CORRESPONDENCE

TOXOPLASMOSIS AND KANGAROO MEAT

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We refer to the recent article in *Communicable Diseases Intelligence* entitled *A probable food-borne outbreak of toxoplasmosis* by Robson *et al*[1]. We note also associated articles in the *Women's Weekly*, the daily press and electronic media which concentrated on a possible association with raw kangaroo meat. We recognise the value of bringing toxoplasmosis, and particularly congenital toxoplasmosis to the attention of the general community and the medical community and also the need to focus on possible modes of transmission. It is also important to note however that no evidence has been presented which warrants the conclusion that raw kangaroo meat was the source of toxoplasmosis.

As Dr Robson *et al* stated "no statistically significant association could be demonstrated between the acquisition of toxoplasmosis and any of the foods ingested". In fact any one or all of the foods or even the salads (which were not investigated) could have been the source of infection.

It is interesting to note that as many as 25% of lamb and 25% of pork samples have been shown to contain tissue cysts[2]. Tissue cysts have rarely been isolated from beef[3]. No evidence has been presented that kangaroo meat contains tissue cysts. The only evidence presented was serological evidence - not evidence of tissue cysts, and the serological prevalence of toxoplasmosis was much higher in sheep (16.9% - 61.7%) and pigs (7.2% - 23.3%) than in macropods including kangaroos (4% - 8.5%)[1].

The advice on cooking all meats for 4 minutes at 61°C is important. However until tissue cysts have been demonstrated in kangaroo meat, and specifically kangaroo meat prepared for restaurants, there is no scientific basis for implicating kangaroo meat as a cause of this 'outbreak'.

1. Robson JMP, Wood RN. A probable food-borne outbreak of toxoplasmosis. *Comm Dis Intell* 1995;19:517-52.2
2. Dubey JP A review of toxoplasmosis in pigs. *Vet Parasitol* 1986; 19: 181-223.
3. Mandell GL, Bennett JE, Dolin R. *Principles & Practice of Infectious Diseases* 4th Ed. New York: Reply from the principal author. Churchill Livingstone, 1995.

Reply from the principal author

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I wish to take issue with a number of points raised in the correspondence from Drs Davison and El-Saadi.

I did state that there was no statistically significant association between toxoplasmosis and any food ingested. Perusal of the menu and a description of the cooked nature of the food served at the function still leads me to conclude that the undercooked kangaroo meat was the most likely source, on scientific grounds.

It is not relevant to quote the higher prevalence of tissue cysts in pork when pork was not on the menu. What is important is that kangaroo meat is a potential source of infection, and on this occasion, would appear to be the most likely source. Undercooked red kangaroo meat was noted by the majority of attendees. There were less people uncertain whether or not they ate this item as compared to any other item on the menu. The questionnaire was completed by the majority of respondents before any association with kangaroo meat was widely known or considered. Other possible meat sources appeared well cooked. There was almost no salad (garnish only) served with the cocktails and it is therefore difficult to believe that 12 people could have become infected via this source particularly when hygienic measures at the restaurant appeared appropriate.

I think it is incorrect to say that there is no evidence that kangaroo meat can contain tissue cysts. There is a wealth of veterinary evidence that kangaroos are highly susceptible to toxoplasmosis and that the natural biology of the disease in all intermediate hosts means tissue cysts will occur in those kangaroos that are infected[1-2].

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From my literature research there are very few good descriptions of outbreaks of toxoplasmosis relating to ingestion of food[1-3]. Each of these papers was merely a description of a small outbreak. The quality of the scientific data in my recent publication surpasses these in terms of establishing an association with toxoplasmosis and food ingestion. Rare kangaroo meat was the most likely source on scientific grounds and had the closest association statistically (if not significantly). It goes some way towards clarifying the relative importance of various modes of transmission of this infection in the Australian community. Therefore a failure to publish the data would be irresponsible on my part.

I have no problems with the comments and criticisms of the study. It was carried out some time after the event and has a number of flaws. However if we insist on statistical significance for these matters then findings of public health significance might never be published.

CDI took the editorial decision to publish this paper knowing the statistical nature of the data. I believe that this was the correct decision in the interests of public health.

1. Canfield PJ, Hartley WJ, Dubey JP. Lesions of toxoplasmosis in Australian marsupials. *J Comp Path* 1990; 103: 159-167.
2. Readacliff GL, Hartley WJ, Dubey JP, Cooper DW. Pathology of experimentally induced, acute toxoplasmosis in macropods. *Aust Vet J* 1993; 70: 4-6.
3. De Silva LM, Mulcahy DL, Kamath KR. A family outbreak of toxoplasmosis serendipitous finding. *J Inf* 1984; 8: 163-167.
4. Masur H, Jones TC, Lempert JA, Cherubini TD. Outbreak of toxoplasmosis in a family and documentation of acquired retinochoroiditis. *Am J Med* 1978; 64: 396-402.
5. Kean BH, Kimball AC, Christenson WN. An epidemic of acute toxoplasmosis. *JAMA* 1969; 208: 1002-1004.