



# CDR WEEKLY

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## News

Last updated: **16 December 2004**  
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-  [Director for the new European Centre for Disease Prevention and Control named](#)
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### Director for the new European Centre for Disease Prevention and Control named

The management board of the new European Centre for Disease Prevention and Control (ECDC) has named Mrs Zsuzanna Jakab as the Centre's new director (1). Mrs. Jakab is currently Secretary of State (the most senior civil servant at the ministry) in Hungary's Ministry of Health. She has been responsible for overseeing Hungary's implementation of the European Union (EU) policies and laws in her area, administering the spending of EU financial assistance, and managing Hungary's national public health programme. Mrs Jakab worked as a Director in WHO Europe for 11 years before being invited by to join the ministry by the Hungarian government in 2002. Further details about the new director and the set-up work in 2005 are available on the EUROPA website (2).

The post of director of the ECDC was advertised in the EU's Official Journal and in the press in August and early September. Thirty-five applications were received, with candidates coming from a wide range of EU countries. The European Commission was responsible for assessing the applications and, after a rigorous process of interviews and screening, it presented the ECDC Management Board with a shortlist of three candidates.

With the director now in place it is expected that recruitment of other staff will begin early in 2005, so that the Centre can become operational in May 2005. The Centre has a budget of €4.8 million for 2005, so its initial staff will be quite small. The Centre's budget is expected to rise to about €29 million by 2007.

### References

1. EUROPA (portal site of the European Union). Protecting Europe from epidemics: Director named for new EU health agency. (press release) IP/04/1472. EUROPA, 14 December 2004. Available at <http://europa.eu.int/rapid/pressReleasesAction.do?reference=IP/04/1472&format=HTML&aged=0&language=en&guiLanguage=en>>..
2. EUROPA (portal site of the European Union). Protecting Europe from epidemics: Director named for new EU health agency. (press release) IP/04/1472. EUROPA, 14 December 2004. Available at <http://europa.eu.int/rapid/pressReleasesAction.do?reference=IP/04/1472&format=HTML&aged=0&language=en&guiLanguage=en>>..



## Rabies infected area in France and new rabies guidance published

Three cases of rabies have occurred in dogs illegally imported into France in 2004, with implications for British travellers to France. In the most recent incident, in August 2004, the rabid dog is known to have come into contact with other dogs during its infectious period, and it is possible that other dogs may have been infected as a result (1). As a precautionary measure, France has declared the area in which this latest dog travelled during its illness as "rabies infected" from September 2004 up to the end of February 2005. This is an extension of the original period, of three months, as infected dogs may incubate the virus for up to six months. This area of south west France comprises the three Départments of Gironde, Dordogne, and Lot et Garonne.

British individuals who are bitten or have had other types of close exposure to animals while travelling in this part of France, during this period, should be managed as if they had been in a rabies endemic area. They may be offered rabies vaccine or rabies vaccine and immunoglobulin, if indicated, following a risk assessment.

These incidents highlight the fact that people who have had potential rabies exposures should receive an individual assessment to decide on further management. For expert advice in the United Kingdom contact:

### England

- The Health Protection Agency's Centre for Infections Virus Reference Department, tel: 020 8200 4400
- Centre for Infections duty doctor service, tel: 020 8200 6868

### Wales

- National Public Health Service for Wales, tel: 029 20742178, out of hours tel: 029 207 47747 and ask for the medical virologist on call.

### Scotland

- Health Protection Scotland, tel: 0141 300 1100

### Northern Ireland

- Consultant in Communicable Disease Control in the relevant Health Board, or Communicable Disease Surveillance Centre (Northern Ireland) tel: 02890 263765.

### References

1. HPA. Rabid dog in south west France. *Commun Dis Rep CDR Wkly* [serial online] 2004; 14(36): News. Available at <<http://www.hpa.org.uk/cdr/archive04/news/news3604.htm#rabies>>.

### New UK rabies guidance

New publications on rabies have recently been updated and made available. These include:

1. Department of Health, Welsh Office, Scottish Office Department of Health, DHSS (Northern Ireland). Immunisation Against Infectious Disease (chapter 27). London: Department of Health, 1996. Available at <<http://www.dh.gov.uk/assetRoot/04/09/79/03/04097903.pdf>>.
2. HPA. The public health management of a suspected case of human rabies - A standard operating procedure for communication and action. London: Health Protection Agency, 30 November 2004. Available at <[http://www.hpa.org.uk/infections/topics\\_az/rabies/final\\_rabies\\_SOP\\_301004.pdf](http://www.hpa.org.uk/infections/topics_az/rabies/final_rabies_SOP_301004.pdf)>.

**Note:** This is the new communications SOP for how the agencies will work together on managing a human case of rabies. available

3.HPA. Duty doctor joint protocol for rabies queries. London: Health Protection Agency, 2004. Available at: <[http://www.hpa.org.uk/infections/topics\\_az/rabies/rabies\\_duty\\_doc\\_protocol\\_dec\\_04.pdf](http://www.hpa.org.uk/infections/topics_az/rabies/rabies_duty_doc_protocol_dec_04.pdf)>.

**Note:** this duty doctor protocol for rabies queries (mainly post-exposure prophylaxis). This is for use by duty doctors at the HPA's Centre for Infections, but may be helpful for other colleagues in the HPA if they wish to refer to it or adapt it for local use.

4. DEFRA. Defra rabies contingency plan (Draft).. London: Department for Environment, Food and Rural Affairs, 7 December 2004. Available at <[http://www.defra.gov.uk/animalh/rabies/rabies\\_contingency/](http://www.defra.gov.uk/animalh/rabies/rabies_contingency/)>.

5. Department of Health. Memorandum on Rabies – prevention and control. London: Department of Health, February 2000. Available at <<http://www.dh.gov.uk/assetRoot/04/08/06/57/04080657.pdf>>

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## Influenza pandemic preparedness

On the 8 December 2004, the World Health Organization (WHO) issued a further warning statement on the risk of a future influenza pandemic, and urged countries to develop or update their influenza pandemic preparedness plans. <[http://www.who.int/csr/disease/influenza/preparedness2004\\_12\\_08/en/](http://www.who.int/csr/disease/influenza/preparedness2004_12_08/en/)>.

The continuing widespread outbreaks of avian influenza A (H5N1) among poultry in south east Asia remain of particular concern in light of the possibility that they might give rise to an influenza strain with pandemic potential. Although the global spread of the next pandemic cannot be stopped once it has started, preparedness will help to reduce the impact in terms of morbidity and mortality in the population, and may also help to reduce the socioeconomic impact of the pandemic.

An expert meeting on pandemic preparedness planning, convened by WHO, took place on 13-15 December 2004. In coming weeks, WHO will be publishing a national assessment tool to evaluate and focus national preparedness preparations and will be providing guidance on stockpiling antiviral drugs and vaccines. WHO is continuing to expedite work on the development of pandemic virus vaccines and research into the mechanisms of the emergence and spread of influenza pandemics.

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## Agency website makes top one hundred

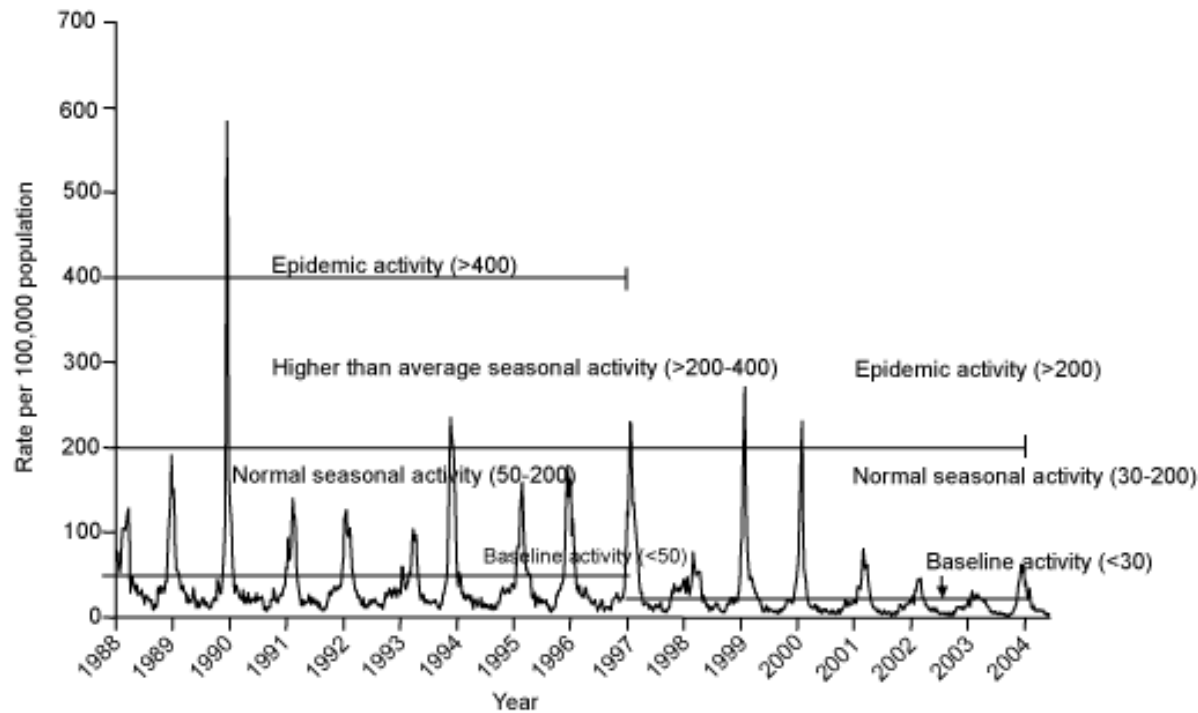
The Health Protection Agency website has been rated one of the 100 most useful websites by readers, contributors, and journalists of The Guardian Online <<http://www.guardian.co.uk/online/story/0,,1374155,00.html>>. The list is broken down into twenty categories, and the Agency site is listed as one of the five most useful sites for health information. The article says of the site "The Health Protection Agency (formerly Public Health Laboratory Service) has masses of information, including all the symptoms, facts and figures you could ever want on infectious diseases...". The information on the other aspects of the Agency's work is currently being expanded, and will include information on radiation from April, following the merger with the National Radiological Protection Board.

The four other sites listed under health are the National Electronic Library for Health <[www.nelh.nhs.uk](http://www.nelh.nhs.uk)>, the Food Standards Agency <[www.food.gov.uk](http://www.food.gov.uk)>, the British Medical Journal <[www.bmj.com](http://www.bmj.com)>, and Avert, the website of an international AIDS charity <[www.avert.org](http://www.avert.org)>

**Erratum: Change in thresholds used to describe levels of influenza activity**

In CDR Weekly volume 14, number 40, 30 September 2004, the published item 'Health Protection Agency (HPA) weekly influenza report – winter 2004/05' contained a graph illustrating the revised thresholds used to describe levels of influenza activity <<http://www.hpa.org.uk/cdr/PDFfiles/2004/cdr4004.pdf>>.

The revised upper threshold was incorrectly labelled as 'epidemic activity >400'. This should have read 'epidemic activity >200' and has been amended accordingly (figure).

**Figure RCGP weekly consultation rate for influenza-like illness (ILI), England, showing revised thresholds for describing levels of influenza activity\***

\*Revised thresholds for forthcoming influenza season (2004/05) shown for previous seasons for illustrative purposes. There has been a secular decline in GP consultation rates for influenza-like illness over recent years (1).

**References**

1. Goddard NL, Kyncl J, Watson JM. 2003. Appropriateness of thresholds currently used to describe influenza activity in England. *Commun Dis Public Health*; 6(3): 238-45.

## Bacteraemia

Last updated: 16 December 2004

Next update due: 20 January 2005

 [Uncommon pathogens involved in bacteraemia, England, Wales and Northern Ireland 2003](#)

 [Polymicrobial bacteraemias, England, Wales, and Northern Ireland: 2003](#)

### Uncommon pathogens involved in bacteraemia, England, Wales and Northern Ireland: 2001-2003

#### Introduction

This review covers bacteraemia reports from laboratories in England, Wales, and Northern Ireland identified from blood samples in 2003. The reports were made to the Health Protection Agency's Centre for Infections under the voluntary reporting scheme, which reports both community-acquired and hospital-acquired bacteraemias. This report covers uncommon pathogens involved in bacteraemia, which we define as organisms from genera with fewer than 50 bacteraemia reports in 2003.

Due to the small number of reports of uncommon pathogens, details such as a recent travel history, use of an intravascular line or a history of recent surgery are not examined further in this report.

#### Results

Seven hundred and seventy four reports were made of uncommon pathogens in 68 genera. Of the uncommon pathogens, *Ochrobactrum* spp, *Agrobacterium* spp, and *Lactobacillus* spp were the most frequently reported. A full list of all genera with fewer than 50 reports in 2003 is given in table 1.

**Table Uncommon pathogens involved in bacteraemia, England, Wales and Northern Ireland: 2001-2003\***

Genus	Reported bacteraemias		
	2003	2002	2001
<i>Abiotrophia</i> spp	11	11	8
<i>Abiotrophia adjacens</i>	5	7	3
<i>Abiotrophia defectiva</i>	3	3	4
<i>Achromobacter</i> spp*	8	5	3
<i>Actinobacillus</i> spp	1	3	5
<i>Actinobacillus ureae</i>	1	–	–
<i>Actinomyces</i> spp	5	6	1
<i>Actinomyces meyeri</i>	1	–	–
<i>Actinomyces naeslundii</i>	2	1	–
<i>Actinomyces odontolyticus</i>	–	–	1
<i>Agrobacterium</i> spp	48	66	55
<i>Agrobacterium radiobacter/tumefaciens</i>	43	52	47
<i>Anaerobiospirillum</i> spp	4	–	1
<i>Arcanobacterium</i> spp	7	5	3
<i>Arcanobacterium haemolyticum</i>	7	5	3
<i>Bifidobacterium</i> spp	4	2	1
<i>Bordetella</i> spp	3	6	1
<i>Bordetella bronchiseptica</i>	–	2	–

<i>Bordetella pertussis</i>	3	2	1
<i>Borrelia</i> spp	2	4	4
<i>Borrelia burgdorferi</i>	2	4	4
<i>Branhamella (Moraxella)</i> spp	6	2	1
<i>Brevibacterium</i> spp	14	11	8
<i>Brevundimonas</i> spp	21	20	16
<i>Brevundimonas diminuta</i>	5	6	4
<i>Brevundimonas vesicularis</i>	16	14	11
<i>Brucella</i> spp	10	22	20
<i>Brucella abortus</i>	3	13	5
<i>Brucella melitensis</i>	1	1	2
<i>Capnocytophaga</i> spp	11	5	8
<i>Capnocytophaga ochracea</i>	1	–	1
<i>Cardiobacterium</i> spp	1	2	1
<i>Cardiobacterium hominis</i>	1	2	1
<i>Cedecea</i> spp	1	1	–
<i>Cedecea davisae</i>	1	1	
<i>Chromobacterium</i> spp	3	6	4
<i>Chromobacterium violaceum</i>	1	5	3
<i>Chryseobacterium</i> spp	31	28	31
<i>Chryseobacterium indologenes</i>	23	21	20
<i>Chryseobacterium meningosepticum</i>	7	7	10
<i>Chryseomonas</i> spp	41	29	29
<i>Chryseomonas luteola</i>	41	28	26
<i>Comamonas</i> spp	29	69	84
<i>Comamonas acidovorans</i>	24	29	24
<i>Comamonas testosteroni</i>	3	3	3
<i>Dermabacter</i> spp	2	2	1
<i>Dermabacter hominis</i>	2	2	1
<i>Edwardsiella</i> spp	2	–	1
<i>Edwardsiella tarda</i>	1	–	1
<i>Eikenella</i> spp	8	5	2
<i>Eikenella corrodens</i>	7	5	2
<i>Empedobacter</i> spp	2	1	1
<i>Empedobacter brevis</i>	2	1	1
<i>Erwinia</i> spp	–	1	1
<i>Erysipelothrix</i> spp	2	1	3
<i>Erysipelothrix rhusiopathiae (insidiosa)</i>	2	1	3
<i>Eubacterium</i> spp	11	12	10
<i>Eubacterium lentum</i>	7	8	5
<i>Flavimonas</i> spp	41	35	17
<i>Flavimonas oryzihabitans</i>	41	35	17
<i>Flavobacterium</i> spp**	13	16	13
<i>Francisella</i> spp	2	1	–
<i>Gardnerella</i> spp	3	2	2
<i>Gardnerella vaginalis</i>	2	2	2
<i>Globicatella</i> spp	–	–	1

<i>Globicatella sanguis</i>	–	–	1
<i>Hafnia</i> spp	34	21	43
<i>Hafnia alvei</i>	32	21	41
<i>Kingella</i> spp	5	4	4
<i>Kingella denitrificans</i>	–	1	–
<i>Kingella kingae</i>	4	1	4
<i>Kluyvera</i> spp	22	22	21
<i>Kluyvera ascorbata</i>	–	1	1
<i>Lactobacillus</i> spp	46	30	26
<i>Lactobacillus acidophilus</i>	–	2	4
<i>Lactobacillus rhamnosus</i>	5	1	2
<i>Lactococcus</i> spp	29	27	24
<i>Lactococcus cremoris</i>	10	13	10
<i>Lactococcus lactis</i>	12	8	8
<i>Leclercia</i> spp	2	1	1
<i>Leclercia adecarboxylata</i>	2	1	1
<i>Legionella</i> spp	–	3	1
<i>Leptospira</i> spp	–	1	1
<i>Leptospira icterohaemorrhagia</i>	–	1	–
<i>Leptotrichia</i> spp	–	3	2
<i>Leptotrichia buccalis</i>		2	2
<i>Leuconostoc</i> spp	27	15	24
<i>Mobiluncus</i> spp	1	–	–
<i>Myroides</i> spp	–	2	–
<i>Myroides odoratus</i>	–	2	–
<i>Nocardia</i> spp	2	2	3
<i>Nocardia asteroides</i>	–	1	–
<i>Nocardia otitidiscaviarum (caviae)</i>	–	–	2
<i>Ochrobactrum</i> spp	50	52	42
<i>Ochrobactrum anthropi</i>	49	50	39
<i>Oerskovia</i> spp	–	–	1
<i>Oligella</i> spp	1	2	1
<i>Oligella ureolytica</i>	1	1	–
<i>Oligella urethralis</i>	–	–	1
<i>Pediococcus</i> spp	4	2	1
<i>Peptococcus</i> spp	17	12	17
<i>Porphyromonas</i> spp	3	1	2
<i>Porphyromonas asaccharolytica</i>	3	1	1
<i>Rahnella</i> spp	1	7	3
<i>Ralstonia</i> spp	10	10	8
<i>Ralstonia pickettii</i>	10	10	8
<i>Rhodococcus</i> spp	9	9	6
<i>Rhodococcus equi (corynebacterium equi)</i>	–	–	1
<i>Roseomonas</i> spp	1	–	2
<i>Rothia</i> spp	1	2	–
<i>Rothia dentocariosia</i>	1	2	–
<i>Shewanella</i> spp	7	3	3

<i>Shewanella putrefaciens</i> ( <i>Pseudomonas</i> )	7	3	3
<i>Shigella</i> spp	1	1	5
<i>Shigella flexneri</i>	–	–	3
<i>Shigella sonnei</i>	1	–	1
<i>Sphingobacterium</i> spp	3	4	2
<i>Sphingobacterium multivorum</i>	2	1	1
<i>Sphingobacterium spiritivorum</i>	1	1	–
<i>Sphingomonas</i> spp	38	25	29
<i>Sphingomonas paucimobilis</i>	35	24	28
<i>Stomatococcus</i> spp	8	5	–
<i>Stomatococcus mucilaginosus</i>	8	5	–
<i>Streptobacillus</i> spp	1	1	2
<i>Streptobacillus moniliformis</i>	1	1	1
<i>Tropheryma</i> spp	–	–	1
<i>Veillonella</i> spp	14	14	10
<i>Vibrio</i> spp	5	4	4
<i>Vibrio alginolyticus</i>	2	1	–
<i>Vibrio fluvialis</i>	–	1	–
<i>Vibrio hollisae</i>	–	1	–
<i>Vibrio metschnikovii</i>	1	–	1
<i>Vibrio parahaemolyticus</i>	1	–	–
<i>Weeksella</i> spp	2	3	1
<i>Weeksella virosa</i>	–	3	1
<i>Yersinia</i> spp	13	16	9
<i>Yersinia enterocolitica</i>	8	14	7
<i>Yersinia frederiksenii</i>	1	–	–
<i>Yersinia intermedia</i>	–	–	1
<i>Yersinia pseudotuberculosis</i>	2	1	–
<i>Yersinia rohdei</i>	–	–	1

\*Some species are now part of the *Chrysobacterium*, *Myroides* and *Sphingobacterium* genera.

For some organisms it was apparent that serum samples for antibody and antigen detection had been recorded as blood samples. For example, there were 47 reports of *Borrelia bergdorferi* in 2003, but only two of these were recorded as having been identified by blood culture. All organisms that had a 'parent specimen type' of blood that were recorded as having been identified by antibody- or antigen detection alone were removed from this report

## Discussion

The purpose of this review is to cover the unusual bacterial genera that have not been discussed in the other bacteraemia reports in the CDR Weekly this year. Although these bacteria only account for approximately 1%-2% of the total bacteraemia reports, they can be associated with important clinical consequences. For example, some genera, such as *Cardiobacterium* spp, *Eikenella* spp, and *Kingella* spp can be associated with endocarditis (1).

These reports should reflect clinically significant disease. It can be difficult, however, to distinguish true clinical bacteraemias and contamination of cultures can lead to the diagnosis of a pseudobacteraemia (2, 3). For example, *Ralstonia pickettii* is a rare bacteraemia (4), and this organism has previously been identified as a source of pseudobacteraemias, suggesting further investigation may be recommended if *R. pickettii* is identified in blood culture (5). In 2003 there were ten reports of bacteraemias due to *R. pickettii*. Molecular tools have improved the detection of the more unusual bacteria from blood and such methods have allowed the identification of new agents of severe disease such as endocarditis, although the nature of these methods requires that great care must be taken to avoid reporting contaminants (1, 5, 6).

As noted above, a number of reports for certain organisms referred to antibody detection, rather than blood culture. This is of concern as it may lead to an exaggeration of the number of bacteraemia reports. Reports of bacteraemias based on antibody- or antigen detection alone in 2003 have been adjusted in this report and we intend to further investigate this in the near future.

This is the third time that these uncommon genera have been reported in CDR Weekly and feedback is welcome. If confirmation of unusual bacterial pathogens is required, isolates can be sent to the Health Protection Agency's Laboratory of Healthcare Associated Hospital Infection, Specialist and Reference Microbiology Division, Colindale, London, NW9 5DF.

### Acknowledgments

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. Please send any comments/feedback to Andrew Pearson <[andrew.pearson@hpa.org.uk](mailto:andrew.pearson@hpa.org.uk)> or Amy Glasswell <[amy.glasswell@hpa.org.uk](mailto:amy.glasswell@hpa.org.uk)>. In addition, the support from colleagues within the Health Protection Agency, Centre for Infections, is valued in the preparation of the reports. These contributions are greatly appreciated.

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## Polymicrobial bacteraemias, England, Wales, and Northern Ireland: 2003



### Key points:

- In 2003, from 82,852 records, 12,514 bacteraemia reports were matched to at least one other report extracted from the voluntary reporting system.
- Of the 76,188 patient episodes, 5850 (8%) were polymicrobial bacteraemia episodes; the remaining 70,338 were identified as monomicrobial bacteraemias.
- *Enterococcus* spp, *Klebsiella* spp, *Enterobacter* spp, *Proteus* spp, and *Acinetobacter* spp were the predominant genera associated with polymicrobial bacteraemias.

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# Polymicrobial bacteraemias, England, Wales, and Northern Ireland: 2003

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- Of the 76,188 patient episodes, 5850 (8%) were polymicrobial bacteraemia episodes; the remaining 70,338 were identified as monomicrobial bacteraemias
- *Enterococcus* spp, *Klebsiella* spp, *Enterobacter* spp, *Proteus* spp, and *Acinetobacter* spp were the predominant genera associated with polymicrobial bacteraemias.

## Introduction

This report covers all data on routine laboratory reporting of polymicrobial bacteraemias in England, Wales, and Northern Ireland in 2003. Polymicrobial bacteraemia is defined as the isolation of multiple organisms from the same blood culture.

## Methods

Data from the voluntary reporting scheme were extracted from LabBase2\*. Multiple isolates from one blood culture are not linked on the database system, and were established by identifying records that matched on the fields: 'specimen date', 'laboratory', 'date of birth', 'gender', and 'soundex'†. A total of 83,301 bacteraemia records were extracted from the database. Fungi were not included for this analysis. Duplicates (449), with the same bacterial species were removed from the database, although we allowed inclusion of both cases where one indicated, eg, *Acinetobacter* spp and the other *Acinetobacter baumannii*, due to lack of speciation (15% of polymicrobial bacteraemias were not speciated past the genus level). A final dataset of 82,852 records were used in this report.

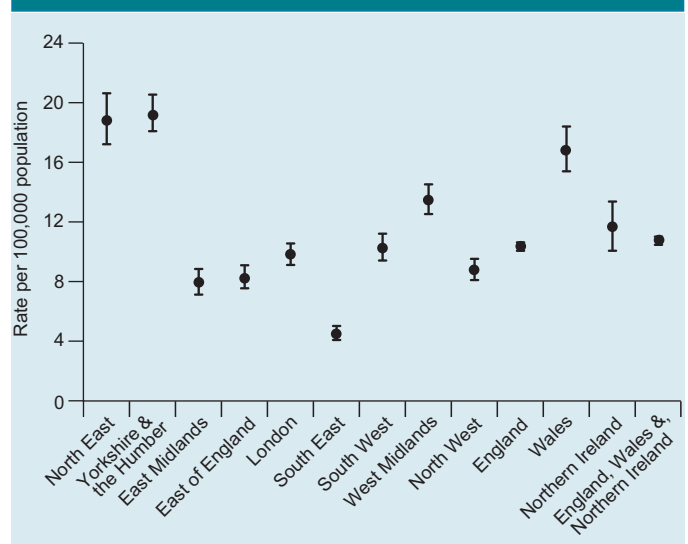
Bacteraemia rates were calculated using 2003 resident population denominators for England, Wales, and Northern Ireland. Regional analysis was performed with reference to the English boundaries introduced in April 2002. Confidence intervals were calculated using commercial software‡.

## Results

Of 82,852 records, there were 12,514 bacteraemia reports (15%) that were identified as matching at least one other report. These were grouped further to obtain the number of patient episodes of bacteraemias. Of the 76,188 patient episodes, 5850 were polymicrobial (PMB) and the remaining 70,338 were held as monomicrobial (MMB).

There was variation of PMB reports among the different English regions, Wales and Northern Ireland (figure 1). The highest rate of PMB reported in England was in Yorkshire and the Humber (19.3 per 100,000 population), followed closely by the North East region

**Figure 1** Regional distribution of episodes of polymicrobial bacteraemia rates, England, Wales, and Northern Ireland: 2003\*



\* Rates calculated using 2003 mid-year resident population estimates

(18.9/100,000). The lowest reporting rate of PMB was in the South East region (4.5/100,000). The rate of PMB in Wales and Northern Ireland was 16.9 and 11.6/100,000 respectively. The overall rate of PMB for England, Wales, and Northern Ireland was 10.7/100,000.

Two microorganisms were isolated in 5139 polymicrobial episodes (88%), three microorganisms were isolated in 618 episodes (11%), four microorganisms were isolated in 84 episodes (1%), five

\*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 Health Protection Agency's Centre for Infections.

†Soundex is a non-unique alphanumeric coding of the patients surname. When this is combined with date of birth and gender, this allows for duplicate reports of the same individual to be identified without the use of patient names.

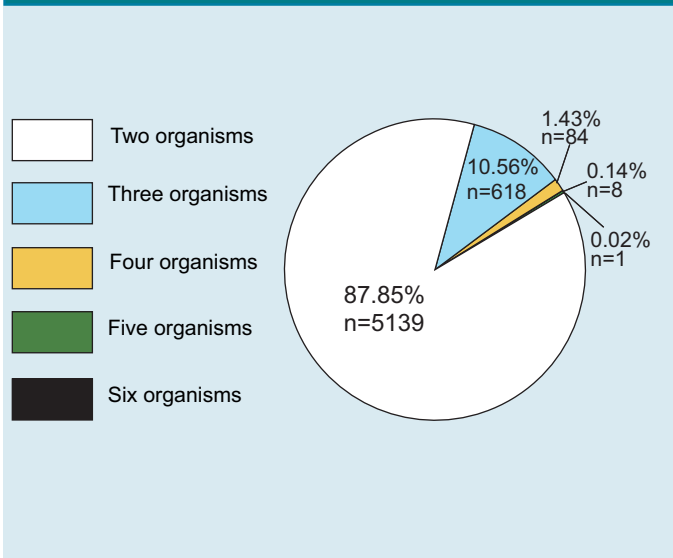
‡Stata Statistical software: release 8.2. College Station, Texas, Stata Corporation, 2001.

**Table 1 Organisms reported in monomicrobial and polymicrobial bacteraemias, England, Wales, and Northern Ireland: 2003**

Organism	Monomicrobial bacteraemias			Polymicrobial bacteraemias			Organism	Monomicrobial bacteraemias			Polymicrobial bacteraemias		
	Number of reports	(%)	Rank*	Number of reports	(%)	Rank*		Number of reports	(%)	Rank*	Number of reports	(%)	Rank*
<i>Abiotrophia</i>	7	0.01	66	4	0.03	50	<i>Lactobacillus</i>	37	0.05	42	8	0.06	42
<i>Achromobacter</i>	6	0.01	67	2	0.02	56	<i>Lactococcus</i>	21	0.03	49	8	0.06	42
<i>Acinetobacter</i>	813	1.16	11	273	2.18	10	<i>Leclercia</i>	1	–	87	1	0.01	63
<i>Actinobacillus</i>	–	–	–	1	0.01	63	<i>Legionella</i>	2	–	79	–	–	–
<i>Actinomyces</i>	4	0.01	72	1	0.01	63	<i>Leptospira</i>	9	0.01	60	–	–	–
<i>Aerococcus</i>	57	0.08	34	20	0.16	32	<i>Leuconostoc</i>	16	0.02	53	11	0.09	35
<i>Aeromonas</i>	85	0.12	27	26	0.21	25	<i>Listeria</i>	168	0.24	24	16	0.13	33
<i>Agrobacterium</i>	37	0.05	42	11	0.09	35	<i>Micrococcus</i>	217	0.31	23	26	0.21	25
<i>Alcaligenes</i>	82	0.12	28	22	0.18	30	<i>Mobiluncus</i>	1	–	87	–	–	–
<i>Anaerobiospirillum</i>	4	0.01	72	–	–	–	<i>Moraxella</i>	95	0.14	26	21	0.17	31
<i>Arcanobacterium</i>	6	0.01	67	1	0.01	63	<i>Morganella</i>	306	0.44	18	103	0.82	18
<i>Bacillus</i>	256	0.36	21	71	0.57	19	<i>Mycobacterium</i>	51	0.07	37	7	0.06	46
<i>Bacteroides</i>	886	1.26	9	186	1.49	11	<i>Neisseria</i>	46	0.07	38	25	0.20	27
<i>Bifidobacterium</i>	3	–	75	1	0.01	63	<i>Nocardia</i>	2	–	79	–	–	–
<i>Bordetella</i>	9	0.01	60	–	–	–	<i>Ochrobactrum</i>	39	0.06	41	11	0.09	35
<i>Borrelia</i>	46	0.07	38	–	–	–	<i>Oligella</i>	–	–	–	1	0.01	63
<i>Branhamella</i>	6	0.01	67	–	–	–	<i>Pantoea</i>	80	0.11	29	34	0.27	22
<i>Brevibacterium</i>	13	0.02	56	2	0.02	56	<i>Pasteurella</i>	61	0.09	31	5	0.04	48
<i>Brevundimonas</i>	18	0.03	52	2	0.02	56	<i>Pediococcus</i>	3	–	75	1	0.01	63
<i>Brucella</i>	15	0.02	54	–	–	–	<i>Peptococcus</i>	10	0.01	58	7	0.01	46
<i>Burkholderia</i>	45	0.06	40	8	0.06	42	<i>Peptostreptococcus</i>	112	0.16	25	35	0.28	21
<i>Campylobacter</i>	61	0.09	31	3	0.02	52	<i>Porphyromonas</i>	3	–	75	–	–	–
<i>Capnocytophaga</i>	10	0.01	58	1	0.01	63	<i>Prevotella</i>	52	0.07	35	9	0.07	39
<i>Cardiobacterium</i>	1	–	87	–	–	–	<i>Propionibacterium</i>	293	0.42	19	40	0.32	20
<i>Cedecea</i>	–	–	–	1	0.01	63	<i>Proteus</i> spp	277	0.39	8	121	0.97	8
<i>Chromobacterium</i>	2	–	79	1	0.01	63	<i>Proteus mirabilis</i>	1268	1.80	–	332	2.65	–
<i>Chryseobacterium</i>	22	0.03	48	9	0.07	39	<i>Providencia</i>	60	0.09	33	28	0.22	24
<i>Chryseomonas</i>	30	0.04	45	11	0.09	35	<i>Pseudomonas</i> spp	552	0.78	6	162	1.29	6
<i>Citrobacter</i>	450	0.64	14	185	1.48	12	<i>Pseudomonas</i>	1957	2.78	–	402	3.21	–
<i>Clostridium</i>	442	0.63	15	165	1.32	13	<i>aeruginosa</i>	–	–	–	–	–	–
Coliform	285	0.41	20	356	2.84	9	<i>Rahnella</i>	1	–	87	–	–	–
<i>Comamonas</i>	21	0.03	49	8	0.06	42	<i>Ralstonia</i>	9	0.01	60	1	0.01	63
<i>Corynebacterium</i>	381	0.54	17	116	0.93	16	<i>Rhodococcus</i>	9	0.01	60	–	–	–
<i>Dermabacter</i>	2	–	79	–	–	–	<i>Roseomonas</i>	1	–	87	–	–	–
Diphtheroids	239	0.34	22	111	0.89	17	<i>Rothia</i>	1	–	87	–	–	–
<i>Edwardsiella</i>	2	–	79	–	–	–	<i>Salmonella</i>	431	0.61	16	3	0.02	52
<i>Eikenella</i>	6	0.01	67	2	0.02	56	<i>Serratia</i>	836	1.19	10	156	1.25	14
<i>Empedobacter</i>	1	–	87	1	0.01	63	<i>Shewanella</i>	2	–	79	4	0.03	50
<i>Enterobacter</i>	462	0.66	7	129	1.03	7	<i>Shigella</i>	1	–	87	–	–	–
<i>Enterobacter cloacae</i>	1389	1.97	–	377	3.01	–	<i>Sphingobacterium</i>	2	–	79	1	0.01	63
<i>Enterococcus</i> spp	1569	2.23	4	802	6.41	2	<i>Sphingomonas</i>	35	0.05	44	2	0.02	56
<i>Enterococcus faecalis</i>	1870	2.66	–	766	6.12	–	<i>Staphylococcus</i> spp	144	0.20	1	54	0.43	1
<i>Enterococcus faecium</i>	731	1.04	–	277	2.21	–	<i>Staphylococcus</i>	14,058	19.99	–	1322	10.56	–
<i>Erysipelothrix</i>	1	–	87	1	0.01	63	<i>aureus</i>	–	–	–	–	–	–
<i>Escherichia</i> spp	22	0.03	2	4	0.03	4	Coagulase-negative	6196	8.81	–	1244	9.94	–
<i>Escherichia coli</i>	14,945	21.25	–	1415	11.31	–	<i>Staphylococcus</i>	–	–	–	–	–	–
<i>Eubacterium</i>	8	0.01	64	3	0.02	52	<i>Staphylococcus</i>	1479	2.10	–	197	1.57	–
<i>Flavimonas</i>	26	0.04	46	15	0.12	34	<i>epidermidis</i>	–	–	–	–	–	–
<i>Flavobacterium</i>	8	0.01	64	5	0.04	48	<i>Stenotrophomonas</i>	527	0.75	13	125	1.00	15
<i>Francisella</i>	1	–	87	1	0.01	63	<i>Stomatococcus</i>	6	0.01	67	2	0.02	56
<i>Fusobacterium</i>	65	0.09	30	25	0.20	27	<i>Streptobacillus</i>	1	–	87	–	–	–
<i>Gardnerella</i>	2	–	79	1	0.01	63	<i>Streptococcus</i> spp	3730	5.30	3	1170	9.35	3
<i>Gemella</i>	52	0.07	35	23	0.18	29	Strep Group A	1219	1.73	–	172	1.37	–
<i>Haemophilus</i>	563	0.80	12	29	0.23	23	Strep Group B	936	1.33	–	136	1.09	–
<i>Hafnia</i>	25	0.04	47	9	0.07	39	<i>Streptococcus</i>	5307	7.54	–	141	1.13	–
<i>Kingella</i>	4	0.01	72	1	0.01	63	<i>pneumoniae</i>	–	–	–	–	–	–
<i>Klebsiella</i> spp	1416	2.01	5	403	3.22	5	<i>Veillonella</i> spp	13	0.02	56	1	0.01	63
<i>Klebsiella pneumoniae</i>	2106	2.99	–	475	3.80	–	<i>Vibrio</i>	3	–	75	2	0.02	56
<i>Kluyvera</i>	19	0.03	51	3	0.02	52	<i>Weeksella</i>	1	–	87	1	0.01	63
							<i>Yersinia</i>	14	0.02	55	1	0.01	63
<b>Total =</b>	<b>70,338</b>	<b>100</b>		<b>12,514</b>	<b>100</b>								

\* Does not correspond to patient episodes, as each organism isolation constitutes a separate report. Ranking of organisms are at the genus level.

**Figure 2** Number of organisms involved in polymicrobial bacteraemia episodes

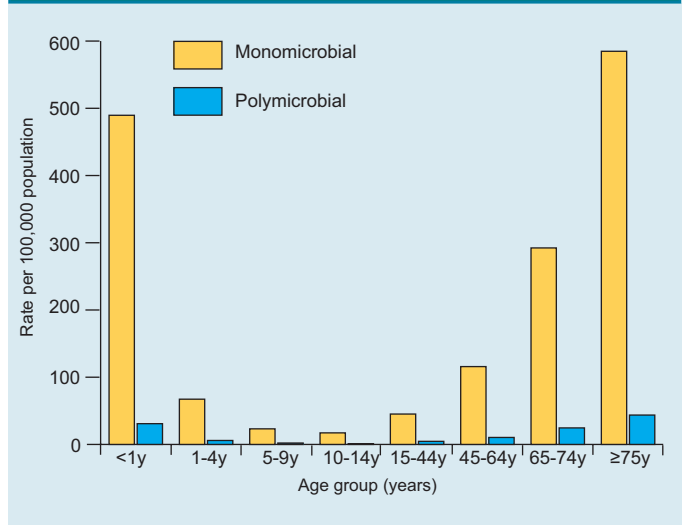


microorganisms were isolated in eight episodes (0.1%) and there were six microorganisms isolated in one episode (0.02%) (figure 2). The episode with six microorganisms cultured consisted of two *Acinetobacter* species, a *Pantoea* species, a coagulase-negative staphylococcus (CNS), a *Stenotrophomonas* spp and a *Streptococcus* spp isolate. Of the patient episodes where five isolates were cultured, seven of the eight episodes had two organisms of the same genus, namely, either *Clostridium*, *Enterococcus*, *Pseudomonas*, *Staphylococcus*, *Acinetobacter*, or *Klebsiella* species.

There were 99 different organisms at the genus level and 341 different organisms at the species level identified. Unspecified organisms (coliforms and diphtheroids) comprised 1.2% of all bacteraemias reported in 2003. Table 1 describes the organisms at the genus level, with major organism groups which had more than 1000 reports listed at the species level. Overall, *Staphylococcus* as a group constituted the leading pathogen responsible for 30% of bacteraemias in 2003. This was followed by *Enterococcus* spp for PMB and *Escherichia* spp for MMB. At the species level, *Escherichia coli* constituted the leading pathogen responsible for 21% of all MMB and 11% of all PMB. *S. aureus* (20.0% MMB and 10.6% PMB) and CNS (8.8% MMB and 9.9% PMB) followed as the second and third most common pathogen to cause both MMB and PMB respectively.

The percentage of *Enterococcus* spp and *Enterobacter* spp organisms in PMB were higher than those in MMB. This was reflected at the species level, where there were higher proportions of *Enterobacter cloacae* (3%), *Enterococcus faecalis* (6.1%), and *Enterococcus faecium* (2.2%). Approximately 40% of bacteraemia organisms reported in 2003 were found more commonly in polymicrobial than monomicrobial bacteraemias. Some genera that featured more strongly in polymicrobials were the *Enterococcus* spp (14% PMB, 6% MMB), *Klebsiella* spp (7% PMB, 5% MMB), *Enterobacter* spp (4% PMB, 3% MMB), *Proteus* spp (4% PMB, 2% MMB), and *Acinetobacter* spp (2% PMB, 1% MMB). The

**Figure 3** Age-specific rates of mono and polymicrobial bacteraemia episodes, England, Wales, and Northern Ireland: 2003



rates in these polymicrobial and monomicrobials bacteraemias were significantly different.

Patients with bacteraemias (both poly- and monomicrobial bacteraemias) were predominantly in the older age groups, with the highest number of episodes and proportion in the 74 years and over age group (24,201 patient episodes, 584/100000 with MMB and 1807 patient episodes, 44/100,000 with PMB episodes) (figure 3). The median age for MMB was 68 years and for PMB 65 years, with the older age groups with higher rates of bacteraemias. The proportion of patients in each age-group was similar for poly- and monomicrobial bacteraemias with the ages ranging from under 1 year to 103 years (mean = 60 ±25).

### Discussion

Previous studies have found that polymicrobial bacteraemias have been associated with poorer outcome for the patient than those with monomicrobial bacteraemias (1,2). Polymicrobial bacteraemias have been reported to be associated with higher mortality rates than monomicrobial infections (2). In 2001 polymicrobials accounted for 14% of bacteraemias with 4212 patient episodes in England and Wales (4). In 2002, this was 12.6% with 4365 patient episodes (3). The percentage of polymicrobials in England, Wales, and Northern Ireland was 15% with 5850 patient episodes in 2003. There appears to be an increase in polymicrobial bacteraemias. Caution should be taken in comparing as data from Northern Ireland was not collected in 2001 and the two previous years included the presence of *Candida* (1.6% of total infections per year for both years), which is a fungal infection. This increase may also be as the result of increased ascertainment of reports by laboratories over the three years.

This report highlights some major organisms that are found in polymicrobial bloodstream infections for example, *E. coli*, *S. aureus*, and *Enterococcus faecalis*. *Enterobacteriaceae*, *Pseudomonas* species, streptococci other than group A and pneumococci have been detected in

polymicrobial bacteraemia in a previous study (5). In this report, *S. pneumoniae* featured strongly in MMB (8%) and poorly in PMB (1%). The high proportion of *E. coli* bacteraemia may be from an excess of urinary tract infection (where it was likely to be the sole pathogen) or an excess of intra-abdominal sepsis (where it was likely to be mixed, often with *Enterococcus* spp) (6) .

Previous studies (1) have reported higher rates of polymicrobials in geriatric populations (*ie*, aged 65 years and over), as well as in infants (*ie*, those aged under 1 year). This was observed in this patient group.

An increase in the detection of polymicrobial bacteraemia may have important therapeutic as well as patient management implications.

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