

Waterborne diseases among Aboriginal people

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Aboriginal people in many communities in New South Wales (NSW) have, until now, not enjoyed the same access to water and sewerage services as the rest of the NSW population. Evidence from international studies shows that lack of these services leads to poorer health.¹

Adequate quality and quantity of water are essential for drinking, food preparation and cooking, washing, waste removal, cultivation and recreation and, therefore, for health. A study of the global burden of disease found that poor water supply, sanitation, personal and domestic hygiene were responsible for 5.3% of total deaths and 6.8% of total disability-adjusted life years (DALYs) in 1990.² There are a number of communicable diseases that result from poor water quality and quantity and they can be classified according to transmission route (Table 1).³

Since Aboriginality is poorly reported on deaths data by health care workers (identification is currently estimated at 76.6%)⁴ it is difficult to determine the number of Aboriginal deaths from the diseases caused by poor water quality and quantity in NSW. However, the Australian Institute of Health and Welfare has found that Aboriginal infants in Australia are 7.9 times more likely to die of infectious and parasitic diseases (which would include

waterborne diseases) than non-Aboriginal infants. Furthermore, Aboriginal children aged 1–14 years are five times more likely to suffer from these diseases than non-Aboriginal children.⁵

After NSW became a British colony, Aboriginal people were made to live together in locations on the edges of, or remote from, towns. These communities became known as ‘reserves’ and, after the *Aboriginal Land Rights Act* was enacted in 1983, became the responsibility of the Local Aboriginal Land Councils. The Local Aboriginal Land Councils were responsible for all services on the reserves including maintenance of the water and sewerage infrastructure. Although the Act was intended as an act of reconciliation, the newly created Local Aboriginal Land Councils were given responsibilities for which they were ill-prepared, including the maintenance of water sewerage infrastructure.

With the evidence that Aboriginal people are more likely to suffer from infectious and parasitic diseases and that water quality in certain Aboriginal communities in NSW is often inadequate, a broad alliance of NSW Government departments and non-government organisations prepared a case for the NSW Government to address the issue. In 2008, the NSW Government committed \$250 million of funding over 25 years for the upgrade, maintenance and operation of the water and sewerage infrastructure on specific Aboriginal communities. This program is currently being implemented and will require ongoing participation from the NSW Department of Health and regional public health units to ensure the interests of the communities are considered.

Table 1. Classification of water-related diseases by transmission route

Category	Disease example
Waterborne	Typhoid Infectious hepatitis A
Water-washed (caused by lack of water, poor personal hygiene and lack of proper human waste disposal)	Trachoma, scabies Shigella dysentery
Water-based (caused by aquatic organisms that spend part of their life cycle in the water and another part as parasites of animals)	Schistosomiasis Guinea worm (nematode)
Water-related insect vectors	Malaria, trypanosomiasis, Murray Valley and Ross River viruses
a. Water-biting	
b. Water-breeding	Onchocerciasis

Source: Adapted from White GF, Bradley DJ, White AU. Drawers of water: domestic water use in East Africa. Chicago: University of Chicago Press; 1972.

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Dental caries in children

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Dental caries is a common childhood health problem in New South Wales (NSW). It disproportionately affects children from low income, Aboriginal and migrant families, and children who live in rural and remote areas.¹ If left untreated, caries can significantly undermine child health and development, and may require treatment in hospital under general anaesthesia.²

Disease aetiology

Caries is a bacterial disease that is modified by diet. It requires the simultaneous presence of three factors: bacteria, fermentable carbohydrates and a susceptible tooth. A number of bacteria have been linked to caries, however, there is strong empirical evidence that *Streptococcus mutans* is the primary disease agent in caries development and progression.³ Children are not born with *S. mutans* in their mouth but are exposed to the bacteria. Bacteria are mostly transmitted from the primary carer to child via activities such as tasting the child's food before the child eats.²

Bacteria in dental plaque metabolise sugars and starches, producing organic acids. Organic acids lower the pH in the mouth and promote the loss of essential minerals from the tooth surface, including fluoride, calcium and phosphate. Minerals are returned to the tooth surface once the neutral pH is restored (approximately 20 minutes after eating). If there is a frequent net loss of essential minerals from the tooth surface, over time the tooth structure will break down, creating a cavity.³

Implications of untreated caries for child health and development

Poor oral health and untreated dental caries in childhood can impede healthy growth and development. Advanced caries may lead to: suppressed growth due to dental pain and reluctance to eat; difficulty communicating with others due to impaired speech; low self-esteem due to bad breath and an unsightly smile; and poor educational outcomes due to dental pain, interrupted sleep, difficulty concentrating and hours of schooling lost.^{2,4}

Risk factors

Dental caries in children is mostly preventable and can be reversed if detected at an early stage.⁵ Key modifiable risk factors include: frequent consumption of high sugar foods and drinks; poor oral hygiene; high levels of *S. mutans* in the primary carer's mouth; and restricted access to a fluoridated water supply.² Consumption of fluoridated water protects against caries as fluoride assists with the replenishment of essential minerals to primary teeth, and, when ingested during the development of teeth, makes them resistant to decay-causing organic acids.³

Prevention

A number of strategies have been proven empirically to reduce the risk of dental caries in children, including:

- Fluoridating public water supplies. Water fluoridation is a safe, effective, cheap to administer, and equity-promoting population oral health strategy.
- Brushing with adult-strength fluoride toothpaste twice daily. Regular brushing with fluoride toothpaste is important for rural and remote communities that do not have access to fluoridated water. Parents and guardians should seek advice from a dental professional before introducing adult-strength toothpaste for children aged under 6 years.