

## Do differences in the food supply explain discrepancies in epidemiology?

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Epidemiological studies often show correlations within a population between specific food types and disease outcomes. However a considerable amount of variability exists between such studies in terms of level of significance (or relevance) of these correlations, particularly between different regional or national settings. These differing outcomes are often a result of three distinct shortcomings of epidemiological investigations involving diet: (i) Poor adjustment for intake (or lack of intake) of other dietary factors, (ii) Lack of adequate description or subgrouping of food types on dietary recall tools such as food frequency questionnaires, (iii) Food compositional differences at a regional or national level. The first limitation requires a case by case evaluation, however the latter two points are best illustrated by reference to a specific case, that of the ongoing debate over red meat consumption and colon cancer. For the situation regarding the recording of food intake, the recall tools are usually 'blunt' instruments that collect simplified information from which unsubstantiated conclusions are made. For instance frequency data is collected on 'meat' intake (often without quantities) where the term 'meat' includes: lean meat, fatty meat cuts and dishes and meat products (with added fat, food additives and other food types). In the case of national food compositional differences, red meat can have a broad range of nutrient, contaminant and fat content and type. The US situation from which many of these studies originate involves dramatic differences in animal feeding regimes, meat composition and preparation to Australia.

For instance the average selvedge fat on retail Australian beef and lamb cuts is 2.35 mm and 3.73 mm, respectively, with most cuts completely trimmed of fat (1). In a US study, average selvedge fat on retail beef and lamb cuts was 3.8 mm (1991) (2). Nutrition surveys also suggest that around 80% of Australians eat their meat trimmed of fat (3). In addition high red meat eaters have been shown to consume almost 40% more vegetables than non red meat eaters and 60% more than light red meat eaters (4).

The majority of Australian beef and lamb are grass-fed. Due to the extensive practice of grain-feeding (mainly corn), US beef cuts are more marbled and contain almost twice as much fat and saturated fatty acids as comparable Australian beef cuts (5). Grass-fed Australian beef contains significantly more long chain omega 3 polyunsaturated fatty acids (LCPUFA) than grain-fed US beef. Lean Australian beef rump contains approximately 100 mg of LC n-3 PUFA which is comparable to that of many species of white fish in Australia (6). Furthermore, the intramuscular fat of Australian grass-fed steers has higher levels of conjugated linoleic (7) acid and lower levels of trans-fatty acids than grain fed steers (8).

Lean red meat is more widely available in Australia than in the US. The data presented suggests that studies investigating the association between red meat consumption and cancer in US populations may not be relevant to Australians due to these differences in the red meat supply.

### References

1. Cobiac L, Droulez V, Leppard P, Lewis J. Use of external fat width to describe beef and lamb cuts in food composition tables. *Journal of Food Composition and Analysis* 2002; in press.
2. Savell JW, Harris JJ, Cross HR, Hale DS, Beasley LC. National Beef Market Basket Survey. *J Anim Sci*. 1991; 69: 2883–2893.
3. Coles-Rutishauser I, Penm R. Monitoring food habits and food security: Australia 1995–1996. Canberra; Australian Institute of Health & Welfare: 1996.
4. Baghurst K, Record S, Leppard P. Red meat consumption in Australia: intakes, nutrient contribution and changes over time. *Austr J Nutr Diet* 2000; 57 (4 Suppl): S3–S36.
5. [www.nal.usda.gov/fnic/foodcomp](http://www.nal.usda.gov/fnic/foodcomp)
6. Sinclair AJ, Oon S, Lim C, Li D, Mann NJ. The omega-3 fatty acid content of canned, smoked and fresh Australian fish. *Aust J Nutr Dietet* 1998; 55: 3116–120.
7. French P, Stanton C, Lawless F, O'Riordan EG, Monahan FJ, Caffrey PJ, Moloney AP. Fatty acid composition including CLA of intramuscular fat from steers offered grazed grass, grass silage or concentrate based diets. *J Anim Sci* 2000; 78: 2849–55.
8. Sinclair AJ, Mann NJ, Yep Y. The omega-3 content of lean red meat, MLA Project CHMN.016 Final Report, 2002.