

**Meat and Relative Vegetable Intake for European Longevity (MARVEL):  
the Australian version**

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The association of meat intake and colorectal cancer remains controversial as results are not consistent across countries or studies. These inconsistencies may relate to different types of meat being eaten, different foods accompanying meat, the degree of doneness of meat, quantity of meat eaten, as well as different cooking and trimming methods. In addition, there is considerable variability in the methodology used to assess meat intake and in the definition of meat used when calculating risk and odds ratios in population studies. European researchers have proposed that a uniform approach across countries is needed to assess intakes of meat, taking into account all of these aforementioned factors, and to cover all animal flesh based food. This approach could help to clarify the role of meat and cancer. This current Australian study is based on the European initiative. Two aspects will be reported: defining meat intakes in the 1995 National Nutrition Survey (NNS); and developing an assessment tool suitable to evaluate meat intake.

The NNS is the latest national survey but extrapolations are limited because these data are for one day's intake only. However, using unweighted data from 10,851 adults, 41% consumed beef and veal, 12% lamb, 20% fish and seafood, 29% chicken, 8% pork, 24% ham or bacon on the day of the survey. The median intakes of consumers of meat (on the day of the survey) were as follows: beef steak and roast 64-117g for men and 42-86g for women; lamb chops and leg steaks 71-81g for men and 44-52g for women; chicken meat and breast, 67-143 g for men and 45-87g for women; fish 90g for men and 70g for women. Insufficient numbers consumed pork to calculate a reliable median. In general, those who consumed more meat, ate more vegetables.

National data on meat preparation, cooking methods and eating practices are limited. A detailed and accurate assessment tool suitable for Australian conditions and consumers is needed. Photographs of 12 popular Australian cuts of meat were collated to represent varying degrees of doneness, outside charring, usual cooking methods, trimming practices, and serving sizes. For eight of the meat cuts, a set of 10 photographs was taken to represent differences in internal and external colour. Thirty volunteers were asked to rate, on a 10 cm line scale, each of the 10 photos presented in random order. Using repeated measures ANOVA to determine the average rating, the regression model was used to compare pairwise, the values for each of the photographs. We found that 3-6 photographs were sufficient for participants to differentiate differences ( $P < 0.05$ ).

A larger validation study in 482 adults (age range 20-70 years, diverse socioeconomic backgrounds, 52% women, 48% men) evaluated a wide range of tools, including questions, graphical representation, black-and-white and colour photographs, a meat module from the CSIRO food frequency, 24-hour recall data, and comparisons with real examples of cooked meats. Since the total number of questions was high, the potential assessment tools and samples of meat were each evaluated by approximately 100 people. Known and published assessment tools and methods were included where appropriate, and new questions were designed where there appeared to be no known tools already designed. This validation study will identify those questions, graphics, and photographs that most closely represent the practices depicted by the real examples of cooked meat, and by different dietary intake methodologies. The results of the validation study will be presented.