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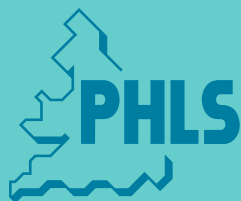
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### An outbreak of measles linked to the University of Durham

A cluster of cases of measles at the University of Durham is being investigated. There are currently two cases confirmed by ELISA and MACRIA as IgM positive for measles and four probable cases. Four of the six cases are students aged from 18 to 20 years from the University of Durham, three of whom live at the same college. The other two cases are siblings of one of the student cases. Five of the six cases had not been immunised against measles and one case had previously received a single dose of MMR vaccine. None of the six cases had travelled abroad during the incubation period of their illness. University of Durham students are now on holiday, they are dispersed around the United Kingdom and more widely.

The onset dates of cases were from 17 to 30 November 2001. Cases presented with a febrile prodromal illness followed by a rash and other symptoms including headache, conjunctivitis, cough, photophobia, swollen glands, and Koplik's spots. All cases are recovering well and none have been admitted to hospital.

The cluster is being investigated by staff at the Communicable Disease Control (CDC) Unit at County Durham and Darlington Health Authority and the University Health Centre with support from PHLS North, the Immunisation Division at CDSC and the Enteric, Respiratory and Neurological Virus Laboratory (ERNVL) at Central PHL. A message has been sent to CCDCs and PHL Directors alerting them to possible measles cases with a link to the University of Durham. Any suspected cases of measles with possible links to the University of Durham should be reported to the CDC Unit at County Durham and Darlington Health Authority and investigated for IgM antibody using the oral fluid testing kits used routinely to confirm notified cases of measles, mumps and rubella. If the swab is taken within seven days of onset of the illness, it may be possible to detect measles virus by PCR, which may enable the virus to be genotyped. It is therefore vital that the onset date is included on any request form for salivary testing of any cases to enable the laboratory to process the specimen appropriately. For further information on this cluster please contact Dr Deb Wilson at the CDC Unit at County Durham and Darlington Health Authority on 0191 333 3372.

ERNVL have also confirmed an additional case of measles with an onset date of 5 December in a student returning home from university in London. This emphasises the need to investigate any rash-illness in students returning from any higher education establishment.

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### MRC review of autism research: epidemiology and causes

The Medical Research Council (MRC) *Review of autism research*, commissioned by the Department of Health in March 2001, is now complete (1). The review took the broadest possible view of the causes of

autism, to consider whether autism spectrum disorders (ASDs) have increased, and to identify priority areas for research. Public debate about autism has focused primarily on an unsupported hypothesis that MMR vaccine might be associated with bowel disorders and autism. The MRC has included all possible hypotheses in its review.

ASDs, which include autism and Asperger's syndrome, affect more people than had previously been recognised – approximately 60 per 10,000 children under 8 years of age. Most researchers believe that ASDs have a variety of causes and that a genetic component is well established, although the extent of gene involvement remains unclear. Interaction between genetic susceptibility and environmental factors is likely to play a key role but the nature of these interactions is not yet known.

In relation to MMR vaccine, the review concludes that current evidence supports the view that there is no link between MMR and ASDs, and is consistent with the findings of previous expert groups.

1. Medical Research Council. *Review of autism research: epidemiology and causes*. London: Medical Research Council, December 2001. Available from <[http://www.mrc.ac.uk/pdf-autism\\_report.pdf](http://www.mrc.ac.uk/pdf-autism_report.pdf)>.

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## **Outbreak of Ebola haemorrhagic fever in Gabon and the Republic of Congo**

The World Health Organization (WHO) has received reports of 27 cases of Ebola haemorrhagic fever (25 confirmed cases: 8 laboratory confirmed, 17 epidemiologically linked to cases, and 2 suspected cases under investigation), including 15 deaths, from Gabon and the Republic of Congo (1). Sixteen of the 27 cases were detected in Gabon and 11 in the neighbouring villages of the Republic of Congo.

The Gabon Ministry of Health has established a national task force and is being assisted by an international team from WHO and its partners in the Global Alert and Response Network (GOARN). The team is working closely with a team from the Congolese Ministry of Health (1).

A surveillance system has been established and the international team are actively tracing contacts on both sides of the border. Two hundred and twenty-seven contacts have been identified so far, as of 19 December 2001, 133 contacts are being followed up in Gabon and 94 in the Republic of Congo. The team has also set up an isolation unit and is carrying out education in the local communities aimed at preventing exposure in two areas – Makakou and in Zadié district.

This is the fourth laboratory verified Ebola outbreak in Gabon since December 1994. Although non-human primates have been the source of most of these outbreaks, they are not thought to be the reservoir. Extensive ecological studies have so far failed to identify the reservoir of Ebola.

1. World Health Organization. *Ebola haemorrhagic fever in Gabon/The Republic of the Congo - Update 7*. Available from <<http://www.who.int/disease-outbreak-news/n2001/december/20december2001.html>>.

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## Polymicrobial bacteraemias: England and Wales, 1999 and 2000

### Key points:

- Of approximately 110,000 bacteraemia laboratory reports in 1999 and 2000, 10% were found to be linked reports of multiple organism isolation from single bacteraemia episodes
- Subsequent to removal of duplicate patient episodes, 5.1% of the remaining 104,000 bacteraemias were identified as polymicrobial
- Numbers of reports of both poly- and monomicrobial bacteraemias increased between 1999 and 2000 by 5% and 3% respectively

Reports from diagnostic laboratories of bacteraemias from specimens taken in 1999 and 2000 were extracted for this review. All reports are of bacterial isolations from blood culture, with or without cerebrospinal fluid (CSF). Individual bacteraemia reports held on LabBase correspond to a single clinically significant organism identified from a patient specimen. Multiple organism isolates from blood culture are not linked, so a matching procedure was required to identify polymicrobial bacteraemias. This involved identifying bacteraemia records with identical specimen dates, dates of birth, sex, and patient identifiers for each laboratory. Where reports matched on all these data items, but did not match completely on patient identifiers, they were examined visually to determine whether they related to the same episode. Descriptive analyses were then performed comparing these polymicrobial bacteraemias to single-organism bacteraemias. All rates were calculated using 2000 mid-year resident population estimates for each corresponding age group and regional office boundary, respectively.

A total of 110,914 bacteraemia reports were received by CDSC for specimens collected in 1999 and 2000 (54,744 and 56,170 respectively). Of these, 602 were excluded from further analyses due to missing sex and/or dates of birth. A further 211 records had no patient identifiers recorded, but as they matched on all other parameters (sex, date of birth, specimen date, specimen type, and laboratory), they were considered to be linked specimens. Of the remaining 110,312, a subset of 11,266 bacteraemia reports was identified as being linked to one or more other bacteraemia reports, which translates to 5329 specimens with multiple organism isolations from one blood culture set. The remaining 99,046 were considered to be monomicrobial.

Following on from the identification of linked bacteraemia reports, the total number of bacteraemias in 1999 and 2000 was thus reduced from 110,312 to 104,375 patient episodes. Therefore 5.1% of all bacteraemia episodes were identified as having multiple bacterial species isolated.

Numbers of both mono- and polymicrobial bacteraemias increased slightly between 1999 and 2000 in England and Wales (table 1), although the overall proportion of bacteraemias which were polymicrobial remained essentially unchanged (5.1 and 5.2% respectively).

### Regional distribution

Some variation in the proportion of polymicrobial bacteraemias as a proportion of all bacteraemias was evident between the regions, especially in 2000 where the lowest proportion was in London (3.3%) and the highest in the North West (8.4%) (table 1).

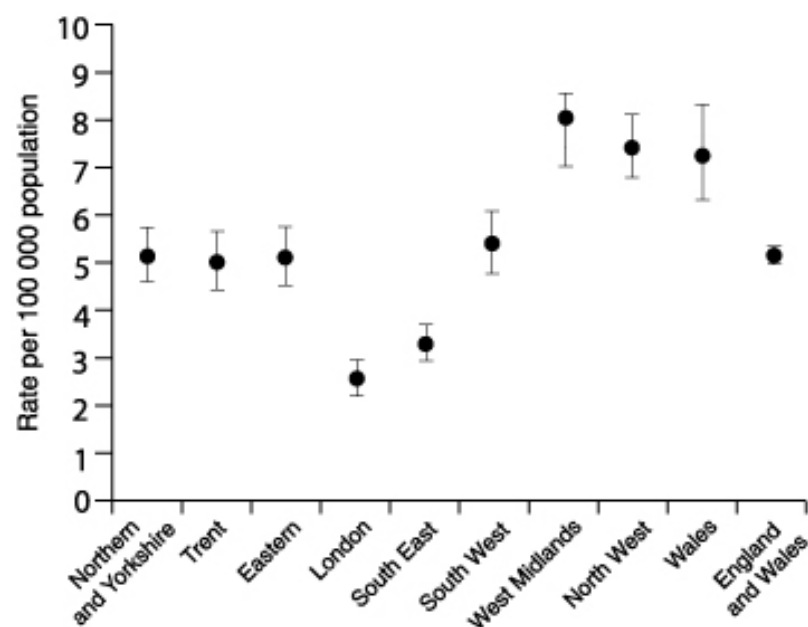
**Table 1 Mono- and polymicrobial bacteraemia episodes: England & Wales, 1999 and 2000**

	Monomicrobial		Polymicrobial				Total	
	1999	2000	1999	(%*)	2000	(%*)	1999	2000
<b>Northern &amp; Yorkshire</b>	5947	6303	259	(4.2)	326	(4.9)	6206	6629
<b>Trent</b>	5345	6197	236	(4.2)	259	(4.0)	5581	6456
<b>Eastern</b>	4754	5154	185	(3.7)	279	(5.1)	4939	5433
<b>London</b>	5379	5506	227	(4.0)	190	(3.3)	5606	5696
<b>South East</b>	6455	6859	304	(4.5)	288	(4.0)	6759	7147
<b>South West</b>	4681	4642	298	(6.0)	269	(5.5)	4979	4911
<b>West Midlands</b>	6350	7198	349	(5.2)	414	(5.4)	6699	7612
<b>North West</b>	6334	5355	532	(7.7)	491	(8.4)	6866	5846
<b>Wales</b>	3535	3052	209	(5.6)	214	(6.6)	3744	3266
<b>England &amp; Wales</b>	<b>48780</b>	<b>50266</b>	<b>2599</b>	<b>(5.1)</b>	<b>2730</b>	<b>(5.2)</b>	<b>51,379</b>	<b>52,996</b>

\* % bacteraemias

Rates of polymicrobial bacteraemias by regional population varied considerably between the English regions and Wales in 2000 (figure 1). Rates of reports from the West Midlands (7.76/100,000 population), North West (7.43/100,000) and Wales (7.26/100,000) were considerably higher than for the all other English regions, where rates varied from 2.58 (London) to 5.41/100,000 (South West).

**Figure 1 Polymicrobial bacteraemia rates (95% confidence intervals) per 100,000 population: England and Wales, 2000**

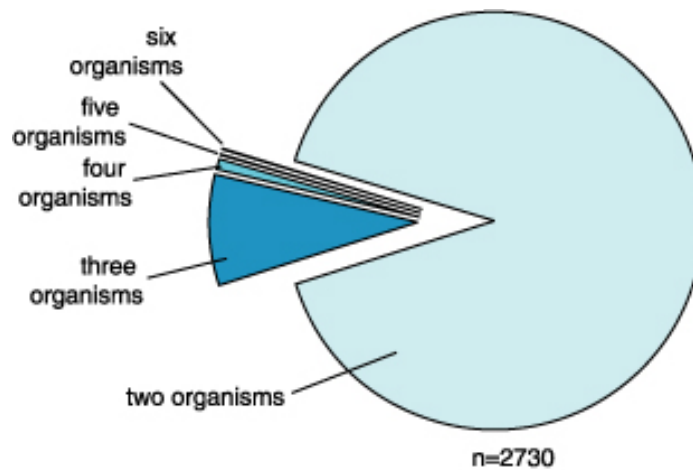


\* rates calculated using 2000 mid-year resident population estimates

### Species involved in mono- and polymicrobial bacteraemias

Of the 2730 polymicrobial bacteraemias in 2000, 90% involved two organisms (2470), 9% (234) involved three, 1% (22) had four and 0.1% (2) each involved five and six species (figure 2).

**Figure 2 Number of organisms involved in polymicrobial bacteraemia episodes: England and Wales, 2000**



Owing to the large number of different species combinations reported, no attempt was made to describe all combinations for the polymicrobial reports. The most common combination of different genera were of *Staphylococcus* and *Streptococcus* species being isolated together in a blood culture set, comprising 374 reports (1999 and 2000). Of these reports, 67% (249) involved *Staphylococcus aureus*, the remainder (125) being coagulase-negative staphylococci. The most common streptococci involved in these staphylococci-streptococci polymicrobial reports were pyogenic streptococci (165). The second most common combination of genera were *Staphylococcus* spp and *Enterococcus* spp (419), of which 59% (249) involved *S. aureus*, followed by *Escherichia coli* and *Enterococcus* (242), and then *E. coli* and *Klebsiella* spp (223).

A comparison of genera reported in mono- and polymicrobial bacteraemias was made whereby all genera across all reports were compared. The distribution of genera in mono- and polymicrobial bacteraemias varied slightly, although numbers involved for some were small (table 2). Of the polymicrobial genera with more than 50 reports, *Citrobacter* spp, *Clostridium* spp, *Enterococcus* spp, *Morganella* spp, and *Stenotrophomonas* spp were at least twice as prevalent in polymicrobial bacteraemia reports as in monomicrobial reports. Conversely, *E. coli* and *Streptococcus* spp were relatively under-represented among polymicrobial reports. Interestingly, coagulase-negative staphylococci, which made up a quarter (3719/15,264) of all the monomicrobial staphylococci, were relatively more common among polymicrobial bacteraemias, making up half of all staphylococci reported (554/1170).

**Table 2 Organisms reported in mono- and polymicrobial bacteraemia reports: England and Wales, 2000**

Genus	Monomicrobial bacteraemias			Polymicrobial bacteraemias		
	Number of reports	(%)	Rank	Number of reports*	(%)	Rank
<i>Abiotrophia</i>	2	(0.0)	75	0	(0.0)	60
<i>Achromobacter</i>	5	(0.0)	60	1	(0.0)	52
<i>Acinetobacter</i>	643	(1.3)	13	130	(2.3)	11
<i>Actinomyces</i>	1	(0.0)	84	1	(0.0)	52
<i>Aerococcus</i>	40	(0.1)	36	16	(0.3)	23
<i>Aeromonas</i>	60	(0.1)	28	11	(0.2)	26
<i>Agrobacterium</i>	30	(0.1)	37	6	(0.1)	37
<i>Alcaligenes</i>	53	(0.1)	30	3	(0.1)	44
<i>Anaerobiospirillum</i>	5	(0.0)	60	2	(0.0)	48
<i>Arcanobacterium</i>	5	(0.0)	60	0	(0.0)	60
<i>Bacillus</i>	114	(0.2)	24	29	(0.5)	19
<i>Bacteroides</i>	770	(1.5)	12	105	(1.9)	12
<i>Bifidobacterium</i>	2	(0.0)	75	0	(0.0)	60
<i>Bordetella</i>	1	(0.0)	84	0	(0.0)	60
<i>Borrelia</i>	9	(0.0)	56	0	(0.0)	60

<i>Branhamella</i>	4	(0.0)	65	0	(0.0)	60
<i>Brevibacterium</i>	6	(0.0)	58	0	(0.0)	60
<i>Brevundimonas</i>	17	(0.0)	47	2	(0.0)	48
<i>Brucella</i>	1	(0.0)	84	0	(0.0)	60
<i>Burkholderia</i>	22	(0.0)	42	3	(0.1)	44
<i>Campylobacter</i>	111	(0.2)	25	5	(0.1)	39
<i>Capnocytophaga</i>	2	(0.0)	75	0	(0.0)	60
<i>Cardiobacterium</i>	1	(0.0)	84	0	(0.0)	60
<i>Chromobacterium</i>	3	(0.0)	70	0	(0.0)	60
<i>Chryseobacterium</i>	13	(0.0)	50	0	(0.0)	60
<i>Citrobacter</i>	330	(0.7)	17	82	(1.5)	14
<i>Clostridium</i>	301	(0.6)	19	95	(1.7)	13
<i>Comamonas</i>	11	(0.0)	52	7	(0.1)	33
<i>Corynebacterium</i>	162	(0.3)	21	25	(0.4)	20
<i>Edwardsiella</i>	1	(0.0)	84	0	(0.0)	60
<i>Ehlichia</i>	2	(0.0)	75	0	(0.0)	60
<i>Eikenella</i>	4	(0.0)	65	0	(0.0)	60
<i>Enterobacter</i>	1483	(3.0)	9	224	(4.0)	10
<i>Enterococcus</i>	2446	(4.9)	7	774	(13.9)	2
<i>Erwinia</i>	3	(0.0)	70	0	(0.0)	60
<i>Erysipelothrix</i>	2	(0.0)	75	0	(0.0)	60
<i>Escherichia</i>	10192	(20.5)	3	723	(13.0)	4
<i>Eubacterium</i>	8	(0.0)	57	1	(0.0)	52
<i>Ewingella</i>	1	(0.0)	84	0	(0.0)	60
<i>Flavimonas</i>	10	(0.0)	53	3	(0.1)	44
<i>Flavobacterium</i>	10	(0.0)	53	4	(0.1)	43
<i>Fusobacterium</i>	48	(0.1)	32	7	(0.1)	33
<i>Gardnerella</i>	4	(0.0)	65	0	(0.0)	60
<i>Gemella</i>	30	(0.1)	37	9	(0.2)	30
<i>Haemophilus</i>	331	(0.7)	16	30	(0.5)	18
<i>Hafnia</i>	21	(0.0)	44	7	(0.1)	33
<i>Kingella</i>	2	(0.0)	75	0	(0.0)	60
<i>Klebsiella</i>	2616	(5.3)	6	485	(8.7)	7
<i>Kluyvera</i>	15	(0.0)	48	0	(0.0)	60
<i>Lactobacillus</i>	24	(0.0)	41	7	(0.1)	33
<i>Lactococcus</i>	18	(0.0)	46	11	(0.2)	26
<i>Leclercia</i>	1	(0.0)	84	0	(0.0)	60
<i>Legionella</i>	22	(0.0)	42	0	(0.0)	60
<i>Leptotrichia</i>	2	(0.0)	75	0	(0.0)	60
<i>Leuconostoc</i>	5	(0.0)	60	5	(0.1)	39
<i>Listeria</i>	56	(0.1)	29	5	(0.1)	39
<i>Micrococcus</i>	80	(0.2)	26	9	(0.2)	30
<i>Moellerella</i>	1	(0.0)	84	0	(0.0)	60
<i>Moraxella</i>	72	(0.1)	27	10	(0.2)	28
<i>Morganella</i>	217	(0.4)	20	57	(1.0)	17
<i>Mycobacterium</i>	30	(0.1)	37	1	(0.0)	52
<i>Myroides</i>	1	(0.0)	84	0	(0.0)	60

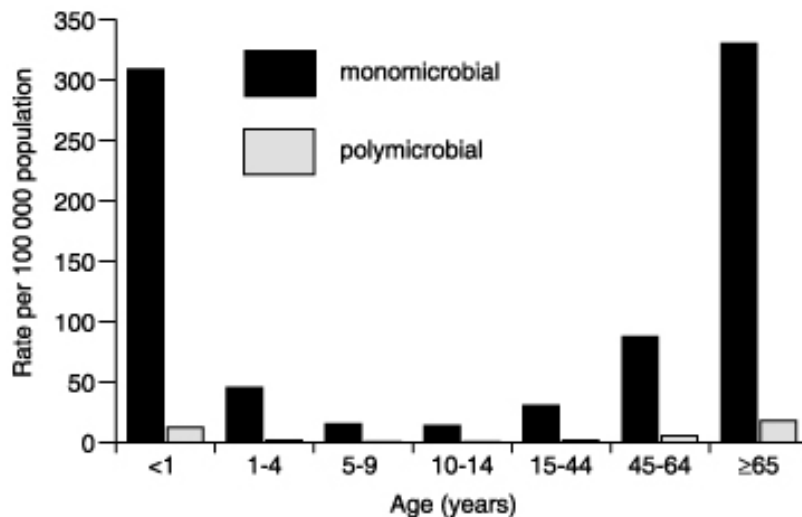
<i>Neisseria</i>	810	(1.6)	11	24	(0.4)	21
<i>Ochrobactrum</i>	45	(0.1)	33	5	(0.1)	39
<i>Pantoea</i>	44	(0.1)	34	14	(0.3)	25
<i>Pasteurella</i>	41	(0.1)	35	2	(0.0)	48
<i>Pediococcus</i>	0	(0.0)	97	1	(0.0)	52
<i>Peptococcus</i>	13	(0.0)	50	1	(0.0)	52
<i>Peptostreptococcus</i>	119	(0.2)	23	10	(0.2)	28
<i>Plesiomonas</i>	1	(0.0)	84	0	(0.0)	60
<i>Porphyromonas</i>	3	(0.0)	70	0	(0.0)	60
<i>Prevotella</i>	21	(0.0)	44	8	(0.1)	32
<i>Propionibacterium</i>	134	(0.3)	22	23	(0.4)	22
<i>Proteus</i>	1376	(2.8)	10	256	(4.6)	9
<i>Providencia</i>	52	(0.1)	31	16	(0.3)	23
<i>Pseudomonas</i>	1806	(3.6)	8	264	(4.7)	8
<i>Rahnella</i>	5	(0.0)	60	0	(0.0)	60
<i>Ralstonia</i>	6	(0.0)	58	0	(0.0)	60
<i>Rhodococcus</i>	3	(0.0)	70	2	(0.0)	48
<i>Salmonella</i>	377	(0.8)	15	6	(0.1)	37
<i>Serratia</i>	520	(1.0)	14	69	(1.2)	16
<i>Shewanella</i>	2	(0.0)	75	0	(0.0)	60
<i>Shigella</i>	4	(0.0)	65	0	(0.0)	60
<i>Sphingobacterium</i>	1	(0.0)	84	0	(0.0)	60
<i>Sphingomonas</i>	29	(0.1)	40	3	(0.1)	44
<i>Staphylococcus</i>	15264	(30.7)	1	1170	(21.0)	1
<i>Staphylococcus aureus</i>	11435	(23.0)	–	604	(10.8)	–
<i>Coagulase-negative staphylococci</i>	3719	(7.5)	–	554	(9.9)	–
<i>Stenotrophomonas</i>	325	(0.7)	18	74	(1.3)	15
<i>Stomatococcus</i>	3	(0.0)	70	1	(0.0)	52
<i>Streptobacillus</i>	1	(0.0)	84	0	(0.0)	60
<i>Streptococcus</i>	8256	(16.6)	4	729	(13.1)	3
<i>Treponema</i>	2	(0.0)	75	0	(0.0)	60
<i>Veillonella</i>	10	(0.0)	53	1	(0.0)	52
<i>Vibrio</i>	1	(0.0)	84	0	(0.0)	60
<i>Weeksella</i>	4	(0.0)	65	0	(0.0)	60
<i>Yersinia</i>	14	(0.0)	49	0	(0.0)	60
Missing	492	–	–	178	–	–
<b>Total reports</b>	<b>50266</b>	<b>100</b>		<b>5752</b>	<b>100</b>	

\* does not correspond to patient episodes as each organism isolation constitutes a separate report

### Age distribution

Both mono- and polymicrobial bacteraemia reports peaked in those aged under 1 year and those aged 65 years and over, although the polymicrobial reports were less marked in those aged under 1 year compared with the monomicrobial bacteraemias (figure 3).

**Figure 3 Age-specific rates of mono- and polymicrobial bacteraemia episodes per 100,000 population: England and Wales, 2000**



\* rates calculated using 2000 mid-year resident population estimates

## Discussion

Analysis of bacteraemia reports for specimens taken in 1999 and 2000 showed that 1 in 10 are linked to one or more other reports of bacterial isolations from the same blood culture. As no specimen identifier was collected through CoSurv, identification of these reports was reliant on finding records in which the patient, specimen type, date and laboratory identifiers matched at least one other record. This process was dependent on relevant fields being completed and details being similarly recorded in separate records. As all but 602 records contained patient demographic information, missing information was not a major problem, although a further 211 had no patient identifiers but were included on the assumption that they were probably true matches (they matched on all other data items). The limitations of the matching process rest more on possible discrepancies in demographic information or specimen dates/types which would result in matches not being identified, therefore diluting our estimate of the proportion of bacteraemias being polymicrobial. Furthermore, the variations in this proportion across the regions also suggest differences in reporting practices for multiple organism isolations, thus potentially further underestimating this figure.

Out of the 11,266 matched specimens, 5329 distinct patient episodes could be discerned, translating to 5% of all bacteraemias in 1999 and 2000 being identified as polymicrobial bloodstream infections. Other studies have reported between 6 and 21% of bloodstream infections to be polymicrobial (1-4), with some finding polymicrobial bacteraemia to be associated with increased mortality (4,5). These estimates support the assertion that our estimate is low, although some of these estimates included *Candida* species, which were not extracted for this review but would potentially have increased our estimate (6).

The significance of the polymicrobial bacteraemias described in this review, for instance the extent to which they are found in immunocompromised patients or later assessed as not being clinically significant, cannot be fully elucidated given the lack of clinical information accompanying these reports. For instance, five of the polymicrobial bacteraemias reviewed here involved *Ochrobactrum anthropi*, an organism subject to ongoing investigations which so far suggest a proportion to be pseudobacteraemias (7). (Please contact Georgia Duckworth – tel: 020 8200 6868, email: [gduckworth@phls.org.uk](mailto:gduckworth@phls.org.uk) if you have had clusters of pseudobacteraemia associated with *O. anthropi* with or without *Stenotrophomonas maltophilia* or other organisms in 2000 or 2001). The limitations of interpreting laboratory data in absence of clinical information is also shown by the observation that a higher proportion of poly- than monomicrobial bacteraemias involved coagulase-negative staphylococci.

## Acknowledgements

These reports would not be possible without the enduring weekly contributions from microbiology colleagues in laboratories across England and Wales, without whom there would be no surveillance data, and the continuing efforts of Regional Epidemiologists in encouraging laboratory reporting. Laboratory reporting is the bedrock of national surveillance. In addition, the support from colleagues within the PHLS, CPHL in particular, is valued in the preparation of the reports.

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## Royal Society of Medicine meeting on the management of burns

The Royal Society of Medicine will be holding a meeting entitled *The management of burns* on 5 February 2002. The programme will include the microbiology of burns, burns and skin grafting, microbial acquisition times, antibiotic pharmacokinetics of burn patients, design and commissioning of burns units, control of MRSA in a burns unit, tissue services for burns units, and positive or negative pressure in burns units. It will be a good opportunity for learning and discussion of the field of burns medicine, and to hear about research and professional experiences across Europe. All relevant meetings have CME and PGEA approval. Clinical case presentations may only be attended by those holding professional qualifications. To find out more about the meeting and the venue please visit the Royal Society of Medicine's website at [www.rsm.ac.uk/pathology](http://www.rsm.ac.uk/pathology); programme details and online registration can also be found here.

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