

Box 1.6 Control of hydatid disease in Tasmania, 1960s-**Box 1.6 Control of hydatid disease in Tasmania, 1960s-**

Zoonoses are infectious diseases that occur naturally in animals and can be transmitted to humans. They include various strains of influenza (e.g., 'bird flu'), brucellosis, echinococcosis, listeriosis, Q fever and salmonellosis, among others. Echinococcosis or hydatid disease is a potentially fatal parasitic disease, common to humans and some animals, caused by infection with tapeworm larvae of the genus *Echinococcus granulosus*. In Australia, it is transmitted by wildlife in a prey-predator life cycle, with dogs (including wild dogs and dingoes) and foxes as definitive hosts and herbivorous animals (e.g., sheep, goats, kangaroos) as intermediate hosts. Although human hydatid disease occurs in almost all rural communities and grazing lands of the world, it carries the added stigma of being preventable.¹⁻³

The highest prevalence of human hydatid disease in the English-speaking world was recorded in Tasmania in the 1960s.⁴ The disease was also found in other areas of Australia, with a mean annual prevalence of 2.6 infections (ranging from 0.3 to 25.5) per 100,000 rural population; and a number of cases from urban areas found in NSW/ACT hospital studies.⁵ At the launch of '*The Travelling Parasite*', a public health educational video on the prevention of hydatid infection in 1996, it was described as occurring mostly in eastern NSW along the Great Dividing Range, with an estimated average of one person a day treated for it in Australia (although accurate data were not available).⁶ Despite being a notifiable disease, human hydatidosis was widely under-reported. Later information indicated that the disease was common in sheep-farming areas in NSW, ACT, Victoria, southwest WA and eastern Qld, and probably SA. It was also found in cattle in the Kimberley (WA) and in Qld.⁷

A major contributing factor to the higher incidence in Tasmania - where the disease was common in sheep (with 60% carrying cysts) and rural dogs (12% carrying the tapeworm) - was the habit of feeding sheep offal to working dogs.^{8,9} A large number of human infections resulted, some of which were fatal. A 1960 survey reported 92.5 human infections per 100,000 population.

Tasmania began a control program in 1962 to stop the transmission of hydatid disease to humans. Public meetings were held and committees formed to raise awareness of the considerable health risk of hydatids. The Tasmanian program was aimed at stopping the hydatid life cycle by denying dogs access to offal from sheep, cattle, goats and pigs. It included regular testing of dogs for tapeworm infection, together with an educational program emphasising prevention. Abattoir monitoring of sheep enabled rural properties with infected dogs to be traced. With community support, the voluntary program became compulsory in 1966. The number of new human infections per year fell from 24 in 1967 to four in 1983, with equally striking falls in the prevalence of tapeworm in dogs and hydatid cysts in sheep (to less than 1%) (*Figure 1*).¹⁰

In 1996, Tasmania was declared 'provisionally free' of hydatid disease, as there had been no new infections in humans, dogs or commercial livestock for several years.¹¹ Around 400,000 sheep and 60,000 cattle were inspected for hydatid cysts in abattoirs each year in Tasmania and, if found, further action (e.g., quarantine, slaughter of flock) was taken at the property of origin. It continued to be illegal to allow dogs access to livestock offal in Tasmania, and dogs entering the island had to have been previously treated for tapeworm.

Hydatid disease does not 'conform to a pattern to which the health care systems are designed to respond' because successful prevention and control measures required the collaboration of health as well as non-health actors, such as those in agriculture, education and conservation, and communities.² The success of the Tasmanian Hydatid Control Programs, 1962-1996, however, was recognised worldwide as a model for hydatid control programs. Success was achieved through multiple emphases on public participation, community education, and united action by many agencies including agriculture and health departments, underpinned by sound epidemiological principles.¹²

Hydatid disease ceased to be a nationally notifiable disease in the year 2000;¹³ but it remained notifiable in Qld, WA, SA, NT and Tasmania (2014)¹⁴⁻¹⁶, and between 80 and 100 new cases were still diagnosed in Australia each year, some in children as young as 26 months.¹⁶ However, in Tasmania, epidemiological data from 1996 to 2012 found no evidence of transmission of hydatid disease to humans, following the provisional declaration of eradication of hydatid disease, demonstrating 'the likely success of the Tasmanian Hydatids Eradication Council in eliminating transmission of hydatid disease within Tasmania'.¹⁰

In addition to the human cost, losses to the Australian meat industry continued to be considerable (e.g., for Qld, losses were estimated at from \$2.7m to \$6m annually in 2004).^{16,17} Urban areas encroaching on potentially infected wild dog ranges (e.g., in Qld^{17,18}), increasing use of national parks in which wildlife were disease reservoirs (the numbers of potential intermediate and definitive host populations were in the millions, with species widespread across the country), and under-reporting and notification, including in abattoirs, meant there was low public awareness of the disease and how it could be prevented. Public awareness could be further improved, and other actions to reduce transmission, included:

- improved reporting on human infection; and
- a national awareness program targeted particularly at rural children, which could be incorporated into school curricula; and
- a livestock vaccination program for livestock on farms at the junction of national/ state parks and reserves (where the wildlife reservoir provided a constant source of infection for both humans and domestic animals).^{16,21,19,20}

References

1. Craig PS, Larrieu E. Control of cystic echinococcosis/hydatidosis: 1863 2002. *Advances in Parasitology* 2006; 61:443-508.
2. McCullagh PJ. Hydatid disease: medical problems, veterinary solutions, political obstacles. *Medical Journal of Australia* 1996; 164(1):7-8.
3. Clunies Ross I. A survey of the incidence of *Echinococcus granulosus* (Batsch) or hydatid disease in NSW. *Australian Veterinary Journal* 1926; 2:56-67.
4. Goldsmid JM. Custom, culture and health in the tropics. In Goldsmid JM, Leggat PA, eds. *Primer of tropical medicine*. Brisbane: Australasian College of Tropical Medicine, 2005.
5. Jenkins DJ, Power K. Human hydatidosis in New South Wales and the Australian Capital Territory, 1987 1992'. *Medical Journal of Australia* 1996; 164(1):14-17.
6. Anderson J, Federal Primary Industries and Energy Minister. Launch of the video: The travelling parasite [media release], 1996.
7. Sarre A. (2000) Hydatids - when a dog is not man's best friend [web article]. <<http://www.sciencearchive.org.au/nova/056/056key.html>>
8. Goldsmid JM, Pickmere J. Hydatid eradication in Tasmania: point of no return? *Australian Family Physician* 1987; 11:1672-1674.
9. King S, Hutchinson G. *Hydatids - you, too, can be affected* (2nd edn.). Sydney: NSW Dept of Primary Industries, 2005.
10. O'Hern JA, Cooley L. A description of human hydatid disease in Tasmania in the post-eradication era. *Medical Journal of Australia* 2013; 199(2):117-120.
11. Tasmanian Department of Primary Industries and Water. *Hydatid disease*. Hobart: Tasmanian Department of Primary Industries and Water, 2006.
12. Donaldson C. *The Tasmanian hydatid control programme*. Armidale: University of New England, 1988.
13. Department of Health and Ageing (DoHA). Australian national notifiable diseases list [website]. CDNA. Viewed 12 May 2006.
14. Department of Health and Human Services (DHHS), Tasmania. *Guidelines for notifiable diseases, human pathogenic organisms and contaminants*. Hobart: DHHS, 2010. <www.dhhs.tas.gov.au/__data/assets/pdf_file/0003/53319/Notifiable_Diseases_Guideline_FINAL_Feb_2010.pdf>
15. SA Health. *Hydatid disease - symptoms, treatment and prevention*. SA Health. [website]. <www.sahealth.sa.gov.au/wps/wcm/connect/public/content/sa+health+internet/health+topics/health+conditions+prevention+and+treatment/infectious+diseases/hydatid+disease>
16. Jenkins DJ. Cystic echinococcosis in Australia: the current situation. *Southeast Asian Journal of Tropical Medicine and Public Health* 2004; 35(suppl 1):183-188.
17. Brown B, Copeman DB. Zoonotic importance of parasites in wild dogs caught in the vicinity of Townsville. *Australian Veterinary Journal* 2003; 81:700-702.
18. Jenkins DJ, Allen L, Goulet M. Encroachment of *Echinococcus granulosus* into urban areas in eastern Queensland, Australia. *Australian Veterinary Journal* 2008; 86(8):294-300.
19. Lightowlers MW, Colebrook AL, Gauci CG, Gauci SM, Kyngdon CT, Monkhouse JL, et al. Vaccination against cestode parasites: anti-helminth vaccines that work and why. *Veterinary Parasitology* 2003; 115(2):83-123.
20. Craig PS, McManus DP, Lightowlers MW, Chabalgoity JA, Garcia HH, Gavidia CM, et al. Prevention and control of cystic echinococcosis. *Lancet Infectious Diseases* 2007; 7(6):385-394.
21. Barnes TS, Deplazes P, Gottstein B, Jenkins DJ, Mathis A, Siles-Lucas M, et al. Challenges for diagnosis and control of cystic hydatid disease. *Acta Tropica* 2012; 123:1-7.