

First case of *Mycobacterium ulcerans* disease (Bairnsdale or Buruli ulcer) acquired in New South Wales

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Mycobacterium ulcerans is a slow-growing environmental bacterium that causes Buruli ulcer (also known as Bairnsdale ulcer in Victoria and Daintree ulcer in northern Queensland). We describe two patients with laboratory-confirmed Buruli ulcer who were infected either in New South Wales or overseas. A molecular epidemiological investigation demonstrated that, while one case was probably acquired in Papua New Guinea, the other was most likely to have been acquired in southern NSW. To our knowledge, this is the first case of *M. ulcerans* infection acquired in NSW. (MJA 2007; 186: 62-63)

Clinical records

Patient 1

A 50-year-old geologist was referred in April 2005 for assessment of chronic cellulitis and ulceration of the right hand, present for 11 weeks (Box 1). An intraoperative swab showed acid-fast bacilli on Ziehl-Neelsen staining. Buruli ulcer (*Mycobacterium ulcerans* infection) was confirmed by polymerase chain reaction (PCR) testing. Over the next 3 months, the patient received a combination of antibiotic and surgical therapy. At follow-up 1 week after ceasing antibiotic therapy (4 months after initial presentation), the skin graft had healed, and the patient remained well.

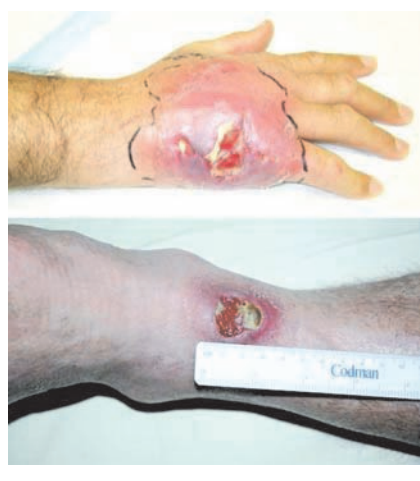
The patient lived in rural New South Wales but had travelled to the Mornington Peninsula and East Gippsland regions of Victoria 5 years previously. Two weeks before the onset of illness, he had been fishing in the Snowy Mountains. He also made frequent work trips to Papua New Guinea, with seven trips in the 15 months before illness. His most recent trip there lasted 18 days, and he returned to Australia almost 12 weeks before the onset of infection.

Variable number tandem repeat (VNTR) typing (Box 2) revealed that the isolate had the same profile as a previously described *M. ulcerans* strain from PNG, which differed from Victorian strains at loci 8 and 19.¹ Similarly, the isolate had a restriction fragment length polymorphism (RFLP) band profile identical to that of the PNG strain, but differing from that of Victorian strains.² These results suggest that the infection was acquired in PNG, not Australia. The minimum incubation period in this case was therefore 3 months.

Patient 2

The second patient was a 42-year-old Australian citizen usually resident in Holland. He presented in Melbourne in January 2006 with a skin ulcer over the left ankle (Box 1) which had been present for 5 months. Buruli ulcer had been correctly diagnosed in the Netherlands, and he had been treated with appropriate

1 Lesions in Patient 1 (top) and Patient 2 (bottom)



antibiotics for 6 weeks with no apparent response. The lesion was excised, a skin graft applied, and further antibiotic therapy given for 6 weeks, resulting in complete resolution. PCR testing performed on resection specimens from the ulcer was positive for *M. ulcerans*.

The patient had travelled widely in Africa between 5 and 2 months before the appearance of the skin lesion; 7 months before its appearance, he had spent 2 weeks sea kayaking near Eden on the southern NSW coast. He had not visited Victoria for at least 10 years.

M. ulcerans was not able to be cultured, so typing was performed on DNA extracted from the resection specimens. The two VNTR loci that discriminate between African and Victorian strains were examined.¹ The estimated PCR product sizes of 420

base pairs (locus 4) and 650 base pairs (locus 8) were consistent with the Victorian profile.¹ A second typing method, multilocus sequence typing, revealed that the patient's strain lacked the C-to-T substitution in the *sodA* gene characteristic of African isolates.³ These data suggest that the infection was acquired in southern NSW and not Africa. The incubation period in this case was therefore about 7 months.

Discussion

Mycobacterium ulcerans infection was first described in patients in the Bairnsdale district of Victoria,⁴ where it was known as Bairnsdale ulcer. Since then, the disease has been recognised in Far North Queensland (known as Daintree ulcer),⁵ central coastal Queensland⁶ and the Northern Territory in Australia,⁷ and in as many as 30 other countries, including PNG and sub-Saharan Africa.⁸ In the past 15 years, significant clusters of cases have occurred on Phillip Island⁹ and the Mornington and Bellarine Peninsulas near Melbourne (Box 3). Despite this wide distribution, no cases have been reported previously from NSW, except in patients who were exposed during interstate or overseas travel.¹⁰

M. ulcerans is an environmental pathogen, which is transmitted by an unknown mechanism to humans who enter endemic areas.

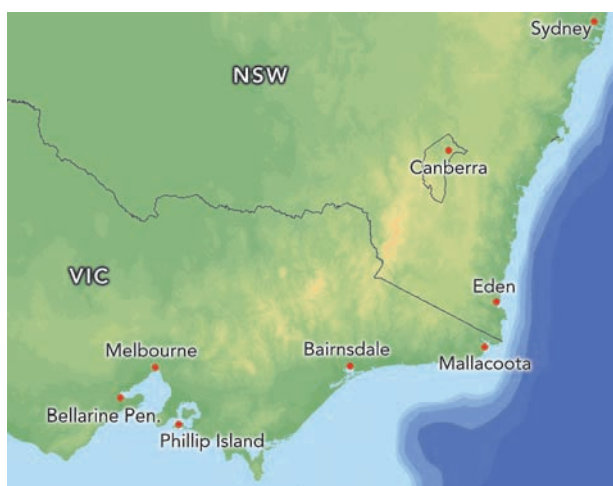
2 What is variable number tandem repeat (VNTR) typing?

- VNTR typing is a DNA fingerprinting method based on polymerase chain reaction (PCR).
- The technique detects differences in the number of tandem repeat DNA sequences in specific regions of microbial genomes (known as VNTR loci).
- Strains of *Mycobacterium ulcerans* from different geographic regions can be reliably distinguished by VNTR typing.¹
- VNTR typing is usually performed on cultured isolates, but can be performed using DNA extracted directly from patient specimens. ♦

Our patients had both travelled to several regions of Australia and overseas where Buruli ulcer occurs. Using a combination of conventional epidemiology and molecular typing, we determined the most likely geographic origin of transmission for each patient: PNG for Patient 1 and southern coastal NSW for Patient 2. The latter case represents the first strong evidence for Buruli ulcer having been acquired in NSW. However, there have been cases of Buruli ulcer from Mallacoota (unpublished data), a small town in eastern Victoria adjacent to the NSW border (Box 3).

It is not surprising that *M. ulcerans* exists in coastal environments in southern NSW, just as it does in Victoria. The rarity of cases in NSW compared with Victoria remains unexplained. It is unlikely to result from failure to recognise previous cases in NSW, as the progressive nature of the infection means that most cases are eventually diagnosed. Australian primary care clinicians need to be aware that Buruli ulcer may occur in NSW, to ensure early diagnosis and treatment to minimise disability.

3 Victoria and southern New South Wales showing relevant regions



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Competing interests

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