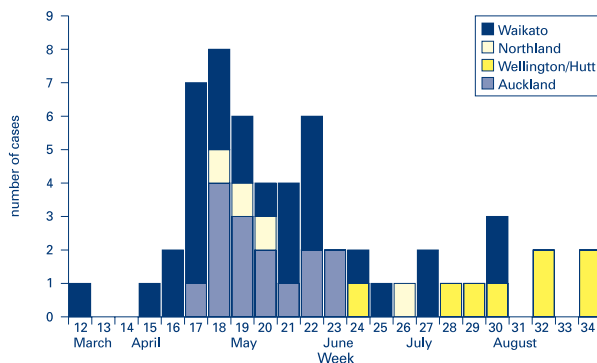


ECHOVIRUS TYPE 33 OUTBREAK IN 2000

Echovirus type 33 (E33) belongs to the family Picornaviridae and the genus *Enterovirus*, which includes the polioviruses, coxsackieviruses, echoviruses and newer numbered enteroviruses. E33 was the last echovirus to be described. Its prototype strain, Toluca-3, was first isolated from a child in Toluca, Mexico, in 1959 and subsequently designated as E33 in 1965 by the Panel for Picornaviruses.¹ The clinical spectrum of echoviruses is similar to that of non-polio enteroviruses in general. E33 is recognised as an etiological agent for aseptic meningitis, respiratory disease, gastroenteritis, rashes, undifferentiated fever, abortion and intrauterine death.^{2,3,4,5} The pathogenesis of E33 is also similar to enteroviruses. The incubation period is usually between 7-14 days. The portal of entry is believed to be the alimentary tract via the mouth. After initial and continuing multiplication, probably in lymphoid tissue of the pharynx and gut, viremia may occur and in turn lead to further virus proliferation in the cells of the reticuloendothelial system and finally to involvement of the target organs (spinal cord, brain, meninges, myocardium, skin). Usually the virus is excreted in the stools for several weeks and is present in the pharynx for 1 to 2 weeks after infection in individuals having either clinical or subclinical infection.

Compared with other enterovirus-associated meningitis outbreaks (eg, E30), E33-associated meningitis outbreaks are uncommon. In March 2000, an E33 outbreak started in the Waikato region of the North Island, and then spread to the Auckland, Northland and Wellington/Hutt regions. A total of 56 patients from these regions yielded E33 isolates during the six months between March and August 2000 (Figure 1). The age of the cases ranged from 1 week to 43

Figure 1. Cases of E33 by geographic area, March-August 2000



years, with cases clustered in early infancy (1-6 months) and the 5-14 year age group. There were more male (31) than female cases (25). The ethnicity was known for 53 cases, including Maori (19), European (17), and Pacific Islanders (7).

Among the 46 cases who were over 1 year of age, 38 (83%) were diagnosed with aseptic meningitis, one with encephalitis, and one with acute flaccid paralysis. The remainder of the cases over 1 year old presented with less serious illness, such as gastroenteritis, non-specific febrile illness and upper respiratory tract infection. Most (93%) of the cases over 1 year old were hospitalised. Among the 10 cases under 1 year of age, only two were diagnosed with meningitis. All cases under 1 year old were hospitalised. One case, a neonate, died.

Detailed clinical information was available for 53 of the 56 cases. Of these, 43 cases over 1 year of age most commonly presented with headache (80%), vomiting (70%), photophobia (63%), sore or stiff neck (61%), and fever (54%). The 10 cases under 1 year of age most commonly presented with rash (90%), vomiting (60%), fever (50%), irritability (50%), and anorexia (50%). Several cases had bi-phasic illness, with onset of symptoms such as lethargy and headache, a period of improvement, and then onset of more severe symptoms, usually fever, headache and vomiting. In seven of the nine infants with a rash, the rash was maculopapular and/or petechial.

During the period from March to August, 67 isolates of E33 virus were obtained from 56 patients. These were from CSF (16), faeces/rectal/anal (22), throat/nasal (25), urine (3) and liver (1). Primary isolation was carried out in Waikato (41), Auckland (15) and ESR (11) virology laboratories. All of the isolates from Auckland and Waikato were referred to ESR for typing. The Auckland Hospital laboratory and ESR virology laboratory did initial typing by antibody neutralisation test with LBM pools which suggested E33. However, the ESR confirmatory neutralisation tests by RIVM pool and various monospecific antisera did not give conclusive results. Twenty-six isolates were sent to CDC Atlanta and four isolates were sent to VIDRL Melbourne for molecular typing. Around 360 nucleotides in the 5' portion of the VP1 gene were sequenced and the sequence was compared to a database containing all the prototype enterovirus sequences. The results showed that the isolates were 78% identical to

Leading article

| | |
|------------------------------------|-----------|
| Echovirus Type 33 Outbreak in 2000 | 29 |
| Bacteriology | 30 |
| Invasive Infections | 30 |
| <i>Bordetella pertussis</i> | 31 |
| Legionellosis and Environmental | |
| Legionella Isolates | 31 |
| Leptospirosis | 31 |
| Special Bacteriology | 31 |

Listeria monocytogenes

| | |
|---|-----------|
| Enteric Pathogens | 32 |
| Salmonella | 32 |
| Non-Human Sources | 32 |
| <i>Escherichia coli</i> | 32 |
| Unusual Isolates | 32 |
| Shigella | 32 |
| Antibiotic Resistance | 33 |
| WHO Gonococcal AntiMicrobial Surveillance Programme, 1999 | 33 |

| | |
|--|-----------|
| Surveillance of Tuberculosis Resistance, January-June 2000 | 33 |
| Antibiotic-Resistant Bacteria Monitoring Scheme | 33 |
| Virology | 34 |
| Respiratory Viruses | 34 |
| Norwalk-like Virus | 35 |
| Culture Collection | 35 |
| New Names | 35 |
| Mycology | 36 |

the prototype E33 strain. This suggests that the virus has genetically drifted, and may explain the confusion with the antibody neutralisation result. The outbreak virus may have drifted so much that the antisera used, which were raised against the prototype virus that was circulating 30-50 years ago, could not sufficiently neutralise the virus.

Enteroviruses are principally transmitted from person to person through the faecal-oral route. Therefore, extra attention to handwashing after using the toilet, before food preparation, and before and after handling babies and their nappies is important in limiting an outbreak. Newborns most commonly acquire the virus in the immediate perinatal period from the mother's blood, cervical and vaginal secretions, and faecal contamination of the perineum. Therefore, pregnant women should avoid contact with known cases of viral meningitis to minimise the risk of infection and vertical transmission of the virus to their newborn baby. Neonatal and maternity ward staff, midwives, and obstetricians need to pay particular attention to handwashing, and cleaning and disinfection of surfaces and other potentially contaminated objects in order to prevent cross-infection between neonates.

Q. Sue Huang, PhD

Enterovirus Reference Laboratory, ESR

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BACTERIOLOGY

INVASIVE INFECTIONS

Numbers of isolates received from cases of invasive disease caused by *Haemophilus influenzae*, *Neisseria meningitidis*, *Streptococcus pneumoniae*, *Streptococcus pyogenes* (Group A), and *Streptococcus agalactiae* (Group B) during July to September 2000, are shown in Table 1.

Table 1. Sterile site isolates, July-September 2000

| Organism | BC | CSF or CSF/BC | Other Sterile Site | Total | Cumulative Total to Sept 2000 |
|-------------------------------------|-----|---------------|--------------------|-------|-------------------------------|
| <i>H. influenzae</i> ¹ | 21 | 3 | 1 | 25 | 43 |
| <i>N. meningitidis</i> ² | 61 | 14 | 1 | 76 | 184 |
| <i>S. pneumoniae</i> | 161 | 7 | 3 | 171 | 345 |
| <i>S. pyogenes</i> | 28 | 0 | 7 | 35 | 96 |
| <i>S. agalactiae</i> | 16 | 1 | 2 | 19 | 44 |

¹ *H. influenzae*: 3 serotype b and 22 non-b

² Includes one isolate that was contaminated on arrival but which had been confirmed by the submitting laboratory

The age profile of the patients from whom the isolates were obtained is given in Table 2.

Table 2. Age distribution of cases of invasive disease, July – September 2000

| Organism | <1m | 1-11m | 1y | 2y | 3y | 4y | 5-9y | 10-24y | 25-59y | ≥60y |
|---|-----|-------|----|----|----|----|------|--------|--------|------|
| <i>H. influenzae</i> b | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| <i>H. influenzae</i> non b ¹ | 3 | 0 | 1 | 0 | 0 | 1 | 2 | 2 | 3 | 9 |
| <i>N. meningitidis</i> | 0 | 12 | 14 | 6 | 3 | 6 | 7 | 16 | 10 | 2 |
| <i>S. pneumoniae</i> ¹ | 0 | 18 | 21 | 8 | 3 | 3 | 9 | 7 | 36 | 65 |
| <i>S. pyogenes</i> | 0 | 1 | 2 | 0 | 1 | 0 | 1 | 2 | 10 | 18 |
| <i>S. agalactiae</i> | 6 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 5 | 5 |

¹ Information on age was not provided with one isolate of *H. influenzae* and one isolate of *S. pneumoniae*

Haemophilus influenzae

During July to September 2000, 25 isolates were received from cases of *H. influenzae* invasive disease. Three of these isolates were serotype b, one was serotype c, one was serotype e, and the others were non-serotypable using serotype-specific antisera. This compares with three serotype b from a total of 14 isolates for the same period in 1999.

None of the non-serotypable organisms were shown by PCR to possess either the serotype b specific *cap* gene or the *bexA* gene necessary for capsular expression.

Neisseria meningitidis

During July to September 2000, a total of 76 sterile site isolates were received from cases of meningococcal disease, compared with 96 for the same period in 1999. However, one of these isolates was contaminated on arrival and was unable to undergo further typing. It had been confirmed and identified as serogroup B by the submitting laboratory. Of the 75 isolates tested, 72 were serogroup B, one was serogroup C, and two were serogroup W135. Serotyping and serosubtyping results of the serogroup B and C organisms are given in Table 3. The serogroup W135 isolates were W:NT:NST and W:NT:P1.6. In addition, two isolates were received from non-sterile sites from notified cases. These isolates were identified as B:4:P1.4, and B:NT:P1.4.

Table 3. Serotypes and subtypes of N. meningitidis isolates, July-September 2000

| Subtype | Serotype | | | | | | | Total |
|--------------------|----------|----------|----------|-----------------------|----------|----------|----------|-----------------------|
| | 1 | 2a | 2b | 4 | 14 | 15 | NT | |
| <i>Serogroup B</i> | | | | | | | | |
| P1.4 | 1 | | | 55 ¹ | 6 | | 5 | 67 |
| P1.13 | | | | 1 | | | | 1 |
| P1.15 | | | | 2 | | | | 2 |
| NST | | | | 1 | | 1 | | 2 |
| Total | 1 | 0 | 0 | 59¹ | 6 | 1 | 5 | 72¹ |
| <i>Serogroup C</i> | | | | | | | | |
| P1.5 | | 1 | | | | | | 1 |
| Total | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |

¹ Includes one isolate whose subtype was determined by PCR and DNA-DNA hybridisation.

NT - non typable

NST - non subtypable

All meningococci were tested against the following serotypes and subtypes: serotype 1, 2a, 2b, 4, 14 and 15

subtypes P1.1, P1.2, P1.4, P1.5, P1.6, P1.7, P1.9, P1.10, P1.12, P1.13, P1.14, P1.15 and P 1.16.

Twenty-two blood, CSF and skin aspirate samples from culture-negative cases of invasive meningococcal disease were tested by PCR for the presence of meningococcal DNA. Nineteen samples were shown to contain the meningococcal *porA* gene, which encodes the subtype-specific antigens. Restriction digestion and dot blot hybridisation showed that 13 of these samples were subtype P1.7, 4, one was P1.2, one was P1.7, one was P1.7, 16, and three were not P1.2, 4, 7 or 16.

The current testing shows that the epidemic strain (B:4:P1.4) continues to cause most disease.

BORDETELLA PERTUSSIS

During July to September 2000, a total of 338 isolates of *Bordetella pertussis* were received for serotyping and surveillance, compared with 95 for the same period in 1999. This shows the continuing rise in cases associated with the current epidemic, which commenced in June 1999. Four isolates were serotype 1, 2, two were 1, 2, 3, and 332 were 1, 3. The ages of the 335 cases for whom age was provided are given in Table 4. The recommended ages for vaccination against *B. pertussis* in New Zealand are at six weeks, three months, five months and 15 months.

Table 4. Age distribution of cases of *Bordetella pertussis*, July-September 2000

| Age | <5m | 5-<15m | 15m-4y | 5-9y | 10-14y | 15-19y | ≥20y |
|--------|-----|--------|--------|------|--------|--------|------|
| Number | 28 | 19 | 54 | 114 | 43 | 14 | 63 |

LEGIONELLOSIS AND ENVIRONMENTAL LEGIONELLA ISOLATES

During July to September 2000, 14 cases of legionellosis were laboratory-identified, and a further three cases were notified based on clinical grounds only. Seven of the cases were regarded as confirmed and ten as probable. Thirteen (76%, 13/17) of the cases were notified. In 1999, 16 cases were identified consisting of four confirmed and 12 probable cases.

The majority of cases (65%, 11/17) were males and ten cases (59%, 10/17) were aged over 60 years. The age range was 30 to 78 years. The infecting *Legionella* species and serogroup was identified in all 14 laboratory-identified cases (Table 5). This quarter, *Legionella longbeachae* caused 64% (9/14) of cases, continuing the high incidence of legionellosis caused by *L. longbeachae* species over the last two years in New Zealand.

During July to September 2000, 75 presumptive environmental *Legionella* isolates from various environmental sources were received from other laboratories or were isolated by ESR. Fifty-six of these could be identified to species and serogroup level (Table 5). A further 19 isolates did not belong to the genus *Legionella*.

Table 5. Laboratory identified legionellosis cases and environmental isolates, July-September 2000

| Legionella species / serogroup | Number of Cases | | | Number of environmental isolates |
|---|-----------------|----------|-----------|----------------------------------|
| | Confirmed | Probable | Total | |
| <i>L. pneumophila</i> serogroup 1 | 0 | 1 | 1 | 16 |
| <i>L. pneumophila</i> serogroup 5 | 0 | 1 | 1 | 2 |
| <i>L. pneumophila</i> serogroup 6 | 0 | 0 | 0 | 1 |
| <i>L. pneumophila</i> serogroup 8 | 0 | 0 | 0 | 3 |
| <i>L. pneumophila</i> serogroup unidentified ¹ | 1 | 1 | 2 | 0 |
| <i>L. anisa</i> | 0 | 0 | 0 | 14 |
| <i>L. bozemanii</i> serogroup 1 | 0 | 0 | 0 | 1 |
| <i>L. bozemanii</i> serogroup 2 | 1 | 0 | 1 | 1 |
| <i>L. feeleeii</i> serogroup 1 | 0 | 0 | 0 | 1 |
| <i>L. feeleeii</i> serogroup 2 | 0 | 0 | 0 | 2 |
| <i>L. longbeachae</i> serogroup 1 | 3 | 2 | 5 | 0 |
| <i>L. longbeachae</i> serogroup 2 | 1 | 0 | 1 | 4 |
| <i>L. longbeachae</i> serogroup unidentified ² | 1 | 2 | 3 | 0 |
| <i>L. maceachernii</i> | 0 | 0 | 0 | 2 |
| <i>L. micdadei</i> | 0 | 0 | 0 | 9 |
| Total | 7 | 7 | 14 | 56 |

¹ The serogroup could not be identified due to cross-reactivity or a dual infection.

² The serogroup could not be identified due to cross reactions between *L. longbeachae* serogroup 1 and 2 or a dual infection.

LEPTOSPIROSIS

During July to September 2000, a total of 30 cases of leptospirosis were laboratory-confirmed and two were notified based on clinical grounds only, compared with 19 (17 laboratory-confirmed and two notified only) cases in the same period in 1999. The infecting *Leptospira* species and serovar was identified in all 30 laboratory confirmed cases (Table 6).

Table 6. Leptospirosis cases, July-September 2000

| Leptospira species / serovar | Number of cases |
|--------------------------------------|-----------------|
| <i>L. interrogans</i> sv copenhageni | 1 |
| <i>L. interrogans</i> sv pomona | 7 |
| <i>L. borgpetersenii</i> sv ballum | 8 |
| <i>L. borgpetersenii</i> sv hardjo | 14 |
| Total | 30 |

Twenty-six cases were notified (81%, 26/32). Twenty-nine of the cases were male (91%, 29/32) and 21 (66%, 21/32) were aged between 30-49 years. The age range was from 20 to 60 years. The occupation or exposure was known for 24 cases (Table 7).

Table 7. Occupation or known exposure for leptospirosis cases, July-September 2000

| Occupation/known exposure | Number of Cases |
|-------------------------------|-----------------|
| Freezing worker | 9 |
| Farmer | 5 |
| Freezing work – gutter | 3 |
| Butcher | 1 |
| Pig farmer | 1 |
| Stock driver | 1 |
| Lives on a farm | 1 |
| Meat packing factory - pelter | 1 |
| Forestry worker | 1 |
| Poisoning mice | 1 |
| Total | 24 |

SPECIAL BACTERIOLOGY

Interesting Isolates Received in the Special Bacteriology Laboratory

- *Rothia mucilaginosa* from the blood of two patients (F 7y and F 78y). This species is a resident of the human oral cavity and pharynx, but is recognised as an opportunistic pathogen causing septicaemia and endocarditis as well as other serious infections. The organism is a gram-positive fermentative coccus which forms characteristic rubbery adherent colonies. It was formerly named *Stomatococcus mucilaginosus* and was re-classified in 2000 as a member of the genus *Rothia*.
- *Pandoraea pnomenus* from the sputum of a cystic fibrosis patient (M 21y). This isolate was identified at ESR using 16S rRNA sequencing as it was unidentifiable by API2ONE and Microscan systems used by the submitting laboratory and by conventional biochemical work-up in the Special Bacteriology Laboratory. A Belgian study¹ which resulted in the description of the new genus *Pandoraea* in 2000, was initiated by receipt of several isolates cultured from sputa of cystic fibrosis patients. These isolates had been tentatively identified as *Burkholderia cepacia* or *Ralstonia* species, but proved to belong to a new genus. The available clinical data indicate that at least some of the organisms in the genus *Pandoraea* may cause chronic infection in, and have been transmitted amongst, cystic fibrosis patients.

¹ IJSEM 2000; 50:887-99

LISTERIA MONOCYTOGENES

Six isolates of *L. monocytogenes* from human cases were referred for confirmation of identity and serotyping in the period July to September 2000 (Table 8). Two of the isolates were from perinatal cases in which there was one foetal death. The remaining four cases were adult, of whom three had an underlying illness and/or were elderly, and one had no risk factors identified.

Table 8. *Listeria monocytogenes* from human cases, July-September 2000

| Month isolated or of onset | Health District | Sex/Age | Source | O antigen serotype |
|----------------------------|---------------------|-----------|----------------|--------------------|
| July | Wellington | M foetus | BC (stillborn) | 4 |
| July | South Auckland | M 80y | BC | 4 |
| July | Hutt | F 79y | BC | 1/2 |
| August | Central Auckland | F neonate | BC | 4 |
| August | South Auckland | M 53y | Ascitic fluid | 4 |
| September | North West Auckland | M 44y | CSF | 1/2 |

ENTERIC PATHOGENS

SALMONELLA

During July to September 2000, 409 human isolates of *Salmonella* were received, compared with 383 for the same period in 1999.

S. Typhi

Two isolates were confirmed and phage typed in July, and two in August. All but one of these isolates were from patients with a history of overseas travel. The remaining case was from the Auckland health district.

Clusters recognised during July to September 2000 included:

- ***S. Typhimurium* phage type 101**
An increase in numbers of this phage type was noted in Canterbury, Otago, and Southland. No common source was found.
- ***S. Enteritidis* phage type 4**
A cluster of cases was confirmed following a travel company trip to Bali.
- ***S. Typhimurium* phage type 160**
Isolates of this uncommon phage type increased from four in the April to June quarter to 46 in the July to September period. Most cases were from Canterbury, but cases also occurred in Manawatu, Wellington, and Southland in August, and in Nelson/Marlborough and the West Coast in September. No common source was found. This phage type has been isolated from a range of animals including birds, cats, horses, and cattle.
- ***S. Paratyphi B* var Java**

There was a dispersed outbreak of eight cases of this serotype from five separate Health Districts (Auckland, Waikato, Wanganui, Manawatu and Wellington) reported between 18-20 September 2000. None of the cases recorded a history of overseas travel.

A case control study was undertaken to identify the source of this outbreak. This study failed to conclusively identify the likely source of the outbreak. Contributing to this result may have been the small number of cases, the length of time (six weeks) before the study was initiated, and the use of an incubation period in the questionnaire that, although practical in terms of recall, may have been too short.

NON-HUMAN SALMONELLA

There were 912 non-human isolates during July to September 2000, compared with 808 for the same period last year. *S. Brandenburg* has caused ovine abortions in Southland and Otago for the fourth year in succession and is responsible for the overall increase in non-human isolates.

ESCHERICHIA COLI

There were 14 *E. coli* O157 isolates confirmed during July to September 2000 compared with 10 during the same time period in 1999. (Table 9)

Table 9. Isolates of *E. coli* O157, July-September 2000

| Month | Sex / Age | Health District | Comments |
|-----------|-----------|------------------|------------------|
| August | M 1y | Waikato | Bloody diarrhoea |
| August | M 3y | Waikato | No details |
| August | F 72y | Otago | Diarrhoea |
| August | F 2y | Nelson | Diarrhoea |
| August | F 2y | Waikato | Contact |
| August | F 2y | Taranaki | Diarrhoea |
| August | F 6y | Hawkes Bay | Bloody diarrhoea |
| August | F 51y | Canterbury | No details |
| August | F 1y | Rotorua | Diarrhoea |
| August | M 1y | Taranaki | Diarrhoea |
| September | F 55y | South Canterbury | No details |
| September | M 1y | Wanganui | No details |
| September | F 1y | Waikato | Diarrhoea |
| September | F 1y | South Canterbury | Diarrhoea |

UNUSUAL ISOLATES

An isolate of *Yokenella regensburgei* was confirmed in September. The isolate was from a wound received in a road traffic accident. This organism was also known as *Koserella trabulsii* until 1991. It grows well on routine laboratory media and resembles *Hafnia alvei*, but is citrate and melibiose positive and glycerol negative. It has been isolated overseas from insect intestines and human sites, including urine, wounds, sputum, throat, knee fluid and stool. This is the first isolate to be confirmed by the Enteric Reference Laboratory. It has been deposited in the New Zealand Reference Culture Collection, Medical Section.

SHIGELLA

During July to September 2000 there were 35 isolations of *Shigella* species, compared with 34 in the same period in 1999. (Table 10)

Table 10: *Shigella* isolates, July to September 2000

| Species | Type | Number | Comment |
|-----------------------|-----------|--------|------------------------------|
| <i>S. boydii</i> | 2 | 1 | Overseas travel |
| <i>S. flexneri</i> | 1b | 2 | 1 overseas travel, 1 refugee |
| <i>S. flexneri</i> | 2a | 5 | 1 overseas travel |
| <i>S. flexneri</i> | 2b | 1 | |
| <i>S. flexneri</i> | 4a | 1 | Refugee |
| <i>S. flexneri</i> | y variant | 1 | Refugee |
| <i>S. sonnei</i> | Biotype a | 19 | 8 overseas travel |
| <i>S. sonnei</i> | Biotype g | 2 | 1 overseas travel |
| <i>S. sonnei</i> | Biotype e | 1 | |
| <i>S. sonnei</i> | Biotype f | 1 | Refugee |
| <i>S. dysenteriae</i> | Untypable | 1 | |

ANTIBIOTIC RESISTANCE

WHO GONOCOCCAL ANTIMICROBIAL SURVEILLANCE PROGRAMME, 1999

The WHO Gonococcal Antimicrobial Surveillance Programme (GASP) is a multi-centre long-term programme that has been monitoring the antibiotic susceptibility of *Neisseria gonorrhoeae* since 1992. New Zealand is one of 16 countries in the Western Pacific Region (WPR) that regularly tests and submits data as part of the programme. The New Zealand data were provided by Auckland Healthcare and include isolates from the Auckland sexual health clinics, Auckland regional hospitals, Auckland private laboratories, and Waikato Hospital.

In 1999, a total of 9,300 isolates were tested in 16 countries in the region. High proportions of isolates in many countries were resistant to quinolones and penicillins, continuing the trends observed by the programme since 1992.

Resistance to penicillin (≥ 1.0 mg/L), both chromosomal (CMRNG) and plasmid mediated (PPNG), remained widespread. Very high rates of all penicillin resistance were recorded in the Philippines (94%), Korea (92%), China (88%), Hong Kong SAR (73%), Brunei (67%), Vietnam (66%), Singapore (56%), and Mongolia (48%). In New Zealand resistance was 8.1%, made up of 2.8% PPNG and 5.3% CMRNG. The penicillin resistance in Australia was 21.7%, predominantly CMRNG.

The proportion of PPNG has been declining in some centres, but CMRNG has become more prominent. As a point of reference, the WHO recommends that an antibiotic should no longer be used for treatment when 5% of isolates are resistant to its action. In 1999, the majority of the 16 countries showed a resistance figure above this level for penicillin. Of interest were the low rates of penicillin resistance found in some Pacific Island states.

Resistance of the quinolone antibiotics (QRNG), represented by ciprofloxacin (≥ 1.0 mg/L), has become a major problem in parts of the WPR in recent years and overall the situation has deteriorated in 1999. Resistance is all chromosomal and 10 of 14 countries that test for this showed quinolone resistance. The countries where high rates of resistance were seen include the Philippines (61%), Hong Kong (67%) and China (53%). Australia had 3.5% and New Zealand 2.2% resistance, the latter being up on the 1998 figure of 1.2%. There was also a significant increase in the numbers of isolates that were less sensitive, compared to previous years. Based on this, the prediction for 2000 would be for an even higher increase of resistance.

Resistance to ceftriaxone was absent. Tetracyclines are not a recommended treatment for gonorrhoea, yet their ready availability and low cost means that they are often used in the informal health sector in a number of countries. The programme only monitors high level tetracycline resistance (TRNG) and these types have been clustered in Malaysia, Singapore, Solomon Islands and Vietnam, ranging from 40 to 68% resistance. Australia has 7.8% and New Zealand 1.3% TRNG. It should be noted that chromosomal resistance for tetracycline (≥ 1.0 mg/L) is high and as many as 30% of isolates (local New Zealand data) are resistant.

The changes observed in the 1999 patterns were again incremental. The above data suggest that the ability to treat gonorrhoea with cheap oral penicillin and quinolone agents has been severely compromised in the WHO WPR. There has been a significant rise over the last two years in the number of gonorrhoea cases, both in New Zealand and

overseas. This, combined with the ever increasing resistance patterns, is an area of concern.

*Contributed by Mike Brokenshire
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SURVEILLANCE OF TUBERCULOSIS RESISTANCE JANUARY TO JUNE 2000

During January to June 2000, a total of 129 isolates (123 *M. tuberculosis* and six *M. bovis*) were identified. Susceptibility test results were available for 123 *M. tuberculosis* and five *M. bovis*. The proportion of the isolates resistant to each of the five antimicrobial agents tested is shown in Table 11.

Table 11. Resistances to each antimicrobial (alone or in combination), January - June 2000

| Antimicrobial | Number tested | Number resistant | % resistance |
|---------------|---------------|------------------|--------------|
| Isoniazid | 128 | 14 | 10.9 |
| Rifampicin | 128 | 1 | 0.8 |
| Ethambutol | 128 | 3 | 2.3 |
| Pyrazinamide | 128 | 7 | 5.5 |
| Streptomycin | 128 | 10 | 7.8 |

Nearly 84% of the isolates were sensitive to all the agents tested (Table 12). One (0.8%) isolate was multidrug-resistant (MDR, defined as resistance to at least isoniazid and rifampicin). The MDR isolate was from a patient who had been born in China and had recently arrived in New Zealand. Since data collation began in 1995, all MDR isolates have been from cases that were born overseas.

Table 12. Resistance patterns among the 128 isolates, January-June 2000

| | Number (%) | Resistance pattern | Number (%) with each pattern |
|------------------------|------------|--------------------|-------------------------------|
| Fully sensitive | 107 (83.6) | | |
| Resistance to 1 agent | 13 (10.2) | H S Z | 6 (4.7) 4 (3.1) 3 (2.3) |
| Resistance to 2 agents | 5 (3.9) | HS HZ | 3 (2.3) 2 (1.6) |
| Resistance to 3 agents | 1 (0.8) | HES | 1 (0.8) |
| Resistance to 4 agents | 1 (0.8) | HESZ | 1 (0.8) |
| Resistance to 5 agents | 1 (0.8) | HRESZ | 1 (0.8) |

E = ethambutol, H = isoniazid, R = rifampicin, S = streptomycin, Z = pyrazinamide

ANTIBIOTIC RESISTANT BACTERIA MONITORING SCHEME (ARBMS)

The Antimicrobial Resistance Working Group Surveillance subcommittee met in November 2000 to review antimicrobial resistance data and the surveillance programme for 2001. The ARBMS commenced in 1983 with the purpose of confirming new and emerging resistances and also to enable extended sensitivity testing and typing of strains. The list of bacteria under surveillance through the ARBMS has been reviewed at intervals. In a review in 1999, erythromycin-resistant *Streptococcus pyogenes* and penicillin-resistant viridans streptococci were added to the list. At the November meeting it was decided that penicillin-resistant *S. pneumoniae* should be replaced by cefotaxime or ceftriaxone-resistant *S. pneumoniae*. However, ESR will continue to provide reference testing for laboratories that need confirmation of results. From January 2001, hospital and community laboratories are requested to refer the following antibiotic-resistant bacteria to ESR:

- Cefotaxime/Ceftriaxone-resistant *S. pneumoniae*
- Vancomycin-resistant gram-positive bacteria
- High-level gentamicin-resistant enterococci
- Beta-lactamase producing enterococci
- Enterobacteriaceae with ESBL
- Multiresistant-MRSA
- Penicillinase-producing *Neisseria gonorrhoeae*
- Ampicillin-resistant *Salmonella Typhi*
- Erythromycin-resistant *S. pyogenes*
- Penicillin-resistant viridans streptococci

Compiled by Maggie Brett
Antibiotic Reference Laboratory, ESR

LITERATURE REVIEW

Aaron SD, Ferris W, Henry DA, et al. **Multiple combination bactericidal antibiotic testing for patients with cystic fibrosis infected with *Burkholderia cepacia***. Am J Respir Crit Care Med 2000; 161: 1206-12.

These investigators describe a technique for evaluating single, double and triple antibiotic combinations for bactericidal activity against *B. cepacia*. Aaron et al. describe the activity of 15 antibiotics used in a total of 430 combinations by their multiple combination bactericidal test (MCBT) on 119 consecutive *B. cepacia* isolates over a 10 year period. The authors showed that triple antibiotic combinations that include tobramycin, meropenem and another antibiotic were most effective and bactericidal for 81-93% of their isolates. They also report that antagonism was relatively common and stressed the need for using MCBT to detect potentially antagonistic antibiotic combinations. [Editorial note: In response to requests from clinicians for synergy testing, the Antibiotic Reference Laboratory, ESR, now has the capability to perform MCBT for a small number of combinations of antibiotics commonly used in cystic fibrosis patients.]

VIROLOGY

RESPIRATORY VIRUSES

Influenza

During the 2000 winter season, the level of flu-like illness in New Zealand was the lowest in the past nine years (Figure 2). This figure was based on weekly consultation rates for influenza-like illness collected from sentinel surveillance. Influenza sentinel surveillance was established in 1991 in New Zealand, although data on consultation rates were only available from mid 1992. In 2000, the national average consultation rate was 32.5 per 100,000 patient population, compared with 112.3 per 100,000 patient population in 1999.

Influenza isolations in 2000 peaked very late with the highest level of activity in week 38 (late September) (Figure 3). Comparing the influenza isolation data of the past 11 years, a peak of influenza virus isolations usually occurred in June or July.

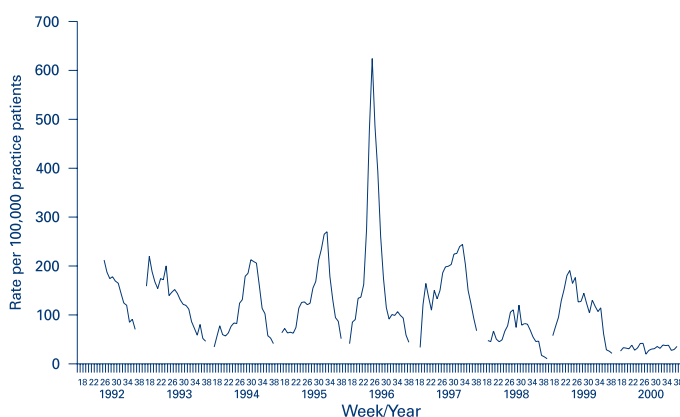
A total of 184 influenza isolates from all sources were analysed antigenically by ESR, Auckland Healthcare and Canterbury Health Laboratories during the surveillance period (weeks 18-39). The majority of the isolates were influenza A (149, 81.0%). Thirty-five

cases of influenza B were identified which made up 19.0% of total isolates. Most of the influenza A isolates were subtyped. A(H1N1) was the predominant subtype (73/184, 39.7%) and there were 52 A(H3N2) isolates (28.3%) (Figure 3). This is in contrast to 1999 where A(H3N2) was the predominant subtype, making up 62.1% of total isolates.

The first A(H1N1) was isolated from a specimen taken on May 12th, from a 42-year-old female in South Auckland. Since then, A(H1N1) circulated throughout the winter season as the predominant strain. All influenza A(H1N1) isolates were antigenically similar to the A/New Caledonia/20/99-like viruses.

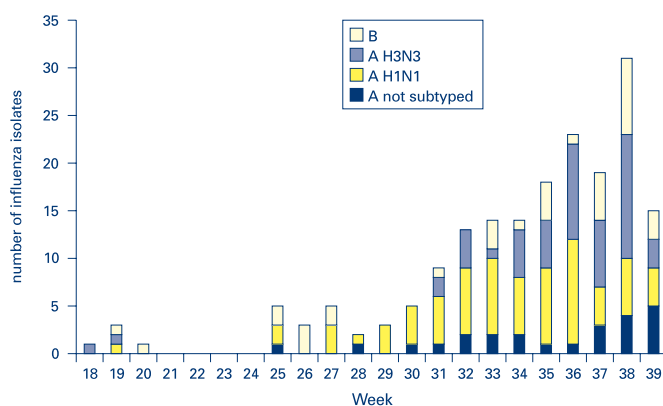
The first two A(H3N2) isolations were from Christchurch on May 5th and from Auckland on May 8th. Since then, A(H3N2) was not detected by the surveillance system for nearly 3 months and then reappeared in August and September. All influenza A(H3N2) viruses were of the A/Sydney/5/97 lineage.

Figure 2: Weekly consultation rates for influenza-like illness in New Zealand 1992-2000



The first influenza B was collected from a 33-year-old male from Auckland on May 9th. Since then, influenza B co-circulated throughout the winter. During the past 10 years (1990-99), influenza B predominated or co-dominated in every second year, ie, in 1991, 1993, 1995, 1997 and 1999. Because of this pattern, the prediction was that there might not be much influenza B activity at all. However, this prediction was incorrect. One explanation is that the circulating B strains in New Zealand have antigenically drifted, in particular those at the end of the flu season. All influenza B isolates were antigenically related to the B/Beijing/184/93 strain. However, they showed an 8-fold to 32-fold reduction in reaction with B/Beijing/184/93-like virus antisera. The population immunity was not protective enough against these newly drifted B strains.

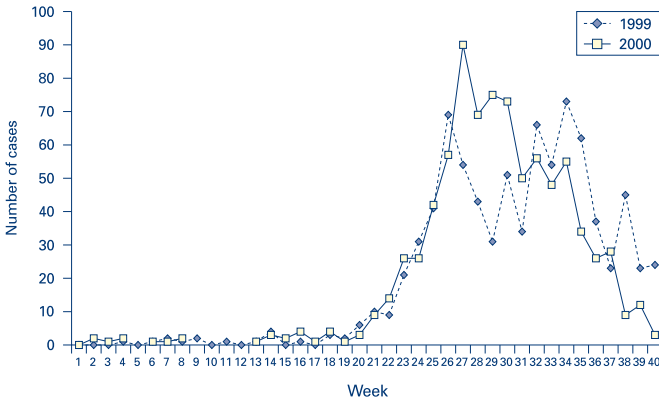
Figure 3: New Zealand influenza isolates by types, May-September 2000



Respiratory Syncytial Virus (RSV)

The number of respiratory syncytial virus (RSV) cases in 2000 was similar to 1999. During January to September, a total of 830 RSV laboratory-confirmed cases were reported compared with 826 during the same period in 1999 (Figure 4). RSV activity peaked in Week 27 (early July) and remained high until Week 34 (late August). Since then, the number of RSV cases rapidly declined.

Figure 4: RSV laboratory-confirmed cases by week, 1999 and 2000



NORWALK-LIKE VIRUS

Characterisation of Norwalk-like virus strains from gastroenteritis outbreaks occurring between January-September 2000¹

Table 13. Norwalk-like virus outbreak strains January-September 2000

| Outbreak Month | Outbreak District | Outbreak Setting | NLV Strain Identification |
|----------------|-------------------|---|---------------------------|
| January | Waikato | Rest home | GII/6, Napier virus |
| January | Coromandel | Rest home | GII/6, Napier virus |
| January | Auckland | Family, person to person | GII/3, Mexico virus |
| January | Auckland | Family, person to person | GII/6, Napier virus |
| January | Auckland | Burger restaurant | GII/6, Napier virus |
| January | Auckland | Contaminated food | GII/3, Mexico virus |
| January | Christchurch | Not supplied | GII/6/7/9 |
| January | Hamilton | NZ oysters - associated with 4 outbreaks | GII/3, Mexico virus |
| January | Auckland | Turkish cafe | Not determined |
| January | Northland | Community-wide outbreak | GII/3, Mexico virus |
| February | Auckland | Family swimming pool | GII/6, Napier virus |
| February | Auckland | Pizza restaurant | GII/6, Napier virus |
| February | Auckland | Not supplied | GII/3, Mexico virus |
| March | Wellington | Foodhandler | GII/3, Mexico virus |
| April | Rotorua | Poor toilet facilities at orienteering event | GII/6, Napier virus |
| April | Auckland | Wedding BBQ, person to person via vomit / aerosol | GII/3, Mexico virus |
| April | Dunedin | Asymptomatic foodhandler with sick child | GII/4,8, 'Global strain' |
| July | Christchurch | Hospital, foodhandler? | GII/3, Mexico virus |
| July | Hamilton | Rest home | GII/4,8, 'Global strain' |
| August | Wellington | Catered lunch, foodhandler? | GII/4,8, 'Global strain' |
| August | Auckland | Person to person | GII/4,8, Lordsdale virus |
| August | Auckland | Korean oysters | GII/4,8, Lordsdale virus |
| September | Christchurch | Fast food restaurant | GII/1 Hawaii virus |

¹ J Infect Dis 2000; 181 S2:336-48.

During January to September 2000, there were 23 laboratory-confirmed outbreaks of Norwalk-like virus (NLV) in New Zealand (Table 13). The DNA sequences of NLV outbreak strains identified between January and September 2000 have been submitted to the Calicinet database at CDC, Atlanta, for full identification according to the new classification system developed by CDC scientists¹ (Table 13). This database shows the linkage between individual strains, including other New Zealand and international strains. New Zealand strains from 1996 onwards are now deposited in this database, allowing the identification of common strains occurring concurrently throughout the country and retrospectively over previous years. This function may assist public health staff to find common sources of infection. The analysis of sequence data has already shown that in New Zealand there is a specific cluster of NLV strains not recognised elsewhere (GII/6, Napier virus), as well as the 'global strain' (GII/4,8) which is found worldwide and is especially common in rest home outbreaks. NLVs belonging to the 'Mexico-like virus' subgroup were the predominant outbreak strain occurring in late 1999 and early 2000. This strain was identified for the first time in commercially farmed New Zealand oysters harvested from two separate growing areas in October and December 1999.

CULTURE COLLECTION

Recent accessions to the Collection are shown in Table 14. The 1998 catalogue of strains is now online at www.esr.cri.nz.

Table 14. NZRM new accessions

| Name | NZRM No. | Source, Strain | Comments |
|----------------------------------|----------|------------------|---|
| <i>Burkholderia cepacia</i> | 4013 | LMG 12614 | Genomovar III |
| <i>Burkholderia multivorans</i> | 4014 | LMG 14293 | Genomovar II |
| <i>Burkholderia stabilis</i> | 4015 | LMG 14294 | Genomovar IV |
| <i>Burkholderia vietnamensis</i> | 4016 | LMG 10929 | Genomovar V |
| <i>Salmonella</i> Brandenburg | 4021 | NZ isolate, 2000 | NZ South Island strain, from environmental source |
| <i>Salmonella</i> Brandenburg | 4024 | NZ isolate, 1999 | NZ South Island strain, from seagull |
| <i>Salmonella</i> Brandenburg | 4026 | NZ isolate, 1999 | NZ South Island strain, from calf meat |
| <i>Yokenella regensburgei</i> | 4012 | NZ isolate, 2000 | |

NEW NAMES

The names in Table 15 have either been published in the International Journal of Systematic and Evolutionary Microbiology (IJSEM), formerly the International Journal of Systematic Bacteriology (IJSB), or validated by announcement in the IJSEM having been previously effectively published elsewhere.

Many names are validated in each bi-monthly publication of the IJSEM. Those notified as validated in the IJSEM of July 2000 and considered to be of relevance to Lablink readers are listed below.

Table 15. New names notified as validated, July 2000

| Name | Previous name | Reference |
|----------------------------|------------------------------------|--|
| <i>Finegoldia magna</i> | <i>Peptostreptococcus magnus</i> | Murdoch and Shah. Anaerobe 1999; 5 : 555-9 |
| <i>Micromonas micros</i> | <i>Peptostreptococcus micros</i> | Murdoch and Shah. Anaerobe 1999; 5 : 555-9 |
| <i>Rothia mucilaginosa</i> | <i>Stomatococcus mucilaginosus</i> | Collins et al. IJSEM 2000; 50 : 1247-51 |

MYCOLOGY

A summary of the opportunistic mycoses detected during January to June 2000 is shown in Table 16. Data were collated from replies received from all of 13 sentinel laboratories throughout New Zealand. The significance of some of the isolates is difficult to determine due to the absence of clinical details supplied.

Table 16. Biannual summary of opportunistic mycoses in New Zealand, January–June 2000

| Organism | No. of cases | Site | Clinical data |
|---|--------------|--|---|
| Fungi | | | |
| <i>Aspergillus fumigatus</i> | 1 | sinus aspirate and bone | AML, seen in direct exam. |
| <i>Exophiala jeanselmei</i> | 1 | aspirate from hand dorsum | abscess |
| <i>Exophiala species</i> | 1 | CAPD fluid | CRF, peritonitis, yeast cells seen in direct exam. |
| <i>Fusarium oxysporum</i> | 1 | corneal ulcer | Hyphae seen in gram stain, treated with natamycin and amphotericin B (no history of trauma) |
| <i>Mucor ramosissimus</i> | 1 | frontal sinus | nasal crusting |
| Black mycelial fungus - identification pending | 1 | (R) elbow subcutaneous lump | recurrent chromoblastomycosis, typical muriform bodies seen in direct exam. |
| <i>Pneumocystis carinii</i> | 6 | sputum (3) bronchial lavage (2) right and left lung washings (1) | HIV post bone marrow transplant (1), post renal transplant (1) ARF, increased shortness of breath, polymyositis, treated with Cotrimoxazole, but died |
| Yeasts | | | |
| <i>Candida albicans</i> | 32 | blood culture (20) CAPD fluid (3) liver aspirate (1) pleural and (L) flank aspirate (1) abdominal wound aspirate and blood culture (1) splenectomy bed aspirate (1) subphrenic abscess (1) blood, (R) flank aspirate and abdo wound fluid (1) finger aspirate (1) retroperitoneal collection (1) sternal debridement (1) | AML (1), sarcoma (1), line sepsis (4), CRF, on steroids, chest infection (1), CLL (1), abdo pain, caecal mass, developed LLL pneumonia and septic shock, treated with broad spectrum antibiotics (no antifungals), patient deceased same day as yeast isolated in blood (1), PE, lung Ca (1), long-term ICU patient (1), premature, skin broken down, skin colonised with <i>C. albicans</i> , infected lines (1), NR (8) ESRF, peritonitis AML, prolonged neutropenia, 2° to chemotherapy cholecystochal cyst, treated with Amphotericin B post bowel surgery (Crohn's disease), ?line sepsis, also isolated with <i>Candida parapsilosis</i> myeloproliferative disorder, GI bleed, combined splenectomy and hysterectomy, treated with fluconazole perforated gastric ulcer with subphrenic collection NR ?Candida endocarditis, recent bowel perforation NR osteomyelitis |
| <i>Candida albicans</i> and <i>Candida glabrata</i> | 1 | blood culture | ICU patient |
| <i>Candida glabrata</i> | 4 | blood culture (1) corneal graft (1) L) neck FNA (1) CAPD fluid (1) | urinary catheter <i>in-situ</i> also isolated from contaminated organ culture media lump (L) neck, pus and yeast cells seen in direct ESRF, peritonitis, also isolated with <i>Saccharomyces cerevisiae</i> |

| Organism | No. of cases | Site | Clinical data |
|--|--------------|--|---|
| <i>Candida guilliermondii</i> | 2 | CAPD | ESRF, peritonitis |
| <i>Candida krusei</i> | 1 | blood culture | septicaemia |
| <i>Candida parapsilosis</i> | 13 | blood culture (6) tenckhoff catheter tip (1) CAPD (5) CAPD and tenckhoff catheter tip (1) | line sepsis, AML (1), line sepsis (1), line sepsis, pre stem cell transplant (1), line sepsis premature baby (1), NR (2) ESRF, peritonitis ESRF, peritonitis ESRF, peritonitis, also isolated with <i>Candida guilliermondii</i> |
| <i>Candida tropicalis</i> | 5 | blood (2) abdo drainage and multiple sites (1) CAPD fluid (1) bile (1) | ALL, febrile, treated with ambisome(1), line sepsis, Ca return, on TPN, rapid improvement after line removed, no antifungals (1) yeast cells seen in direct exam. ESRF, peritonitis colonisation of stents post liver transplant (HCV), also isolated with <i>Candida glabrata</i> |
| <i>Cryptococcus neoformans</i> | 5 | CSF and blood (1) CSF (4) | Waldenström's macroglobulinaemia HIV, transferred from Samoa to Auckland (1), HIV, Thai visitor returned home on fluconazole (1), Low grade non-Hodgkin's lymphoma, receiving intrathecal chemotherapy at time of diagnosis (1), headache (1) |
| <i>Rhodotorula species</i> | 1 | CAPD fluid | ESRF, peritonitis |
| <i>Rhodotorula glutinis</i> | 1 | CAPD fluid | ESRF, peritonitis |
| <i>Rhodotorula mucilaginosa (rubra)</i> | 1 | CAPD fluid | ESRF, peritonitis |
| <i>Ustilago species</i> - most closely resembles | 1 | blood culture | NR |
| Actinomycetes | | | |
| <i>Actinomyces israelii</i> | 3 | FNA abdo wall (1) abdo wall abscess (1) liver abscess (1) | ?pulmonary nocardiosis, also grew <i>Actinobacillus actinomycetemcomitans</i> also isolated with mixed anaerobes NR |
| <i>Actinomyces israelii</i> and <i>Propionibacterium propionicus</i> | 1 | maxillary sinus | chronic maxillary sinusitis |
| <i>Propionibacterium propionicus</i> | 1 | tear duct | canalculitis |
| <i>Nocardia asteroides</i> | 1 | sputum | cystic fibrosis |
| <i>Nocardia asteroides</i> - most closely resembles | 2 | sputum (1) hand (1) | NR infected cut |
| <i>Nocardia brasiliensis</i> | 2 | knee (1) and arm (1) | NR |
| <i>Nocardia farcinica</i> | 2 | (L) breast (1) blood culture (1) | abscess admitted with left ventricular fibrillation, 2° acute myocardial infarction, now deceased |
| <i>Nocardia nova</i> | 8 | bronchial washing (2) sputum (6) | ?Ca lung (1), RLL pneumonia (x TB MGIT tube) (1) sarcoma (1), COAD, chest infection (x TB MGIT tube) (1), myeloma RUL pneumonia (1), bronchiectasis (1), NR (2) |
| <i>Nocardia nova</i> - most closely resembles | 1 | sputum | bronchiectasis |
| <i>Nocardia transvalensis</i> - most closely resembles | 1 | bronchial washing | bilateral pneumonia |
| <i>Rhodococcus species</i> | 1 | CAPD fluid | ESRF, peritonitis |
| <i>Tsakumurella species</i> | 1 | CAPD fluid | ESRF, peritonitis. Isolated 4x. Identity confirmed by ESR, Wellington, using 16S rRNA sequencing |

KEY:

| | | | |
|------|---|-----|------------------------------|
| AML | Acute myeloid leukaemia | GI | Gastrointestinal |
| Ca | Carcinoma | HCV | Hepatitis C virus |
| CAPD | Continuous ambulatory peritoneal dialysis | HIV | Human immunodeficiency virus |
| CLL | Chronic lymphoblastic leukaemia | ICU | Intensive care unit |
| CRF | Chronic renal failure | NR | Clinical data not received |
| ESRF | End stage renal failure | PE | Pulmonary embolus |
| FNA | Fine needle aspirate | TPN | Total parenteral nutrition |

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