



Health Protection Report

weekly report

Volume 3 Number 42 Published on: 23 October 2009

Current News

- ▶ National increase in *Salmonella* Enteritidis Phage Type 14b infections in England
- ▶ Gastroenteritis associated with travel to Turkey
- ▶ Pandemic influenza: UK situation at 22 October 2009

Infection Reports

Immunisation

- ▶ Quarterly report from the sentinel surveillance study of hepatitis testing in England: data for April to June 2009 (quarter 2)
- ▶ Transfusion-transmitted infections reported to the NHSBT/HPA Epidemiology Unit in 2008

News

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-

National increase in *Salmonella* Enteritidis Phage Type 14b infections in England

This report outlines an upsurge that has been noted since mid August in the number of non-travel human isolates of *Salmonella* Enteritidis PT14b. Most non typhoidal *Salmonella* infections, of which there are over 2500 serotypes that cause gastroenteritis, are caused by *S. Enteritidis*, and *S. Enteritidis* accounted for 43% of all *Salmonella* infections in England and Wales during 2008.

Illness normally occurs 12-48 hours (range 5-72 hours) after the ingestion of this bacterium and is characterised by non-bloody diarrhoea, nausea, vomiting, fever and abdominal pain. Diagnosis is by the isolation of the bacterium from samples of faeces, usually taken during the symptomatic period, and also from blood or other body fluids where systemic illness has occurred. Carriage and shedding of the organisms may occur for up to one year in children under five (median 10 weeks) and for up to 12 weeks (median 4 weeks) in older patients.

Antimicrobial chemotherapy is recommended for invasive disease but not in uncomplicated gastroenteritis and treatment may prolong carriage of this bacterium. Some strains of this bacterium have outstanding properties for acquiring resistance to antimicrobial agents which are used in both human and veterinary medicine as well as in animal husbandry. Increased resistance to antimicrobial agents in *Salmonella* has reduced the effective therapeutic options for human medicine for treating systemic infections.

Transmission occurs by eating contaminated food, mainly of animal origin, or by faecal contamination from an infected person or animal. Risk factors for *S. Enteritidis* infection include the consumption of contaminated poultry meat and eggs, and from the handling of contaminated raw poultry meat and eggs and cross-contamination to other ready-to-eat food products. About 45% of cases are associated with overseas travel.

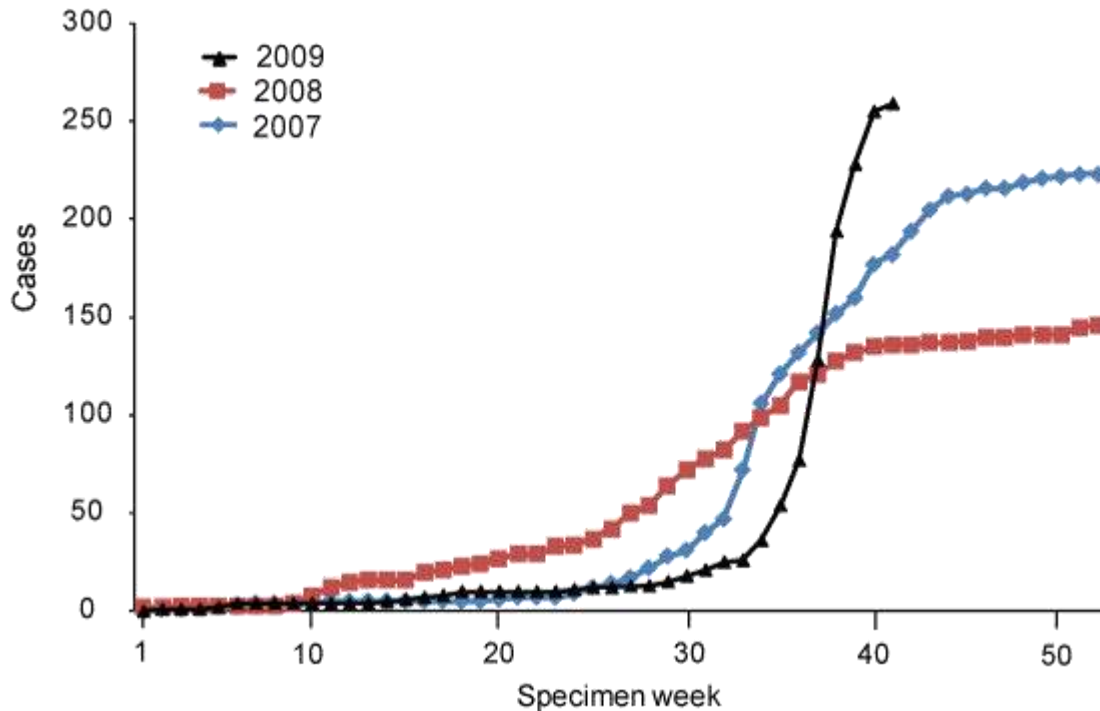
Current situation

The upsurge that is currently being investigated has been dominated by an antibiotic resistance profile, with 259 of those cases reported by the Laboratory of Gastrointestinal Pathogens in 2009 having resistance to naladixic acid and low level resistance to ciprofloxacin (NxCpl) compared to 136 cases in 2008.

Eight *S. Enteritidis* PT 14b NxCpl outbreaks have also been reported to the HPA during August and September in England, and one has occurred in Wales in late September. The earliest date of onset for these outbreaks was 17 August 2009. Five of the nine outbreaks have been linked to oriental restaurants, three were linked to other restaurant establishments, and one took place in a care home. These nine outbreaks are also above the level that might be expected, and this would appear to indicate significant exposure to this bacterium through a widespread common food source across several parts of the country. There are also other foodborne outbreaks of *S. Enteritidis* of different phage types that are being concurrently investigated to determine if these are linked or not to the PT 14b NxCpl outbreaks.

A total of 130 cases have been associated with the nine outbreaks, which have ranged in size from two to 68 cases. Seventy seven of the 130 cases have been confirmed as having *S. Enteritidis* PT 14b, and three have been hospitalized. In one outbreak (in a care home), deaths have been reported in two elderly people infected with *S. Enteritidis* PT 14b. Post mortem investigations have been conducted and the results inconclusive. Inquests have been ordered into both deaths.

Cumulative incidence (weekly) of non-travel related NxCpl resistant *Salmonella* Enteritidis PT14b by year, 2007-2009



Actions taken

All of the outbreaks have been investigated by the HPA or, in one instance, by Wales NPHS. Preliminary investigations have suggested putative links to chicken and/or eggs in some outbreaks, and this is being actively tested through analytical epidemiological studies and appropriate investigation of supply chains

A standard national protocol and guidance for the management and investigation of *S. Enteritidis* PT 14b outbreaks by the HPA National Outbreak Control Team (led by the Centre for Infections) has been prepared, disseminated and is in use across the Agency, ie by the Centre for Infections, Local and Regional Services Division, and the Regional Microbiology Network. Both local point source outbreaks and sporadic human cases of infection are being investigated. Investigation of sporadic human cases of infection started on 12 October 2009. The Food Standards Agency, Department for Environment, Food and Rural Affairs, Department of Health, and the Local Authorities Co-ordinators of Regulatory Services have been informed.

Gastroenteritis associated with travel to Turkey

During the summer of 2009, a large cluster of cases of gastroenteritis, of mixed aetiology, has been detected in travellers returning from a hotel complex in the resort of Sarigerme, south west Turkey. Active surveillance was initiated in mid-September following a series of ad hoc reports of cases received from late August onwards.

As of 21 October 2009, a total of 87 cases of gastroenteritis have been detected in England and Wales with onset dates in May (two cases) June (one), July (13), August (34), September (32), and October (five). Sixty-six of the cases (76%) are children aged 14 years and under. Both *Salmonella* Enteritidis and *Cryptosporidium* spp have been isolated in most cases, with many (28%) infected with both organisms. The breakdown of organisms isolated is detailed in table 1.

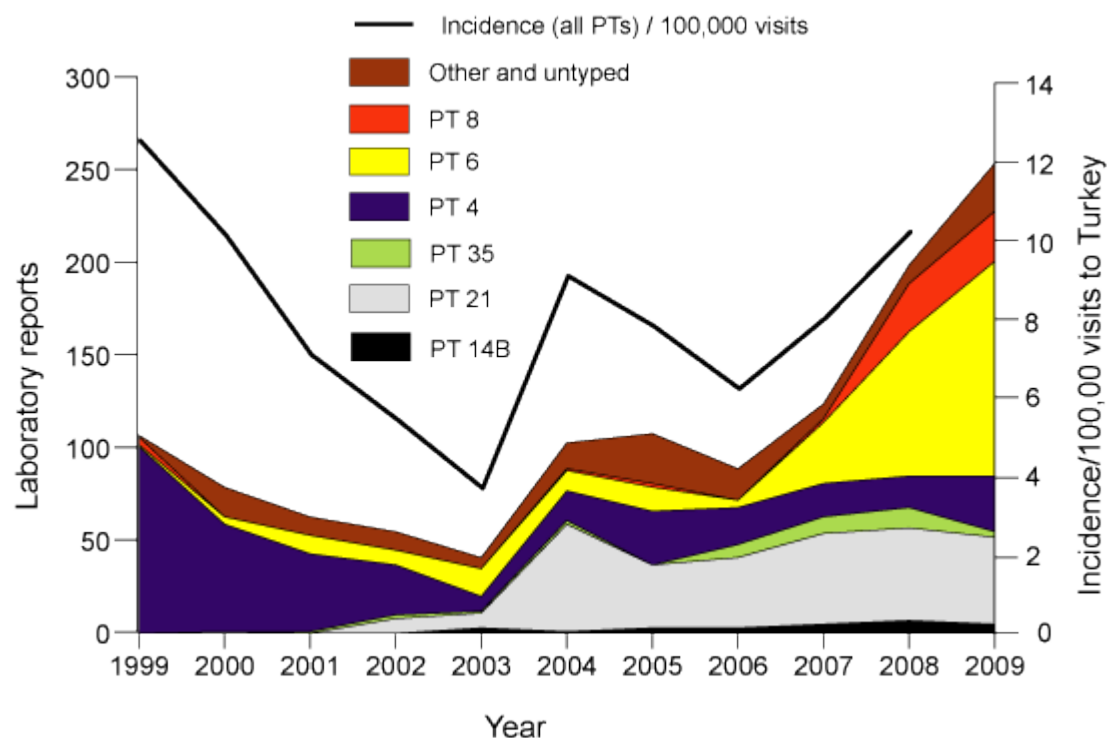
Table 1. Organisms isolated from cases of gastroenteritis associated with staying at a hotel complex in Turkey (onset dates May to October 2009)

Organism	Infection with single organism	Co-infection with <i>Cryptosporidium</i>	Co-infection with <i>Campylobacter</i>	Total
S. Enteritidis PT6	13	14	1	28
S. Enteritidis PT 21	8	8	-	16
S. Enteritidis PT 14B	1	-	-	1
S. Enteritidis untyped	1	1	-	2
S. Enteritidis subtotal	23	23	1	47
<i>Salmonella</i> sp (untyped)	6	1	-	7
<i>Campylobacter</i>	2	-	-	2
<i>Cryptosporidium</i>	31	-	-	31
Total	62	24	1	87

There were a number of anecdotal reports of gastrointestinal illness in travellers returning from the same resort during the summer of 2008 [1]. At that time 15 confirmed cases of *S. Enteritidis* PT6 were reported.

There has been an increase in laboratory reports of *Salmonella* Enteritidis (in particular *S. Enteritidis* PT 6) associated with recent travel to Turkey as a whole [figure 1] as well as a slight increase in the incidence of *S. Enteritidis* per 100,000 visits to Turkey up to 2008. The number of reports of *Cryptosporidium* spp associated with travel to Turkey has also increased slightly in 2008 and 2009. However, it must be noted that travel history for *Cryptosporidium* spp is very under reported, making interpretation of these data problematic.

Figure 1. Laboratory reports of *Salmonella* Enteritidis in England, Wales and Northern Ireland associated with recent travel to Turkey: 1999 to 15 October 2009



An independent environmental health consultancy, on behalf of the associated tour operator, conducted an audit of the hotel in August 2009 and no major breakdowns in hotel hygiene practices were reported. There are two further independent environmental audits taking place at the hotel to try to ascertain possible sources of infection (one on behalf of the BBC Watchdog programme, and one on behalf of the tour operator). The mixed aetiology of the cases reported is suggestive of a water source (although a foodborne source, such as washed salad, cannot be ruled out). Hotel outbreaks of gastrointestinal illness have sometimes been associated with swimming pool contamination [2], however, no evidence has yet been found to confirm or deny this as a source in this cluster.

The Health Protection Agency has shared available data about cases in returning travellers with the Federation of Tour Operators, the World Health Organization Regional Office for Europe, and the Turkish health authorities. There have been no similar increases in gastroenteritis observed within the general Turkish population, either nationally or in the region where the hotel is located. The Turkish health authorities are continuing to investigate the situation.

As the source of infection has not yet been determined, there is currently no specific advice for travellers to Turkey over and above general prevention measures. Gastroenteritis is a very common illness in travellers to many countries, and all travellers should ensure they practise food and water hygiene precautions particularly after going to the toilet and before eating. Information about general food and water hygiene is available from the [NaTHNaC website](#). Travellers should observe hygiene notices displayed in hotels and around swimming pools and ensure that their children do not go in pools if they are suffering from diarrhoea. The use of appropriate swim wear for babies and very young children will minimise the risk of faecal accidents. Swimmers should take care to avoid swallowing water.

References

1. HPA. Imported infections, England and Wales: July to September 2008. *Health Protection Report [HPR] Weekly* 2008; **2**(51). Available online at <http://www.hpa.org.uk/hpr/archives/2009/hpr0109.pdf>
2. Galmes A, Nicolau A, Gomis E, Guma M, Hernandez-Pezzi G, and Soler P. Cryptosporidiosis outbreak in British tourists who stayed at a hotel in Majorca, Spain. *Eurosurveillance* 2003; **7**(33). Available online at <http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=2275>.

Pandemic influenza: UK situation at 22 October 2009

The Health Protection Agency's Weekly National Influenza Report of 22 October (week 43) [1] further described the UK (and international) situation as follows:

- ▶ Pandemic influenza activity increased across the UK, the main burden of disease remaining in school-aged children and young adults;
- ▶ In week 42 (week-ending 18 October), the weekly influenza/ILI consultation rates increased, and were above the winter baseline thresholds in England, Wales and Northern Ireland;
- ▶ The National Pandemic Flu Service (NPFS) continued to issue antiviral drugs to people in England with an influenza-like illness who called or logged on to the internet site. The number of assessments and antiviral collections has continued to increase gradually over the past week;
- ▶ At least 85 schools throughout England have reported outbreaks of ILI, since the beginning of the autumn term, with virological confirmation of pandemic influenza in at least one case in 65 of the schools. School outbreaks have also been reported from Scotland, Wales and Northern Ireland;
- ▶ Interpretation of data to produce estimates on the number of new cases continued to be subject to a considerable amount of uncertainty with the move to NPFS. HPA modelling gave an estimate of 53,000 (range 27,000 – 115,000) new cases in England in week 42. The estimated number of new cases increased in all regions and age groups;
- ▶ The main influenza virus circulating in the UK continued to be the pandemic (H1N1) 2009 strain, with few influenza H1 (non-pandemic), H3 and B viruses detected. Three of 1733 pandemic viruses tested have been confirmed to carry a mutation which confers resistance to the antiviral drugs oseltamivir; both have been shown phenotypically to be resistant to the drug but retain sensitivity to zanamivir and a third is undergoing further testing;
- ▶ The majority of pandemic influenza cases continued to be mild. The cumulative number of deaths reported due to pandemic (H1N1) 2009 in the UK was 119. There was a total of 884 new patients hospitalised with suspected pandemic influenza in the week 15 to 21 October, an increase from 667 in the previous week. The highest hospitalisation rates have consistently been in the under-5-year age group and have increased in all age groups recently;
- ▶ According to the European Centre for Disease Prevention and Control (ECDC), by 21 October, 5303 deaths due to pandemic influenza had been reported globally;
- ▶ According to the World Health Organisation (16 October), influenza activity is low in temperate southern hemisphere regions, is increasing in the temperate northern hemisphere regions and remains variable in tropical areas.

References

1. HPA. [Weekly National Influenza Report: week 43](http://www.hpa.org.uk/swineflu/surveillance&epidemiology) (22 September 2009, PDF 367 KB), HPA website: www.hpa.org.uk/swineflu/surveillance&epidemiology.

Infection reports

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- ▶ **Quarterly report from the sentinel surveillance study of hepatitis testing in England: data for April to June 2009 (quarter 2)**
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Quarterly report from the sentinel surveillance study of hepatitis testing in England: data for April to June 2009 (quarter 2)

The sentinel surveillance study of hepatitis testing, which began in 2002, 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.

Data from an additional London laboratory are presented for the first time in this report.

Over recent months, dried blood spot testing [1] has started to be rolled out in some of the laboratories that participate in the sentinel surveillance study. Early data indicates that individuals undergoing dried blood spot testing are at increased risk of Hepatitis C infection when compared the general population undergoing hepatitis testing. Therefore, these data are excluded from the main analysis of HBsAg and anti-HCV testing and will be presented separately in future reports.

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 the second quarter of 2009, a total of 7,765 individuals were tested at least once for anti-HAV IgM in 21 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. As in the first quarter of 2009 [2] the highest proportion of positive tests was in South Central and the West Midlands (table 1). This may represent more targeted testing of individuals at risk, however, it is possible that the prevalence of HAV has increased over the last six months in these regions.

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

Region (number of centres)	Number tested	Number positive
East Midlands (1)	1,129	2 (0.2)
East of England (1)	528	2 (0.4)
London (5)	2,173	18 (0.8)
North East ** (1)	13	– (–)
North West (5)	1,151	6 (0.5)
South Central (1)	230	4 (1.7)
South East Coast (1)	376	1 (0.3)
South West (1)	822	1 (0.1)
Wales ***	11	– (–)
West Midlands (1)	438	6 (1.4)
Yorkshire & the Humber (2)	894	4 (0.4)
Total, all regions (19)	7,765	44 (0.6)

* Excludes reference and confirmatory testing. Individuals aged less than one year are included. Some duplication of individual patients may occur due to limitations of the information supplied. 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.

*** Although there are no sentinel centres outside England, limited first-line testing from general practices in Wales is carried out by sentinel centres in the North West and is therefore included here.

Table 2 shows the age and gender of individuals tested, and testing positive, for anti-HAV IgM in sentinel laboratories between April to June 2009. Gender and age were reported for the majority of people tested (99.2%). The ratio of males to females tested was 1.3:1, which is the same as previous quarters. The mean age of individuals tested was 46.1 years (range 0-102 years), where as the mean age of those testing positive was 38.6 years (range 7-82 years). The largest group tested were aged 35-44 years (n= 1,574). The highest overall percentage of individuals testing positive was among 25-34 year olds and children aged 1-14 years although few people were tested in this latter age group.

Table 2. Number of individuals tested, and testing positive, for anti-HAV IgM in participating centres, April – June 2009*

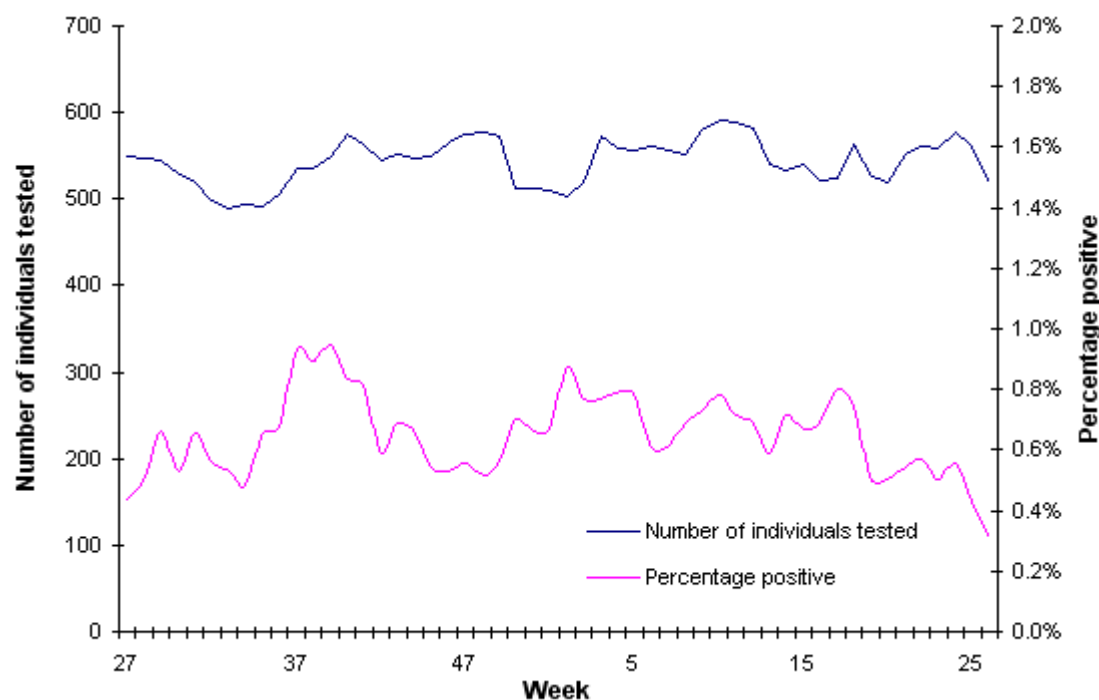
Age group	Female		Male		Unknown		Total	
	No. tested	No. positive (%)	No. tested	No. positive (%)	No. tested	No. positive (%)	No. tested	No. positive (%)
Under 1 year	20	– (–)	34	– (–)	0	– (–)	54	– (–)
1-14 years	77	2 (2.6)	96	– (–)	3	– (–)	176	2 (1.1)
15-24 years	376	3 (0.8)	407	3 (0.7)	7	– (–)	790	6 (0.8)
25-34 years	512	5 (1.0)	795	8 (1.0)	19	2 (10.5)	1,326	15 (1.1)
35-44 years	580	3 (0.5)	983	5 (0.5)	11	– (–)	1,574	8 (0.5)
45-54 years	612	5 (0.8)	723	– (–)	10	– (–)	1,345	5 (0.4)
55-64 years	538	2 (0.4)	598	3 (0.5)	6	– (–)	1,142	5 (0.4)
≥65 years	651	3 (0.5)	692	– (–)	6	– (–)	1,349	3 (0.2)
Unknown	1	– (–)	8	– (–)	–	– (–)	9	– (–)
Total, all age groups	3,367	23 (0.7)	4,336	19 (0.4)	62	2 (3.2)	7,765	44 (0.6)

* Excludes reference and confirmatory testing. Individuals aged less than one year are included. Some duplication of individual patients may occur due to limitations of the information supplied. All data are provisional.

To provide an indication of trends in testing, data from 20 sentinel centres for which full data were available were compared for the second quarters of 2008 and 2009. In the period April to June 2009, 42 of 7,076 (0.6%) people tested positive for anti-HAV IgM compared to 31 of 7,066 (0.4%) for the same period and centres in 2008. This shows a slight increase in the proportion of individuals testing positive, while the level of testing remained stable.

Figure 1 shows the five-weekly moving average for number of people tested for anti-HAV IgM and percentage positive over the last year (July 2008 to June 2009 inclusive) for the 20 sentinel centres from which full data were available. Testing has remained stable over the last year with noticeable troughs during the Easter, summer and Christmas holiday periods. The proportion positive fluctuated, although a slight decline is suggested from May 2009. Data from quarter third quarter of 2009 may show if this trend continues.

Figure 1. Five-weekly moving average of number of people tested, and percentage positive, for anti-HAV IgM between July 2008 and June 2009 (Note difference in scale of axes compared with figures 2 and 3)



Hepatitis B surface antigen (HBsAg) testing

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 individuals 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 the second quarter of 2009, a total of 14,618 individuals were identified as undergoing antenatal screening for HBsAg in 21 participating sentinel centres (table 3). Of these, 0.5% (n=77) were positive. This is the first time these individuals had been reported to the sentinel surveillance scheme.

Individuals identified as undergoing antenatal screening comprised 22.5% of all individuals tested for HBsAg in participating laboratories during the second quarter of 2009.

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

Table 3 . Number of individuals tested, and testing positive, for HBsAg through antenatal screening in participating laboratories, April – June 2009*

Region (number of centres)	Number tested	Number positive (%)
East Midlands (1)	14	3 (21.4)
East of England (1)	731	2 (0.3)
London (7)	3,610	38 (1.1)
North East* (1)	–	– (–)
North West (5)	2,608	10 (0.4)
South Central (1)	1,081	– (–)
South East Coast (1)	1,208	3 (0.2)
South West (1)	2,277	4 (0.2)
West Midlands (1)	102	4 (3.9)
Yorkshire & the Humber (2)	2,987	13 (0.4)
Total, all regions (19)	14,618	77 (0.5)

* Excludes reference and confirmatory testing. Some duplication of individual patients may occur due to limitations of the information supplied. All data are provisional.

b) Non-antenatal HBsAg testing

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

During the second quarter of 2009, a total of 50,312 individuals were tested for HBsAg in 21 participating sentinel centres, excluding antenatal testing (table 4) and dried blood spot testing. Of these, 1.9% (n=959) 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 2.9% for the fifth consecutive quarter. The North West and West Midlands also had a high proportion of individuals testing positive (2.2% and 1.9% respectively), which is consistent with previous quarters.. This may reflect more targeted testing of risk groups and/or genuinely higher prevalence in people being tested in this region.

Table 4. Number of individuals tested, and testing positive, for HBsAg in participating centres (excluding antenatal testing), April – June 2009*

Region (number of centres)	Number tested	Number positive (%)
East Midlands (1)	4,617	44 (1.0)
East of England (1)	2,732	22 (0.8)
London (6)	19,477	559 (2.9)
North East (1)	670	6 (0.9)
North West (5)	7,375	165 (2.2)
Northern Ireland **	4	– (–)
South Central (1)	1,438	14 (1.0)
South East Coast (1)	3,270	22 (0.7)
South West (1)	4,342	29 (0.7)
Wales**	22	– (–)
West Midlands (1)	1,586	30 (1.9)
Yorkshire & the Humber (2)	4,779	68 (1.4)
Total, all regions (20)	50,312	959 (1.9)

* Excludes dried blood spot, reference and confirmatory testing. Individuals aged less than one year are included. Some duplication of individual patients may occur due to limitations of the information supplied. All data are provisional.

** Although there are no sentinel centres outside England, limited first-line testing from general practices in Northern Ireland and Wales is carried out by sentinel centres in the North West and is therefore included here.

Excluding individuals identified from the test request location or clinical details as undergoing antenatal testing, similar numbers of men and women were tested for HBsAg (table 5). The number of women tested may include antenatal testing that cannot be identified as such from the information provided, or may reflect similar levels of testing among men and women.

As reported previously the proportion testing positive for HBsAg was higher among men than women (2.4% v 1.4%). The largest group tested were aged 25-34 years (n=14,799); where as the percentage of individuals testing positive was highest among people aged 35-44 years (2.5%). The mean age of individuals tested was 37.6 years (range 0-106 years) and of those testing positive was 36.7 years (range 1-106 years). As with previous quarters, the relatively high prevalence of HBsAg among tested individuals of unknown gender (3.2%) 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 high risk of hepatitis B infection.

Table 5. Age and sex of individuals tested for HBsAg in participating centres (excluding antenatal testing), April – June 2009*

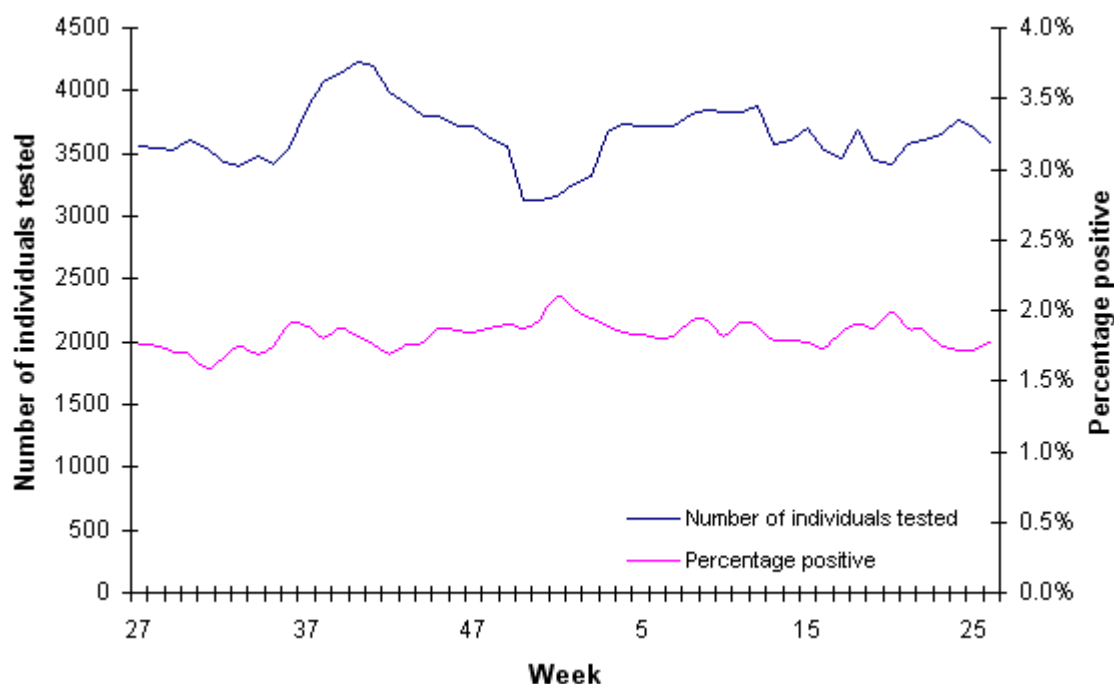
Age group	Female		Male		Unknown		Total	
	No. tested	No. positive (%)	No. tested	No. positive (%)	No. tested	No. positive (%)	No. tested	No. positive (%)
Under 1 year	86	– (–)	115	0 (0.0)	2	– (–)	203	– (–)
1-14 years	409	3 (0.7)	448	4 (0.9)	19	– (–)	876	7 (0.8)
15-24 years	5,805	66 (1.1)	4,011	73 (1.8)	133	1 (0.8)	9,949	140 (1.4)
25-34 years	8,130	128 (1.6)	6,490	189 (2.9)	179	11 (6.1)	14,799	328 (2.2)
35-44 years	4,846	93 (1.9)	5,599	172 (3.1)	122	2 (1.6)	10,567	267 (2.5)
45-54 years	2,394	41 (1.7)	3,144	81 (2.6)	78	4 (5.1)	5,616	126 (2.2)
55-64 years	1,655	19 (1.1)	2,142	43 (2.0)	34	1 (2.9)	3,831	63 (1.6)
≥65 years	1,964	10 (0.5)	2,348	16 (0.7)	23	– (–)	4,335	26 (0.6)
Unknown	26	– (–)	50	– (–)	60	2 (3.3)	136	2 (1.5)
Total, all age groups	25,315	360 (1.4)	24,347	578 (2.4)	650	21 (3.2)	50,312	959 (1.9)

* Excludes dried blood spot, reference and confirmatory testing. Some duplication of individual patients may occur due to limitations of the information supplied. All data are provisional.

To provide an indication of trends in testing, data from the 20 sentinel centres for which full data were available were compared for the second quarters of 2008 and 2009. In the period April to June 2009, 844 of 46,894 (1.8%) people tested positive for HBsAg (excluding antenatal testing), compared to 893 of 45,459 (2.0%) for the same period in 2008. This shows a slight increase in the number of people tested and decline in the proportion of individuals testing positive for HBsAg.

Figure 2 shows the five-weekly moving average for number of people tested for HBsAg and percentage positive over the last year (excluding antenatal testing; July 2008 to June 2009 inclusive) for the 20 sentinel centres from which full data were available. Although the level of testing drops during the Christmas and Easter holiday period testing overall has remained stable over the past year, while the proportion positive has shown a very slight increase.

Figure 2. Five-weekly moving average of number of people tested, and percentage positive, for HBsAg between July 2008 and June 2009 (excluding antenatal testing) (Note difference in scale of axes compared with figures 1 and 3)



Hepatitis C testing

During the second quarter of 2009, a total of 40,724 individuals were tested at least once for hepatitis C-specific antibodies (anti-HCV) in 21 participating sentinel centres (table 6), excluding dried blood spot testing. This is the first time these individuals had been reported to the sentinel surveillance scheme.

Overall, 3.3% of individuals tested for anti-HCV were positive, though this varied by region. As with previous quarters the highest proportion of positive tests in England were from the North West (table 6). This may reflect a 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 6. Number of individuals tested, and testing positive, for anti-HCV in participating centres, April – June 2009*

Region (number of centres)	Number tested	Number positive (%)
East Midlands (1)	3,976	85 (2.1)
East of England (1)	1,707	73 (4.3)
London (7)	13,797	404 (2.9)
North East (1)	539	13 (2.4)
North West (5)	7,229	400 (5.5)
South Central (1)	1,035	11 (1.1)
South East Coast (1)	3,133	53 (1.7)
South West (1)	3,613	153 (4.2)
Wales**	17	1 (5.9)
West Midlands (1)	1,366	35 (2.6)
Yorkshire and Humberside (2)	4,312	135 (3.1)
Total, all regions (21)	40,724	1,363 (3.3)

* Excludes dried blood spot, reference and confirmatory testing. Excludes individuals aged less than one year, in whom positive tests may reflect the presence of passively-acquired maternal antibody rather than true infection. Some duplication of individual patients may occur due to limitations of the information supplied. All data are provisional.
 ** Although all sentinel centres are in England, a small amount of first-line testing from general practices in Wales is carried out by laboratories in the North West and West Midlands

Of the 1,363 individuals testing positive for anti-HCV during the second quarter of 2009, 885 (64.9%) were also tested for HCV RNA by PCR (qualitative and/or quantitative). Of these individuals, 608 were PCR positive (69.6%).

Gender was reported for the majority of people tested. Slightly more males and females were tested (table 7); the ratio of males to females tested was 1.2:1. The ratio of males to females testing positive was 2:1. The mean age of individuals tested was 39.9 years (range 1-103 years) and of those testing positive was 41.7 years (range 1-90 years). As with the previous quarter the largest group tested were aged 25-34 years (n=10,631). The percentage of individuals testing positive was highest among 45-54 year olds (5.6%). The relatively high level of individuals with unknown age testing positive (4.9%) may reflect testing of individuals in settings such as prisons, drug services and GUM clinics where fewer demographic details on patients were available and where service users may be at high risk of hepatitis C infection.

Table 7. Age and sex of individuals tested for anti-HCV in participating centres, April – June 2009*

Age group	Female		Male		Unknown		Total	
	No. tested	No. positive (%)	No. tested	No. positive (%)	No. tested	No. positive (%)	No. tested	No. positive (%)
1-14	306	3 (1.0)	327	0 (0.0)	7	0 (0.0)	640	3 (0.5)
15-24	3,944	36 (0.9)	3,269	28 (0.9)	101	2 (2.0)	7,314	66 (0.9)
25-34	4,916	121 (2.5)	5,560	220 (4.0)	155	11 (7.1)	10,631	352 (3.3)
35-44	3,794	136 (3.6)	5,237	317 (6.1)	100	10 (10.0)	9,131	463 (5.1)
45-54	2,163	88 (4.1)	2,921	201 (6.9)	65	0 (0.0)	5,149	289 (5.6)
55-64	1,566	33 (2.1)	1,968	91 (4.6)	24	2 (8.3)	3,558	126 (3.5)
≥65	1,941	32 (1.6)	2,219	26 (1.2)	16	1 (6.3)	4,176	59 (1.4)
Unknown	25	1 (4.0)	37	4 (10.8)	63	0 (0.0)	125	5 (4.0)
Total, all age groups	18,655	450 (2.4)	21,538	887 (4.1)	531	26 (4.9)	40,724	1,363 (3.3)

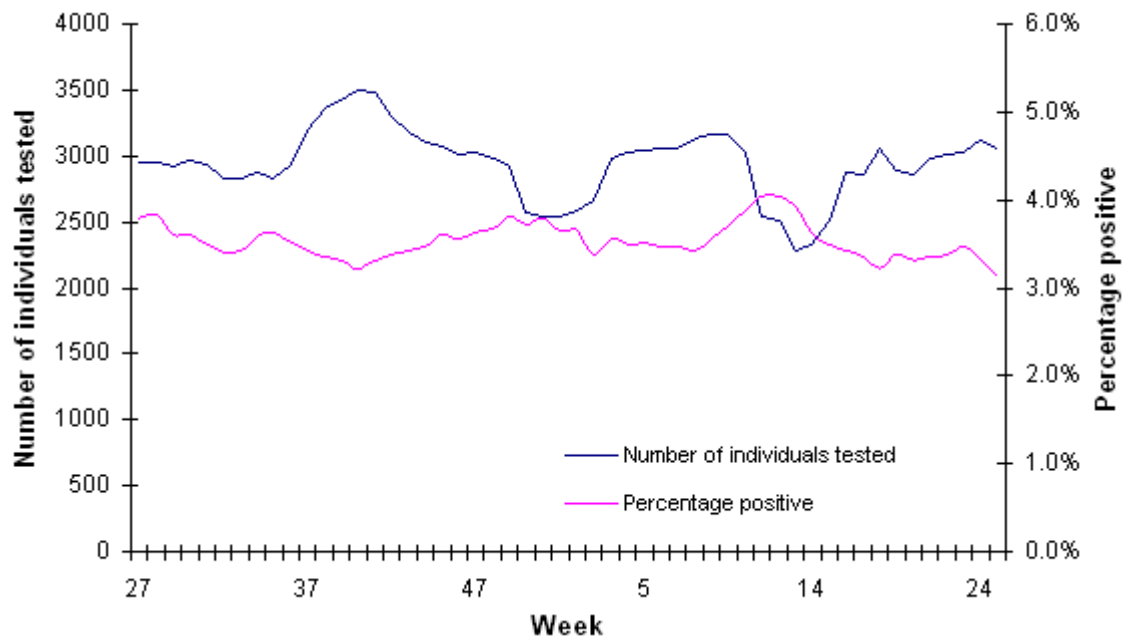
* Excludes dried blood spot, reference and confirmatory testing. Individuals aged less than one year are excluded since positive tests in this age group may reflect the presence of passively-acquired maternal antibody rather than true infection. Some duplication of individual patients may occur due to limitations of the information supplied. All data are provisional.

To provide an indication of trends in testing, data from the 20 sentinel centres from which full data were available were compared for the second quarters of 2008 and 2009. In the period April to June 2009, 1,225 of 36,797 (3.3%) people tested were positive for anti-HCV, compared to 1,343 of 35,630 (3.8%) for the same period in 2008. This may suggest a greater proportion of people at lower risk of infection were tested during the second quarter of 2009, and/or the prevalence of hepatitis C was decreasing among the individuals tested.

Figure 3 shows the five-weekly moving average for number of people tested for anti-HCV and percentage positive over the last year (July 2008 to June 2009 inclusive) for the 20 sentinel centres from which full data were available. Apart from a trough during the Christmas and Easter holiday periods, there was a slight increase in the number of people tested for anti-HCV up until week 36. Testing between weeks 36 to 41 showed a more marked increase which declined to previous levels by week 49. As observed over the previous quarters, several peaks in testing correspond to simultaneous troughs in the percentage positive; perhaps suggesting increased testing of people at low risk of infection. The proportion of people testing positive increased slightly in March, then declined. This decline may be due in part to the role out of dried blood spot testing to high risk individuals who are difficult to bleed, mainly intravenous drug users. An overall decline in the

percentage positive over the past year is still apparent, in line with the long-term annual trend in declining percentage positive among individuals tested for anti-HCV observed over the course of the study.

Figure 3. Five-weekly moving average of number of people tested, and percentage positive, for anti-HCV between July 2008 and June 2009 (Note difference in scales to figures 1 and 2.)



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Transfusion-transmitted infections reported to the NHSBT/HPA Epidemiology Unit in 2008

The surveillance of suspected transfusion-transmitted infections (TTIs) began in October 1995 and is coordinated by the NHS Blood and Transplant (NHSBT)/Health Protection Agency (HPA) Centre for Infections (CfI) Epidemiology Unit. Data collected forms part of the Serious Hazards of Transfusion Haemovigilance Scheme (SHOT). Data presented here are for NHSBT/HPA TTI surveillance only. The 2008 SHOT annual report has already been published and is available via the SHOT website (www.shotuk.org).

Methods

Blood centres in England, Wales and Northern Ireland report possible TTIs of which they have been informed to NHSBT/HPA TTI surveillance. Blood centres in Scotland report all incidents to the Microbiology Reference Unit of the Scottish National Blood Transfusion Service, for investigation. Details and findings on each incident are passed to NHSBT/HPA TTI surveillance annually.

Reports of suspected transfusion-transmitted infections

Between 1 January 2008 and 31 December 2008, 33 reports of suspected TTIs were made by blood centres throughout the UK to NHSBT/HPA TTI surveillance. After complete investigation, four reports (all bacterial) were determined to be TTIs according to the definition below. All four incidents involved the transfusion of platelet units. Twenty-four investigations were concluded as not TTIs (three hepatitis B [HBV], eight hepatitis C [HCV], three HIV, one Parvo B19, one toxoplasmosis, one chickenpox and seven bacterial). One bacterial report was concluded as undetermined (ie it was not possible to confirm or refute that the patient's infection was acquired via blood transfusion). In an additional two incidents it was not possible to confirm or refute TTI because the blood unit was not available for investigation. Two incidents (one HBV, one HCV) are pending complete investigation.

Definition

A report was classified as a **transfusion-transmitted infection** if, following investigation:

- The recipient had evidence of infection post-transfusion, and there was no evidence of infection prior to transfusion and no evidence of an alternative source of infection

And, either

- At least one component received by the infected recipient was donated by a donor who had evidence of the same transmissible infection,

Or

- At least one component received by the infected recipient was shown to contain the agent of infection

Confirmed incidents, 2008

Report of transfusion-transmitted *Staphylococcus epidermidis*

An elderly male patient was transfused with a unit of pooled platelets for thrombocytopenia. During the transfusion the patient developed chills, rigors, back pain and hypotension, and the transfusion was stopped. *Staphylococcus epidermidis* was isolated from patient blood cultures taken at the time of the reaction, and from the remains of the platelet pack. Four associated red cell units and one unit of fresh frozen plasma were recalled by the blood services but were found to be negative on culture.

All four donors contributing to the platelet unit were recalled. *S. epidermidis* was identified from venepuncture site samples from two of the donors, from pre-cleaning swabs only. Pulse field gel electrophoresis (PFGE) revealed that one of the strains was identical to that isolated from the remains of the platelet pack. The blood culture isolate from the patient was not available for further investigation and so it was not possible to determine whether all three isolates (from patient, donor and pack) were of identical strains, however, contamination of the platelet unit by skin flora from the donor venepuncture site was probably responsible for the patient's reaction. *S. epidermidis* is a

common skin commensal and it is recognised that the donor arm cleansing procedure is not 100% effective [1]. Informal quality audits carried out by NHSBT during 2008 suggested that the procedure could be improved, and an extensive staff re-training exercise was undertaken (see commentary).

Report of transfusion-transmitted Group G Streptococcus (two recipients)

A unit of apheresis platelets was split to produce two platelet doses. Pack 1 was transfused to a teenager with acute lymphoblastic leukaemia (ALL) who reacted with allergy-like symptoms. Pack 2 was transfused to a female patient in her 50's with acute myeloid leukaemia (AML) who developed chills, nausea and a feeling of impending doom. The remains of both units were returned to the blood services for investigation, with a delay in the return of pack 1 due to the initial diagnosis of an allergic reaction.

Blood cultures from both patients yielded Lancefield Group G streptococcus (GGS), as did cultures of both platelet units carried out at the blood services. GGS are known as both commensals and pathogens in animals and humans [2]. The apheresis donor denied any recent illness or change in bowel habit, but GGS was identified from their stool sample.

All five isolates (from both patients, both packs and the donor) were sent to a national reference laboratory for typing, and were found to be of the same strain. The likely but unproven chain of transmission was from donor gut to venepuncture site via the donor's fingers, and from there to donated component. As with the previous case, it cannot be guaranteed that this chain of transmission would be prevented by donor arm cleansing (see commentary).

Report of transfusion-transmitted Group G Streptococcus

A woman in her 50s with severe aplastic anaemia received a unit of pooled platelets. Within five minutes of starting the infusion the patient developed urticaria and pain along the access vein. She was given antihistamine and the transfusion was continued. One hour later she became pyrexial and hypotensive, requiring admission to the Intensive Therapy Unit (ITU). The transfusion was stopped and patient blood cultures were taken. These revealed Lancefield Group G streptococcus (GGS), as did cultures of the remains of the platelet pool. Four units of red cells and one unit of fresh frozen plasma associated with implicated pack were recalled but cultures of these were all negative.

The donors contributing to the platelet pool were recalled; GGS was identified in stool samples provided by three of the four donors. Typing confirmed that one of these isolates represented the same strain as that isolated from both the patient blood cultures and the platelet unit. The donor denied any illness at or around the time of donation.

Report of transfusion-transmitted *Klebsiella pneumoniae* (two recipients)

A donation of apheresis platelets was split to produce two platelet doses. The first was transfused into a male neurosurgery patient with head injury and pre-existing ischaemic bowel, liver disease and sepsis. The patient died 11 hours post transfusion and death was thought to be due the sepsis from the ischaemic bowel. As a transfusion reaction was not suspected, the transfused pack was not retained for further investigation. However, blood cultures had been taken from the patient prior to his death.

The second recipient was a male patient with AML with chemotherapy related pancytopenia. Five minutes into the transfusion the patient became acutely unwell, requiring admission to ITU where he subsequently suffered a cardiac arrest and died. Blood cultures had also been taken from this patient prior to his death. The remains of the transfused pack were cultured at the hospital microbiology laboratory before being returned to the blood services.

Blood cultures from both patients yielded *Klebsiella pneumoniae*, as did cultures of the unit transfused to the patient with AML, and all 3 isolates were found to be of a single strain. The case was concluded as a proven incident of bacterial contamination of two platelet units with *K. pneumoniae*. This probably resulted in the death of one patient and contributed to the death of the other. The source of the

organism was most likely the donor gut, transferred to the venepuncture site and from there to the donated component. Both incidents were reported to the local Strategic Health Authority (SHA) as a Serious Untoward Incident.

Cumulative total (1995-2008)

Since surveillance began in 1995, 67 confirmed TTI incidents have been reported to the scheme (see table). More than half (59.7%, 40/67) of all confirmed TTIs were due to bacterial contamination. There have been no confirmed viral TTIs since 2005. To date, the most commonly confirmed viral TTI has been hepatitis B.

Commentary

Each year the number of reports received by the NHSBT/HPA Epidemiology Unit TTI scheme is small and fluctuations are to be expected. Clinically apparent cases such as acute reactions following bacterial contamination, or newly acquired infections in returning blood donors, are more likely to be ascertained and investigated than chronic cases, for example of sub-clinical HCV infection. Therefore surveillance of TTIs tends to be biased towards acute cases. It is important for clinicians to notify the blood services when an infection is identified in a blood transfusion recipient. At the same time, the risk of an infectious donation being missed on screening is small, so clinicians should concurrently investigate other possible risk exposures among individuals with newly diagnosed infections, rather than waiting for the investigation into the blood to be completed.

In 2008, four confirmed bacterial TTI incidents were reported involving the transfusion of contaminated units to six recipients, four of whom recovered and two of whom died (one death due to transfusion, one death in which transfusion was implicated). The likely but unproven source of contamination in at least three of the four incidents was flora present at the donor venepuncture site. It is recognised that arm cleansing techniques are unlikely to be 100% effective in removing bacteria from the venepuncture site [1]. However, informal quality audits undertaken by NHSBT during 2008 suggested that the procedure could be improved. An extensive staff re-training exercise was undertaken in late 2008, and monitoring logs were implemented to observe and record evidence of practice standards. A national audit programme is also being developed to support effective pre-donation skin preparation and the UK blood transfusion services (UKBTS) have asked the Standing Advisory Committee on Transfusion Transmitted Infections (SACTTI) to produce standards on how donor arm cleansing should be monitored.

Two TTI incidents in 2008 involved the transfusion of an implicated donation to more than one recipient. Suspected cases should be reported promptly so that associated units may be recalled prior to their transfusion. Difficulties arise when it is uncertain whether the transfusion reaction was due to contamination of a blood unit or not.

For the third consecutive year there were no confirmed viral transmissions via blood transfusion, consistent with the current very low estimated frequency of infectious donations entering the UK blood supply [3].

Cumulative total of reports of transfusion transmitted infections made to NHSBT/HPA TTI surveillance between 1/10/1995 and 31/12/2008 by year of transfusion and infection, UK *

Year of transfusion	Pre-1997	'97	'98	'99	'00	'01	'02	'03	'04	'05	'06	'07	'08	Total	Deaths
Infection															
HAV	1 (1)	–	–	–	1 (1)	–	–	–	–	1 (1)	–	–	–	3	–
HBV	3 (3)	1 (1)	1 (1)	2 (3)	1 (1)	–	1 (1)	1 (1)	–	1 (1)	–	–	–	11	–
HCV	1 (1)	1 (1)	–	–	–	–	–	–	–	–	–	–	–	2	–
HIV	1 (3)	–	–	–	–	–	1 (1)†	–	–	–	–	–	–	2	–
HEV	–	–	–	–	–	–	–	–	1 (1)	–	–	–	–	1	–
HTLV I	2 (2)	–	–	–	–	–	–	–	–	–	–	–	–	2	–
Bacteria	2 (2)	3 (3)	4 (4)	4 (4)	7 (7)	5 (5)	1 (1)	3 (3)	&	2 (2)	2 (2)	3 (3)	4 (6)	40	10
Malaria	–	1 (1)	–	–	–	–	–	1 (1)	–	–	–	–	–	2	1
vCJD/prion	1 (1)	2 (2)	–	1 (1)	–	–	–	–	–	–	–	–	–	4	3 ±
Total	11 (13)	8 (8)	5 (5)	7 (8)	9 (9)	5 (5)	3 (3)	5 (5)	1 (1)	4 (4)	2 (2)	3 (3)	4 (6)	67	12

* The number of incidents is shown with the total number of identified infected recipients in brackets. Data is included from the beginning of the NHSBT/HPA Infection Surveillance Programme (October 1995) to December 2008. Data presented in the SHOT Report 2008 is from October 1996 only. Therefore, the numbers shown in this table do not match those presented in the SHOT report.

† One investigation not included in this table. In 2003 an anti-HIV negative donation (donated in 2002) was found to be HIV RNA positive on retrospective PCR testing of a seroconverting donor. Red cells from the seronegative unit had been transfused into an elderly patient during surgery for a fractured femur in 2002. The recipient died soon after surgery and her HIV status was not determined. This case was classified as a near miss.

& One investigation not included in this table. In 2004 there was an incident involving contamination of a pooled platelet pack with *Staphylococcus epidermidis*, which did not meet the TTI definition because transmission to the recipient was not confirmed, but it would seem likely. This case was classified as 'not transfusion transmitted'.

± A further prion case died but transfusion was not implicated as the cause of death.

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