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Laboratory surveillance of pyogenic and non-pyogenic streptococcal bacteraemia in England, Wales and Northern Ireland: 2017

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The analyses in this report are based on data relating to diagnoses of pyogenic and non-pyogenic streptococcal bloodstream infections between 2009 and 2017 in England, Wales and Northern Ireland. Data for England were extracted from the Public Health England (PHE) Second Generation Surveillance System (SGSS), a voluntary surveillance database, on 1 November 2018. Data for Northern Ireland were extracted from CoSurv on 5 November 2018 and for Wales from Datastore on 6 February 2018.

Invasive group A streptococcal disease is notifiable in England and Wales under the Health Protection (Notification) Regulations 2010 [1]. Records of group A streptococcal (GAS) bacteraemia based on isolates submitted to the PHE Respiratory and Vaccine Preventable Bacteria Reference Unit (RVPBRU, Colindale) were merged with laboratory reports (England only). Reports of group B streptococcal (GBS) bacteraemia in Northern Ireland are enhanced with data submitted through statutory notifications of infant disease to the Public Health Agency [2]. The majority of data collection for this report is based on voluntary reporting systems and as such it is important to note that regional and temporal incidence rates can be affected by completeness of and local variations in reporting.

In England and Northern Ireland, laboratories are requested to submit data individually to SGSS/CoSurv, with reporting based on clinically significant isolates. In Wales, data are collected by extraction from a single laboratory information system used by all microbiology laboratories; this system records all positive blood cultures, including those not thought to be clinically significant.

Beta-haemolytic pyogenic streptococci are classified according to the type of major surface polysaccharide antigen (Lancefield group), namely: group A (*Streptococcus pyogenes*), group B (*Streptococcus agalactiae*), group C (multiple zoonotic species plus the human species *Streptococcus dysgalactiae* subsp. *equisimilis*); group G (human and animal species *Streptococcus dysgalactiae* subsp. *equisimilis* and *Streptococcus canis*). Non-pyogenic streptococci are subdivided into groups: Mitis; Sanguinis; Anginosus; Salivarius; Mutans; Bovis. *Streptococcus pneumoniae* and group D streptococci (now classified as *Enterococcus* spp.) are not included in this report.

The report includes analyses on the trends, age and sex distribution, geographical distribution and antimicrobial susceptibility of laboratory-reported cases of pyogenic and non-pyogenic streptococcal bacteraemia. Rates of laboratory-reported bacteraemia were calculated using mid-year resident population estimates for the respective year and geography [3]. Rates of GBS bacteraemia in infants were calculated using 2017 live birth denominators [4,5]. Geographical analyses were based on cases in England being assigned to one of nine PHE Centres formed from administrative local authority boundaries. [Data for England-only are provided as a web appendix.](#)

Key points

- between 2013 and 2017 there was a 57% increase in the number of laboratory reports of streptococcal bacteraemia (from 11,219 to 17,597 reports) in England, Wales and Northern Ireland
- the reported rates for all pyogenic and non-pyogenic streptococcal groups increased between 2009 and 2017
- in 2017 the rates of bacteraemia were 3.6/100,000 population for group A streptococci (GAS), 3.9/100,000 for group B streptococci (GBS), 2.4/100,000 for group C streptococci (GCS) and 2.4/100,000 for group G streptococci (GGS)
- in line with previous reports, rates of pyogenic streptococcal bacteraemia were highest in the elderly, with the exception of GBS where rates were highest in infants
- the overall rate for England, Wales and Northern Ireland of GBS disease in infants less than 90 days old decreased from 0.73/1,000 live births in 2016 to 0.69/1,000 live births in 2017
- in England, the rate of early onset (<7 days' old) infant GBS disease in 2017 was the same as the previous year (0.46/1,000 live births), whereas the rate of late onset (7 to 90 days' old) infant GBS disease decreased slightly (from 0.25 to 0.22/1,000 live births)
- resistance to clindamycin has increased since 2013 for GCS (from 16% to 23%) and GGS (from 23% to 30%); resistance to erythromycin and tetracycline did not change
- resistance to penicillin was reported for 14% of Mitis group isolates (unchanged since 2015), 16% of Salivarius group isolates (an increase from 11% in 2015), and 20% of Sanguinis group isolates (unchanged since 2015)

Trends: England, Wales and Northern Ireland

Between 2013 and 2017 there was a 57% increase in the number of laboratory reports of streptococcal bacteraemia (from 11,219 to 17,597 reports; table 1) in England, Wales and Northern Ireland, comprising a 54% increase in pyogenic (4,768 to 7,356) and a 59% increase in non-pyogenic streptococcal bloodstream infections (6,451 to 10,241). In England, the rate at which blood cultures were performed, as reported through mandatory surveillance, increased by 30% between 2013 and 2017, from 47.9/1,000 bed days to 62.2 [6]. Therefore, the rates of isolation of pyogenic and non-pyogenic streptococci increased more than the rate of blood culture over this period.

In 2017, 87% (15,232/17,597) of *Streptococcus* spp. isolates from blood (excluding *S. pneumoniae*) were reported to species level, a slight increase on previous years (84% in 2015, 85% in 2016).

Table 1. Reports of pyogenic and non-pyogenic streptococcal bacteraemia by species (England, Wales and Northern Ireland); 2013 to 2017

	2013		2014		2015		2016		2017	
	No.	%	No.	%	No.	%	No.	%	No.	%
Pyogenic streptococci	4,768	100	4,914	100	6,078	100	6,988	100	7,356	100
Group A	1,680	35	1,362	28	1,927	32	2,142	31	2,152	29
Group B	1,616	34	1,785	36	1,947	32	2,269	32	2,345	32
Group C	598	13	779	16	1,037	17	1,275	18	1,430	19
Group G	874	18	988	20	1,167	19	1,302	19	1,429	19
Non-pyogenic streptococci	6,451	100	6,632	100	8,266	100	9,460	100	10,241	100
Anginosus group	994	15	1,003	15	1,162	14	1,391	15	1,546	15
<i>S. anginosus</i>	413	6	430	6	519	6	639	7	724	7
<i>S. constellatus</i>	270	4	296	4	287	3	374	4	417	4
<i>S. intermedius</i>	115	2	130	2	173	2	207	2	210	2
<i>S. milleri</i> group	162	3	128	2	154	2	149	2	172	2
<i>Streptococcus</i> group F	34	1	19	<1	29	<1	22	<1	23	<1
Bovis group	332	5	363	5	424	5	495	5	628	6
<i>S. alactolyticus</i>	31	<1	34	1	51	1	54	1	51	0
<i>S. bovis</i> biotype ii	18	<1	18	<1	109	1	127	1	156	2
<i>S. bovis</i> untyped	178	3	185	3	114	1	160	2	226	2
<i>S. equinus</i>	17	<1	18	<1	14	<1	20	<1	28	<1
<i>S. gallolyticus</i>	64	1	68	1	81	1	87	1	97	1
<i>S. infantarius</i>	24	<1	40	1	55	1	47	<1	70	1
Mitis group	1,173	18	1,324	20	1,700	21	1,969	21	2,201	21
<i>S. mitis</i>	817	13	822	12	1,005	12	1,128	12	1,296	13
<i>S. oralis</i>	355	6	497	7	670	8	808	9	867	8
<i>S. cristatus</i>	1	<1	5	<1	25	<1	33	<1	38	<1
Mutans group	84	1	76	1	95	1	83	1	120	1
<i>S. mutans</i>	82	1	74	1	92	1	82	1	115	1
<i>S. sobrinus</i>	2	<1	2	<1	3	<1	1	<1	5	<1
Salivarius group‡	440	7	484	7	662	8	774	8	798	8
<i>S. salivarius</i>	402	6	439	7	618	7	706	7	641	6
<i>S. vestibularis</i>	38	1	45	1	42	1	68	1	157	2

	2013		2014		2015		2016		2017	
	No.	%	No.	%	No.	%	No.	%	No.	%
Sanguinis group^α	728	11	769	12	971	12	1,189	13	1,442	14
<i>S. gordonii</i>	97	2	122	2	150	2	205	2	214	2
<i>S. parasanguinis</i>	284	4	311	5	449	5	533	6	688	7
<i>S. sanguinis</i>	347	5	336	5	372	5	451	5	540	5
Other streptococci	2,310	36	2,214	33	2,823	34	3,017	32	2,976	29
'Anaerobic streptococcus'	30	<1	52	1	46	1	56	1	44	<1
<i>S. acidominimus</i>	14	<1	9	<1	12	<1	7	<1	2	<1
<i>S. suis</i>	1	<1	6	<1	5	<1	0	0	2	<1
<i>S. uberis</i>	3	<1	4	<1	3	<1	3	<1	3	<1
Streptococci not fully identified	1,963	30	1,723	26	2,206	27	2,350	25	2,365	23
<i>Streptococcus</i> spp., other named [‡]	299	5	420	6	551	7	601	6	560	5
Genera closely related to streptococci[†]	390	6	399	6	429	5	542	6	530	5
<i>Abiotrophia</i> spp.	19	<1	28	<1	35	<1	39	<1	54	1
<i>Aerococcus</i> spp.	153	2	182	3	213	3	294	3	278	3
<i>Gemella</i> spp	98	2	112	2	125	2	155	2	127	1
<i>Globicatella sanguinis</i>	3	<1	4	<1	3	<1	6	<1	18	<1
<i>Leuconostoc</i> spp.	44	1	25	<1	36	<1	43	<1	52	1
<i>Pediococcus</i> spp.	3	<1	11	<1	9	<1	7	<1	7	<1
<i>Peptostreptococcus</i> spp.	89	<1	65	1	41	<1	37	<1	48	<1

[‡] total includes those recorded as '*S. hyointestinalis*' without further information

^α total includes those recorded as '*S. massiliensis*' without further information

[‡] including: *Streptococcus thermophilus*, *Streptococcus infantis*, *Streptococcus lutetiensis*, *Streptococcus pluranimalium*, *Streptococcus pasteurianus*, *Streptococcus ovis*, *Streptococcus peroris*, *Streptococcus sobrinus*, *Streptococcus australis*, *Streptococcus pseudoporcinus*, *Streptococcus thoralensis*, *Streptococcus peroris*, *Streptococcus porcinus*

[†] total includes those recorded as 'nutritionally variant Streptococci' without further information

Figure 1a. Trends in pyogenic streptococcal bacteraemia reports, by group, per 100,000 population (England); 2009 to 2017

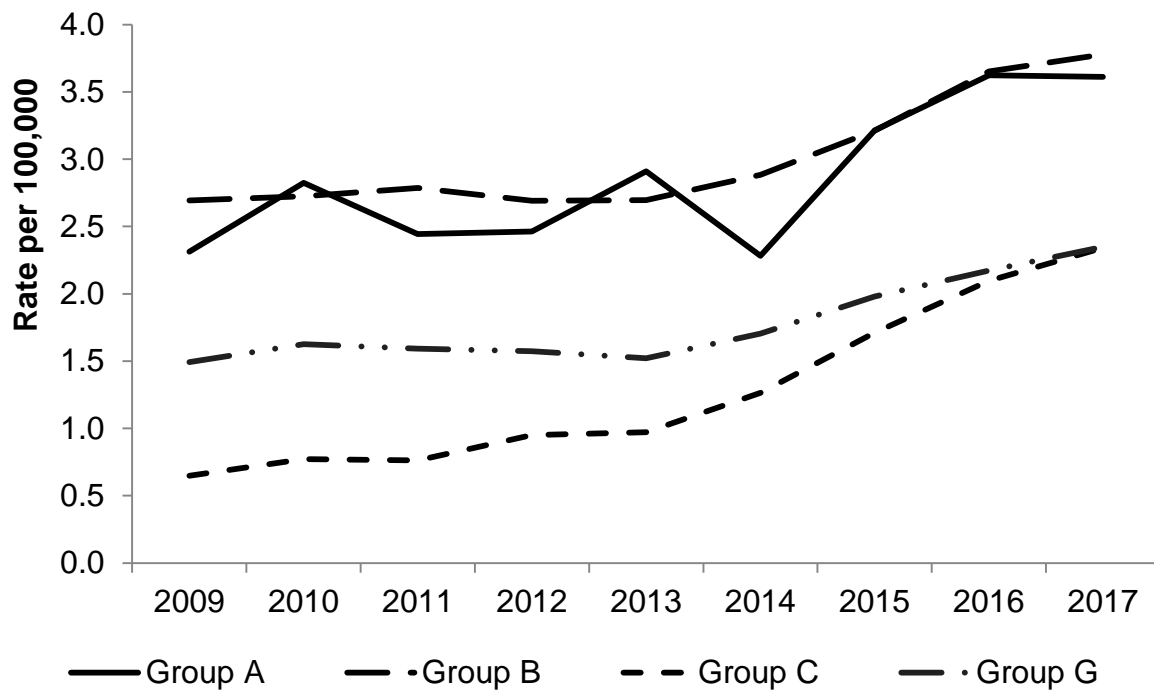
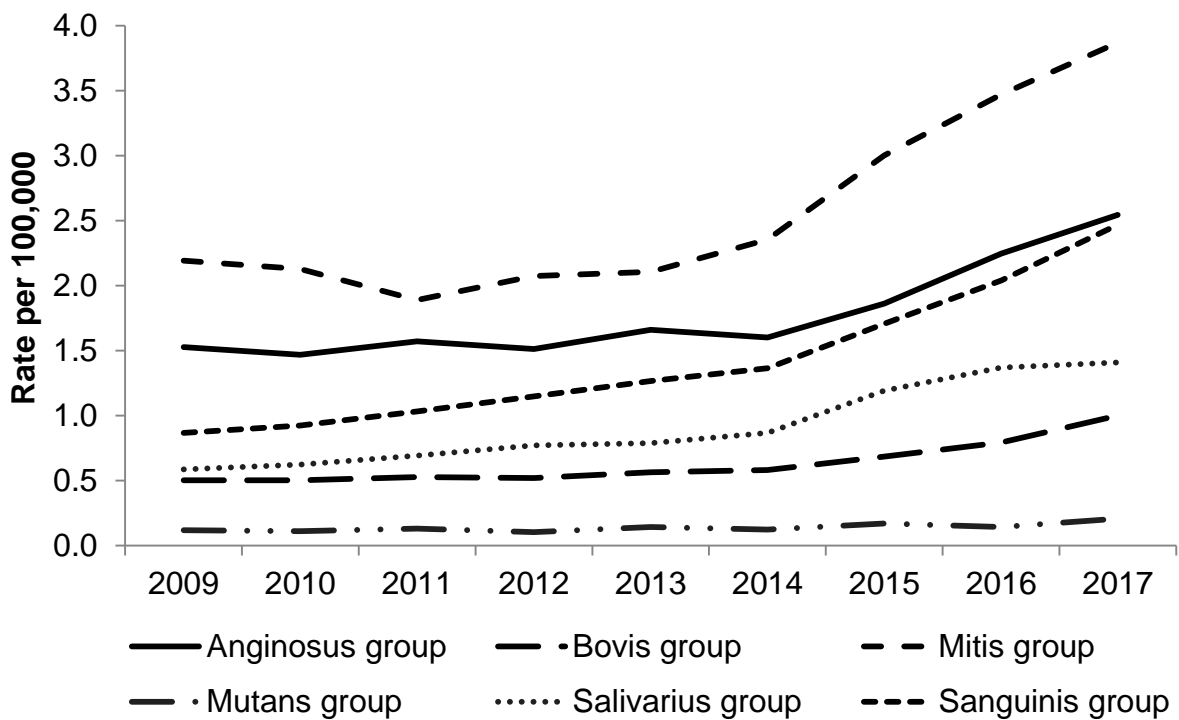


Figure 1b. Trends in non-pyogenic streptococcal bacteraemia reports per 100,000 population (England); 2009 to 2017



Pyogenic Streptococci

Table 2. Rate per 100,000 population of pyogenic streptococcal bacteraemia reports by Region and country (England, Wales and Northern Ireland); 2017

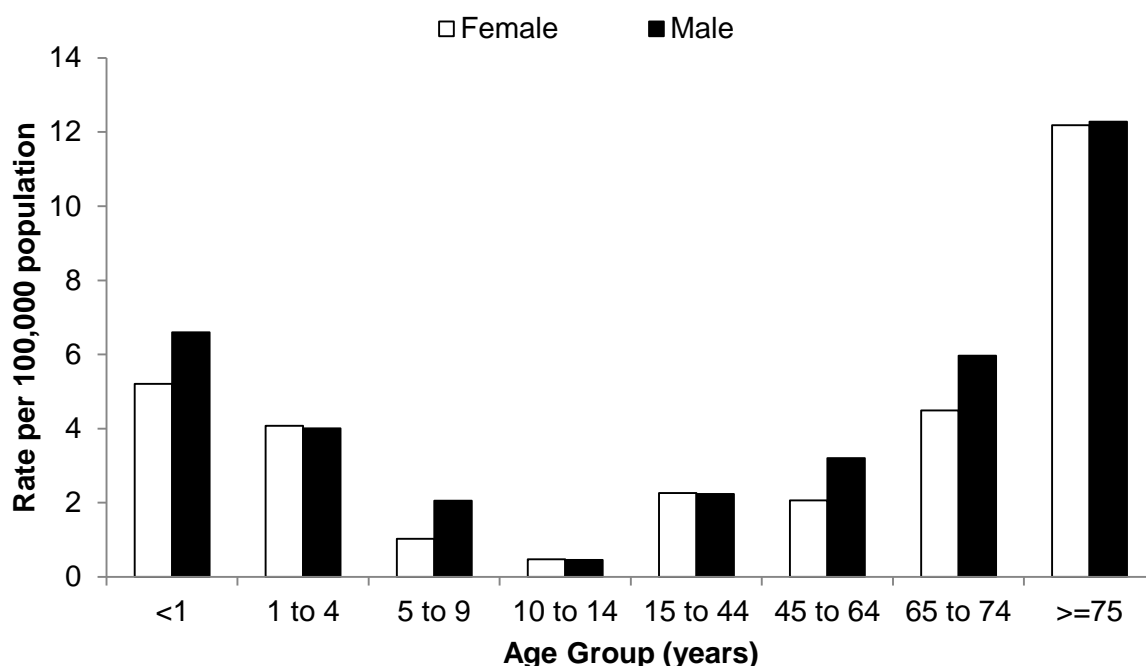
Region	PHE Centre	Rate per 100,000 population			
		Group A	Group B	Group C	Group G
North of England	North East	3.4	3.2	3.9	0.8
	North West	3.7	3.5	1.8	2.3
	Yorkshire and Humber	4.1	3.1	2.8	1.6
Midlands and East of England	East Midlands	3.6	4.0	1.9	4.1
	East of England	3.4	3.5	2.1	3.1
	West Midlands	4.4	3.6	3.5	3.4
London	London	2.9	4.7	1.3	1.2
South of England	South East	3.2	3.3	2.6	1.8
	South West	4.4	4.5	2.5	3.1
England		3.6	3.8	2.3	2.3
Wales		2.9	5.6	2.7	3.6
Northern Ireland		2.8	3.7	2.3	0.6
England, Wales & Northern Ireland		3.6	3.9	2.4	2.4

Group A Streptococci

Of the pyogenic streptococci causing bacteraemia in England, Wales and Northern Ireland in 2017, group A streptococci (GAS) accounted for 29% (2,152/7,356) of reports (table 1). The overall rate of GAS bacteraemia in 2017 was 3.6 cases per 100,000 population (figure 1a), the same as in 2016. There was wide variation in GAS bacteraemia reports across England in 2017, with rates ranging from 2.9 per 100,000 population in the London region to 4.4/100,000 in the West Midlands and South West regions (table 2).

Rates of GAS bacteraemia were markedly higher in males than females in the <1 year, 5-9, 45-64, and 65-74 years age groups (figure 2). The highest rates were in the elderly (75+ years; 12.3/100,000 males; 12.2/100,000 females), followed by those under 1 year old (6.6/100,000 males; 5.2/100,000 females).

Figure 2. Group A streptococcal bacteraemia age and sex rates per 100,000 population in England, Wales and Northern Ireland; 2017



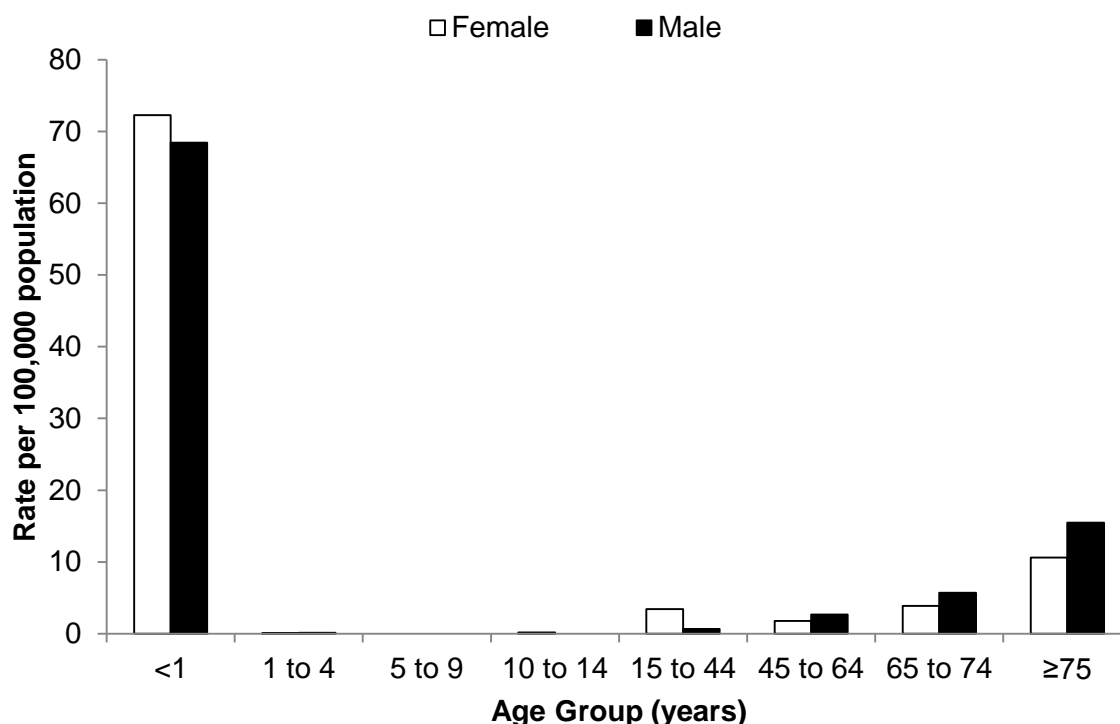
In England and Northern Ireland, the proportion of GAS bacteraemia reports accompanied by antimicrobial susceptibility data in 2017 was 48%, 60% and 64% for clindamycin, erythromycin and tetracycline, respectively. In 2017, resistance (defined as reduced- or non-susceptibility) to clindamycin, erythromycin and tetracycline was recorded for 6%, 7% and 12% of cases, respectively, unchanged from the previous year (table 4).

Group B Streptococci

In 2017, 2,345 cases of GBS bacteraemia were reported by laboratories in England, Wales and Northern Ireland to PHE, a 20% increase compared to 2015 (1,947 reports; table 1). This is higher than any of the previous four years. GBS bacteraemia accounted for 32% of the pyogenic streptococcal bacteraemia reported in 2017, the same proportion as in 2015 and 2016. The reported rate of GBS bacteraemia in England, Wales and Northern Ireland was 3.9 per 100,000 population in 2017, compared with 3.7 in 2016 (table 2). There was variation between countries with notably higher rates in Wales (England 3.8/100,000, Wales 5.6/100,000, and Northern Ireland 3.7/100,000). Within England, the Yorkshire and Humber region reported the lowest rate of infection (3.1/100,000), London region the highest rate (4.7/100,000).

Rates of GBS bacteraemia were highest in those aged less than one year, at 71.0 per 100,000 population (72.3/100,000 in females and 68.4/100,000 in males; figure 3). Rates were higher in males than females in the older age groups (65-74 years, males 3.9/100,000, females 2.7/100,000; 75+ years age group, males 15.5/100,000, females 10.6/100,000).

Figure 3. Group B streptococcal bacteraemia age and sex rates per 100,000 population in England, Wales and Northern Ireland; 2017



In infants under 90 days' old the rate of GBS bacteraemia in England in 2017 was 0.68 per 1,000 live births (table 3), a slight decrease compared with 2016 (0.72/1,000) [7]. Decreases were also observed over the same period in Northern Ireland (from 0.58 to 0.52/1,000 live births) and Wales (from 1.00 to 0.96/1,000 live births).

In England, rates of early onset disease (<7 days old) were higher than late onset disease (7-90 days old) (0.46 compared with 0.22 per 1,000 live births). The rate of late onset disease showed a slight decrease from 2016 (0.25 to 0.22/1,000 live births), whereas the rate of early onset disease was unchanged (0.46 per 1,000 live births).

In Wales, there was a reduction in early onset rates (0.64 to 0.56/1,000) and a slight increase in late onset rates (0.36 to 0.40/1,000); Northern Ireland saw reductions in rates of early onset (0.25 to 0.22/1,000) and late onset disease (0.33 to 0.30/1,000). However, it should be noted that in Wales and Northern Ireland the numbers of cases are small.

Table 3. Number and rate per 1000 live births of group B streptococcal bacteraemia in infants 0-90 days old (England, Wales and Northern Ireland); 2017

	All cases (0-90 days old)		Early onset (0-6 days old)		Late onset (7-90 days old)	
	No.	rate	No.	rate	No.	rate
England	440	0.68	300	0.46	140	0.22
Wales	31	0.96	18	0.56	13	0.40
Northern Ireland (NI)	12	0.52	5	0.22	7	0.30
England, Wales & NI	483	0.69	323	0.46	160	0.23

The proportion of GBS bacteraemia reports in 2017 accompanied by antimicrobial susceptibility test result data was 63%, 77% and 83% for clindamycin, erythromycin and tetracycline, respectively. Clindamycin and erythromycin resistance increased in GBS bacteraemia isolates between 2015 and 2017, from 21% to 27% for clindamycin, 27% to 32% for erythromycin (table 4). Tetracycline resistance in GBS bacteraemia reports remained constant at 85%. These results further support guidance by the Royal College of Obstetricians and Gynaecologists regarding the prevention of early-onset neonatal GBS disease, specifically that clindamycin is not recommended due to the rate of resistance [8].

Groups C and G Streptococci

In England, Wales and Northern Ireland the number of cases of GCS bacteraemia increased by 12% between 2016 and 2017, from 1,275 to 1,430 reports, continuing a year-on-year increase since 2013 (table 1). The rate of GCS bacteraemia in England was 2.4 per 100,000 population in 2017, more than three times the rate observed in 2009 (0.6/100,000) (figure 1a). The numbers of GGS bacteraemia reported in England, Wales and Northern Ireland increased by 10% between 2016 and 2017 (from 1,302 to 1,429 reports), reaching 2.4 cases per 100,000 population (table 2).

Population rates of infection varied by country for both GCS and GGS bacteraemia in 2017, with GCS bacteraemia rates of 2.3, 2.7 and 2.3 per 100,000 population and GGS bacteraemia rates of 2.3, 3.6 and 0.6/100,000 in England, Wales and Northern Ireland, respectively (table 2). Within England GCS bacteraemia rates ranged from 1.3/100,000 in London to 3.9 in the North East. Rates of GGS bacteraemia also varied, ranging from 0.8/100,000 in the North East to 4.1/100,000 in the East Midlands. Rates of GCS and GGS bacteraemia were highest in the elderly; 14.3/100,000 and 16.0/100,000 in the 75 years and over age group, respectively (figures 4 and 5). Rates were higher in males than in females in all age groups.

Susceptibility data were available for 67%, 77% and 85% of GCS bacteraemia isolates in 2017 for clindamycin, erythromycin and tetracycline, respectively. For GGS bacteraemia isolates, susceptibility results to clindamycin, erythromycin and tetracycline were reported for 64%, 79% and 88%, respectively. In 2017, the proportion of isolates resistant to clindamycin, erythromycin and tetracycline in GCS bacteraemia was 23%, 27% and 29%, respectively (table 4). The proportion of resistant isolates was higher in GGS bacteraemia isolates, with 30%, 37% and 47% resistant to clindamycin, erythromycin and tetracycline, respectively. Resistance to clindamycin has increased since 2013 for GCS (from 16% to 23%) and GGS (from 23% to 30%), whereas resistance to erythromycin and tetracycline was relatively unchanged.

Figure 4. Group C streptococcal bacteraemia age and sex rates per 100,000 population in England; 2017

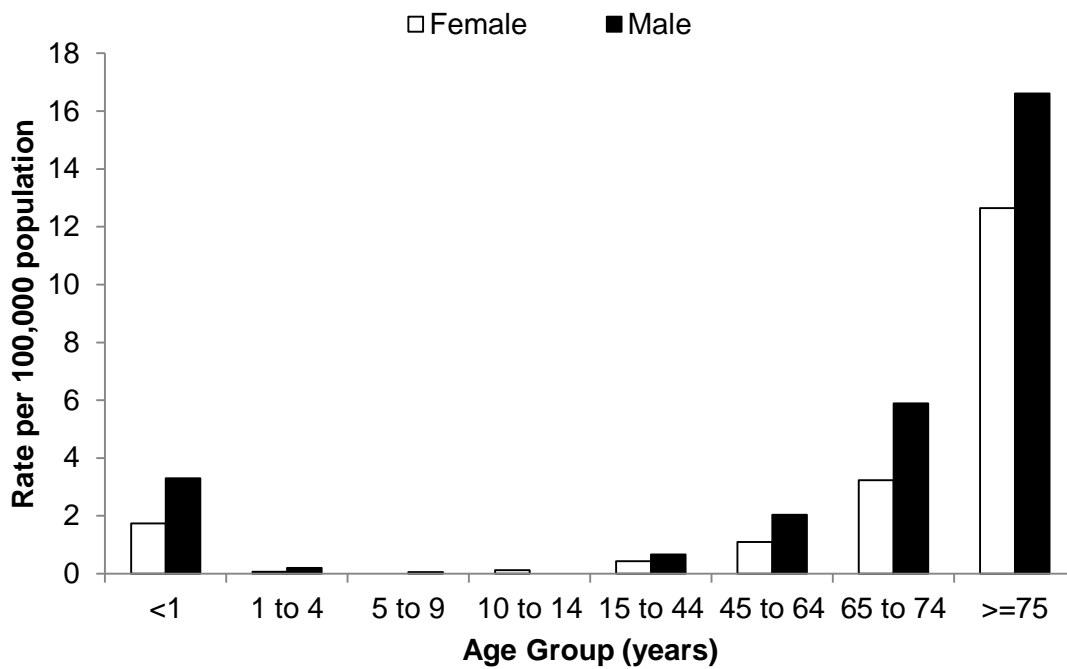


Figure 5. Group G streptococcal bacteraemia age and sex rates per 100,000 population in England; 2017

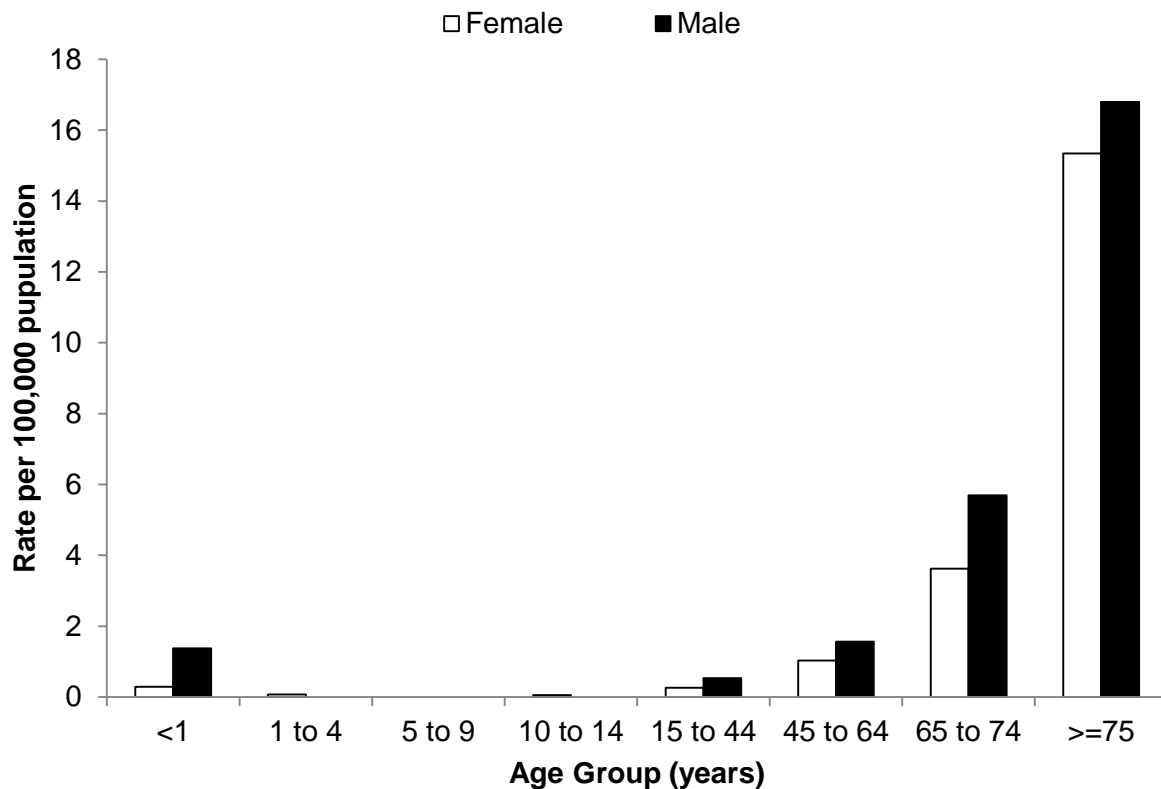


Table 4. Antimicrobial susceptibility* for pyogenic streptococci causing bacteraemia (England & Northern Ireland); 2015 to 2017

		2015			2016			2017		
	Antimicrobial agent	S (%)	I (%)	R (%)	S (%)	I (%)	R (%)	S (%)	I (%)	R (%)
Group A	clindamycin	95	0	5	94	<1	6	94	0	6
	erythromycin	93	<1	6	93	1	7	93	<1	7
	tetracycline	90	<1	10	89	<1	11	88	<1	12
Group B	clindamycin	79	<1	21	75	<1	25	73	0	27
	erythromycin	72	<1	27	68	1	30	67	1	32
	tetracycline	15	<1	85	15	<1	85	15	<1	85
Group C	clindamycin	83	<1	16	81	<1	19	77	<1	23
	erythromycin	72	1	27	72	2	26	71	1	27
	tetracycline	70	1	29	67	1	32	70	1	29
Group G	clindamycin	77	<1	23	70	<1	30	70	<1	30
	erythromycin	60	1	39	59	2	39	62	1	37
	tetracycline	52	<1	47	54	1	45	53	1	47

*S = susceptible; I = intermediate (reduced susceptibility); R = resistant

Non-pyogenic streptococci

The number of cases of non-pyogenic streptococcal bacteraemia reported in England, Wales and Northern Ireland has increased each year since 2013, with an overall 59% increase (from 6,451 to 10,241 reports; table 1). Rates increased in all of the non-pyogenic groups between 2009 and 2016 (figure 1b; England only), with the largest increases occurring in Salivarius and Sanguinis group streptococci (0.6 to 1.4, and 0.9 to 2.5 per 100,000 population, respectively).

As in previous years, rates in 2017 varied by individual country. Of the non-pyogenic streptococci, the rate of bacteraemia reports in England was highest for Mitis group streptococci (3.9 per 100,000 population; table 5), with the lowest rates for Mutans group (0.2/100,000). In contrast, the highest non-pyogenic bacteraemia rates in Wales and Northern Ireland were observed for Anginosus group streptococci, with 2.6/100,000 and 2.7/100,000 respectively.

Incidence rates for each of the non-pyogenic groups varied within England. Anginosus group bacteraemia rates ranged from 3.2 per 100,000 population in the North East to 2.2/100,000 in the London and Yorkshire and Humber regions. Rates of Mitis group bacteraemia ranged from 5.2/100,000 in the North East to 3.1/100,000 in the East of England region. The largest variation was seen with Bovis group bacteraemia, which ranged from 0.6/100,000 in the East of England to 2.1/100,000 in the West Midlands.

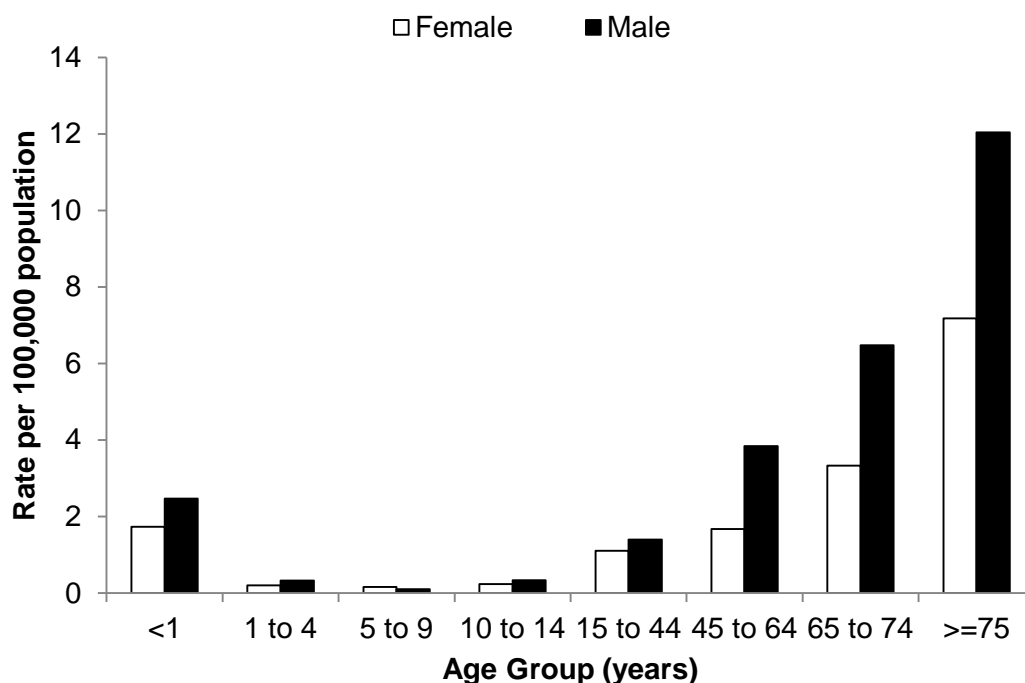
Among all non-pyogenic streptococci bacteraemia reported in 2017 in England, Wales and Northern Ireland, the Mitis group accounted for the majority of reports (21%); in this group, reports increased by 88% (from 1,173 to 2,201 reports) between 2013 and 2017 (table 1). Increases in the number of non-pyogenic streptococcal bacteraemia reports were seen in all groups since 2013, with the greatest increase being seen in the Sanguinis group (98%, from 728 to 1,442 reports). The changes in distribution of some other less common species of the non-pyogenic streptococci may in part be due to increasing use of matrix-assisted laser desorption/ionization time of flight (MALDI-ToF) analysis in hospitals, which allows for rapid species identification, and to greater reporting of minor species not previously recognised in most clinical laboratories.

Table 5. Rate per 100,000 population non-pyogenic streptococcal bacteraemia reports by region and country (England, Wales and Northern Ireland); 2017

Region	PHE Centre	Rate per 100,000 population					
		Anginosus Group	Bovis Group	Mitis Group	Mutans Group	Salivarius Group	Sanguinis Group
North of England	North East	3.2	1.4	5.2	0.3	2.4	3.5
	North West	2.4	1.1	3.9	0.3	1.3	2.8
	Yorkshire and Humber	2.2	0.8	3.5	0.1	1.4	2.8
Midlands and East of England	East Midlands	3.1	0.9	3.6	0.2	1.1	2.4
	East of England	2.3	0.6	3.1	0.2	1.2	2.0
	West Midlands	2.6	2.1	5.1	0.2	1.6	2.7
London	London	2.2	0.8	3.9	0.2	1.2	2.0
South of England	South East	2.6	0.8	3.7	0.2	1.3	2.4
	South West	3.0	0.8	3.6	0.2	1.9	2.6
England		2.5	1.0	3.9	0.2	1.4	2.5
Wales		2.6	1.6	0.6	0.1	0.1	1.7
Northern Ireland		2.7	1.1	1.6	0.1	0.6	1.2
England, Wales & Northern Ireland		2.6	1.0	3.6	0.2	1.3	2.4

Distributions of non-pyogenic streptococcal bacteraemia reports by age and sex showed higher rates among males compared to females, and in the youngest (<1 year) and oldest age groups (figures 6-10). Rates were highest in those aged 75 years and above for Anginosus (figure 6) and Bovis (figure 7) streptococcal group bacteraemia (9.2 and 7.2 per 100,000 population, respectively), whereas rates were highest in those aged under one year old for Mitis (23.8/100,000, figure 8), Salivarius (12.1/100,000, figure 9) and Sanguinis (12.5/100,000, figure 10) streptococcal groups.

Figure 6. Anginosus group streptococcal bacteraemia age and sex rates per 100,000 population in England, Wales and Northern Ireland; 2017



Erythromycin susceptibility data were available (depending on the species) for 57-67% of Anginosus, Bovis, Mitis, Mutans, Salivarius and Sanguinis bacteraemia isolates from England and Northern Ireland; for tetracycline, data availability was 41-54%; for penicillin, 82-96%. Resistance to penicillin was reported for 14% of Mitis isolates (unchanged since 2015), 16% of Salivarius isolates (an increase from 11% in 2015), and 20% of Sanguinis isolates (unchanged since 2015) (table 6). The proportion of isolates reported as resistant to erythromycin increased between 2013 and 2017 in all of the non-pyogenic streptococcal groups except Mitis and Sanguinis. Tetracycline resistance decreased markedly for Bovis (from 73% to 66%) and Sanguinis (from 37% to 28%) groups.

Figure 7. Bovis group streptococcal bacteraemia age and sex rates per 100,000 population (England, Wales and Northern Ireland); 2017

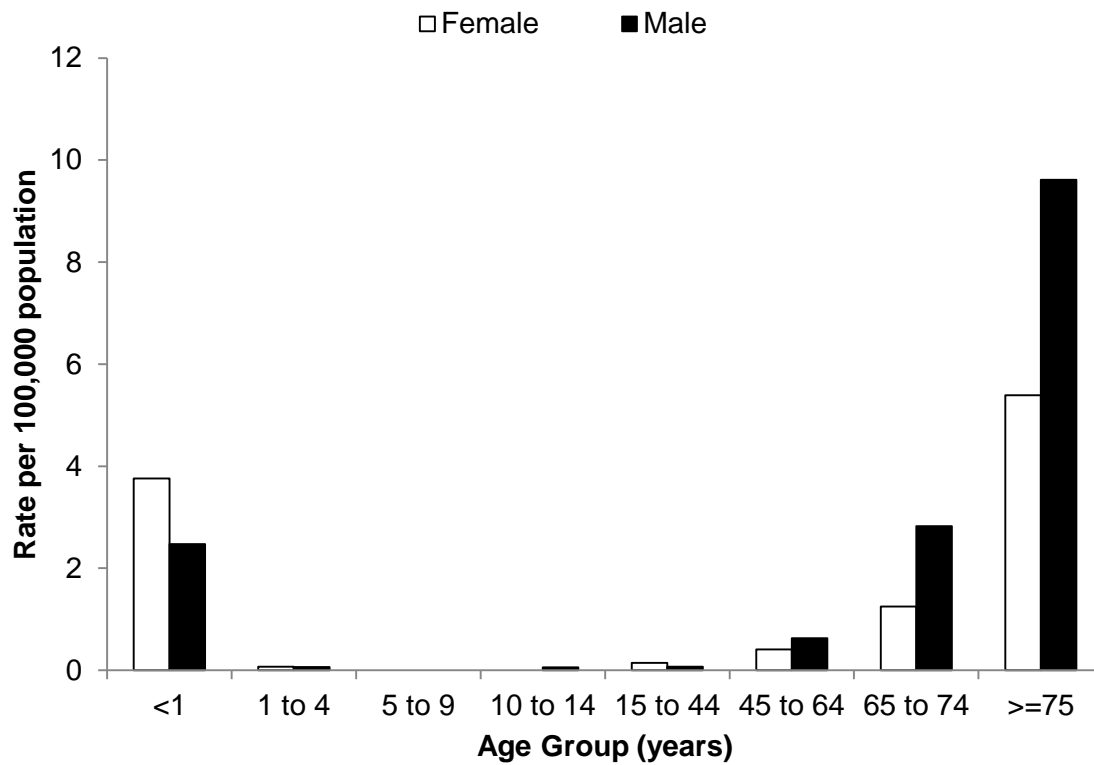


Figure 8. Mitis group streptococcal bacteraemia age and sex rates per 100,000 population in England, Wales and Northern Ireland; 2017

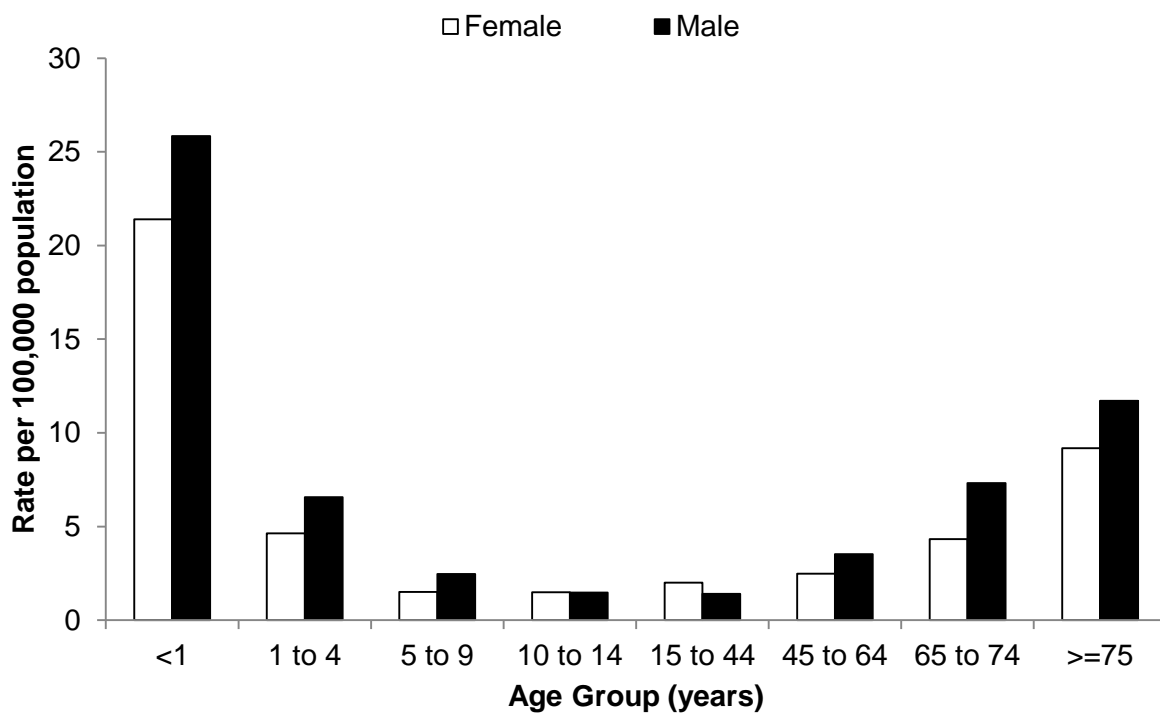


Figure 9. Salivarius group streptococcal bacteraemia age and sex rates per 100,000 population in England, Wales and Northern Ireland; 2017

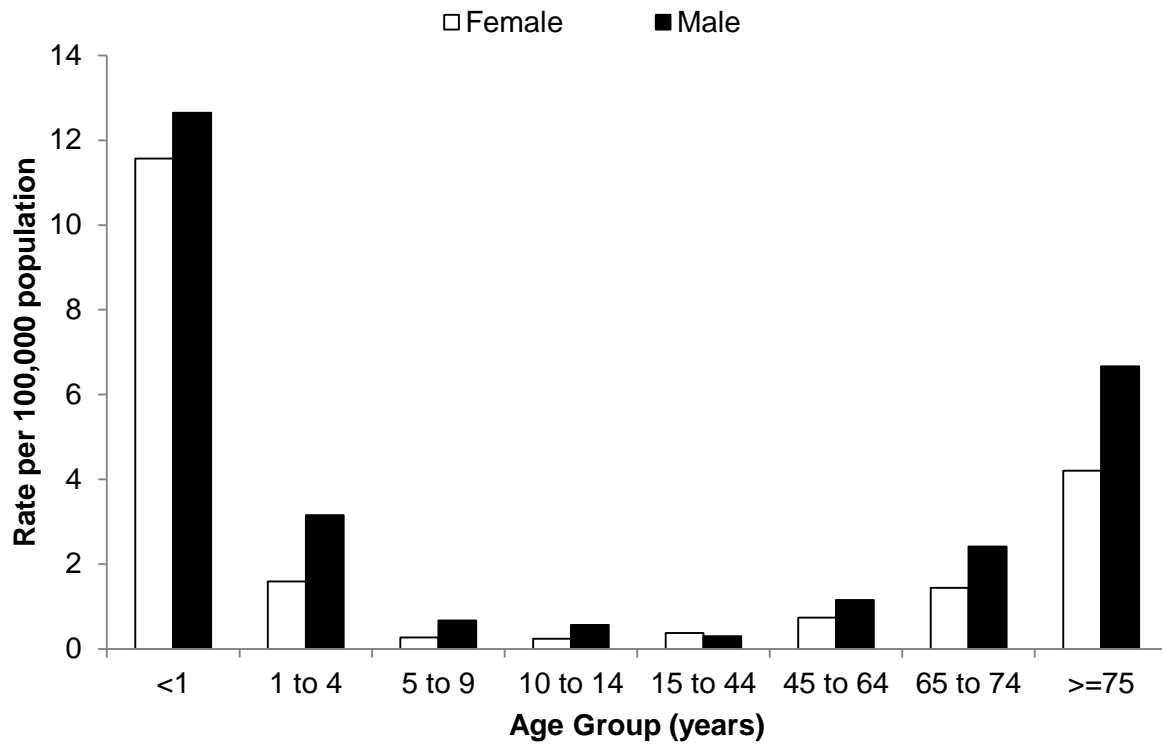


Figure 10. Sanguinis group streptococcal bacteraemia age and sex rates per 100,000 population in England, Wales and Northern Ireland; 2017

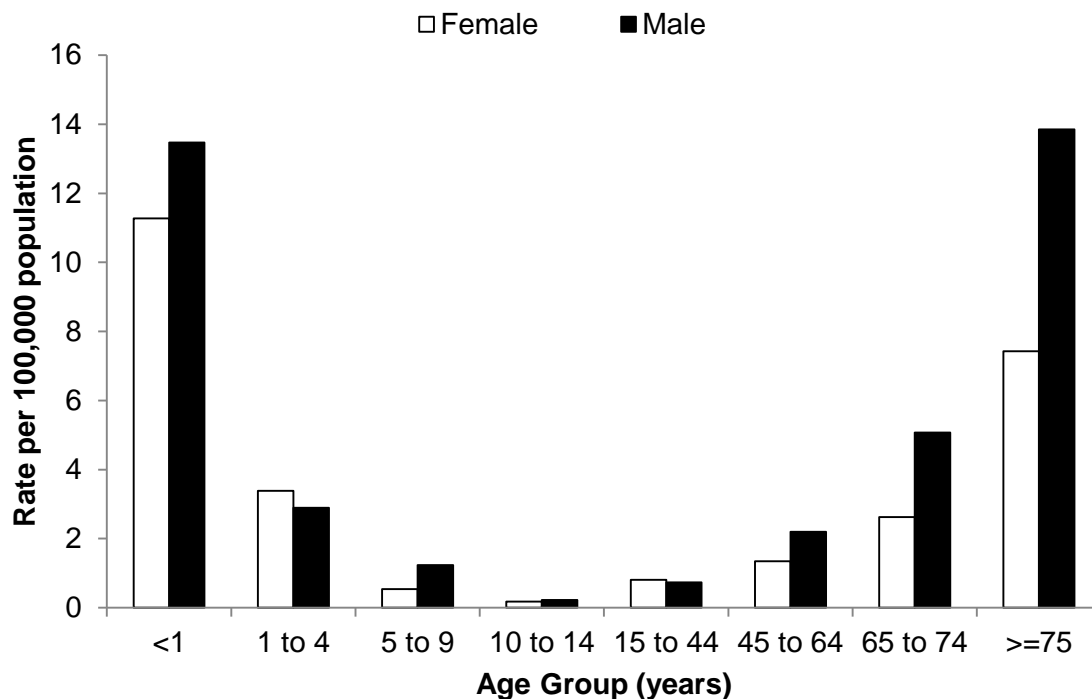


Table 6. Antimicrobial susceptibility for non-pyogenic streptococci causing bacteraemia (England & Northern Ireland); 2015 to 2017

		2015			2016			2017		
	Antimicrobial agent	S (%)	I (%)	R (%)	S (%)	I (%)	R (%)	S (%)	I (%)	R (%)
Anginosus	erythromycin	91	0	9	90	<1	10	88	0	12
	tetracycline	79	<1	20	83	<1	17	81	0	19
	penicillin	99	<1	1	99	<1	<1	99	<1	1
Bovis	erythromycin	72	0	28	69	1	30	67	<1	33
	tetracycline	27	0	73	33	<1	67	33	<1	66
	penicillin	98	1	1	98	1	<1	98	1	1
Mitis	erythromycin	50	<1	49	50	1	50	49	1	50
	tetracycline	69	<1	31	72	<1	28	72	<1	28
	penicillin	80	5	14	81	5	14	81	6	14
Salivarius	erythromycin	55	<1	44	53	<1	46	48	<1	52
	tetracycline	82	<1	18	81	0	19	81	<1	19
	penicillin	80	8	11	80	6	14	77	7	16
Sanguinis	erythromycin	53	<1	47	50	<1	50	52	<1	47
	tetracycline	62	2	37	64	1	34	71	<1	28
	penicillin	68	11	21	67	11	21	69	11	20

***S** = susceptible; **I** = intermediate (reduced susceptibility); **R** = resistant

Reference Microbiology Service

In 2017, the proportion of reports of streptococcal bacteraemia in which the organism was not fully identified was 13%, a reduction from 15% in 2016 [7]. 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. 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 PHE, Colindale. Guidelines for the management of close community contacts of invasive GAS cases [9] and the prevention and control of GAS transmission in acute healthcare and maternity settings [10] are available at the following web-page:

www.gov.uk/government/publications/invasive-group-a-streptococcal-disease-managing-community-contacts

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