



# Health Protection Report

weekly report

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## News

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### **Oseltamivir resistant influenza A(H1N1) virus in the UK, 2008/09 – an update**

Following the recently reported, first UK oseltamivir resistant influenza A case (H1N1) in the 2008/09 season [1], several further cases have been detected. From week 36/08 up to 19 November 2008, twelve of the 13 influenza A(H1N1) isolates detected in England have been found to be resistant to oseltamivir. All these cases are from the south west of England. Two oseltamivir resistant influenza A(H1N1) cases have also been detected in Scotland. All the H1N1 cases from England remain sensitive to zanamivir and amantadine and are antigenically similar to the H1N1 reference strain A/Brisbane/59/2007, which is included in this season's influenza vaccine.

Since the start of the current 2008/09 flu season, between weeks 40/08 and 46/08, sporadic laboratory-confirmed influenza infections have been detected across the UK including 58 influenza A(H3), 13 influenza A(H1), 57 influenza A (not subtyped) and three influenza B viruses [2]. Although clinical indicators of influenza activity remain below base-line levels throughout the UK, a recent trend of increasing levels in these indicators is apparent.

The oseltamivir resistant cases are focused in one geographical area of England. Most cases, where age is known, have occurred in the 20-29 year age group. Investigation of the cases by the Avon, Gloucestershire and Wiltshire Health Protection Unit, in collaboration with HPA South West and HPA Centre for Infections, is continuing. There is no evidence of any increased morbidity in these cases to date.

It remains too early to predict which strain(s) of influenza virus will predominate this season. The Agency will continue to monitor closely the characteristics of circulating isolates including drug susceptibility. It remains important that respiratory samples are taken from suspected influenza cases, and that outbreaks of acute respiratory illness are investigated. Respiratory samples confirmed as influenza virus positive should be forwarded to the HPA Centre for Infections Respiratory Virus Unit for culture and anti-viral testing.

Efforts should continue to encourage people in the CMO-defined influenza risk groups to take up the recommendation of seasonal influenza vaccination [3].

Influenza virus detections across Europe remain low so far in this season. Oseltamivir-resistant influenza A(H1N1) isolates have also been reported in a small number of other countries. Oseltamivir-resistant influenza A(H1N1) viruses emerged last season in association with the H274Y mutation, which confers resistance to oseltamivir, but not to zanamivir. By the end of the 2007/08 season, 26 of 34 reporting European countries had reported H1N1 oseltamivir resistance and, in the UK, 38 out of 347 (11%) were found to be oseltamivir resistant [4, 5]. The epidemiological evidence from the 2007/08 season suggested no reported increase in morbidity associated with these confirmed oseltamivir-resistant cases.

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## References

1. HPA. Identification in the UK of the first oseltamivir resistant-influenza virus (H1N1). Health Protection Report [serial online] 2008, 2(43): news, 24 October 2008. Available at: <http://www.hpa.org.uk/hpr/archives/2008/news4308.htm#ah1n1>.
  2. Weekly HPA influenza report, week 46. [http://www.hpa.org.uk/web/HPAwebFile/HPAweb\\_C/1226478484902](http://www.hpa.org.uk/web/HPAwebFile/HPAweb_C/1226478484902).
  3. DH. PL CMO (2008)3, PL CNO (2008)2, PL CPHO (2008)1: The influenza immunisation programme 2008/09. [http://www.dh.gov.uk/en/Publicationsandstatistics/Lettersandcirculars/Professionalletters/Chiefmedicalofficerletters/DH\\_083812](http://www.dh.gov.uk/en/Publicationsandstatistics/Lettersandcirculars/Professionalletters/Chiefmedicalofficerletters/DH_083812)
  4. European Centre for Disease Prevention and Control. Antivirals and antiviral-resistant influenza – resistance to oseltamivir (Tamiflu) in some influenza A(H1N1) virus samples. ECDC website [online] September 2008 [cited 24 October 2008]. [http://ecdc.europa.eu/Health\\_topics/influenza/antivirals.html](http://ecdc.europa.eu/Health_topics/influenza/antivirals.html)
  5. WHO. Influenza A(H1N1) virus resistance to oseltamivir. 13 October 2008. [http://www.who.int/csr/disease/influenza/h1n1\\_table/en/index.html](http://www.who.int/csr/disease/influenza/h1n1_table/en/index.html).
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## Annual Evidence Update on Diagnosing HIV/AIDS

The Infections Specialist Library (ISL) [1] is hosting the first Annual Evidence Update on Diagnosing HIV/AIDS (also known as “national knowledge week”) from 24 November to 7 December 2008, which encompasses World AIDS day on 1 December 2008. The event is held in collaboration with the Sexual Health Programme Board and the National Library for Public Health.

The focus of the event is the diagnosis of HIV and the importance of early diagnosis that benefits both the individual – through much improved prognosis – and the community – through reduced onward transmission of HIV.

A comprehensive collection of peer-reviewed publications is being brought together on an Evidence Update webpage [2], including several commentaries, written by experts in the field, that elaborate on the recently released guidelines on guidelines for HIV testing [3].

ISL is a single portal to evidence-based medical knowledge on infections, based at the Health Protection Agency Centre for Infections, having strong links with many partner organisations, professional groups and charities. It aims to provide access to the best available evidence on prevention, treatment and investigation of infections.

## References

1. <http://www.library.nhs.uk/infections/>
2. Diagnosing HIV Annual Evidence Update 2008 homepage, <http://www.library.nhs.uk/infections/Page.aspx?prv=y&pagename=HIVAEU>.
3. BHIVA/BASHH/BIS. UK National Guidelines for HIV Testing 2008. Available at: <http://www.britisheinfectionsociety.org/documents/GlinesHIVTest08.pdf>. See also: New guidelines on HIV testing in high-prevalence areas. Health Protection Report [serial online] 2008, 2 (38): news. Available at: <http://www.hpa.org.uk/hpr/archives/2008/news3808.htm#sophid>.

## Further information

Further information about SLI, including subscription to its newsletter, can be obtained by emailing to: [isl@hpa.org.uk](mailto:isl@hpa.org.uk).

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## **Confirmed rabies case in puppy in Malawi**

The HPA has been involved in contact tracing following a case of confirmed rabies in a puppy that may have been in contact with UK travellers at a backpacker lodge in Lilongwe, Malawi, East Africa. Up to 75 UK travellers are thought to have stayed at the lodge in late October and early November and the Agency has advised that those who had any contact with the animal during this period should seek medical advice.

An HPA press release (containing full details of the case) [1] reminds travellers that, outside of western Europe, a rabies vaccination may be recommended for travel to some countries, especially developing countries where rabies is common in animals.

### **Reference**

1. HPA press release, Confirmed rabies case in puppy in Malawi, 21 November 2008, <http://www.hpa.org.uk/hpr/archives/2008/news4708.htm#malawi>.

### **Further information**

Healthcare professionals and members of the public can find detailed information about travel health (including country-specific advice) from the National Travel Health Network and Centre (NaTHNaC), <http://www.nathnac.org/>, or the Fit for Travel website, <http://www.fitfortravel.nhs.uk/>

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## Infection reports

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### Bacteraemia

#### Pyogenic and non-pyogenic streptococcal bacteraemia, England, Wales and Northern Ireland: 2007

##### Introduction

These analyses are based on data extracted from our voluntary surveillance database (LabBase2\*) on the 17 October 2008 for the period 2003-2007. The exception to this is for data on group A streptococcal (GAS) infections for which an enhanced surveillance system was set up in the UK in 2003 as part of the Strep-EURO programme [1,2]. Although the project has now been completed, the augmented data collection mechanism established, which pools reports from LabBase2 and the Streptococcus and Diphtheria Reference Unit (SDRU), is still in use.

Rates for 2007 were calculated using 2006 mid-year resident population estimates based on the 2001 census for England, Wales, and Northern Ireland. In infants, rates were calculated using a provisional estimate of the number of live births in 2006 as the denominator (data from ONS and Northern Ireland Statistics and Research Agency). Regional analyses were made according to the Government Office Regions introduced in April 2002. Additional figures and tables giving regional breakdowns of antimicrobial resistance, multiple resistance patterns and age and sex-specific rates can be found on the [Epidemiological Data](#) pages within the Streptococcal Infections section of the HPA web-site.

The data presented here differ in some instances from data in earlier publications due to the addition of late reports to the database and the recent introduction of a new patient-based algorithm\*\*, rather than laboratory-based geography, to assign a location in the database.

##### Group A streptococci

Data from laboratory reports and isolate referrals have shown a decrease in the numbers of reports of group A streptococcal (GAS) bacteraemia in 2007 compared with 2006, from 1272 to 1239 (table 1). The rate of GAS bacteraemia reported in England, Wales and Northern Ireland for 2007 was 2.2 per 100,000 population (95% CI 2.1-2.4). Rates of reported GAS bacteraemia were higher in England (2.3) than Wales (1.9) or Northern Ireland (1.3), although there was wide variation within England, from 1.5/100,000 in the North East to 3.1/100,000 in the West Midlands (table 2a).

The highest reported rates of GAS bacteraemia were in adults aged 75 and over (7.6/100,000, 95% CI 6.8-8.4) and those aged less than one year (5.6/100,000, 95% CI 4.0-7.7). Rates of GAS bacteraemia among young adults showed a slight decrease in 2007 from 1.4 in 2006 to 1.3/100,000 in 2007, consistent with the decline in IDU-related infection identified through isolate referrals to SDRU [3]. Rates of GAS bacteraemia reports were higher in males than females across most age groups, the exception being in the 15-44 years age group.

**Table 1 Laboratory reports of streptococcal bacteraemia, England, Wales and Northern Ireland: 2003-2007**

	2003	2004	2005	2006	2007
<b>Pyogenic streptococci:</b>	<b>3916</b>	<b>3710</b>	<b>3553</b>	<b>3759</b>	<b>3784</b>
group A streptococci	1688	1535	1252	1272	1239
group B streptococci	1226	1176	1249	1442	1401
group C streptococci	275	255	276	292	320
group G streptococci	727	744	776	753	824
<b>Non-pyogenic streptococci:</b>	<b>2413</b>	<b>2520</b>	<b>2643</b>	<b>2818</b>	<b>3060</b>
<b>Anginosus group</b>	<b>612</b>	<b>631</b>	<b>678</b>	<b>726</b>	<b>771</b>
<i>Streptococcus anginosus</i>	146	193	174	175	222
<i>Streptococcus constellatus</i>	169	160	206	203	201
<i>Streptococcus intermedius</i>	57	77	74	93	93
<i>Streptococcus milleri</i> group	203	179	177	214	219
<i>Streptococcus</i> group F	37	22	47	43	36
<b>Bovis group</b>	<b>235</b>	<b>231</b>	<b>214</b>	<b>252</b>	<b>263</b>
<i>Streptococcus bovis</i> (untyped)	186	187	177	214	216
<i>Streptococcus bovis</i> biotype I	20	20	17	12	20
<i>Streptococcus bovis</i> biotype II	14	13	12	16	14
<i>Streptococcus equinus</i>	12	9	7	7	8
<i>Streptococcus alactolyticus</i>	3	1	1	3	5
<b>Mitis group</b>	<b>1005</b>	<b>1074</b>	<b>1052</b>	<b>1164</b>	<b>1243</b>
<i>Streptococcus mitis</i>	27	50	50	45	111
<i>Streptococcus oralis</i>	310	340	341	365	408
" <i>Streptococcus mitis</i> group"	663	680	655	758	724
<b>Mutans group</b>	<b>45</b>	<b>41</b>	<b>48</b>	<b>44</b>	<b>53</b>
<i>Streptococcus mutans</i>	45	40	47	44	53
<i>Streptococcus sobrinus</i>	0	1	1	0	0
<b>Salivarius group</b>	<b>189</b>	<b>226</b>	<b>282</b>	<b>291</b>	<b>332</b>
<i>Streptococcus salivarius</i>	161	195	249	263	300
<i>Streptococcus vestibularis</i>	28	31	33	32	32
<b>Sanguinis group</b>	<b>327</b>	<b>317</b>	<b>369</b>	<b>341</b>	<b>398</b>
<i>Streptococcus gordonii</i>	21	14	26	23	42

<i>Streptococcus sanguinis</i>	4	10	8	16	25
<i>Streptococcus parasanguinis</i>	64	58	73	85	110
" <i>Streptococcus sanguinis</i> group"	237	235	262	217	221
<b>Other streptococci:</b>	<b>1607</b>	<b>1745</b>	<b>1715</b>	<b>1853</b>	<b>2314</b>
<i>Streptococcus acidominimus</i>	45	47	52	53	26
<i>Streptococcus suis</i>	2	0	3	3	1
<i>Streptococcus uberis</i>	3	4	6	8	9
"Anaerobic streptococcus"	40	48	31	37	55
Streptococci not fully identified	1,517	1,646	1,623	1,752	2,223
<b>TOTAL:</b>	<b>7936</b>	<b>7975</b>	<b>7911</b>	<b>8430</b>	<b>9158</b>
<b>Genera closely related to streptococci:</b>	<b>356</b>	<b>452</b>	<b>468</b>	<b>517</b>	<b>552</b>
<i>Abiotrophia</i> spp	11	20	26	34	28
<i>Aerococcus</i> spp	79	98	106	133	150
<i>Gemella</i> spp	80	92	98	111	138
<i>Globicatella sanguis</i>	0	0	0	2	3
<i>Leuconostoc</i> spp	29	35	31	43	39
<i>Pediococcus</i> spp	4	3	4	3	6
<i>Peptostreptococcus</i> spp	153	204	203	191	188

**Table 2a Region-specific rates (per 100,000 population) of pyogenic streptococcal bacteraemia: England, Wales and Northern Ireland, 2007**

Region	Rate per 100,000 population			
	Group A	Group B	Group C	Group G
North East	1.5	1.4	0.3	0.8
Yorkshire & Humber	3.0	3.1	1.0	2.1
East Midlands	1.8	2.4	0.5	1.5
East of England	2.1	2.7	0.6	1.8
London	2.3	2.4	0.4	1.2
South East	1.9	2.0	0.4	1.0
South West	2.2	2.3	0.5	1.7
West Midlands	3.1	3.7	0.8	2.1
North West	2.3	2.6	0.6	1.3
<b>England</b>	<b>2.3</b>	<b>2.5</b>	<b>0.6</b>	<b>1.5</b>
<b>Wales</b>	<b>1.9</b>	<b>2.2</b>	<b>1.1</b>	<b>1.6</b>
<b>Northern Ireland (N.I.)</b>	<b>1.3</b>	<b>2.9</b>	<b>0.2</b>	<b>1.0</b>
<b>England, Wales and N.I.</b>	<b>2.2</b>	<b>2.5</b>	<b>0.6</b>	<b>1.5</b>

**Table 2b Region-specific rates (per 100,000 population) of non-pyogenic streptococcal bacteraemia: England, Wales and Northern Ireland, 2007**

Region	Rate per 100,000 population				
	"Anginosus Group"	"Bovis Group"	"Mitis Group"	"Salivarius Group"	"Sanguinis Group"
North East	0.70	0.20	2.35	0.55	0.55
Yorkshire & Humber	1.48	0.66	2.64	0.37	0.45
East Midlands	1.15	0.30	1.79	0.76	0.41
East of England	1.41	0.39	2.03	0.52	0.82
London	1.06	0.48	2.37	0.56	0.39
South East	1.86	0.49	2.44	0.73	0.75
South West	1.35	0.49	1.91	0.45	0.70
West Midlands	1.70	0.73	2.66	0.61	1.10
North West	1.52	0.45	3.46	0.88	1.18
<b>England</b>	<b>1.42</b>	<b>0.48</b>	<b>2.45</b>	<b>0.62</b>	<b>0.72</b>
<b>Wales</b>	<b>0.84</b>	<b>0.27</b>	<b>0.78</b>	<b>0.27</b>	<b>0.54</b>
<b>Northern Ireland (N.I.)</b>	<b>1.44</b>	<b>0.57</b>	<b>0.92</b>	<b>0.63</b>	<b>0.80</b>
<b>England, Wales &amp; N.I.</b>	<b>1.39</b>	<b>0.47</b>	<b>2.31</b>	<b>0.60</b>	<b>0.72</b>

#### *Antimicrobial resistance*

Reported resistance rates to clindamycin, erythromycin and tetracycline were 5.1%, 5.6% and 14.0% respectively in 2007 (table 3). Whilst tetracycline and erythromycin resistance have remained relatively stable since 2003, prevalence of clindamycin resistance has fluctuated substantially. Penicillin resistance has not been seen to date in the UK and remains the therapeutic drug of choice for GAS infections.

Erythromycin resistance was commonly associated with resistance to other antibiotics, with 73% and 62% of erythromycin isolates being resistant to clindamycin and tetracycline respectively. Of the 214 isolates reported as having been tested against all three agents, seven (3.3%) were reported as resistant to all three. This is an increase over that seen in 2006 where 0.8% showed multiple resistance to the three antibiotics.

**Table 3 Antibiotic resistance data for streptococcal bacteraemia reports: England, Wales and Northern Ireland: 2003-2007**

		2003		2004		2005		2006		2007	
		No. tested	(% resist't)	No. tested	(% resist't)	No. tested	(% resist't)	No. tested	(% resist't)	No. tested	(% resist't)
<b>Group A</b>	clindamycin	478	(2%)	209	(7%)	158	(3%)	171	(6%)	214	(5%)
	erythromycin	1058	(5%)	899	(4%)	648	(5%)	708	(5%)	708	(6%)
	tetracycline	760	(17%)	567	(14%)	386	(16%)	464	(17%)	609	(14%)
<b>Group B</b>	clindamycin	165	(10%)	162	(6%)	155	(9%)	210	(9%)	256	(8%)
	erythromycin	824	(7%)	856	(8%)	862	(10%)	1029	(11%)	1036	(11%)
	tetracycline	536	(76%)	566	(78%)	567	(76%)	715	(80%)	861	(83%)
<b>Group C</b>	clindamycin	31	(6%)	50	(16%)	41	(12%)	38	(8%)	56	(5%)
	erythromycin	174	(12%)	173	(17%)	195	(14%)	197	(9%)	223	(11%)
	tetracycline	110	(29%)	97	(38%)	123	(24%)	129	(23%)	188	(18%)
<b>Group G</b>	clindamycin	91	(11%)	123	(6%)	114	(5%)	115	(6%)	152	(10%)
	erythromycin	534	(16%)	575	(14%)	569	(18%)	552	(19%)	598	(23%)
	tetracycline	338	(50%)	382	(50%)	409	(50%)	397	(47%)	493	(46%)
<b>"Angin- osus"</b>	erythromycin	365	(7%)	399	(8%)	430	(10%)	455	(9%)	531	(10%)
	penicillin	413	(3%)	461	(3%)	491	(4%)	558	(4%)	642	(5%)
	tetracycline	211	(16%)	218	(12%)	233	(22%)	324	(15%)	408	(16%)
<b>"Bovis"</b>	erythromycin	122	(13%)	145	(16%)	120	(15%)	148	(21%)	159	(18%)
	penicillin	139	(6%)	167	(4%)	138	(9%)	180	(9%)	197	(6%)
	tetracycline	72	(56%)	88	(47%)	84	(58%)	109	(59%)	129	(64%)
<b>"Mitis"</b>	erythromycin	584	(36%)	631	(36%)	636	(40%)	696	(43%)	823	(41%)
	penicillin	627	(21%)	721	(22%)	756	(22%)	862	(25%)	1,016	(23%)
	tetracycline	328	(29%)	305	(31%)	380	(31%)	469	(32%)	607	(28%)
<b>"Salivar- ius"</b>	erythromycin	111	(20%)	124	(35%)	161	(31%)	186	(33%)	210	(31%)
	penicillin	122	(22%)	160	(22%)	192	(29%)	220	(28%)	260	(26%)
	tetracycline	73	(22%)	78	(21%)	109	(18%)	128	(17%)	146	(23%)
<b>"Sangu- inis"</b>	erythromycin	189	(28%)	193	(28%)	230	(36%)	230	(33%)	270	(35%)
	penicillin	219	(18%)	225	(21%)	270	(24%)	280	(20%)	323	(28%)
	tetracycline	132	(25%)	111	(23%)	146	(35%)	160	(29%)	207	(29%)

A total of 687 GAS blood culture isolates were submitted to SDRU in 2007 from laboratories in England, Wales and Northern Ireland. The most common *emm* /M-types identified were *emm* /M1 (20%), *emm* /M89 (18%), *emm* /M28 (12%), *emm* /M12 (7%), *emm* /M3 (6%), and *emm* /M4 (5%), which between them accounted for 68% of isolates typed.

## Group B streptococci

Having increased substantially between 2005 and 2006, from 1249 to 1442 (15% increase), reports of bacteraemia due to group B streptococcus (GBS) in England, Wales and Northern Ireland showed a decrease to 1401 in 2007. Nevertheless, GBS remains ahead of GAS as the leading cause of streptococcal bacteraemia. The overall rate of reports from laboratories in England, Wales and Northern Ireland was 2.5 (95% CI 2.4-2.7) per 100,000 population (table 2a), with rates higher in Northern Ireland (2.9) than England (2.5) or Wales (2.2), a pattern also seen in 2006.

The rate of GBS bacteraemia reports in infants was 64.9/100,000 (95% CI 59.0-71.2). Rates were higher for males than females across most age groups, the exception being in the 15-44 age group. The biggest increase in rates of reports between 2006 and 2007 was seen for females aged under one year old, with rates of reports increasing from 56.3 to 63.3/100,000.

**Table 4 Number and rate (per 1000 live births) of group B streptococcal bacteraemia reports in infants 0-90 days old in England, Wales and Northern Ireland: 2007**

Country	All cases (0-90 day old)			Early onset (0-6 days old)			Late onset (7-90 days old)		
	No.	rate	(95% CI)	No.	rate	(95% CI)	No.	rate	(95% CI)
England	383	0.60	(0.54-0.67)	235	0.37	(0.32-0.42)	148	0.23	(0.20-0.27)
Wales	18	0.54	(0.32-0.85)	10	0.30	(0.14-0.55)	8	0.24	(0.10-0.47)
Northern Ireland (N.I.)	20	0.86	(0.52-1.33)	13	0.56	(0.30-0.96)	7	0.30	(0.12-0.62)
England, Wales & N.I.	421	0.61	(0.55-0.67)	258	0.37	(0.33-0.42)	163	0.24	(0.20-0.27)

### *Antimicrobial resistance*

The proportion of GBS bacteraemia reports accompanied by susceptibility data has increased since 2003 although only 18% reports included results for clindamycin in 2007. Resistance of GBS blood culture isolates to clindamycin, erythromycin and tetracycline was noted in 7.8%, 10.7% and 82.6% of reports respectively, with erythromycin resistance showing a steady increase from 7% in 2003 (table 3). Of the 237 isolates reported as being tested against all three agents, 13 (5.5%) were found to be resistant to all three.

## **Group C & G streptococci**

Voluntary reporting has shown a general increase in the numbers of reports of bacteraemia caused by group C streptococci (GCS) from 275 in 2003 to 320 in 2007. Reports of bacteraemia due to group G streptococci (GGS) increased in 2007 to 824 compared with 753 in 2006 (table 1). The rate of reported bacteraemia due to GCS in England, Wales and Northern Ireland in 2007 was 0.6 per 100,000 (95% CI 0.5-0.6) and the highest regional rate was observed in Yorkshire and the Humber at 1.0/100,000. The rate of GGS bacteraemia reports in England, Wales and Northern Ireland was 1.5/100,000 (95% CI 1.3-1.5) with the highest reported rates being again detected in Yorkshire and the Humber and the West Midlands at 2.1/100,000 (table 2a).

The age distributions of rates of both GCS and GGS bacteraemia reports were concentrated in the elderly, with rates tending to be higher in males than females in all age groups, the exception being for GCS bacteraemia where the rate for the elderly showed no difference between the sexes in 2007.

### *Antimicrobial resistance*

Reported resistance to clindamycin, tetracycline and erythromycin showed no clear trends between for GGS or GCS between 2003 and 2007, with the exception of erythromycin resistance in GGS isolates, which increased steadily from 16% to 23% (table 3). Resistance to clindamycin for GGS increased from 6% in 2006 to 10% in 2007, this is the highest rate of resistance since 2003. Of the 56 GCS isolates tested for all three agents, none were reported as multiple resistant. Three of the 153 GGS (2%) isolates tested against all three antibiotics showed multiple resistance.

## Non-pyogenic streptococci

Reports of bacteraemia due to non-pyogenic streptococci increased steadily between 2003 and 2007 from 2413 to 3057 reports for all groups combined (table 1) . The largest increases were observed for the 'salivarius' group where reports increased by 76% since 2003. All other groups also increased, with the exception of the 'bovis' and 'mutans' groups which showed little change.

Reporting rates for England, Wales and Northern Ireland in 2007 ranged from 0.5 per 100,000 population (95% CI 0.4-0.5) for bacteraemia due to 'bovis group' streptococci to 2.3/100,000 (95% CI 2.1-2.4) for the 'mitis group' (table 2b) .

Distribution of non-pyogenic streptococcal bacteraemia reports by age group and sex showed a concentration in the youngest and oldest age groups, and in most cases among males compared to females.

### *Antimicrobial resistance*

Since 2003, the proportion of bacteraemia reports accompanied by susceptibility data has increased markedly for all non-pyogenic groups, with over 80% including information on susceptibility to penicillin.

In contrast to the pyogenic streptococci, where penicillin resistance has not been observed, between 5 and 28% of isolates from non-pyogenic groups were reported as penicillin resistant, the highest frequency being observed in the 'sanguinis group'. Erythromycin resistance was also high in the non-pyogenic groups compared to the pyogenic groups, with between 18-41% of isolates from non-pyogenic groups reported as erythromycin resistant, with the exception of the 'anginosus group' (10%) (table 3). The highest levels of tetracycline resistance were observed in the 'bovis group' where 64% of isolates were reported as resistant.

## Reference microbiology service

Substantial numbers of reports continue to be made of streptococcal bacteraemia in which the organism is not fully identified (2223 in 2007). Precise species identification of isolates would improve the monitoring of disease trends of non-pyogenic streptococci and related genera in particular.

The Streptococcus and Diphtheria 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. However, a free-of-charge reference service will continue to be available for urgent public health investigations, outbreaks and incident management, either hospital or community based.

Laboratories are requested to send any pyogenic streptococcal isolates exhibiting a decreased sensitivity to penicillin to the Antibiotic Resistance Monitoring and Reference Laboratory (ARMRL) for confirmation. Both laboratories are based at the Health Protection Agency, Centre for Infections, in Colindale. In addition, any streptococci (pyogenic or non-pyogenic) with suspected glycopeptide or linezolid resistance should be referred for further investigation.

## References

1. PHLS. Enhanced surveillance of invasive group A streptococcal infections. *Commun Dis Rep CDR Wkly* [serial online] 2002; **12**(51): news.

2. Lamagni TL, Neal S, Keshishian C, Alhaddad N, George R, Duckworth G, Vuopio-Varkila J and Efstratiou A. Severe *Streptococcus pyogenes* infections, United Kingdom, 2003-2004. *Emerg Infect Dis* 2008; **14**(2) 202-209.

3. Health Protection Agency, Health Protection Scotland, National Public Health Service for Wales, CDSC Northern Ireland, and CRDHB. *Shooting up: infections among injecting drug users in the United Kingdom 2007*. London: Health Protection Agency; 2008.

### Footnotes

\* LabBase2 is the database that collects laboratory reports of all microorganisms isolated at nearly 400 NHS and other laboratories throughout England, Wales and Northern Ireland. The database is managed and accessed at the Centre for Infections.

\*\* The algorithm allocates geographical locations based on the available postcode. It looks for a valid postcode of residence first. If this is missing it will then utilise the patient's registered GP postcode, and if this is missing it will then utilise the source laboratory postcode. Previously the laboratory that first received the specimen was used to assign the geographical area of the report.

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