UK Health Security Agency

Laboratory surveillance of streptococcal bacteraemia in England: 2024 update

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Contents

Introduction

The analyses in this report are based on data relating to diagnoses of pyogenic and non-pyogenic streptococcal bloodstream infections between 2014 and 2024 (calendar years) in England. Data for England were extracted from the UK Health Security Agency's Second Generation Surveillance System (SGSS), the national laboratory surveillance database, on 30 October 2024. All laboratories in England are requested to submit data to SGSS, with reporting based on clinically relevant isolates.

Invasive group A S*treptococcal* disease is notifiable in England and Wales under the Health Protection (Notification) Regulations 2010. Records of group A streptococcal (GAS) bacteraemia based on isolates submitted to the UKHSA Staphylococcal and Streptococcal Reference Service (SSRS) (part of the Antimicrobial Resistance and Healthcare Associated Infections (AMRHAI) Reference Unit, Colindale) are routinely uploaded and merged into SGSS. Beta-haemolytic streptococci are classified according to the type of major surface polysaccharide antigen (Lancefield group), namely: group A (*Streptococcus pyogenes*; GAS), group B (*Streptococcus agalactiae*; GBS), group C (multiple zoonotic species including the human species *Streptococcus dysgalactiae* subsp. *equisimilis*; GCS) and group G (human and zoonotic species *Streptococcus dysgalactiae* subsp. *equisimilis* and *Streptococcus canis*; GGS). These are grouped as pyogenic streptococci within this report.

Non-pyogenic streptococci, including alpha- and non-haemolytic streptococci, are subdivided into groups: mitis; sanguinis; anginosus; salivarius; mutans and bovis. *Streptococcus pneumoniae* and group D streptococci (now classified as *Enterococcus* spp.) are not included in this report, bacteraemia incidence and antimicrobial resistance trends for *S. pneumoniae* and *Enterococcus* spp. are available within the annual English surveillance programme for antimicrobial utilisation and resistance (ESPAUR) reports.

The report includes analyses on the trends, distribution by age and sex, ethnicity, region and deprivation, and antimicrobial susceptibility of laboratory-confirmed pyogenic and non-pyogenic streptococcal bacteraemia. Rates of bacteraemia were calculated using mid-year resident population estimates for the respective year and geography. Rates of GBS bacteraemia in infants were calculated using 2024 live birth denominators.

Geographical analyses were based on cases being assigned to 1 of 9 regions formed from administrative local authority boundaries in England; deprivation analyses were based on indices of multiple deprivation (IMD) assigned to the residential postcode where cases lived at the time of diagnosis.

Ethnicity analyses were based on aggregated ethnic groups derived using the Method for assigning ethnic group in the COVID-19 Health Inequalities Monitoring for England (CHIME) tool.

A web appendix is available featuring the findings of this report. It should be noted that the data presented here for earlier years may differ from those in previous publications due to the inclusion of late reports.

Main points

Key findings from this report:

- between 2020 and 2024 there was a 27% overall increase in the number of laboratory reports of streptococcal bacteraemia (from 14,626 to 18,548 reports) in England, with a 0.3% increase noted between 2023 (18,497 reports) and 2024
- further to the declines in incidence noted during the COVID-19 pandemic (2020 and 2021) for GAS, GBS, mitis group streptococci and sanguinis group streptococci bacteraemia, 2024 incidence rates were similar to pre-pandemic levels for each
- the rate of GAS bacteraemia decreased by 27% from 5.8 cases per 100,000 population in 2023 to 4.2 per 100,000 in 2024
- resistance to tetracycline, clindamycin, erythromycin and linezolid in GAS bacteraemia in was 37%, 8%, 14% and less than 1%, respectively
- in 2024, 2,392 cases of GBS bacteraemia were reported by laboratories in England, an 8% increase from 2020 (2,208)
- in line with previous reports, rates of pyogenic streptococcal bacteraemia were highest in the elderly, except for GBS where rates were highest in infants
- rates of GBS disease in infants less than 90 days old (both early and late onset) increased in 2024 compared to those reported in 2023, 0.70 per 1,000 live births versus 0.64 per 1,000
- resistance to clindamycin and erythromycin in GBS bacteraemia increased between 2020 and 2024, from 31% to 36% for clindamycin and 36% to 44% for erythromycin
- the number of ‘non-pyogenic’ streptococcal bacteraemia increased by 7% between 2023 and 2024, from 7,985 to 8,562 reports, although variation was noted by group
- further to declines in incidence noted during the COVID-19 pandemic years (2020 and 2021), mitis and sanguinis group streptococcal bacteraemia continue to see an increase in reports from 2021 to 2024 from 3.4 to 4.7 per 100,000 (mitis) and 2.4 to 3.2 per 100,000 (sanguinis)
- Resistance to penicillin was reported for 8% of mitis group isolates (similar to 2020, 9%), 14% of salivarius group isolates (an increase from 12% in 2020), and 19% of sanguinis isolates (similar to what was reported in 2020, 21% resistance)
- all sterile site beta-haemolytic streptococcal isolates should be referred to UKHSA SSRS laboratory, and any isolates with suspected resistance to penicillin (groups A, C and G: minimum inhibitory concentration (MIC) >0.03 mg/L, or zone diameter <23mm; group B: MIC >0.125 mg/L, or zone diameter <18mm), cephalosporins, glycopeptides, lipoglycopeptides, lipopeptides, oxazolidinones, tigecycline or

quinupristin-dalfopristin referred to the UKHSA AMRHAI Reference Unit Antimicrobial Resistance and Mechanisms Service for confirmation

Trends in England

The number of laboratory reports of 'pyogenic' (beta-haemolytic) and 'non-pyogenic' (alpha- and non-haemolytic) streptococcal bacteraemia remained stable between 2023 and 2024, with a slight 0.3% increase seen in England (18,497 to 18,548). Over the 5-year period 2020 to 2024, a 27% increase in streptococcal bacteraemia reports (from 17,238 to 18,548 reports; Table 1) was observed, following reductions during the COVID-19 pandemic, which resulted in reduced contact between individuals, decreased planned healthcare and an associated decline in infections associated with healthcare interventions, particularly surgery.

In 2024, 90% (16,680 out of 18,548) of *Streptococcus* spp. isolates from blood (excluding *Streptococcus pneumoniae*) were reported to species level. Of those identified to species level in 2024, 46% (7,712 out of 18,548) were pyogenic streptococci (groups A, B, C and G), slightly lower than the distribution in 2023 (51%; Table 1).

Figures 1a and 1b show the rate per 100,000 population trends of the pyogenic (Figure 1a) and non-pyogenic group streptococcal bacteraemia (Figure 1b) between 2015 and 2024. Between 2023 and 2024 a level trend in bacteraemia rates was seen for both streptococcal groups, with a few notable exceptions. A 27% decrease in incidence was seen for GAS bacteraemia between 2023 and 2024 (Figure 1a), and for the species of the mitis and sanguinis group (Figure 1b) a 9% and 11% increase was seen over the same period.

Table 1. Reports of pyogenic and non-pyogenic streptococcal bacteraemia by species in England, 2020 to 2024 [note 1]

Species	2020: number	2020: %	2021: number	2021: %	2022: number	2022: %	2023: number	2023: %	2024: number	2024: %
Pyogenic streptococci	**6,279**	**100**	**5,564**	**100**	**7,476**	**100**	**8,529**	**100**	**7,712**	**100**
Group A	1,314	21	695	12	2,510	34	3,363	39	2,490	32
Group B	2,208	35	2,089	38	2,072	28	2,244	26	2,392	31
Group C [note 2]	1,489	24	1,586	29	1,657	22	1,760	21	1,703	22
Group G [note 3]	1,268	20	1,194	21	1,237	17	1,162	14	1,127	15
Non-pyogenic streptococci	**6,442**		**6,798**		**7,258**		**7,985**		**8,562**	
anginosus group	**1,628**	**100**	**1,691**	**100**	**1,530**	**100**	**1,756**	**100**	**1,783**	**100**
S. anginosus	815	50	826	49	772	50	900	51	908	51
S. constellatus, not further speciated	441	27	457	27	395	26	438	25	470	26
S. constellatus subsp *constellatus*	16	<1	17	1	13	<1	17	<1	10	<1
S. constellatus subsp *pharyngis*	4	<1	2	<1	0	0	0	0	2	<1
S. intermedius	217	13	244	14	228	15	277	16	266	15
S. milleri group	130	8	135	8	115	8	116	7	121	7
Streptococcus group F	5	<1	10	<1	7	<1	8	<1	6	<1
bovis group	**830**	**100**	**819**	**100**	**803**	**100**	**908**	**100**	**974**	**100**
S. alactolyticus	48	6	33	4	5	<1	5	<1	5	<1
S. gallolyticus subsp *gallolyticus* [note 4]	452	54	465	57	480	60	521	57	557	57
S. gallolyticus subsp *pasteurianus*	27	3	29	4	30	4	52	6	68	7

Species	2020: number	2020: %	2021: number	2021: %	2022: number	2022: %	2023: number	2023: %	2024: number	2024: %
Streptococcus bovis biotype II, not further speciated	45	5	30	4	38	5	41	5	35	4
S. bovis untyped	31	4	28	3	25	3	34	4	47	5
S. equinus	20	2	15	2	24	3	12	1	14	1
S. infantarius [note 5]	55	7	62	8	84	10	140	15	147	15
S. lutetiensis [note 6]	152	18	157	19	117	15	103	11	101	10
mitis group	**1,939**	**100**	**1,944**	**100**	**2,357**	**100**	**2,519**	**100**	**2,768**	**100**
S. mitis group, not further speciated	959	49	923	47	1,144	49	1,734	69	2,124	77
S. mitis [note 7]	87	5	73	4	102	4	123	5	133	5
S. oralis	846	44	890	46	1,016	43	558	22	375	14
S. pseudopneumoniae	2	<1	4	<1	5	<1	7	<1	11	<1
S. infantis	8	<1	9	<1	13	<1	24	<1	19	<1
S. cristatus	33	2	42	2	67	3	69	3	92	3
S. peroris	4	<1	3	<1	10	<1	4	<1	8	<1
S. australis	0	0	0	0	0	0	0	0	6	<1
mutans group	**109**	100	**131**	100	**132**	100	**136**	100	**132**	100
S. mutans	107	98	125	95	129	98	134	99	127	96
S. sobrinus	2	2	6	5	3	2	2	1	5	4
salivarius group	**712**	**100**	**884**	**100**	**876**	**100**	**986**	**100**	**1036**	**100**
S. salivarius	551	77	643	73	640	73	653	66	696	67

Species	2020: number	2020: %	2021: number	2021: %	2022: number	2022: %	2023: number	2023: %	2024: number	2024: %
S. vestibularis	150	21	211	24	205	23	244	25	211	20
S. hyointestinalis	2	<1	1	<1	1	<1	3	<1	0	0
S. thermophilus	9	1	29	3	30	3	86	9	129	12
sanguinis group	**1,224**	**100**	**1,349**	**100**	**1,560**	**100**	**1,680**	**100**	**1,869**	**100**
S. gordonii	199	16	249	18	265	17	282	17	348	19
S. parasanguinis	640	52	699	52	836	54	861	51	939	50
S. massiliensis	10	<1	14	1	12	<1	14	<1	9	<1
S. sanguinis [note 8]	38	3	29	2	33	2	43	3	45	2
S. sanguinis group, not further speciated	337	28	358	27	414	27	480	29	528	28
Other streptococci	**1,907**	**100**	**1,860**	**100**	**1,748**	**100**	**1,986**	**100**	**2,274**	**100**
Anaerobic Streptococcus	27	1	17	<1	27	2	11	<1	11	<1
S. merionis	0	0	0	0	0	0	5	<1	9	<1
S. sinensis	0	0	2	<1	1	<1	2	<1	2	<1
S. pseudoporcinus	4	<1	2	<1	6	<1	2	<1	4	<1
S. pluranimalim	1	<1	1	<1	3	<1	0	0	1	<1
S. ovis	3	<1	0	0	1	<1	1	<1	0	0
S. suis	2	<1	4	<1	4	<1	5	<1	4	<1
Streptococcus spp. other named [note 9]	126	7	123	7	115	7	188	9	375	16
Streptococcus not fully identified	1,744	91	1,711	92	1,591	91	1,772	89	1,868	82
Total Streptococci [note 1]	**14,628**		**14,242**		**16,482**		**18,500**		**18,548**	

Species	2020: number	2020: %	2021: number	2021: %	2022: number	2022: %	2023: number	2023: %	2024: number	2024: %
Genera closely related to streptococci [note 10]	**591**	**100**	**672**	**100**	**713**	**100**	**713**	**100**	**791**	**100**
Abiotrophia spp.	45	8	47	7	66	9	73	10	68	9
Aerococcus spp.	313	53	377	56	410	58	410	58	456	58
Gemella spp.	137	23	151	22	140	20	136	19	166	21
Globicatella spp.	18	3	17	3	20	3	21	3	20	3
Leuconostoc spp.	39	7	39	6	35	5	40	6	50	6
Pediococcus spp.	10	2	7	1	14	2	11	2	13	2
Peptostreptococcus spp.	28	5	34	5	28	4	22	3	18	2

Notes

Note 1. 'Total streptococci' excludes *S. pneumoniae*.

Note 2: includes those reported as *S. dysgalactiae*, *S. dysgalactiae* subsp. *dysgalactiae*, *S. dysgalactiae* subsp. *equisimilis*, *S. equi*, *S. equisimilis*, *Streptococcus* group C, and *S. zooepidemicus*

Note 3: includes those reported as *S. canis* and *Streptococcus* group G

Note 4: total includes those reported as '*Streptococcus bovis* biotype I'.

Note 5: includes those reported as '*Streptococcus infantarius* sp *infantarius*', '*S. infantarius*' and '*Streptococcus infantarius* sp *nov*'

Note 6: includes those reported as *S. infantarius* subsp. *coli*

Note 7: includes those reported as *S. mitis* I or *S. mitis* II.

Note 8: includes those reported as *S. sanguinis* I or *S. sanguinis* II.

Note 9: including: *S. porcinus* (n=4), *S. thoraltensis* (n=4), *S. acidominus* (n=1), *S. uberis* (n=3), *S. urinalis* (n=1) and '*Streptococcus* spp., other named' without further information (n=914).

Note 10: 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 in England, 2015 to 2024

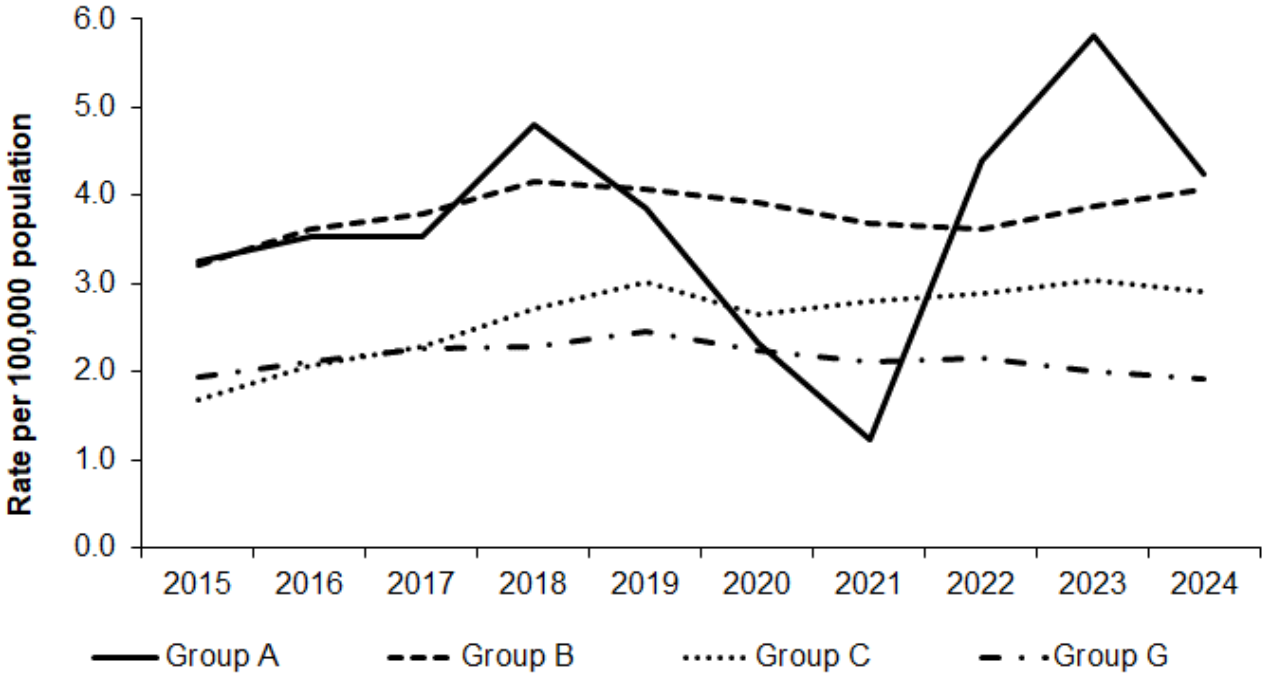
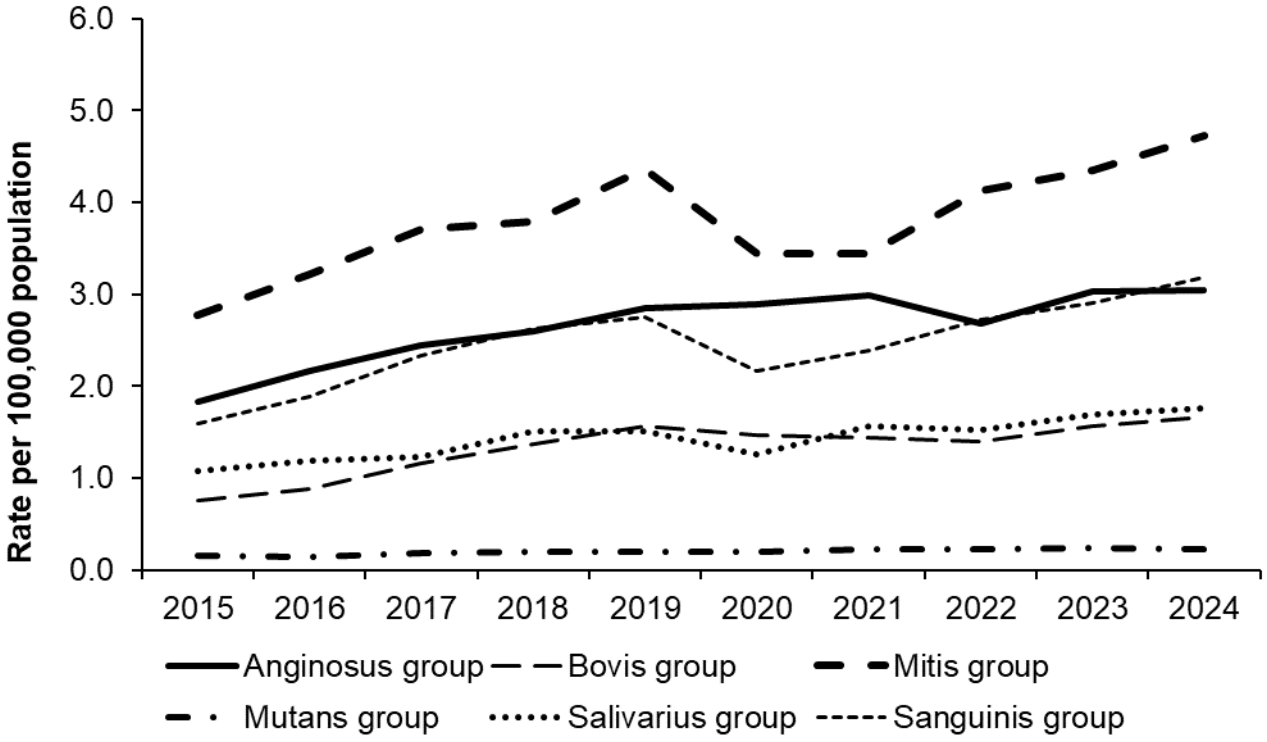


Figure 1b. Trends in non-pyogenic streptococcal bacteraemia reports, by group, per 100,000 population in England, 2015 to 2024



Pyogenic streptococci

Table 2 shows the regional rates of the pyogenic streptococcal bacteraemia by group in 2024. Variation in rates by region was seen for each of the pyogenic streptococcal groups in 2024, with no region recording the highest or lowest rate per 100,000 population across all of the groups.

Table 2. Rate per 100,000 population of pyogenic streptococcal bacteraemia reports by region and group in England, 2024

Region	Rate per 100,000 population			
	Group A	Group B	Group C	Group G
North East	6.8	3.8	4.0	1.5
North West	4.0	4.3	2.2	2.7
Yorkshire and Humber	4.9	4.0	4.2	2.7
East Midlands	3.1	4.3	2.5	1.7
East of England	3.3	3.0	2.5	1.6
West Midlands	4.3	4.6	3.8	2.1
London	5.0	3.6	1.6	0.5
South East	3.7	4.5	3.2	2.0
South West	4.4	4.6	3.3	2.7
England	**4.2**	**4.1**	**2.9**	**1.9**

Table 3 shows the rates per 100,000 of cases of pyogenic group streptococci, by Index of Multiple Deprivation (IMD, a socio-economic deprivation indicator derived from 7 key domains of deprivation assigned to the area of residence) in 2024. Comparing the least deprived quintile 5 with the most deprived quintile 1, all pyogenic groups have lower rates in quintile 5 than in quintile 1.

Table 3. Rate per 100,000 population of pyogenic streptococcal bacteraemia reports by index of multiple deprivation and group in England, 2024 [note 11]

IMD Quintile	Rate per 100,000 population			
	Group A	Group B	Group C	Group G
1 (most deprived)	5.9	5.4	3.2	2.2
2	4.0	4.7	3.0	2.0
3	4.1	4.1	3.0	1.9
4	3.4	4.0	3.3	2.3
5 (least deprived)	3.0	3.5	3.1	2.0

Note 11: Data for IMD is based on the patient residence information. Records are excluded when this information is not available. In 2024 the number of pyogenic streptococci episodes excluded was 369 out of 7,712 (4.8%).

Table 4 shows the rates per 100,000 of pyogenic group streptococci, by ethnic group. The unadjusted rates for 2024 were highest in the White ethnic group for each of the pyogenic groups, with the exception of group B streptococcal bacteraemia, where the rate was highest for the Black ethnic group (4.9 out of 100,000).

Table 4. Rate per 100,000 population of pyogenic streptococcal bacteraemia reports by ethnic group in England, 2024 [note 12]

Ethnicity	Rate per 100,000			
	Group A	Group B	Group C	Group G
Asian	2.4	4.1	0.7	0.5
Black	2.6	4.9	1.2	0.1
Mixed	2.1	1.3	0.3	0.1
White	4.3	4.0	3.4	2.3
Other	2.0	3.1	0.2	0.2

Note 12: 362 (4.7%) pyogenic streptococcal bacteraemia episodes could not be linked to ethnic group information in 2024. Following successful linkage, 151 (2.1%) pyogenic streptococci cases had ethnicity recorded as ‘Not known’ or ‘Not Stated’.

Table 5 shows the number of reports for each pyogenic group streptococcal bacteraemia that were tested and the proportion that resistant to key antibiotics (clindamycin, erythromycin, tetracycline, vancomycin, and linezolid) in England between 2020 and 2024.

Key antibiotic resistance trends for each pyogenic streptococcal group are described within relevant sections of the report.

Table 5. Antimicrobial susceptibility for pyogenic streptococci causing bacteraemia in England, 2020 to 2024

In this table NT = number tested, and R = resistant.

Species	Antimicrobial agent	2020: NT	2020: R (%)	2021: NT	2021: R (%)	2022: NT	2022: R (%)	2023: NT	2023: R (%)	2024: NT	2024: R (%)
Group A	Clindamycin	834	9	450	11	1,490	7	2,130	6	1,519	8
	Erythromycin	773	8	408	14	1,471	7	1,914	7	1,379	14
	Tetracycline	941	28	512	40	1,729	22	2,221	21	1,563	37
	Vancomycin	568	<1	320	0	1,070	0	1,486	<1	1,007	<1
	Linezolid	333	0	193	0	633	<1	863	0	635	<1
Group B	Clindamycin	1,487	31	1,457	33	1,404	34	1,594	34	1,659	36
	Erythromycin	1,585	36	1,524	38	1,459	40	1,565	41	1,618	44
	Tetracycline	1,855	84	1,781	83	1,670	83	1,802	82	1,774	83
	Vancomycin	1,186	<1	1,155	<1	1,094	<1	1,194	<1	1,195	<1
	Linezolid	757	<1	788	<1	678	0	741	<1	773	<1
Group C	Clindamycin	1,072	23	1,221	27	1,199	26	1,309	27	1,277	27
	Erythromycin	1,056	29	1,132	32	1,087	31	1,180	32	1,131	33
	Tetracycline	1,246	31	1,367	33	1,333	31	1,455	35	1,388	38
	Vancomycin	730	<1	847	<1	836	<1	925	<1	830	0
	Linezolid	519	<1	600	<1	582	0	619	0	536	<1
Group G	Clindamycin	961	43	903	38	898	40	835	37	856	38
	Erythromycin	907	44	833	44	810	41	727	40	706	43
	Tetracycline	1,083	44	1,010	43	985	41	902	44	844	48

Species	Antimicrobial agent	2020: NT	2020: R (%)	2021: NT	2021: R (%)	2022: NT	2022: R (%)	2023: NT	2023: R (%)	2024: NT	2024: R (%)
	Vancomycin	677	0	675	<1	628	<1	566	<1	490	0
	Linezolid	384	0	374	<1	351	0	328	<1	258	0

Group A streptococci

Of the pyogenic streptococci causing bacteraemia in England in 2024, group A streptococci (GAS) accounted for 32% (2,490 out of 7,712) of reports (Table 1).

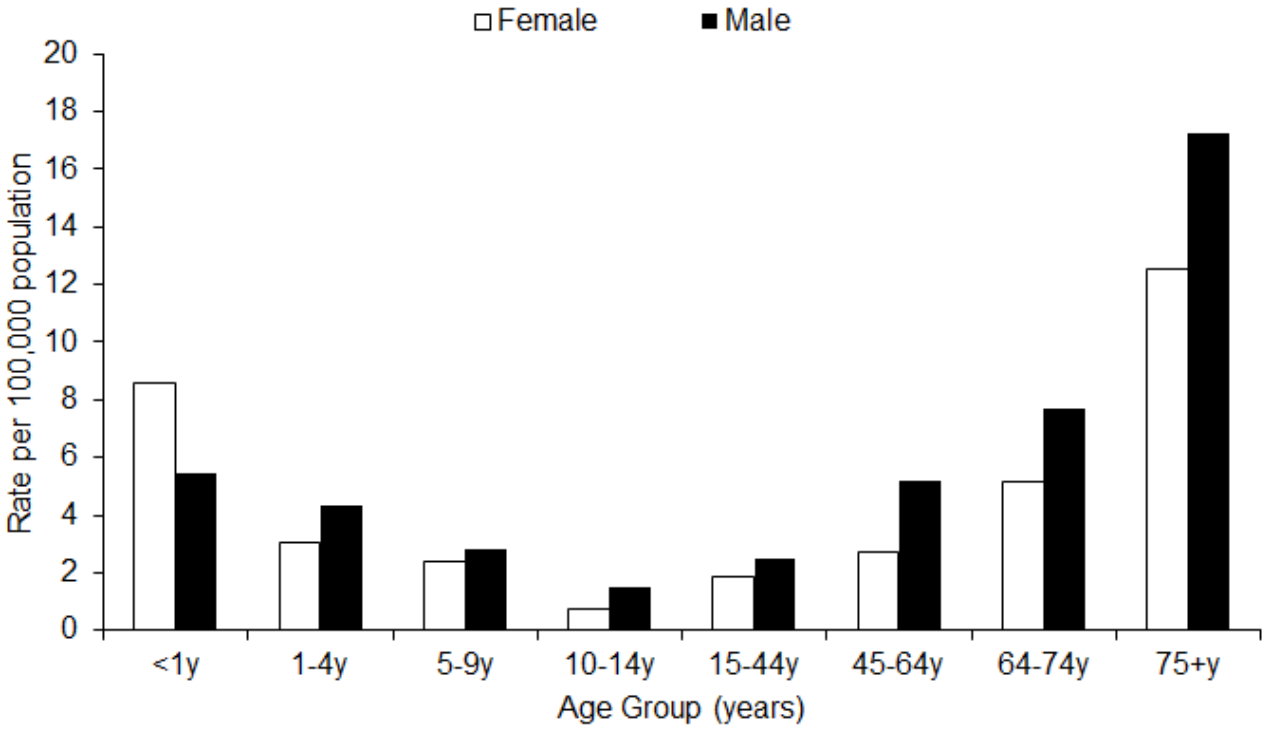
In comparison with other causes of bacteraemia, GAS were ranked 7th amongst monomicrobial and 18th amongst polymicrobial bacteraemia in 2023 (summary tables published in the ESPAUR report 2023 to 2024), up from 11th and 20th in 2022, respectively. An increasing trend in the rate of GAS bacteraemia was seen between 2015 (3.3 per 100,000 population) and 2018 (4.8 per 100,000) after which cases declined from 2019 to a minimum observed rate in 2021 (1.2 per 100,000 population). Following a sharp increase between 2021 and 2022 (4.4 per 100,000), GAS bacteraemia rates reached a peak in 2023 (5.8 per 100,000). In 2024 the rate has since decreased by 27% to 4.2 per 100,000 (Figure 1a).

The upsurge in invasive GAS (sterile-site specimens) and scarlet fever notifications during 2022 and early 2023 are described more fully within the contemporary seasonal reports.

The rate of GAS bacteraemia reports across England in 2024 ranged from 3.1 in the East Midlands to 6.8 per 100,000 in the North East (Table 2).

Figure 2 shows the rates of GAS bacteraemia were higher in males than females the majority of age groups, the only exception was in the under 1 year age group. The highest rates were observed in the elderly (aged 75 years or more) at 14.6 per 100,000 (17.3 in males and 12.6 per 100,000 in females), followed by those aged less than 1 year and 64 to 74 years at 7.1 per 100,000 and 6.4 per 100,000, respectively. GAS bacteraemia rates were lower for all age groups in 2024 when compared with 2023.

Figure 2. Group A streptococcal bacteraemia age and sex rates per 100,000 population in England, 2024



In 2024, the incidence of GAS bacteraemia by IMD quintile exhibited a pattern of decreased rate as deprivation quintile decreased, from the most deprived 20% to the least deprived 20% of the population in England (Table 3). Compared to the other pyogenic group streptococci, GAS bacteraemia incidence showed the greatest difference between the most deprived quintile and least deprived quintile: 5.9 per 100,000 in quintile 1 compared to 3.0 per 100,000 in quintile 5 (34% difference).

GAS bacteraemia (unadjusted) rates varied by ethnic group in 2024, from 4.3 per 100,000 population in the White ethnic group to 2.0 in the 'Other' ethnic group (Table 4).

In England, the percentage of GAS bacteraemia reports accompanied by antimicrobial susceptibility data in 2024 were 74% (77% in 2023), 67% (69%), 76% (80%), 49% (53%), and 31% (31%) for clindamycin, erythromycin, tetracycline, vancomycin, and linezolid, respectively.

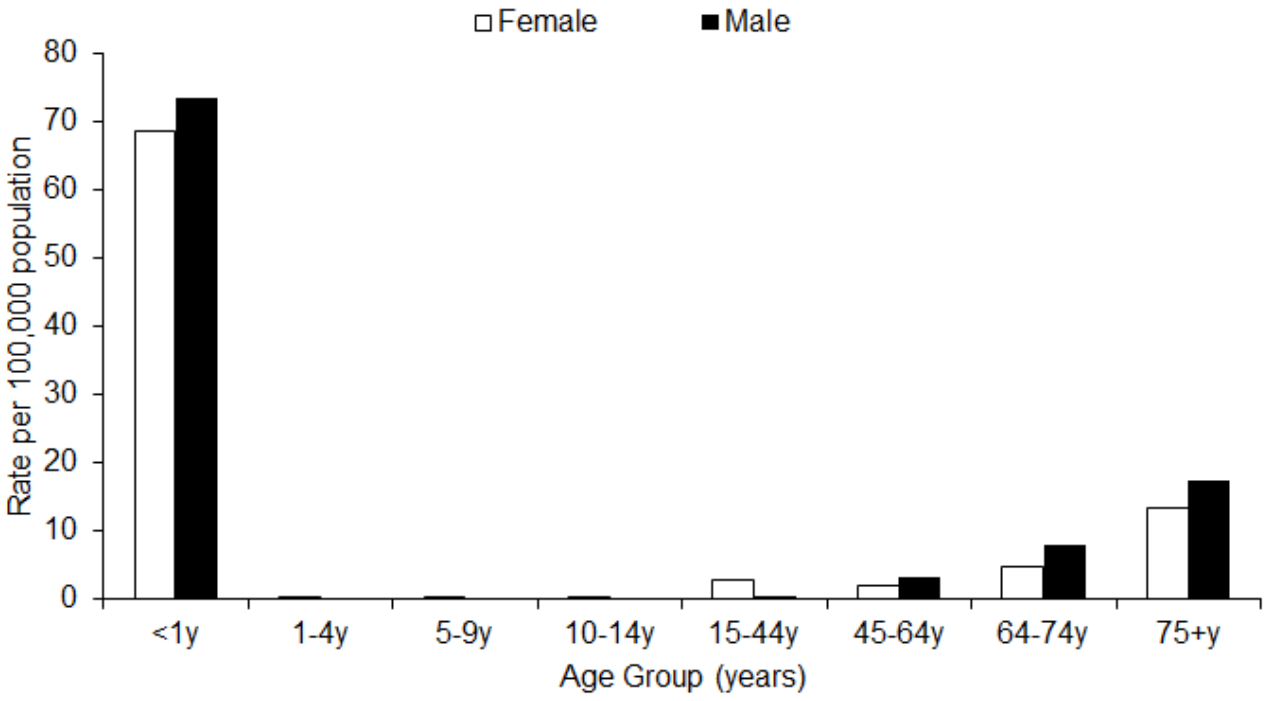
In 2024, resistance to clindamycin, erythromycin, tetracycline was recorded for 8%, 14% and 37% of cases, respectively (Table 5). For both vancomycin, and linezolid, resistance for 2024 was less than 1%. Resistance in 2024 to each of the 5 antibiotics has increased compared to the resistance reported for 2023. Antimicrobial resistance in *S. pyogenes* has been detected in multiple but not all *emm* gene sequence types (1) and elevation in resistance from year to year can relate to circulating strain types.

Group B streptococci

GBS is a clinically important pathogen of particular note in the extremes of age. In 2024, 2,392 cases of GBS bacteraemia were reported by laboratories in England, a 7% increase from numbers reported in 2023 (2,244). GBS bacteraemia accounted for 31% of the pyogenic streptococcal bacteraemia reported in 2024, higher than observed in the prior 2 years (26% and 28%, respectively), possibly reflecting the decrease in GAS bacteraemia in 2024 (Table 1). The rate of GBS bacteraemia in England was 4.1 per 100,000 population in 2024 (Table 2), compared with 3.2 per 100,000 in 2015 (Figure 1a). Within England, the South West and West Midlands regions reported the highest rate of infection (both 4.6 per 100,000), and the East of England (3.0 per 100,000) the lowest (Table 2).

Figure 3 shows that in 2023 the rates of GBS bacteraemia were highest in those aged less than 1 year, at 71.1 per 100,000 population (68.6 in females and 73.5 per 100,000 in males). Rates of GBS bacteraemia were higher in males compared with females in most age groups, with the exception rates in those aged 15 to 44 years, where females had higher rates of GBS bacteraemia (2.9 per 100,000 compared to 0.6 per 100,000). For the older age groups, the rates of GBS bacteraemia were: 65 to 74 years, males 7.9, females 4.9 per 100,000, and 75 years and over age group, males 17.3, females 13.3 per 100,000.

Figure 3. Group B streptococcal bacteraemia age and sex rates per 100,000 population in England; 2024



In infants aged under 90 days old, the rate of GBS bacteraemia in England in 2024 was 0.7 per 1,000 live births (Table 6), slightly higher than 2023 (0.64 per 1,000) and 2022 (0.63 per 1,000) and a decrease from 2020 (0.80 per 1,000).

In England, rates of early-onset neonatal infection (aged less than 7 days old) were higher than late-onset infection (7 to 90 days old) (0.42 compared with 0.28 per 1,000 live births). The rates for both late onset and early onset disease are comparable to rates in 2023 (0.24 and 0.40 respectively).

Table 6. Number and rate per 1,000 live births of group B streptococcal bacteraemia in infants 0 to 90 days old in England, 2024

Infant age group	Number of episodes	Rate per 1,000 live births
All infant cases: 0 to 90 days old	396	0.70
Early onset: 0 to 6 days old	238	0.42
Late onset: 7 to 90 days old	158	0.28

Rates of GBS in 2024 ranged from 5.4 per 100,000 in the most deprived IMD quintile (20% of the population) to 3.5 per 100,000 in the least deprived IMD quintile (Table 3).

By ethnic group, (unadjusted) rates per 100,000 for GBS cases were highest amongst those of Black ethnicity (4.9 per 100,000), followed by cases of an Asian ethnicity group (4.1 per 100,000) (Table 4) in 2024.

The percentage of GBS bacteraemia reports from England accompanied by antimicrobial susceptibility data in 2024 were 70% (71% in 2023), 69% (70%), 75% (81%), 51% (53%), and 33% (33%) for clindamycin, erythromycin, and tetracycline, vancomycin, and linezolid, respectively. Clindamycin, erythromycin resistance increased in GBS bacteraemia isolates between 2020 and 2024, from 31% to 36% for clindamycin and 36% to 44% for erythromycin (Table 5). Tetracycline resistance remained similar compared to 2020 at 83%. Resistance was less than 1% for both vancomycin and linezolid.

GBS resistance to penicillin remains exceedingly rare with just one confirmed report of reduced susceptibility to penicillin in the UK, from 2016 (2). If laboratories suspect penicillin resistance (MIC >0.125 mg/L, or zone diameter <18mm) in a pyogenic group *Streptococcus*, the isolate should be sent to the UKHSA AMRHAI Reference Unit for confirmation.

Group C and G streptococci

The number of cases of group C streptococcal (GCS) bacteraemia increased by 14% between 2020 and 2024 in England, accounting for 22% of the reported pyogenic streptococcal bacteraemia in 2024 (Table 1). The rate of GCS bacteraemia in England was 2.9 per 100,000 population in 2024, an increase of 72% from the rate observed in 2015 (1.7 per 100,000) (Figure 1a). The number of cases of Group G streptococcal (GGS) bacteraemia reported in England was 1,127, an 11% decline in reports from 1,268 reported in 2020 (Table 1). The rate

reported in 2024 was the same as observed in 2015 at 1.9 per 100,000 for both years (Figure 1a).

Within England, GCS bacteraemia rates varied considerably by region in 2024, from 1.6 per 100,000 in London to 4.2 in Yorkshire and Humber (Table 2). Rates of GGS bacteraemia also varied substantially in 2024, ranging from 0.5 in London to 2.7 per 100,000 in the North West, Yorkshire and Humber, and South West regions.

Rates of GCS and GGS bacteraemia were highest in the 75 years and over age group for both groups in 2024, 19.0 and 13.1 per 100,000, respectively (Figure 4 and Figure 5). Rates were higher in males than females in most age groups, with the exception of less than 1 year-olds for GCS bacteraemia.

In contrast to GAS and GBS, no obvious pattern in incidence by deprivation quintile was noted for either GCS or GGS in 2024 (Table 3), although population rates were lower amongst the least deprived quintile compared with the most deprived. For GCS the rate of infection was similar across all quintiles, with the greatest rate seen in quintile 4 (3.3 per 100,000). For GGS the highest rate was also seen in quintile 4 (2.3 per 100,000) (Table 3).

In 2024, both GCS and GGS had considerably higher rates for those of a White ethnic group, 3.4 and 2.3 per 100,000 population respectively, compared to other ethnic groups (Table 4). Antimicrobial susceptibility data were available for 74%, 66%, 80%, 48%, and 31% of GCS bacteraemia isolates in 2024 for clindamycin, erythromycin, and tetracycline, vancomycin, and linezolid, respectively, compared with 74%, 67%, 82%, 52%, and 35% in 2023. For GGS bacteraemia, susceptibility data for clindamycin, erythromycin, and tetracycline, vancomycin, and linezolid was reported for 72%, 60%, 71%, 41%, and 22% of isolates in 2024, respectively, compared 68%, 60%, 74%, 46%, and 27% in 2023. In 2024, the percentage of GCS bacteraemia isolates resistant to clindamycin, erythromycin and tetracycline were 27%, 33% and 38%, respectively (Table 5). The percentage of resistant isolates was higher for GGS bacteraemia isolates, with 38%, 43% and 48% resistant to clindamycin, erythromycin and tetracycline, respectively. Resistance for vancomycin and linezolid for both GCS and GGS was less than 1%. Resistance for clindamycin has increased compared to resistance seen in 2020, 23% for GCS, though for GGS the percentage resistance has decreased from 43% to 38%.

Figure 4. Group C streptococcal bacteraemia age and sex rates per 100,000 population in England, 2024

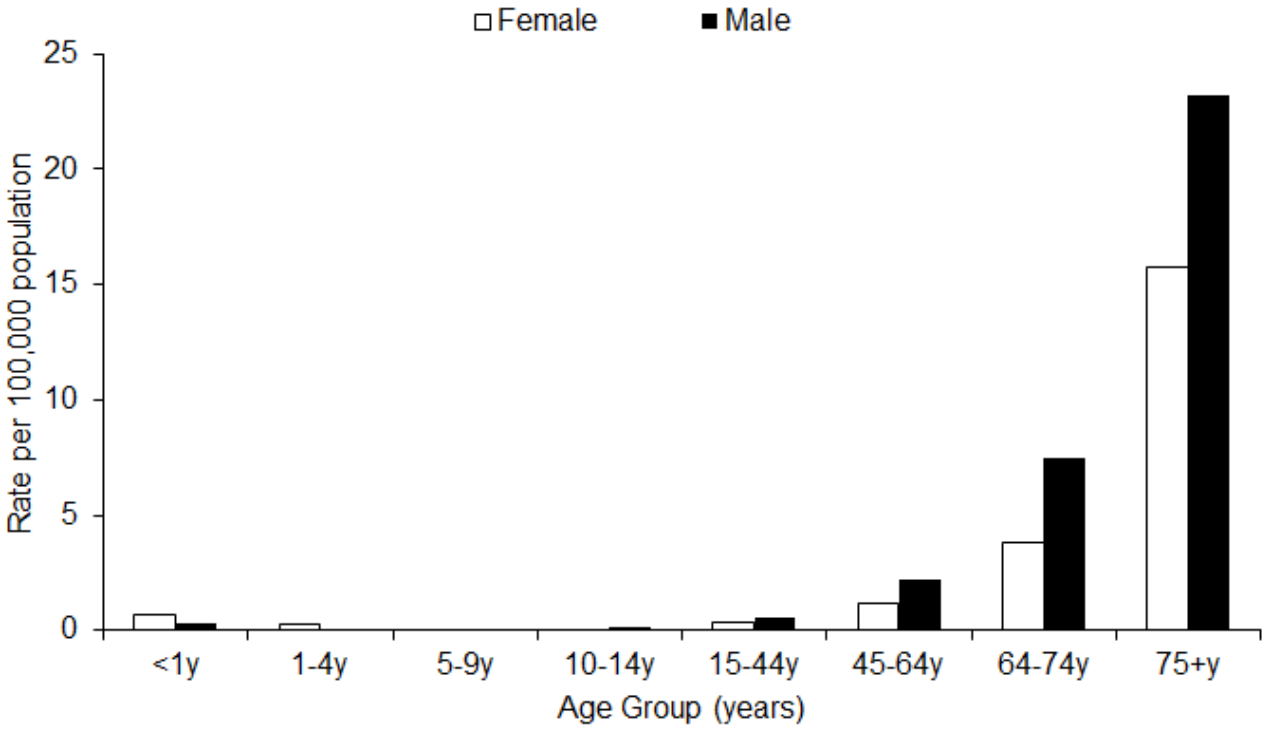
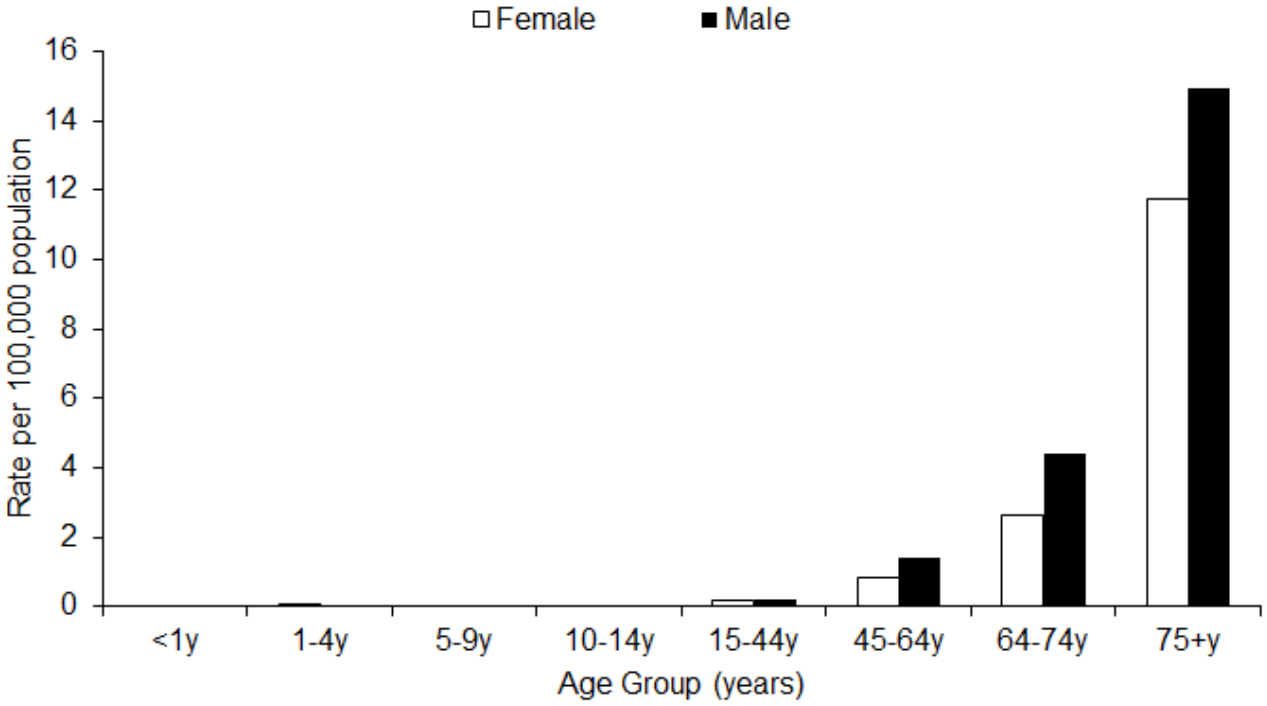


Figure 5. Group G streptococcal bacteraemia age and sex rates per 100,000 population in England; 2024



Non-pyogenic streptococci

Cases of non-pyogenic streptococcal bacteraemia have shown a 7% increase in 2024 from the previous year (7,985 in 2023 to 8,562 in 2024), and a 33% increase from 2020 (6,442) (Table 1). Rates of bacteraemia showed an overall increase across all non-pyogenic streptococcal groups in England between 2015 and 2024 (Figure 1b), although some groups (mitis, salivarius, and sanguinis groups) saw declines during the period of COVID-19 pandemic restrictions and disruptions to healthcare delivery (2020 and 2021).

Of the non-pyogenic streptococci, bacteraemia rates in 2024 were highest for mitis group streptococci (4.7 per 100,000 population; Figure 1b), and lowest rates for mutans group (0.2 per 100,000).

Among all non-pyogenic streptococcal bacteraemia reported in 2024 in England, the mitis group accounted for the largest percentage of reports, 2,768 of the 8,562 (32%; Table 1).

The previous increases in reports and subsequent distribution of less common non-pyogenic streptococcal species 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, facilitating reporting of species not previously recognised by clinical laboratories. It is of note that identification of *Streptococcus* to species level using MALDI-ToF alone is undergoing evaluation by the AMRHAI Reference Unit. Accurate species determination may not be achieved with this standalone test for all species and this needs to be accounted for when species such as *S. alactolyticus*, *S. equinus* and *S. acidominimus*, amongst others, which are not usually associated with human infection, are currently being reported, and the isolate should be referred to the *Staphylococcus* and *Streptococcus* Reference Section (SSRS) for a full identification.

It is also of note that the reference laboratory detected 30 *Streptococcus dysgalactiae* subspecies *equisimilis* (SDSE) expressing the Group A surface antigen from sterile-site isolate referrals in 2023. These isolates would be reported as SDSE by laboratories that perform MALDI-ToF alone, and as GAS by laboratories that do not use MALDI-ToF and perform only Lancefield grouping on beta-haemolytic streptococci. Referral to the national SSRS provides an opportunity to correct any misidentification of species.

Table 7 shows that the incidence rates for each of the non-pyogenic groups varied within England in 2024. Rates of mitis group streptococci bacteraemia ranged from 2.3 per 100,000 in the North East region to 6.8 per 100,000 in the West Midlands region. Anginosus group streptococcal bacteraemia rates ranged from 2.1 in the London region to 3.6 per 100,000 in the South West.

Table 7. Rate per 100,000 population of non-pyogenic streptococcal bacteraemia reports by Region in England, 2024

Region	Rate per 100,000 population					
	anginosus group	bovis group	mitis group	mutans group	salivarius group	sanguinis group
North East	3.0	2.2	2.3	0.2	2.0	3.4
North West	3.2	2.0	5.7	0.2	2.0	3.0
Yorkshire and Humber	3.5	1.8	3.8	0.3	1.8	3.4
East Midlands	3.4	2.0	4.5	0.1	1.8	3.5
East of England	2.7	1.3	4.1	0.3	1.6	2.9
West Midlands	2.9	1.8	6.8	0.3	2.1	4.0
London	2.1	1.0	3.8	0.1	1.4	2.7
South East	3.3	1.6	5.5	0.2	1.8	3.1
South West	3.6	1.8	4.3	0.2	1.6	3.2
England	**3.0**	**1.7**	**4.7**	**0.2**	**1.8**	**3.2**

Table 8 shows the rates per 100,000 of cases of non-pyogenic group streptococci, by IMD (socio-economic deprivation indicator derived from 7 key domains of deprivation). Comparing the least deprived quintile 5 with the most deprived quintile 1, all non-pyogenic groups have lower rates in quintile 5 than in quintile 1, with the exception of the mutans group.

Table 8. Rate per 100,000 population of non-pyogenic streptococcal bacteraemia reports by IMD in England, 2024 [note 13]

IMD Quintile	Rate per 100,000 population					
	anginosus group	bovis group	mitis group	mutans group	salivarius group	sanguinis group
1 (most deprived)	3.8	1.8	5.7	0.2	2.2	3.7
2	3.0	1.7	5.1	0.2	1.8	3.7
3	3.1	1.9	4.4	0.2	1.8	3.4
4	3.1	2.0	4.9	0.3	1.5	3.4
5 (least deprived)	3.2	1.6	4.6	0.3	1.8	3.0

Note 13: Data for IMD is based on the patient residence information. Records are excluded when this information is not available. In 2024 the number of non-pyogenic streptococci records excluded was 141 out of 8,562 (1.6%).

For non-pyogenic streptococci in 2024, only the mitis group display a clear pattern of increasing rate with increasing levels of deprivation (measured by IMD quintile; Table 8), all other groups do not display such trends. The anginosus, bovis, mitis, salivarius, and sanguinis groups all have a lower rate in the least deprived quintile than the most deprived. The rate for mutans group bacteraemia is similar across all 5 deprivation quintiles.

Table 9 shows the rates per 100,000 of non-pyogenic group streptococci by ethnicity. The rates for the majority of non-pyogenic groups in 2024 were highest among those of a White ethnicity, the exception is seen for the salivarius group where the highest rate was in those of Black ethnicity (2.1 per 100,000 population), slightly higher than those from the White ethnic group (1.8 per 100,000).

Table 9. Rate per 100,000 population of non-pyogenic streptococcal bacteraemia reports by ethnic group in England, 2024 [note 14]

Ethnicity	Rate per 100,000 population					
	anginosus group	bovis group	mitis group	mutans group	salivarius group	sanguinis group
Asian	1.9	0.9	4.3	0.1	1.3	2.5
Black	2.3	0.8	4.5	0.1	2.1	2.4
Mixed	0.7	0.2	3.2	0.1	1.5	1.6
White	3.3	1.9	4.8	0.3	1.8	3.4
Other	2.0	0.5	3.3	0.0	1.5	1.6

Note 14: 341 (4.0%) non-pyogenic streptococcal bacteraemia episodes could not be linked to ethnic group information in 2024. Following successful linkage, 180 (2.2%) non-pyogenic streptococci cases had ethnicity recorded as ‘Not known’ or ‘Not Stated’.

Distributions of non-pyogenic streptococcal bacteraemia reports by age and sex showed generally higher rates among males compared to females, and in the youngest (less than 1 year) and oldest age groups (Figure 6 to Figure 10). Rates were highest in those aged 75 years and above for anginosus group (Figure 6) and bovis group (Figure 7) streptococcal group bacteraemia (10.5 and 11.0 per 100,000 population, respectively). In contrast, rates were highest in those aged under 1 year old for mitis group (38.7 per 100,000, Figure 8), salivarius group (21.1 per 100,000, Figure 9) and sanguinis group (20.4 per 100,000, Figure 10) streptococci.

Figure 6. *Anginosus* group streptococcal bacteraemia age and sex rates per 100,000 population in England, 2024

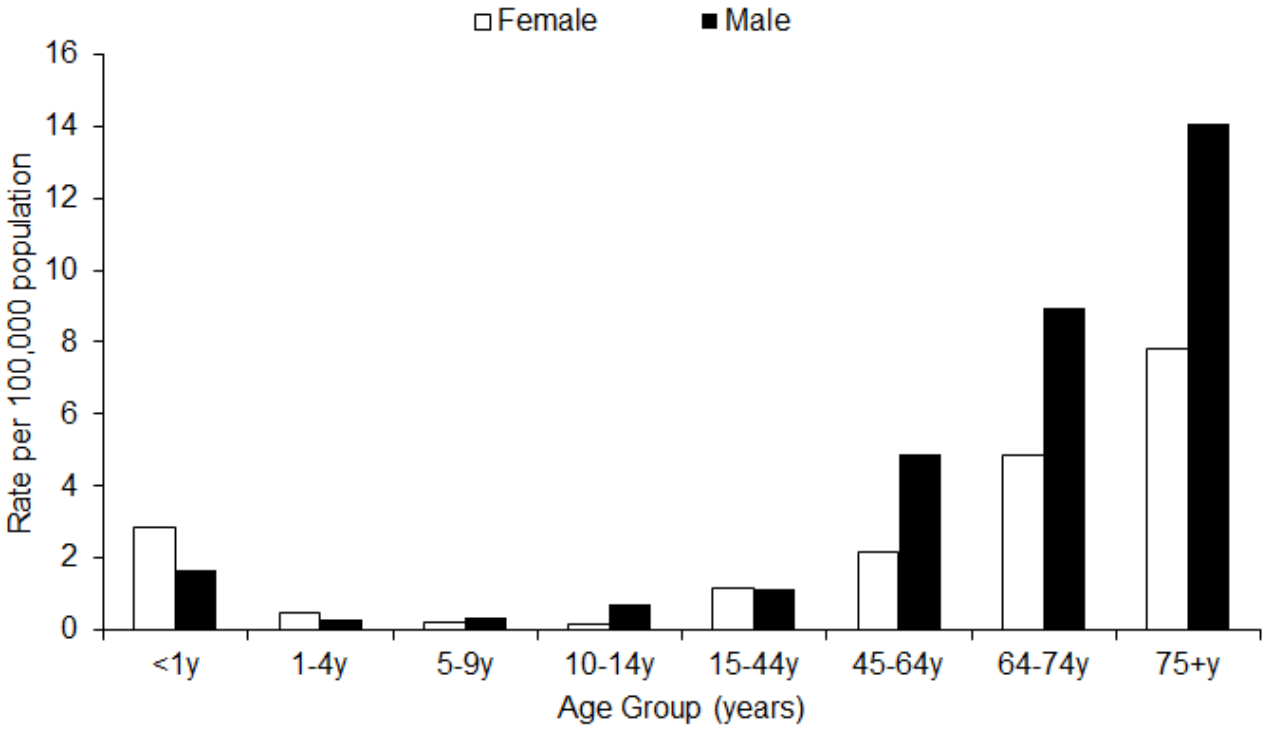


Figure 7. Bovis group streptococcal bacteraemia age and sex rates per 100,000 population in England, 2024

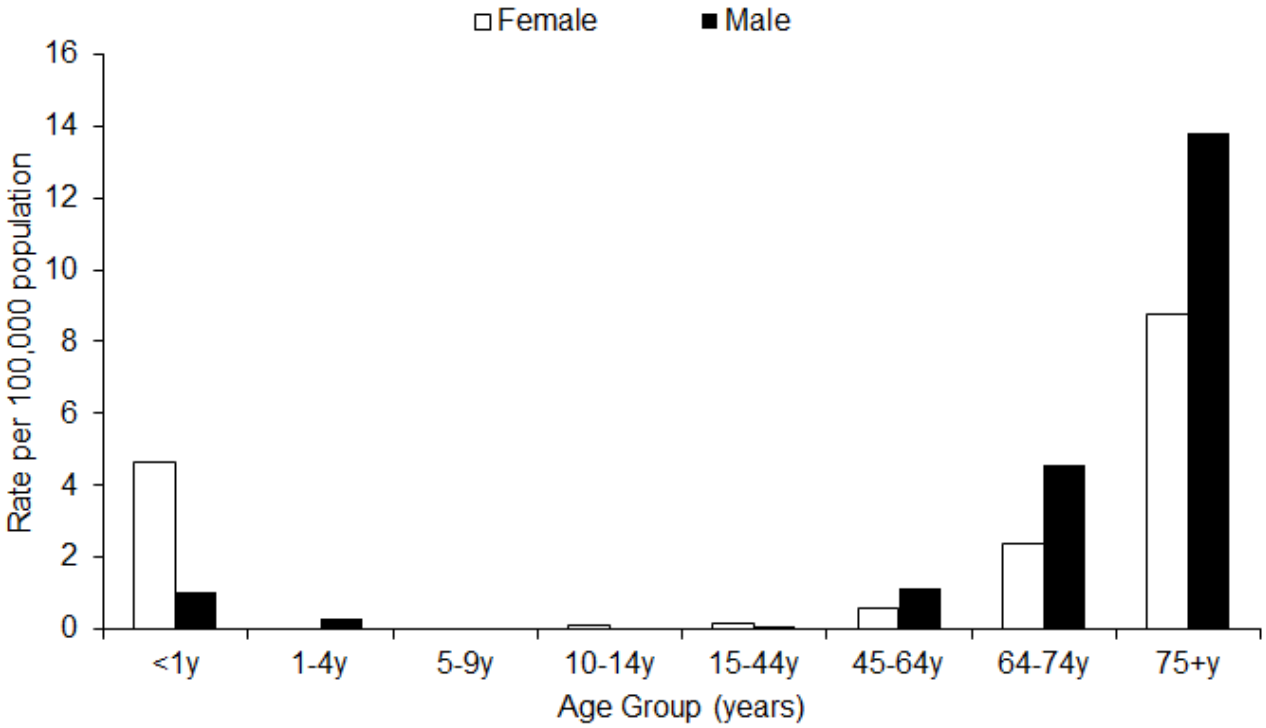


Figure 8. Mitis group streptococcal bacteraemia age and sex rates per 100,000 population in England, 2024

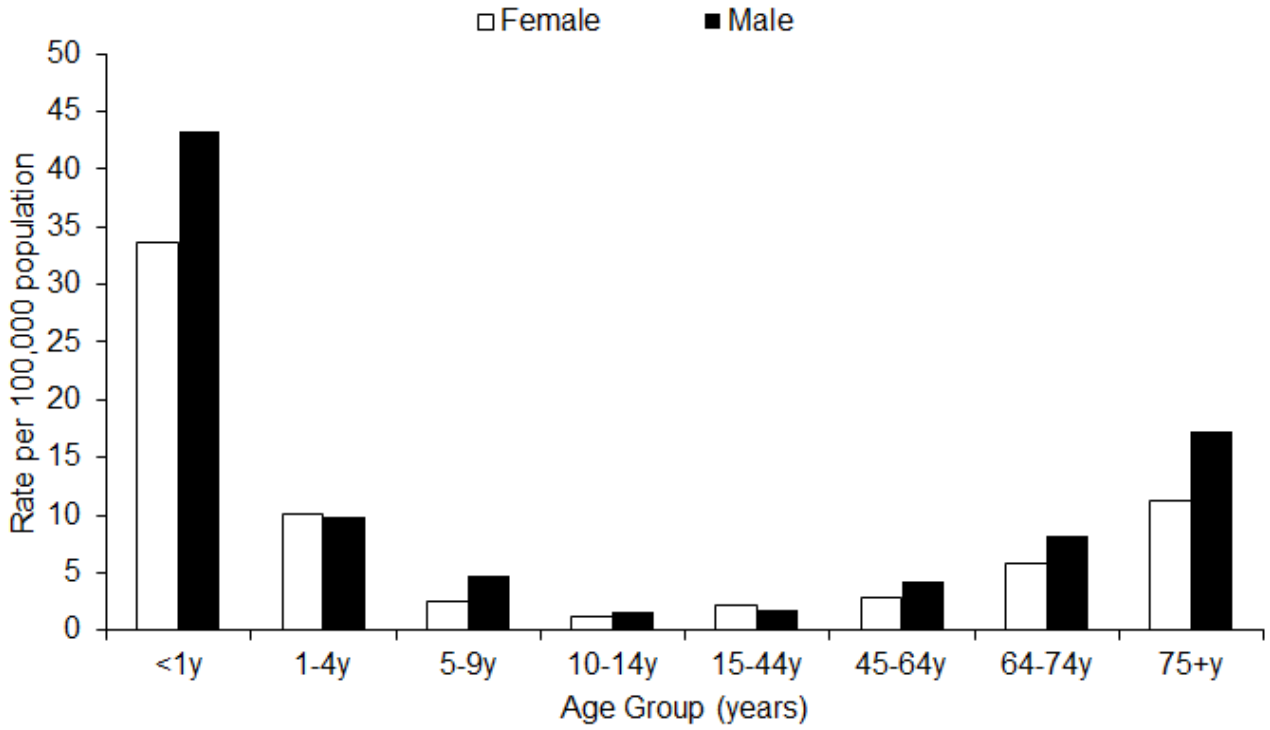


Figure 9. Salivarius group streptococcal bacteraemia age and sex rates per 100,000 population in England, 2024

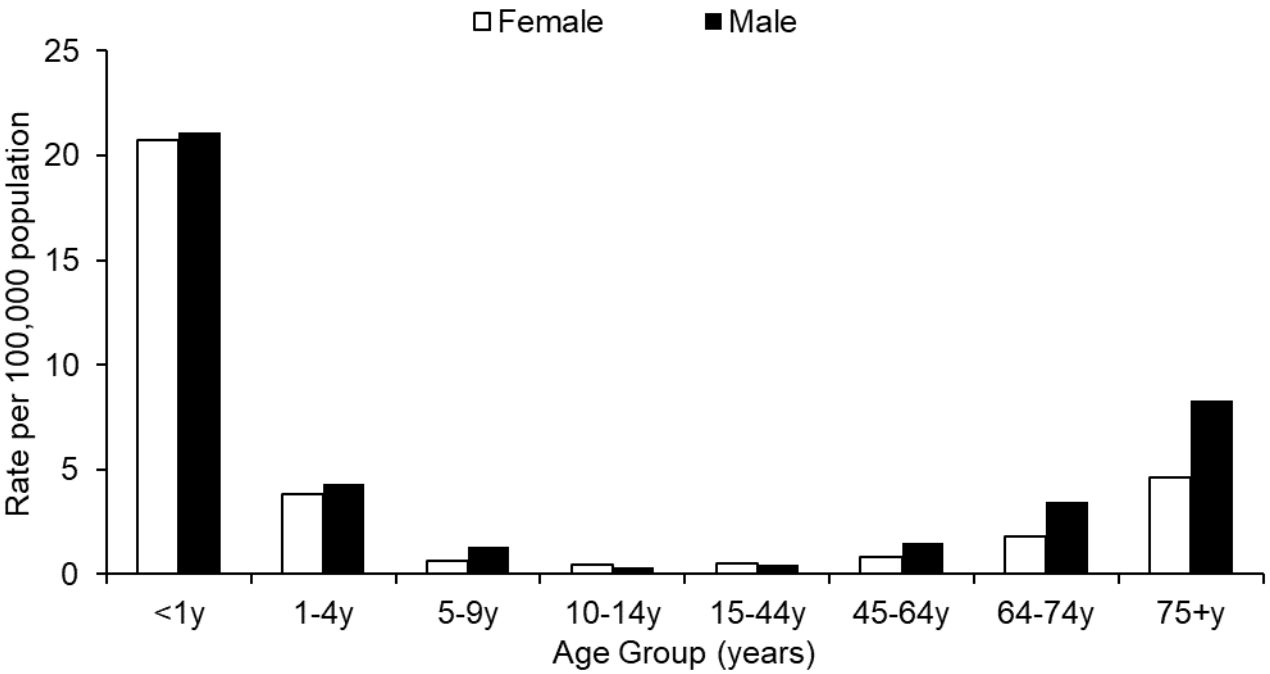


Figure 10. Sanguinis group streptococcal bacteraemia age and sex rates per 100,000 population in England, 2024

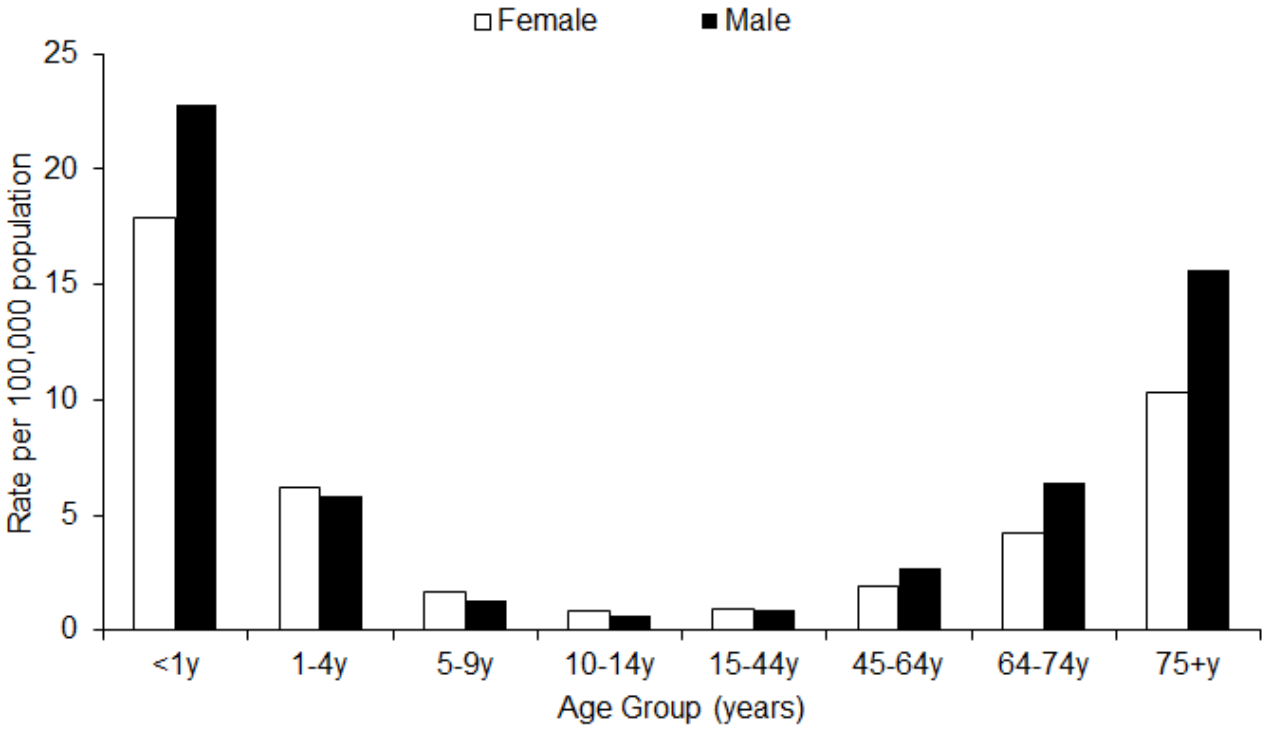


Table 10 shows the number of reports for each non-pyogenic streptococcal group bacteraemia that are tested and the percentage that are resistant to key antibiotics (penicillin, erythromycin and tetracycline) in England between 2020 and 2024.

Erythromycin susceptibility data were available for 20% to 47% of anginosus, bovis, mitis, salivarius and sanguinis group bacteraemia isolates from England in 2024; for tetracycline, data availability was 80% to 87% and for penicillin, 59-73% in 2023. Resistance to penicillin was reported for 8% of mitis isolates (a similar percentage to 2020 of 9%), 14% of salivarius isolates (an increase from 12% in 2020), and 19% of sanguinis isolates (a slight reduction from 21% in 2020) (Table 10). The percentage of isolates reported as resistant to erythromycin decreased or remained similar between 2020 and 2024 for all groups with the exception of salivarius where resistance has increased from 39% to 42%.

Table 10. Antimicrobial susceptibility for non-pyogenic streptococci causing bacteraemia in England, 2020 to 2024

In this table NT = number tested, and R = resistant.

Species	Antimicrobial agent	2020: NT	2020: R (%)	2021: NT	2021: R (%)	2022: NT	2022: R (%)	2023: NT	2023: R (%)	2024: NT	2024: R (%)
Anginosus	Erythromycin	562	12	634	12	482	16	444	12	367	13
	Tetracycline	580	20	614	17	470	21	378	22	303	19
	Penicillin	1,385	<1	1529	<1	1350	<1	1580	<1	1568	<1
	Vancomycin	1,034	<1	1146	<1	985	<1	1190	<1	1212	<1
	Linezolid	292	<1	281	<1	210	2	151	<1	113	0
Bovis	Erythromycin	338	30	288	32	240	32	242	32	191	28
	Tetracycline	345	69	275	67	229	61	199	70	175	65
	Penicillin	714	<1	691	<1	694	0	785	<1	841	<1
	Vancomycin	580	<1	564	<1	576	<1	660	<1	701	<1
	Linezolid	212	<1	177	0	159	0	120	0	117	0
Mitis	Erythromycin	581	43	593	40	599	43	486	41	431	43
	Tetracycline	619	24	574	21	564	25	428	25	312	33
	Penicillin	1,705	9	1668	9	1904	9	2155	9	2353	8
	Vancomycin	1,315	<1	1317	<1	1550	<1	1799	<1	2038	<1
	Linezolid	381	<1	354	<1	365	<1	243	0	196	1
Salivarius	Erythromycin	262	39	330	35	233	39	209	37	176	42
	Tetracycline	253	14	307	8	205	16	174	13	120	19
	Penicillin	566	12	765	9	709	8	830	12	860	14

Species	Antimicrobial agent	2020: NT	2020: R (%)	2021: NT	2021: R (%)	2022: NT	2022: R (%)	2023: NT	2023: R (%)	2024: NT	2024: R (%)
	Vancomycin	407	2	565	1	544	2	651	3	641	2
	Linezolid	111	0	150	0	101	<1	92	0	53	0
Sanguinis	Erythromycin	407	44	420	45	405	43	371	50	327	47
	Tetracycline	437	32	448	29	399	31	320	32	244	30
	Penicillin	1,053	21	1186	21	1337	18	1502	20	1654	19
	Vancomycin	806	<1	943	<1	1077	<1	1217	<1	1335	<1
	Linezolid	256	0	270	<1	237	<1	167	<1	121	<1

Reference microbiology service

In 2024, the percentage of reports of streptococcal bacteraemia in which the organism was not fully identified was 9%. Precise species identification of isolates would improve the monitoring of trends in non-pyogenic streptococci and related genera. The UKHSA Staphylococcus and Streptococcus reference section in the AMRHAI Reference Unit 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, including non-sterile site isolates (of GAS, GBS, GCS and GGS) reported during the referral process as being associated with outbreaks. All such isolates should be submitted to the AMRHAI Reference Unit along with all GAS, GBS, GCS and GGS isolates from normally sterile sites (3, 4).

Laboratories are also requested to send any pyogenic streptococcal isolates exhibiting resistance to penicillin (according to EUCAST clinical breakpoints v. 15.0 (5) groups A, C and G: MIC >0.03 mg/L, or zone diameter <23mm; group B: MIC >0.125 mg/L, or zone diameter <18mm), cephalosporins, daptomycin, quinupristin-dalfopristin or tigecycline to the AMRHAI Reference Unit for confirmation. In addition, any streptococci (pyogenic or non-pyogenic) with suspected resistance to vancomycin, teicoplanin, telavancin, dalbavancin, linezolid or tedizolid resistance should be referred for further investigation.

UK public health guidance on the management of close contacts of iGAS cases in community settings was updated in December 2022, expanding the public health action to include patients with probable invasive GAS infection, with additional close contact groups being recommended for antibiotic prophylaxis. Additional guidelines for the prevention and control of GAS transmission in acute healthcare and maternity settings in the UK (6) are also available.

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Prepared by: Eleanor Blakey, Rebecca Guy, Kartyk Moganeradj, Katie Hopkins and Theresa Lamagni

For queries relating to this document, please contact: hcai.amrdepartment@ukhsa.gov.uk

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