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Pre-admission benzylpenicillin for suspected meningococcal disease: other antibiotics not needed in the GP bag

In the 1995 PHLS guidance on management of meningococcal disease, an injection of benzylpenicillin was recommended before admission to hospital in cases of suspected meningococcal disease (1). An injection of chloramphenicol was suggested when there was a history of anaphylaxis to penicillin. Cephalosporins were not recommended in this circumstance because of the potential for cross-allergy with penicillin (2). Recent recommendations in the British National Formulary and the Drug and Therapeutics Bulletin (3,4) have suggested cefotaxime as an alternative to benzylpenicillin in patients who are allergic to penicillin, or chloramphenicol as an alternative in those with a history of anaphylaxis to penicillin. Neither cefotaxime nor chloramphenicol are suggested as emergency drugs for other purposes (4).

The PHLS Meningococcus Forum confirms its recommendation that an injection of benzylpenicillin should be given urgently to cases of suspected meningococcal disease (5). Anaphylactic reactions after giving penicillin are rare, occurring in 1 in 7,000 to 1 in 25,000 of treated patients (6). Anaphylaxis is more likely if there is a history of **immediate** allergic reactions (such as difficulty breathing, collapse, generalised itchy rash) after previous penicillin administration (6,7). In these patients, giving penicillin or an alternative antibiotic may carry an increased risk of anaphylactic reactions, and we consider that **urgent transfer to hospital is the most important measure**. Systemic antibiotic treatment should be started immediately on arrival in hospital.

The National Institute of Clinical Excellence is to review the management of medical emergencies in primary care (8). In the meantime, the PHLS Meningococcus Forum considers that general practitioners do not need to carry an additional antibiotic in their emergency bag.

1. PHLS Meningococcal Infections Working Group and Public Health Environmental Group. Control of meningococcal disease: guidance for consultants in communicable disease control. *Commun Dis Rep CDR Rev* 1995; **5**: R189-99.

2. Anderson JA. Cross-sensitivity to cephalosporins in patients allergic to penicillin. *Pediatr Infect Dis* 1986; **5**:557-61.

3. Consumers Association. Drugs for the doctor's bag revisited. *Drug and Therapeutics Bulletin* 2000; **38**: 65-8.

4. Joint Formulary Committee. *British National Formulary* 2000; **40**: 254.

5. Cartwright K, Strang J, Gossain S, Begg N. Early treatment of meningococcal disease. *BMJ* 1992; **305**: 774.

6. Idsoe O, Guthe T, Willcox RR, de Weck AL. Nature and extent of penicillin side reactions, with particular reference to fatalities from anaphylactic shock. *Bull World Health Organ* 1968; **38**:159-88.

7. Kerr JR. Penicillin allergy: a study of incidence as reported by patients. *Br J Clin Pract* 1994; **48**: 5-7.

8. National Institute for Clinical Excellence. *NICE welcomes new work programme from the Department of Health. NICE 2000/044* [online]. London, NICE, 16 November 2000 [cited 14 February 2001]. Available from: <www.nice.org.uk/article.asp?a=12267>

Staphylococcus aureus bacteraemia: England and Wales January to December 2000

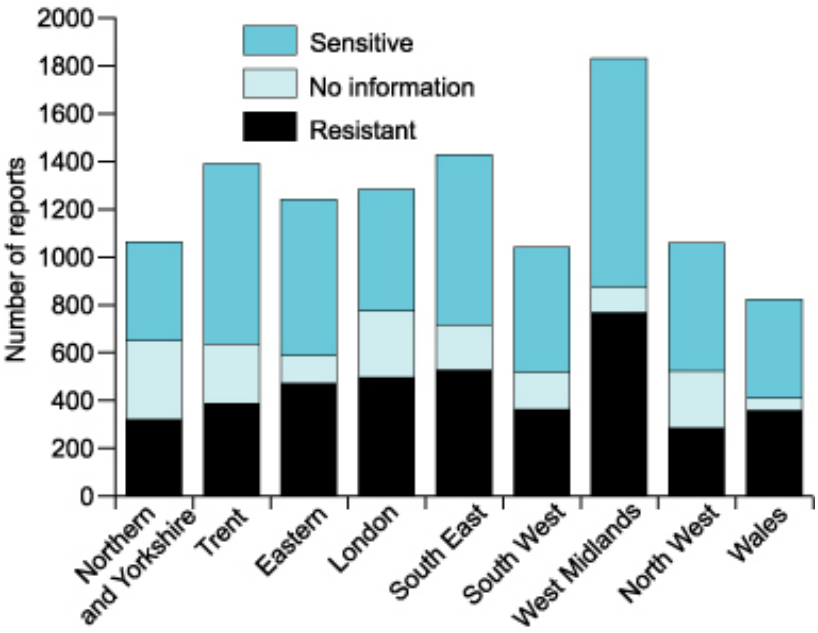
Laboratories in England and Wales reported 11,162 *Staphylococcus aureus* bacteraemias to PHLS Communicable Disease Surveillance Centre during 2000 (table), an increase of 1056 reports on 1999 (1), an annual reporting rate of 21 per 100,000 population (figure 1). The annual rate ranged from 34 per 100,000 in West Midlands region, an increase from 26.6 per 100,000 in 1999, to 16 per 100,000 in the North West. There have been reporting difficulties during 2000 in the North West which may account for the fall in the reporting rate in that region from 1999. Elsewhere, reporting rates increased (by 3 to 7 per 100,000 between 1999 and 2000 in Trent, London, the South East, and Wales) or were unchanged (South West, Eastern, and Northern and Yorkshire regions).

Table Methicillin resistance data in *Staphylococcus aureus* bacteraemia reports: English health regions and Wales, 2000

	Resistant (%) a	Sensitive (%) b	No information (%) c	Total d
North and Yorkshire	322 (30)	413 (39)	328 (31)	1063
Trent	388 (28)	754 (54)	248 (18)	1390
Eastern	473 (38)	653 (53)	115 (9)	1241
London	496 (39)	509 (40)	278 (22)	1283
South East	527 (37)	711 (50)	191 (13)	1429
South West	364 (35)	524 (50)	154 (15)	1042
West Midlands	769 (42)	957 (52)	105 (6)	1831
North West	286 (27)	535 (51)	238 (22)	1059
Wales	359 (44)	414 (50)	51 (6)	824
England and Wales	**3984 (36)**	**5470 (49)**	**1708 (15)**	**11162**

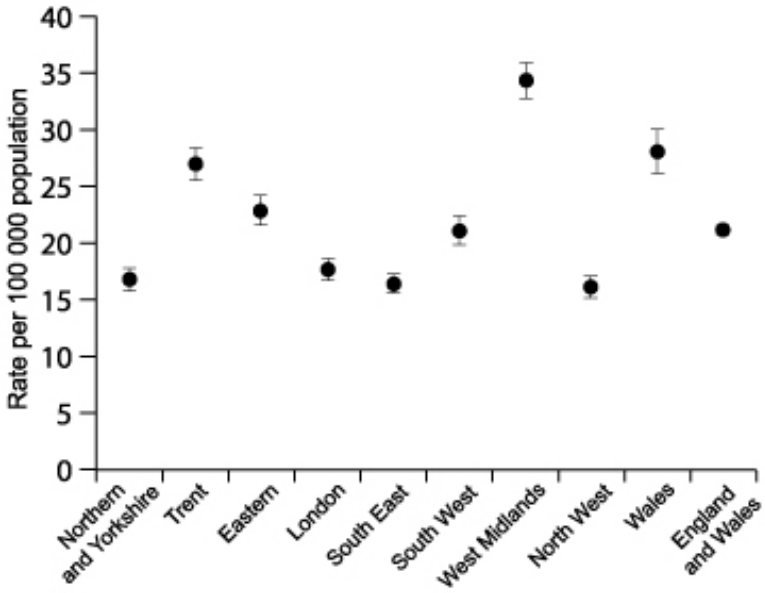
* provisional data; a+b+c=d

Figure 1 *Staphylococcus aureus* bacteraemia reports and methicillin susceptibility data: English health regions and Wales, 2000*



There were considerable improvements in reducing the number of reports lacking information on methicillin susceptibility between 1999 and 2000. The largest was seen in the West Midlands (table, figure 2) where 24% of reports lacked this information in 1999 (1), compared to only 6% in 2000. The proportion fell from 9% at the beginning of the year to 1% in the last quarter. Northern and Yorkshire had the highest numbers of reports missing methicillin susceptibility information in both years, although there was a small improvement from 38% in 1999 to 31% in 2000. The overall figure for 2000 masks a consistent improvement in Northern and Yorkshire's figures throughout the year, from 37% missing this information in the first quarter to 27% in the last. Reporting difficulties in the North West may account for the rise in reports lacking methicillin susceptibility from 13% in 1999 to 22% in 2000. Several regions had similar levels in 2000 compared to 1999: London (22% *vs* 20%), Trent (18% *vs* 15%), South East (13% *vs* 15%) and South West (15% *vs* 12%). Wales and Eastern region maintained their strong position, although Eastern lost some ground in 2000 (6% and 9% of reports respectively lacked this information in 2000, compared to 5% and 2% in 1999).

Figure 2 *Staphylococcus aureus* bacteraemia reporting rates* (95% confidence intervals) per 100,000 population: English health regions and Wales, 2000**

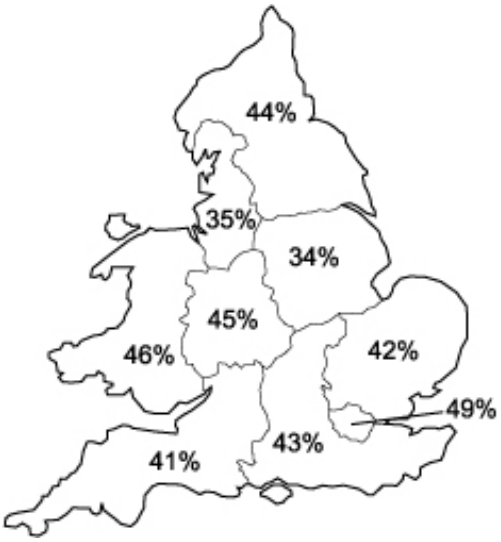


* *S. aureus* bacteraemia reporting rate = total *S. aureus* reports (column d in table) divided by the regional/Welsh population (from census data) x 100,000; ** provisional data

Nine thousand four hundred and fifty-four (85%) of the 11,162 *Staphylococcus aureus* bacteraemia reports in 2000 included information on the methicillin susceptibility of the isolate. This is an increase of 1020 reports on 1999, an increase of 2%. Most of the increase in reports of methicillin sensitive *Staphylococcus aureus* (MSSA) and methicillin resistant *Staphylococcus aureus* (MRSA) in 2000 is due to the increased number of reports from the West Midlands: an increase of 644 reports over 1999, evenly distributed between MSSA and MRSA (318 and 326 respectively). The next biggest increases in these reports were seen in the South East (253) and Trent (190), although the majority of the increase in these regions was due to reported MRSA (197 and 113 respectively). The only region to show a fall in the MSSA and MRSA reports was Eastern Region, with 41 fewer reports in 2000 compared to 1999, due to a drop in MSSA reports. London, the South West, and Northern and Yorkshire had increased numbers of MRSA reports in 2000 compared with 1999 (96, 70, and 64), against a backdrop of fewer MSSA reports (falls of 9, 67, and 4 respectively).

Methicillin resistance was reported in 3984 (42%) of 9454 *Staphylococcus aureus* isolates for which methicillin susceptibility information was available, an increase of 5% over the 1999 figures (table, figure 3). Methicillin resistance ranged from 34 % in Trent to 49% in London. The biggest increases in methicillin resistance were seen in the South East and South West, where the proportion resistant rose by 9% and 8% respectively on 1999 figures. The increase in the South East may reflect the improved reporting rate in 2000. Increases in the other regions and Wales ranged between 2 and 6%.

Figure 3 Methicillin resistance data in *S. aureus* bacteraemia reports: English health regions and Wales, 2000*, MRSA as a percentage of isolates whose susceptibilities were reported**



* provisional data; ** MRSA as a percentage of isolates whose susceptibilities were reported = reported methicillin resistant (column a in table) divided by the sum of methicillin resistant (a) and methicillin sensitive (b) isolates reported x 100

In conclusion, 2000 marked yet another annual increase in the proportion of *Staphylococcus aureus* bacteraemias caused by MRSA. Some regions have made good progress in reducing the numbers of reports lacking information on the isolate's methicillin susceptibility and in improving overall reporting rates. In the meanwhile, it is important to audit the completeness of reporting in laboratories in preparation for the advent of mandatory *Staphylococcus aureus* bacteraemia reporting in April 2001.

These figures are provisional and based on the specimen date. Figures for the individual quarters of 2000 will be updated and placed on the PHLS website at <www.phls.co.uk/facts/bacteraemia/stap.htm>. These will have changed since the original quarterly reports, due to delayed reports and corrections.

1. CDSC. Staphylococcus aureus bacteraemia: England and Wales, January to December 1999. *Commun Dis Rep CDR Weekly* 2000; **10** (3): 23-4.

Surveillance of waterborne disease and water quality: July to December 2000

This report is part of a twice-yearly series on the surveillance of waterborne disease and water quality. The PHLS uses a framework for assessing the strength of association between human illness and water exposure in outbreak investigations according to microbiology results from cases, microbiological examination of water samples and descriptive and analytical epidemiology (1). The data on microbiological quality of private water supplies and bathing pools were collected from Bristol, Chelmsford, Chester, Norwich, Nottingham, Preston, and Reading Public Health Laboratories, and the Wessex Environmental Microbiological Services (WEMS).

Incidents of association between human illness and water

Seven incidents were reported to the PHLS Communicable Disease Surveillance Centre between 1 July and 31 December 2000: six clusters of cryptosporidiosis associated with swimming pools and one outbreak of campylobacter infection associated with a public water supply (table 1).

Table 1 Outbreaks and incidents of association between human illness and water in England and Wales: July to December 2000

Outbreak reference number	Pathogen	NHS region	Month	Cases		Association
				Total	Positive	
00/723	Cryptosporidium	London	July and August	5	5	Possible
Public swimming pool. Cryptosporidium oocysts identified in cases, pool water, and pool filter sand. Pool operating regime reviewed and enhanced.						
00/656	Cryptosporidium	London	September	10	10	Probable
Public swimming pool. Cryptosporidium oocysts identified in cases, pool water, and pool filter sand. Pool operating regime reviewed and enhanced.						
00/1022	Cryptosporidium	Eastern	September	7	7	Probable
Public swimming pool. Cryptosporidium oocysts identified in cases, pool water, and pool filter sand. Pool operating regime reviewed and enhanced.						
00/870	Cryptosporidium	South West	September	12	7	Probable
Public swimming pool: attention to pool operation. Oocysts from cases and water						
00/766	Campylobacter	Wales	September	281	15	Strong
Public water supply. Influx of surface water into a holding tank for treated water.						
00/1023	Cryptosporidium	Trent	September	9	9	Probable
Public swimming pool. Cryptosporidium oocysts identified in cases but not in pool, however indicator organisms detected in pool.						
00/972	Cryptosporidium	South West	October and November	5	5	Probable
Club swimming pool. One viable oocyst from filter.						

In each of the five pool associated clusters of cryptosporidiosis in which oocysts were identified in pool water and/or filters, the pool was temporarily closed. In all six pool incidents, the operation of the pool was reviewed, enhancements of routine cleaning, filtration and operation established, following which further linked cases were not observed. Two incidents occurred in public swimming pools in London: the first in July and August involved three children (one case infected with a genotype 1 organism), and the second, in September, involved ten cases (all genotype 1). Cryptosporidium oocysts were detected in pool water and sand filters in both incidents. Three further clusters associated with public swimming pools occurred in September 2000: a cluster of seven cases associated with a public pool in the Eastern region, but near to London, and a cluster of 12 cases associated with a public pool in the South West region. Cryptosporidium oocysts were identified in sand filters of both pools. A cluster of none cases of cryptosporidiosis associated with a public swimming pool was investigated in Trent in September. Indicator organisms were detected in water: no cryptosporidium oocysts were identified in water or filters. A further cluster of five children with cryptosporidiosis associated with a private club swimming pool in the South West was detected in October and November 2000. Four were infected with genotype on organisms and one genotype 2). A single cryptosporidium oocyst was identified from a filter.

An outbreak of gastroenteritis associated with contamination of a public water supply occurred in Wales in September 2000. Two hundred and eighty one people developed gastro enteritis out of a population of 1215 served by the supply. Fifteen people tested positive for campylobacter. Indicator organisms but no pathogens were detected in the water supply. A case control study showed an increased risk associated with consumption of unboiled tap water.

Surveillance of water quality

Private water supplies

A private water supply is any water supply that is not provided by a statutorily appointed water company. Private water supplies are divided into category 1 supplies (which are used wholly for domestic purposes) and category 2 supplies (which include supplies to premises such as hospitals, residential homes, holiday sites and food preparation premises) (2). These categories are further sub-divided into classes depending on the volume of water or number of people supplied. About 1% of the population of England and Wales have private water supplies to their homes. Many more people may, however, be exposed transiently to private water supplies, particularly category 2 supplies when used in hospitals, holiday sites, and for food preparation. There is a statutory obligation for local authorities to monitor private water supplies and the specified frequency varies between two samples per month to one sample every 5 years, depending on the class of supply. Local authorities also have powers to secure improvements to private water supplies or connection to a mains supply.

Results of microbiological analysis of samples from various classes of private water supply for July to December 2000 are presented (table 2). The presence of *Escherichia coli* indicates that human or animal faecal contamination has occurred and that urgent action should be taken to eradicate the contamination. *E. coli* was isolated from 28% (408/1471) of supplies examined. It corroborates earlier findings that the microbiological quality of private water supplies is better in the period January to June compared with the period July to December (table 3) (3). The 1471 supplies examined yielded a total 2288 samples, 23% (515) of which were positive for *E. coli*.

Table 2 Routine, including regulatory, tests of private water supplies: July to December 2000

	Number of supplies (samples)						
	Total supplies	Category 1: domestic			Category 2: others*		Category unknown
		Class F (single dwelling)	Class D and E (<= 100 people)	Class A to C (>100 people)	Class 3 to 5 (daily volume <=100m^3)	Class 1 and 2 (daily volume >100m^3)	
Number tested	1471 (2288)	199 (235)	61 (68)	–	270 (306)	9 (60)	932 (1619)
Number positive							
for *E. coli*	408 (515)	81 (95)	20 (21)	–	111 (120)	1 (1)	195 (278)
for total coliforms (including *E. coli*)	686 (884)	115 (136)	34 (35)	–	151 (160)	1 (1)	385 (552)

* supplies to premises such as hospitals, residential homes, holiday sites, and food preparation premises.

Table 3 Percentage of private water supplies positive for *Escherichia coli*: January 1995 to December 2000

Year	% of private water supplies positive for *E. coli*	
	January-June	July-December
1995	19	42
1996	18	40
1997	13	31
1998	23	37
1999	20	29
2000	17	28

The presence of coliforms other than *E. coli* in water does not specifically indicate faecal contamination, as they are natural inhabitants of many aquatic environments. They are, however, indicators of the efficiency of water treatment and current legislation states that they should not be present in drinking water. Coliforms (including *E. coli*) were isolated from 47% (686/1471) of supplies, from which 884 samples out of a total of 2288 (39%) were positive.

The percentage of samples positive for *E. coli* from category 1 supplies (39%) was similar to that of samples from category 2 supplies (43%).

The results of statutory testing of public water supplies in England and Wales have been compiled and published annually by the Drinking Water Inspectorate since 1990. These reports have shown that the microbiological quality of mains water supplied by the twenty-nine water companies has been continually improving. In 1999 0.04% and 0.52% of the total samples from water supply zones were positive for *E. coli* and coliforms, respectively (4). In contrast, private water supplies are generally of a poor microbiological quality and have shown no improvement since PHLS surveillance began in 1995.

Pool waters

Guidelines for pool water quality have been formulated and state that *E.coli* should be absent from 100mL samples from all pools and that *Pseudomonas aeruginosa* should be absent from 100mL samples from spa and hydrotherapy pools (5,6). Coliforms should also be absent from 100mL. A count of <10/100mL coliforms is acceptable, however, provided that they are not in consecutive samples, total viable count (TVC) after 24 hours incubation at 37°C is less than 10 colony forming units per mL (CFU/mL) and the residual disinfection and pH are within the recommended range. A raised TVC may result from heavy pool use and microbial proliferation in the pool water and indicates possible discrepancies in disinfection.

Results from the microbiological analysis of 3692 pool water samples from 1129 pools (62 hydrotherapy, 224 spa and 843 swimming pools) are shown in table 4. The swimming pools were in municipal, leisure and sports centres and hotels. Pools on a single site, such as learner, diving, and main pools, were counted separately. As for previous years, there was a low rate of isolation of *E.coli*, with 6.4% (72/ 1129) of pools positive. The 72 positive pools yielded 86 positive samples. Coliforms (including *E. coli*) were isolated from 132 pools, which yielded 163 positive samples.

Table 4 Routine (including regulatory) tests of pool waters: July to December 2000

Organisms	Total pools (samples)	Hydrotherapy pools (samples)	Spa pools (samples)	Swimming pools (samples)
Coliforms and *E. coli*				
Number tested	1129 (3692)	62 (266)	224 (613)	843 (2813)
Number positive for *E. coli*	72 (86)	5 (5)	13 (17)	54 (64)
Total coliforms (including *E. coli*)	132 (163)	11 (12)	29 (36)	92 (115)
Pseudomonas aeruginosa*				
Number tested	1009 (3403)	61 (265)	215 (604)	733 (2534)
Number positive	208 (504)	7 (13)	60 (126)	141 (365)

* not always tested for routinely

The presence of *P. aeruginosa* in hydrotherapy and spa pools is a potential health risk, as outbreaks of disease caused by *P. aeruginosa* have been associated with them. In conventional pools, *P. aeruginosa* is an optional quality parameter and is not always looked for. *P. aeruginosa* was isolated from 19% (141/733) of swimming pools in which it was looked for, 11.5% (7/61) hydrotherapy pools and 28% (60/215) spa pools (table 4). TVC of greater than 100 colony-forming units per mL were found in 8% (287/3692) and these 287 samples were obtained from 134 pools (table 5).

Table 5 Highest total viable count in all pool waters (colony forming units per mL)

	Pool waters	
Total viable count	**Pools**	**Samples**
0-10	774	3054
11-100	221	351
>100	134	287
Total	1129	3692

Enteroviruses in water

Asymptomatic enterovirus infections of the gastrointestinal tract are common throughout the year, resulting in their presence in sewage. This, combined with the relative ease with which enteroviruses may be cultured in the laboratory, has made these viruses the most practical and widely used marker of human faecal viruses in the environment. This assay is one of the parameters in the current European Union Bathing Water Directive. The recommended method for concentrating enteroviruses from water varies according to the matrix: for crude sewage 100ml is concentrated by protein precipitation to a volume of 10ml. Enteroviruses are detected using BGM (monkey cells) cells in a suspended cell plaque assay.

Figure 1 Sewage treatment works – isolation of enterovirus in 2000

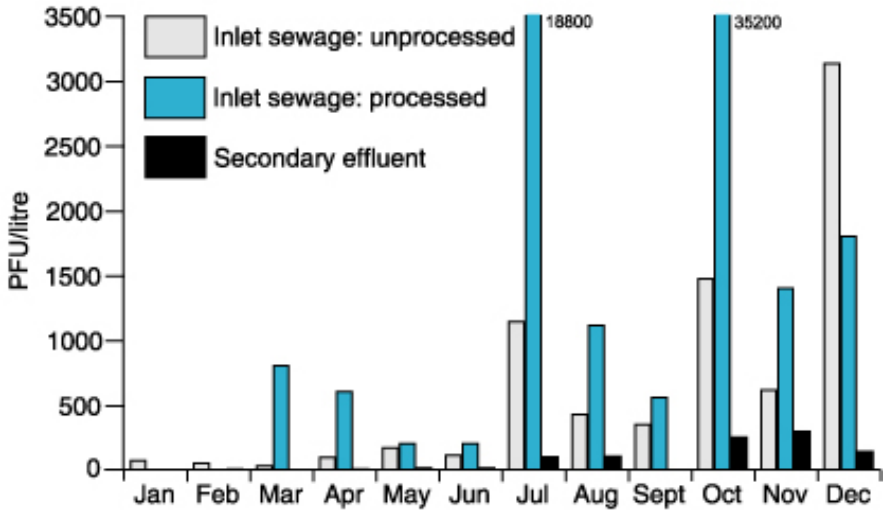
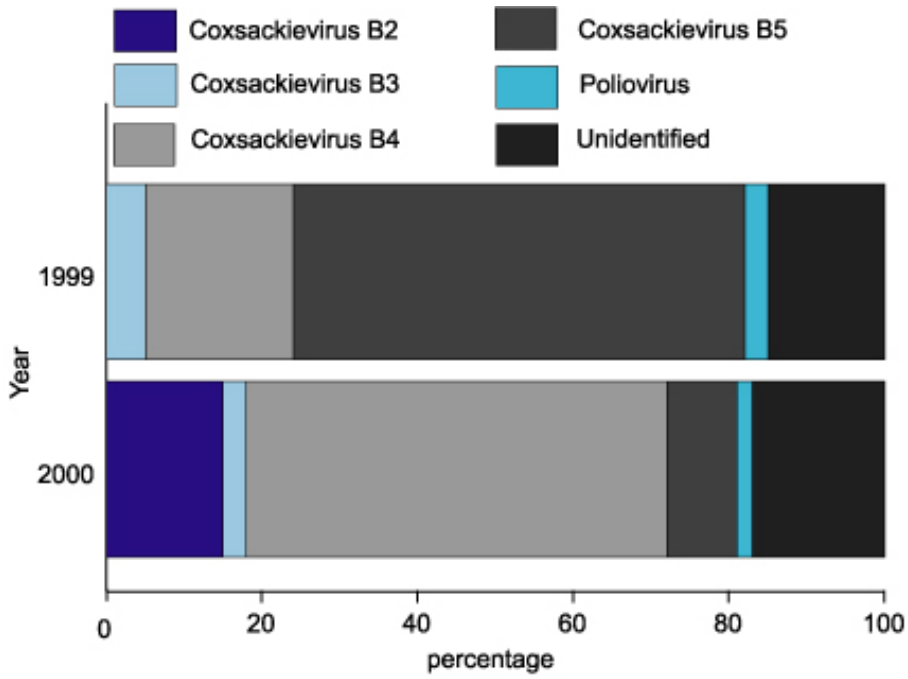


Figure 1 shows the plaque counts found in crude sewage and secondary effluent samples collected monthly during 2000 from a single inland sewage treatment works. The expected marked seasonal increase of enteroviruses from the summer onwards is apparent. In every monthly sample, except December, the unprocessed crude sample contained a larger number of detectable enteroviruses than the processed. One litre of fully treated secondary effluent was processed by protein precipitation as low numbers were expected. As all sampling was done at the same time, there was no direct relationship between the crude and effluent samples. No relationship between the numbers found in the two types of sample was expected or demonstrated.

The viral plaques were confirmed by passage to fresh BGM cells and the virus serotype was identified by immunofluorescence using monoclonal antibodies. Figure 2 shows the proportion of enterovirus serotypes identified in 100 samples collected each year in 1999 and 2000. The results demonstrate the change in dominant serotype in different years - coxsackievirus B5 for 1999 and coxsackievirus B4 during 2000. Reports of isolates from clinical specimens are biased towards those enteroviruses that cause illness, most commonly meningitis. Coxsackievirus B5 was a major cause of illness during 1999 and echovirus 13 was common in 2000. The latter virus was not represented in these sewage samples as it does not form plaques in the detection assay used.

Figure 2 Enterovirus serotypes identified in environmental samples in 1999 and 2000



A small number of polioviruses were identified which were further characterised by RT-PCR and restriction enzyme analysis. All isolates were vaccine-like which supports the World Health Organization certification of the United Kingdom as free of wild poliovirus.

1. CDSC. Strength of association between human illness and water: revised definitions for use in outbreak investigations. *Commun Dis Rep CDR Wkly* 1996; **6**: 65.

2. *The Private Water Supplies Regulations 1991. (Statutory Instrument: No. 2790:1991).* London: HMSO, 1991.

3. Rutter, M, Nichols GL, Swan A, De Louvois J. A survey of the microbiological quality of private water supplies in England. *Epidemiol. Infect* 2000; **124:** 417-25.

4. DETR. *Drinking Water 1999 - a report by the Chief Inspector Drinking Water Inspectorate.* London: The Stationery Office, 2000.

5. PHLS Working Party. *Hygiene for hydrotherapy pools.* London: Public Health Laboratory Service, 1990.

6. Pool Water Treatment Advisory Group. *Swimming pool water: treatment and quality standards.* Diss: PWTAG, 1999.