2010. Around 40 diagnoses a month are now being made, with 256 diagnosed in 2010 to the end of June. Virtually all diagnoses were seen in HIV-positive white men who have sex with men (MSM), presenting with proctitis, some of whom have a large number of sexual partners. The cases are geographically dispersed although the epidemic is focused on London and, to a lesser extent, Brighton and Manchester.

Behavioural modification is a key component to the control of LGV and the Terrence Higgins Trust, in collaboration with the HPA, the British Association for Sexual Health and HIV (BASHH) and the British HIV Association (BHIVA), recently launched a new information leaflet aimed at increasing awareness amongst MSM [2]. This new information resource contains information on disease presentation, transmission, how to avoid infection and where to obtain testing and advice, and will be targeted at attendees at genitourinary medicine services.

## References

1. HPA. Substantial increase in cases of *Lymphogranuloma venereum* (LGV) in UK. *Health Protection Report* 4(8) (26 February 2010).
2. LGV: a new infection affecting gay and bisexual men. Available at: <http://www.tht.org.uk/informationresources/publications/gaymengenralinformation/lgvleafletclinics0125201.pdf>.

## Confirmed measles cases in England and Wales in 2010: update to end-July

The number of measles cases confirmed in England and Wales with onset in July was 83 bringing the total for the year so far to 208 (table). The increase of cases in July was associated with several events attended by members of the travelling communities. There is also evidence of increase of number of cases outside these communities in at least four areas in the country.

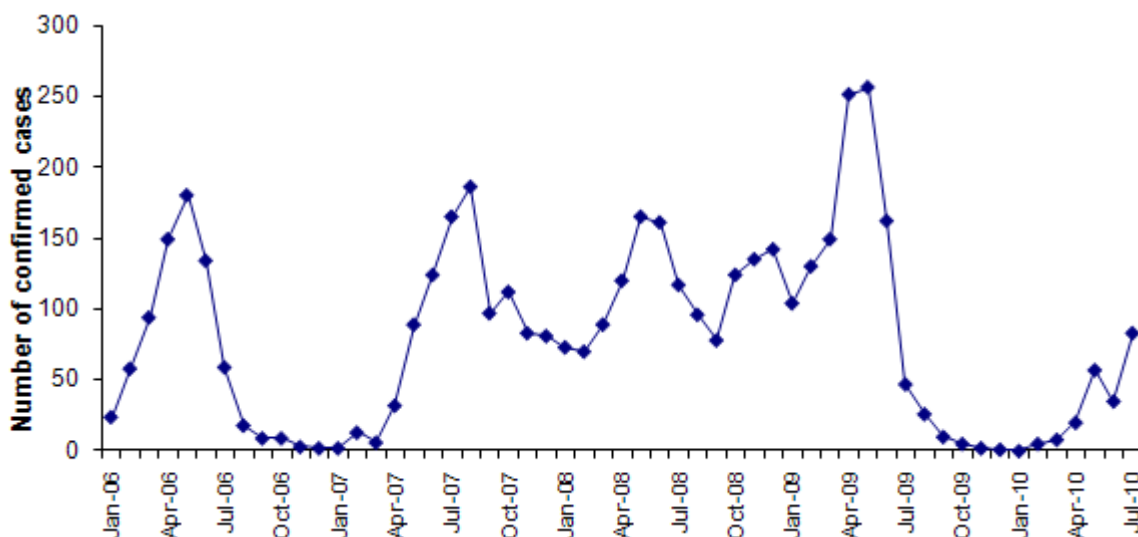
The majority of cases were reported from four regions, London (27%; 57/208), South East region (23%; 48/208), East of England region (20%; 41/208) and North West region (14%; 29/208) (table).

An age breakdown of cases for 2010 to the end of May by region is available at [http://www.hpa.org.uk/web/HPAweb&HPAwebStandard/HPAweb\\_C/1223019390211](http://www.hpa.org.uk/web/HPAweb&HPAwebStandard/HPAweb_C/1223019390211).

### Confirmed cases of measles by region and month of onset, England and Wales: January 2010 to July 2010

Month/year	Lond'n	East Mids.	Eastern	North East	North West	South East	South West	West Mids	Wales	York & Hum	Total
<b>Total 2009</b>	<b>198</b>	<b>47</b>	<b>74</b>	<b>122</b>	<b>79</b>	<b>276</b>	<b>43</b>	<b>95</b>	<b>159</b>	<b>51</b>	<b>1144</b>
Jan-10	–	–	–	–	–	–	–	–	–	–	–
Feb-10	–	–	2	–	–	3	–	–	–	–	5
Mar-10	1	–	2	–	–	3	2	–	–	–	8
Apr-10	7	–	2	–	5	2	1	–	3	–	20
May-10	28	2	13	1	5	4	1	–	2	1	57
Jun-10	3	–	13	1	10	4	1	–	–	3	35
Jul-10	18	4	9	–	9	32	–	2	–	9	83
<b>Total 2010</b>	<b>57</b>	<b>6</b>	<b>41</b>	<b>2</b>	<b>29</b>	<b>48</b>	<b>5</b>	<b>2</b>	<b>5</b>	<b>13</b>	<b>208</b>

### Number of laboratory confirmed cases in England and Wales by month of onset: January 2006 to July 2010



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## Sixth annual review of infections in UK blood/tissue donors and transfusion recipients

The NHS Blood and Transplant (NHSBT)/Health Protection Agency (HPA) Centre for Infections Epidemiology Unit runs a series of national schemes which provide epidemiological information about bloodborne infections in blood, tissue and cell donors in the UK and the associated risk of transmission via transfusion or transplantation, in order to inform donor selection practices and public health.

The NHSBT/HPA Epidemiology Unit's sixth annual review [1] presents national data for 2009 from all the schemes run by the Unit, and aims to describe the data collected and any trends observed. In addition the report includes the most recent estimated risks of current donation testing strategies not identifying an infectious donation. Information about antenatal samples tested by NHSBT is also presented.

Key information in the 2009 report includes:

- HBV was the most frequently detected infection in blood donations in 2009 with a significant increase in the number of repeat donors testing positive following the introduction of HBV Nucleic Acid Testing (NAT) in April 2009. However, the overall numbers testing positive remained small.
- HTLV was the least frequently detected infection in 2009, but was at its highest frequency since HTLV testing was introduced in 2002: Three HTLV co-infections were also detected in 2009.
- Up to date estimates for the residual risk of a viral infection entering the blood and tissue supply, despite donor testing, are included and show that the probability of acquiring hepatitis B, hepatitis C, HIV or HTLV via blood transfusion was very low between 2007 and 2009.
- The frequency of infection among surgical bone donors and deceased donors declined in 2009 compared to 2008. There was a small increase in the frequency of infection among cord blood donors in 2009 (four positive donors were identified compared to three in 2008).
- The frequency of infection is generally higher in tissue and cell donors as compared to blood donors. This reflects demographic differences between the tissue, cord blood and blood donor populations as well as the ways in which donations are collected.
- There were two confirmed reports of bacterial transfusion transmitted infection (TTI) in 2008, involving the transmission of infection to a total of two recipients. There were no confirmed reports of a viral TTI for the fourth consecutive year.
- The proportion of antenatal samples tested by NHSBT that were positive for HBsAg declined in 2009 but remained the most frequently detected marker of infection. The frequency of samples reported as negative for rubella antibodies (anti-rubella levels <10IU/ml) increased again in 2009 to 3.4% of all samples tested.

Data from the transfusion-transmitted infection surveillance scheme form part of the UK haemovigilance scheme known as SHOT ("Serious Hazards of Transfusion", <http://www.shotuk.org>) which aims to build an evidence base on transfusion hazards.

The 2009 annual review additional data (available in slide set and pdf format) [2] and information about the unit's data sources and collection methods [3] are available from the [Bloodborne Infections in Blood and Tissue Donors \(BIBD\)](#) pages of the HPA website and surveillance data are published periodically in the *Health Protection Report*.

### References

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2. *Supplementary data tables, Annual review from the NHS Blood and Transplant/HPA Centre for Infections Epidemiology Unit, 2009.* HPA website: BIBD References and Publications.
3. *NHS Blood and Transplant/Health Protection Agency Epidemiology Unit: data sources and methods (August 2010).* HPA website: BIBD References and Publications.

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## Infection reports

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### HIV/ STIs

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- ▶ **Gonococcal Resistance to Antimicrobials Surveillance Programme in England and Wales (GRASP): report of 2009 data**

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### Rise in new diagnoses of sexually transmitted infections (UK, 2009)

#### KEY POINTS AND RECOMMENDATIONS

- ▶ Numbers of new diagnoses of sexually transmitted infections (STIs) in the UK rose by 3% between 2008 and 2009, continuing the trend of the past decade.
- ▶ The impact of poor sexual health is greatest in young heterosexual adults and in men who have sex with men.
- ▶ There is considerable geographic variation in the distribution of STIs with highest rates seen in urban areas of higher deprivation, reflecting concentrations of the population who are at greatest risk.
- ▶ Increasing sexual behaviour risk may be contributing to the rise in STIs and will have done so in men who have sex with men, but much of the change will have been due to the increasing application of more sensitive tests throughout the past decade and to the more recent expansion of chlamydia screening of young adults in community settings.
- ▶ Prevention efforts, such as greater STI screening coverage and easier access to sexual health services, should be sustained and continue to focus on groups at highest risk.
- ▶ Health promotion and education remain the cornerstones of STI and HIV prevention through improving public awareness of STIs and HIV and encouraging safer sexual behaviour such as consistent condom use and reductions in both the numbers and concurrency of sexual partnerships.

This report is in two parts. The first part presents data on trends in sexually transmitted infections (STIs) in the United Kingdom (UK) between 2000 and 2009 using data from genitourinary medicine (GUM) clinics and community-based settings screening for chlamydia such as primary care. The second part presents a more-detailed analysis of STI epidemiology in England in 2009, using data from the recently introduced Genitourinary Medicine Clinic Activity Dataset (GUMCAD).

#### 1. TRENDS IN DIAGNOSES IN THE UK, 2000-2009

Latest data indicate that numbers of new cases of sexually transmitted infections (STIs) in the UK rose in 2009. The total number of new cases of STI (see box below) diagnosed in genitourinary medicine (GUM) clinics and in community-based settings screening for chlamydia, rose by 3% last year (470,701 to 482,696), while other STI diagnoses rose by 2% (243,423 to 249,377) over the same 12-month period (see box below).

The rise in total numbers of new STI diagnoses between 2008 and 2009 was primarily associated with increased diagnoses of genital chlamydia (7%; 203,773 to 217,570), gonorrhoea (6%; 16,451 to 17,385), and genital herpes (5%; 28,807 to 30,126). During the same period, new diagnoses of genital warts were relatively unchanged (-0.3%; 91,503 to 91,257) while those of syphilis (-1%; 3,309 to 3,273) and non-specific genital infection (-3%, 96,153 to 93,456) fell slightly.

Over the past 10 years there has been a substantial increase in diagnoses of many STIs, although diagnoses of gonorrhoea had been in decline (figure 1). It is likely that increased transmission through unsafe sexual behaviour, especially among men who have sex with men (MSM), has contributed to the overall rise in STI diagnoses (figure 1b). However, to some extent, the rise in diagnoses of gonorrhoea and genital herpes will have been due to increasing use of more sensitive molecular diagnostic tests [1,2]. Likewise, improved availability of community-based chlamydia screening for young adults through the National Chlamydia Screening Programme (NCSP) has resulted in more chlamydia diagnoses [3]. There has been a substantial increase in chlamydia testing coverage of

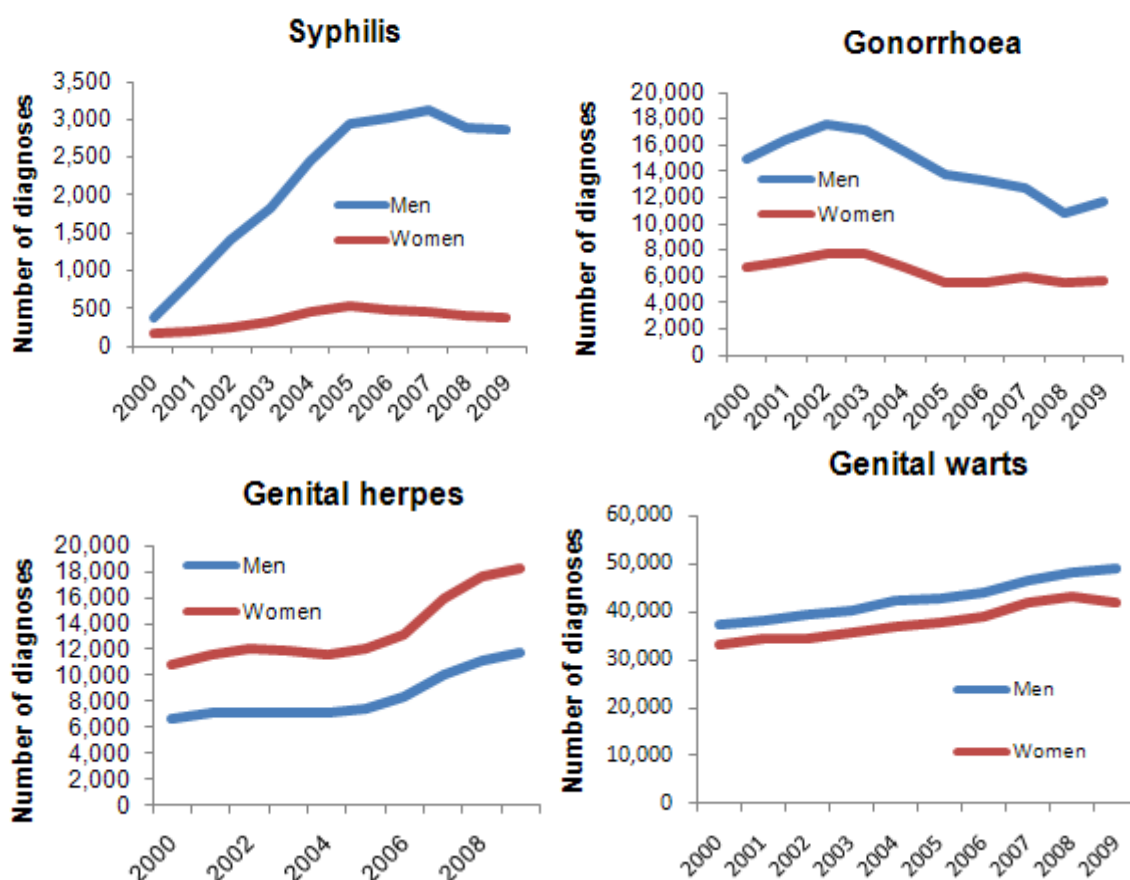
young adults in England in the past year, estimated to be about 30% of those aged 15 to 24 in 2009/10 [3].

### Categories of STI diagnoses \*

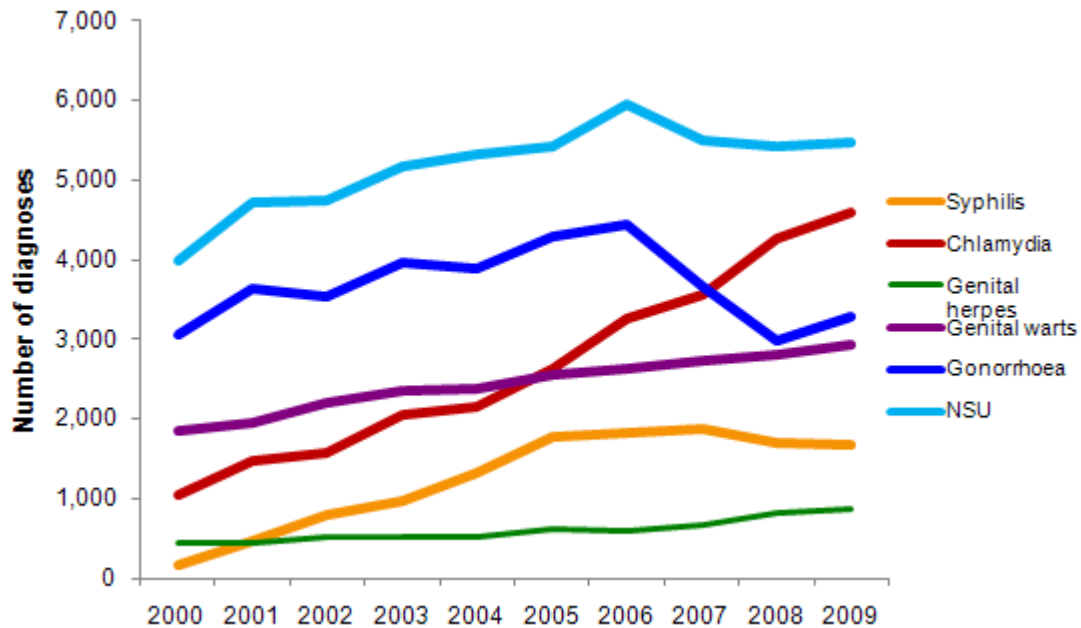
<p><b>New STI diagnoses</b></p> <p>Chlamydial infection (uncomplicated and complicated).          Gonorrhoea (uncomplicated and complicated).          Syphilis (primary, secondary and early latent).          Genital herpes simplex (first episode).          Genital warts (first episode).          New HIV diagnosis.          Non-specific genital infection/urethritis (NSGI/NSU) (uncomplicated and complicated)          Chancroid.          Lymphogranuloma venerum (LGV).          Donovanosis.          Molluscum contagiosum.          Trichomoniasis.          Scabies.          Pediculus pubis.</p>	<p><b>Acute STI diagnoses</b></p> <p>Chlamydial infection (uncomplicated and complicated).          Gonorrhoea (uncomplicated and complicated).          Syphilis (primary, secondary and early latent).          Genital herpes simplex (first episode).          Genital warts (first episode).          Non-specific genital infection/urethritis (NSGI/NSU) (uncomplicated and complicated)          Chancroid.          Lymphogranuloma venerum (LGV).          Donovanosis.          Molluscum contagiosum.          Trichomoniasis.          Scabies.          Pediculus pubis.</p>
<p><b>Other STI diagnoses</b></p> <p>Congenital and other acquired syphilis.          Recurrent genital herpes simplex.          Recurrent and re-registered genital warts.          Subsequent HIV presentations (including AIDS).          Ophthalmia neonatorum (chlamydial or gonococcal).          Epidemiological treatment of suspected STIs (syphilis, chlamydia, gonorrhoea, NSGI/NSU).</p>	

\* Unless stated otherwise, the data presented include chlamydia diagnoses made in any GUM clinic or community-based setting. Data presented on all other STIs include diagnoses made in GUM clinics only.

**Figure 1a. New diagnoses of syphilis, gonorrhoea, genital herpes and genital warts at GUM clinics by gender, 2000-2009, United Kingdom**



**Figure 1b. Men who have sex with men: New diagnoses of STIs at GUM clinics, 2000-2009, United Kingdom**



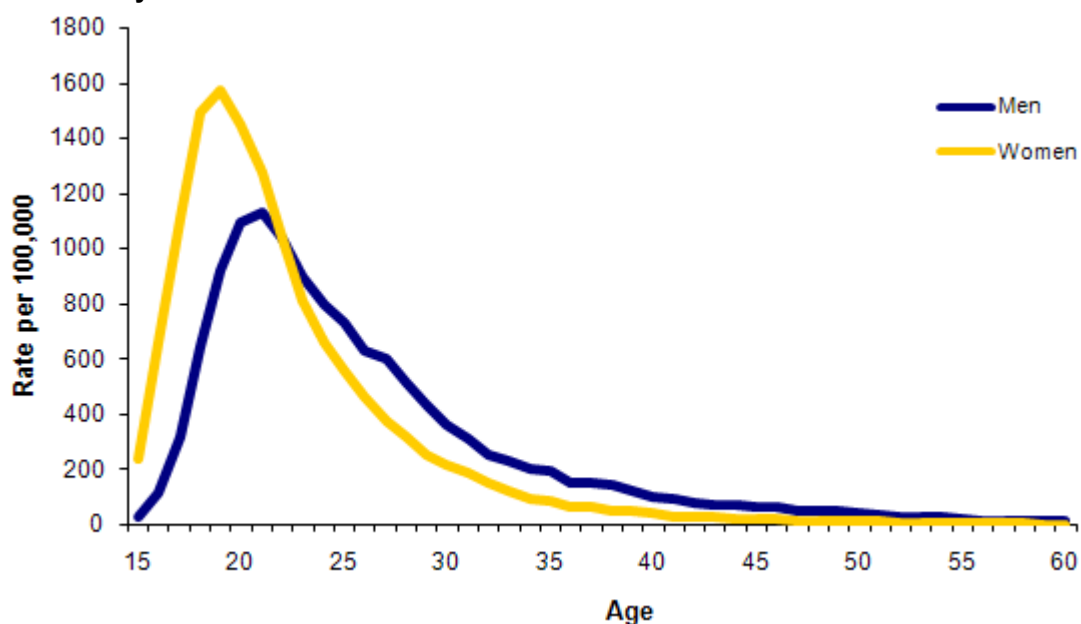
## 2. EPIDEMIOLOGY OF STIs IN ENGLAND, 2009

### Young people and STIs

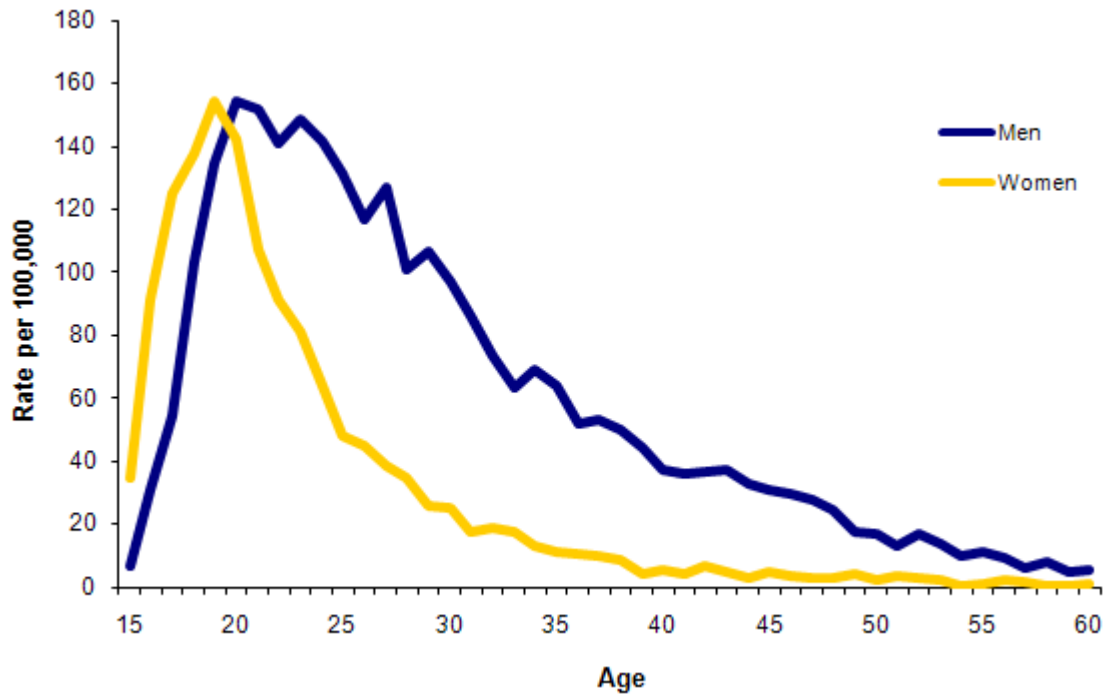
Young people aged less than 25 years, experience the highest rates of STIs. In those attending GUM clinics in 2009, 65% (61,183/94,751) of chlamydia, 50% (7,335/14,676) of gonorrhoea, 55% (39,980/72,639) of genital warts and 43% (10,854/25,535) of genital herpes diagnoses were in those aged under 25 years. Among women, rates of diagnosis of gonorrhoea and chlamydia peaked in those aged 19 while those of genital herpes peaked in 20 year olds (figure 2). The peak in men occurred in slightly older men and was more attenuated. Rates of gonorrhoea, chlamydia and genital herpes diagnoses in men peak in those aged 20, 21 and 23 years respectively (figure 2).

**Figure 2. Age-specific distribution of STI diagnoses made in GUM clinics by gender, England, 2009**

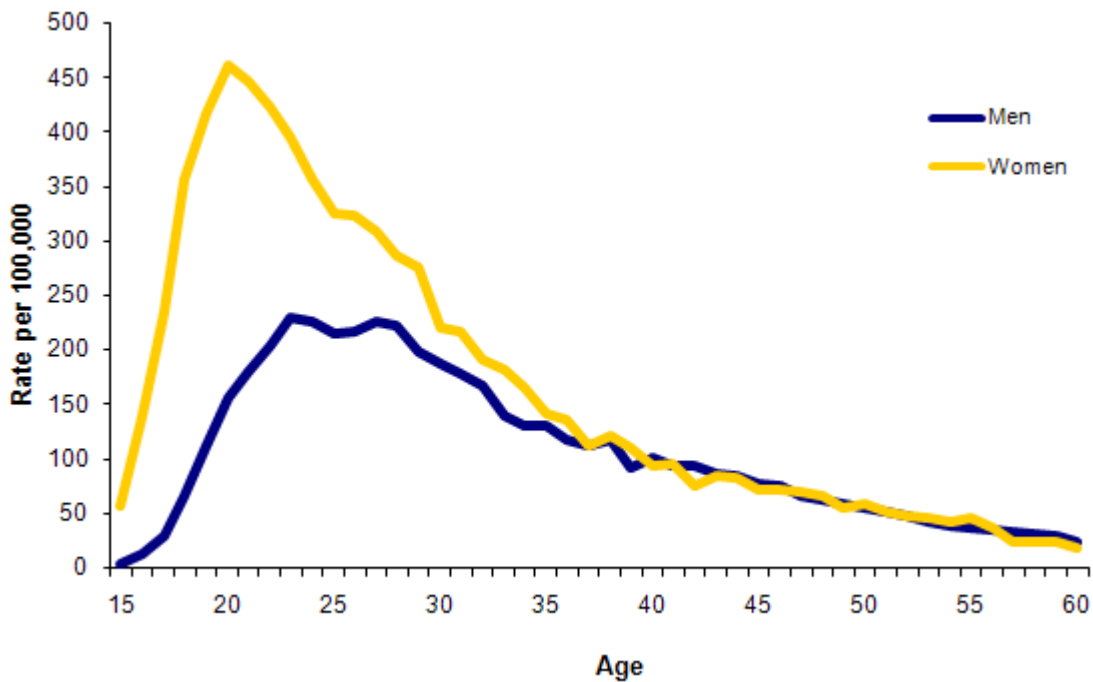
### 2a. Chlamydia



## 2b. Gonorrhoea



## 2c. Genital herpes

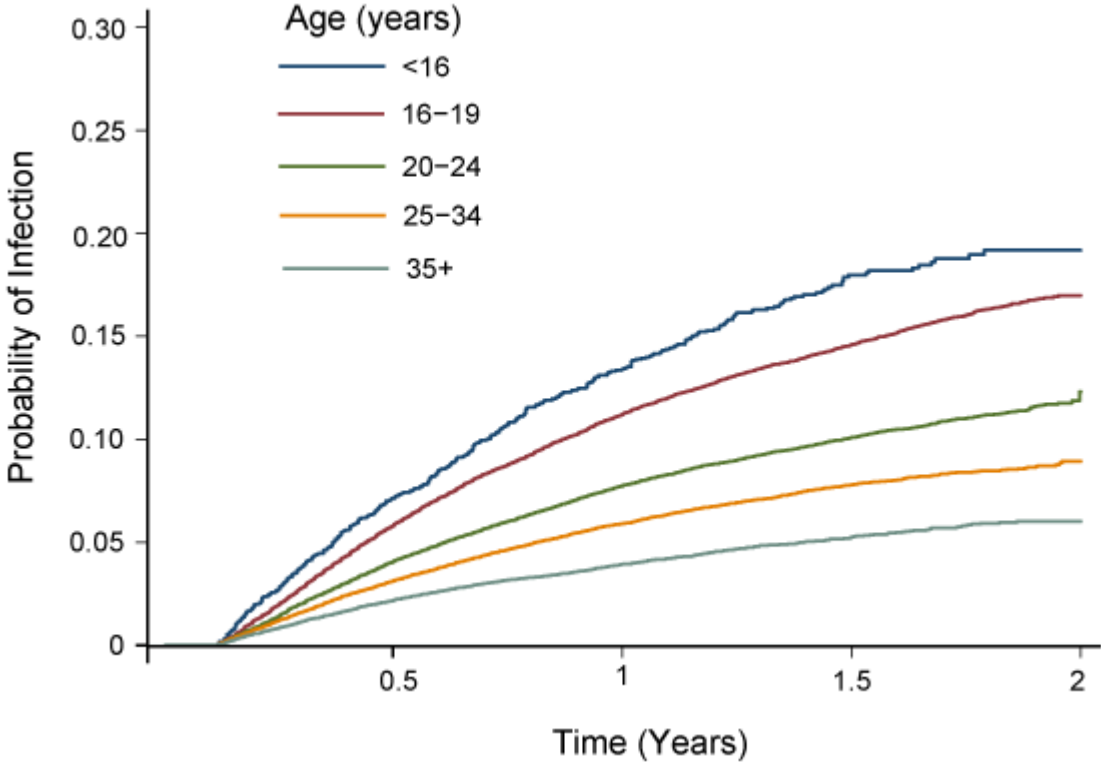


Young people are also more likely to become re-infected with STIs, contributing to infection persistence and health service workload. In England, at least 11% of 16 to 19 year old women and 12% of 16 to 19 year old men presenting with an acute STI (see box above) at a GUM clinic will become re-infected with an STI within a year \* (figure 3). Teenagers may be at risk of reinfection because they lack the skills and confidence to negotiate safer sex [4].

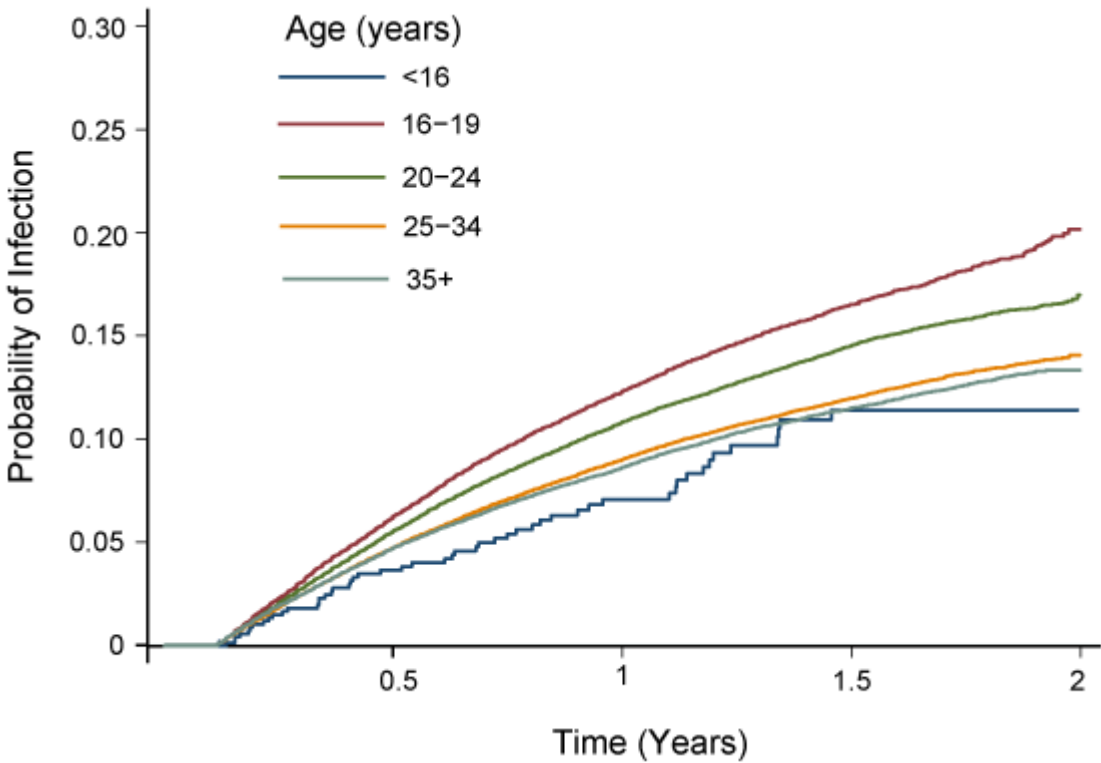
\* Re-infection rates based on GUMCAD data will be underestimated as repeat attendances by patients can only be determined within the clinic the patient first attended.

Figure 3. Rates of re-infection with an acute STI\*, GUM clinic attendees by age group and gender, England: 2008-9

3a. Women



3b. Men

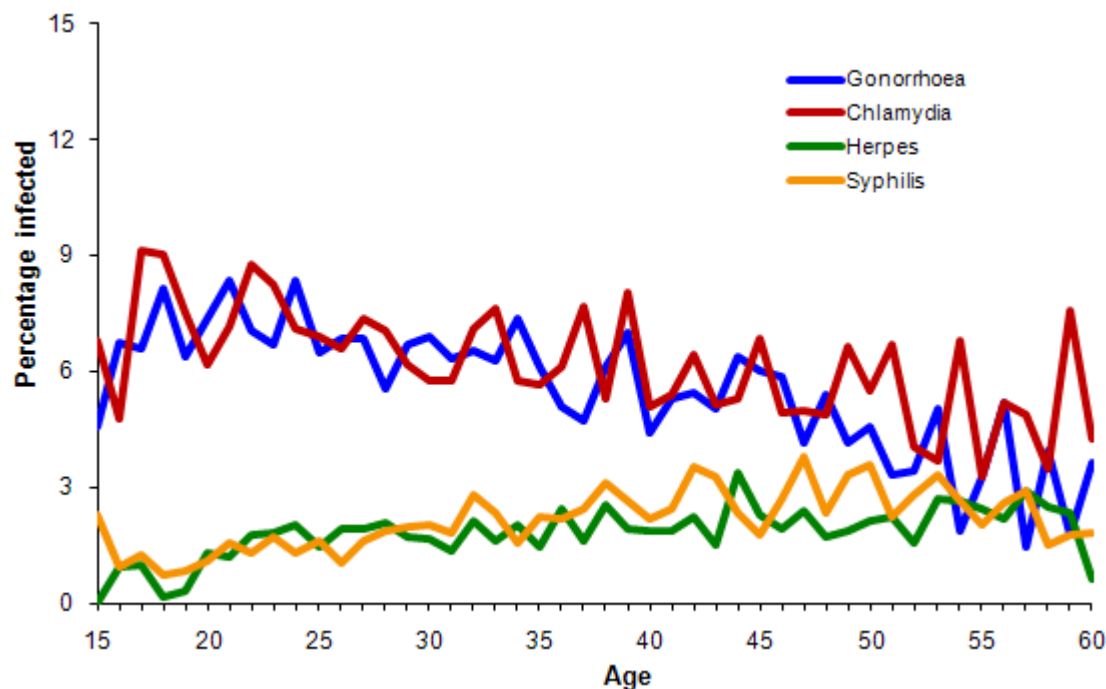


\* Excludes HIV diagnoses.

### Men who have sex with men

Men who have sex with men (MSM) are also a priority for targeted HIV/STI prevention and health promotion work. In 2009, for cases in men where sexual orientation was recorded, about 66% (1,326/2,024) of syphilis and 36% (2,794/7,773) of gonorrhoea diagnoses in England were among MSM. In contrast to heterosexuals, STIs in older MSM are common. Of MSM receiving a sexual health screen at a GUM clinic, the percentage diagnosed with infectious syphilis increased with age, peaking in those aged 50 years at just under 4%, and the percentage diagnosed with chlamydia and gonorrhoea declined only gradually with age (figure 4).

**Figure 4. Men who have sex with men: Age-specific distribution of the percentage of those screened in GUM clinics infected with an STI, England, 2009**

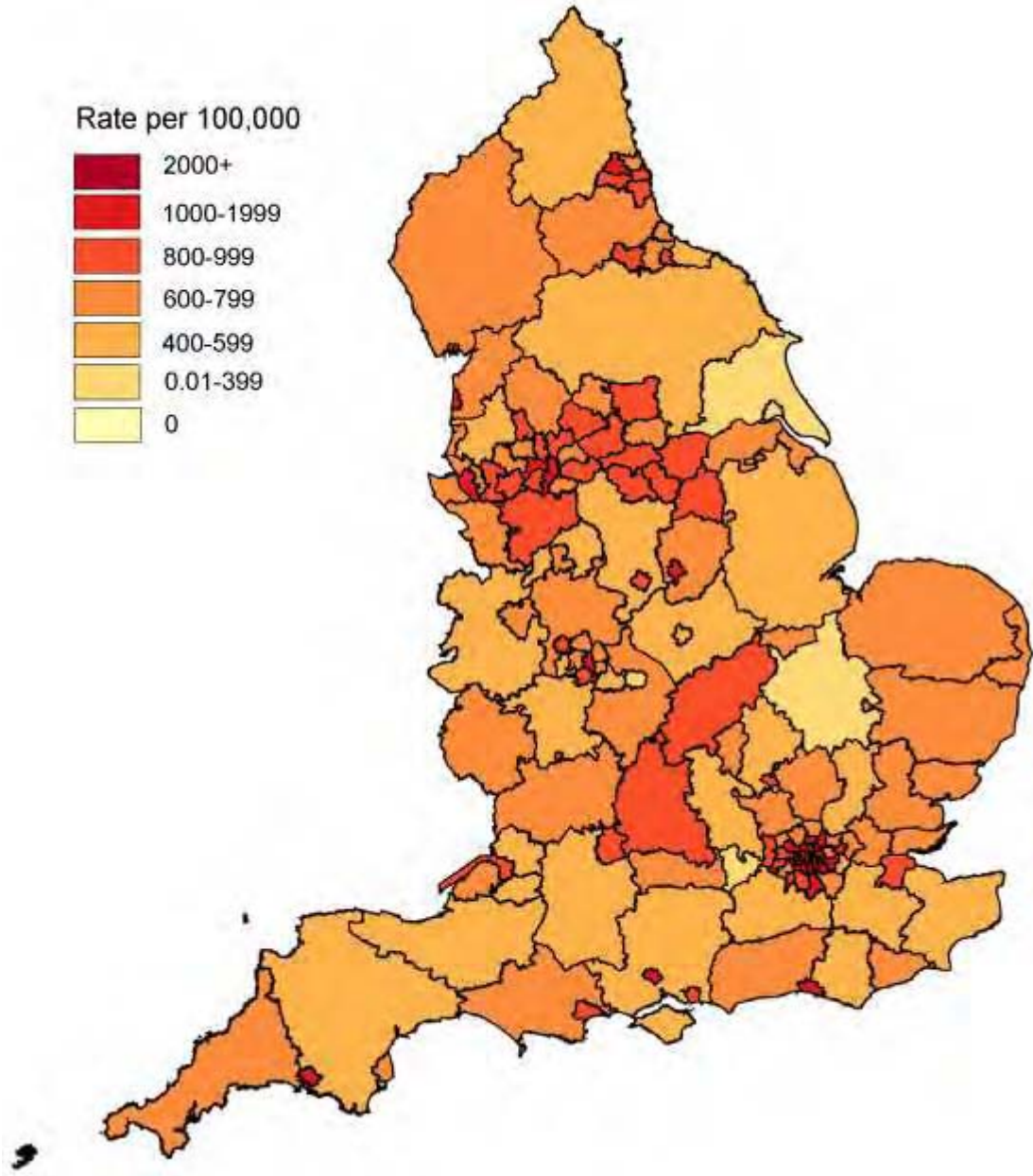


Local outbreaks of syphilis and lymphogranuloma venereum (LGV) among MSM have become a feature of STI epidemiology and the high prevalence of HIV co-infection reflects the close relationship between the epidemics [5]. During the latter half of 2009 and early 2010, diagnoses of LGV rose substantially, particularly in older, HIV-infected MSM [6].

### STI distribution by PCT of residence

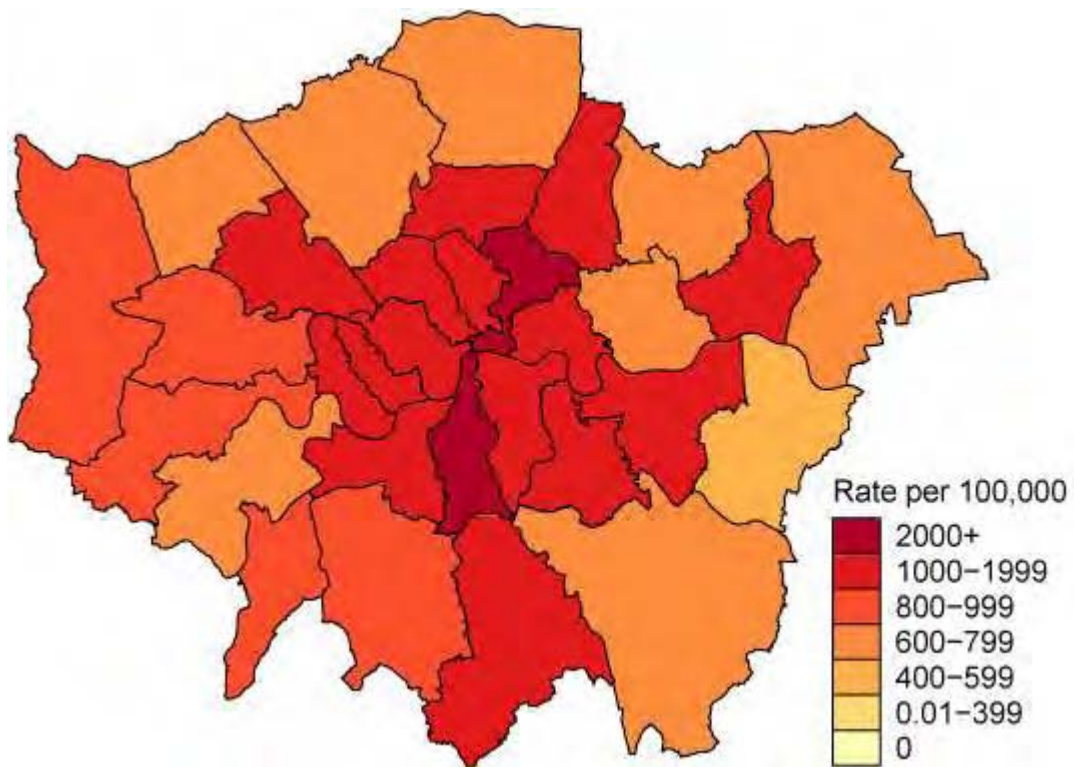
For the first time, STI data are available by area of residence from the recently introduced Genitourinary Medicine Clinic Activity Dataset (GUMCAD) in England. Data from GUMCAD illustrate considerable geographic variation in the distribution of STIs. In 2009, rates of acute STI diagnoses (Box) were highest in residents of urban areas, particularly in London reflecting, to a large extent, the distribution of core groups of the population who are at greatest risk of infection [7] (figure 5). Of the 31 Primary Care Trusts (PCTs) in London, 19 (61%) were in the highest quartile for STI diagnosis rates (figure 6). STI diagnoses are particularly concentrated in deprived urban areas. Socio-economic deprivation (SED) is a known determinant of poor health outcomes [8,9] and GUMCAD data show a strong positive correlation between rates of STI and the index of multiple deprivation across England (figure 7). The relationship between STIs and SED is probably influenced by a range of factors such as the provision of and access to health services, education, health awareness, health-care seeking behaviour and sexual behaviour [10,11].

Figure 5a. Acute STI diagnoses\* by PCT of residence, 2009 (England)



\* Excludes HIV diagnoses and includes data on chlamydia diagnoses from community-based test settings.

**Figure 5b. Acute STI diagnoses\* by PCT of residence, 2009 (London)**

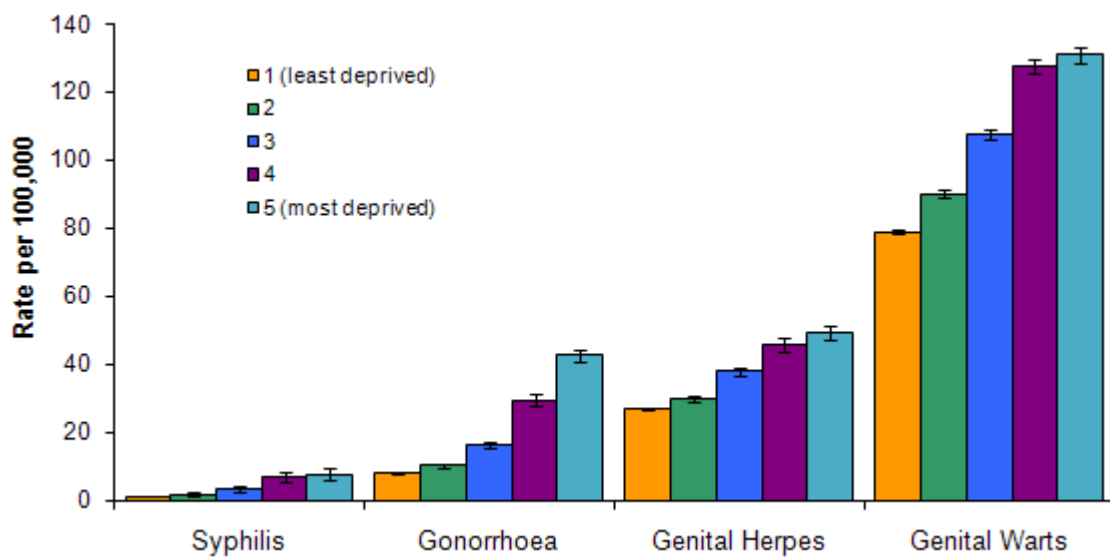


\* Excludes HIV diagnoses and includes data on chlamydia diagnoses from community-based test settings.

**Figure 6. Acute STI diagnoses by PCT of residence, England, 2009.**

*See appendix (or PDF file in website version)*

**Figure 7. Rates of diagnoses of STIs by deprivation quintile using the Index of Multiple Deprivation, England [12], 2009**



## DISCUSSION AND CONCLUSIONS

Numbers of STI diagnoses have increased steadily over the last 10 years. While some of this increase is associated with more testing and improved diagnostic sensitivity, it is clear that high rates of infection persist in some population groups.

There is considerable inequality in the distribution of STIs across the population. Prevention efforts, such as enhanced health promotion, sexual health education, greater STI screening coverage and easier access to sexual health services, will be important for controlling infection transmission. These efforts need to continue to focus on high risk groups such as young people and MSM, and should be intensified in those parts of the country with the highest rates of STIs.

### **Resources on the HPA website**

Further STI data are available on the HPA website in tables ([www.hpa.org.uk/stiannualdatatables](http://www.hpa.org.uk/stiannualdatatables)) and in interactive maps, the *Sexual Health Profiles* ([www.hpa.org.uk/sexualhealthprofiles](http://www.hpa.org.uk/sexualhealthprofiles)). The *Sexual Health Profiles* were created by the HIV & STI Department (HPA Centre for Infections) in collaboration with South West Public Health Observatory to support the work of Strategic Health Authorities and Primary Care Trusts in monitoring the health of their population and the performance of local health systems. The profiles include measures published in the 2008 review of the *Sexual Health Strategy* commissioned by the Independent Advisory Group on Sexual Health and HIV. The *Sexual Health Profiles* are presented using InstantAtlas™ mapping software.

Further information on the new GUMCAD surveillance system is available at [www.hpa.org.uk/gumcad](http://www.hpa.org.uk/gumcad).

### **Statistical notes on the data analysis**

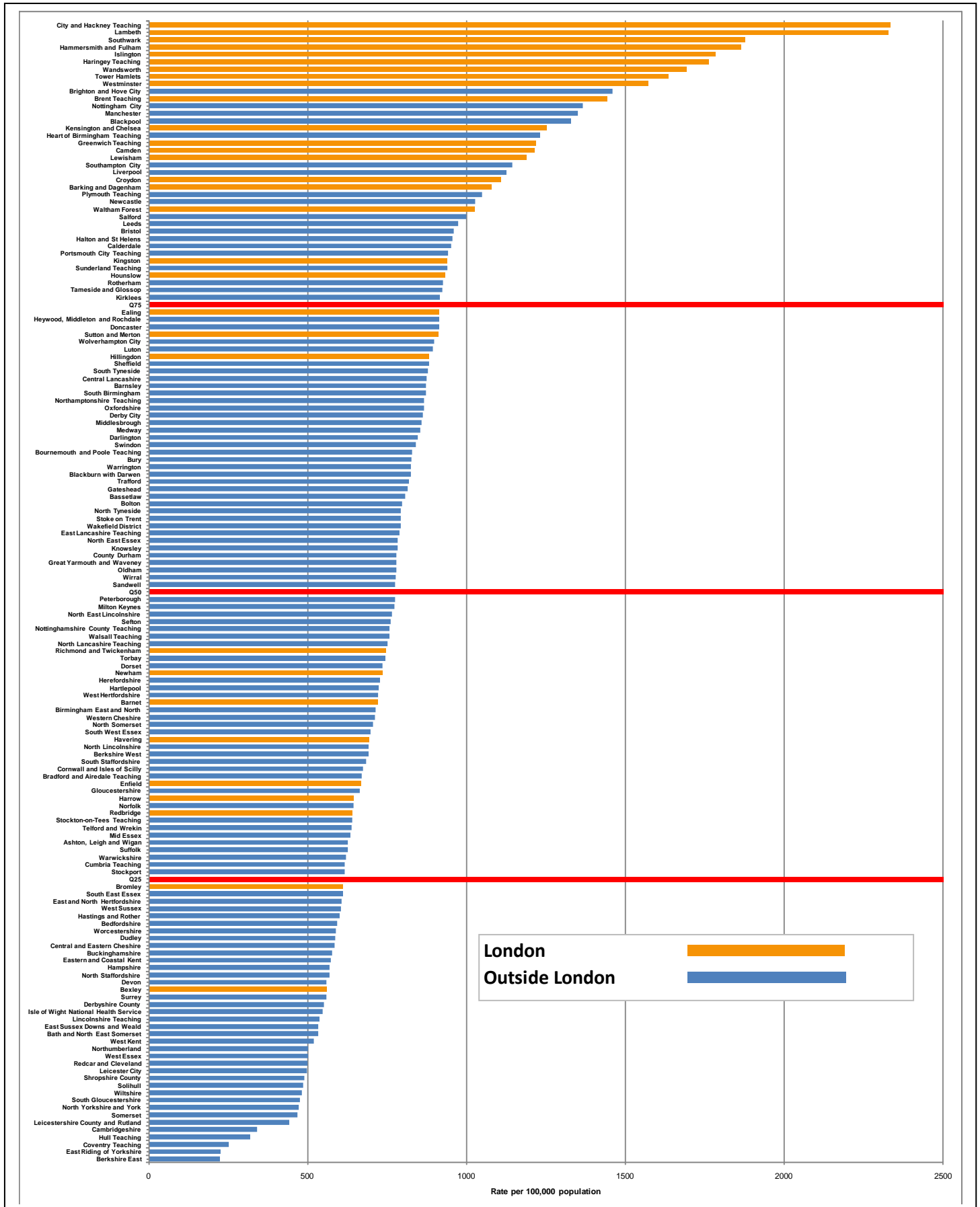
GUM clinic data covering diagnoses in 2009 were collected through a new electronic surveillance system, the Genitourinary Medicine Clinic Activity Dataset (GUMCAD). During years prior to this, data were collected on an aggregated, paper-based form, the KC60 statistical return. Unlike KC60 surveillance, GUMCAD enables errors in data coding submitted by clinics to be identified and corrected. The net effect has been to reduce slightly the number of diagnoses reported, as duplicates can be removed. To enable fair comparisons of trends in STI diagnoses reported over time using these two surveillance systems, numbers of diagnoses reported through KC60-based surveillance in years prior to 2009 have been adjusted down. The adjustment has been calculated using the estimated percentage difference in diagnoses reported through GUMCAD and KC60 for the same

calendar quarters in 2008 and 2009. This was possible as both systems were run in parallel during these years. In addition, as in previous years, data have been imputed for the small number of clinics which did not report data for some calendar quarters. The imputation is based on the average number of diagnoses reported by the same clinic in previous calendar quarters.

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**APPENDIX Figure 6. Acute STI diagnoses\* by PCT of residence\*\*, England, 2009\*\*\***



\* Excludes HIV diagnoses and includes data on chlamydia diagnoses from community-based test settings.  
 \*\* STI rates in residents of Torbay and North East Lincolnshire PCTs may have been slightly underestimated due to mapping issues for these PCTs in some clinic software systems.  
 \*\*\* Rates of STI are highest in residents of large urban areas reflecting, to a large extent, the distribution of core groups of the population who are at greatest risk of infection.

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## Gonococcal Resistance to Antimicrobials Surveillance Programme in England and Wales (GRASP): report of 2009 data

### KEY MESSAGES

- ▶ The third generation cephalosporins, cefixime or ceftriaxone, are the recommended treatment for gonorrhoea and remain effective. In 2009, 94% of GRASP GUM (genitourinary medicine - sexual health) clinic patients with gonorrhoea were prescribed a cephalosporin.
- ▶ Confirmed therapeutic failure to cefixime is rare and to ceftriaxone is undocumented in England & Wales.
- ▶ The relationship between susceptibility testing and therapeutic failure is unclear and hence MIC breakpoints to indicate resistance are tentative. However, in 2009, 1.2% of GRASP gonococcal isolates demonstrated decreased susceptibility to cefixime (MIC $\geq$ 0.25mg/l), and 0.3% to ceftriaxone (MIC $\geq$ 0.125mg/l).
- ▶ At a slightly lower cut off of MIC $\geq$ 0.125mg/l, 10.6% of isolates showed decreased susceptibility to cefixime.
- ▶ Isolates with decreased susceptibility to cefixime and ceftriaxone were predominantly found among MSM of white ethnicity, who reported having two or more UK partners in the three months prior to diagnosis.
- ▶ All isolates demonstrating decreased susceptibility to cefixime and ceftriaxone were also found to be ciprofloxacin (MIC $\geq$ 1mg/l) and tetracycline (MIC $\geq$ 2mg/l) resistant.
- ▶ The growing evidence of emerging decreased susceptibility to cephalosporins and possible dwindling treatment options highlight the need for robust strategies to promote preventative interventions.
- ▶ Despite low ciprofloxacin prescribing rates, there continue to be increases in ciprofloxacin resistance. Resistance increased from 28% to 35% between 2008 and 2009.
- ▶ In 2009, no isolates demonstrated resistance to spectinomycin (MIC  $\geq$  128mg/l).

### RECOMMENDATIONS

- ▶ Ongoing monitoring of antimicrobial resistance by surveillance programmes is vital.
- ▶ Maintaining culture, in this era of nucleic acid amplification tests (NAATs), is essential.
- ▶ Clinicians should continue to be vigilant to the possibility of treatment failures among their patients.
- ▶ Clinicians should also consider performing tests of cure, particularly if symptoms persist or following pharyngeal infection
- ▶ Any isolates from patients with therapeutic failure should be sent to the Sexually Transmitted Bacteria Reference Laboratory (STBRL) at the HPA.

## BACKGROUND

Now in its tenth year the Gonococcal Resistance to Antimicrobials Surveillance Programme (GRASP) was established to monitor trends in and risk factors associated with antimicrobial resistance in gonorrhoea in England and Wales. GRASP was used to inform national treatment guidelines when resistance to ciprofloxacin increased above 5% in 2002. The programme is currently monitoring the emergence of decreased susceptibility to the third generation cephalosporins, the current first line treatments. Both cefixime and ceftriaxone remain active and the treatment of choice; however, the emergence of decreased susceptibility is of global concern as alternative therapies are lacking.

GRASP is an enhanced sentinel survey collecting gonococcal isolates from 24 laboratories and associated epidemiological data from 26 GUM (Genitourinary medicine – sexual health) clinics over three months of each year. The gonococcal isolates are tested against a range of antimicrobials to determine susceptibility to therapeutically important antimicrobial agents, and the results linked to the epidemiological data prior to statistical analysis. During the 2009 collection period, 1,505 samples were collected from patients attending GRASP GUM clinics, of which 94.7% (1,425) were retrieved and 92.7% (1395) were successfully tested for antimicrobial resistance.

### DISTRIBUTION OF GONOCOCCAL INFECTION AMONG INDIVIDUALS ATTENDING GRASP CLINICS IN ENGLAND AND WALES: 2009

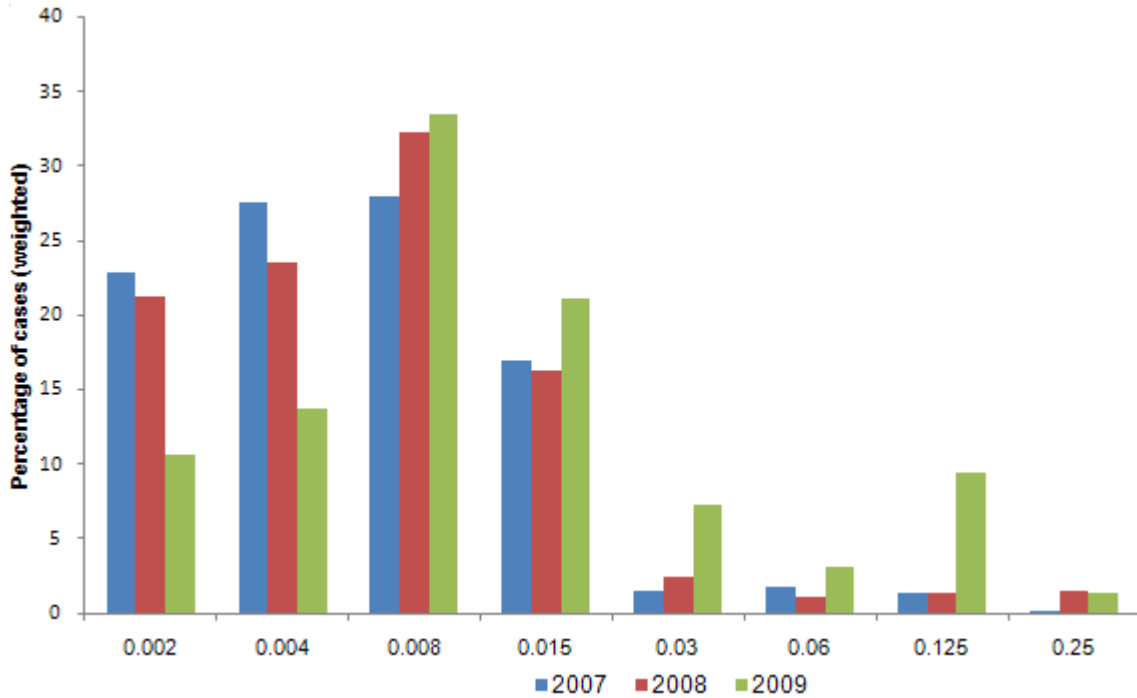
- ▶ Thirty-eight percent of infections among patients attending GRASP clinics with gonorrhoea during the study period were in MSM; 34% were in heterosexual men and 28% in women.
- ▶ Thirty-one percent of infections were in those aged 25-34 years, while 29% were in the 20-24 year age group.
- ▶ High proportions of infections were found in young women: 39% of infections in women were in 20-24 year olds and 35% in 16-19 year olds
- ▶ Among MSM attending GRASP clinics, 86% self-identified as white British or from other white backgrounds.
- ▶ Historically, individuals of black Caribbean origin have been disproportionately affected by gonorrhoea compared with other ethnic groups. In 2009, 27% of heterosexual men and 19% of women with gonorrhoea were of black Caribbean origin.
- ▶ Forty-five percent of women and 33% of MSM infected with gonorrhoea did not experience any symptoms associated with their infection. The proportion of heterosexual men without symptoms was much lower (12%).
- ▶ Among MSM 45% reported a previous gonococcal infection, compared with 23% of heterosexual males and 16% of women.
- ▶ Thirty-six percent of MSM with gonorrhoea were co-infected with HIV compared with 1.1% of heterosexual men and 0.7% of women.
- ▶ Forty-eight percent of GRASP clinic attendees reported between 2-5 UK partners in the three months prior to diagnosis.
- ▶ Sexual contact abroad in the three months prior to diagnosis was reported by 14% of heterosexual males, 22% of MSM and 5% of women.
- ▶ Five percent of GRASP patients reported sexual contact in Western Europe (excluding the UK) in the three months prior to diagnosis.

## FIRST LINE THERAPIES

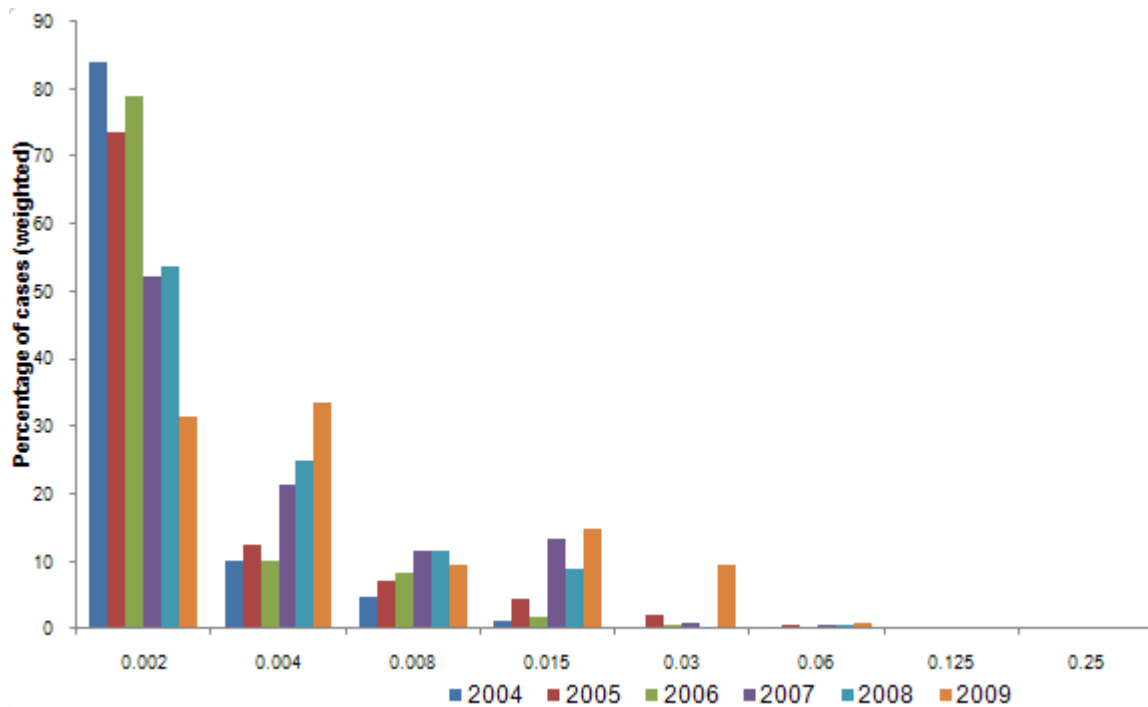
### *Third Generation Cephalosporins*

There has been an upward drift in the MICs for both cephalosporins used as recommended therapies since sensitivity testing for these antimicrobials began (figure 1a & 1b).

**Figure 1a. Proportion of gonococcal isolates by cefixime MIC (mg/l) and year, 2007-2009**



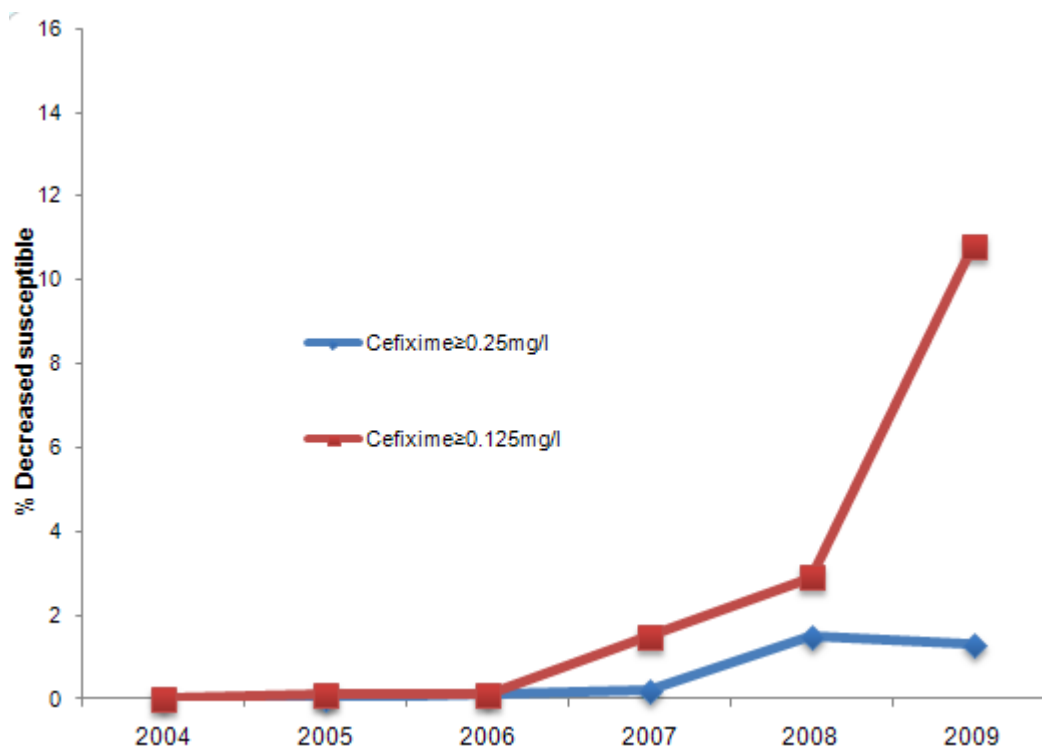
**Figure 1b. Proportion of gonococcal isolates by ceftriaxone MIC (mg/l) and year, 2004-2009**



## Cefixime

The cut-off for decreased susceptibility to cefixime is currently tentative. We considered the accepted cut-off of MIC $\geq$ 0.25mg/l as well as a slightly lower cut-off of MIC $\geq$ 0.125mg/l. In 2009, 1.2% of isolates demonstrated decreased susceptibility to cefixime (MIC $\geq$ 0.25mg/l). At the lower cut-off (MIC $\geq$ 0.125mg/l) decreased susceptibility first emerged in 2005 (0.1%). It has since increased to 2.8% in 2008 and to 10.6% in 2009 (figure 2).

**Figure 2: Trends in decreased susceptibility to cefixime, MIC $\geq$ 0.125mg/l and MIC $\geq$ 0.25mg/l, 2004-2009**



Between 2006 and 2009, 38 isolates demonstrating decreased susceptibility to cefixime at the higher cut off (MIC $\geq$ 0.25mg/l) were identified by GRASP; while 200 isolates with decreased susceptibility to cefixime at the lower cut off (MIC $\geq$ 0.125mg/l) have been identified since 2005.

Isolates demonstrating decreased susceptibility to cefixime were found in all three gender and sexual orientation groups, but were more predominant in MSM, particularly at the lower cut-off (table 1). In 2009, 0.9% of heterosexual men, 2.5% of MSM and 0.3% of women had isolates with decreased susceptibility to cefixime (MIC $\geq$ 0.25mg/l). Isolates from MSM demonstrating decreased susceptibility to cefixime were predominantly of white ethnicity and reported having two or more sexual partners in the UK in the three months prior to diagnosis (table 1). Approximately one third of isolates from MSM with decreased susceptibility to cefixime were from individuals co-infected with HIV. Similar proportions reported sexual contact abroad in the three months prior to diagnosis, including in Western Europe, Africa, North America and Central & South America.

Between 2006 and 2009, all 38 isolates showing decreased susceptibility to cefixime (MIC $\geq$ 0.25mg/l) were also found to be resistant to tetracycline (MIC $\geq$ 2mg/l) and highly resistant to ciprofloxacin (MIC $\geq$ 1mg/l). Ten out of 38 isolates were also found to have decreased susceptibility to ceftriaxone.

## Ceftriaxone

Decreased susceptibility to ceftriaxone (MIC $\geq$ 0.125mg/l) was first observed in a single isolate in 2005 (0.1%). In 2009, 4 (0.3%) isolates seen through GRASP demonstrated decreased susceptibility to this antimicrobial. The prevalence of decreased susceptibility to ceftriaxone among MSM in 2009 was 0.8% compared to 1.2% in 2008. There were no isolates with decreased susceptibility to ceftriaxone among heterosexual men or women in 2009.

Between 2005 and 2009, 11 isolates showed decreased susceptibility to ceftriaxone. The characteristics of these individuals were similar to those with isolates demonstrating decreased susceptibility to cefixime (table 1). Isolates tended to be from white MSM with two or more recent UK sexual contacts (table 1). Two out of seven reported sexual contact abroad. Seven out of 10 had a genital infection and three out of 10 had pharyngeal in addition to genital infection. Five out of eight MSM patients with isolates showing decreased susceptibility to ceftriaxone were co-infected with HIV.

Between 2005 and 2009, all 11 isolates demonstrating decreased susceptibility to ceftriaxone were also resistant to ciprofloxacin (MIC $\geq$ 1mg/l) and tetracycline (MIC $\geq$ 2mg/l). Ten out of 11 showed decreased cefixime susceptibility at the higher cut-off (MIC $\geq$ 0.25mg/l) and all 11 showed decreased susceptibility to cefixime at the lower cut-off (MIC $\geq$ 0.125mg/l).

**Table 1: GRASP: Characteristics of GUM patients with gonococcal isolates demonstrating decreased susceptibility to cefixime and ceftriaxone, 2005-2009 [1]**

Characteristics	Number (%) of patients with decreased susceptible isolates		
	Cefixime (MIC $\geq$ 0.125mg/l) (N=200)	Cefixime (MIC $\geq$ 0.25mg/l) (N=38)	Ceftriaxone (MIC $\geq$ 0.125mg/l) (N=11)
<b>Gender and sexual orientation</b>			
Heterosexual men	18 (10.1)	9 (25.7)	1 (11.1)
MSM	148 (83.1)	24 (68.6)	8 (88.9)
Women	12 (6.7)	2 (5.7)	– (0)
<b>Total [2]</b>	<b>178</b>	<b>35</b>	<b>9</b>
<b>Ethnic group</b>			
White	144 (84.7)	27 (81.8)	8 (88.9)
Black or Black British	11 (6.5)	3 (9.1)	1 (11.1)
Asian or Asian British	2 (1.2)	– (0)	– (0)
Other ethnic group	13 (7.6)	3 (9.1)	– (0)
<b>Total [2]</b>	<b>170</b>	<b>33</b>	<b>9</b>
<b>HIV status</b>			
Negative	97 (61.4)	22 (68.7)	4 (44.4)
Positive	61 (38.6)	10 (31.2)	5 (55.6)
<b>Total [2]</b>	<b>158</b>	<b>32</b>	<b>9</b>
<b>UK partners</b>			
0	2 (1.2)	– (0)	– (0)
1	49 (28.8)	12 (34.3)	1 (11.1)
2-5	96 (56.5)	20 (57.1)	7 (77.8)
6+	23 (13.5)	3 (8.6)	1 (11.1)
<b>Total [2]</b>	<b>170</b>	<b>35</b>	<b>9</b>

1. The data in this table are unweighted.

2. Total: the no. of individuals for whom data on the variable in question are available.

## SPECTINOMYCIN

No isolates in the 2009 collection were found to be resistant to spectinomycin ( $MIC \geq 128mg/l$ ). Only six isolates in total since 2000 have demonstrated resistance to spectinomycin.

## TREATMENT WITH CEPHALOSPORINS

In 2009, 94% of patients with gonorrhoea attending GRASP genitourinary medicine clinics (GUM) were treated with a cephalosporin. Sixty percent of patients were treated with cefixime and 35% were treated with ceftriaxone (table 2). Treatment varied slightly by gender and sexual orientation group with 96% of heterosexual men and MSM treated with a cephalosporin compared with 88% of women.

There is significant regional variation in the prescribing of cephalosporins, ranging from 100% in the Eastern region to 82% in the South East ( $p < 0.001$ ).

**Table 2: Proportion of patients receiving cefixime or ceftriaxone during each episode of gonorrhoea by region 2009**

Region	% of patients prescribed recommended cephalosporins	
	Cefixime	Ceftriaxone
Eastern	100.0	0
London	64.0	33.4
South East	23.5	63.0
South West	47.1	51.0
West Midlands	86.8	3.9
North West	25.5	65.3
Wales	96.1	1.3
North East	94.3	5.7
East Midlands	5.2	80.7
Yorkshire & Humberside	74.2	19.2

## ALTERNATIVE TREATMENTS

GRASP continues to test susceptibility to antimicrobial agents previously used for treatment, to monitor trends and to detect any return to susceptibility. These agents are no longer recommended as first-line treatments but could be useful in the future for individual patient management where the susceptibility of the infecting isolate is known.

### ***Ciprofloxacin***

The prevalence of ciprofloxacin resistance ( $MIC \geq 1mg/l$ ) increased significantly among GRASP isolates, from 28% in 2008 to 35% in 2009 ( $p=0.02$ ). In 2009, the greatest burden of ciprofloxacin resistance continued to be among MSM with 54% of isolates from this group demonstrating resistance, compared with 29% of isolates from heterosexual men and 15% from women (table 3).

There were higher proportions of resistant isolates among older ages, varying from 58% among those aged 35-44 years, 55% among those 45 and older and 17% in the under 20s. There was also significant regional variation ranging from 11% in East Midlands to 53% in Wales ( $p < 0.001$ ).

The prevalence of ciprofloxacin resistance continues to be highest among individuals of Asian (62%) and white ethnicity (43%), compared with those of black ethnicity where prevalence is much lower, ranging from 7.6% among black Caribbeans to 10.5% among those in the black other ethnic group. Among Asian patients attending GRASP clinics in 2009, the prevalence of ciprofloxacin resistance was 59% in individuals of Indian, Pakistani or Bangladeshi origin and 64% among individuals from Chinese and other Asian backgrounds.

There is an association between sexual contact abroad and ciprofloxacin resistance. Of those reporting contact abroad in the three months prior to diagnosis, 53% had isolates which demonstrated ciprofloxacin resistance, compared with 30% of isolates from individuals who did not report sexual contact abroad ( $p < 0.001$ ).

## **AZITHROMYCIN**

There continue to be low levels of azithromycin resistance ( $MIC \geq 1\text{mg/l}$ ) in England and Wales. Resistance increased from 0.8% in 2008 to 1.2% in 2009 (table 3). The prevalence of resistance varied by gender and sexual orientation group ranging from 0.6% and 0% among heterosexual men and women, respectively, to 2.4% among MSM. In 2009, prevalence was higher among the 20-24 (1.7%) and the 25-34 (1.6%) year age groups. Since 2001 none of the isolates from patients attending GRASP clinics in the Eastern region have been found to be azithromycin resistant. The high-level resistance ( $MIC \geq 256\text{mg/L}$ ) reported in 2007 was not observed in 2009.

## **PENICILLIN**

The overall prevalence of penicillin resistance ( $MIC \geq 1\text{mg/l}$  or  $\beta$ -lactamase +) was found to be 21% in 2009. The prevalence was higher among MSM (32%) than among heterosexual men (18%) and women (11%) (table 3).

In 2009, 16% of isolates were chromosomally-mediated resistant to *N. gonorrhoeae* (CMRNG) compared with 8.5% in 2008 and 15% in 2007. The increased tolerance of these gonococcal organisms to a hydrophobic environment ensures that they are more common among MSM (28%), compared with heterosexual men (8.8%) and women (7.8%). The prevalence of CMRNG resistance was 20% among individuals of white ethnicity and 17% among Asians in 2009.

Five percent of isolates in the 2009 collection demonstrated plasmid mediated penicillin resistance (including those also exhibiting plasmid-mediated resistance to tetracycline, PPNG-TRNG) compared with 9.6% in 2008 ( $p = 0.001$ ). In 2009, prevalence was higher among heterosexual men (8.4%) than women (3.0%) and MSM (3.2%). Resistance was particularly high among individuals of Asian (13%) ethnicity compared with black Caribbeans (2.1%). Among GRASP patients reporting sexual contact abroad in the three months prior to diagnosis, 12% had isolates that showed plasmid mediated penicillin resistance.

## **TETRACYCLINE**

Overall tetracycline ( $MIC \geq 2\text{mg/l}$ ) resistance increased from 59% to 68% between 2008 and 2009. In 2009, resistance was highest among MSM (92%), compared with 55% among heterosexual men and 47% among women (table 3). There was significant regional variation with resistance ranging from 44% in the East Midlands to 81% in the North West ( $p < 0.001$ ). The prevalence of resistance exceeded 40% in all ethnic groups, but was highest among individuals of Asian (86%) and white (75%) ethnicity.

**Table 3: Proportion of GRASP isolates with resistance to specific antimicrobials, 2008 and 2009, by gender and sexual orientation**

Anti-microbial	Heterosexual males % [95% CI]		MSM % [95% CI]		Women % [95% CI]		Total % [95% CI]	
	2008	2009	2008	2009	2008	2009	2008	2009
<b>Penicillin</b> (≥1mg/l or β lactamase+)	18.9 [13.2,26.3]	17.6 [12.1,24.7]	25.8 [21.5,30.7]	31.6 [24.9,39.2]	8.6 [6.2,11.7]	11.1 [7.3,16.4]	<b>18.5</b> [15.1,22.4]	<b>21.5</b> [16.0,28.3]
<b>Tetracycline</b> (≥2mg/l)	50.4 [43.2,57.7]	55.1 [47.9,62.1]	88.2 [83.9,91.4]	92.0 [87.7,94.8]	36.5 [30.7,42.7]	47.2 [38.6,56.0]	<b>58.8</b> [50.6,66.6]	<b>68.0</b> [59.9,75.1]
<b>Ciprofloxacin</b> (≥1mg/l)	24.7 [17.8, 33.3]	28.7 [21.6,36.9]	45.9 [41.2,50.7]	54.0 [49.0,59.0]	11.9 [8.1,17.1]	15.1 [11.1,20.3]	<b>28.1</b> [22.4,34.7]	<b>35.3</b> [28.2,43.2]
<b>Azithromycin</b> (≥1mg/l)	0.7 [0.2,2.0]	0.6 [0.2,2.0]	1.4 [0.6,3.2]	2.4 [1.1,5.2]	0.3 [0.0,2.7]	0.0 [-,-]	<b>0.8</b> [0.4,1.3]	<b>1.2</b> [0.8,1.8]

# Health Protection Report

weekly report

Volume 4 Number 34 Published on: 27 August 2010

## Infection Reports

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### Immunisation

- ▶ Laboratory confirmed (culture, PCR, serology) cases of pertussis reported to the enhanced pertussis surveillance programme during January to March 2010
- ▶ Laboratory reports of *Haemophilus influenzae* by age group and serotype, England and Wales, April to June 2010
- ▶ Hepatitis in England and Wales: annual reports for 2009
- ▶ Annual report from the sentinel surveillance study of hepatitis testing in England: data for January to December 2009
- ▶ Laboratory confirmed cases of measles, mumps and rubella, England and Wales: April to June 2010

## Laboratory confirmed (culture, PCR, serology) cases of pertussis reported to the enhanced pertussis surveillance programme during January to March 2010

There were 68 laboratory-confirmed cases of pertussis reported to the pertussis enhanced surveillance programme in the first quarter of 2010 (table 1). This represents almost a 50% reduction in the number of cases reported in the previous quarter (133 in October to December 2009 [1]) and the same quarter last year (137 in January to March 2009[2]) (figure 1). This decrease is consistent with the observed epidemiological pattern of 3-4 yearly cyclical peaks in pertussis, with the last peak occurring in 2008 [2].

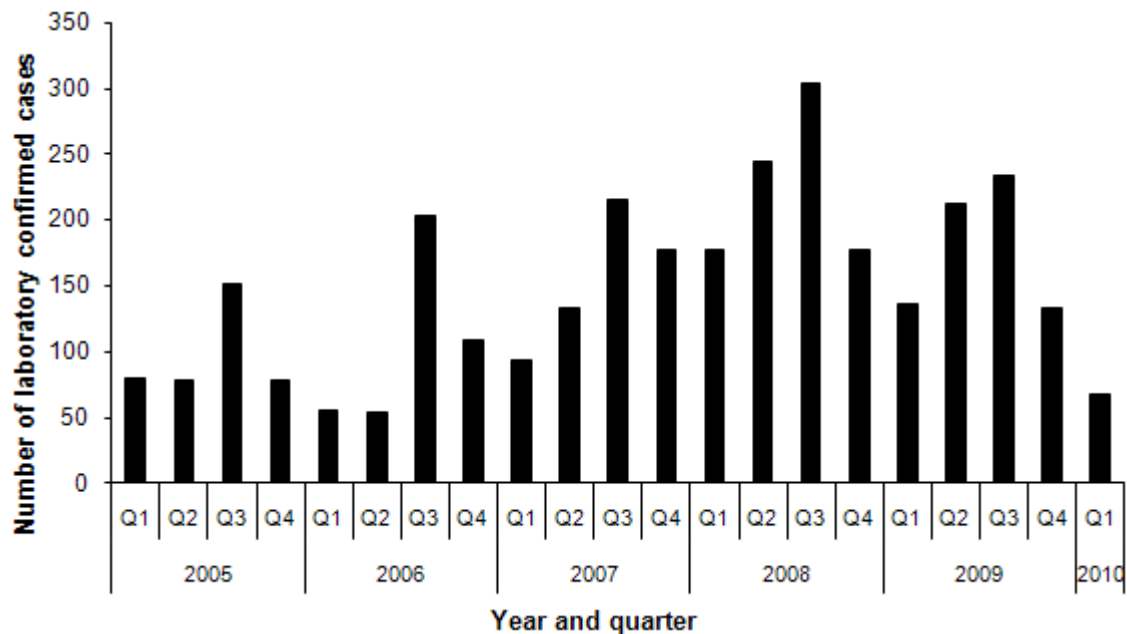
The majority of laboratory confirmed cases are in older age groups (63% total cases occurring in those aged 15 years or older). The introduction of serology testing in 2006 has led to increased testing particularly in older age groups, although rates of confirmed cases in these age groups remain relatively low [2]. More detailed explanations are provided in previous HPR articles [3].

**Table 1. Age distribution and method of laboratory confirmation of pertussis cases in England and Wales, January-March 2010\***

Age group	Culture	PCR only	Serology only	Total
<3 months	6	3	–	9
3-5 months	2	–	–	2
6-11 months	–	–	–	–
1-4 years	–	–	2	2
5-9 years	–	–	2	2
10-14 years	–	–	9	9
15+ years	–	–	43	43
Not known	–	–	1	1
<b>Total</b>	<b>8</b>	<b>3</b>	<b>57</b>	<b>68</b>

\* Data are provisional

**Figure 1. Total number of laboratory confirmed pertussis cases per evaluation quarter in England and Wales since 2005**



Since May 2010 follow-up procedures for all laboratory confirmed cases of pertussis by serology, culture and PCR have undergone revision to bring them in line with other vaccine preventable diseases. General Practitioners are now contacted directly in order to gather a minimal amount of data on the patient for surveillance purposes. HPU's will continue to be advised for information only when a patient is being followed up as part of the national surveillance of pertussis.

*Bordetella pertussis* PCR (for hospitalised cases <1 year old) and serological investigation by estimation of anti-pertussis toxin (PT) IgG antibody levels for older children and adults are provided by the Centre for Infection's Respiratory and Systemic Infection Laboratory (RSIL). The laboratory also encourages submission of all *Bordetella pertussis* isolates for confirmation and national surveillance purposes. Further information is available on the HPA website at : <http://www.hpa.org.uk/cfi/rsil/bordetella.htm>

## References

1. HPA. Laboratory-confirmed cases of pertussis reported to the enhanced pertussis surveillance programme in 2009. *Health Protection Report* 2010; **4**(25): immunisation. Available at <http://www.hpa.org.uk/hpr/archives/2010/hpr2510.pdf>.
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3. HPA. Laboratory confirmed cases of pertussis reported to the enhanced pertussis surveillance programme in 2007. *HPR* 2007; **2**(26): immunisation. Available at: <http://www.hpa.org.uk/hpr/archives/2008/hpr2608.pdf>.

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## Laboratory reports of *Haemophilus influenzae* by age group and serotype, England and Wales, April to June 2010

### Laboratory reports of *Haemophilus influenzae* by age group and serotype, England and Wales, April to June 2010 (2009)

Type	Age					Total 2010 (2009)
	<1y	1-4y	5-14y	15+	nk	
b	1 (4)	– (–)	– (–)	6(5)	– (–)	7 (9)
nc	7 (10)	2 (2)	2 (–)	61 (71)	– (–)	72 (83)
a,e,f	– (1)	2 (2)	– (1)	9 (8)	– (–)	11 (12)
not typed	1 (3)	2 (3)	1 (3)	41 (35)	– (–)	45 (44)
<b>Total</b>	<b>9 (18)</b>	<b>6 (7)</b>	<b>3 (4)</b>	<b>117 (119)</b>	<b>– (–)</b>	<b>135 (148)</b>

Figures in brackets are for the second quarter, 2009.

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## Hepatitis in England and Wales: annual reports for 2009

1a. Laboratory reports of hepatitis A infection, England and Wales, 2009

1b. *Corrigendum*: laboratory reports of hepatitis A by age, sex and quarter, 2008

2. Laboratory reports of hepatitis C, England and Wales, 2009

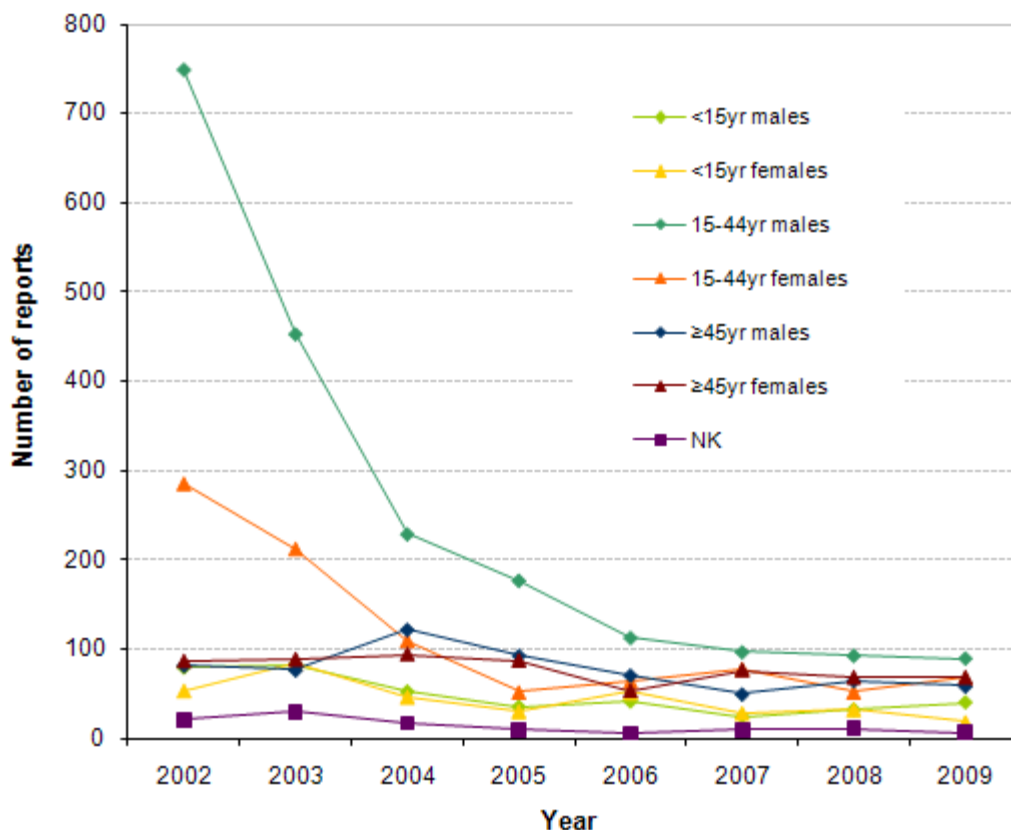
3. Acute hepatitis B in England, annual report for 2009

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### 1a. Laboratory reports of hepatitis A infection, England and Wales, 2009

There were 351 confirmed laboratory reports of hepatitis A virus (HAV) infection in England and Wales made to the Health Protection Agency in 2009. This total has fallen year on year since 2002 when there were 1357; a 74% decrease in seven years. More recently, hepatitis A laboratory report totals for England and Wales have been: 400 in 2006, 364 in 2007, and 354 in 2008. This downward trend has been most noticeable among those aged from 15 to 44 years, and in particular, among males aged from 15 to 44 years. However, there has been a general downward trend in all age groups (figure 1).

Fig. 1. Laboratory reports of hepatitis A by age and sex, England and Wales (2002-2009)



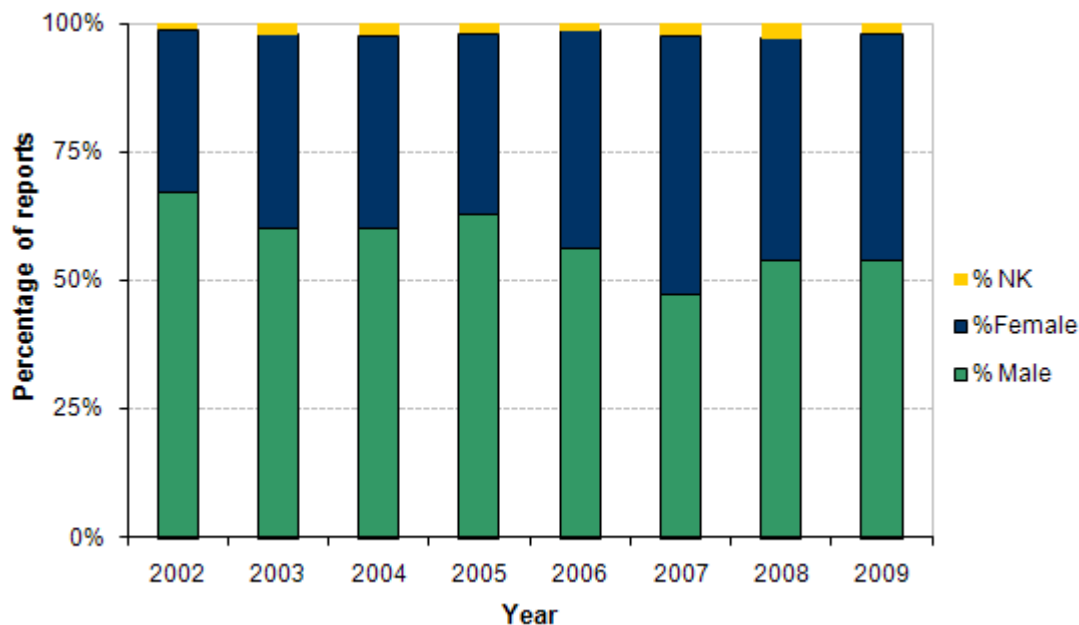
Despite the large relative decrease of laboratory reports among 15 to 44 year olds, they still account for a high proportion of the total. Forty-six percent (160/351) of HAV laboratory reports in 2009 were among those aged 15 to 44 years (table 1); the same age group accounted for 42% (150/354) and 49% (178/364) in 2008 and 2007, respectively.

**Table 1. Laboratory reports of hepatitis A by age, sex, and quarter, England and Wales, 2009**

Age group (years)	Q1			Q2			Q3			Q4			Total
	Jan-Mar			Apr-Jun			Jul-Sep			Oct-Dec			
	Male	Female	NK	Male	Female	NK	Male	Female	NK	Male	Female	NK	
<1	0	0	0	0	1	0	0	0	0	0	0	0	1
1 to 4	3	0	1	2	0	0	2	0	0	6	0	0	14
5 to 9	6	1	0	1	3	0	5	4	0	4	5	0	29
10 to 14	1	2	0	2	2	0	3	1	1	5	0	0	17
15 to 24	15	12	0	4	4	0	7	5	0	7	2	1	57
25 to 34	9	11	0	9	8	1	5	3	0	8	5	0	59
35 to 44	9	7	0	9	5	0	5	5	0	3	1	0	44
45 to 54	9	5	0	4	4	0	2	3	0	7	7	0	41
55 to 64	3	7	0	1	4	1	8	5	0	3	4	0	36
≥65	7	6	0	5	7	0	4	5	0	6	11	0	51
NK	0	0	0	0	0	1	0	0	0	0	0	1	2
<b>Total</b>	<b>62</b>	<b>51</b>	<b>1</b>	<b>37</b>	<b>38</b>	<b>3</b>	<b>41</b>	<b>31</b>	<b>1</b>	<b>49</b>	<b>35</b>	<b>2</b>	<b>351</b>

In 2009, 54% (189/351) of HAV laboratory reports from England and Wales were among males, and in 2% (7/351) the sex was not stated (similar to previous years). It is usually observed that males account for more laboratory reports of HAV than females. Every year since 2002 has had a majority of reports among males (with the exception of 2007) (figure 2). However, since 2002 there has been a slight decline in the ratio of reports among males to females, with 2002 having a ratio of 2.1:1 and 2009 of 1.2:1.

**Figure 2. Percentages of hepatitis A laboratory reports by sex, England and Wales (2002-2009)**



In 2009, the regions with the highest numbers of HAV laboratory reports were the North West (65) and the West Midlands (60). These regions have had consistently high numbers of reports since 2006 (table 2).

**Table 2: Laboratory reports of hepatitis A by region, England and Wales (2006-2009)**

Region	Year			
	2006	2007	2008	2009
East Midlands	13	13	16	10
Eastern	39	26	25	38
London	47	50	55	56
North East	12	14	5	8
North West	71	63	49	65
South East	32	37	68	48
South West	41	35	30	21
West Midlands	66	70	67	60
Wales	24	19	10	10
Yorkshire & Humberside	55	37	29	35
<b>Total</b>	<b>400</b>	<b>364</b>	<b>354</b>	<b>351</b>

There was no risk factor information reported for anything other than recent travel in 2009; only 2.8% had information on this (table 3). HAV laboratory reports are therefore extremely lacking in risk factor information – with declining information in recent years. This is reflected in the decline in the proportion of reports with travel history recorded. In 1998, 18.5% had this information, but only 2.8% in 2009. However, these small numbers have only been reached after thorough manual searching of reports. Risk factor and travel information is rarely provided (particularly in recent years), making it difficult to draw conclusions about the acquisition of HAV in England and Wales.

Despite the year on year decline of HAV laboratory reports, risk factor information is essential to better understand the epidemiology of hepatitis A virus infection in England and Wales, and consequently to further improve its control.

**Table 3: Trends in hepatitis A laboratory reports, England and Wales (2002-2009)**

Year	2002	2003	2004	2005	2006	2007	2008	2009
<b>Number of reports</b>	1357	1028	671	485	400	364	354	351
<b>Number (%) aged 15-44 years</b>	1041 (77%)	678 (66%)	348 (52%)	236 (49%)	182 (46%)	178 (49%)	150 (42%)	160 (46%)
<b>Number (%) male</b>	911 (67%)	618 (60%)	403 (60%)	305 (63%)	225 (56%)	172 (47%)	190 (54%)	189 (54%)
<b>Number (%) with travel history</b>	61 (4.5%)	41 (4.0%)	21 (3.1%)	14 (2.9%)	14 (3.5%)	13 (3.6%)	19 (5.4%)	10 (2.8%)

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### 1b. *Corrigendum*: laboratory reports of hepatitis A by age, sex and quarter, 2008

Between April 2008 and June 2009, hepatitis A laboratory reports were subject to over-reporting. The corrected data for 2008 is presented below.

#### Laboratory reports of hepatitis A by age, sex, and quarter, England and Wales, 2008

Age group (years)	Q1			Q2			Q3			Q4			Total
	Jan-Mar			Apr-Jun			Jul-Sep			Oct-Dec			
	Male	Female	NK	Male	Female	NK	Male	Female	NK	Male	Female	NK	
<1	0	0	0	0	0	0	0	0	0	0	0	0	0
1 to 4	2	3	1	3	2	0	1	0	0	3	4	0	19
5 to 9	3	0	0	3	2	0	5	5	1	4	7	0	30
10 to 14	0	0	0	1	0	0	4	4	0	3	6	0	18
15 to 24	4	5	1	4	5	0	13	8	0	16	6	0	62
25 to 34	4	0	1	5	3	0	7	7	0	15	6	1	49
35 to 44	4	3	2	4	1	0	10	6	0	7	2	0	39
45 to 54	3	2	0	3	5	0	7	5	0	10	2	0	37
55 to 64	4	4	0	3	5	0	5	4	0	2	5	0	32
≥65	5	7	2	8	13	0	5	11	1	10	5	1	68
NK	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>29</b>	<b>24</b>	<b>7</b>	<b>34</b>	<b>36</b>	<b>0</b>	<b>57</b>	<b>50</b>	<b>2</b>	<b>70</b>	<b>43</b>	<b>2</b>	<b>354</b>

## 2. Laboratory reports of hepatitis C, England and Wales, 2009

In 2009, there were 8812 confirmed laboratory reports of hepatitis C to the Health Protection Agency Centre for Infections (see table). This constitutes a 6% rise on reports in 2008 and continues the year on year increase seen since the early 1990s (with the exception of a fall in 2000/2001). These trends in the number of reports reflect the number of individuals being tested rather than the incidence of infection. Sixty-one percent (5319/8738) of HCV laboratory reports with age reported were among those aged between 25 and 44 years, slightly lower than the proportion reported in 2008 (62%; 5077/8218). As is usually observed, males accounted for a greater proportion of reports than females and this was the case for every quarter of 2009. Overall, males accounted for 69% (5901/8542) of HCV laboratory reports where the sex was known. This is equivalent to a ratio of females to males of 1:2.2, slightly higher than 1:2.1 in 2008. Forty-one percent (3639/8812) of all HCV laboratory reports in 2009 were among males aged from 25 to 44 years.

### Laboratory reports of hepatitis C by age, sex, and quarter, England and Wales, 2009\*

Age group (years)	Q1			Q2			Q3			Q4			Total
	Jan-Mar			Apr-Jun			Jul-Sep			Oct-Dec			
	Male	Female	NK	Male	Female	NK	Male	Female	NK	Male	Female	NK	
<1	1	1	0	2	2	0	0	3	0	1	2	0	12
1 to 4	1	1	0	1	2	0	1	3	0	1	3	0	13
5 to 9	1	0	0	1	2	0	2	0	1	5	0	0	12
10 to 14	0	0	0	3	1	0	3	3	0	5	0	1	16
15 to 24	79	92	3	68	69	4	61	53	6	50	51	7	543
25 to 34	429	258	21	445	183	15	388	186	18	345	179	20	2487
35 to 44	581	222	33	539	194	19	469	166	15	443	134	17	2832
45 to 54	335	151	17	325	117	8	337	108	10	307	103	14	1832
55 to 64	105	54	6	137	57	6	122	40	2	109	49	4	691
≥65	36	33	2	42	37	2	46	28	3	29	37	5	300
NK	10	5	3	15	4	2	11	4	3	10	4	3	74
<b>Total</b>	<b>1578</b>	<b>817</b>	<b>85</b>	<b>1578</b>	<b>668</b>	<b>56</b>	<b>1440</b>	<b>594</b>	<b>58</b>	<b>1305</b>	<b>562</b>	<b>71</b>	<b>8812</b>

\* Laboratory reports are not reliable for differentiating acute and chronic infections. Due to late reporting, numbers for each quarter may have changed slightly since their HPR quarterly reports.

## 3. Acute hepatitis B in England, annual report for 2009

### Introduction

Hepatitis B is a blood borne infection of the liver caused by the hepatitis B virus (HBV). The virus can provoke an acute illness characterised by nausea, malaise, abdominal pain, and jaundice but can also produce a chronic infection that is associated with an increased risk for chronic liver disease and hepatocellular carcinoma. Transmission is by parenteral exposure to infected blood and body fluids, most often through sexual contact, blood-to-blood contact and perinatal transmission from mother to child. HBV infection can be prevented by vaccination and in the UK immunisation is used for individuals at high risk of exposure to the virus or complications of the disease e.g. injecting drug users, healthcare workers. Immediate post-exposure vaccination is used to prevent infection, especially in babies born to infected mothers or following needle stick injuries. [1]

Surveillance of hepatitis B is essential to target prevention and control activities such as the immunisation programme. The Health Protection Agency (HPA) implemented national surveillance standards [1] for hepatitis B in 2007 which provided the framework for more consistent reporting of cases from Health Protection Units (HPUs). Available laboratory data can then be used to augment the epidemiological data collected from HPUs and the first report was published for 2008.

This report provides an update and presents acute hepatitis B surveillance data in 2009.

### **Methods**

The surveillance definition for acute hepatitis B [2] is: **“HBsAg [1] positive and anti-HBc IgM [1] positive and abnormal liver function tests with a pattern consistent with acute viral hepatitis.”**

As information on liver function is usually not available at Cfl, for the purpose of this analysis, cases classified as acute hepatitis by the unit or the laboratory and with a documented positive anti-HBc IgM were classified as acute infections. 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. Those classified as acute but with contradictory evidence e.g. positive hepatitis serology results dated before July 2008; were reclassified as chronic. Cases classified as chronic or those not classified where anti-HBc IgM was negative or equivocal were assumed to be chronic infections. Those cases that remained unclassified and without anti-HBc IgM results were excluded from further analysis.

HPU cases with report date (sample date was used if report date was missing) from 1 January 2009 to 31 December 2009 were matched to three laboratory datasets with a probabilistic matching programme (relink) on STATA 11, using the following variables: soundex first name, soundex surname, date of birth and sex. The three laboratory databases include all confirmed infections reported to the HPA Centre for Infections by laboratories in England and Wales (Labbase), all samples tested for hepatitis B anti-HBc IgM at the blood Borne Virus unit of the HPA Cfl and individuals tested HBsAg positive in the Sentinel Surveillance of Hepatitis testing scheme. [1] The results obtained from these three laboratory surveillance systems were used to augment laboratory results and determine final status of any matching cases reported from the HPU. A final reconciled dataset included cases classified as acute or probable acute and reported from the HPU and/or from the laboratory to the HPA Centre for Infections.

### **Results**

The HPUs reported 597 hepatitis B cases from 1 January to 31 December 2009 to the HPA Cfl. The matching and classification exercise resulted in 345 of these being confirmed as acute and 53 re-classified as probable acute cases with the remainder classified as chronic or excluded. Seven cases were re-classified from acute to chronic as they had no anti-HBc IgM result and were classified as chronic on the matched laboratory databases.

There were 5,406 hepatitis B cases reported from laboratories to Cfl for the same period, 296 (5.5%) of which were classified as acute cases, 79 (1.5%) as probable acute cases, 1533 (28%) were classified as chronic and 3498 (65%) remained unclassified.

Linking these two databases together results in a total of 597 acute or probable acute hepatitis B cases reported for England in 2009. This gives an incidence of 1.15 per 100,000 population [1], slightly lower than the 1.21 per 100,000 incidence reported for 2008 [1]. London is still the region with the highest incidence at 1.8 with the West Midlands is now the region with the lowest incidence at 0.74 per 100,000. The only region showing an increase in incidence is the North East (table 1). There is regional variation in the contribution of the different sources to the overall total. This suggests different levels of completeness of reporting by laboratories and local clinicians.

**Table 1. Acute hepatitis B cases by region and source of report, 2009 (incidence in 2008 included for reference)**

Region	HPU	Laboratory	Both	Total	Incidence of reported acute hepatitis B per 100,000 population [3] in 2009	Incidence of reported acute hepatitis B per 100,000 population in 2008
East Midlands	14	4	20	38	0.85	1.3
East of England	3	20	26	49	0.85	0.97
London	84	22	34	140	1.8	1.83
North East	14	8	11	33	1.28	0.70
North West	9	52	52	113	1.64	1.79
South East	22	28	37	87	1.03	1.00
South West	2	29	10	41	0.78	0.85
West Midlands	14	4	22	40	0.74	0.76
Yorkshire and Humberside	7	31	17	55	1.05	1.18
Not known	–	1	–	1	–	–
<b>National</b>	<b>169</b>	<b>199</b>	<b>229</b>	<b>597</b>	<b>1.15</b>	<b>1.21</b>

The majority of cases were men (61%) who had an overall incidence of 1.42 per 100,000 compared to 0.61 per 100,000 in women. Men aged 25 to 34 had the highest incidence of acute hepatitis B overall in England at 2.53 per 100,000, closely followed by the 35 to 44 age group. The incidence in children was very low (table 2).

**Table 2: Age and sex breakdown of acute hepatitis B reports, 2009 (mid-2009 population ONS)**

Age groups	Female		Male		Not known	Total	
	N	Incidence of reported acute hepatitis B per 100,000 population	N	Incidence of reported acute hepatitis B per 100,000 population		N	Incidence of reported acute hepatitis B per 100,000 population
<15	4	0.09	3	0.06	1	8	0.09
15-24	36	1.08	63	1.80	15	114	1.66
25-34	48	1.44	87	2.53	23	158	2.33
35-44	29	0.76	90	2.38	12	131	1.72
45-54	22	0.63	73	2.12	14	109	1.57
55-64	10	0.32	25	0.84	5	40	0.66
≥65	8	0.17	16	0.43	3	27	0.32
Not known	3	–	6	–	1	10	–
<b>Total</b>	<b>160</b>	<b>0.61</b>	<b>363</b>	<b>1.42</b>	<b>74</b>	<b>597</b>	<b>1.15</b>

Only 46% of acute or probable acute hepatitis B cases reported by HPUs had their ethnicity recorded. The majority of these were White at 59%, followed by Asian or Asian British ethnicity at 21% and Black or Black British at 12%.

Of the 398 acute and probable acute cases reported by HPUs, 226 (57%) had associated exposure information. The commonest reported risk factor for acute cases was heterosexual exposure, reported in 143 (63% of cases with known exposure). Injecting drug use (IDU) and homosexual exposure were the next most common risk factors, implicated in 30 (13%) and 22 (10%) cases respectively. 38 cases had health care related exposures including, surgery, dental treatment and blood transfusion, but 22 of these had other possible exposures identified. Only 11 of the 38 cases were reported to have been exposed in the UK. Two cases with a history of blood transfusion in the UK as the only risk factor were investigated by NHS Blood and Transplant and confirmed as not being transmitted through blood. Skin piercing, tattooing and acupuncture combined were listed as possible exposures for 29 cases (13%).

## Discussion

Reporting from HPUs in 2009 has continued to exceed that from laboratories within the same period demonstrating that this surveillance system can provide a reasonable yield of cases. The proportion of acute and probable acute hepatitis B cases reported by both HPU and laboratory systems have remained stable at about 38% (229/597). However, the majority of acute cases (62%) were reported independently by the HPU or laboratory, highlighting the importance of using both systems to minimise under ascertainment and compile an accurate picture of acute hepatitis B epidemiology. It is important also to note that the use of serological data especially anti-HBc IgM could also result in over estimation of acute hepatitis cases which are chronic infections with flares, where IgM levels can be detected. This is minimised by matching to historical laboratory results to ensure no previous test result was available for the same patient. Similarly, there continues to be significant misclassification of chronic cases as acute infections in both separate datasets. Given the large number of chronic cases diagnosed each year, a small proportion of cases misclassified as acute would substantially increase the estimated incidence of acute hepatitis B.

Overall, incidence has fallen slightly from 2008 but comparisons should be made with caution due to the limitations highlighted above. Risk factor data was available in 38% of cases compared to 39% in 2008. The interpretation of this data is difficult because in many instances, more than one possible exposure is listed and a 'most likely' exposure is not assigned. The data suggests that number of cases in intravenous drug use (IDUs) was only slightly higher than in 2008. The continued low incidence in this group is supported by the 2009 unlinked anonymous HIV and Hepatitis survey among IDUs which showed that anti-HBc prevalence has remained lower than any year since 1990 [8].

Apart from young children less than 15 years, there was a clear higher incidence of cases in males of all age groups in 2009. The incidence remains higher in males even if we assume that those with unknown gender are all females. This excess in male cases would also fit with a higher incidence in men who have sex with men, although only 30 cases with this exposure category were reported. As such cases are more likely to be diagnosed in GUM clinics and investigation and contact tracing conducted by GUM clinic staff, it is plausible that information reported to HPUs may be less complete for this group. The interpretation of risk factor data is also limited by the misclassification of chronic to acute cases. As most chronic cases are acquired prior to migration to the UK, this will probably result in transmission being wrongly attributed to common exposures such as heterosexual transmission or medical procedures.

In 2010, HPU reporting to Cfl will be extracted from HPzone – a software package which is now being used for case management across the HPA. Guidelines on how to extract hepatitis data for surveillance purpose have been issued by the HPA Hepatitis Leads group. It is hoped that such a system will standardise the surveillance data sent to Cfl as well as lead to better completion of the minimum dataset. Local laboratories can also now send samples from acute cases to the national reference laboratory at Cfl for genotyping of the hepatitis B virus. Avidity testing to confirm acute cases is also being developed [9]. This will contribute to outbreak detection and improved case ascertainment.

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## Annual report from the sentinel surveillance study of hepatitis testing in England: data for January to December 2009

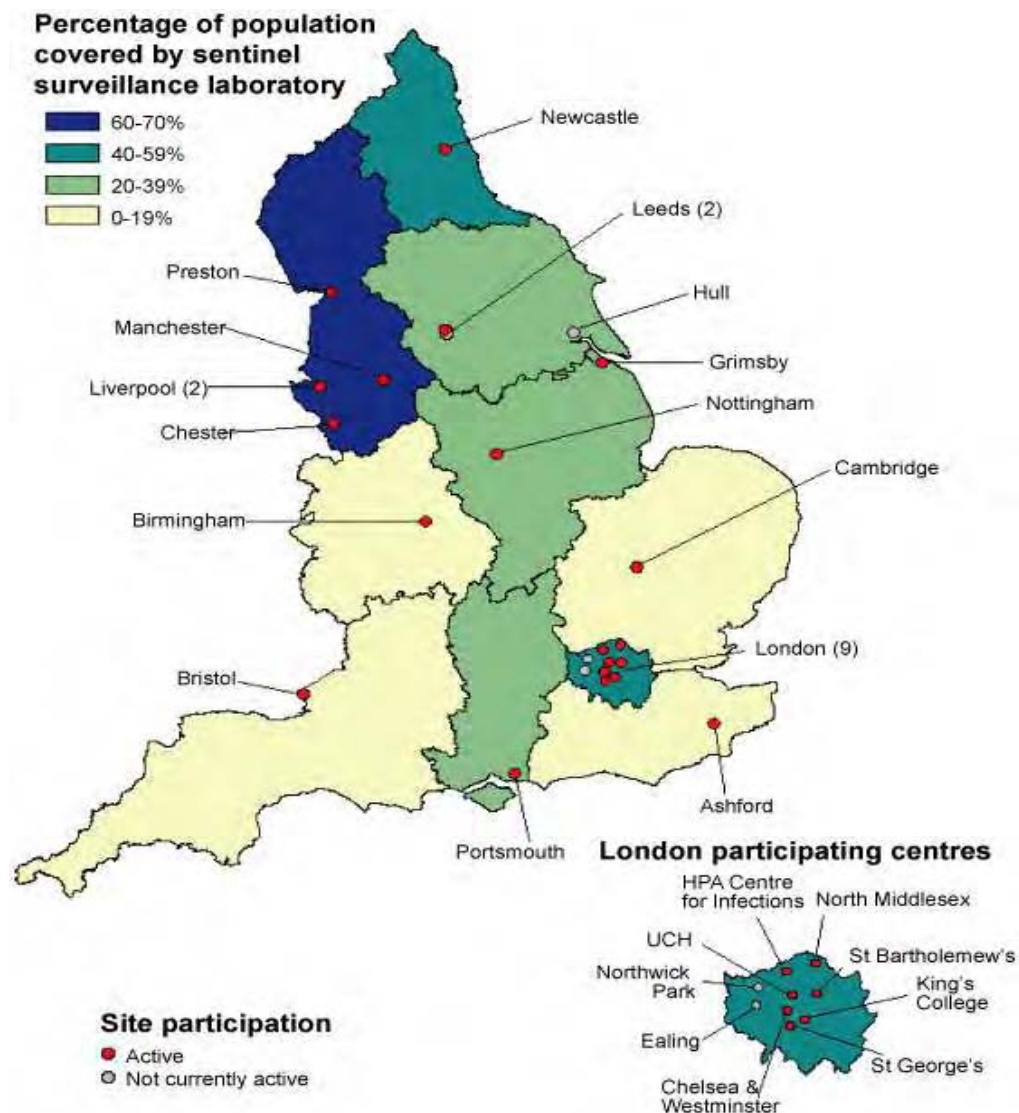
The sentinel surveillance study of hepatitis testing began in 2002. The study aims to supplement routine surveillance of hepatitis A, B and C infections in England by providing information on trends in testing, individual risk exposures and clinical symptoms. The study collects information on hepatitis A, B and C testing carried out in participating centres regardless of test result and therefore can also be used to estimate prevalence in those individuals tested.

This report provides summary data for 2009.

Duplicate patient records were identified using patient soundex, first initial and date of birth. The de-duplication process implemented and reported on in 2009 was updated in 2010 to allow de-duplication across multiple centres. Patient records were retrospectively checked to identify duplicate records which were excluded from analysis. Duplication checks are now run on a monthly basis. This has led to a slight decrease in the number of patients tested and reported as positive. The removal of duplicate patients across centres has allowed us to produce even more accurate data.

Dried blood spot testing [1] data from three sentinel centres are presented in section 4. Concateno plc has kindly made available oral fluid testing data which are presented in section 5. These data are presented for the first time in this report. Please note that testing data provided by Concateno plc represents indicative results only and is not intended to be used for diagnosis. The testing is performed to help identify those individuals that need to see a specialist and get them into treatment.

In 2009, approximately one third of the population was covered by these sentinel centres. Each region in England was included. The map below shows all the sentinel centres which have taken part in the study.



## 1. Hepatitis A IgM testing

The sentinel surveillance study collects data on testing for hepatitis A-specific IgM antibody (anti-HAV IgM), a marker of acute hepatitis A infection.

During 2009, a total of 27,277 individuals were tested at least once for anti-HAV IgM in 20 participating sentinel centres (table 1). This is the first time these individuals had been reported to the sentinel surveillance scheme. Overall, 0.6% of individuals tested for anti-HAV IgM were positive, though this varied by region with the highest proportion of positive tests in the West Midlands and London (1.0% and 0.9% respectively) (table 1).

**Table 1. Number of individuals tested, and testing positive, for anti-HAV IgM in participating centres, January – December 2009\***

Region (number of centres)	Number tested	Number positive
East Midlands (1)	4,220	5 (0.1)
East of England (1)	1,947	9 (0.5)
London (6)	5,874	54 (0.9)
North East (1) †	43	– (0)
North West (5)	4,406	31 (0.7)
South Central (1)	930	5 (0.5)
South East Coast (1)	1,411	10 (0.7)
South West (1)	3,258	18 (0.6)
West Midlands (1)	1,870	19 (1.0)
Yorkshire & the Humber (2)	3,318	14 (0.4)
<b>Total, all regions (20)</b>	<b>27,277</b>	<b>165 (0.6)</b>

\* Excludes 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.

† The low number of individuals tested in the North East is due to changes in sample referral patterns which mean that most of the testing carried out by the sentinel laboratory in this region is referred from other hospitals and is therefore excluded from these quarterly analyses.

Table 2 shows the age and gender of individuals tested, and testing positive, for anti-HAV IgM in sentinel centres January to December 2009. Age and gender were reported for the majority of people tested (>99%). Slightly more males were tested than females (55.2% males). The mean age of those tested was 46.3 years (range 0 – 105 years), whereas the mean age of those tested positive was 37.1 years (range 1 – 94 years). The highest overall percentage of individuals testing positive was among children aged 1-14 years (5.0%); however, only a small number of people were tested in this age-group.

**Table 2. Age and gender of individuals tested for anti-HAV IgM in participating centres, January – December 2009\***

Age group	Female		Male		Unknown		Total	
	Number tested	Number positive (%)	Number tested	Number positive (%)	Number tested	Number positive (%)	Number tested	Number positive (%)
Under 1 year	93	– (0)	136	– (0)	1	– (0)	230	– (0)
1-14 years	272	11 (4.0)	366	21 (5.7)	7	– (0)	645	32 (5.0)
15-24 years	1,376	12 (0.9)	1,448	11 (0.8)	29	1 (3.4)	2,853	24 (0.8)
25-34 years	1,908	11 (0.6)	2,672	19 (0.7)	58	1 (1.7)	4,638	31 (0.7)
35-44 years	1,847	10 (0.5)	3,165	9 (0.3)	51	– (0)	5,063	19 (0.4)
45-54 years	2,060	11 (0.5)	2,635	9 (0.3)	29	1 (3.4)	4,724	21 (0.4)
55-64 years	1,987	9 (0.5)	2,151	7 (0.3)	26	– (0)	4,164	16 (0.4)
≥65 years	2,432	10 (0.4)	2,463	11 (0.4)	14	– (0)	4,909	21 (0.4)
Unknown	11	– (0)	31	– (0)	9	1 (11.1)	51	1 (2.0)
<b>Total, all age groups</b>	<b>11,986</b>	<b>74 (0.6)</b>	<b>15,067</b>	<b>87 (0.6)</b>	<b>224</b>	<b>4 (1.8)</b>	<b>27,277</b>	<b>165 (0.6)</b>

\* Excludes 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.

Table 3 shows the number of individuals tested, and testing positive, for anti-HAV IgM in sentinel centres by service type January to December 2009. General practice accounted for 53.8% of all anti-HAV IgM testing and 47.3% of all individuals testing positive. The highest overall percentage of individuals testing positive were from fertility and paediatric services (6.7% and 3.0% respectively); however, only a small number of people were tested from these services.

**Table 3. Number of individuals tested, and testing positive for anti-HAV IgM in participating centres by service type, January – December 2009\***

Service type	Number tested	Number positive (%)
<b>Primary care</b>		
Accident and emergency	536	10 (1.9)
Drug dependency services	162	– (0)
General practitioner	14,666	78 (0.5)
GUM clinic	389	2 (0.5)
Occupational health	44	– (0)
Prison services	397	1 (0.3)
<b>Secondary care</b>		
Antenatal	335	1 (0.3)
Fertility services	15	1 (6.7)
General medical / surgical departments	2,800	20 (0.7)
Obstetrics and gynaecology	287	– (0)
Other ward type (known service) †	4,526	18 (0.4)
Paediatric services	571	17 (3.0)
Renal	404	1 (0.2)

Specialist liver services	818	6 (0.7)
Unspecified ward	866	9 (1.0)
Unknown	461	1 (0.2)
<b>Total</b>	<b>27,277</b>	<b>165 (0.6)</b>

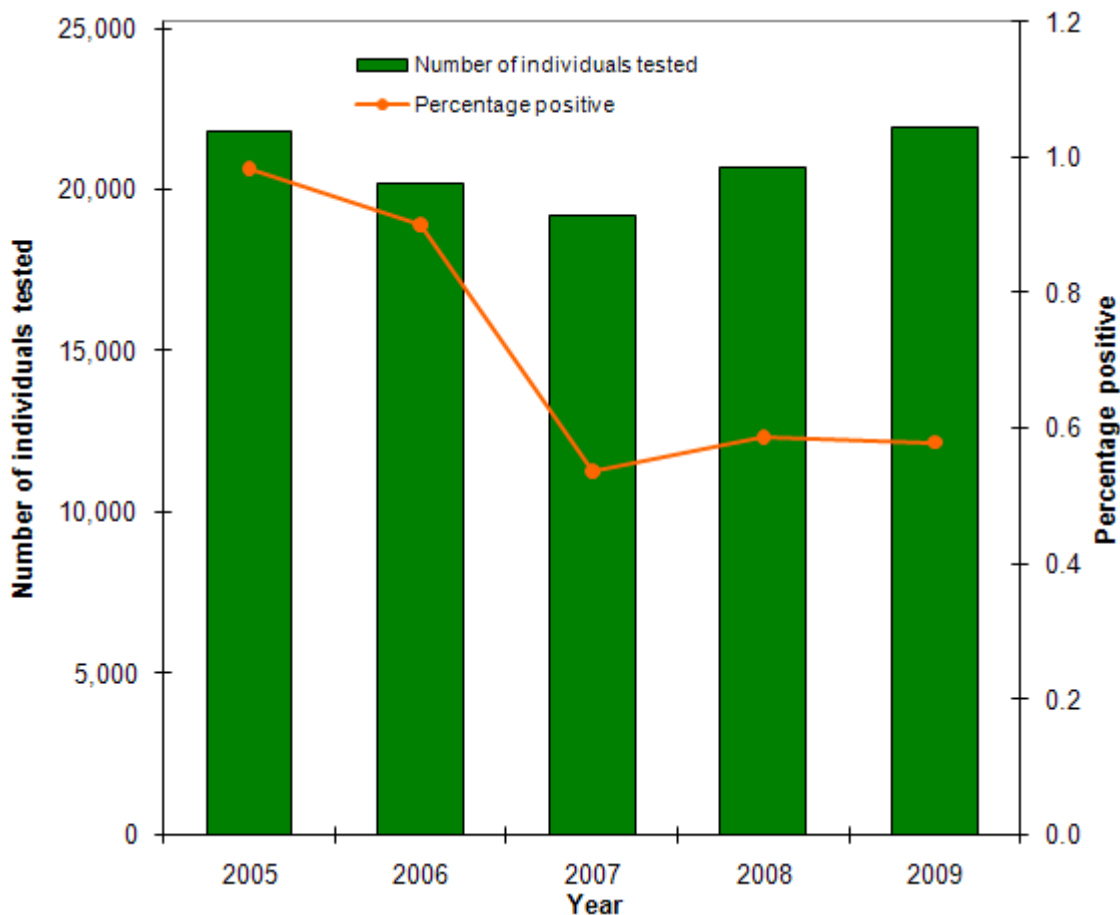
\* Excludes reference testing and testing from hospitals referring all samples. Data are de-duplicated subject to availability of date of birth, soundex and first initial. All data are provisional.

† Other ward types includes cardiology, coroner, dermatology, haematology, ultrasound, x-ray.

To provide an indication of trends in testing figure 1 shows the number of people tested for anti-HAV IgM and percentage positive over the last five years (January to December inclusive) for the 18 laboratories from which full data were available. The number of individuals tested declined slightly from 21,777 in 2005 to 19,204 in 2007 then increased to 21,935 in 2009. The proportion of individuals testing positive declined from 1.0% in 2005 to 0.5% in 2007, then remained at 0.6% during 2008 and 2009.

**Figure 1. Number of people tested for anti-HAV IgM, and percentage positive, between January 2005 and December 2009**

(Note difference in scale of axes compared with figures 2, 3, and 4)



\* Excludes 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.

## 2. Hepatitis B surface antigen (HBsAg) testing

The sentinel surveillance study collects data on HBsAg testing, as well as testing for other hepatitis B markers, such as anti-HBcIgM, HBeAg and anti-HBe, where available. Currently, individuals are not classified as having an acute or chronic infection; we are currently reviewing this data and hope to make details available in a future edition of HPR.

All pregnant women in the UK are offered hepatitis B screening as part of their antenatal care. Data from the test request location and freetext clinical details field accompanying the test request were reviewed to distinguish individuals tested for HBsAg as part of routine antenatal screening (section 2a) from those tested in other settings and for other reasons (section 2b). It is possible that some women undergoing antenatal screening may not be identified as such and may therefore be included in section 2b as non-antenatal testing.

### a) Antenatal HBsAg screening

During 2009, a total of 54,438 women were identified as undergoing antenatal testing for HBsAg in 20 participating sentinel laboratories (table 4). Of these, 0.6% (n= 312) were positive. This is the first time these women had been reported to the sentinel surveillance scheme.

Women identified as undergoing antenatal testing comprised 23.1% of all individuals tested for HBsAg in participating laboratories during 2009.

In those regions where few samples were tested (e.g. East and West Midlands) it is likely that routine antenatal screening was performed by another laboratory that does not participate in the sentinel surveillance study and that the sentinel laboratory is performing reference testing.

**Table 4. Number of individuals tested, and testing positive, for HBsAg through antenatal screening in participating laboratories, January – December 2009\***

Region (number of centres)	Number tested	Number positive
East Midlands (1)	124	11 (8.9)
East of England (1)	2,914	6 (0.2)
London (6)	13,656	151 (1.1)
North East (1)	–	– (0)
North West (5)	9,402	53 (0.6)
South Central (1)	3,823	4 (0.1)
South East Coast (1)	4,426	9 (0.2)
South West (1)	9,207	17 (0.2)
West Midlands (1)	374	10 (2.7)
Yorkshire & the Humber (2)	10,512	51 (0.5)
Total, all regions (20)	54,438	312 (0.6)

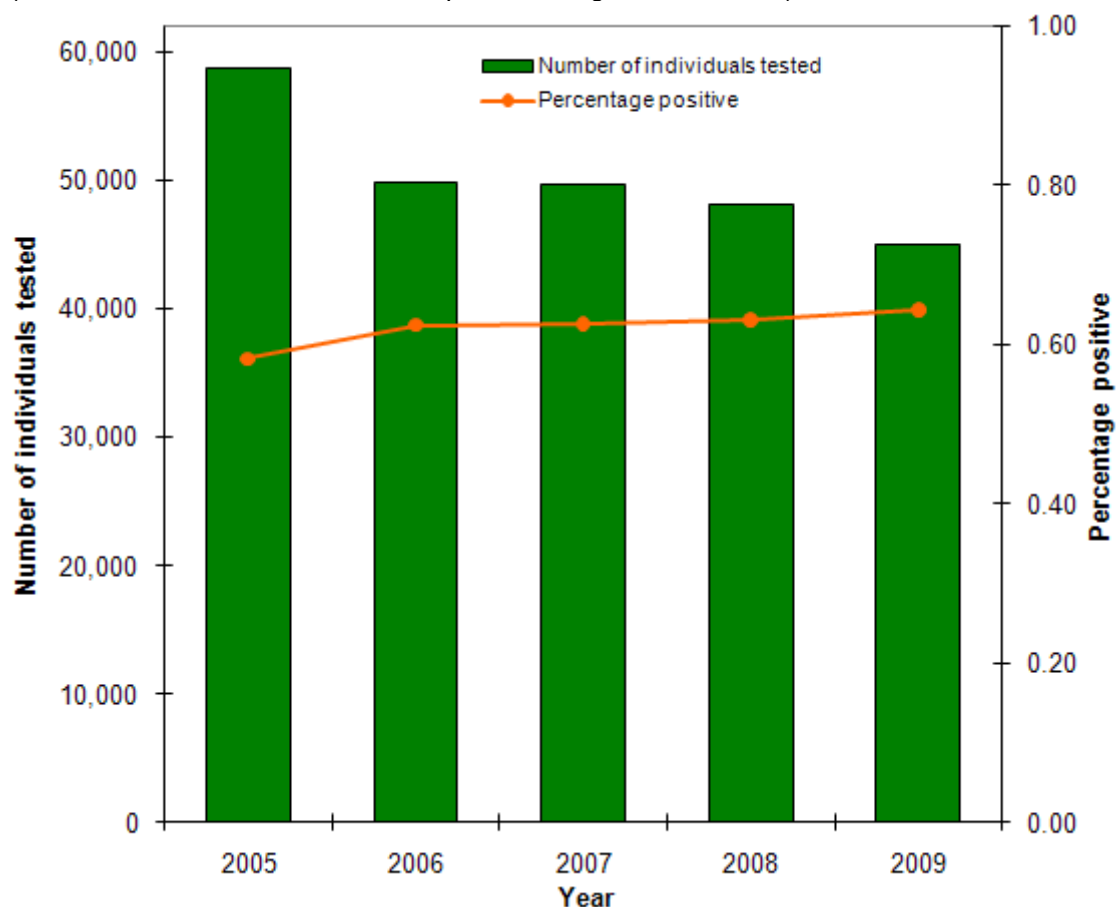
\* Includes women aged between 10 and 50 years who underwent routine antenatal testing for HBsAg. Excludes dried blood spot, oral fluid, reference testing and testing from hospitals referring all samples. Data are de-duplicated subject to availability of date of birth, soundex and first initial. All data are provisional.

Of the 312 HBsAg positive women identified, data on e-antigen status was available for 292 (93.6%); 33 (11.3%) were HBeAg positive.

To provide an indication of trends in antenatal testing figure 2 shows the number of people tested for HBsAg and percentage positive over the last five years (January to December inclusive) for the 18 laboratories from which full data were available. The number of women tested per year has declined from 58,755 in 2005 to 45,037 in 2009. The proportion of women testing positive has remained stable at 0.6%.

**Figure 2. Number of people tested for HBsAg, and percentage positive through antenatal screening, between January 2005 and December 2009**

(Note difference in scale of axes compared with figures 1, 3 and 4)



\* Includes women aged between 10 and 50 years who underwent routine antenatal testing for HBsAg. Data are de-duplicated where possible given restrictions in the identifiers provided. Data are de-duplicated subject to availability of date of birth, soundex and first initial. All data are provisional.

### **b) Non-antenatal HBsAg testing**

This includes all individuals tested for HBsAg at participating laboratories who are not identified from the test request location or the clinical details accompanying the test request as undergoing antenatal screening.

During 2009, a total of 181,114 individuals were tested for HBsAg in 20 participating sentinel laboratories, excluding antenatal testing (table 5). Of these, 1.6% (n= 2,857) were positive. This is the first time these individuals had been reported to the sentinel surveillance scheme.

London had the highest proportion of individuals testing positive (2.5%). This may reflect more targeted testing of risk groups and/or genuinely higher prevalence in people being tested in this region. Some of the HBsAg positive individuals may have acute infection; these data are currently being reviewed. However, 2,165 (75.8%) of these HBsAg positive individuals were also tested for anti-HBc IgM, of which 162 (7.5%) were anti-HBc IgM positive.

**Table 5. Number of individuals tested, and testing positive, for HBsAg in participating laboratories (excluding antenatal testing), January – December 2009\***

Region (number of centres)	Number tested	Number positive
East Midlands (1)	16,738	130 (0.8)
East of England (1)	10,534	76 (0.7)
London (6)	63,233	1,568 (2.5)
North East (1)	2,505	22 (0.9)
North West (5)	27,410	464 (1.7)
South Central (1)	6,029	62 (1.0)
South East Coast (1)	12,765	76 (0.6)
South West (1)	16,868	123 (0.7)
West Midlands (1)	7,263	145 (2.0)
Yorkshire & the Humber (2)	17,769	191 (1.1)
<b>Total, all regions (20)</b>	<b>181,114</b>	<b>2,857 (1.6)</b>

\* Excludes dried blood spot, oral fluid, reference testing and testing from hospitals referring all samples. Individuals aged less than one year are included. Data are de-duplicated subject to availability of date of birth, soundex and first initial. All data are provisional.

Excluding women identified from the test request location or clinical details as undergoing antenatal testing, similar numbers of males and females were tested for HBsAg (49.8% males) (table 6). It is possible this included some women undergoing antenatal testing that cannot be identified as such from the information provided.

The proportion testing positive for HBsAg was higher among men than women (2.0% v 1.2%). The percentage of individuals overall testing positive was highest among people aged 25 - 44 years (2.0%). The mean age of those tested was 38.0 years (range 0 – 107 years) where as the mean age of those tested positive was 36.5 years (range 0 – 106 years). The relatively high prevalence of HBsAg among tested individuals of unknown gender (1.8%) may reflect testing of individuals in settings such as prisons, drug services and GUM clinics where few demographic details on patients (such as gender) were available and where service users may be at higher risk of hepatitis B infection.

**Table 6. Age and gender of individuals tested for HBsAg in participating centres (excluding antenatal testing), January – December 2009\***

Age group	Female		Male		Unknown		Total	
	Number tested	Number positive (%)	Number tested	Number positive (%)	Number tested	Number positive (%)	Number tested	Number positive (%)
Under 1 year	290	1 (0.3)	356	2 (0.6)	10	– (0)	656	3 (0.5)
1-14 years	1,423	20 (1.4)	1,494	21 (1.4)	55	– (0)	2,972	41 (1.4)
15-24 years	21,736	180 (0.8)	15,821	248 (1.6)	903	8 (0.9)	38,460	436 (1.1)
25-34 years	26,526	348 (1.3)	24,284	637 (2.6)	831	24 (2.9)	51,641	1,009 (2.0)
35-44 years	15,867	228 (1.4)	19,919	475 (2.4)	525	13 (2.5)	36,311	716 (2.0)
45-54 years	8,575	115 (1.3)	11,598	239 (2.1)	250	5 (2.0)	20,423	359 (1.8)
55-64 years	6,054	69 (1.1)	7,708	125 (1.6)	107	1 (0.9)	13,869	195 (1.4)
≥65 years	7,394	41 (0.6)	8,733	48 (0.5)	69	– (0)	16,196	89 (0.5)
Unknown	142	– (0)	194	5 (2.6)	250	4 (1.6)	586	9 (1.5)
<b>Total, all age groups</b>	<b>88,007</b>	<b>1,002 (1.1)</b>	<b>90,107</b>	<b>1,800 (2.0)</b>	<b>3,000</b>	<b>55 (1.8)</b>	<b>181,114</b>	<b>2,857 (1.6)</b>

\* 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.

Table 7 shows the number of individuals tested, and testing positive, for HBsAg in sentinel centres by service type January to December 2009. General practice accounted for the highest proportion of individuals tested (27.9%) and 37.6% of all individuals testing positive. The highest overall percentage of individuals testing positive were from specialist liver services (3.7%).

**Table 7. Number of individuals tested, and testing positive for HBsAg in participating centres by service type (excluding antenatal testing), January – December 2009\***

Service type	Number tested	Number positive (%)
<b>Primary care</b>		
Accident and emergency	1,428	30 (2.1)
Drug dependency services	1,762	23 (1.3)
General practitioner	50,608	1,073 (2.1)
GUM clinic	44,991	607 (1.3)
Occupational health	15,048	101 (0.7)
Prison services	2,921	41 (1.4)
<b>Secondary care</b>		
Fertility services	8,301	45 (0.5)
General medical surgical departments	6,095	117 (1.9)
Obstetrics and gynaecology	4,584	36 (0.8)
Other ward type (known service) †	27,931	493 (1.8)
Paediatric services	2,148	21 (1.0)
Renal	4,848	31 (0.6)
Specialist liver services	3,459	128 (3.7)
Unspecified ward	3,532	41 (1.2)
Unknown	3,458	70 (2.0)
<b>Total</b>	<b>181,114</b>	<b>2,857 (1.6)</b>

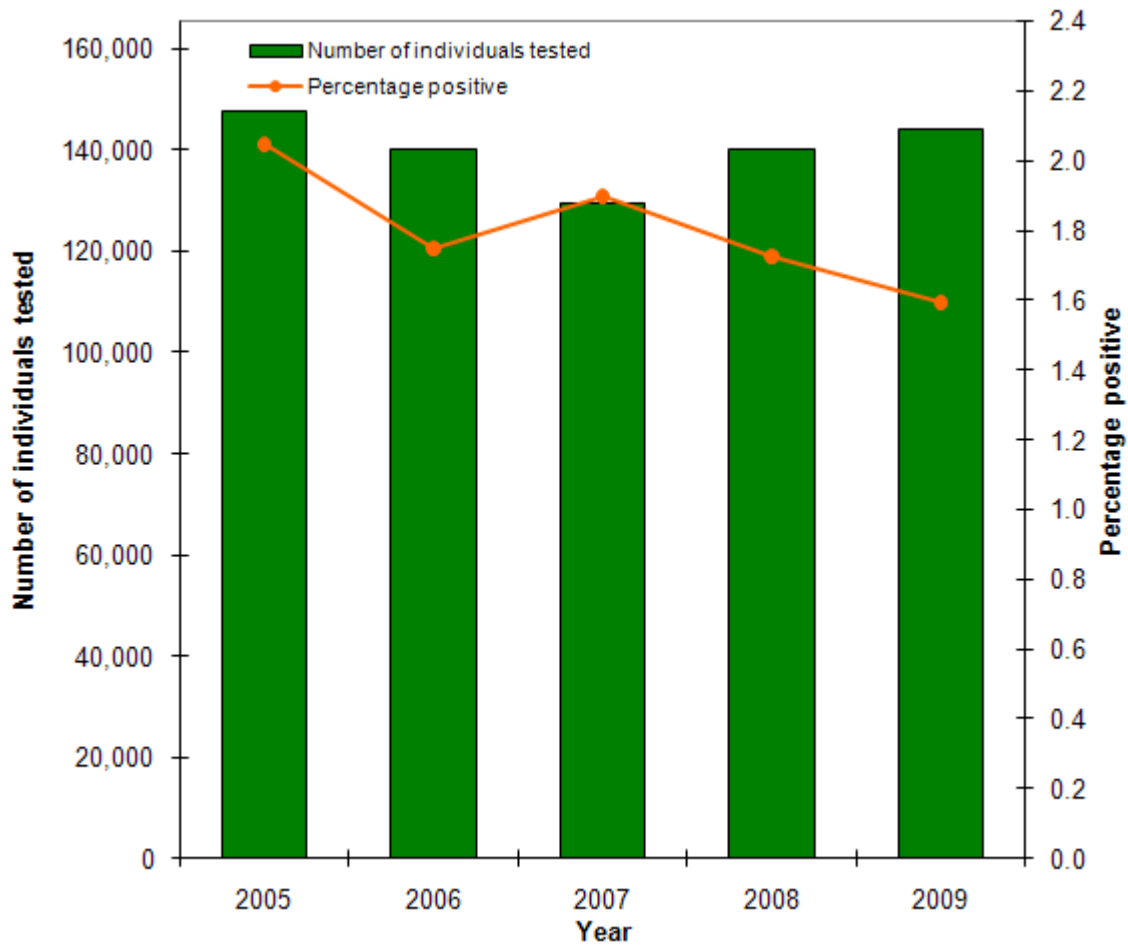
\* Excludes dried blood spot, oral fluid, reference testing and testing from hospitals referring all samples. Data are de-duplicated subject to availability of date of birth, soundex and first initial. All data are provisional.

† Other ward types includes cardiology, coroner, dermatology haematology, ultrasound, x-ray

Figure 3 shows trends in testing and percentage positive from 2005 – 2009 (January to December inclusive) for the 18 laboratories for which full data are available. The number of individuals tested declined slightly from 147,781 in 2005 to 129,631 in 2007 then increased to 143,985 in 2009. The proportion of individuals testing positive has declined overall from 2.0% in 2005 to 1.6% in 2009.

**Figure 3. Number of people tested for HBsAg, and percentage positive, (excluding antenatal testing) between January 2005 and December 2009**

(Note difference in scale of axes compared with figures 1, 2 and 4)



\* 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.

### 3. Hepatitis C testing

During 2009, a total of 151,543 individuals were tested at least once for hepatitis C-specific antibodies (anti-HCV) in 20 participating sentinel centres (table 8). This is the first time these individuals had been reported to the sentinel surveillance scheme.

Overall, 2.7% of individuals tested for anti-HCV were positive, though this varied by region with the highest proportion of positive tests in the North West (table 8). This may reflect more targeted testing of risk groups and/or genuinely higher prevalence in people being tested in this region.

It is important to note that no laboratory methods are currently available to distinguish between acute or chronic hepatitis C virus infections. These positive anti-HCV results do not therefore necessarily represent incident infections.

**Table 8. Number of individuals tested, and testing positive, for anti-HCV in participating centres, January – December 2009\***

Region (number of centres)	Number tested	Number positive
East Midlands (1)	14,469	264 (1.8)
East of England (1)	6,792	140 (2.1)
London (5)	48,399	1,188 (2.5)
North East (1)	2,061	42 (2.0)
North West (6)	26,755	1,124 (4.2)
South Central (1)	4,252	61 (1.4)
South East Coast (1)	12,414	190 (1.5)
South West (1)	14,526	476 (3.3)
West Midlands (1)	6,066	130 (2.1)
Yorkshire and Humberside (2)	15,809	437 (2.8)
<b>Total, all regions (20)</b>	<b>151,543</b>	<b>4,052 (2.7)</b>

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

Of the 4,052 individuals testing positive for anti-HCV during 2009, 2,773 (64.1%) were also tested for HCV RNA by PCR (qualitative and/or quantitative). Of these individuals, 1,950 were HCV PCR positive (70.3%).

Gender was reported for the majority of people tested. Similar numbers of males and females were tested (52.6% males) (table 9); however the proportion of males testing positive was higher (3.3% vs 2.0%). The mean age of those tested was 39.6 years (range 1 – 107 years), the mean age of those tested positive was 41.1 years (range 1 – 100 years). The largest group tested were aged 35–44 years (n= 1,320). The percentage of individuals overall testing positive was highest among 45 –54 year olds (4.6%). The high proportion of individuals with unknown age testing positive (4.3%) may reflect testing of individuals in settings such as prisons, drug services and GUM clinics where few demographic details on patients were available and where service users may be at high risk of hepatitis C infection.

**Table 9. Age and gender of individuals tested for anti-HCV in participating centres, January – December 2009\***

Age group	Female		Male		Unknown		Total	
	Number tested	Number positive (%)	Number tested	Number positive (%)	Number tested	Number positive (%)	Number tested	Number positive (%)
1-14 years	1,057	7 (0.7)	1,082	5 (0.5)	30	– (0)	2,169	12 (0.6)
15-24 years	16,059	133 (0.8)	12,928	89 (0.7)	699	3 (0.4)	29,686	225 (0.8)
25-34 years	18,083	419 (2.3)	20,850	684 (3.3)	693	17 (2.5)	39,626	1,120 (2.8)
35-44 years	13,286	371 (2.8)	18,657	925 (5.0)	460	24 (5.2)	32,403	1,320 (4.1)
45-54 years	7,685	239 (3.1)	10,770	602 (5.6)	197	10 (5.1)	18,652	851 (4.6)
55-64 years	5,735	107 (1.9)	6,978	225 (3.2)	84	3 (3.6)	12,797	335 (2.6)
≥65 years	7,350	80 (1.1)	8,262	82 (1.0)	61	4 (6.6)	15,673	166 (1.1)
Unknown	99	5 (5.1)	180	16 (8.9)	258	2 (0.8)	537	23 (4.3)
<b>Total, all age groups</b>	<b>69,354</b>	<b>1,361 (2.0)</b>	<b>79,707</b>	<b>2,628 (3.3)</b>	<b>2,482</b>	<b>63 (2.5)</b>	<b>151,543</b>	<b>4,052 (2.7)</b>

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

Table 10 shows the number of individuals tested, and testing positive, for anti-HCV in sentinel centres by service type January to December 2009. General practice accounted for 26.5% of all anti-HCV testing and 30.4% of all individuals testing positive. The highest overall percentage of individuals testing positive was from drug dependency services (22.7%) and prison services (15.9%).

**Table 10. Number of individuals tested, and testing positive for anti-HCV in participating centres by service type, January – December 2009\***

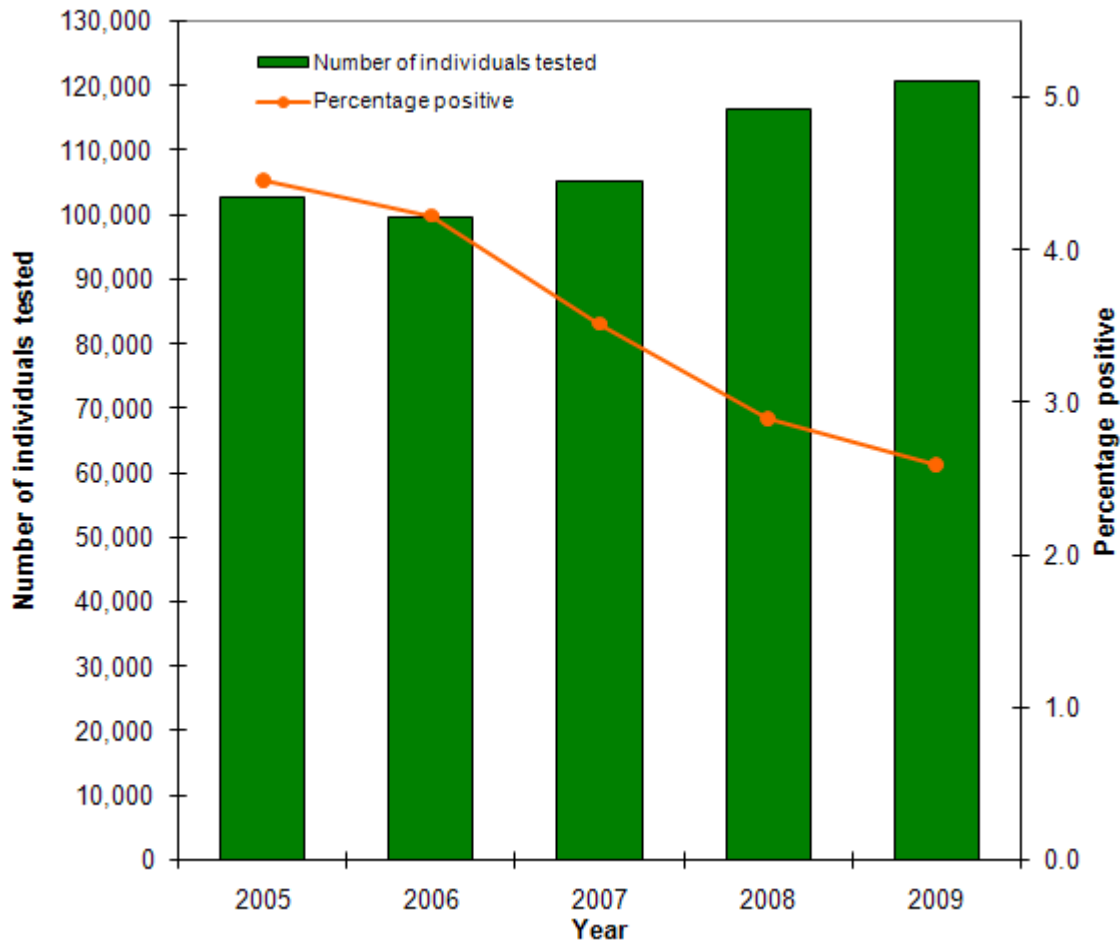
Service type	Number tested	Number positive (%)
<b>Primary care</b>		
Accident and emergency	1,362	52 (3.8)
Drug dependency services	2,036	463 (22.7)
General practitioner	40,203	1,233 (3.1)
GUM clinic	32,281	504 (1.6)
Occupational health	12,731	39 (0.3)
Prison services	3,311	527 (15.9)
<b>Secondary care</b>		
Antenatal	1,256	46 (3.7)
Fertility units	9,766	35 (0.4)
General medical surgical departments	6,193	199 (3.2)
Obstetrics & gynaecology	2,561	55 (2.1)
Other hospital services †	23,737	543 (2.3)
Paediatric services	1,480	13 (0.9)
Renal units	4,923	44 (0.9)
Specialist liver services	3,515	174 (5.0)
Unknown hospital services	3,641	65 (1.8)
Unknown service type	2,547	60 (2.4)
<b>Total</b>	<b>151,543</b>	<b>4052 (2.7)</b>

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

† Other ward types includes cardiology, coroner, dermatology haematology, ultrasound, x-ray.

Figure 4 shows the number of people tested for anti-HCV and percentage positive over the last five years (January to December inclusive) for the 18 laboratories from which full data were available. The number of individuals tested for anti-HCV declined slightly from 102,686 in 2005 to 99,588 in 2006 then increased to 120,552 in 2009. The proportion of individuals testing positive has declined year on year from 4.5% in 2005 to 2.6% in 2009.

**Figure 4. Number of people tested for anti-HCV, and percentage positive, between January 2005 and December 2009** (Note difference in scale of axes compared with figures 1, 2, and 3)



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

#### 4. Dried blood spot testing

Three sentinel centres provide dried blood spot testing facilities. These data are described here for the first time. Data are shown by region of the requesting clinician.

##### a) HBsAg testing

During 2009, a total of 1,404 individuals were tested at least once for HBsAg by dried blood spot testing (table 11). Overall, 1.6% (n=23) of individuals tested were positive, though this varied by region. This is the first time these individuals had been reported to the sentinel surveillance scheme. More males were tested than females (65.4% males), most of the individuals testing positive were male (18/21). The mean age of individuals tested was 35.5 years (range 1 –93 years); the mean age of those testing positive was 38.6 (range 19–82 years).

**Table 11. Number of individuals tested, and testing positive, for HBsAg by dried blood spot (sentinel surveillance laboratories only), January – December 2009\***

Region of test request	Number tested	Number positive
East Midlands	28	– (0)
East of England	122	2 (1.6)
London	58	2 (3.4)
North East	359	6 (1.7)
North West	429	8 (1.9)
South Central	132	1 (0.8)
South East Coast	220	2 (0.9)
South West	–	– (0)
West Midlands	56	2 (3.6)
Yorkshire & the Humber	–	– (0)
<b>Total, all regions</b>	<b>1,404</b>	<b>23 (1.6)</b>

\* Dried blood spot testing only. Data are de-duplicated subject to availability of date of birth, soundex and first initial. All data are provisional.

##### b) Anti-HCV testing

During 2009, 1,842 individuals underwent DBS testing for anti-HCV, of whom 22.2% tested positive, though this varied by region (table 12). This is the first time these individuals had been reported to the sentinel surveillance scheme. Males accounted for 68.5% of those tested (1,157) and 70.8% of those tested positive (264). The mean age of individuals tested was 35.6 years (range 11 - 93 years); the mean age of those testing positive was 37.9 (range 13 - 63 years).

Of the 418 individuals testing positive for anti-HCV during 2009, 378 (92.4%) were also tested for HCV RNA by qualitative PCR, using the DBS sample). Of these individuals, 198 were HCV PCR positive (52.4%).

**Table 12. Number of individuals tested, and testing positive, for anti-HCV by dried blood spot, January – December 2009\***

Region of test request	Number tested	Number reactive (%)
East Midlands	25	6 (24.0)
East of England	150	59 (39.3)
London	42	6 (14.3)
North East	276	33 (12.0)
North West	939	267 (28.4)
South Central	92	4 (4.3)
South East Coast	223	29 (13.0)
South West	–	– (0)
West Midlands	66	5 (7.6)
Yorkshire & the Humber	29	9 (31.0)
<b>Total, all regions</b>	<b>1,842</b>	<b>418 (22.7)</b>

\* Dried blood spot testing only. Data are de-duplicated subject to availability of date of birth, soundex and first initial. All data are provisional.

### 5. Anti-HCV oral fluid testing

Aggregate oral fluid testing data have been provided by Concateno Plc. These data are described here for the first time. Data are shown by region of the requesting clinician.

During the first quarter of 2010, 1,276 individuals were tested at least once for hepatitis C-specific antibodies (anti-HCV) by oral fluid, of whom 13.1% (n=167) had a reactive test result.

**Table 13. Number of individuals tested, and testing reactive, for anti-HCV by oral fluid, January – December 2009\***

Region of test request	Number tested	Number reactive (%)
East Midlands	1,738	251 (14.4)
East of England	338	43 (12.7)
London	584	58 (9.9)
North East	340	28 (8.2)
North West	37	15 (40.5)
South Central	77	18 (23.4)
South East Coast	32	1 (3.1)
South West	130	29 (22.3)
West Midlands	83	15 (18.1)
Yorkshire & the Humber	1,696	351 (20.7)
<b>Total, all regions</b>	<b>5,055</b>	<b>809 (16.0)</b>

\* Oral fluid testing only. Some duplication of patients may occur as only aggregate numbers are supplied by Concateno Plc. therefore duplication checks could not be made and some patients may have been tested more than once during the time period. All data are provisional.

### References

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3. Health Protection Agency. Quarterly report from the sentinel surveillance study of hepatitis testing in England: data for April to June 2009 (quarter 2). *Health Protection Report* 2009; **3**(42): immunisation. Available at: <http://www.hpa.org.uk/hpr/archives/2009/hpr4209.pdf>.
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5. Judd A, Parry J, Hickman M, McDonald T, Jordan L, Lewis K, et al. Evaluation of a modified commercial assay in detecting antibody to hepatitis C virus in oral fluids and dried blood spots. *J Med Virol* 2003; **71**(1): 49–55.

## Laboratory confirmed cases of measles, mumps and rubella, England and Wales: April to June 2010

Data presented here are for the second quarter of 2010 (i.e. April to June 2010). Cases include those confirmed by CfI oral fluid testing (IgM antibody tests and/or PCR) and national routine laboratory reports (table 1). Analyses are by date of onset. Regional breakdown figures relate to Government Office Regions rather than regional health authorities (pre-April 2002 definitions).

Quarterly figures for cases confirmed by oral fluid antibody detection only from 1995 and annual total numbers of confirmed cases by health region and age are available from:

[http://www.hpa.org.uk/web/HPAweb&HPAwebStandard/HPAweb\\_C/1195733778332](http://www.hpa.org.uk/web/HPAweb&HPAwebStandard/HPAweb_C/1195733778332)

[http://www.hpa.org.uk/web/HPAweb&HPAwebStandard/HPAweb\\_C/1195733841496](http://www.hpa.org.uk/web/HPAweb&HPAwebStandard/HPAweb_C/1195733841496)

[http://www.hpa.org.uk/web/HPAweb&HPAwebStandard/HPAweb\\_C/1195733752351](http://www.hpa.org.uk/web/HPAweb&HPAwebStandard/HPAweb_C/1195733752351)

**Table 1. Total confirmed cases of measles, mumps and rubella, and oral fluid IgM antibody tests in notified cases: weeks 14-26/2010**

	Notified cases	Confirmed cases						
		Oral fluid testing				Confirmed infections	Other samples	Total
		Number tested	% tested	Total positive	Recently vaccinated			
<b>Measles</b>	736	639	86.8	82	14	68	54	<b>122</b>
<b>Mumps</b>	3665	2257	61.6	1050	4	1046	285	<b>1331</b>
<b>Rubella</b>	220	183	83.2	7	3	4	3	<b>7</b>

### Measles

One hundred and twenty two cases of measles were confirmed with onset dates in the second quarter of 2010, compared to thirteen in the first quarter of 2010 [1]. Most of the cases this quarter were in three English regions (London 38, East of England 28, and North West 21) and were associated with outbreaks in schools and communities.

Measles infection was diagnosed in four cases with history of recent travel to South Africa and additional five cases reporting travel to other places in the world: Dubai (2 cases), India (1 case), Afghanistan (1 case) and France (1 case).

Eighty eight cases (72%) were confirmed in children (range 4 months to 18 years): 10 under one year; 34 aged 1 to 4 years; 13 aged 5 to 9 year, 22 aged 10 to 14 years; 9 aged 15 to 18 years. The remaining 34 were adults aged 19 to 55 years. Only three of the cases reported receiving a measles containing vaccine.

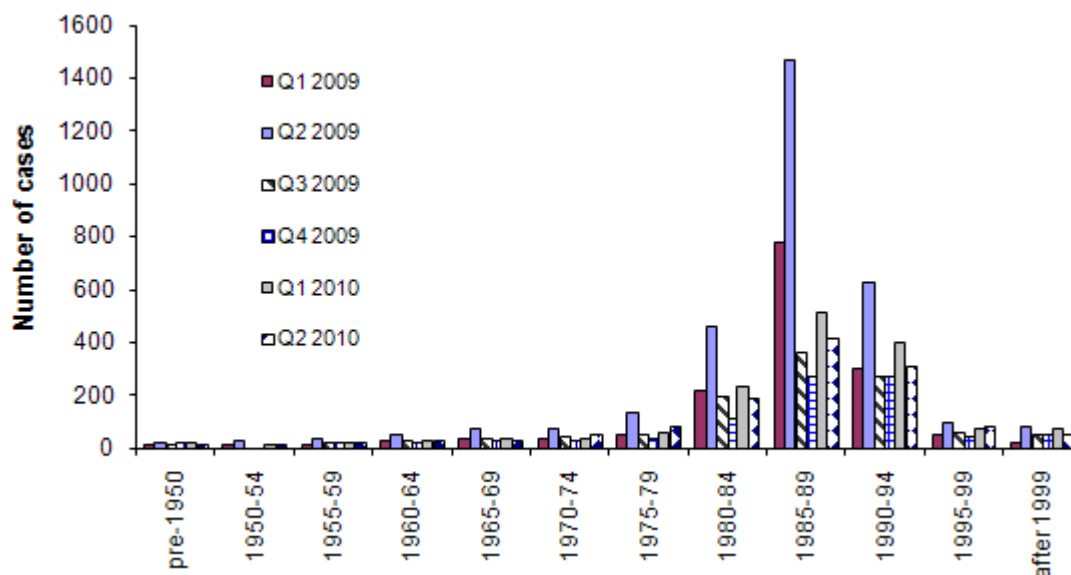
### Mumps

One thousand three hundred and thirty one confirmed mumps cases with onset dates in the second quarter of 2010 were reported compared to 1583 in the previous quarter [1]. Cases continue to occur predominantly in individuals born between 1980 and 1990, many of whom either were not routinely offered MMR vaccination in childhood, or have only received one dose (table 2 and figure) [2].

**Table 2. Confirmed cases of mumps by age group and region, England and Wales: weeks 01-13/2010**

Region	Age group								Total
	<1	1-4	5-9	10-14	15-19	20-24	25+	N/k	
North East	–	–	1	1	12	23	10	1	<b>48</b>
North West	–	5	5	13	45	60	58	1	<b>187</b>
Yorkshire & Humber	–	7	4	6	31	50	41	–	<b>139</b>
East Midlands	–	–	4	4	19	20	15	–	<b>62</b>
West Midlands	–	2	1	3	14	13	20	1	<b>54</b>
East of England	–	–	–	8	25	29	58	–	<b>120</b>
London	–	6	3	19	49	88	100	1	<b>266</b>
South East	–	1	6	18	58	90	68	–	<b>241</b>
South West	–	6	2	9	41	72	45	–	<b>175</b>
Wales	–	1	–	2	11	13	12	–	<b>39</b>
<b>Total</b>	<b>–</b>	<b>28</b>	<b>26</b>	<b>83</b>	<b>305</b>	<b>458</b>	<b>427</b>	<b>4</b>	<b>1331</b>

**Number of laboratory confirmed mumps cases in England and Wales by year of birth and quarter**



### Rubella

Seven laboratory confirmed cases of rubella were reported in the second quarter of 2010. The age range of the infected individuals ranged between 22 and 57 years. Three of the cases were in females, two tourists from China and one woman who has recently travelled to South Africa. None were pregnant during illness.

### References

1. HPA. Laboratory confirmed cases of measles, mumps and rubella, England and Wales : January to March 2010. *Health Protection Report HPR 2010* [cited 28 May 2010]; **4**(8): immunisation. Available at: <http://www.hpa.org.uk/hpr/archives/2010/hpr2110.pdf>.
2. HPA. Laboratory confirmed number of mumps cases in England and Wales: update to end-November 2009 *Health Protection Report HPR 2010* [cited 15 January 2010]; **4**(2): news. Available at: <http://www.hpa.org.uk/hpr/archives/2010/news0210.htm#mmps>.