



BUSSELTON WATER

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## **Naegleria Information**

*The following information is an abridged extract from the article 'Operational Management of Naegleria spp. In drinking water supplies in Western Australia', by R. Trolio, A. Bath, C. Gordon, R. Walker and A. Wyber published 2008 IWA Publishing in Water Science & Technology: Water Supply- WSTWS 8.2 pp207-215*

*Naegleria fowleri* is a free-living amoeboflagellate inhabiting soil and water that can cause Primary Amoebic Meningoencephalitis (PAM), a rare and sometimes fatal disease. In Australia, the amoeba typically inhabits drinking water supplies that have consistent water temperatures above 20°C. The incidence of PAM is widespread in Australia, with reports from South Australia, Western Australia, New South Wales and Queensland. One of the key issues for water utilities is the potential widespread distribution of *N. fowleri* and its ability to infect and re-infect drinking water supplies.

*N. fowleri* is a human pathogen that can cause the waterborne disease PAM, through the use of contaminated water for swimming or domestic bathing, with the risk arising from nasal contact with the infected water (i.e. ingestion of water through the nose). Instances of PAM have been reported in many countries, including several states within Australia. Generally cases are associated with geothermal water or heated swimming pools, although there have been cases where the source was traced back to reticulated water. In WA, the last reported human case was in 1985. Other species of *Naegleria* may also be pathogenic, however, only *N. fowleri* has been associated with infecting the human central nervous system.

For WA, the large water supply distribution systems and the ability of the pathogen to infect and re-infect drinking water supplies pose the greatest challenge in being able to control *N. fowleri*. *Naegleria* can inhabit pipeline biofilms or the sediments of treated water storage tanks, as well as establish a biofilm ecosystem within the distribution system. Chlorine is the main barrier to control *N. fowleri*, however, once the amoeba reside within the pipeline or tanks, the chlorine residual become less effective, and it is extremely difficult to completely remove all amoeba and their cysts.

Pathogenic and non-pathogenic species of *Naegleria* have been isolated from groundwater and surface sources in WA. (Note: Busselton currently has one of the non-pathogenic species within the water supply, *Naegleria Ivoaniensis*.) Where *Naegleria* has been detected, and/or where the water temperature is consistently greater than 25°C for 4 months a year, the source is classified as high risk for *Naegleria* contamination. (Note: Busselton water fits into this category). As stated, a continuous free chlorine residual is the best barrier to control and eliminate *Naegleria* from a distribution system, and the chlorinator is the critical control point in water supplies that have a *Naegleria* risk.