Public Health England

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Current News

- **Use of genomics in salmonella outbreak surveillance**
- **Quarterly update on enteric fever in EW&NI**
- **Impact of changing nature of injecting drug use on infections in the UK**

Infection Reports

Enteric infections

- **General outbreak of foodborne illness in humans, England and Wales: weeks 40-44/2015**
- **Common gastrointestinal infections, England and Wales: laboratory reports, weeks 40-44/2015**
- **Suspected and laboratory-confirmed reported norovirus outbreaks in hospitals, with regional breakdown: outbreaks occurring in weeks 40-44/2015**
- **Enteric fever surveillance quarterly report (EWNI): Q3/2015**

News

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Use of genomics in salmonella outbreak surveillance

PHE's Gastrointestinal Bacteria Reference Unit (GBRU) has been implementing the use of whole genome sequencing (WGS) for identifying and characterising salmonella isolates since April 2014. The initial step involves Multi Locus Sequence Typing (MLST) to assign each isolate a profile or sequence type that correlates closely to traditional serotype, allowing backward compatibility. This method has, since April 2015, replaced most of the serotyping for routine identification of salmonella species. The second step involves the comparison of the isolate's full genome to an appropriate reference genome to identify individual nucleotide differences (single nucleotide polymorphisms or SNPs). The assigned SNP address for each isolate is then added to a secure Gastro Data Warehouse and used to identify clusters of cases and, if available, food isolates that have the same SNP address. Clusters of interest are further investigated by generating phylogenetic trees, to take advantage of the unparalleled information obtained with WGS. Due to the sequential nature of mutational drift, phylogenetic methods can be used to study variation in genomes and reveal ancestral relationships.

The use of WGS is proving to be particularly useful in detecting outbreaks of genetically monomorphic clones such as *Salmonella* Enteritidis, excluding unrelated cases within the same phage type, providing case definitions and refining outbreak investigations to increase the chances of identifying a common source exposure. This enhanced ability to identify and effectively investigate outbreaks resulted in implementation of appropriate risk mitigation measures in two recent cases: the *S.* Enteritidis phage type (PT) 14b outbreak in 2014 [1], and a *S.* Enteritidis outbreak earlier this year linked to snake ownership [2]. Most significantly, without the use of WGS, the latter example would not have been identified as an outbreak – and the subsequent epidemiological investigation linking the *S.* Enteritidis cluster to contaminated mice used for reptile feed, and the publication of targeted public health advice by PHE, would not have occurred.

The high resolution WGS typing of isolates at a national level is facilitating the improved detection of smaller or geographically scattered clusters and PHE's Gastrointestinal Infections Department and GBRU are now developing cluster detection and reporting methods which will allow appropriate and timely investigation of such clusters. Time, size and genetic variation are being taken into account and clusters are being assessed, within the GI department initially,

with the aim of developing an automated reporting system in future to initiate appropriate epidemiological investigation.

Further information about these techniques, including explanation of how genomics can be applied to support public health, is available from the e-learning module at: http://public-health-genomics.phe.org.uk/.

Assistance with the use of whole genome sequencing data is available from PHE's Gastrointestinal Infections Department and the Gastrointestinal Bacterial Referencing Unit.

References

1. Inns T, Lane C, Peters T, Dallman T, Chatt C, McFarland N, Crook P, *et al*, on behalf of the outbreak control team (2015). "A multi-country *Salmonella* Enteritidis phagetype 14b outbreak associated with eggs from a German producer: near real-time application of whole genome sequencing and food chain investigations, United Kingdom, May – September 2014". *Euro Surveill.* **20**(16).
2. Carrion I [presenter], Kanagarajah S, Awofisayo-Okuyelu A, Ashton P, Dallman T, Hawker J, *et al* (2015). 'Uncovering the scale of a reptile associated salmonellosis outbreak in the United Kingdom (UK) 2015: a recent history'. Presentation at the European Scientific Conference on Applied Infectious Disease Epidemiology (ESCAID)".

Quarterly update on enteric fever in EW&NI

PHE's latest quarterly report summarising the epidemiology of enteric fever across England, Wales and Northern Ireland is published in the Infection Reports section of this issue of *HPR* [1].

The report includes analysis of the data according to organism type, age/sex and geographical distribution of cases, and travel history of cases.

The data shows a decline in case reports compared with the equivalent period in 2014, and compared with the mean number of reports over the past eight years.

Reference

Enteric fever surveillance quarterly report (England, Wales and Northern Ireland): third quarter 2015.

Impact of changing nature of injecting drug use on infections in the UK

The thirteenth annual report on infections among people who inject drugs (PWID) in the United Kingdom – *Shooting Up* – has been published by Public Health England [1].

PWID are vulnerable to a wide range of infections – including those caused by viruses such as HIV and hepatitis B and C, and bacteria such as *Clostridium botulinum* and *Staphylococcus aureus* – that can cause significant morbidity and mortality. The report examines the extent of infections and the associated risks among PWID under five headings.

Changing patterns of psychoactive drug injection are increasing risk

Heroin, alone or in combination with crack-cocaine, remains the most commonly injected psychoactive drug. However, there is evidence of an increase in the injection of stimulants, including recently emerged psychoactive drugs such as mephedrone. Over the past decade, the number of people reporting that amphetamines and amphetamine-type drugs are their main drug of injection has increased three-fold. One in eight now say these are the main drug they inject.

Overall, needle and syringe sharing among those currently injecting psychoactive drugs has fallen from 28% in 2004 to 17% in 2014. However, people injecting stimulants report much higher levels of risk behaviours such as sharing and re-using needles and syringes. Higher levels of risk behaviours associated with the use of stimulants can increase harm, and increased rates of stimulant injection has been a factor in a number of infections outbreaks among PWID in other countries.

Bacterial infections continue to be a problem

Around a third (31%) of those who inject psychoactive drugs reported having a symptom of an injecting site infection during the preceding year. Outbreaks of infections due to bacteria, such as *Clostridium botulinum*, continue to occur in this group. Some of these infections are severe and place substantial demands on healthcare. Half of those with hepatitis C remain unaware of their status.

Hepatitis C remains a major problem among PWID in the UK, with around half of those who inject psychoactive drugs having antibodies to hepatitis C. Data indicate that hepatitis C transmission is probably stable in this group and further effort is needed to reduce this. Although the uptake of diagnostic testing is high (83%), about half of the hepatitis C infections remain undiagnosed – either because people have never had a test or have become infected since their last test. Those PWID with undiagnosed hepatitis C typically make use of a range of health

services. This underlines the need to identify, and make use of, the opportunities for regularly offering tests to those at risk.

Hepatitis B remains rare but vaccine uptake has stopped improving

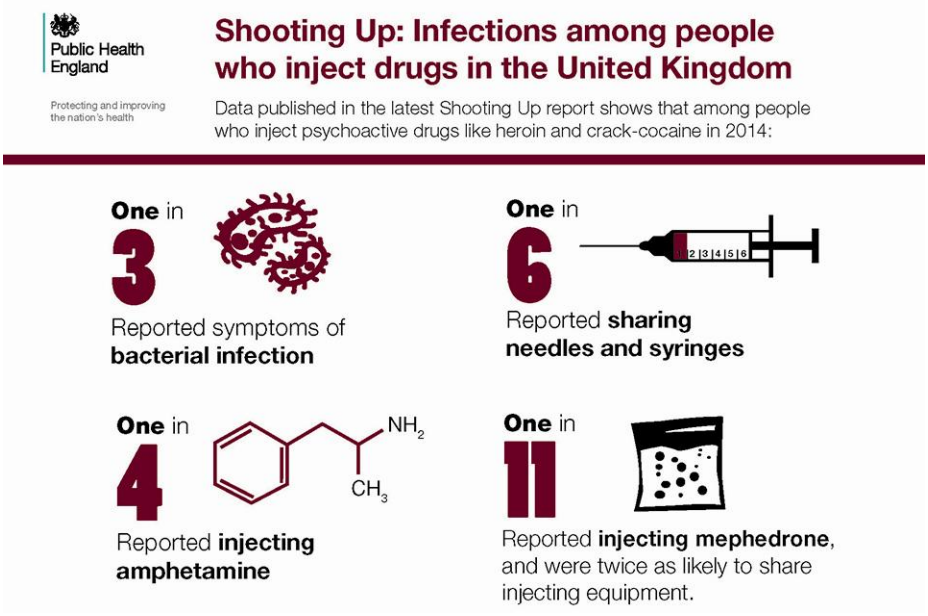
Less than 1% of those who inject psychoactive drugs are currently infected with hepatitis B. The proportion ever infected with hepatitis B has fallen from 28% in 2004 to 14% in 2014. This public health success reflects a marked increase in the uptake of the vaccine against hepatitis B during the 2000s. In 2014, 72% reported vaccination uptake – this was lower than the uptake seen in 2011 (76%) and indicates that uptake may now be declining. Most of those who have not been vaccinated have been in contact with health services where they could have received a dose of the vaccine.

HIV levels remain low overall and the uptake of care is good

HIV infection among PWID remains rare in the UK compared with many other countries. Only 1% of those who inject psychoactive drugs have HIV, and overall HIV incidence is currently low among PWID. Most of those infected with HIV are aware of their infection and are accessing care. The low overall prevalence in this group probably reflects the extensive provision of needle and syringe programmes, opioid substitution therapy and other drug treatment since the 1980s. The recent outbreak of HIV among PWID in Glasgow is a concern.

Key facts about the risk behaviours of those injecting psychoactive drugs are presented in an infographic associated with the new report (see extract below), highlighting the fact that, among people who were injecting psychoactive drugs in 2014: one in three reported symptoms of bacterial infection, one in four reported injecting amphetamines, and one in six reported sharing needles and syringes. The one in 11 who reported injecting mephedrone were twice as likely to share injecting equipment.

The findings presented in the report indicate a need to maintain, and improve services that aim to reduce injecting-related harms and to support those who want to stop injecting. A range of services, including locally appropriate provision of needle and syringe programmes, opioid substitution treatment, and other drug treatment, should be provided. In addition, there should be easy access to diagnostic testing for hepatitis C and HIV (including access to care pathways for those living with these infections), to vaccinations including that for hepatitis B, and to information and advice on safer injecting practices, on preventing infections and on the safe disposal of used equipment. These services should be developed in line with published guidelines [2,3,4,5] to ensure that the interventions they provide have sufficient coverage to prevent infections.



Source: Infographic "Shooting Up: infections among people who inject drugs in the UK" illustrating aspects of the data contained in the new report, with particular reference to those who inject psychoactive drugs (heroin, crack-cocaine, etc). See Shooting Up webpages (reference 1).

References

1. PHE, Health Protection Scotland, Public Health Wales and Public Health Agency Northern Ireland (November 2015). "Shooting Up: infections among people who inject drugs in the UK, 2014". For related documents, see Shooting Up webpages.
2. Department of Health (2007). "Drug misuse and dependence – guidelines on clinical management: update 2007".
3. NICE (July 2007). Drug misuse: psychosocial interventions Clinical Guideline CG51.
4. NICE (July 2007). Drug misuse: opioid detoxification Clinical Guideline CG52.
5. NICE (March 2014). Needle and syringe programmes: providing people who inject drugs with injecting equipment Public Health Guidance, PH52.

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Infection Reports

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Infection reports / Enteric

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General outbreaks of foodborne illness in humans, England and Wales: weeks 40-44/2015

Preliminary information has been received about the following outbreaks.

PHE Centre/ Health Protect'n Team	Organism	Location of food prepared or served	Month of outbreak	Number ill	Cases positive	Suspect vehicle	Evidence
South West	*Clostridium perfringens*	Function/party	October	20	Not known	Unknown	N/a

Common gastrointestinal infections, England and Wales, laboratory reports: weeks 40-44/2015

Laboratory reports	Number of reports received					Total reports	Cumulative total	
	40/15	41/15	42/15	43/15	44/15	40-44/15	1-44/15	1-44/14
Campylobacter	1076	1009	959	918	900	4862	51471	52118
Escherichia coli O157 *	8	22	27	14	6	74	662	623
Salmonella †	208	167	113	55	8	551	7172	6064
Shigella sonnei	18	14	23	23	19	97	1043	928
Rotavirus	39	14	22	22	16	113	5044	4160
Norovirus	32	67	62	71	79	311	6374	4565
Cryptosporidium	188	184	182	159	115	828	4328	3239
Giardia	84	101	110	69	89	453	3674	3323

*Vero cytotoxin–producing isolates: data from PHE's Gastrointestinal Bacteria Reference Unit (GBRU).
† Data from GBRU.

Suspected and laboratory-confirmed reported norovirus outbreaks in hospitals, with regional breakdown: outbreaks occurring in weeks 40-44/15

The hospital norovirus outbreak reporting scheme (HNORS) recorded 11 outbreaks occurring between weeks 40 and 44, 2015, 10 of which led to ward/bay closures or restriction to admissions. Four outbreaks (36%) were recorded as laboratory confirmed due to norovirus. For the calendar year 2015 – between week 1 (January) and week 44 (week beginning 27 September) – 579 outbreaks were reported. Ninety-four per cent (546) of reported outbreaks resulted in ward/bay closures or restrictions to admissions and 66% (380) were laboratory confirmed as due to norovirus (see table).

Seasonal comparison of laboratory reports of norovirus (England and Wales)

In the current season to date† (from week 40, 2015, to week 44, 2015), there were 311 laboratory reports of norovirus; this is 29% lower than the average number of laboratory reports for the same period in the seasons between 2009/10 and 2013/2014 (441). The number of laboratory reports in the most recent weeks will increase as further reports are received.

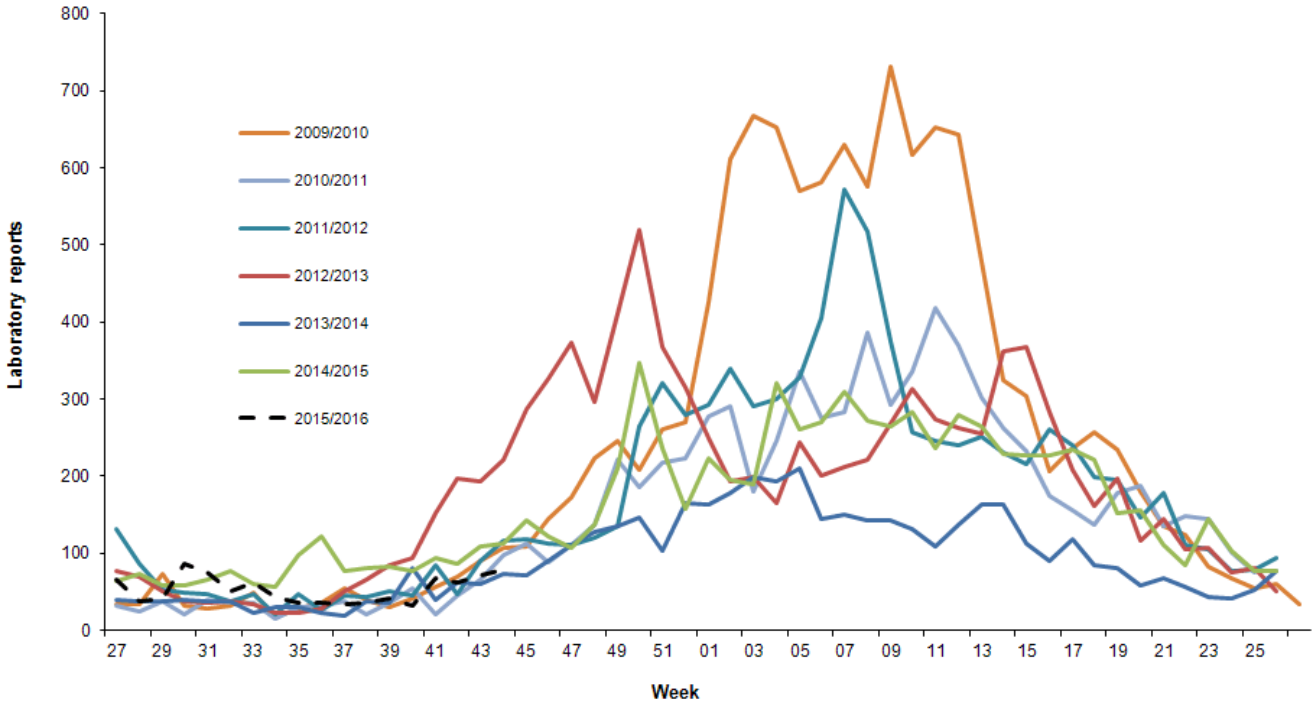
† The norovirus season runs from July to June (week 27 in year 1 to week 26 in year 2) in order to capture the winter peak in one season.

Notes:

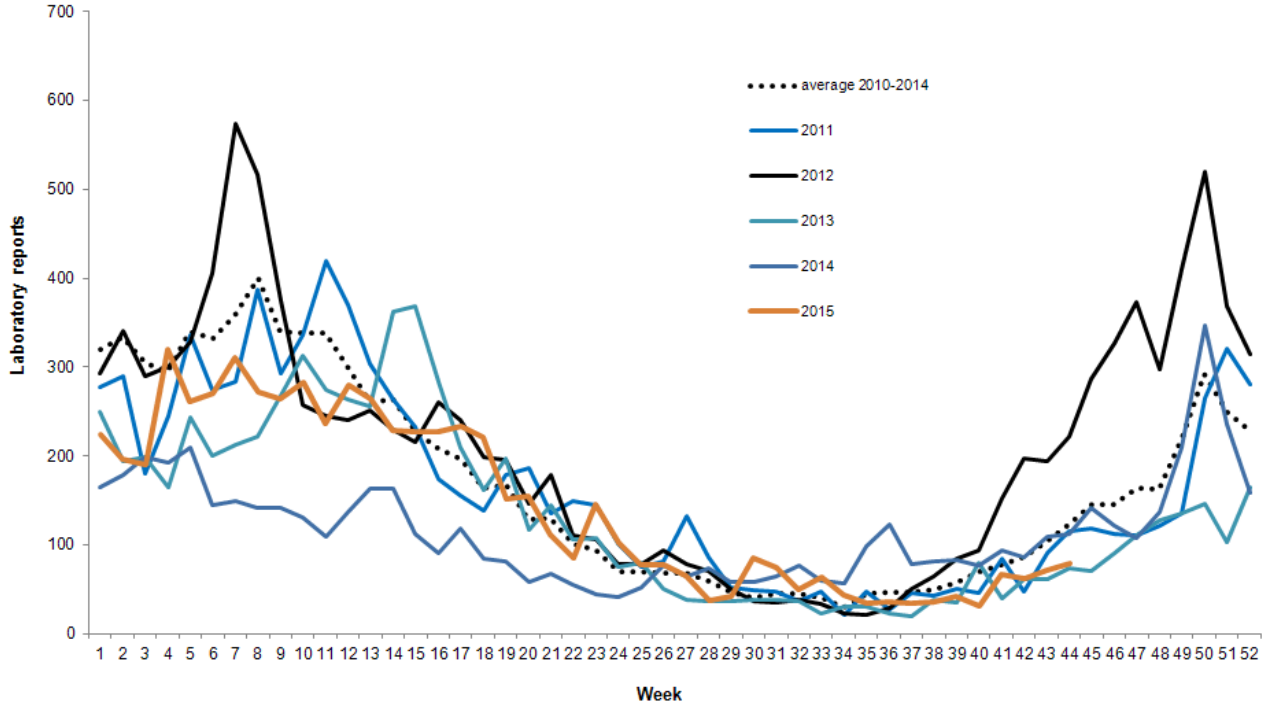
A new laboratory reporting system was commissioned on 1 December 2014; as a result, direct comparisons between the earlier report (based on LabBase2) and the new system (SGSS) may not be valid.

More detailed information is available in the latest PHE Monthly National Norovirus and Rotavirus Report.

Current season's laboratory reports (to week 44, 2015) compared to previous seasons' weekly average (England and Wales)



Calendar year 2015 (to week 44) norovirus laboratory reports compared to previous years' weekly mean (2010-2014)



Suspected and laboratory-confirmed reported norovirus outbreaks in hospitals, with regional breakdown: outbreaks occurring in weeks 40-44/2015

Region/ PHE Centre	Outbreaks: weeks 40-44/2015			Total outbreaks 1-44/2015		
	Outbreaks	Ward/bay closure*	Lab-confirmed	Outbreaks	Ward/bay closure*	Lab-confirmed
Avon, Gloucestershire and Wiltshire	2	2	–	66	65	48
Bedfordshire, Herts. and Northants.	–	–	–	7	7	6
Cheshire and Merseyside	–	–	–	8	6	8
Cumbria and Lancashire	–	–	–	39	38	20
Devon, Cornwall and Somerset	2	2	1	118	118	79
Greater Manchester	–	–	–	17	14	8
Hampshire, Isle of Wight and Dorset	–	–	–	25	24	20
Lincolnshire, Leicestershire, Nottinghamshire and Derbyshire	–	–	–	26	23	22
London	–	–	–	4	4	1
Norfolk, Suffolk, Cambs. and Essex	–	–	–	–	–	–
North East	5	4	2	56	52	33
Sussex, Surrey and Kent	–	–	–	17	17	13
Thames Valley	1	1	–	8	6	1
West Midlands	–	–	–	112	109	58
Yorkshire and the Humber	1	1	1	74	63	63
Total	**11**	**10**	**4**	**579**	**546**	**380**

* Note: not all outbreaks result in whole wards closures, some closures are restricted to bays only.

Infection reports / Enteric

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Enteric fever surveillance quarterly report (England, Wales and Northern Ireland): third quarter 2015

This quarterly report summarises the epidemiology of laboratory confirmed cases of typhoid and paratyphoid reported in England, Wales and Northern Ireland (EWNI) between July and September 2015. It includes both reference laboratory and enhanced enteric fever surveillance data. All data for 2015 presented below are provisional; more detailed reports will be produced on an annual basis. More information about enteric fever surveillance, including previous reports, is available on the PHE website [1].

National summary

In the third quarter (Q3) of 2015, 76 laboratory confirmed cases of enteric fever were reported in England and Wales (table 1), 31% lower than the third quarter of 2014 (110) and 32% below the rolling mean (111) for Q3 2008 to 2015 (figure 1). No provisional cases were reported in Northern Ireland for Q3.

Figure 1. Laboratory confirmed cases of enteric fever by organism, England, Wales and Northern Ireland: Q3 2008 – 2015

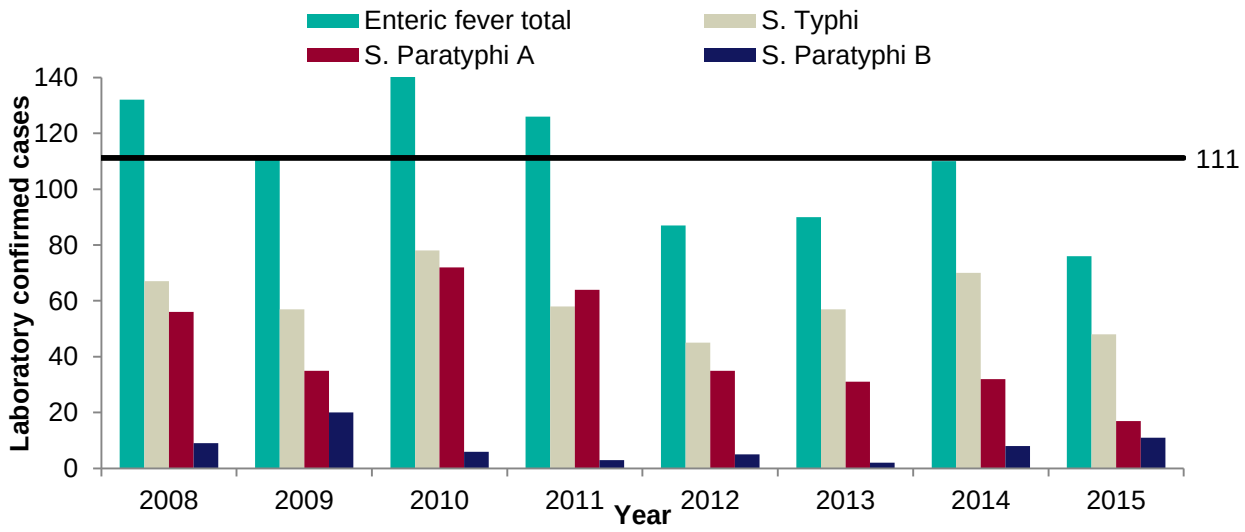


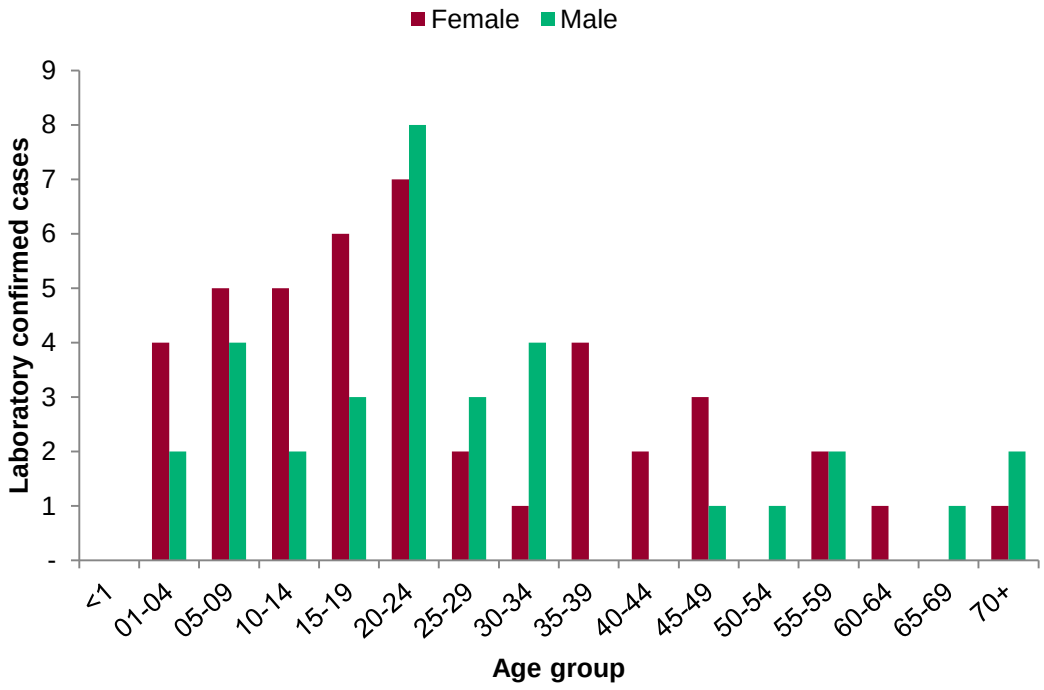
Table 1. Laboratory confirmed cases of enteric fever, England, Wales and Northern Ireland: Q3 2008 – 2015

Organism	Laboratory confirmed cases							
	Q3 2015	Q3 2014	Q3 2013	Q3 2012	Q3 2011	Q3 2010	Q3 2009	Q3 2008
Salmonella Typhi	48	70	57	45	58	78	57	67
Salmonella Paratyphi A	17	32	31	35	64	72	35	56
Salmonella Paratyphi B	11	8	2	5	3	6	20	9
Salmonella Paratyphi C	–	–	–	2	–	–	–	–
Salmonella Typhi and Paratyphi A	–	–	–	–	1	–	–	–
Enteric fever total	**76**	**110**	**90**	**87**	**126**	**156**	**112**	**132**

Age/sex distribution

In Q3 2015, the median age of all cases was 22 years and 32% (24% for males and 37% for females) were aged 16 years and under (figure 2). Females accounted for 57% of all cases in Q3 2015.

Figure 2. Laboratory confirmed cases of enteric fever by age and sex (N=76): Q3 2015



Geographical distribution

Table 3 shows the cases reported by the PHE Centres (PHECs) in Q3 2015 compared to Q3 2014. For all reported cases, the geographical regions have been assigned using the residential postcode where this was available, otherwise referring diagnostic laboratory locations were used. London usually reports the highest proportion of cases in England (36% in 2015 and 38% in 2014). All regions except the South East and East Midlands regions reported a decrease in cases in Q3 2015 compared to 2014 in line with the national trend.

Table 3. Cases of enteric fever by geographical distribution, England, Wales and Northern Ireland: Q3 2015 and 2014.

Geographical area	Q3 2015	Q3 2014	% change between 2014 and 2015
London, PHEC	27	41	-34.1%
South East, PHEC	16	12	33.3%
Yorkshire and Humber, PHEC	8	15	-46.7%
East Midlands, PHEC	7	4	75.0%
East of England, PHEC	5	5	0.0%
South West, PHEC	4	9	-55.6%
West Midlands, PHEC	4	9	-55.6%
North West, PHEC	3	11	-72.7%
North East, PHEC	1	2	-50.0%
England subtotal	**75**	**108**	**-30.56%**
Wales	1	1	0.0%
Northern Ireland	-	1	-100.0%
Total EWNI	**76**	**110**	**-30.9%**

Travel history

In Q3 2015, travel history was available for all 76 cases; of which 67 cases (88%) were presumed to be acquired abroad (61 who had travelled abroad from the UK, five foreign visitors to the UK, and 1 new entrant to the UK). The remaining nine cases had not travelled outside the UK in the 28 days prior to symptoms.

Travel-associated cases

Country of travel was known for all 67 travel-associated cases; 72 countries of travel were reported in total.

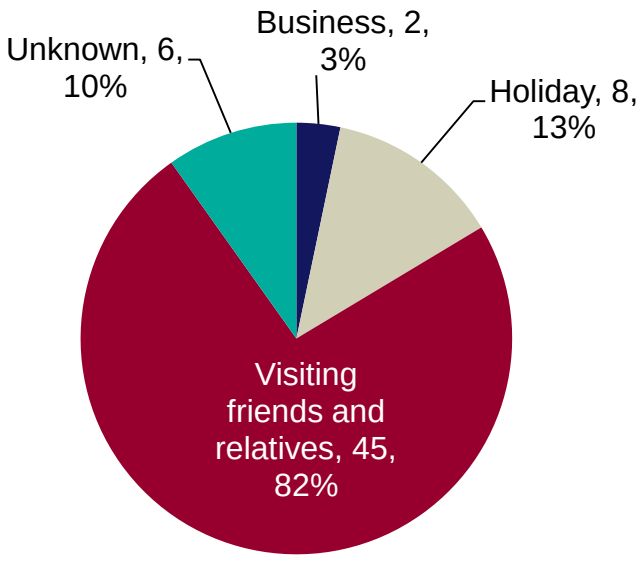
Travel-associated cases were likely to have acquired their infection in: India (19); Pakistan (17); Bangladesh (seven); Bolivia (four); Peru (four); Turkey (four); Iraq (three), Tanzania, Nigeria (two each); Sri Lanka, Philippines, Ghana, Sierra Leone, China, Indonesia, Chile, Zimbabwe, Myanmar, Nepal (one each).

Some cases travelled to more than one country so totals will not equal the number of total cases that travelled. Where multiple countries of travel have been stated by the case, only risk countries, as identified by the National Travel Health Network and Centre [3], were included for analysis. If a case travelled to multiple risk countries each country was counted individually. India and Pakistan continue to be the most frequently reported countries of travel for the third quarter of 2015.

Reason for travel

Of the 61 cases who had travelled abroad from the UK, reason for travel was known for 55. Among those, 82% of cases travelled to visit friends and relatives (figure 4).

Figure 4. Laboratory-confirmed cases of enteric fever that have travelled abroad (N=61) by reason for travel: Q3 2015



Non-travel-associated cases

Two of the non-travel-associated cases were secondary cases who had been in close contact with other travel-associated confirmed cases (family members).

The remaining seven cases stated that they had not been in recent contact with a probable or confirmed case prior to the onset of illness, although three reported links with asymptomatic travellers from endemic countries. No other possible sources have been identified for the remaining non travel cases.

Data sources and acknowledgements

Data were collated and analysed by the Travel and Migrant Health Section, National Infections Service, Colindale. Laboratory data were provided by Gastrointestinal Bacterial Reference Unit, National Infections Service, Colindale. Other surveillance data were provided by Environmental Health Officers and local health protection colleagues in PHE through enteric fever enhanced surveillance.

References

1. GOV.UK website. Enhanced surveillance of enteric fever. Available at: https://www.gov.uk/government/collections/typhoid-and-paratyphoid-guidance-data-and-analysis

2. GOV.UK website. Typhoid and paratyphoid: laboratory confirmed cases in England, Wales and Northern Ireland. Available at: https://www.gov.uk/government/publications/typhoid-and-paratyphoid-laboratory-confirmed-cases-in-england-wales-and-northern-ireland

3. National Travel Health Network and Centre (NaTHNaC) website. Available at: http://travelhealthpro.org.uk/