

## Red meat and breast cancer

Breast cancer is the most commonly diagnosed cancer in women in the UK, with around 50,000 new cases per annum<sup>1</sup>. One in eight women in the UK will develop breast cancer at some point in their life, as well as smaller numbers of men. Most breast cancers occur in post-menopausal women.



According to Cancer Research UK<sup>2</sup>, the major risk factors for breast cancer are age and genetics, with only a third of risk attributed to potentially avoidable lifestyle factors, such as exposure to oestrogen from prescription drugs, obesity, high alcohol intake and physical inactivity.

### Is red meat linked to breast cancer risk?

Major cancer charities don't list red meat consumption as a risk factor for breast cancer but some observational studies, particularly from the US and published by Harvard University, have suggested that high red meat intakes are associated with breast cancer risk. In one such study<sup>3</sup>, women who reported eating red meat more than once a day had a 22% increased relative risk of cancer (1.22) compared with women who ate it less than once a week. So, what does this actually mean?

Estimates suggest that 12.4% of American women will develop breast cancer over a lifetime<sup>4</sup>. If all of them ate red meat more than once a day, 15% of women would be expected to develop breast cancer over a lifetime – that's an absolute increase in risk of just 2.7%. In contrast, being older than 65 years represents a relative risk of 580% (5.80) which would increase the absolute risk of developing breast cancer by 72%<sup>5</sup>.

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<sup>1</sup> [http://breastcancer.org/about-breast-cancer/what-is-breast-cancer/breast-cancer-statistics?gclid=CjwKEAiANbEBRCv9uy4j4SWrgwSJAB5MqJFDa250Q4a5laP4PW4\\_H5F8UWRSfO2Ax3LWzYBCeCoGB0CZUvw\\_wcB](http://breastcancer.org/about-breast-cancer/what-is-breast-cancer/breast-cancer-statistics?gclid=CjwKEAiANbEBRCv9uy4j4SWrgwSJAB5MqJFDa250Q4a5laP4PW4_H5F8UWRSfO2Ax3LWzYBCeCoGB0CZUvw_wcB)

<sup>2</sup> <http://www.cancerresearchuk.org/health-professional/cancer-statistics/statistics-by-cancer-type/breast-cancer#heading-Four>

<sup>3</sup> <http://www.bmj.com/content/348/bmj.g3437>

<sup>4</sup> <https://www.cancer.gov/types/breast/risk-fact-sheet>

<sup>5</sup> <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1514477/>

However, results from other observational studies either find no links with breast cancer or extremely weak statistical links suggestive of a random association, not a real cause.

In a meta-analysis of 14 observational studies<sup>6</sup>, relative risk of breast cancer increased by 10% (1.10) for every 120 grams of red meat eaten daily – a huge intake that is nearly double what is eaten on average in the UK (i.e. 68 grams). In addition, eating more than 50 grams of processed meat daily attracted a relative risk of just 8% (1.08). This amount is treble the average processed meat intake in the UK (17 grams<sup>7</sup>). These relative risks are, therefore, tiny and equate to amounts of meat that are far in excess of typical UK intakes.

Another meta-analysis of 17 observational studies found relative risks closer to 2-7% (1.02-1.07) with a statistical association found only in post-menopausal women (who have higher risks anyway due to their age). The authors concluded that: “red meat and processed meat intake does not appear to be independently associated with increasing the risk of breast cancer”<sup>8</sup>.

Absolute risk and relative risk are different things and shouldn't be confused. Most studies report relative risk.

Say the absolute risk of developing a disease is 4 in 100 in non-smokers. Now, if the relative risk of the disease is increased by 50% in smokers, the 4 would now be boosted by 50% (half). This gives us a new risk figure of 6 in 100 for smokers.

A pooled analysis of data<sup>9</sup> from eight prospective cohort studies from North America and Western Europe found no statistical association with breast cancer when intakes of total meat and red meat were considered. This data set included 350,000 women.

### What does the balance of evidence say?

Taken together, the evidence presents a weak case for implicating red meat in the development of breast cancer. Any statistical associations found by studies tend to relate to small relative risks which equate to single figure percentage points in

<sup>6</sup> <https://www.ncbi.nlm.nih.gov/pubmed/25893586>

<sup>7</sup> Bates et al. (2016) National Diet and Nutrition Survey, years 5-6. London: PHE/FSA.

<sup>8</sup> <https://www.ncbi.nlm.nih.gov/pubmed/21110906>

<sup>9</sup> [www.ncbi.nlm.nih.gov/pubmed/11914299](https://www.ncbi.nlm.nih.gov/pubmed/11914299)

absolute risk. The amounts of meat highlighted as a risk are far in excess of current population intakes. Many other studies find no statistical associations at all.

In addition, scientists have not been able to pinpoint exactly why red meat would influence breast cancer risk, and this again weakens the argument. Theories include high temperature cooking of meat which can create chemicals called PAHs and heterocyclic amines, or hormones given to cattle. However, PAHs and heterocyclic amines are produced when any animal protein is fried at high temperature, including poultry and fish, and hormones in meat are not an issue in Europe where they have long been banned<sup>10</sup>.

### **In conclusion**

It is highly unlikely that red meat has any role in the development of breast cancer. Studies are inconsistent, report very small absolute risks, focus on high amounts of meat rather than the modest amounts eaten in the UK, and there is no agreement on why red meat could influence the development of the disease.

The major modifiable risk factors for breast cancer remain oestrogen use, body weight, alcohol consumption and physical inactivity and these should be the focus of cancer prevention messages.

Women can continue enjoying red and processed meat within a healthy, balanced diet and may indeed benefit from the rich iron and zinc content since these nutrients can be in short supply in the diets of girls and women.

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

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<sup>10</sup> [https://ec.europa.eu/food/safety/chemical\\_safety/meat\\_hormones\\_en](https://ec.europa.eu/food/safety/chemical_safety/meat_hormones_en)