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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

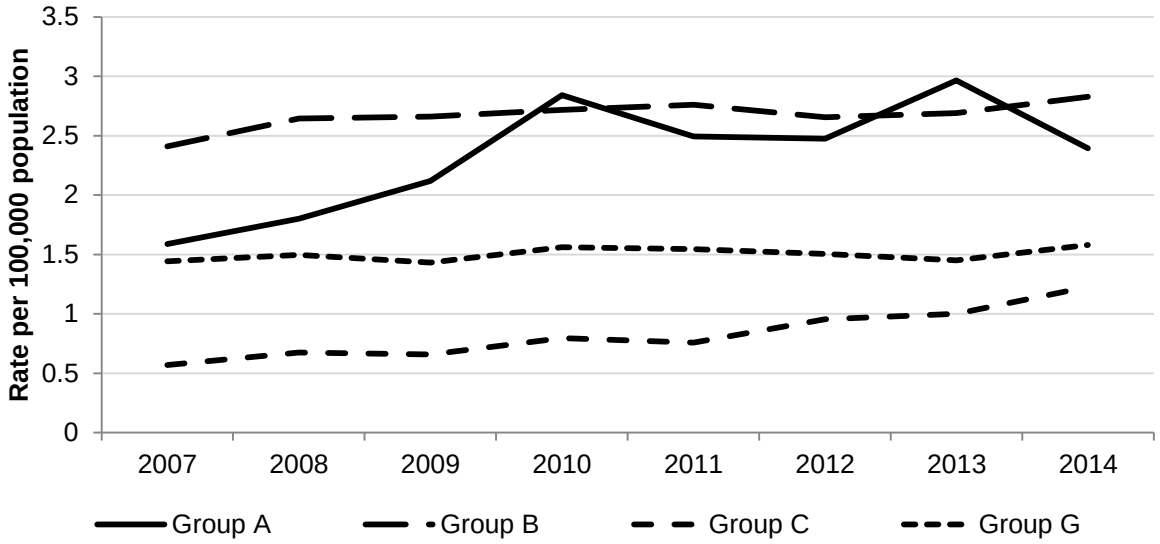


Figure 1b. Trend in non-pyogenic streptococcal bacteraemia reports per 100,000 population in England Wales and Northern Ireland; 2007 to 2014

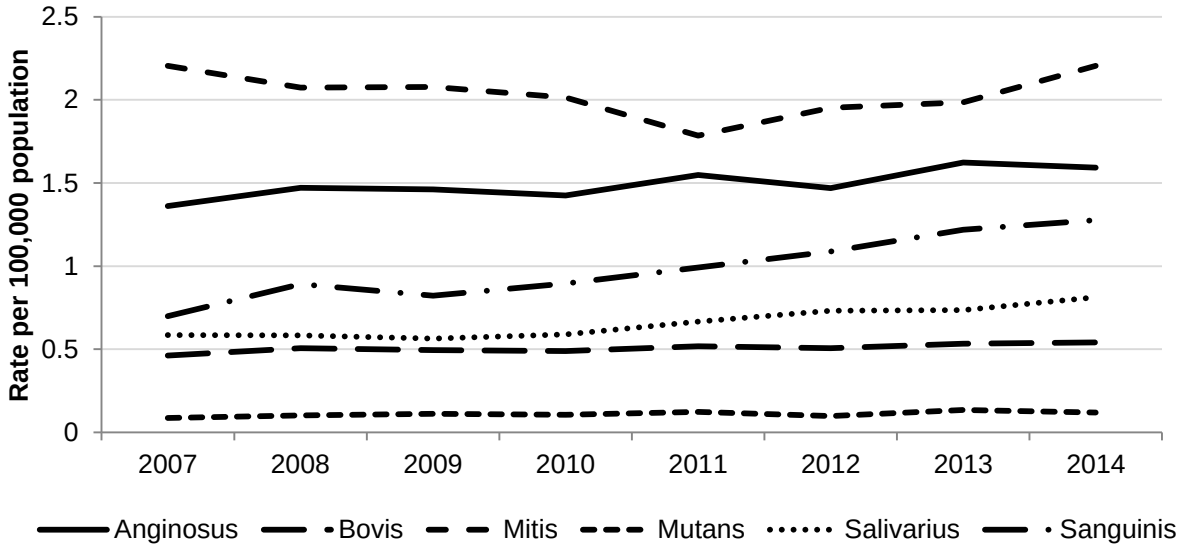


Table 1. Reports of pyogenic and non-pyogenic streptococcal bacteraemia by species in England, Wales and Northern Ireland; 2010 to 2014

	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

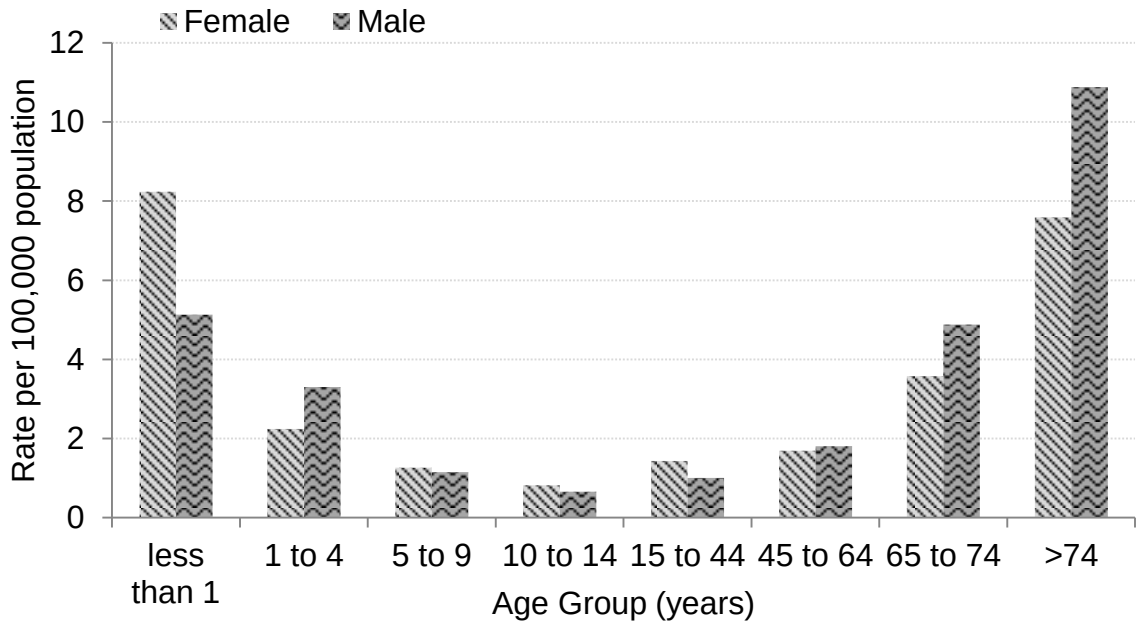
	Rate per 100,000 population			
PHE Centre	**Group A**	**Group B**	**Group C**	**Group G**
London	1.9	3.2	0.8	0.9
South Midlands and Hertfordshire	2.1	2.2	0.9	1.3
East Midlands	3.0	3.5	1.1	3.2
Anglia and Essex	2.3	3.0	1.2	2.6
West Midlands	2.5	3.3	2.1	1.8
Cheshire and Merseyside	2.6	2.6	1.5	2.7
Cumbria 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

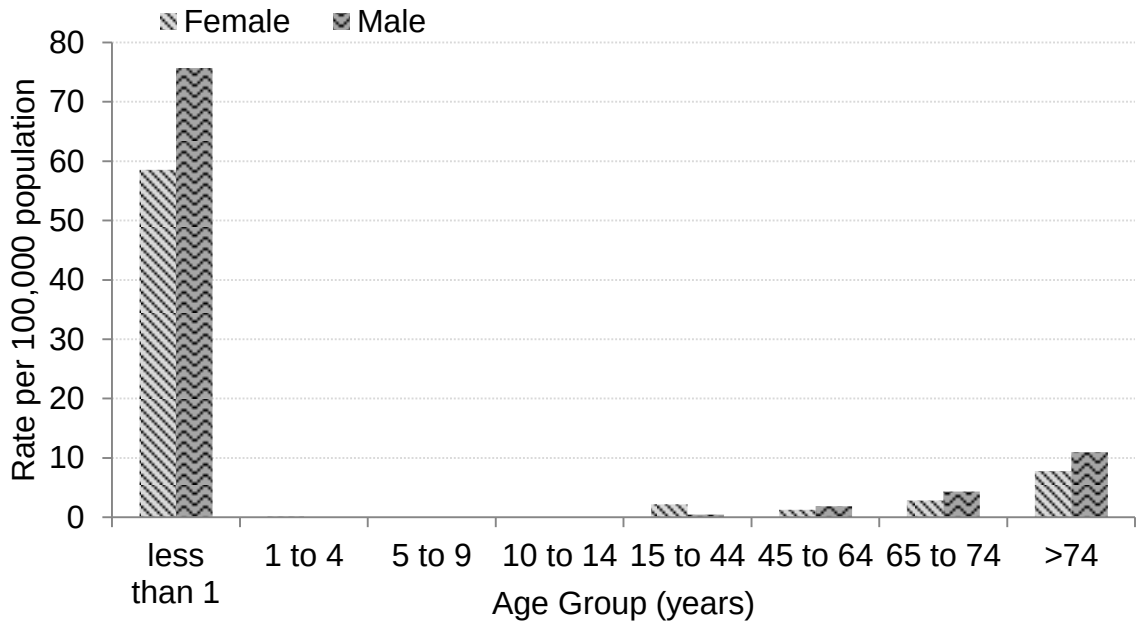


Group B streptococci

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

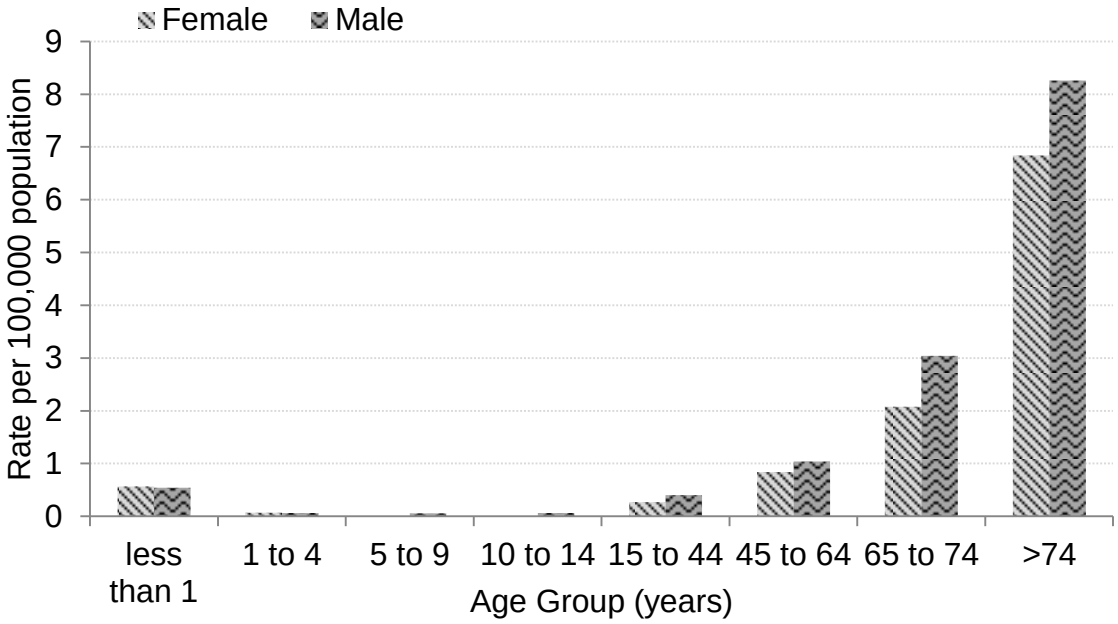
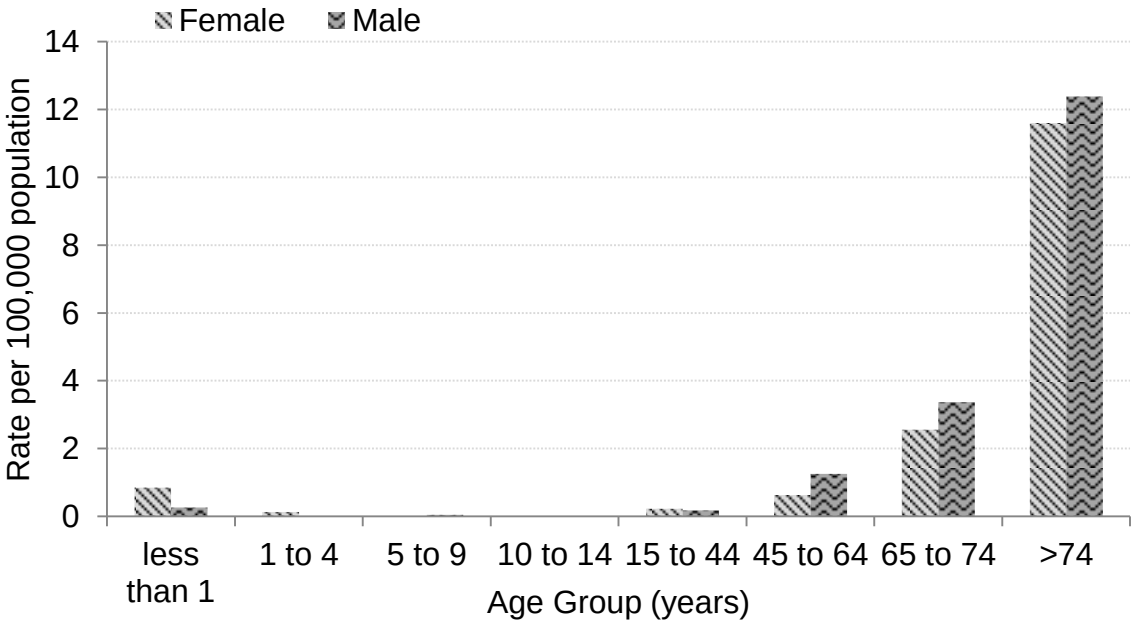


Figure 5. Group G streptococcal bacteraemia age and sex rates per 100,000 population England, Wales and Northern Ireland; 2014



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

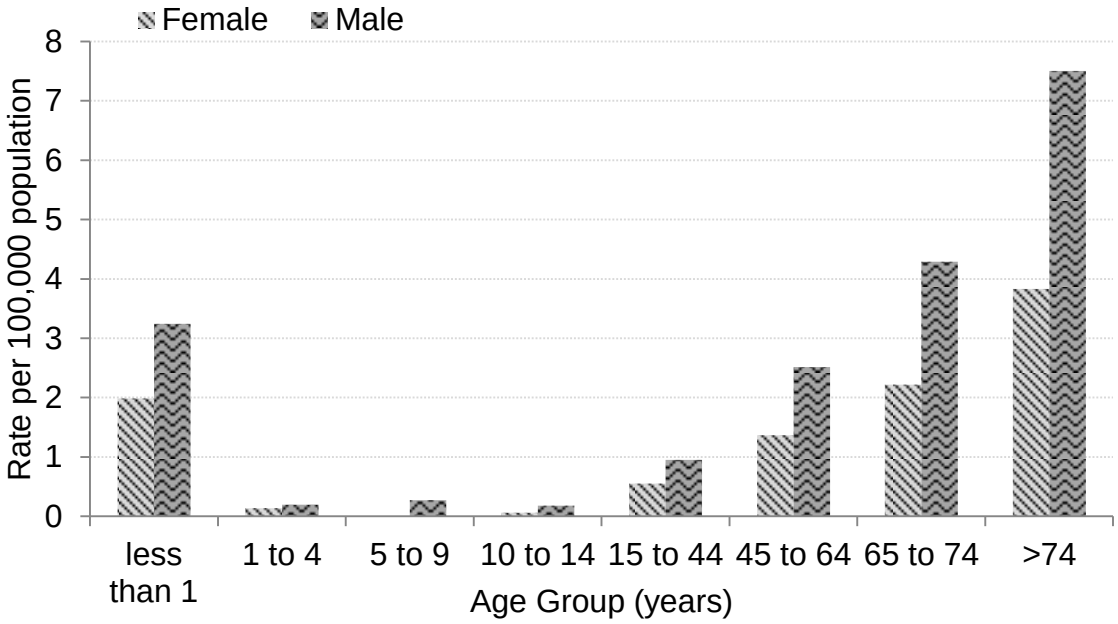
The number of cases of non-pyogenic streptococcal bacteraemia reported in England, Wales and Northern Ireland has increased each year since 2010, an 18% increase overall (3173 to 3879 between 2010 and 2014; table 1). The rate of reports has stayed level or increased slightly in the majority of non-pyogenic 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**

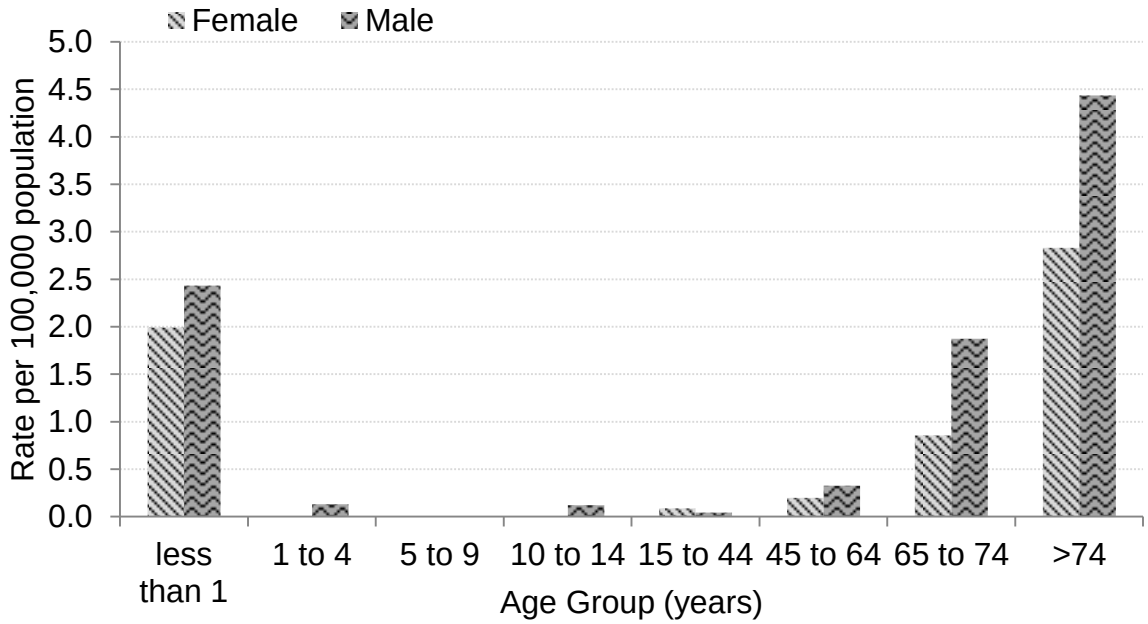
The rates varied by individual country. Of the non-pyogenic streptococci, the rate of bacteraemia reports in England was highest for Mitis group streptococci in 2014 (2.3/100,000; table 5), with the lowest rates for Mutans group streptococci (0.1/100,000). Comparatively the highest non-pyogenic bacteraemia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



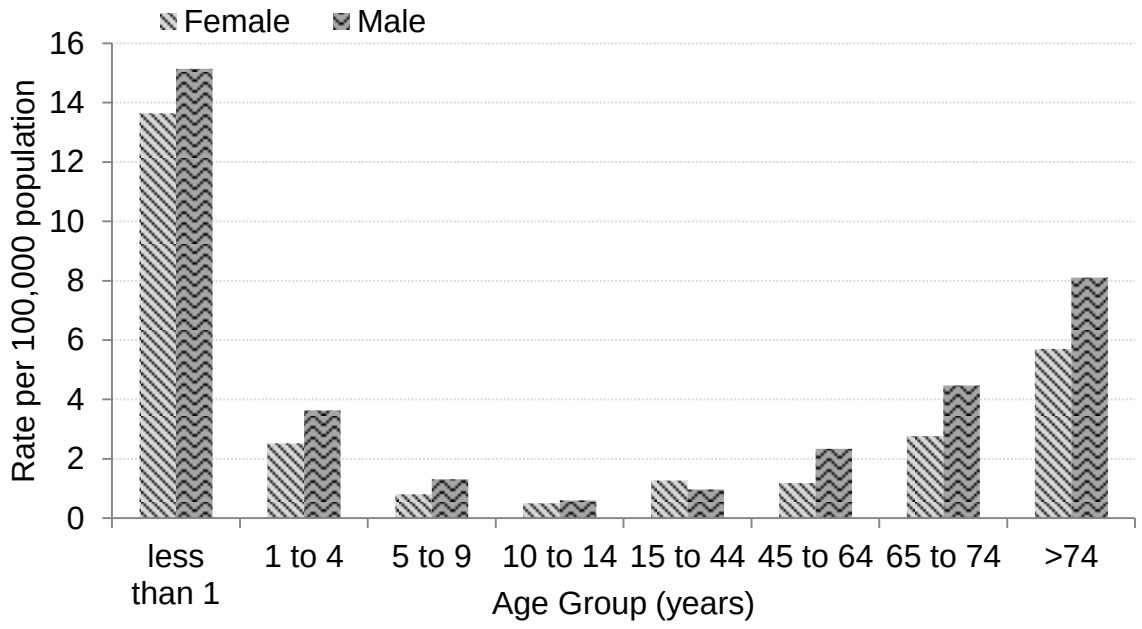
Within England, there was more variation in incidence for each of the non-pyogenic groups. The rate of Anginosus group bacteraemia ranged from 1.0/100,000 population in the Yorkshire and Humber area to 2.6/100,000 in Cumbria and Merseyside in 2014. Rates of Bovis group bacteraemia varied from 0.1/100,000 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

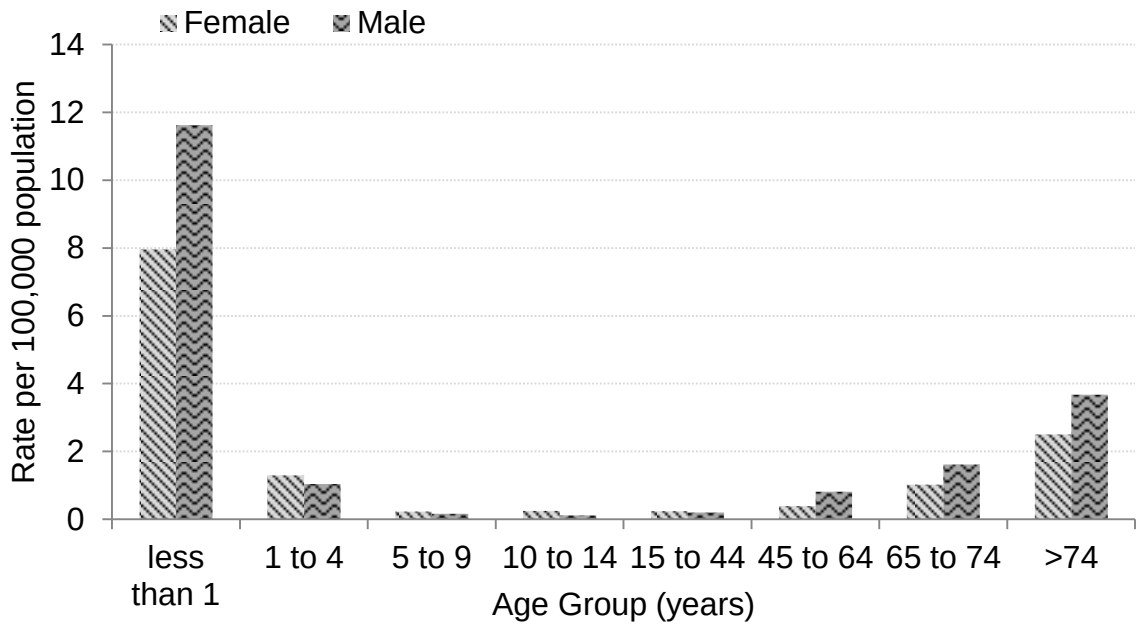


Figure 10. Sanguinis group streptococcal bacteraemia age and sex rates per 100,000 population England, Wales and Northern Ireland; 2014

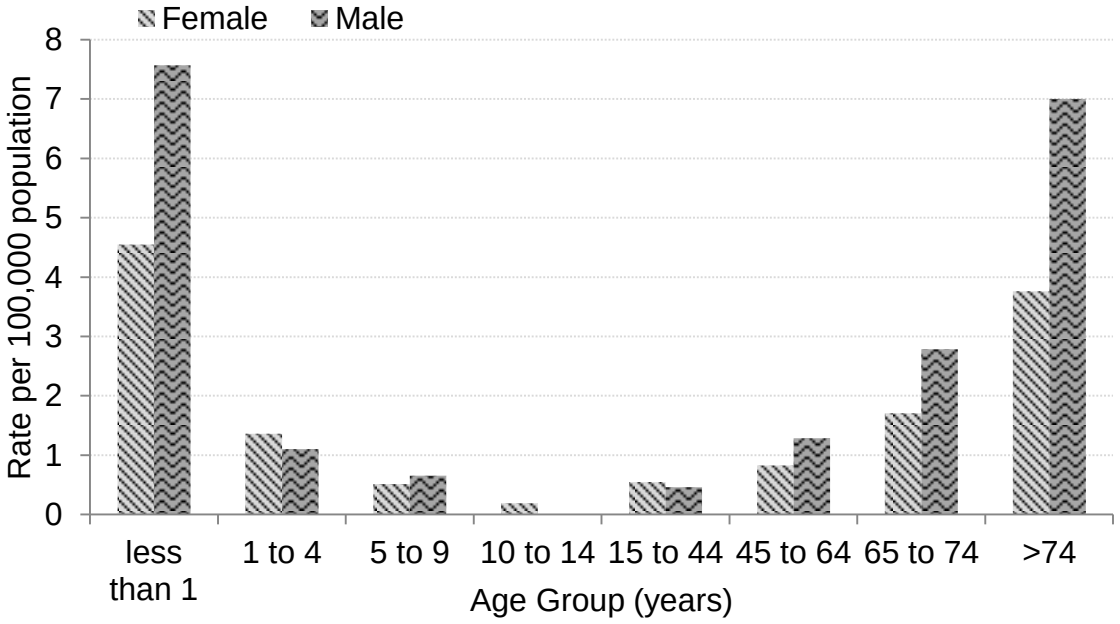


Table 6. Antimicrobial susceptibility for non-pyogenic streptococci causing bacteraemia, England, Wales and Northern Ireland; 2010 to 2014

		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.

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References

1. Office for National Statistics (ONS). Mid-year population estimates for England, Wales and Northern Ireland
2. ONS (July 2015). Births in England and Wales, 2014. Statistical Bulletin.
3. PHE (2015). Polymicrobial bacteraemia and fungaemia in England, Wales and Northern Ireland, 2014. *HPR* **9**(21)
4. PHE (2014). Voluntary surveillance of pyogenic and non-pyogenic streptococcal bacteraemia in England, Wales and Northern Ireland: 2013. *HPR* **8**(44)
5. Health Protection Agency Group A Streptococcus Working Group (2004). Interim guidelines for managing close contacts in cases of invasive group A streptococcal disease. *Commun Dis Public Health* **7**(4):354-361
6. Steer JA, Lamagni TL, Healy B, Morgan M, Dryden M, Rao B *et al* (January 2012). Guidelines for prevention and control of group A streptococcal infection in acute healthcare and maternity settings in the UK. *J Infect* **64**(1): 1-18.