Public Health England

Health Protection Report
weekly report

This is a PDF consolidation of the news items and infection reports published in HPRs 9(41) and 9(42), on 20 and 27 November 2015, respectively

Volume 9 Numbers 41-42 Published on: **20 and 27November 2015**

Current News

Infection Reports

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* Published in *HPR* **9**(41) on 20/11/2015.
** Published in *HPR* **9**(42) on 27/11/2015.

News

Volume 9 Number 41/42 Published on: **20 and 27 November 2015**

English Surveillance Programme for Antimicrobial Utilisation and Resistance second report

The second annual report of the English Surveillance Programme for Antimicrobial Utilisation and Resistance (ESPAUR), published by PHE [1], supplements the first report's data on antibiotic use/prescribing and resistance in the calendar years 2010 to 2013 with new data for 2014; it also reviews antimicrobial stewardship activities pursued in primary and secondary care and considers personal and professional engagement activities, as anticipated by the five year AMR strategy for England published in 2013 [2].

ESPAUR was established in 2013 after PHE was charged with delivering on four of the seven key areas of the UK strategy for 2013-2018 [3].

The key function of the programme is to collate antimicrobial resistance and use data; determine trends in both use of antibiotics and the extent of proliferation of resistant strains associated with those drugs; and also to monitor antimicrobial stewardship programmes and research and public/professional engagement. The first report had provided baseline data on national and regional antibiotic resistance and use, covering the period 2010 to 2013, against which future changes in prescribing practices and resistance could be compared [3].

Key findings of the second report are that:

on usage

- total antibiotic consumption (measured as defined daily dose of antibiotics per 1000 inhabitants per day) in England has increased by 6.5% since 2011: from 21.6 DDD per 1000 inhabitants per day (2011), to 23 DDD per 1000 inhabitants per day in 2014; in absolute terms, total consumption increased by 2.4% between 2013 and 2014;
- the number of prescriptions dispensed in the community declined in both 2013 and 2014 and are now at a lower level than in 2011;
- antibiotic use measured in primary care increased when measured by DDD and decreased when measured by prescription, suggesting that longer courses or higher doses are being used
- prescribing to hospital inpatients increased significantly by 11.7%, and to hospital outpatients by 8.5%, between 2011 and 2014;
- use of broad spectrum antibiotics (those whose use is likely to drive growth in antibiotic resistance) decreased significantly in primary care.

on resistance

- between 2010 and 2014, the rate of bloodstream infections caused by *Escherichia coli* and Klebsiella pneumoniae increased by 15.6% and 20.8% respectively;
- the number of antibiotic resistant *E. coli* bloodstream infections has increased overall between 2010 and 2014;
- there was a 23% reduction in *Streptococcal pneumoniae* bloodstream infections between 2010 and 2014, possibly related to increased pneumococcal vaccination rates.

on stewardship

- in 2014, 60% of clinical commissioning groups (CCGs) and 87% of NHS acute trusts had reviewed the national antimicrobial stewardship toolkits for primary or secondary care; however, only 13% of CCGs and 46% of acute trusts had implemented an action plan to deliver antimicrobial stewardship activities.

on public and professional engagement

- Within the first three months of its launch, the UK-wide Antibiotic Guardian campaign attracted pledges from more than 10,000 members of the public and healthcare professionals on prudent antibiotic use.

EU wide data published

As far as the proliferation of antibiotic-resistant infections is concerned, the new ESPAUR data suggest that the situation in England in most respects mirrors that across the European Union and EEA.

On antibiotic usage, for example, ECDC reports a continuing large inter-country variation in consumption across the EU [4]: several member states report significant reductions in consumption and ESPAUR data indicate that consumption of cephalosporins and quinolones in England is the lowest in the EU [1].

Nevertheless, a common phenomenon reported by both ECDC and ESPAUR is the continuing rise in consumption in hospitals, which is a major driver of the spread of multidrug-resistant bacteria responsible for healthcare-associated infections.

References

1. ESPAUR (16 November 2015). English surveillance programme antimicrobial utilisation and resistance (ESPAUR) 2015 report. See also PHE press release: New ESPAUR report reveals continued rise in antibiotic resistant infections
2. DH (2013). UK five-year antimicrobial resistance strategy 2013 to 2018.
3. ESPAUR (2014). English surveillance programme antimicrobial utilisation and resistance (ESPAUR) 2014 report.

4. ECDC (19 November 2015). European Antimicrobial Resistance Surveillance Network (EARS-Net) annual report. See also: ECDC publishes 2014 surveillance data on antimicrobial resistance and antimicrobial consumption in Europe.

Surveillance of antimicrobial resistance in *Neisseria gonorrhoeae*

The following summarises latest findings from the Gonococcal Resistance to Antimicrobial Surveillance Programme (GRASP) survey, and related surveillance data

Gonorrhoea, caused by infection with the bacterium *Neisseria gonorrhoeae*, is the second most common bacterial sexually transmitted infection in England and, in 2014, was the most common STI diagnosed among men who have sex with men (MSM). New cases continue to increase with 34,958 cases reported in 2014, a 19% increase from 2013 [1]. Over half (55%) of diagnoses in heterosexuals occurred in those aged 15 to 24 years. Gonorrhoea presents a significant public health threat: untreated infection may cause pelvic inflammatory disease and lead to tubal infertility, highlighting the need to maintain effective management [2].

Antimicrobial resistance (AMR) in *N. gonorrhoeae* threatens effective treatment and control. Strategies to address this challenge are outlined in national, regional and global action plans [3-5]. The guidelines emphasise the importance of high quality surveillance, prompt recognition and effective management of potential treatment failures, and effective communication to allow timely review of treatment guidelines and public health policy. The World Health Organization recommends treatment guidelines are changed once resistance to the first line therapies reaches a prevalence of 5% [5].

In England and Wales, the Gonococcal Resistance to Antimicrobials Surveillance Programme (GRASP) is the national sentinel surveillance programme which collects *N. gonorrhoeae* isolates from consecutive patients attending a network of genito-urinary medicine (GUM) clinics between July and September each year. The programme – whose annual report has been published by PHE [6] – informs clinical guidelines by monitoring patterns of susceptibility of *N. gonorrhoeae* to antimicrobial agents used for treatment of gonorrhoea. In 2014, 25 GUM clinics in England and two in Wales participated. Public Health England's Sexually Transmitted Bacterial Reference Unit (STBRU) received 2,581 isolates of which 1,568 were successfully retrieved, tested for antimicrobial susceptibility and matched to clinical data.

For the first time GRASP was supplemented with data on antimicrobial resistance in *N. gonorrhoeae* from primary diagnostic laboratories reported to PHE's Second Generation Surveillance System (SGSS) and the national reference service at PHE's STBRU. Although each data source has limitations this combined data source provides a greater insight into the epidemiology of antimicrobial resistant *N. gonorrhoeae* than was previously possible.

Notes

For the purpose of this report: ceftriaxone resistance is defined as isolates with a minimum inhibitory concentration (MIC) ≥0.125mg/L.

Azithromycin resistance is defined as MIC ≥1mg/l.

References

1. PHE (2015). Sexually transmitted infections and chlamydia screening in England, 2014, *HPR* **9**(22).
2. Bignell C, Fitzgerald M (2011). UK national guideline for the management of gonorrhoea in adults, 2011. *Int J STD AIDS*, 2011, **22**(10): 541-7.
3. Health Protection Agency (2013). Gonoccocal Resistance to Antimicrobials Surveillance Programme (GRASP) Action Plan for England and Wales: Informing the Public Health Response
4. ECDC (2012). Response plan to control and manage the threat of multi-drug resistant gonorrhoea in Europe.
5. WHO (2012). Global action plan to control the spread and impact of antimicrobial resistance in *Neisseria gonorrhoeae*.
6. PHE (2015). Surveillance of antimicrobial resistance in *Neisseria gonorrhoeae*: findings from the Gonococcal Resistance to Antimicrobials Surveillance Programme (GRASP) survey, and related surveillance data, 2014.
7. Wetten S, Mohammed H, Yung M, Mercer CH, Cassell JA, Hughes G (2015). Diagnosis and treatment of chlamydia and gonorrhoea in general practice in England 2000-2011: a population-based study using data from the UK Clinical Practice Research Datalink. *BMJ Open* 2015; **5**(5).

Shingles vaccination programme second annual report

PHE has published a full report on the second year of the shingles immunisation programme – covering the period 1 September 2014 to 31 August 2015 [1].

The report describes coverage (the number of patients who have ever received a vaccination) and uptake (the number who received a vaccination during a particular programme period) achieved for each eligible cohort; it also includes uptake data by gender, and data on vaccination in contraindicated groups [1].

Over 95% of GP practices in England reported coverage data showing that 59% of eligible 70-year-olds (the ‘routine cohort’) and 57.8% and 58.5%, respectively, of the 2 ‘catch-up cohorts’ (those aged 78, and 79, on 1 September 2014), received the vaccine.

The annual report presents coverage data broken down by NHS England area team. Geographical variation in coverage ranged from 48.8% in London to 63.1% in Thames Valley, with the two-thirds of area teams reporting coverage above 60%.

England is one of the few countries to have introduced a shingles vaccination programme for older adults and to be collating comprehensive coverage data.

Training resources for healthcare professionals relating to the shingles vaccination programme, and other relevant guidance, are available on the Shingles: guidance and vaccination programme pages of the GOV.UK website.

Reference

1. PHE (November 2015). Herpes zoster (shingles) immunisation programme 2014 to 2015: report for England.

Latest data on imported dengue fever published

Latest data on dengue fever imported into England, Wales and Northern Ireland (EWNI) have been published by PHE, covering cases reported by the agency's Rare and Imported Pathogens Laboratory (RIPL) in 2014 [1].

In 2014 there was an overall decrease of 37% of cases reported (347) compared to 2013 (549), as against an annual average increase of 36% between 2009 and 2014.

Dengue is most commonly imported into EWNI having been acquired in Asia, south and central America or the Caribbean, with Thailand and India being the most frequently implicated countries of travel. In 2014, there was an unusual increase in cases associated with travel to Malaysia, and to Tanzania (where an outbreak occurred in the early part of the year).

Active surveillance of dengue is not conducted in the UK. Clinical and travel history details for cases are dependent upon what the diagnosing clinician provides with the laboratory request form when the sample is sent to RIPL. It is recommended that those sending samples to RIPL adhere to the guidance about what information to include on the request form, as set out in the RIPL User Manual available on the PHE website [4].

Country-specific information about dengue risk, and a general factsheet, are available on the National Travel Health Network and Centre (NaTHNaC) website [3,4].

References

1. PHE (26 November 2015). Dengue reported in England, Wales and Northern Ireland: 2014.
2. PHE. Rare and Imported Pathogens Laboratory: specimen referral guidelines and service user manual.
3. NaTHNaC website. Country information pages.
4. NaTHNaC website. Dengue factsheet (updated 13 October 2015).

Cost-effectiveness of MRSA screening for hospital admissions

Screening of all hospital admissions for methicillin resistant *Staphylococcus aureus* (MRSA) was instituted in England in 2011, one of a number of infection control initiatives and interventions introduced to control healthcare-associated infections. The aim was to ensure all colonised or infected patients were identified so that they could be isolated and/or given suppressive treatment. Previously, national guidelines had recommended only screening patients in “high risk” specialties, where infections were likely to be deep-seated and difficult to treat.

The Department of Health for England was committed to review the mandatory universal screening policy post-implementation and a report on the universal screening policy’s implementation, including a full cost-effectiveness evaluation, was published in March 2014 [1]. The findings of this report directly informed the modified MRSA screening guidance to the NHS that was issued by the Department in August 2014 [2]. This recommended replacing universal MRSA admission screening with screening of high-risk specialty admissions only. The health economic model, and its findings, in terms of costs and health benefits, which provided the evidence for this modified guidance, have now been published in the Lancet Infectious Diseases journal [3].

The study, led by mathematical modellers at PHE, in collaboration with UCL, used a dynamic, transmission, health economic model to evaluate alternative MRSA screening strategies. It found that the policy of universal MRSA screening was highly likely to be a poor use of resources for the NHS, and that reverting to the previous strategy of targeting MRSA screening to patients admitted to high risk specialties was more likely to represent a better use of resources in the majority of hospital types and prevalence settings. (Switching from universal admission screening to screening only high-risk specialty admissions resulted in a mean difference in total costs per year of £2.7 million per acute hospital, £2.9 million per teaching, and £474,000 per specialty, hospital, for a minimal rise in infections, circa. 1/year/hospital, according to the study’s conclusions.)

In place of universal screening, Trusts are now responsible for identifying and screening all patients admitted to high risk units, and those previously known to have been MRSA-positive, as well as for carrying out local risk assessments to target those at greatest risk of infection and of poor patient outcome.

References

1. Fuller C, Robotham J, Savage J, *et al* (2014). The national one week prevalence audit of MRSA screening.

2. ARHAI (2014). Implementation of modified admission MRSA screening guidance for NHS.

3. Robotham JV, Deeny SR, Fuller C, Hopkins S, Cookson B and Stone S (2015). Cost-effectiveness of national mandatory screening of all admissions to English National Health Service hospitals for meticillin-resistant Staphylococcus aureus: a mathematical modelling study. *The Lancet Infectious Diseases.* Published online, 23 November 2015.

Public Health England

Health Protection Report
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Infection Reports

Zoonoses *

- **Common animal associated infections quarterly report (England and Wales): third quarter 2015; and Lyme disease 2013-2014 data**

Bacteraemia *

- **Pyogenic and non-pyogenic streptococcal bacteraemia (EWNI, voluntary reporting, 2014 data)**

Immunisation **

- **Laboratory confirmed cases of measles, mumps and rubella, England: July to September 2015**
- **Pertussis Vaccination Programme for Pregnant Women: vaccine coverage estimates in England, June to September 2015**

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Infection reports / Zoonoses

Volume 9 Number 41 Published on: 20 November 2015

Common animal associated infections quarterly report (England and Wales): third quarter 2015; and Lyme disease 2013-2014 data

This quarterly report, produced by the Emerging Infections and Zoonoses Section at Public Health England National Infections Service, and the Health Protection Division of Public Health Wales, summarises confirmed cases of zoonoses reported in England and Wales between July and September 2015 (third quarter; weeks 27-39).

Animal associated infections in England and Wales: laboratory reports to SGSS† (unless otherwise specified) by specimen date, Q3 (weeks 27-39/15)

Disease (Organism)	Reports for weeks 01-13		Reports for weeks 14-26		Reports for weeks 27-39		Total for weeks 01-39	
	2015*	2014	2015*	2014	2015*	2014	2015*	2014
Anthrax (*Bacillus anthracis*)	0	0	0	0	0	0	0	0
Brucellosis *(Brucella spp.)*	1	2	5	2	2	4	8	8
Hepatitis E	203	217	213	250	200	234	616	701
Hydatid (*Echinococcus granulosus*)	9	6	8	2	3	1	20	9
Leptospirosis *(Leptospira spp*.)	10	7	10	9	23	30	43	46
Lyme borreliosis: (*Borrelia burgdorferi*)								
All cases	83	142	102	153	421	300	606	595
Acute infections	32	60	57	72	340	180	429	312
Pasteurellosis *(Pasteurella spp.)*	139	126	147	163	181	173	467	462
Psittacosis (*Chlamydophila psittaci)*	4	6	11	4	6	6	21	16
Q-fever *(Coxiella burnetii)*	5	10	3	18	6	16	14	44
Toxoplasmosis# *(Toxoplasma gondii)*	88	76	86	96	82	94	256	266

†Second Generation Surveillance System has now replaced LabBase

* Provisional data

Based on date specimen received

Anthrax

There were no cases reported in the third quarter of 2015.

Brucellosis (data from the Brucella Reference Laboratory)
Two cases were reported in the third quarter of 2015, compared with four in the third quarter of 2014.

One of the cases was male (34 years) and the second was female (30 years). Both were infected with *Brucella melitensis*. The male case was a mechanic who has been resident in the UK for several years but who had a recent history of travel to India where he consumed milk from local shops. The female case had a recent history of travel to an endemic area; further details are awaited.

Hepatitis E (data from Public Health Laboratory Birmingham, and Blood Borne Virus Unit Colindale)
There were 200 cases of hepatitis E in the third quarter of 2015 compared to 234 in the same quarter of 2014. One hundred and twenty-eight cases (64%) were male (aged 12-87 years, median 59) and 67 (34%) were female (aged 16-89 years, median 56). The gender of the remaining five cases was not reported. The persisting observation of the predominance of older men (see table below) remains unexplained. Cases were reported from all regions. The majority of cases (85%, n=171) had no reported travel history.

The number of cases is consistent with the on-going increase observed since 2010[1].

Laboratory confirmed cases of Hepatitis E infection (week 27-39, 2015): age group by sex

Age Group	Male	Female	Unknown	Total
0-14	1	–	–	1
15-24	4	2	1	7
25-44	20	17	2	39
45-64	58	28	1	87
>64	45	20	1	66
Unknown	–	–	–	–
Total	128	67	5	200

Hydatid disease (data from the Parasitology Reference Laboratory)

Three cases of hydatid disease were reported in the third quarter of 2015 compared with one in the third quarter of 2014. Two cases were male (56 years and age unknown), and for the third case neither age nor sex were given. Presentations included liver or abdominal cysts. All three infections are believed to have been acquired outside the UK.

Leptospirosis (data from the Leptospira Reference Unit, Colindale and the Rare and Imported Pathogens Laboratory, Porton)
There were 23 cases of leptospirosis reported in the third quarter of 2015, compared with 30 in the third quarter of 2014.

Sixteen of the cases were male (aged 15-88 years, median 44) and seven were female (aged 17-42 years, median 22). The regions that reported the most cases were London (n=6) and the North West (n=6). Eight of the cases had travelled: two to Thailand; one each to Costa Rica, Malaysia and Sri Lanka; two to unspecified countries; and two cases had travelled to more than one country (Thailand, Vietnam and Cambodia; USA, Costa Rica and Nicaragua).

Four cases reported exposure to rats, including two who were scratched and one who regularly sees rats at a bin yard where he works. Three cases reported exposure to water sources: one who went fishing in the UK; one who went wild water swimming in the UK; and a case who reported exposure to fresh water overseas. One further case was a sewerage worker.

Eleven of the cases were diagnosed by PCR alone. PCR diagnoses were not included in the number of cases reported as confirmed leptospirosis prior to Q2 2015.

Lyme disease (data from the Rare and Imported Pathogens Laboratory, Porton)

During the third quarter of 2015, a total of 421 cases of laboratory confirmed Lyme disease were reported, compared with 300 during the third quarter of 2014. Of these cases, 340 were acute (including 30 neuroborreliosis) and 81 were past infections.

Of the acute cases, 182 were male (aged 2- 90 years, median 46) and 151 were female (aged 1- 93 years, median 51). Gender was unrecorded for seven cases and age was unrecorded for one case.

Laboratory confirmed acute cases of *Lyme borreliosis* (weeks 27-39, 2015): age group by sex; region of reporting laboratory

Age group	Male	Female	Unknown	Total
0-14	18	17		35
15-24	13	9	1	23
25-34	22	15		37
35-44	33	16	1	50
45-54	30	29	1	60
55-64	32	36	2	70
65-74	25	21	1	47
75+	8	8	1	17
Unknown	1	0	0	1
Total	**182**	**151**	**7**	**340**

Region	Cases
East Midlands	6
East of England	22
London	49
North East	11
North West	16
South East	116
South West	94
Wales	5
West Midlands	10
Yorkshire & Humber	11
Total	**340**

Thirty-four (10%) of the acute cases reported foreign travel. The majority of cases had travelled in Europe (n=24), eight had travelled in the Americas, one had been to the Middle East, and one to the Far East. One hundred and fifty-six acute cases reported an insect bite, of whom 145 specified a tick bite. Sixty-eight cases reported erythema migrans as a presenting symptom.

Note: Specimens sent for *Lyme borreliosis* referral testing should be accompanied by a completed referral form: https://www.gov.uk/lyme-borreliosis-service

Pasteurellosis

A total of 181 confirmed cases of pasteurellosis were reported in the third quarter of 2014. This compares to 173 reported in the same quarter of 2014. The following species were reported: *Pasteurella multocida* (116 cases), *Pasteurella canis* (8 cases), *Pasteurella pneumotropica* (6 cases), *Pasteurella* other named (14 cases), *Pasteurella* sp. (37 cases).

One hundred of the cases were female (aged 1- 90 years, median 60) and 81 were male (aged 2-91 years, median 61). The South East of England reported the most cases (n=33), and Wales reported the least (n=3). Twelve of the cases were associated with dog bites, and nine with cat bites.

Laboratory confirmed cases of pasteurellosis (week 27-39, 2015): age group by sex

Age group	Male	Female	Total
0-14	7	8	15
15-29	4	4	8
30-39	2	3	5
40-49	11	14	25
50-59	13	20	33
60-69	18	18	36
70-79	16	15	31
80+	10	18	28
Total	**81**	**100**	**181**

Psittacosis

Six cases of psittacosis were diagnosed in the third quarter of 2015, the same number as in the third quarter of 2014. Four were male (aged 36-62 years, median 55) and two were female (aged 43 and 69 years). Two of the cases were reported by the South West region, and one each was reported by the East of England, Yorkshire and the Humber, the North East of England and the West Midlands.

Note: Serological tests for respiratory chlamydophila infections cannot consistently distinguish psittacosis. The cases reported above have been identified by reporting laboratories as infection with *Chlamydia psittaci*.

Q fever (data from the Rare and Imported Pathogens Laboratory, Porton, and Bristol Reference Laboratory)

There were six cases of Q fever reported in the third quarter of 2015, compared with 16 during the third quarter of 2014. Five were male (aged 32-51 years, median 40) and one was female (aged 49 years). Two cases were reported from both London and the North East, and one case was reported from the South West and Wales. One case reported travel to Iraq.

Toxoplasma (Data from the Toxoplasma Reference Unit)

There were 82 cases of toxoplasmosis reported in the third quarter of 2015 compared with 94 in the third quarter of 2014. Eight cases reported ocular symptoms. Six cases occurred in pregnant women. There were no congenital cases reported in this quarter.

Laboratory confirmed cases of toxoplasma infection (weeks 27-39, 2015): age group by sex; age group by clinical category

Age group	Male	Female	Total
0			0
1-9			0
10-14			0
15-24	6	3	9
25-44	15	33	48
45-64	7	11	18
>64	2	3	5
Unknown	2		2
Total	**32**	**50**	**82**

Age group	Con-genital	Pregnant	HIV	Organ donor	Organ recipient	Other (Immuno-competent)	Other (Immuno-suppressed)	Total
0								0
1-9								0
10-14								0
15-24						9		9
25-44		6	2	1		39		48
45-64			4			14		18
>64					1	4		5
Unknown			1				1	2
Total	**0**	**6**	**7**	**1**	**1**	**66**	**1**	**82**

Other zoonotic organisms

Other zoonotic infections of interest diagnosed in the third quarter of 2015 were as follows:

- Eleven cases of *Capnocytophaga* infection, ten were bacteraemic and one was diagnosed from a pus culture. One case was speciated as *Capnocytophaga ochracea*. Four of the cases were female (aged 46-81 years), and the remaining seven were male (aged 46-90 years). The South East region reported the most cases (n=3). One case reported a dog bite, and one infection in an 81 year old female from Yorkshire and Humber was fatal.
- Four cases of *Erysipelothrix rhusiopathiae* were reported in two males (22 and 38 years) and two females (both aged 74 years). Three of the cases had bacteraemia and the fourth was diagnosed by culture of pleural fluid. One case was reported from each of the East Midlands, the East of England, the North East and the South East.
- Six cases of *Mycobacterium marinum* were reported in four males (aged 24-74 years) and two females (aged 57 and 67 years). Three had tissue infections, one had a skin wound, one was diagnosed from pus culture and the last from a biopsy. Two cases were reported by each of the East Midlands and the North East, and one case was reported by the East of England and the South West regions.
- One acute hantavirus infection was reported in England in a 28 year old woman who owned fancy rats.

- A cluster of three hantavirus infections were reported in Wales. Cases 1 and 2, both adult males, were family members who had the same exposure in a domestic setting. This involved a large number of rats which were bred as feed for snakes. Case 3, also an adult male, had recently started to work at a commercial rat breeder where his job was to clean out and feed 1000s of rats. All three cases were epidemiologically linked by the transfer, breeding and husbandry of domestic (fancy) and/or breeder/feeder rats (bred for food for reptiles). Seoul virus RNA was detected by APHA in a selection of rats from all the related premises. PHE Porton and APHA are collaborating to compare human and rat derived sequences.

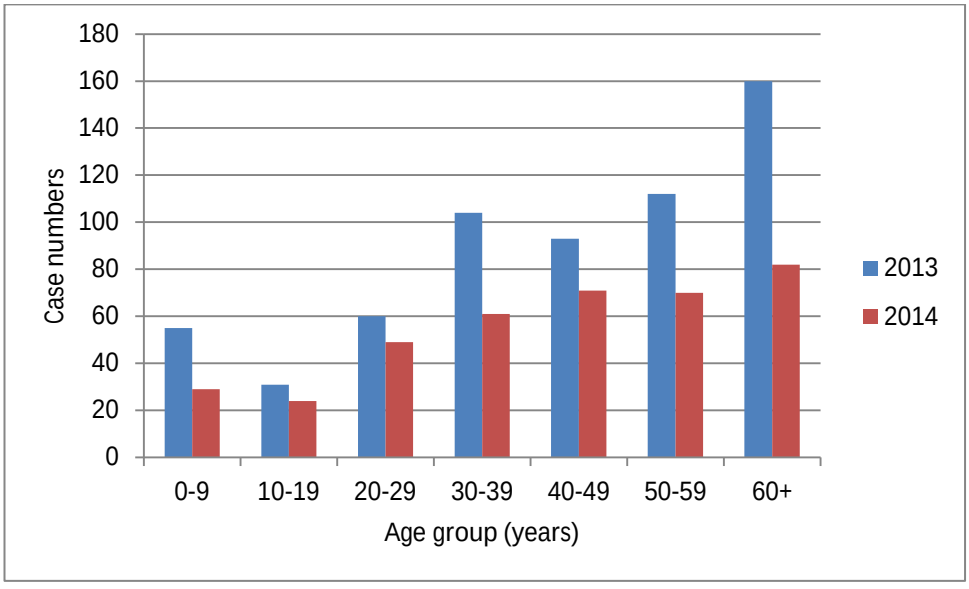
Lyme disease 2013-2014

In 2012, the reference laboratory for *Lyme borreliosis* moved to the Rare and Imported Pathogens Laboratory, PHE Porton. Consistent data for 2013 and 2014, the first two full years of the new surveillance system, are now available. The data include categorisation of the cases into acute and past infections. The following diagnoses were made:

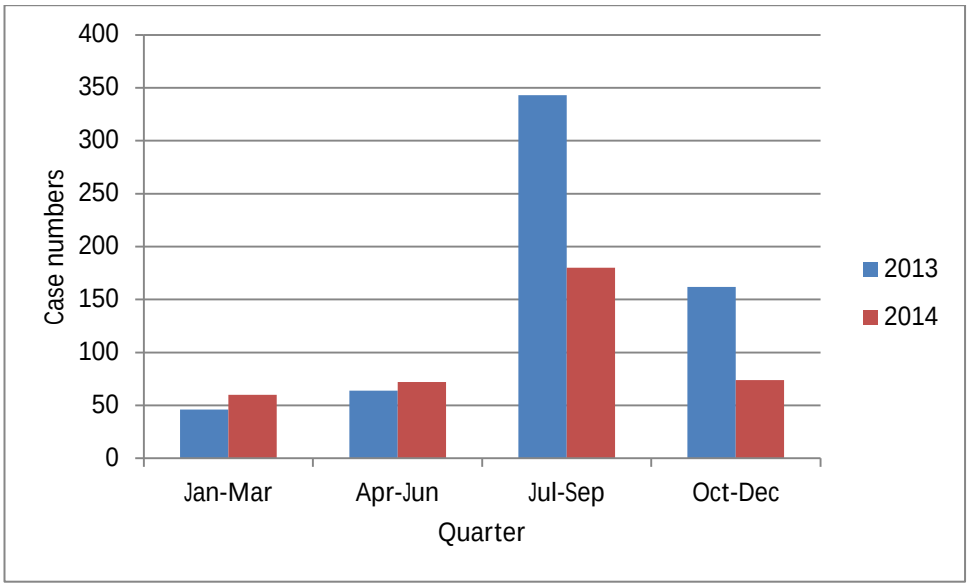
	2013					2014				
Case status	**Q1**	**Q2**	**Q3**	**Q4**	**Total**	**Q1**	**Q2**	**Q3**	**Q4**	**Total**
Acute Lyme	46	63	331	158	598	60	72	172	73	377
Acute neuroborreliosis	0	1	12	4	17	0	0	8	1	9
Equivocal	5	4	20	15	44	15	11	16	6	48
Past infection	41	38	72	68	219	67	70	104	55	296
Total	**92**	**106**	**435**	**245**	**878**	**142**	**153**	**300**	**135**	**730**

A total of 1001 acute cases were diagnosed across the two years: 615 cases in 2013 and 386 in 2014. Of those with information on gender, 502 were male and 479 were female, giving a sex ratio of 1:1. The number of cases increased with age in both years. The majority of cases were diagnosed during the third quarters of 2013 and 2014.

Laboratory confirmed acute cases of *Lyme borreliosis* (including neuroborreliosis) by age group for 2013 (n=615) and 2014 (n=386)



Laboratory confirmed acute cases of *Lyme borreliosis* (including neuroborreliosis) by quarter of first acute specimen for 2013 and 2014



The majority of cases were diagnosed in the south of England (53.2%).

Region	2013	2014
East Midlands	11	13
East of England	51	24
London	122	68
North East	10	12
North West	33	18
South East	178	120
South West	141	94
Wales	20	11
West Midlands	23	18
Yorkshire & Humber	25	8
Unknown	1	0

Of the cases with acute infection: 92 (15.0%) reported history of travel in 2013, as did 54 of the cases in 2014 (14.0%). Across the two years, the majority of cases reporting a travel history (n=146) had either travelled to Europe (105 cases, 71.9%), or the Americas (26 cases, 17.8%).

Over the two year period, 433 cases reported an insect bite, of whom 399 specified a tick bite (238 in 2013 and 161 in 2014). An additional three cases reported a possible tick bite. One hundred and eighty one cases reported erythema migrans (119 in 2013 and 62 in 2014) as a presenting symptom.

Reference

1. https://www.gov.uk/government/publications/hepatitis-e-symptoms-transmission-prevention-treatment/hepatitis-e-symptoms-transmission-treatment-and-prevention

Infection reports / Bacteraemia

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Voluntary surveillance of pyogenic and non-pyogenic streptococcal bacteraemia in England, Wales and Northern Ireland: 2014

These analyses are based on data relating to diagnoses of pyogenic and non-pyogenic streptococcal bloodstream infections during 2007 – 2014 in England, Wales and Northern Ireland (E, W & NI) extracted from Public Health England's (PHE) voluntary surveillance database Second Generation Surveillance System (SGSS).

The data presented here will differ in some instances from those in earlier publications partly due to the inclusion of late reports.

Rates of bacteraemia laboratory reports were calculated using mid-year resident population estimates for the respective year and geography [1]. Rates of group B streptococcal (GBS) bacteraemia in infants were calculated using 2014 live birth denominators [2]. Geographical analyses were based on the residential postcode of the patient if known (otherwise the GP postcode or failing that the postcode of the laboratory) with cases in England being assigned to the catchment area of one of 15 local PHE centres (PHECs) formed from administrative local authority boundaries.

Data collection is based on a voluntary reporting system and as such it is important to note that regional incidence rates can be affected by completeness of reporting.

Beta-haemolytic, pyogenic streptococci are classified according to type of major surface polysaccharide antigen into Lancefield group A (*Streptococcus pyogenes*), B (*Streptococcus agalactiae*), C (multiple zoonotic species plus the human species, *Streptococcus dysgalactiae* subsp*. equisimilis*) and G (human and animal species *Streptococcus dysgalactiae* subsp *equislimilis* and *Streptococcus canis*).

The non-pyogenic streptococci are subdivided into the mitis, sanguinis, anginosus, salivarius, mutans, and bovis groups, of which the first four are often referred to as 'viridans' streptococci. Analyses on *Streptococcus pneumoniae* and group D streptococci (now classified as *Enterococcus* spp.) are not included within this report.

The report includes analyses on the trend, age and sex distribution, geographical distribution and the antimicrobial susceptibility of laboratory reported cases of pyogenic and non-pyogenic streptococcal bacteraemia.

Key points

- between 2013 and 2014 there was a slight increase (1%) in the number streptococcal bacteraemia reports (10,695 and 10,825 respectively) in England, Wales and Northern Ireland
- the overall rate of group A streptococcal (GAS) bacteraemia in 2014 was 2.4 per 100,000 population; the equivalent rates for the other pyogenic streptococci were 2.8 (group B streptococci), 1.2 (group C streptococci) and 1.6 (group G streptococci)
- the rate of reports for the majority of non-pyogenic streptococcal groups increased over the period 2007 to 2014
- in line with previous reports, rates of pyogenic streptococcal bacteraemia were highest in the elderly, with the notable exception of group B streptococci where rates were highest in infants
- rates of group B *Streptococcus* bacteraemia in infants (less than 90 days) increased slightly in 2014 to 0.67 per 1000 live births
- resistance to erythromycin further increased for group B and G streptococci in 2014 reaching 23% and 38% respectively
- between 2% and 28% of non-pyogenic streptococcal group bacteraemic isolates were reported as having reduced susceptibility or resistance to penicillin in 2014

Trends

Between 2010 and 2014 there was a 10% increase in the number of laboratory reports of streptococcal bacteraemia (9764 to 10,825; table 1) in England, Wales and Northern Ireland; a 4% increase in pyogenic (4551 to 4758) and 18% increase in non-pyogenic streptococci (3173 to 3879). Pyogenic and non-pyogenic streptococci accounted for 5.0% and 7.8% of mono-microbial bloodstream infections respectively in 2014 making them the sixth and fourth most commonly reported mono-microbial bloodstream infections respectively [3].

In 2014, 84% of *Streptococcus* spp. isolates from blood were reported to species level (9115 reports), a slight increase compared with 2013 (82%).

Figure 1a. Trend in pyogenic streptococcal bacteraemia reports, by group, per 100,000 population in England Wales and Northern Ireland; 2007 to 2014

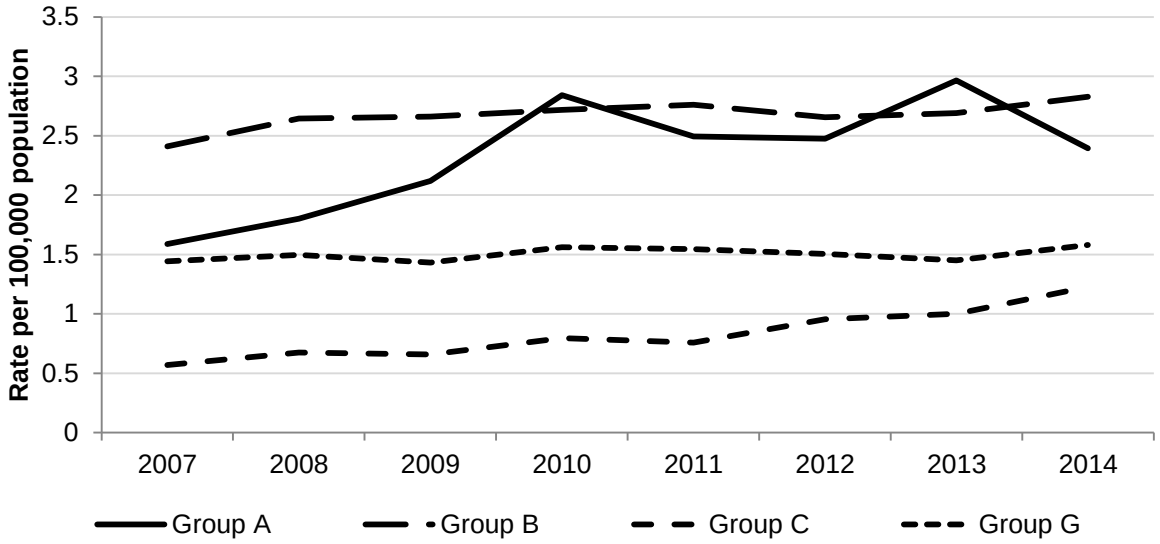


Figure 1b. Trend in non-pyogenic streptococcal bacteraemia reports per 100,000 population in England Wales and Northern Ireland; 2007 to 2014

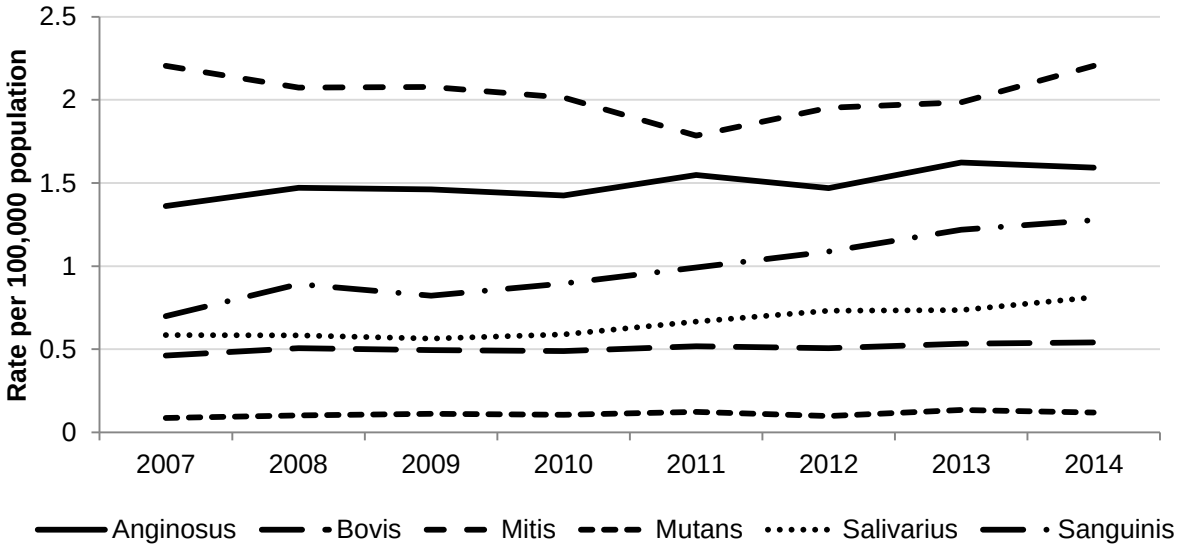


Table 1. Reports of pyogenic and non-pyogenic streptococcal bacteraemia by species in England, Wales and Northern Ireland; 2010 to 2014

	2010	2011	2012	2013	2014
Pyogenic streptococci	**4551**	**4383**	**4431**	**4765**	**4758**
Group A	1633	1446	1445	1743	1419
Group B	1563	1601	1550	1581	1676
Group C	458	440	558	588	727
Group G	897	896	878	853	936
Non-pyogenic streptococci	**3173**	**3268**	**3414**	**3664**	**3879**
Anginosus group	**819**	**898**	**858**	**954**	**943**
S. anginosus	302	325	349	395	409
S. constellatus	201	231	210	260	272
S. intermedius	84	98	107	105	119
S. milleri group	202	203	153	161	124
Streptococcus group F	30	41	39	33	19
Bovis group	**281**	**301**	**296**	**314**	**321**
S. alactolyticus	11	6	10	31	34
S. bovis biotype i	18	20	22	20	18
S. bovis untyped	220	217	167	159	168
S. equinus	8	11	16	16	16
S. gallolyticus	22	37	58	64	47
S. infantarius sp nov	2	10	23	24	38
Mitis group	**1158**	**1035**	**1140**	**1167**	**1306**
S. mitis	782	673	798	784	794
S. oralis	376	362	342	383	512
Mutans group	**61**	**72**	**58**	**79**	**71**
S. mutans	58	70	57	77	68
S. sobrinus	3	2	1	2	3
Salivarius group	**339**	**387**	**427**	**433**	**482**
S. salivarius	316	356	387	395	437
S. vestibularis	23	31	40	38	45
Sanguinis group	**515**	**575**	**635**	**717**	**756**
S. gordonii	58	67	73	97	111
S. parasanguinis	185	176	234	278	312
S. sanguinis	272	332	328	342	333
Other streptococci	**2040**	**2064**	**2116**	**2266**	**2188**
'Anaerobic streptococcus'	37	36	43	30	49
S. acidominimus	12	13	14	11	7
S. suis	2	0	2	1	6
S. uberis	7	6	4	3	4
Streptococci not fully identified	1810	1820	1809	1917	1661
Streptococcus spp., other named	172	189	244	304	461

Group A streptococci

Of the pyogenic streptococci causing bacteraemia, group A *Streptococcus* (GAS) was the second most frequently reported (30%; 1419 reports; table 1) in 2014, a decrease from 2013 where 37% of pyogenic streptococci were identified as GAS in England, Wales and Northern Ireland.

In 2014 the overall rate of GAS bacteraemia for England, Wales and Northern Ireland was 2.4 cases per 100,000 population (figure 1a). England reported the highest incidence rate (2.4), followed by Wales (2.3) and Northern Ireland (1.3; table 2). Each country reported a decrease in incidence compared to 2013 [4].

Table 2. Rate per 100,000 population of pyogenic streptococcal bacteraemia reports by Public Health England Centre and country in England, Wales and Northern Ireland; 2014

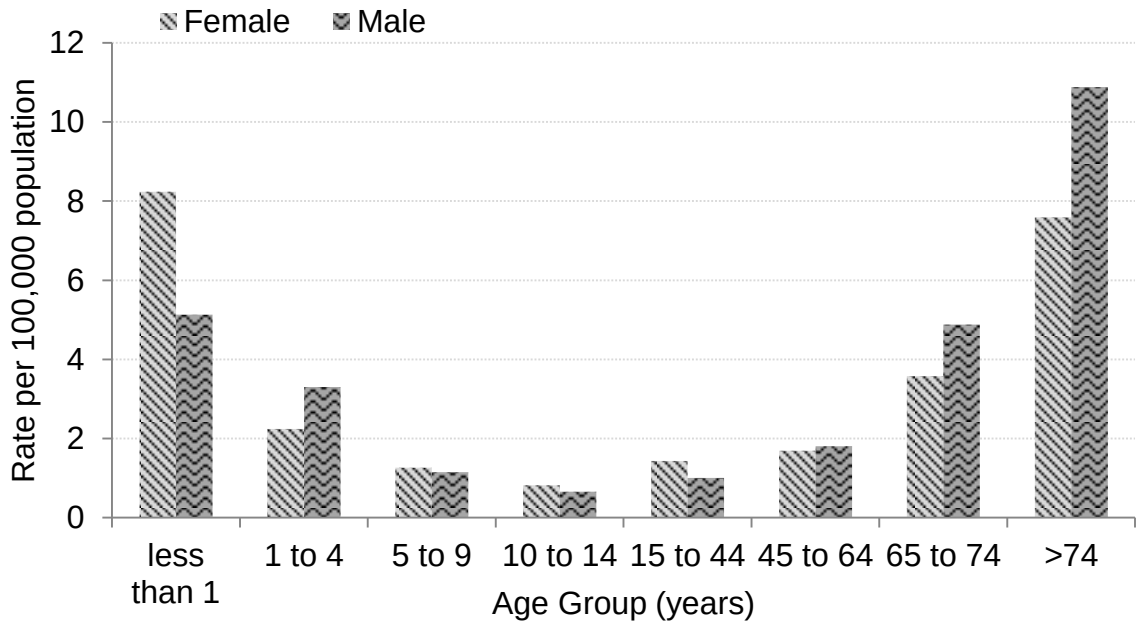
	Rate per 100,000 population			
PHE Centre	**Group A**	**Group B**	**Group C**	**Group G**
London	1.9	3.2	0.8	0.9
South Midlands and Hertfordshire	2.1	2.2	0.9	1.3
East Midlands	3.0	3.5	1.1	3.2
Anglia and Essex	2.3	3.0	1.2	2.6
West Midlands	2.5	3.3	2.1	1.8
Cheshire and Merseyside	2.6	2.6	1.5	2.7
Cumbria and Lancashire	2.6	3.0	1.4	2.3
Greater Manchester	2.9	2.8	1.5	1.7
North East	2.6	2.8	2.4	0.5
Yorkshire and Humber	2.3	2.8	1.3	1.1
Avon Gloucestershire and Wiltshire	2.5	2.9	1.4	2.6
Devon Cornwall and Somerset	3.7	3.1	1.4	2.4
Wessex	2.3	3.6	1.0	1.4
Kent Surrey and Sussex	2.0	2.0	0.7	1.5
Thames Valley	2.6	0.8	0.8	0.2
England	**2.4**	**2.8**	**1.3**	**1.7**
Northern Ireland	**1.3**	**3.3**	**1.4**	**0.2**
Wales	**2.3**	**2.2**	**0.5**	**0.8**
England, Wales and Northern Ireland	**2.4**	**2.8**	**1.2**	**1.6**

There was wide variation in GAS bacteraemia reports within England in 2014, with rates ranging from 1.9 in London to 3.7/100,000 in Devon, Cornwall and Somerset.

Rates of GAS bacteraemia were higher in males than females for older adults with a more mixed pattern for other age groups (figure 2). The highest rates were in the elderly, aged 75 years and over (9.0/100,000), followed by those less than 1 year old (6.8/100,000).

The proportion of GAS bacteraemia reports accompanied by antimicrobial susceptibility data in 2014 was 41%, 54% and 56% for clindamycin, erythromycin and tetracycline respectively (table 3). In 2014 resistance (defined as reduced-susceptibility or non-susceptible) to clindamycin, erythromycin and tetracycline was recorded as 4%, 7% and 10% of cases respectively. Resistance to clindamycin has remained stable since 2010, whereas prevalence of tetracycline resistance has fluctuated over the last five years, remaining around 10%. Resistance to erythromycin remained stable at 5% since 2010 until 2014 where a slight increase is noted at 7%.

Figure 2. Group A streptococcal bacteraemia age and sex rates per 100,000 population England, Wales and Northern Ireland; 2014

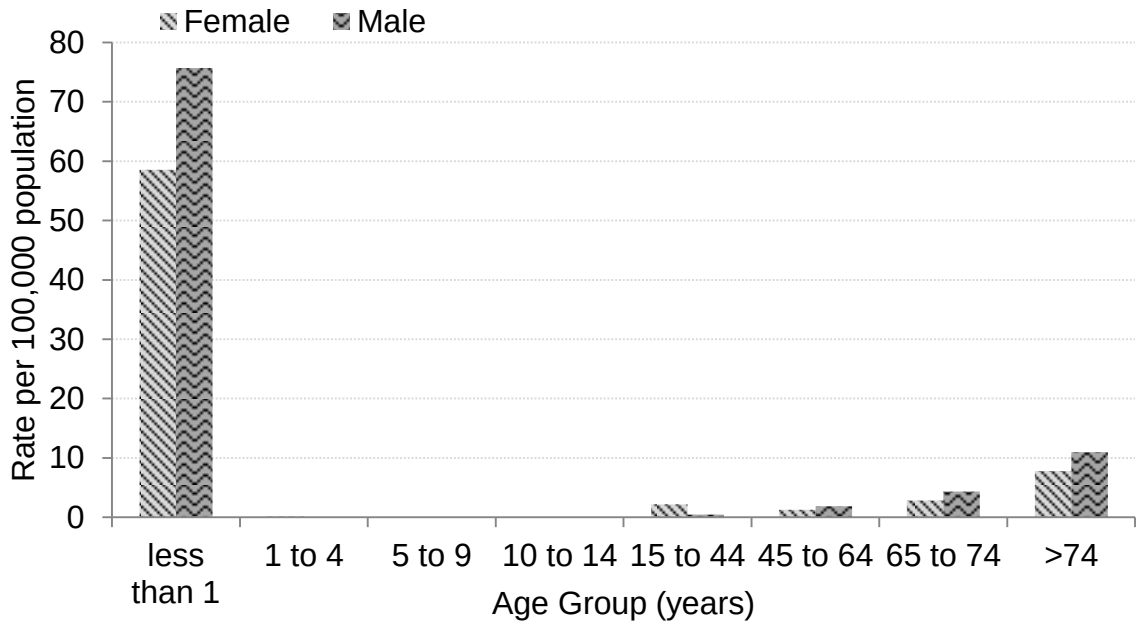


Group B streptococci

In 2014, 1676 cases of GBS bacteraemia were reported by laboratories in England, Wales and Northern Ireland to PHE, a 7% increase compared to 2013 (1581 reports; table 1). This is higher than any of the previous four years. GBS bacteraemia accounted for 35% of the pyogenic streptococcal bacteraemia reported in 2014 making GBS the most frequently reported pyogenic streptococcal bacteraemia.

The reported rate of GBS bacteraemia in England, Wales and Northern Ireland was 2.8 per 100,000 population in 2014, with some variation between countries (England 2.8, Wales 2.2, and Northern Ireland 3.3/100,000; table 2). Within England, there was greater variation with Thames Valley reporting the lowest rate of infection (0.8/100,000) and Wessex and East Midlands areas reporting the highest rates (3.6 and 3.5/100,000 respectively) in 2014.

Figure 3. Group B streptococcal bacteraemia age and sex rates per 100,000 population England, Wales and Northern Ireland; 2014



Rates of GBS bacteraemia remain highest in infants (<1y) at 67.7/100,000 population (58.5 in females and 75.7/100,000 in males; figure 3). Rates were higher in males than females in all age groups except the 15 to 44 years age group (females 2.2 and males 0.5/100,000).

Rates of GBS bacteraemia in infants less than 90 days old in England, Wales and Northern Ireland increased slightly to 0.67/1000 live births in 2014 (table 4) compared with 0.59/1000 in 2013. Consistent with previous years' reports, the reported incidence of early onset disease (<7days old) was higher than late onset disease (7-90 days old) in 2014 (0.42 compared with 0.24/1000 live births).

Table 3. Antimicrobial susceptibility for pyogenic streptococci causing bacteraemia, England, Wales and Northern Ireland; 2010 to 2014

		2010		2011		2012		2013		2014	
		No. tested	% resistant (R)	No. Tested	% R	No. Tested	% R	No. Tested	% R	No. Tested	% R
Group A	clindamycin	421	3%	463	3%	501	4%	677	4%	575	4%
	erythromycin	935	5%	851	5%	799	5%	955	5%	771	7%
	tetracycline	829	8%	726	13%	737	11%	891	10%	795	10%
Group B	clindamycin	452	8%	542	17%	620	13%	598	18%	634	18%
	erythromycin	1100	15%	1054	18%	1069	19%	1039	22%	1030	23%
	tetracycline	1011	82%	1004	83%	1016	85%	1008	86%	1089	83%
Group C	clindamycin	121	12%	182	12%	223	12%	258	13%	323	13%
	erythromycin	324	14%	325	18%	401	24%	393	23%	479	22%
	tetracycline	284	26%	275	27%	375	32%	386	30%	504	33%
Group G	clindamycin	226	8%	283	12%	327	20%	321	18%	387	22%
	erythromycin	648	26%	651	32%	621	37%	624	37%	633	38%
	tetracycline	569	48%	581	49%	561	50%	608	47%	692	52%

Table 4. Number and rate per 1000 live births of group B streptococcal bacteraemia in infants 0-90 days old, England, Wales and Northern Ireland; 2014

	All cases (0-90 days old)			Early onset (0-6 days old)			Late onset (7-90 days old)		
	No.	rate	95% CI	No.	rate	95% CI	No.	rate	95% CI
England	433	0.65	(0.59 - 0.72)	272	0.41	(0.36 - 0.46)	161	0.24	(0.21 - 0.28)
Northern Ireland (NI)	26	1.07	(0.70 - 1.56)	18	0.74	(0.44 - 1.17)	8	0.33	(0.14 - 0.65)
Wales	20	0.60	(0.36 - 0.92)	13	0.39	(0.21 - 0.66)	7	0.21	(0.08 - 0.43)
England, Wales & NI	479	0.67	(0.61 - 0.73)	303	0.42	(0.38 - 0.47)	176	0.24	(0.21 - 0.28)

Rates and absolute numbers of early and late onset GBS disease increased across England, Wales and Northern Ireland in 2014 compared to 2013. A nine per cent increase in early onset GBS bacteraemia reports was noted between 2013 and 2014 (278 to 303) and a 5% increase in late onset GBS bacteraemia reports (167 to 176) over the same period [4].

The proportion of GBS bacteraemia reports in 2014 accompanied by antimicrobial susceptibility test result data was 38%, 61% and 65% for clindamycin, erythromycin and tetracycline respectively. Clindamycin and erythromycin resistance increased in GBS bacteraemia isolates between 2010 and 2014, from 8% and 15% in 2010 to 18% and 23% resistant in 2014 respectively (table 3). Tetracycline resistance in GBS bacteraemia reports remains above 80% in 2014.

Groups C and G streptococci

In England, Wales and Northern Ireland the number of cases of Group C streptococcal (GCS) bacteraemia increased by 24% between 2013 and 2014, from 258 reports to 727 reports, with an observed year-on-year increase since 2011 (table 1). The rate of GCS bacteraemia was 1.2/100,000 population in 2014, double the rate observed in 2007, 0.6/100,000 (figure 1a).

The numbers of group G streptococcal (GGS) bacteraemia reported also increased between 2013 and 2014 (10%; 853 to 936). In England, Wales and Northern Ireland the rate of GGS bacteraemia in 2014 was 1.6/100,000 population.

Population rates of infection varied by individual country for both GCS and GGS bacteraemia in 2014, with GCS bacteraemia rates of 1.3, 1.4 and 0.5/100,000 and GGS bacteraemia rates of 1.7, 0.2 and 0.8/100,000 in England, Northern Ireland and Wales respectively (table 2). Within England GCS bacteraemia rates ranged from 0.7/100,000 in Kent, Surrey and Sussex to 2.4 in the North East of England. Rates of GGS bacteraemia also varied, ranging from 0.2/100,000 in the Thames Valley to 3.2 in the East Midlands.

The rates of both GCS and GGS bacteraemia were highest in the elderly, with 7.4 and 11.9/100,000 in the 75 years and over age group respectively (figures 4 and 5). Rates tended to be higher in males than in females in the majority of age groups.

Figure 4. Group C streptococcal bacteraemia age and sex rates per 100,000 population England, Wales and Northern Ireland; 2014

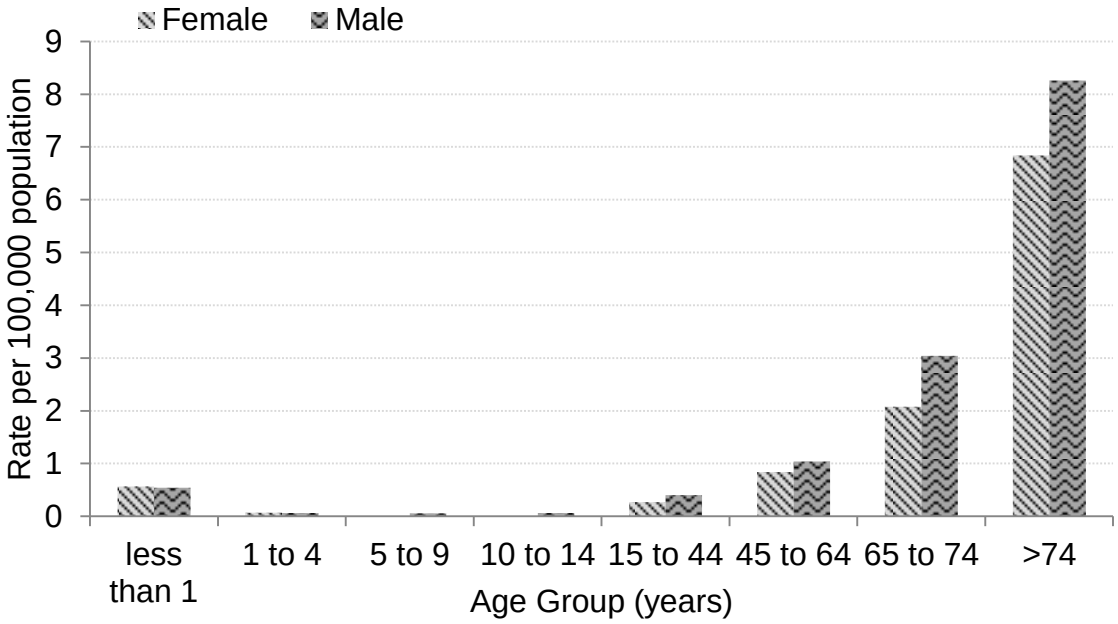
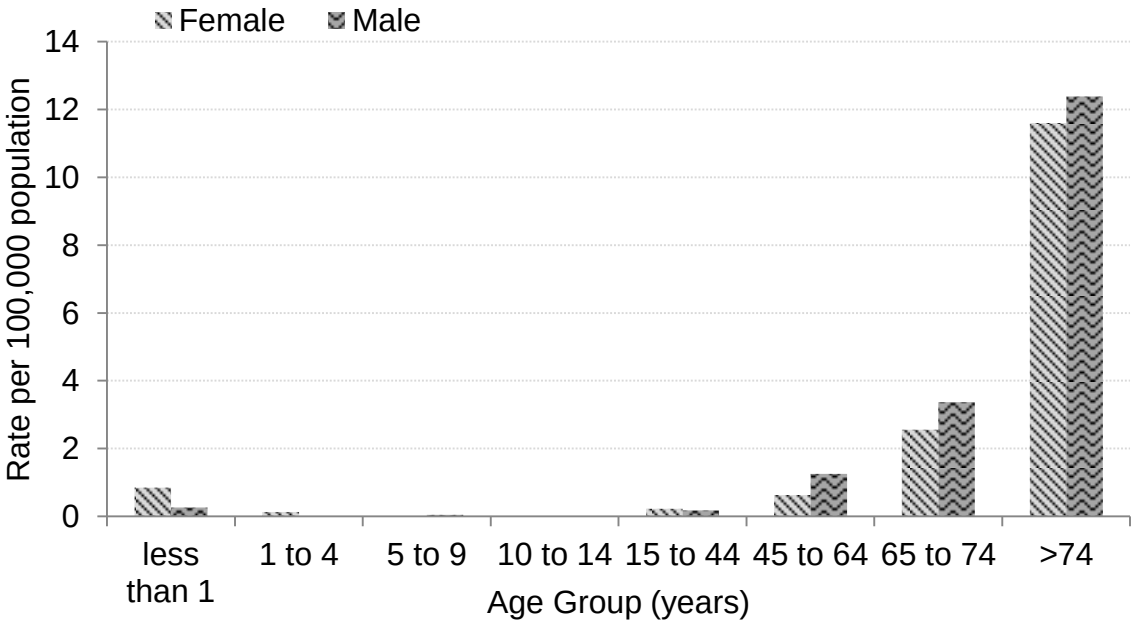


Figure 5. Group G streptococcal bacteraemia age and sex rates per 100,000 population England, Wales and Northern Ireland; 2014



Susceptibility data were available for 44%, 66% and 69% of GCS bacteraemia isolates in 2014 for clindamycin, erythromycin and tetracycline respectively (table 3). A similar picture was seen in GGS bacteraemia isolates with susceptibility results to clindamycin, erythromycin and tetracycline reported for 41%, 68% and 74% of cases in 2014 respectively.

In 2014, the proportion of isolates resistant to clindamycin, erythromycin and tetracycline in reported GCS bacteraemia was 13%, 22% and 33% respectively (table 3). The proportion of

resistant isolates was slightly higher in GGS bacteraemia isolates with 22%, 38% and 52% resistant to clindamycin, erythromycin and tetracycline respectively. This continues a trend of increasing resistance to clindamycin and erythromycin reported since 2010.

Non-pyogenic streptococci

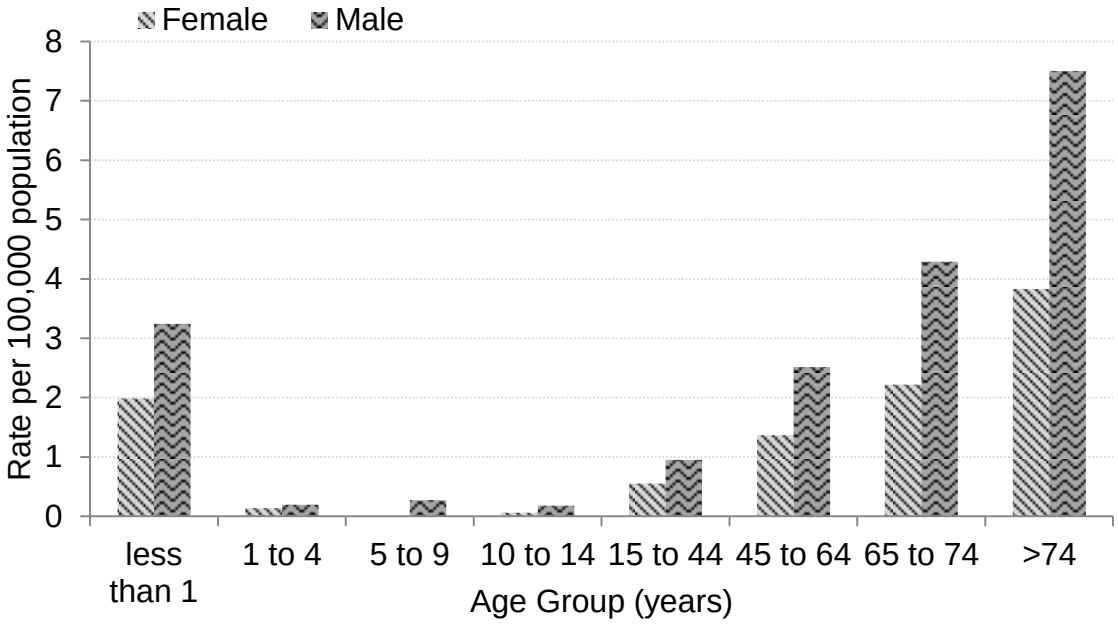
The number of cases of non-pyogenic streptococcal bacteraemia reported in England, Wales and Northern Ireland has increased each year since 2010, an 18% increase overall (3173 to 3879 between 2010 and 2014; table 1). The rate of reports has stayed level or increased slightly in the majority of non-pyogenic groups over that time (figure 1b), the greatest increase (82%) being seen in the Sanguinis group streptococci (0.7 to 1.3/100,000 population between 2007 and 2014).

Table 5. Rate per 100,000 population non-pyogenic streptococcal bacteraemia reports by Public Health England Centre and country in England, Wales and Northern Ireland; 2014

	Rate per 100,000 population					
PHE Centre	**Anginosus Group**	**Bovis Group**	**Mitis Group**	**Mutans Group**	**Salivarius Group**	**Sanguinis Group**
London	1.5	0.5	2.4	0.1	1.0	1.5
South Midlands and Hertfordshire	1.2	0.6	2.5	0.1	1.0	1.4
East Midlands	1.8	0.4	2.5	0.1	0.6	1.2
Anglia and Essex	1.2	0.4	1.2	0.0	0.5	1.2
West Midlands	2.1	1.2	3.5	0.1	1.1	1.9
Cheshire and Merseyside	2.6	1.1	2.3	0.0	1.0	1.7
Cumbria and Lancashire	1.3	1.1	2.6	0.4	0.7	1.2
Greater Manchester	1.9	0.4	2.1	0.1	1.4	1.9
North East	1.3	0.6	1.1	0.3	0.6	1.1
Yorkshire and Humber	1.0	0.3	1.8	0.1	0.7	0.9
Avon Gloucestershire and Wiltshire	1.2	0.3	3.3	0.1	0.7	1.2
Devon Cornwall and Somerset	2.0	0.2	3.5	0.1	1.4	1.3
Wessex	2.2	0.9	2.3	0.1	0.4	0.9
Kent Surrey and Sussex	1.4	0.5	2.2	0.2	0.7	1.6
Thames Valley	2.1	0.1	1.5	0.1	0.9	1.1
England	**1.6**	**0.6**	**2.3**	**0.1**	**0.9**	**1.4**
Northern Ireland	**2.1**	**0.7**	**1.4**	**0.2**	**0.7**	**0.8**
Wales	**1.1**	**0.0**	**0.4**	**0.0**	**0.2**	**0.1**
England, Wales and Northern Ireland	**1.6**	**0.5**	**2.2**	**0.1**	**0.8**	**1.3**

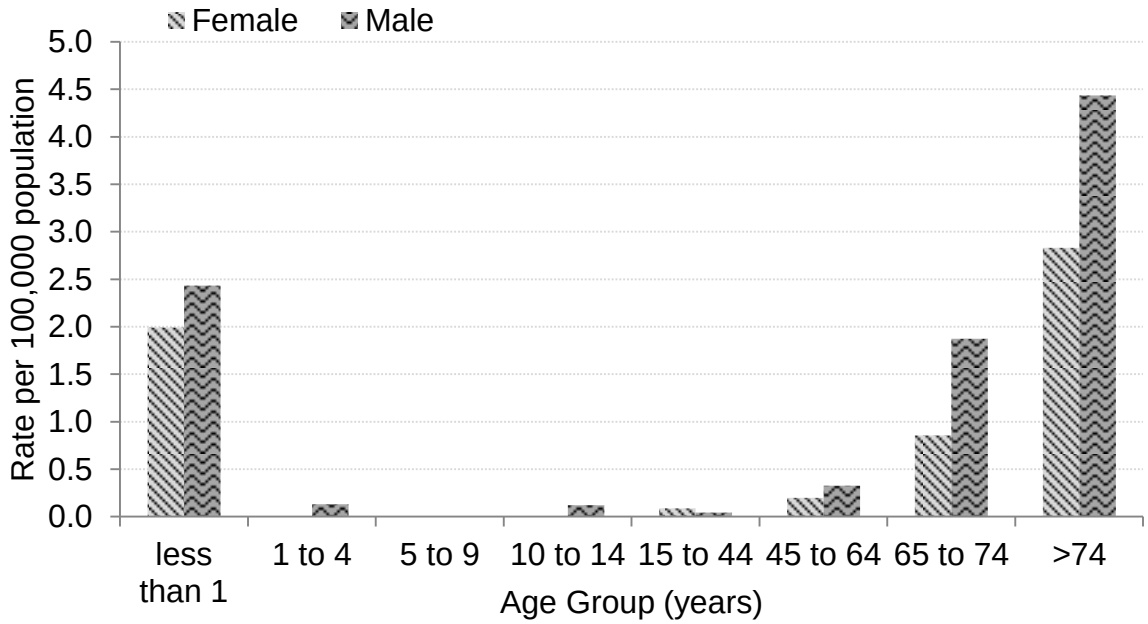
The rates varied by individual country. Of the non-pyogenic streptococci, the rate of bacteraemia reports in England was highest for Mitis group streptococci in 2014 (2.3/100,000; table 5), with the lowest rates for Mutans group streptococci (0.1/100,000). Comparatively the highest non-pyogenic bacteraemia rates were observed for Anginosus group streptococci in Wales and Northern Ireland in 2014, with 1.1 and 2.1/100,000 respectively.

Figure 6. Anginosus group streptococcal bacteraemia age and sex rates per 100,000 population England, Wales and Northern Ireland; 2014



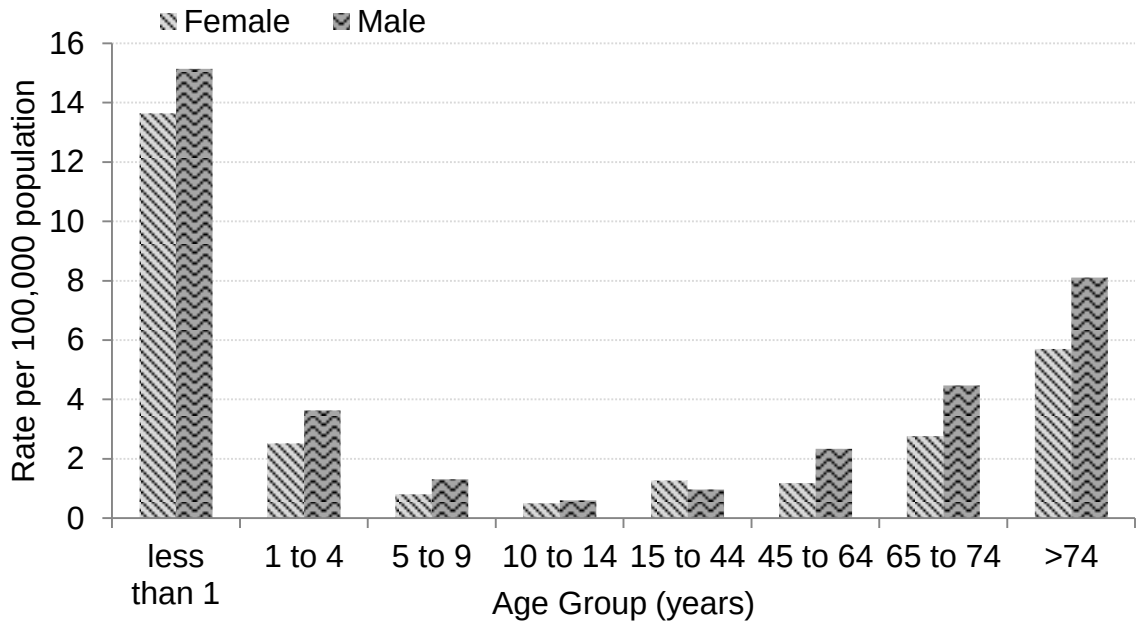
Within England, there was more variation in incidence for each of the non-pyogenic groups. The rate of Anginosus group bacteraemia ranged from 1.0/100,000 population in the Yorkshire and Humber area to 2.6/100,000 in Cumbria and Merseyside in 2014. Rates of Bovis group bacteraemia varied from 0.1/100,000 in the Thames Valley to 1.2/100,000 in the West Midlands, and the largest variation was seen with Mitis group bacteraemia from 1.1/100,000 in Wessex to 3.5/100,000 in West Midlands and Devon, Cornwall and Somerset in 2014.

Figure 7. Bovis group streptococcal bacteraemia age and sex rates per 100,000 population England, Wales and Northern Ireland; 2014



Within non-pyogenic streptococcal groups, the Mitis group accounted for the majority of bacteraemia reports (34%) in 2014, with a 13% increase in the number of reports between 2010 and 2014 (1158 to 1306; table 1). An increase in the number of non-pyogenic streptococcal bacteraemia reports has been seen in each of the groups between 2010 and 2014, the greatest increase being seen in the Salivarius group streptococci (42%), from 339 to 482 reports.

Figure 8. Mitis group streptococcal bacteraemia age and sex rates per 100,000 population England, Wales and Northern Ireland; 2014



The different non-pyogenic streptococcal bacteraemia reports in 2014 displayed a wide variation in rates between age groups, although rates in all groups, except the Mitis and Sanguinis groups, were highest in those aged 75 years and above (figures 6 to 10). In 2014 the Mitis and Sanguinis group streptococci were highest in those aged less than one year (14.5 and 6.5/100,000 in Mitis (figure 8) and Sanguinis group (figure 10) respectively).

The proportion of isolates reported as resistant to erythromycin and penicillin has remained steady between 2010 and 2014 in all of the non-pyogenic streptococcal groups. There was slightly more year-on-year variation seen in resistance to tetracycline (table 6).

Figure 9. Salivarius group streptococcal bacteraemia age and sex rates per 100,000 population England, Wales and Northern Ireland; 2014

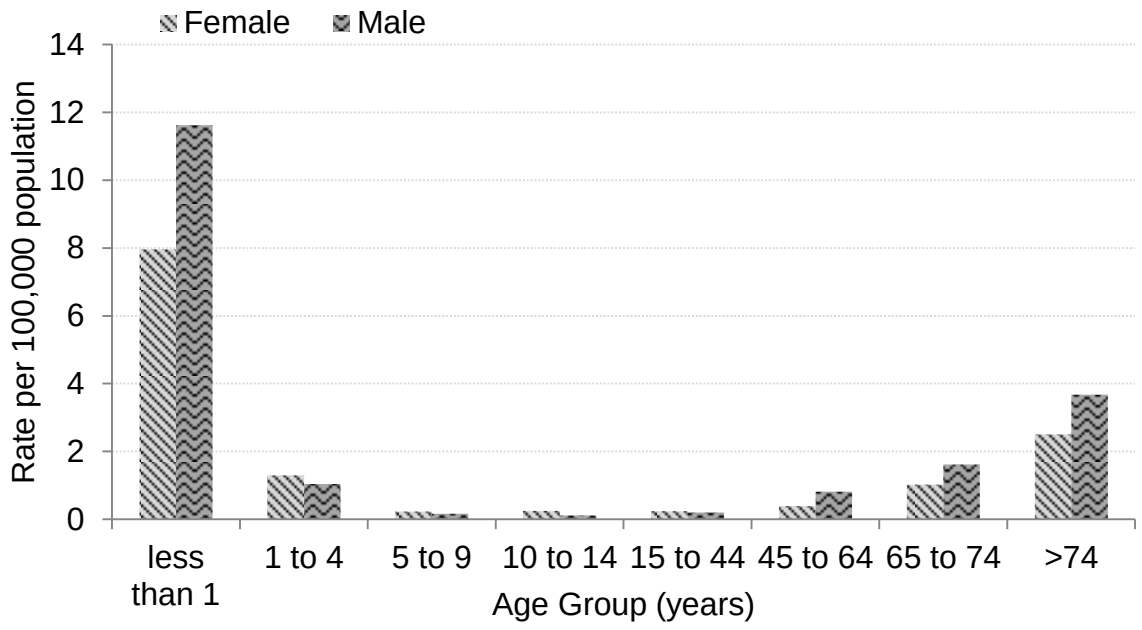


Figure 10. Sanguinis group streptococcal bacteraemia age and sex rates per 100,000 population England, Wales and Northern Ireland; 2014

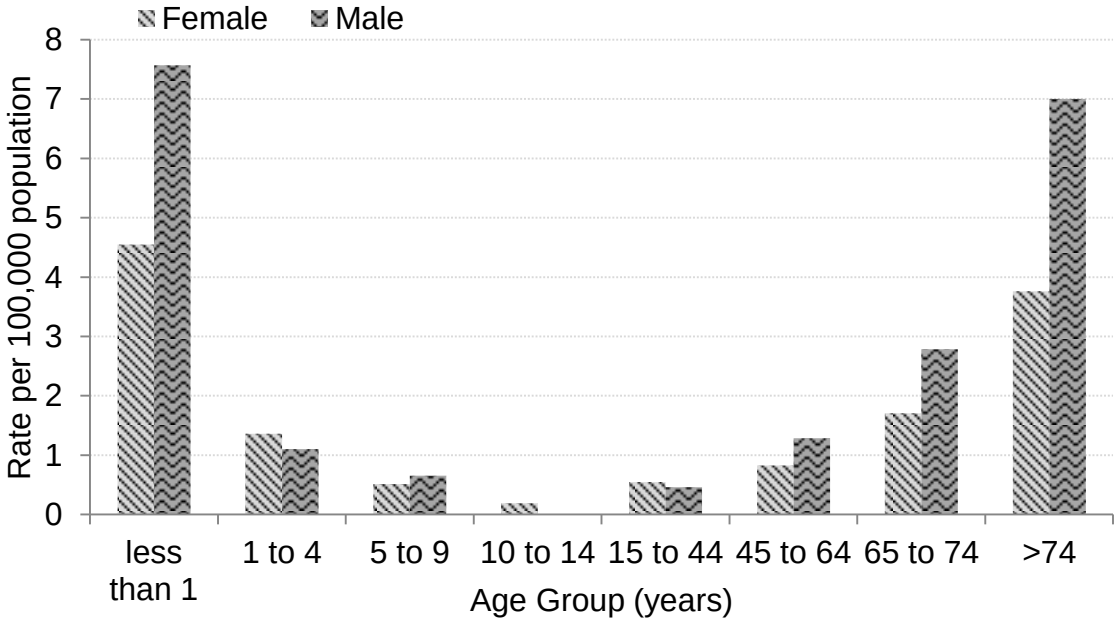


Table 6. Antimicrobial susceptibility for non-pyogenic streptococci causing bacteraemia, England, Wales and Northern Ireland; 2010 to 2014

		2010		2011		2012		2013		2014	
		No. Tested	% resistant (R)	No. Tested	% R	No. Tested	% R	No. Tested	% R	No. Tested	% R
Anginosus	erythromycin	526	9%	613	10%	554	10%	601	10%	538	9%
	penicillin	667	1%	767	1%	727	2%	808	2%	773	2%
	tetracycline	459	23%	506	22%	485	20%	573	17%	486	19%
Bovis	erythromycin	168	30%	187	22%	179	26%	179	31%	185	29%
	penicillin	225	7%	241	5%	236	3%	242	2%	264	3%
	tetracycline	140	60%	173	67%	145	70%	168	70%	171	74%
Mitis	erythromycin	746	44%	700	46%	772	46%	745	46%	793	48%
	penicillin	960	23%	867	19%	970	19%	1003	19%	1113	19%
	tetracycline	623	24%	618	25%	619	29%	622	28%	654	29%
Salivarius	erythromycin	220	39%	245	34%	274	42%	258	47%	280	44%
	penicillin	267	21%	308	22%	336	18%	337	21%	377	24%
	tetracycline	158	18%	197	23%	205	20%	197	16%	237	21%
Sanguinis	erythromycin	341	43%	386	34%	406	38%	451	38%	469	44%
	penicillin	405	26%	478	26%	525	23%	600	24%	621	28%
	tetracycline	261	33%	311	29%	325	32%	390	26%	381	37%

In England, Wales and Northern Ireland in 2014 between 2% and 28% of non-pyogenic streptococcal isolates either had reduced susceptibility or were resistant to penicillin. Erythromycin resistance was high in non-pyogenic streptococcal groups compared to pyogenic groups, with between 29% and 48% of isolates reported as resistant; the only exception is the Anginosus group streptococci where 9% were reported as resistant to erythromycin.

Reference microbiology service

In 2014, the proportion of reports of streptococcal bacteraemia in which the organism was not fully identified remained around 16%. Precise species identification of isolates would improve the monitoring of trends in non-pyogenic streptococci and related genera in particular. The Respiratory and Vaccine Preventable Bacteria Reference Unit (RVPBRU, Colindale) offers a referred (charged for) taxonomic identification service for streptococci and other related Gram-positive, catalase-negative genera from systemic and other significant infections. A free-of-charge reference service is available for urgent public health investigations, either hospital or community based. All such isolates should be submitted to RVPBRU along with all GAS, GBS, GCS and GGS isolates from normally sterile sites.

Laboratories are requested to send any pyogenic streptococcal isolates exhibiting a decreased sensitivity to penicillin to the Antimicrobial Resistance and Healthcare Associated Infections Reference Unit (AMRHAI, Colindale) for confirmation. In addition, any streptococci (pyogenic or non-pyogenic) with suspected glycopeptide or linezolid resistance should be referred for further investigation. Both AMRHAI and RVPBRU are based at the Public Health England, Colindale.

Guidelines for the management of close community contacts of invasive GAS cases [5] and the prevention and control of GAS transmission in acute healthcare and maternity settings [6] are available at the following web-page: https://www.gov.uk/government/collections/group-a-streptococcal-infections-guidance-and-data.

Acknowledgements

These reports would not be possible without the ongoing contributions from microbiology colleagues in laboratories across England, Wales and Northern Ireland, without whom there would be no surveillance data. The support from colleagues within Public Health England, and the PHE Respiratory and Vaccine Preventable Bacteria Reference Unit (RVPBRU, Colindale), in particular, is valued in the preparation of this report. Feedback and any specific enquiries regarding this report should be sent to hcai.armdepartment@phe.gov.uk.

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Infection reports / Immunisation

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Laboratory confirmed cases of measles, mumps and rubella, England: July to September 2015

Measles, mumps and rubella are notifiable diseases and healthcare professionals suspecting a case are legally required to inform the authorities. Oral fluid testing is offered to all notified cases to confirm the diagnosis. This is part of the enhanced surveillance for these vaccine preventable diseases. Recent infection is confirmed by measuring the presence of IgM antibodies or detecting viral RNA (by PCR) in the samples.

Data presented here are for the third quarter of 2015 (i.e. July to September). Cases include those confirmed by oral fluid testing (IgM antibody tests and/or PCR) at the National Reference Laboratory, Colindale and national routine laboratory reports (mumps infections only) (table 1). Analyses are by date of onset and regional breakdown figures relate to Government Office Regions.

Quarterly figures from 2013 for cases confirmed by oral fluid antibody detection only and annual total numbers of confirmed cases by region and age are available from:

https://www.gov.uk/government/publications/measles-confirmed-cases

https://www.gov.uk/government/publications/mumps-confirmed-cases

https://www.gov.uk/government/publications/rubella-confirmed-cases

Table 1. Total laboratory confirmed cases of measles, mumps and rubella, and oral fluid IgM antibody tests in notified cases: weeks 27-39/2015

Notified and investigated cases						Confirmed cases		
Infecting virus	Cases reported to Health Protection Teams in England*	Oral fluid testing					Other samples	**Total**
		Number Tested	% of reported cases tested	*Total Positive*	*Recently Vaccinated*	Confirmed infections		
Measles	351	225	64%	*25*	*12*	13	2	**15**
Mumps	1389	849	61%	*68*	*4*	64	48	**112**
Rubella	111	70	63%	*2*	*2*	0	0	**0**

*This represents the number of infections reported as possible cases and investigated by individual PHE centres in England

Measles

In England, fifteen new measles infections with symptoms onset dates between July and September 2015 were confirmed by the national reference laboratory compared to 33 cases in the second quarter of 2015 [1].

Thirteen of the newly diagnosed cases were from London: five were part of an on-going genotype B3 outbreak in North London that began in May 2015; another five were part of the same family recently returning from Somalia (genotype B3, but different strain). Of the remaining three London cases and two non-London cases, three were associated with recent travel to India (unable to genotype), France (unable to genotype) and Spain (genotype B3, a third strain) and two had no identified epidemiological links but could be linked by molecular sequencing to either the North London or to the Somalian cluster. Scotland, Northern Ireland and Wales have not reported measles cases this quarter.

The majority (8/15, 53%) of measles cases this quarter were in children and adolescents: 2 (13%) aged 1 to 4 years; 2 (13%) aged 10 to 14 years; 4 (26%) aged 15 to 18 years. The remaining 7 cases (47%) were adults aged 21 to 29 years. None of the cases this quarter reported receiving any measles-containing vaccine.

Mumps

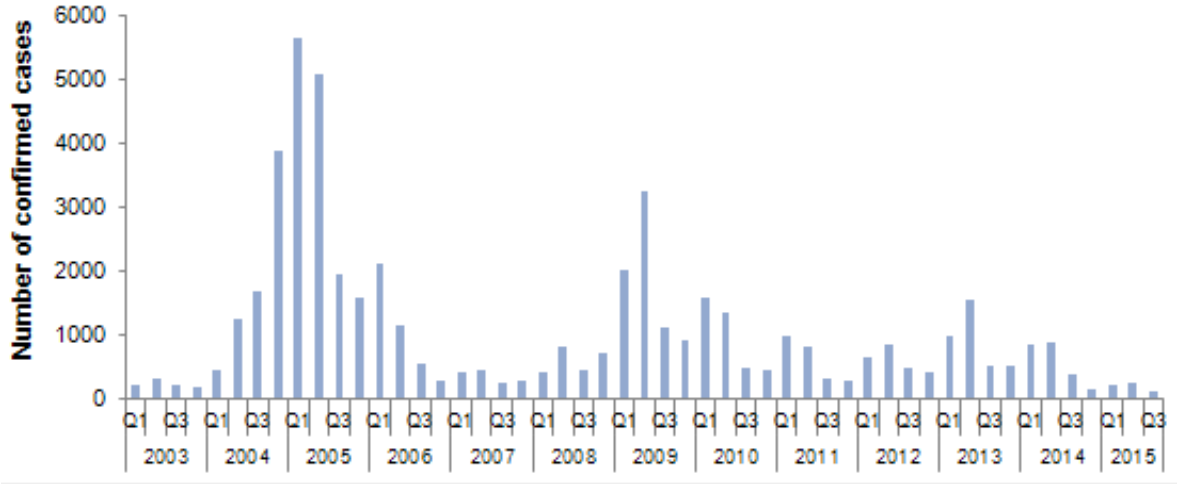
There were 112 laboratory confirmed mumps infections in England with onset in the third quarter of 2015 compared to 251 in the previous quarter (figure) [1]. Additionally, three new mumps infections were confirmed in oral fluid samples from Wales.

The number of mumps infections for the first 9 months of this year were lower than the same period in each year since 2004 and similar to those in 2003 (figure). Cases continued to be identified predominantly in young adults between 20 and 35 years of age (51/112 46%, table 2). Over 30% of all cases this quarter reported receiving at least one dose of MMR vaccination in childhood. Mumps cases were reported in all regions of England although around half of all cases were reported in the North East and London (table 2).

Table 2. Laboratory confirmed cases of mumps by age group and region, England: weeks 27-39/2015

Region	<1	1-4	5-9	10-14	15-19	20-24	25+	Total
North East	–	–	–	5	9	4	13	**31**
North West	–	–	2	3	2	1	4	**12**
Yorkshire & Humber	–	–	2	–	1	3	4	**10**
East Midlands	–	–	–	1	–	1	4	**6**
West Midlands	–	–	–	–	1	–	2	**3**
East of England	–	–	–	–	–	–	5	**5**
London	–	1	2	2	3	3	15	**26**
South East	–	–	–	–	1	–	6	**7**
South West	–	–	–	5	9	4	13	**31**
Total	**0**	**1**	**8**	**14**	**17**	**13**	**59**	**112**

Laboratory confirmed cases of mumps by quarter, England, 2003-2015



Rubella

A late confirmation of a case of rubella with onset in April 2015 was the only reported case in the period between July and September 2015 [1]. This case was in an older adult and was not known to be linked to travel.

Reference

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Infection reports / Immunisation

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Vaccination Programme for Pregnant Women: vaccine coverage estimates in England, June to September 2015

Background to the pertussis vaccination in pregnancy programme

In the UK the introduction of routine national immunisation against pertussis (whooping cough) in 1957 resulted in a marked reduction in pertussis notifications and deaths [1]. Despite a sustained period of high vaccine coverage since the early 1990s, pertussis has continued to display 3-4 yearly peaks in activity. Each year in the five years prior to 2012, there were on average in England nearly 800 confirmed cases of whooping cough, 270 babies admitted to hospital and four deaths in babies [Health Protection Agency (HPA) unpublished data]. The highest disease incidence occurs in infants under three months of age who are too young to have completed the primary vaccine course and have the greatest risk of complications and death. This age group is considered a key indicator of pertussis activity [2] and the primary aim of the pertussis vaccination programme is to minimise disease, hospitalisation and deaths in young infants.

In 2012, pertussis activity increased markedly beyond levels reported in the previous 20 years and extended into all age groups, including infants under three months of age. By April 2012, the HPA had declared a national pertussis outbreak (level 3 incident) [3]. In response to this ongoing outbreak, with the associated disease morbidity and mortality in infants, the Department of Health announced that pertussis immunisation would be offered to pregnant women from 1 October 2012 to protect infants from birth whilst disease levels remain high [4]. This programme aims to passively protect infants from birth, through intra-uterine transfer of maternal antibodies, until they can be actively protected by the routine infant programme with the first dose of pertussis vaccine scheduled at eight weeks of age [5].

Overall pertussis activity persists at raised levels compared to the years preceding the outbreak in 2012 [6]. The incidence of laboratory confirmed cases continues to be highest in infants under three months of age targeted by the vaccination programme. Unlike cases in those aged one year and older, however, reported cases in young infants are now back in line with those seen before the 2012 peak. Between 1 October 2012 and 30 June 2015, 12 deaths have been reported in young babies with confirmed pertussis. Eleven of these 12 babies were born to mothers who had not been vaccinated against pertussis [6].

In June 2014 the Joint Committee on Vaccination and Immunisation (JCVI) considered available data relating to the coverage, effectiveness and safety of the programme, its impact on disease and current epidemiology and advised that the programme should continue for a further five years [7]. This includes the continuation of all surveillance activities introduced to monitor the programme.

Vaccine coverage collection methods

Since April 2014, monthly data on the coverage of pertussis vaccination in pregnancy in England have been collected from GP records via the ImmForm website[1]. The ImmForm web-based system automatically extracts vaccine coverage data from participating General Practice (GP) clinical systems with minimal or no burden to the NHS. Data are then validated and analysed by PHE to check data completeness, identify and query any anomalous results and identify epidemiological trends.

The monthly surveys capture data on number of women who delivered in the survey month at more than 28 weeks gestational age (denominator), and the number of pregnant women who delivered after 28 weeks gestational age in the survey month that received a dose of pertussis-containing vaccine in the preceding fourteen weeks (numerator).

For accurate denominators to be extracted from GP IT systems by the automated survey and precise coverage estimates to be calculated, it is important that the medical records of all women who have given birth have the following fields completed:

- the date of delivery
- the date of receipt of a pertussis-containing vaccine at or after week 28 of pregnancy, regardless of the setting where the vaccine was administered
- where relevant, any record of a premature delivery occurring at less than 28 weeks gestational age

In addition to the numerator and denominator, the automated survey records the number and percentage of GP practices responding each month.

This report updates the previous summary of the pertussis vaccination programme for pregnant women for the five months ending 31 May 2015 [8], presenting data collected for four months ending 30 September 2015.

[1] ImmForm is the system used by Public Health England to record vaccine coverage data for some immunisation programmes and to provide vaccine ordering facilities for the NHS. https://portal.immform.dh.gov.uk/Logon.aspx?returnurl=%2fhome.aspx.

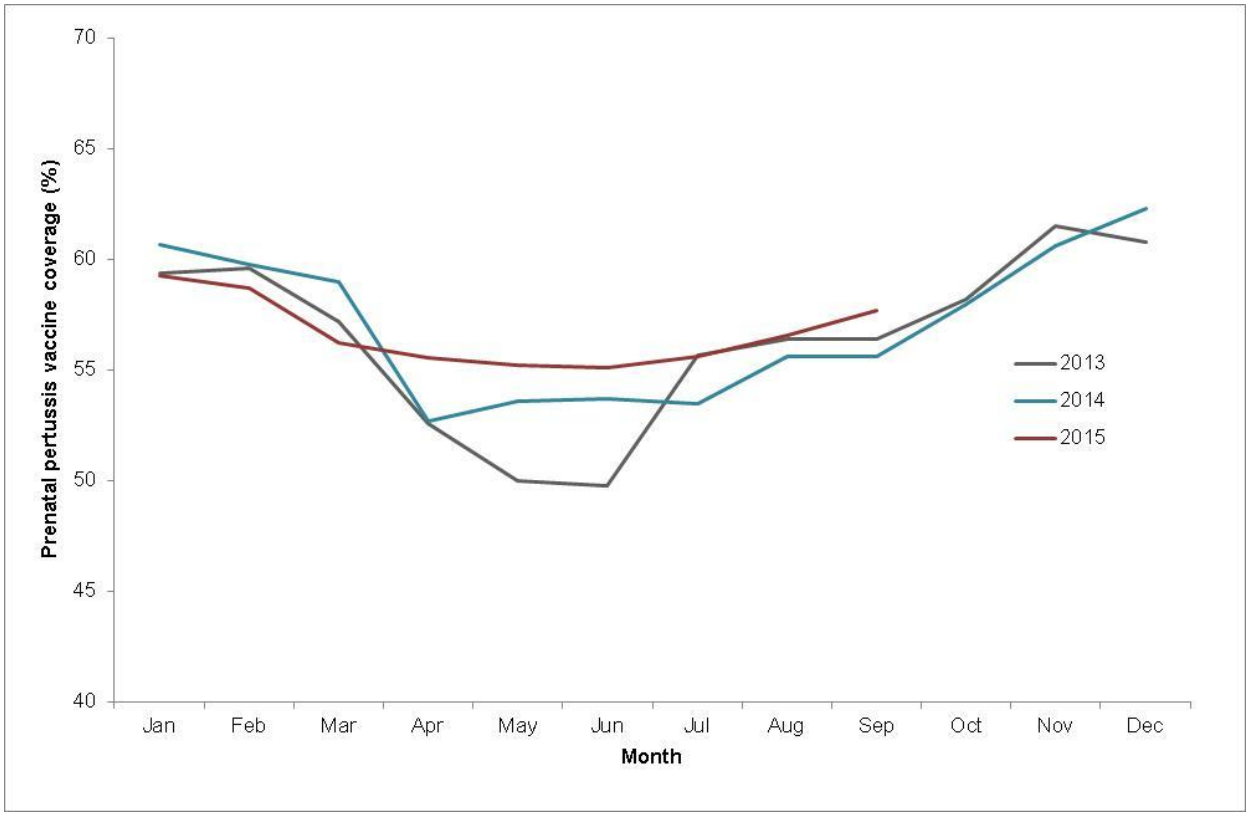
Results

Pertussis vaccine coverage in pregnant women increased over the four months from 55.1% in June to 57.7% in September 2015 (see figure). As observed in 2013 and 2014, coverage declined in late winter and early spring but was maintained at higher levels through the summer months than in the previous two years.

The proportion of GP practices participating nationally in the survey each month was 95.0%.

Vaccine coverage by NHS England Area Team (AT) and Clinical Commissioning Group (CCG) for the period April to September 2015 is presented in an Appendix associated with this report. In September 2015 there was a 21.6% difference in coverage between the ATs with the highest and lowest coverages (68.3% in South Yorkshire and Bassetlaw, 46.6% in London). Nine ATs achieved coverage greater than 60% for all four months and the number of ATs reporting greater than or equal to 60% coverage increased from 9/25 in June to 14/25 in September.

Prenatal pertussis vaccine coverage in England, January to December 2013 and 2014, with January to September 2015 data for comparison



Discussion

Compared with the same period of the previous year, prenatal pertussis vaccine coverage between June and September 2015 was higher every month, with the trough in late spring to early summer 2013 and 2014 not seen. The increase in coverage between September and December in both 2013 and 2014 coincides with the delivery of the seasonal influenza vaccination programme which also targets pregnant women [9], and it is anticipated that a similar increase will occur in late 2015. During the flu campaign GP practices actively call and recall eligible patients, which should include pregnant women, and this may be having a positive knock-on effect on pregnant women being offered pertussis vaccine at the same time.

Overall pertussis disease continues to persist at increased levels in those aged one year and older compared to the years preceding the outbreak in 2012 [6]. Unprotected young infants therefore continue to be at risk of infection and GPs and midwifes should continue to encourage pregnant women to receive the pertussis vaccine, ideally between weeks 28 and 32 of their pregnancy (but up to week 38) [10], to further reduce the incidence of pertussis in young infants. Considerable variation in coverage between ATs has consistently been reported, with around a 20% difference between those with the highest coverage and those with the lowest coverage. Identifying examples of good practice in areas achieving consistently high coverage for pertussis vaccination during pregnancy and applying them to low coverage areas may help address this gap

There are several limitations to the data presented in this report. First, completeness of data is reliant on the recording of delivery dates in the mothers' medical records and comparison of this data with national data on live births, indicates these data represent about 60% of the population of pregnant women [11]. However, monthly variations in the denominator closely mirror the seasonal variation observed in national live births.

Secondly, the survey does not cover all GP practices in England, although 95% of GP practices participated, and there may be differential completeness of the recording of delivery dates among GPs. Coverage may be overestimated if women who have received the vaccine are more likely to have their delivery date recorded. Furthermore, women not registered with a GP (and therefore less likely to be having regular contact with the health service prior to delivery) will not be captured by this reporting system.

Comparison with other data sources examined to estimate the vaccine coverage of this programme suggests that this methodology may be underestimating coverage [12]. If coverage, and ultimately the impact of the programme itself, is to be accurately monitored, it is essential

that GPs and practice nurses ensure that vaccination and date of delivery are recorded in the patient's GP record.

Continued support in the delivery of this important programme is being sought from service providers (GP practices and maternity units), Screening and Immunisation Teams and Health Protection Teams. Screening and Immunisation Teams should continue to update service providers on the current epidemiology of the disease, the effectiveness of the vaccination programme and the need to maintain and improve coverage achieved. Further information on the pertussis vaccination programme for pregnant women is available here: https://www.gov.uk/government/collections/pertussis-guidance-data-and-analysis.

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Appendix

"Prenatal pertussis coverage by area team: England, April to September 2015" is available on the GOV.UK website page "Pertussis immunisation in pregnancy: vaccine coverage estimates (England)".