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Severe acute respiratory syndrome – update

Possible transmission of SARS within the UK

The sixth probable case of severe acute respiratory syndrome (SARS) diagnosed in the UK was reported to the World Health Organization (WHO) on 11 April. The male patient was isolated in hospital where his condition is reported as being stable. This is the first known probable SARS case in the UK or mainland Europe where the patient has no recent history of travel to affected areas. He was diagnosed as a probable SARS case because of having a significant respiratory illness with radiological signs, and having had close contact with a probable case of SARS (case definitions available at http://www.phls.co.uk/topics_az/SARS/case_definition.htm). Laboratory investigations are underway at the Central Public Health Laboratory. Initial tests for coronavirus in the sixth case have been negative. It is, however, recognized that such initial (PCR) tests can be negative in a person who is infected with the SARS virus. Definitive results through antibody testing of acute and convalescent sera will be available later (1,2)

Awareness of the exposure followed an international alert from the Hong Kong public health authorities concerning a Hong Kong national who had traveled to Spain, Germany, and the UK between 30 March and 4 April, and who on his return to Hong Kong was diagnosed as a probable SARS case. The Hong Kong man became ill on 31 March. He was in the UK for less than 24 hours on 2/3 April and he stayed at a hotel at Heathrow airport. The two men met for a one to one, two-hour business meeting in a small room at the hotel on 3 April. As for previous probable cases, all the close contacts of the sixth UK case are being followed up. Investigations have also been undertaken at the hotel of staff and guests by Hillingdon Primary Care Trust and local health protection unit, with support from the Communicable

Disease Surveillance Centre and the Specialist and Reference Microbiology Laboratory (the former Central Public Health Laboratory). These investigations found that the Hong Kong man had little contact with staff or other guests at the hotel and no other cases related to his stay in the UK have been detected. It is now more than ten days since he departed from the UK and so the currently accepted incubation period of ten days has now passed, although retrospective diagnosis remains a possibility. The German and Spanish authorities are investigating contacts in these countries, and working with the airline involved in following up passenger manifests according to the WHO guidelines.

London classified by WHO as a SARS-affected area

Since the sixth probable case has been reported by CDSC to WHO London and the UK have been classified as a SARS affected area (one in which local chains of transmission of SARS is/are occurring as reported by the national authorities) with the provision that this has been classified as: 'An area with limited local transmission and no evidence of international spread from area since 15 March 2003 and no transmission other than close person-to-person contact reported'. The only other countries among those listed as SARS affected with this extra proviso are the United States and Taiwan. Information on affected areas can be found on the WHO website at <<http://www.who.int/csr/sarsareas/en/>>. In the view of the Department of Health and CDSC, the level of risk of acquiring SARS infection in the UK is currently so low (one possible transmission) that no travel restriction for people entering or leaving the UK are justified. It is expected that WHO will further stratify the risk by area in the near future.

Guidance for microbiologists

New guidance on microbiological sampling and investigation of cases of SARS has been published on the HPA CDSC website at <http://www.phls.co.uk/topics_az/SARS/Clinical_guidance.htm>. One important update in this document concerns the taking of convalescent sera, which should now be collected at 21 days after the sampling of acute sera. This document should also be referred to for the interpretation of SARS test results for the newly identified coronavirus known as SARS-associated corona virus (SCV) in relation to SARS, which is still by clinical diagnosis.

European Union

On 15 April the European Union (EU) Communicable Disease Network Committee issued a new document on immediate actions recommended for surveillance and control of SARS in Europe. This can be viewed at <<http://www.eurosurveillance.org>>. The advice can also be viewed through the European Commission Public Health web site at <http://europa.eu.int/comm/health/ph_threats/com/sars/sars_en.htm>

WHO global update

The WHO is updating the case list of reported SARS cases on a daily basis and also regularly updating a raft of information from travel advice to the latest epidemiological data. As of 16 April the cumulative number of reported cases is 3293 cases from 24 countries with 159 deaths. On Friday 11 April WHO added Beijing, China to its list of affected areas. Information on affected areas can be found on the WHO website at <<http://www.who.int/csr/sarsareas/en/>>

WHO guidelines on importation of goods from SARS affected countries

CDSC has received a number of enquiries concerning importation of food and other goods from SARS affected areas. The WHO has issued the following statement concerning information to member states regarding goods and animals arriving from SARS-affected areas 'WHO does not at present conclude that any goods, products or animals arriving from SARS-affected areas pose a risk to public health.' The statement can be found at <http://www.who.int/csr/sars/goods2003_04_10/en/>.

HPA CDSC Website

The SARS team at CDSC is constantly assessing the latest information to provide updates for both health professionals and for the general public. CDSC will continue to update and revise guidance concerning SARS on the website on a regular basis at <http://www.phls.co.uk/topics_az/SARS/menu.htm>.

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“SARS virus” a novel coronavirus announced as the cause of severe acute respiratory syndrome

The World Health Organization (WHO) has announced that a new member of the coronavirus family is the cause of severe acute respiratory syndrome (SARS) (1). The discovery is the result of an international laboratory collaboration brought together after WHO issued a global alert on SARS on 12 March 2003. The priority has been to find the cause and to develop diagnostic tests. The collaboration consists of a network of 13 laboratories in Canada, China (including Hong Kong), France, Germany, Japan, the Netherlands, Singapore, the United States and the United Kingdom where the work is undertaken at the HPA's Central Public Health Laboratory.

The 13 laboratories have been working on meeting Koch's postulates, which is necessary to prove disease causation. These postulates stipulate that to be the causal agent, a pathogen must meet four conditions:

- it must be found in all cases of the disease
- it must be isolated from the host and grown in pure culture
- it must reproduce the original disease when introduced into a susceptible host
- it must be found in the experimental host so infected

The new coronavirus has been named by WHO and member laboratories as 'SARS virus' following work at the Erasmus Medical Center in Rotterdam, which has completed the work to prove that SARS is caused by the new coronavirus. The virus is a new member of the coronavirus family not previously seen in animals. The WHO and the network of laboratories dedicate their detection and characterization of the SARS virus to Dr Carlo Urbani, the WHO scientist who first alerted the world to the existence of SARS in Hanoi, Vietnam, and who died from the disease on 29 March 2003.

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Guidance on the management of people entering or re-entering the UK from abroad at risk of having an infectious disease

The Health Protection Agency (HPA) Communicable Disease Surveillance Centre (CDSC) has published guidance for those working in health services in England. This guidance has been developed jointly between the Department of Health and other divisions within the HPA, and was field-tested prior to publication.

The guidance highlights the potential health risk's posed from people entering the United Kingdom

(UK) from abroad, of whom a small proportion have infections requiring treatment. Some of these infections are contagious and may be transmitted to other people. As well as the potential health threat to the infected person, such infections can be hazardous in hospitals because of the risk of cross-infection. Such imported infections are not always immediately recognised, some are unusual in the UK, and in some, signs and symptoms may not be immediately apparent (eg, during the incubation period or in the presence of another condition).

The document defines current responsibilities, highlighting expert resources, and also reminds readers of current best-practice. The guidance is published on the web at http://www.phls.org.uk/topics_az/travel/risk_management.htm

Comments on the published guidance should be sent to James Sedgwick at CDSC, email: james.sedgwick@hpa.org.uk.

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Pyogenic and non-pyogenic streptococcal bacteraemias, England, Wales and Northern Ireland, 2002

In 2002, 2698 pyogenic and 1973 non-pyogenic streptococcal bacteraemia reports were received from laboratories in England, Wales and Northern Ireland. Compared to reports received in 2001, group C streptococci showed the highest increase of the pyogenic group (34%) and the 'salivarius' and 'mutans group' for the non-pyogenic streptococcal bacteraemias (36%). An improvement in the proportion of reports containing antibiotic susceptibility results between 2001 and 2002 for both pyogenic and non-pyogenic streptococcal bacteraemias was noted. The results give an indication of the geographical variability and extent of antimicrobial susceptibility for the defined groups of streptococci.

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Communicable Disease and Public Health – April 2003 issue published

The first issue for 2003, volume 6, of Communicable Disease and Public Health (CDPH), has just been published. at <http://www.phls.org.uk/publications/cdph/pages/current.html>

This is an April issue to bring it under the new Health Protection Agency banner. The contents include the publication of an article on the rising incidence of Haemophilus influenzae type b explaining the need for a second catch-up vaccination campaign, with an accompanying editorial. The Department of Health's catch-up campaign for children aged between six months and four years is taking place this April/May 2003.

The issue also focuses on the reality in food businesses today - a study of cleaning standards and practices in food premises and an editorial on behaviour change in food businesses. Hepatitis A and C are featured in four articles; others cover primary care, VZV, and PCR for rotavirus and astrovirus.

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Bacteraemia

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Next update due: 15 May 2003

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Pyogenic and non-pyogenic streptococcal bacteraemias, England, Wales, and Northern Ireland: 2002

Key points:

- There was an increase in the number of reports of pyogenic and non-pyogenic streptococcal bacteraemias between 2001 and 2002. Group C streptococci showed the highest increase of the pyogenic group (34%) and the 'salivarius' and 'mutans group' for the non-pyogenic streptococcal bacteraemias (36%).
- Rates of both pyogenic and non-pyogenic streptococcal bacteraemia reports in males exceeded those for females across nearly all age-groups.
- Among the pyogenic streptococcal bacteraemias, group G streptococci had the highest reported resistance to erythromycin 15%, whereas the other groups had less than 10% resistance.
- Among the non-pyogenic streptococcal bacteraemias, the 'mitis group' had the highest reported resistance to erythromycin (36%), followed by the 'sanguinis group' (32%), and the 'salivarius group' (26%).
- The proportion of pyogenic streptococcal isolates reported as either erythromycin or tetracycline resistant in 2002 was similar to 2001.
- There was an improvement in the proportion of reports containing antibiotic susceptibility results between 2001 and 2002, for both pyogenic and non-pyogenic streptococcal bacteraemias.

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Pyogenic and non-pyogenic streptococcal bacteraemias, England, Wales, and Northern Ireland: 2002

Key points:

- In 2002, 2698 pyogenic and 1973 non-pyogenic streptococcal bacteraemia reports were received from laboratories in England, Wales and Northern Ireland.
- There was an increase in the number of reports of pyogenic and non-pyogenic streptococcal bacteraemias between 2001 and 2002. Group C streptococci showed the highest increase of the pyogenic group (34%) and the 'salivarius' and 'mutans group' for the non-pyogenic streptococcal bacteraemias (36%).
- Rates of both pyogenic and non-pyogenic streptococcal bacteraemia reports in males exceeded those for females across nearly all age-groups.
- Among the pyogenic streptococcal bacteraemias, group G streptococci had the highest reported resistance to erythromycin of 15%, whereas the other groups had less than 10% resistance.
- Among the non-pyogenic streptococcal bacteraemias, the 'mitis group' had the highest reported resistance to erythromycin (36%), followed by the 'sanguinis group' (32%), and the 'salivarius group' (26%).
- The proportion of pyogenic streptococcal isolates reported as either erythromycin or tetracycline resistant in 2002 was similar to 2001.
- There was an improvement in the proportion of reports containing antibiotic susceptibility results between 2001 and 2002, for both pyogenic and non-pyogenic streptococcal bacteraemias.

This report contains data from 2002 on laboratory reports of streptococcal bacteraemia, with the exception of *Streptococcus pneumoniae*. Pyogenic streptococci have been grouped according to traditional Lancefield serological groupings, and non-pyogenic streptococci according to their biochemical and genetic properties (based on current taxonomy).

All laboratory reports described refer to isolations of streptococci from blood culture, with or without related cerebrospinal fluid (CSF). Rates were calculated using resident population denominators from 2001 for England, Wales, and Northern Ireland. Regional analyses were performed using the English regional boundaries introduced in 2002.

Pyogenic streptococci

In 2002, 2698 bacteraemias caused by pyogenic streptococci were reported by laboratories in England, Wales, and Northern Ireland (table 1).

Group A streptococcal bacteraemia

Geographical distribution

Nine hundred and twenty-one reports of group A streptococcal bacteraemia were received in 2002 from laboratories across England (880), Wales (26), and Northern Ireland (15). Within England, most reports of bacteraemia due to group A streptococci were received from the South East (131) and Yorkshire and Humberside regions (130) (table 2), while the North East region had the least number of reports (32). The overall reporting rate for England was 1.8 per 100,000 population. Wales and Northern Ireland had lower reporting rates of 0.9/100,000 for group A streptococcal bacteraemias (figure 1). Within England, reporting rates varied considerably between regions, from

2.6/100,000 in the Yorkshire and Humberside region to 1.2/100,000 in the North West region.

Antimicrobial susceptibility

Eighty-one per cent (745/921) of group A streptococcal bacteraemia reports were accompanied by antimicrobial susceptibility information. Penicillin susceptibility data was included in 79% of reports across England (80%), Wales (81%), and Northern Ireland (47%). Within England, penicillin susceptibility reporting ranged from 67% in London to 96% of reports from the Eastern region. No resistance to penicillin (0/732) was reported in 2002, nor, indeed has ever been confirmed (table 3).

Sixty-nine per cent of group A streptococcal bacteraemia reports included data on erythromycin susceptibility across England (69%), Wales (81%), and Northern Ireland (47%). Three per cent (22/634) of group A streptococcal isolates tested for susceptibility to erythromycin were reported as resistant overall (table 3), 5% in Wales, and none in Northern Ireland. Within England, reported resistance to erythromycin ranged from 6% of group A streptococcal bacteraemia reports in London to 1% in the South East region (figure 2).

Tetracycline susceptibility data were reported for 42% of group A streptococcal bacteraemia isolates, 12% of which were reported as resistant overall (table 3), with 10% and none respectively in reports from Wales and Northern Ireland. Five of the 358 group A streptococcal bacteraemia isolates tested against both erythromycin and tetracycline were reported as resistant to both detailed in table 4.

Age distribution

The overall rate of reports due to group A streptococcal bacteraemia in 2002 was 1.7 /100,000, with rates being higher in males (1.9/100,000) than females (1.6/100,000).

Table 1 Laboratory reports of streptococcal bacteraemia, England, Wales, and Northern Ireland: 2002

Pyogenic streptococci	2698	'mutans group'	41
group A streptococci	921	<i>Streptococcus mutans</i>	41
group B streptococci	991		
group C streptococci	206	'salivarius group'	18
group G streptococci	580	<i>Streptococcus salivarius</i>	168
		<i>Streptococcus vestibularis</i>	19
'anginosus group'	508	'sanguinis group'	277
<i>Streptococcus anginosus</i>	137	<i>Streptococcus gordonii</i>	19
<i>Streptococcus constellatus</i>	131	<i>Streptococcus sanguinis</i>	14
<i>Streptococcus intermedius</i>	60	<i>Streptococcus parasanguinis</i>	46
' <i>Streptococcus milleri</i> group'	143	' <i>Streptococcus sanguinis</i> group'	198
<i>Streptococcus</i> group F	37		
'bovis group'	215	Other streptococci	1099
<i>Streptococcus bovis</i>	185	<i>Streptococcus acidominimus</i>	34
<i>Streptococcus bovis</i> biotype I	7	<i>Streptococcus suis</i>	1
<i>Streptococcus bovis</i> biotype II	12	<i>Streptococcus uberis</i>	5
<i>Streptococcus equinus</i>	9	'anaerobic streptococcus'	43
<i>Streptococcus alactolyticus</i>	2	<i>Streptococcus</i> sp	1016
'mitis group'	745	Genera closely related to streptococci	19
<i>Streptococcus mitis</i>	20	<i>Abiotrophia defectiva</i>	3
<i>Streptococcus mitior</i>	3	<i>Leuconostoc</i> sp	14
<i>Streptococcus oralis</i>	239	<i>Pediococcus</i> sp	2
' <i>Streptococcus mitis</i> group'	483		

Table 2 Pyogenic streptococcal bacteraemia laboratory reports by region England, Wales, and Northern Ireland, 2002

Region Name	group A streptococci	group B streptococci	group C streptococci	group G streptococci
North East	32	52	14	19
Yorkshire and Humberside	130	102	30	55
East Midlands	91	84	14	51
Eastern	109	121	22	87
London	92	96	16	41
South East	131	144	28	97
South West	116	108	20	73
West Midlands	98	129	21	76
North West	81	68	21	54
England	880	904	186	553
Wales	26	55	11	25
Northern Ireland	15	32	9	2
England, Wales, and Northern Ireland	921	991	206	580

Rates of group A streptococcal bacteraemia were highest in the very young (those aged under one year) and the elderly (aged 65 years and older)(figure 3). The reporting rate for those aged between 1 and 4 years was 1.4 and 1.7/100,000 for males and females respectively. The rates in those aged between 15 and 45 years were similar.

Group B streptococcal bacteraemia

Geographical distribution

Nine hundred and ninety-one laboratory reports of bacteraemias caused by group B *Streptococcus* were made in 2002 across England (904), Wales (55), and Northern Ireland (32). Within England, the highest number of reports was received from the South East region (144) and

the least from the North East (52) (table 2). The overall reporting rate of group B streptococcal bacteraemias in England was 1.8/100,000, with slightly higher rates of 1.9/100,000 being reported from both Wales and Northern Ireland (figure 4). Within the English regions, the highest reporting rate of group B streptococcal bacteraemia was from the West Midlands (2.5/100,000), with the North West reporting considerably less than any other region (1.0/100,000)(figure 4).

Antimicrobial susceptibility

Almost three-quarters (726/991) of group B streptococcal bacteraemia reports contained information on susceptibility to at least one antimicrobial. Penicillin

Table 3 Antibiotic susceptibility for pyogenic streptococcal bacteraemia reports, England, Wales and Northern Ireland: 2002

	Resistant (%)	Sensitive (%) S + R of S + R	(R as % of S + R of S + R)	No Information
group A streptococci (n=921)				
penicillin	0 (0.0%)	732 (79%)	732 (-%)	189 (20%)
erythromycin	22 (2.4%)	612 (66%)	634 (3%)	287 (31%)
tetracycline	48 (5.2%)	341 (37%)	389 (12%)	532 (58%)
group B streptococci (n=991)				
penicillin	0 (0.0%)	724 (73%)	724 (0.0%)	267 (27%)
erythromycin	43 (4.3%)	613 (62%)	656 (7%)	335 (34%)
tetracycline	274 (27.6%)	117 (12%)	391 (70%)	600 (61%)
group C streptococci (n=206)				
penicillin	0 (0.0%)	139 (67%)	139 (0%)	67 (33%)
erythromycin	10 (4.9%)	117 (57%)	127 (8%)	79 (38%)
tetracycline	23 (11.2%)	51 (25%)	74 (31%)	132 (64%)
group G streptococci (n=580)				
penicillin	0 (0.0%)	458 (79%)	458 (0%)	122 (21%)
erythromycin	65 (11.2%)	357 (62%)	422 (15%)	158 (27%)
tetracycline	120 (20.7%)	127 (22%)	247 (49%)	333 (57%)

Figure 1 Region-specific rates of group A streptococcal bacteraemia, England, Wales and Northern Ireland: 2002 (95% confidence intervals)

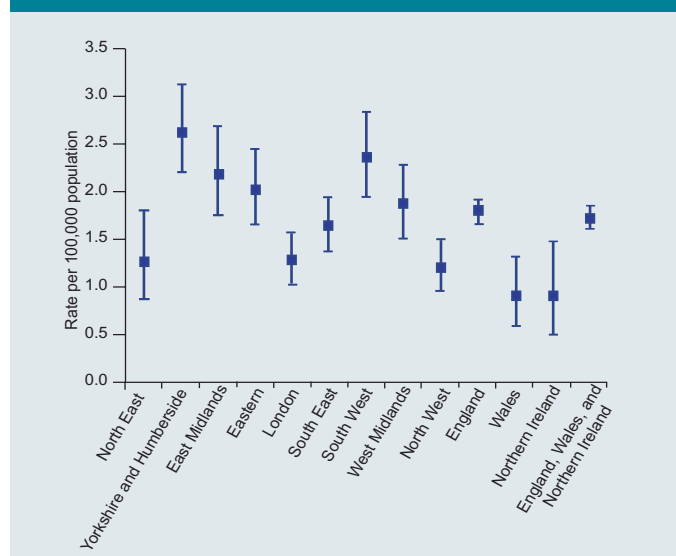
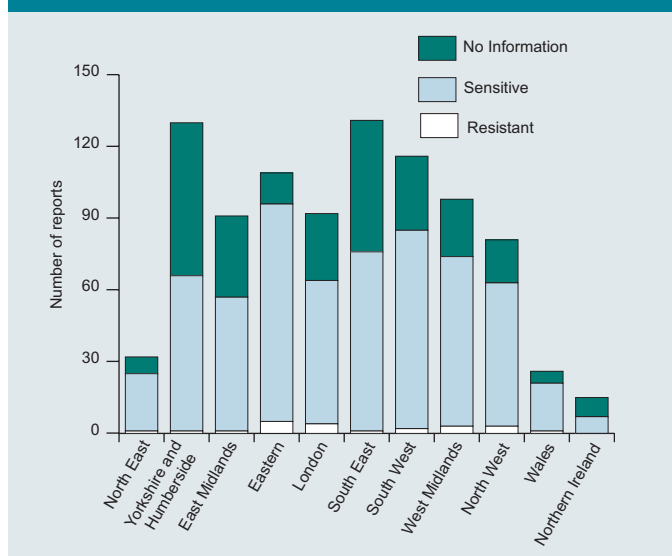


Figure 2 Erythromycin susceptibility data for group A bacteraemia, England, Wales and Northern Ireland: 2002



susceptibility data was included in 73% of reports overall, 75%, 71%, and 31% in England, Wales, and Northern Ireland respectively. Within England, penicillin susceptibility was included most frequently from laboratories in the Eastern region (88%), and least frequently from the North West (53%). No penicillin resistant group B streptococcal bacteraemia isolates were reported in 2002.

Erythromycin susceptibility information was available for 70% of group B streptococcal bacteraemia reports in

2002, 67% for laboratories in England and Wales, and 31% from Northern Ireland. Overall, 7% (43/656) of isolates were reported as erythromycin resistant, 6% in England, 14% in Wales, and 10% in Northern Ireland. Within England, resistance in group B streptococci ranged considerably from 12% in London and rates of 2 to 3% reported from Yorkshire and Humberside, North East, East Midlands, and North West (figure 5).

Tetracycline susceptibility was available in 39% of group B streptococcal bacteraemia reports in 2002. Of the

Table 4 Multiple antibiotic resistance patterns for group A streptococcal bacteraemia laboratory reports England, Wales, and Northern Ireland, 2002

		Erythromycin			Tetracycline		
		resistant (%)	sensitive	no info	resistant (%)	sensitive	no info
Erythromycin	resistant (n=22) sensitive (n=612)				5 (45%) 4 (112%)	6 306	11 265
Tetracycline	resistant (n=48) sensitive (n=341)	5 (11%) 6 (2%)	41 306	2 29			

Figure 3 Age-specific rates of group A streptococcal bacteraemia reports: England, Wales and Northern Ireland, 2002

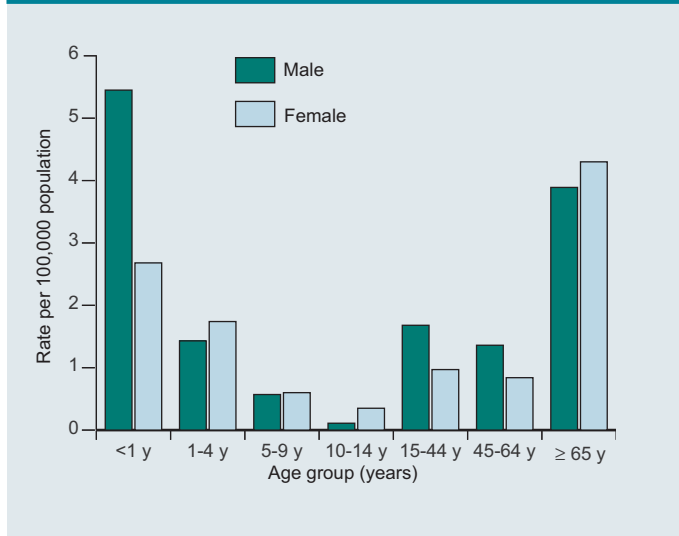


Figure 4 Region-specific rates of group B streptococcal bacteraemia, England and Wales and Northern Ireland: 2002 (95% confidence intervals)

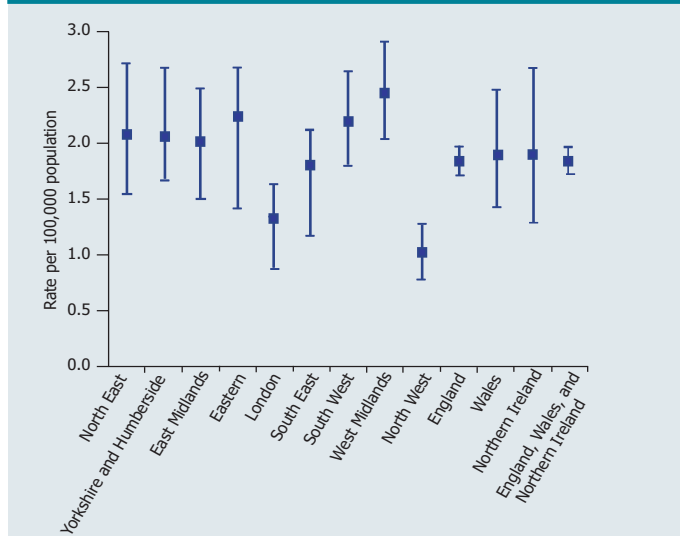


Figure 5 Erythromycin susceptibility data for Group B bacteraemia, England, Wales and Northern Ireland: 2002

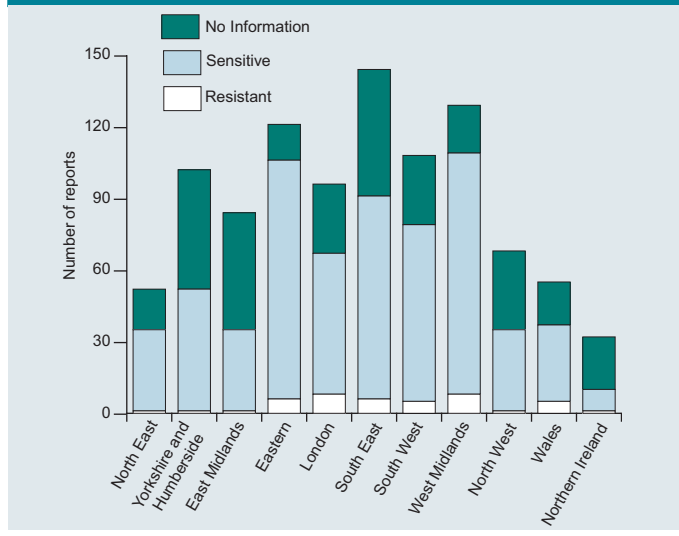
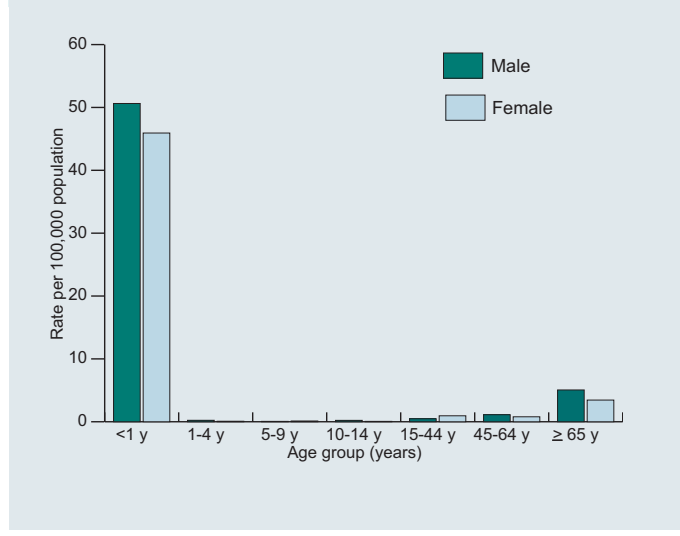


Figure 6 Age-specific rates of group B streptococcal bacteraemia reports: England, Wales and Northern Ireland: 2002



reports including these data, 70% of isolates were reported as resistant, higher than for any other pyogenic streptococcal group (table 3). Dual resistance to

erythromycin and tetracycline was reported in five per cent (18/368) of group B streptococcal bacteraemia isolates tested with both antibiotics (table 5).

Table 5 Multiple antibiotic resistance patterns for group B streptococcal bacteraemia laboratory reports England, Wales, and Northern Ireland, 2002

		Erythromycin			Tetracycline		
		resistant (%)	sensitive	no info	resistant (%)	sensitive	no info
Erythromycin	resistant (n=43)				18	7	18
	sensitive (n= 613)				240	103	270
Tetracycline	resistant (n=274)	18	(7%)	240	16		
	sensitive (n=117)	7	(6%)	103	7		

Figure 7 Region-specific rates of group C streptococcal bacteraemia: England, Wales and Northern Ireland, 2002 (95% confidence intervals)

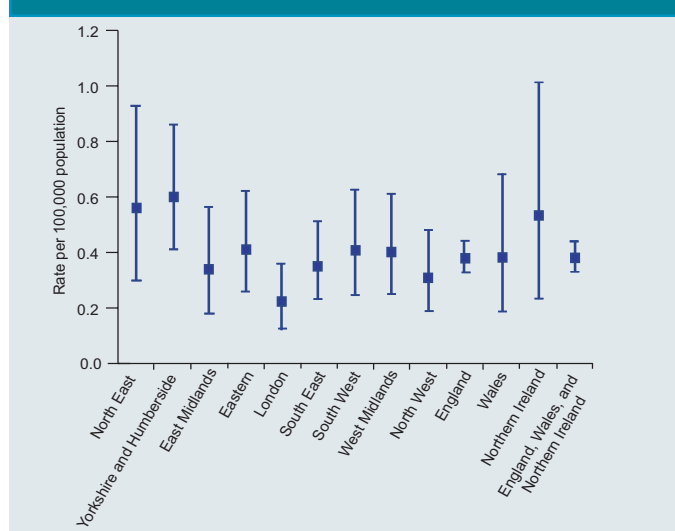
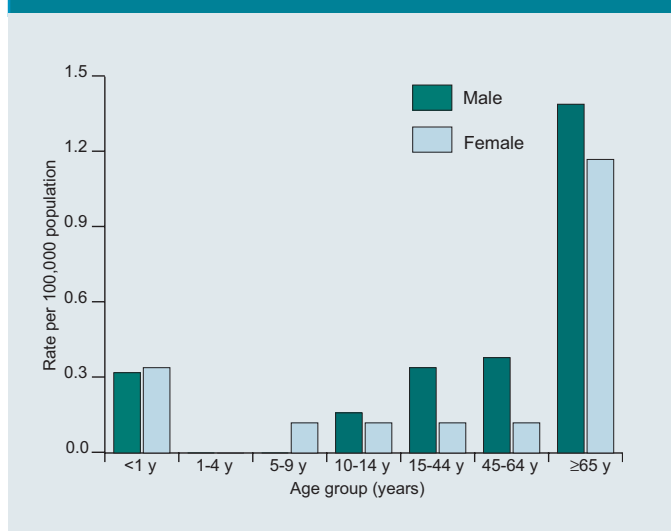


Figure 8 Age-specific rates of group C streptococcal bacteraemia reports: England, Wales and Northern Ireland:2002



Age distribution

Group B streptococci are notorious agents of neonatal sepsis and were strongly concentrated in those aged under one year (figure 6), with rates for males of 50.6/100,000 and for females of 45.9/100,000. The next highest reporting rates were in those aged 65 years and above, with rates of 5.1/100,000 and 3.5/100,000 for males and females respectively.

Group C streptococcal bacteraemia

Geographical distribution

Two hundred and six bacteraemias caused by group C streptococci were reported in 2002, 186 in England, 11 in Wales, and nine in Northern Ireland. The overall reporting rate for group C streptococcal bacteraemia was 0.4/100,000 for both England and Wales, and 0.5/100,000 for Northern Ireland. Within England, the reporting rate ranged from 0.6/100,000 in Yorkshire and Humberside to 0.2/100,000 in London (figure 7).

Antimicrobial susceptibility

Seventy-one per cent (146/206) of group C streptococcal bacteraemia reports contained antibiotic susceptibility information, the least among the pyogenic groups. Sixty-seven per cent of group C streptococcal bacteraemia

reports contained information on penicillin susceptibility in England (69%), Wales (82%), and Northern Ireland (22%). No penicillin resistance was reported in 2002 (table 3).

Erythromycin susceptibility data was included for 62% of group C streptococcal bacteraemias reported from laboratories across England (63%), Wales (82%), and Northern Ireland (11%). In contrast, tetracycline susceptibility was only reported for 36% of isolates. Eight per cent and 31% of group C streptococcal bacteraemia isolates were reported as erythromycin and tetracycline resistant respectively in 2002. Four per cent (3/70) of group C streptococcal bacteraemias were reported as resistant to both erythromycin and tetracycline.

Age distribution

The overall rate of group C streptococcal bacteraemia reported in 2002 was 0.4/100,000. The highest rates were observed in those aged 65 years and older, for both males and females (figure 8). Rates of group C streptococcal bacteraemia reports were higher among men than women across all age groups except for those aged under one year, which were almost equal, and for those aged between 5 and 9 years, where infection was only reported among girls.

Group G streptococcal bacteraemia

Geographical distribution

Five hundred and eighty reports due to group G streptococcal bacteraemia were made by laboratories in England (553), Wales (25), and Northern Ireland (2) in 2002. Within England, the South East region received the most reports for group G streptococcal bacteraemia (97) and the North East the least (19). The overall reporting rate for group G streptococcal bacteraemia in England was 1.1/100,000 population, in Wales 0.9/100,000, and in Northern Ireland 0.1/100,000. Within England, the highest reporting rate was in the Eastern region (1.6/100,000) and the lowest was in London (0.6/100,000) (figure 9).

Antimicrobial susceptibility

Eighty-one per cent (470/580) of bacteraemia reports for

Figure 9 Region-specific rates of group G streptococcal bacteraemia: England, Wales and Northern Ireland, 2002 (95% confidence intervals)

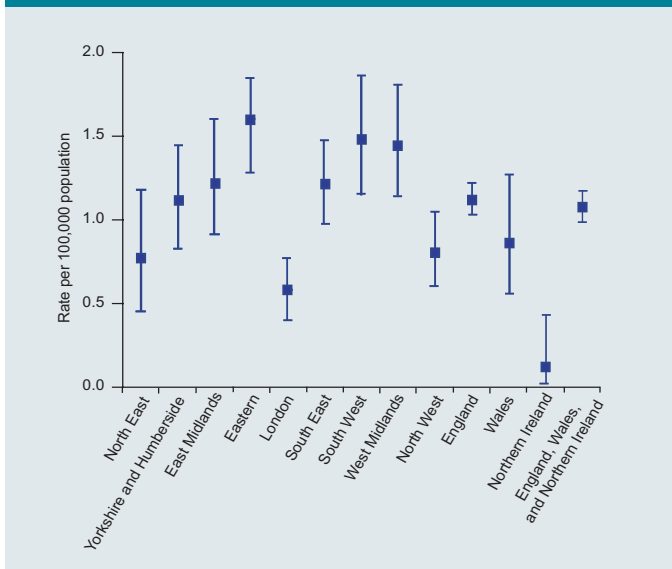
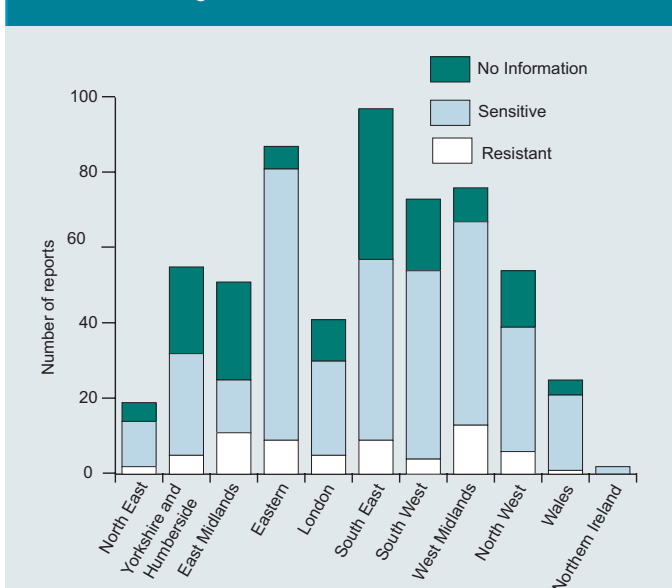


Figure 10 Erythromycin susceptibility data for group G bacteraemia, England, Wales and Northern Ireland: 2002



group G streptococci contained antibiotic susceptibility information. The proportion of reports including antimicrobial susceptibility information was similar to those for group A streptococcal bacteraemias (table 3).

Penicillin susceptibility data was included in 79% of reports overall, 79% and 84% from England and Wales respectively, and for all isolates from Northern Ireland. Reports made by laboratories within the Eastern region were most likely to include penicillin susceptibility (94%) and laboratories in the North East (68%) and Yorkshire and Humberside regions (69%) the least. There were no reports of penicillin resistance in 2002.

Erythromycin susceptibility information was available for 73% of group G streptococcal bacteraemia reports, 72% and 84% from laboratories in England and Wales, and all reports from Northern Ireland. Fifteen per cent of the group G streptococcal bacteraemias were reported as erythromycin resistant, higher than for any other pyogenic streptococcal group. Erythromycin resistance was reported in 16% and 5% of group G streptococcal bacteraemias from England and Wales respectively. No erythromycin-resistant group G streptococcal bacteraemia were reported from Northern Ireland. Within the English regions, the numbers and proportions of group G streptococcal isolates reported as erythromycin resistant are given in figure 10. Although only 43% of group G streptococcal bacteraemia reports contained tetracycline susceptibility information, almost half of the isolates (49%) were reported as resistant. Ten per cent of group G streptococcal bacteraemia isolates (24/237) were reported resistant to both erythromycin and tetracycline (table 6).

Age distribution

The overall rate of group G streptococcal bacteraemia reports in 2002 was 1.1 per 100,000 population. The reporting rates of group G streptococcal bacteraemias in 2002 were higher in males than females for all age groups with the exception of those aged between 10 and 14 years (figure 11). The highest reporting rates were among those aged 65 years and above, 5.4/100,000 population for males, and 4.3/100,000 for females.

Figure 11 Age-specific rates of group G streptococcal bacteraemia reports: England, Wales and Northern Ireland, 2002



Table 6 Multiple antibiotic resistance patterns for group G streptococcal bacteraemia laboratory reports England, Wales, and Northern Ireland: 2002

			Erythromycin			Tetracycline		
			resistant (%)	sensitive	no info	resistant (%)	sensitive	no info
Erythromycin	resistant (n=65)				24	(59%)	17	24
	sensitive (n= 357)				92	(47%)	104	161
Tetracycline	resistant (n=120)		24	(21%)	92		4	
	sensitive (n=127)		17	(14%)	104		6	

Non-pyogenic streptococci (excluding *Streptococcus pneumoniae*)

The '*Streptococcus mitis* group' was the most common (745) of the non-pyogenic streptococci reported in 2002 (table 1 and table 7). The next most common group was the '*Streptococcus anginosus* group' with 508 reports, followed by the '*Streptococcus sanguinis* group' (277), the '*Streptococcus bovis* group' (215), and the '*Streptococcus salivarius* group' (187). The group with the least number of reports was the '*Streptococcus mutans* group' (41). A further 34 reports of *Streptococcus acidominimus*, five of *Streptococcus uberis* and one *Streptococcus suis* were reported in 2002. There were a total of 1059 reports made of streptococcal bacteraemias that were not fully identified. Other closely related genera included 14 reports of *Leuconostoc* species, three reports of *Abiotrophia defectiva*, and two reports of *Pediococcus* species (table 1).

Geographical distribution

The highest overall reporting rate for the non-pyogenic streptococcal bacteraemias was for the 'mitis group', 1.39 /100,000 for England, Wales, and Northern Ireland. The next highest rate was for the 'anginosus group' with a reporting rate for England, Wales, and Northern Ireland of 0.9/100,000, then the 'sanguinis group' with 0.5/100,000, and lastly the 'bovis group' and the 'salivarius group' with 0.4/100,000 (figures 12 to 16).

Variations in English region-specific rates were most pronounced for the 'mitis group', where reporting rates ranged from 2.3/100,000 in the North East to 0.8/100,000 in the East Midlands (figure 14). Variations between the English regions were smaller for the remaining non-pyogenic groups.

Antimicrobial susceptibility

Reporting of susceptibility to any antimicrobial among the non-pyogenic streptococci ranged from 44% of reports for the 'salivarius group' to 63% of reports for the 'bovis group' (table 8). Reporting of antimicrobial susceptibility in 2002 was more complete than for 2001 for all the non-pyogenic streptococcal groups causing bacteraemia (1).

Over half of the 'sanguinis group' streptococcal bacteraemia reports included antimicrobial susceptibility results (157/277). The 'sanguinis group' streptococcal bacteraemia reports had the highest proportion of both penicillin resistant isolates (24%; 35/148) and amoxicillin/ampicillin resistant isolates (7%; 7/97)(table 8). Thirty two per cent of isolates were reported as resistant to erythromycin (40/126) and a quarter reported as resistant to tetracycline (17/67).

Over half of the 'mitis group' streptococcal bacteraemia reports included antimicrobial susceptibility results (405/745). This group had the highest proportion of reported erythromycin resistant isolates (36%), and the second highest proportion of reported penicillin resistant

Table 7 Non-pyogenic streptococcal bacteraemia laboratory reports by region, England, Wales, and Northern Ireland: 2002

Region Name	'anginosus group'	'bovis group'	'mitis group'	'salivarius group'	'sanguinis group'
North East	26	16	58	4	10
Yorkshire and Humberside	54	23	50	8	18
East Midlands	34	14	34	14	14
Eastern	57	19	54	13	44
London	52	15	106	29	27
South East	72	30	121	28	34
South West	61	27	89	26	33
West Midlands	46	29	71	15	43
North West	59	29	128	37	35
England	461	202	711	174	258
Wales	24	8	18	6	13
Northern Ireland	23	5	16	7	6
England, Wales, and Northern Ireland	508	215	745	187	277

Table 8 Antibiotic susceptibility data for non-pyogenic streptococcal bacteraemia reports: England, Wales, and Northern Ireland, 2002

	Resistant (%)	Sensitive (%)	S+R (R as % of S+R)	No Information
'anginosus group' (n=508)				
penicillin	4 (0.8%)	286 (56%)	290 (1%)	218 (43%)
amoxycillin/ampicillin	3 (0.6%)	164 (32%)	167 (2%)	341 (67%)
erythromycin	21 (4.1%)	235 (46%)	256 (8%)	252 (50%)
tetracycline	22 (4.3%)	115 (23%)	137 (16%)	371 (73%)
'bovis group' (n=215)				
penicillin	6 (1.2%)	116 (23%)	122 (5%)	386 (76%)
amoxycillin/ampicillin	2 (0.9%)	104 (48%)	106 (2%)	109 (51%)
erythromycin	19 (8.8%)	87 (40%)	106 (18%)	109 (51%)
tetracycline	36 (16.7%)	23 (11%)	59 (61%)	156 (73%)
'mitis group' (n=745)				
penicillin	73 (14.4%)	297 (58%)	370 (20%)	138 (27%)
amoxycillin/ampicillin	12 (1.6%)	243 (33%)	255 (5%)	490 (66%)
erythromycin	123 (16.5%)	217 (29%)	340 (36%)	405 (54%)
tetracycline	39 (5.2%)	127 (17%)	166 (23%)	579 (78%)
'salivarius group' (n=187)				
penicillin	14 (2.8%)	64 (13%)	78 (18%)	430 (85%)
amoxycillin/ampicillin	2 (1.1%)	47 (25%)	49 (4%)	138 (74%)
erythromycin	18 (9.6%)	50 (27%)	68 (26%)	119 (64%)
tetracycline	2 (1.1%)	34 (18%)	36 (6%)	151 (81%)
'sanguinis group' (n=277)				
penicillin	35 (12.6%)	113 (22%)	148 (24%)	360 (71%)
amoxycillin/ampicillin	7 (2.5%)	90 (32%)	97 (7%)	180 (65%)
erythromycin	40 (14.4%)	86 (31%)	126 (32%)	151 (55%)
tetracycline	17 (6.1%)	50 (18%)	67 (25%)	210 (76%)

Figure 12 Region-specific rates of '*S. anginosus* group' bacteraemia, England, Wales and Northern Ireland: 2002 (95% confidence intervals)

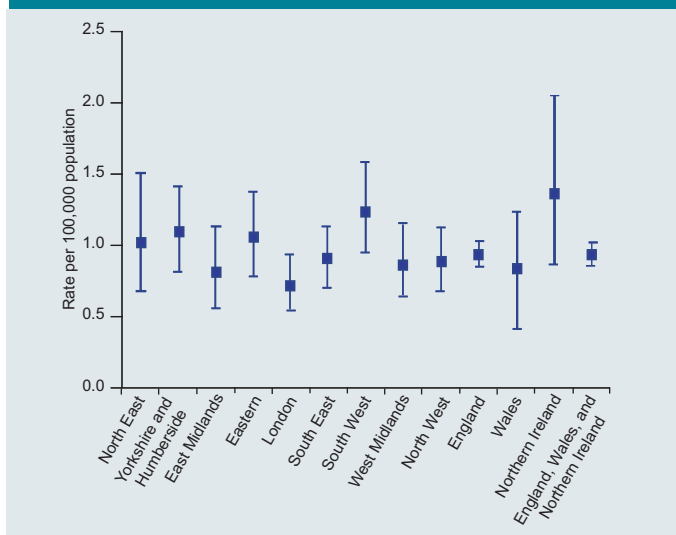


Figure 13 Region-specific rates of '*S. bovis* group' bacteraemia, England, Wales and Northern Ireland: 2002 (95% confidence intervals)

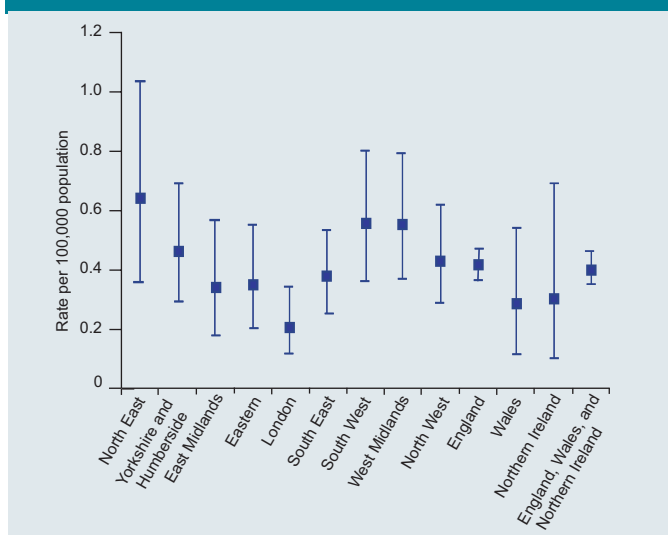


Figure 14 Region-specific rates of '*S. mitis* group' bacteraemia, England, Wales and Northern Ireland: 2002 (95% confidence intervals)

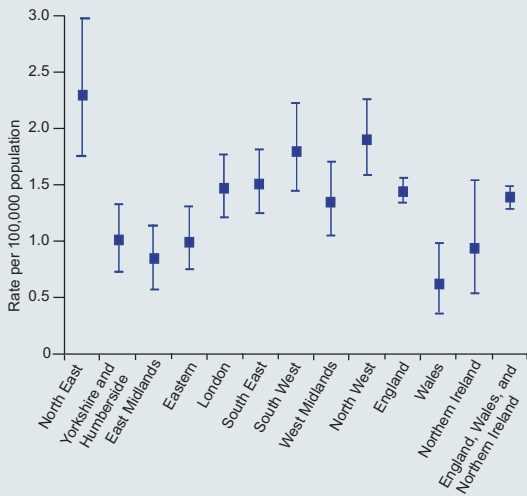


Figure 15 Region-specific rates of '*S. bovis* group' bacteraemia, England, Wales and Northern Ireland: 2002 (95% confidence intervals)

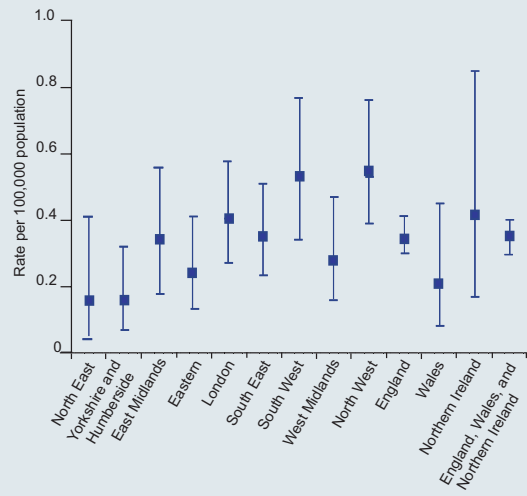


Figure 16 Region-specific rates of '*S. sanguinis* group' bacteraemia: England, Wales and Northern Ireland: 2002 (95% confidence intervals)

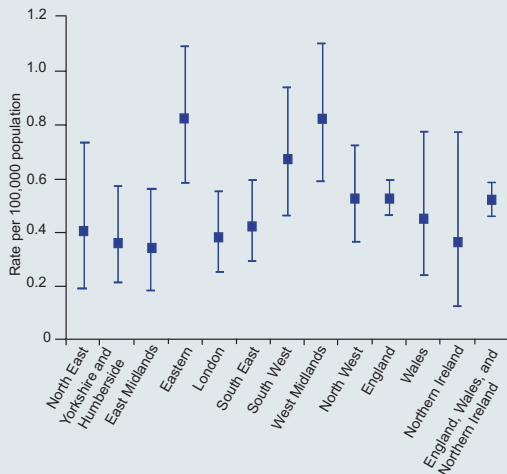


Figure 17 Age-specific rates of '*S. anginosus* group' bacteraemia: England, Wales and Northern Ireland: 2002

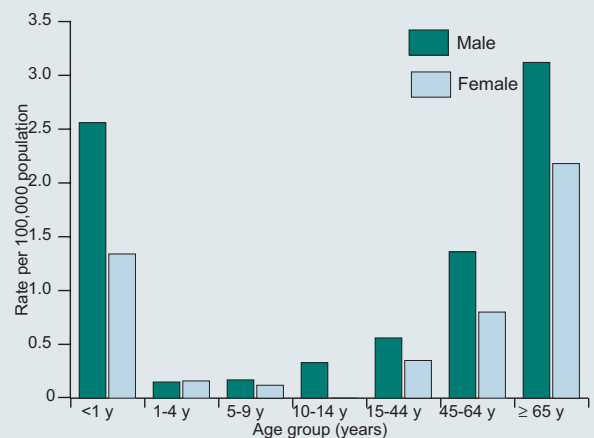


Figure 18 Age-specific rates of '*S. bovis* group' bacteraemia, England, Wales and Northern Ireland: 2002

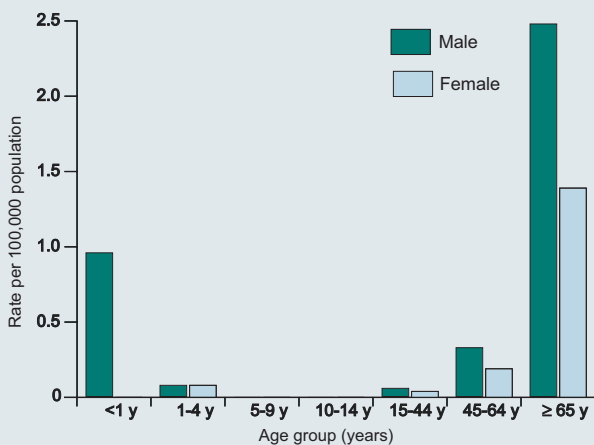


Figure 19 Age-specific rates of '*S. mitis* group' bacteraemia, England, Wales and Northern Ireland: 2002

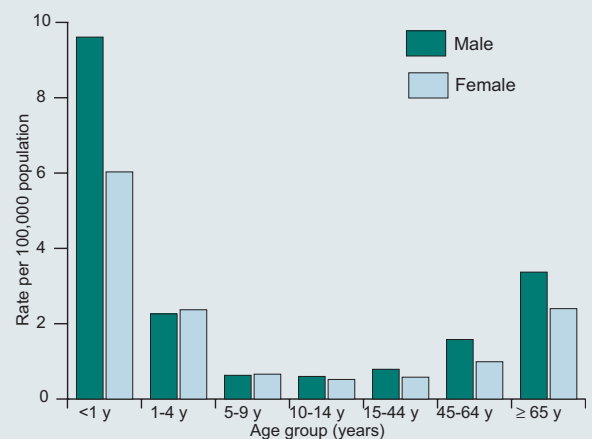
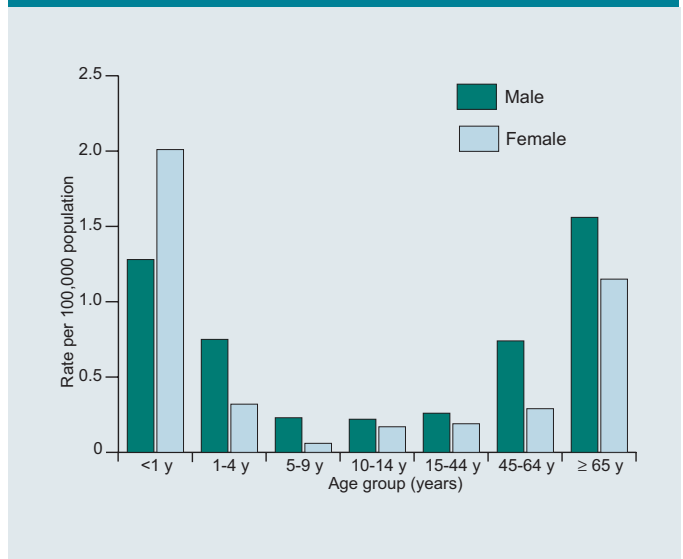


Figure 20 Age-specific rates of 'S. salivarius group' bacteraemia, England, Wales and Northern Ireland: 2002



Figure 21 Age-specific rates of 'S. sanguinis group' bacteraemia, England, Wales and Northern Ireland: 2002



isolates (20%) of all the non-pyogenic streptococcal bacteraemias. Five per cent of isolates tested against amoxycillin/ampicillin (12/255) were reported as resistant, and 23% of isolates (39/166) were reported as resistant to tetracycline.

Three-fifths of the 'bovis group' streptococcal bacteraemia reports included antimicrobial susceptibility information (135/215). The 'bovis group' streptococcal bacteraemia reports had the highest proportion of tetracycline resistant isolates (61%). Two per cent of isolates tested were reported as resistant to amoxycillin/ampicillin (2/106), five per cent were reported as resistant to penicillin, and 18% were reported as resistant to erythromycin.

There was a marked improvement in susceptibility reporting in the 'anginosus group' streptococcal bacteraemia reports, from 21% in 2001(1) to 59% in 2002. Within this group, 1% (4/290) were reported as resistant to penicillin, 2% (3/167) were reported as resistant to amoxycillin/ampicillin, 8% (21/256) were reported resistant to erythromycin, and 16% (22/137) were reported as resistant to tetracycline.

The 'salivarius group' streptococcal bacteraemias had the least proportion (44%) of reports including susceptibility to any antibiotic in 2002. Of the reports that did include this information, 18% were reported as penicillin resistant, 4% were reported as amoxycillin/ampicillin resistant, 26% were reported as erythromycin resistant, and 6% were reported as tetracycline resistant.

Age distribution

Distribution of non-pyogenic streptococcal bacteraemia reports by age-group and gender show a concentration in the youngest and oldest age groups, and among males compared to females (figures 17 to 21). For the majority of age groups, reporting rates of non-pyogenic streptococcal bacteraemias were higher among males than females except for the under one year olds in the 'sanguinis group' (figure 21), for those aged between 1 and 14 years

for the 'salivarius group' (figure 20) and for those aged between 1 and 4 years for the 'mitis group' (figure 19).

Discussion

There was an increase in the number of pyogenic and non-pyogenic streptococcal bacteraemias reported by laboratories in 2002 compared to the previous two years (1-3). The largest of these increases for the pyogenic streptococci was for the group C streptococcal bacteraemias, whose numbers increased by 34% between 2001 and 2002. For the non-pyogenic group, the largest increase was for the 'salivarius' and the 'mutans group', 36% between 2001 and 2002.

An improvement in the number of reports including antibiotic susceptibilities in 2002 was seen, compared to 2001, among all streptococcal groups (1). Antibiotic susceptibility information was received for 71% to 81% of reports, depending on the pyogenic group. This is an improvement from 2001, where susceptibility data was received for 64% to 70% of reports (1). The proportion of pyogenic streptococci reported to be resistant to erythromycin and/or tetracycline was similar to 2001 (1).

In contrast to pyogenic streptococci, the non-pyogenic groups showed changes in resistance in 2002 compared to 2001, both increases and decreases in resistance depending on which group and which antibiotic. This could relate to the increase in susceptibility information reported for isolates in 2002 compared to 2001, which may be improving the accuracy of susceptibility information.

There were no penicillin resistant group A, B, C, or G streptococcal bacteraemias reported in 2002. Laboratories are reminded that any pyogenic streptococcal isolates exhibiting a decreased sensitivity to penicillin or suspected resistance should be sent to the Antibiotic Resistance Monitoring and Reference Laboratory (ARMRL) for confirmation. Any streptococci (both pyogenic and non-pyogenic) with suspected glycopeptide or linezolid resistance should also be sent.

Susceptibility testing for non-pyogenic streptococci is

a challenge, without well-validated disc tests from either the British Society for Antimicrobial Chemotherapy (BSAC) or the National Committee for Clinical Laboratory Standards (NCCLS). While some isolates do have resistance or reduced sensitivity to *B*-lactams (typically affecting all analogues to some degree) the proportions reported as a resistant are probably over-estimates. A review of susceptibility data for non-pyogenic streptococci sent to ARMRL from endocarditis cases between 1996 and 2000 showed that, although 11% has reduced susceptibility to penicillin only 1.2% had clear resistance (4); even in endocarditis, reduced sensitivity can be overcome by giving the *B*-lactam in combination with gentamicin for a full four weeks.

It is hoped that the start of enhanced reporting for invasive group A streptococci, as part of the 'strep-EURO' programme, will serve to further our understanding of the risk factors and microbiological characteristics of these infections. For further information on the surveillance scheme, please refer to the article published in *CDR Weekly* in 2002 (5).

Acknowledgements

These reports would not be possible without the enduring weekly contributions from microbiology colleagues in laboratories across England, Wales, and Northern Ireland, without which there would be no surveillance data. Laboratory reporting is the bedrock of national surveillance. This is your data, so please tell us what you would like done with it. We are always pleased to hear

your views. Please send your comments/feedback to georgia.duckworth@hpa.org.uk. In addition, the support from colleagues within the Health Protection Agency, Specialist and Reference Microbiology Laboratory (SRM) in particular, is valued in the preparation of these reports.

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