



## Red meat and bowel cancer

A large number of studies have looked at the association between environmental and lifestyle factors, including dietary factors, and risk of cancer. The most studied cancer in relation to red and processed meat intake is bowel or colorectal cancer (CRC). This has become an area of considerable scientific debate with widely differing opinion on the interpretation of the evidence.

Increasing age has been suggested to be the biggest single risk factor for bowel cancer, with 84% of cases being diagnosed in people aged 60 years or over (Cancer Research UK 2010). Therefore, with increasing life expectancy the incidence of bowel cancer is also increasing. Another major factor impacting on bowel cancer mortality is screening. Improvements in (early) diagnosis and treatment have resulted in higher survival from the disease.

### What does the evidence say?

Overall, the evidence of a link between cancer and red meat is inconclusive. Some studies have shown an increased risk whilst others have not. Where associations between red and processed meat and bowel cancer have been identified, they have not been clear cut. For example, patterns of associations vary by gender and anatomic location of the tumour in the colon. No association was found with women and an association was only slightly elevated among men (10-30%). Perhaps of even greater importance is the fact that most associations have been shown to be weak in magnitude and the large majority are not statistically significant. In addition, there is a lack of a clear dose-response trend. A recent meta-analysis of six cohort studies showed no association between animal fat and animal protein and bowel cancer<sup>1</sup>.

**Available data are not indicative of a positive association of colon cancer with red meat (Alexander 2009)**

### Where does the evidence come from?

The evidence related to meat consumption and bowel cancer largely rely on observation or epidemiology. Observational studies have their limitations. They report the

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<sup>1</sup> Alexander D et al. Am J Clin Nutr 2009; 18:1402-9

association between food intake and the occurrence of, or death from, a specific disease at some future point in time. Food intake may be assessed at intervals or at a single time point usually remote from the actual occurrence of the disease. Typically, food data is collated using a food frequency questionnaire, which can be unreliable and depends on how well the food category is defined, and how easily a serving can be identified.

### **Inconsistencies with the Evidence**

Variability in measures of intake and analytical comparisons means that there have been considerable inconsistencies between studies. For example, red and processed meat definitions are not uniform across studies. Red meat may be defined by the sum of beef, lamb, (possibly goat and horse) and pork or products containing these meats. Neither is there a generally agreed definition of 'processed meat' and the term is used inconsistently in epidemiological studies. Some may contain little meat and a significant amount of other ingredients such as pastry and vegetable fats and may, or may not, include processed meats. Some studies may have included processed meats in their classification of red meat intake,' thus further confusing the relationship between red meat or processed meat and bowel cancer. This makes judgements and recommendations less clear than they could be.

Observational studies measure many different dietary and lifestyle variables and can only control for confounders by statistical means. This makes it impossible to single out one food group, such as meat, as a cause of CRC.

### **Confounding Factors**

It is very difficult to isolate the effects of red meat consumption on disease outcome from other dietary and lifestyle factors, so called confounding factors. A western lifestyle with high intakes of refined sugars and alcohol, low intakes of fruits, vegetables and fibre and behavioural factors such as low physical activity, high smoking prevalence and high body mass index collectively impact on health. Also, the majority of animal fat intake may be from non-meat sources, such as chocolate, cakes, crisps, fried foods, biscuits sauces. The importance of these confounding factors is now well recognised, making it very difficult to establish an independent positive association between a single dietary factor, such as red meat consumption, and cancer risk.

## Comparison with Vegetarians

Many studies compare meat eaters with vegetarians. This gives a skewed picture of risk for the population as a whole. However, the mortality rates for bowel cancer are similar in Western vegetarians and comparable to non-vegetarians. Indeed, in the Oxford arm of the European Prospective Investigation into Cancer and Nutrition (EPIC-Oxford), the incidence of bowel cancer was higher in vegetarians than in meat eaters<sup>2</sup>.

## The Scientific Advisory Committee on Nutrition (SACN)

This expert Committee advises the UK government on diet and health. When reviewing the evidence on Iron and Health they also looked at the evidence around red meat intake and the risk of bowel cancer. They recognised the limitations of the evidence and concluded that whilst the available evidence suggested that red and processed meat intake was *probably* associated with increased bowel cancer risk, the increase in risk was not statistically significant in most studies. They also highlighted that methodological inconsistencies between the different studies make comparison difficult<sup>3</sup>.

## Consumption of Red Meat in the UK

There has been a general decrease in the amount of red meat consumed in the UK during the last few decades. According to the National Diet and Nutrition Survey (NDNS 2003), average daily intake of red and processed meat among adults in the UK is 96g for men and 57g for women and average daily intake of red and processed meat is 76g. Current expert advice is that individuals' consumption of red and processed meat should not rise and that those consuming large amounts (more than 90g per day) should consider a reduction in intake (SACN 2010). Thus average UK intakes of red meat are well below the high intakes observed in studies that have raised concern.

**Overall, there is no conclusive link between bowel cancer and red meat. Indeed, in the past 35 years, the incidence of bowel cancer in the UK has increased while red meat intakes have declined by around 25 per cent.**

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<sup>2</sup> Key et al. Am J Clin Nutr 2009; 89:1620S-1626S

<sup>3</sup> SACN (Scientific Advisory Committee on Nutrition). (2009). "Draft SACN Report on Iron and Health." Retrieved 1st November 2010, from [http://www.sacn.gov.uk/pdfs/draft\\_iron\\_and\\_health\\_report\\_complete\\_june\\_2009\\_consultation.pdf](http://www.sacn.gov.uk/pdfs/draft_iron_and_health_report_complete_june_2009_consultation.pdf).



## Recommendations for red meat intake

The Department of Health advises that lean red meat should be consumed as part of a balanced diet.

The latest report from World Cancer Research Fund (WCRF 2011) recommends consuming no more than 500g (cooked weight) of red meat per week, which is unchanged from the previous WCRF report (2007) and tallies with current average consumption levels in the UK.

The Scientific Advisory Committee on Nutrition (SACN) recently published a report on Iron and Health which confirmed that the vast majority of people do not need to change their meat-eating habits. The daily red meat intake recommended by SACN is already the average consumption in the UK.

SACN recommends that those consuming large amounts of red meat (more than 90g per day) should consider reducing their intake. However, average daily consumption of red meat in the UK is 76g. This means that most people are eating below this level.

In general, 100g of raw meat will lose between 20-30% weight during cooking giving a cooked weight of between 70-80g.

### What does a portion of cooked red meat weigh in practice?

3 slices of roast lamb	80g
1 grilled sirloin steak	160g
2 grilled rashers of back bacon	40g
1 grilled quarter pounder burger	80g
2 grilled premium sausages	110g
2 grilled lamb chops, excluding the bone	80g
1 portion of stewed mince	80g

## Contribution to the Diet

A recent review of published evidence, in the British Nutrition Foundation *Nutrition Bulletin*, about red meat and its links to health has shown that a moderate intake of lean red meat makes a significant positive contribution to both micronutrient and macronutrient intakes without risking any negative health effects. The review concluded that the relationship between red meat and health is a positive one<sup>4</sup>.

Lean red meat consumed in moderation can make a positive contribution to a healthy balanced diet. It is nutrient dense, that is, it is packed with a variety of nutrients, some of which are known to be in short supply in the diet. Red meat contains protein, iron, zinc,

<sup>4</sup> Wyness L, Weichselbaum E, O'Connor A, Williams EB, Benelam B, Riley H, Stanner S. Red Meat in the Diet: An Update. British Nutrition Foundation Nutrition Bulletin. March 2011.

selenium, vitamins A B6, B12 D and E and heart health omega-3 polyunsaturated fatty acids.

### **In Conclusion**

There is conflicting scientific opinion about the consumption of red and processed meat and risk of bowel cancer. The evidence is inconsistent and far from clear cut, but there is no scientific justification for excluding meat from the diet. Meat and meat products make a significant contribution to nutrient intake for most individuals and, consumed in moderation, can be promoted as part of a healthy balanced diet.

Please visit [www.meatandhealth.com](http://www.meatandhealth.com) for more information.