

## The European Prospective Investigation into Cancer and Nutrition (Epic) Cohort Study on Meat, Eggs, and Dairy Products and Breast Cancer Risk

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### Abstract

**Background:** The Western diet is linked to an increased risk of breast cancer.

**Objective:** We explored the connection of meat, egg, and dairy item utilization with bosom malignant growth risk by utilizing information from the European Forthcoming Examination concerning Disease and Sustenance (EPIC).

**Design:** Data on diet were gathered from 319,826 women between 1992 and 2003. Multivariate Cox proportional hazard models were used to calculate disease hazard ratios.

**Results:** Breast cancer cases (n = 7119) were tracked for an average of 8.8 years. When categorical and continuous exposure variable models were examined, neither the consumption of any of the food groups under investigation nor the risk of breast cancer were found to have a consistent association. In the categorical model, eating a lot of processed meat was linked to a small increase in the risk of breast cancer (hazard ratio: 1.10; 95% CI: 1.00, 1.20; Compared to the lowest quintile, the highest: P for the trend is 0.71). A link between butter consumption and premenopausal women was found in subgroup analyses (hazard ratio: 1.28; 95% CI: 1.06, 1.53; Compared to the lowest quintile, the highest: Trend P value = 0.21). Red meat showed heterogeneity across countries (Q statistic = 18.03; the proportion of meat cooked at high temperatures was significantly (P = 0.023) explained.

**Conclusions:** We have not in every case recognized admissions of meat, eggs, or dairy items as chance elements for bosom malignant growth. High-temperature cooking may play a role in the relationship between red meat consumption and breast cancer risk, which should be the subject of further research.

**Keywords:** Breast cancer risk; Meat; Eggs; Dairy items

### Introduction

There is a lot of evidence that lifestyle factors that can be changed increase the risk of breast cancer, which enables women to lower their risk by altering their lifestyle, such as avoiding weight gain, remaining physically active, limiting alcohol consumption, and following a “healthy” diet. According to epidemiological research, the Western diet and the Westernization of diet may be to blame for the disease’s rising prevalence. Be that as it may, there is a lot of vulnerability with regards to what parts of the Western eating routine ought to be decreased and which choices might best add to diminishing bosom malignant growth risk while simultaneously advancing ladies’ general wellbeing [1].

In ecological studies, meat, eggs, and dairy products—common in the Western diet—have consistently been linked to increased breast cancer incidence and mortality. In addition, the rise in consumption of animal products following World War II coincides with an ecological trend of rising breast cancer mortality.

Recent observational studies suggest that the risk of breast cancer rises is irrelevant to or then again even abatements with expanding admission of at least one creature food varieties. The World Cancer Research Fund’s 2007 report came to the conclusion that no observational epidemiologic study consistently links eating animal products to a higher risk of breast cancer [2].

It is difficult to come up with consensus dietary recommendations that aim to reduce the overall burden of breast cancer due to the lack of consistent findings regarding the risks posed by such pervasive dietary components. Null results may indicate an actual lack of association or may be the result of high measurement error. The measurement error, which can be significant when food consumption is assessed, would have obscured all but very large associations of breast cancer with

dietary components in all prospective studies of diet and breast cancer risk, as all but one of these studies were conducted on population groups characterized by fairly uniform dietary habits. By studying populations in which there is marked variation in the consumption of various food groups between individuals, it is possible to lessen the impact of exposure measurement error [3]. This was the methodology embraced by the European Planned Examination concerning Malignant growth and Nourishment (Awe-inspiring), which selected associates from 10 European nations. In order to determine whether the consumption of meat, eggs, and dairy products is linked to an increased risk of breast cancer, we conducted an analysis on the data of 367,993 EPIC participants.

### Subjects and Methods

The subjects of the EPIC study are 23 centers in Denmark (Aarhus and Copenhagen), France, Germany (Heidelberg and Potsdam), Greece, Italy (Florence, Varese, Ragusa, Turin, and Naples), Norway, Spain (Asturias, Granada, Murcia, Navarra, and San Sebastian), Sweden (Malmö and Ume), the Netherlands (Bilthoven and Utrecht Men

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and women who were eligible were invited to participate; Those who agreed completed questionnaires about their diet, lifestyle, and medical history and gave informed consent. EPIC recruited 367,993 women, the majority of whom were between the ages of 25 and 70. The majority of centers had general population participants [4]. Be that as it may, the French companion was enrolled from female individuals from a health care coverage conspire for school and college workers, the Turin and Ragusa (Italy) and the Spanish places included blood givers, members in Utrecht were selected from a mammographic screening program, the Florence partner included screening program members, and a portion of the Oxford partner comprised of “wellbeing cognizant” people from Britain, Ribs, Scotland, and Northern Ireland.

### Dietary assessment

Dietary and way of life surveys were finished by members at enlistment when anthropometric estimations were additionally taken. Diet was surveyed by utilizing nation explicit (in Italy and Sweden focus explicit) food polls (FQs) intended to catch ongoing utilization of food over the previous year. Eight countries used self-administered FQs, while interviewers in Greece and southern Italy (Naples and Ragusa) administered the questionnaires [5].

In many nations, the surveys were broad quantitative instruments ≤260 food things. Food-frequency questionnaires (FFQs) with semiquantitative data were used in Denmark, Norway, Ume (Sweden), and Naples (Italy). A 7-day dietary diary and a brief nonquantitative FQ were combined in Malmö (Sweden). In the Unified Realm, a FFQ and a 7-d dietary journal were utilized, yet the current outcomes are from the FFQ. All dietary surveys had been recently approved. There are other reports on how the questionnaires and measurements were analyzed.

### Calibration of dietary data

The diet-breast cancer association was adjusted for random and systematic measurement errors in intake estimates from the FQs using a linear calibration method. Additionally, the goal of the calibration model was to correct for differences in FQs between nations due to the fact that these instruments varied between nations and sometimes within nations. The calibration models predicted individual consumption values for each food group. For each food group, the method used 24-HDR data as a reference measure; Using country-specific linear calibration models, these reference measurements were regressed on FQ measurements. The calibration model did not include women whose food intake on the FQ was zero for a particular food; as a result, for those ladies, the saw as well as the adjusted (anticipated)

assessment of admission for that food was left (unaltered) as nothing [6].

### Results

Table 1 displays the number of breast cancer cases by country, as well as the number of cohort members, median age at study entry, median age at end of follow-up, and person-years of follow-up. With 2,812,610 person-years of follow-up since 1992, the median follow-up time was 8.8 years.

Table 2 displays the mean predicted intakes of meat, eggs, and dairy products at recruitment that were derived from the calibration procedure. Utilization of all food things fluctuated significantly across focuses. Except for butter and milk, women in the health-conscious UK group typically ate the fewest animal products. Butter (from <math>0.6</math> g/d in Spain and Greece to <math>8</math> g/d in France and Germany) and processed meat (from 6.2 g/d in Greece to <math>39</math> g/d in Germany and Sweden) showed the greatest variation among the other countries [7].

In the categorical model, processed meat significantly increased the risk of breast cancer (HR: 1.10; 95% CI: 1.00, 1.20 for the last contrasted and the first quintile of admission), yet the pattern of quintile medians was not critical (P = 0.065); There was no significant link between processed meat and breast cancer in the continuous models [8]. There was no linear trend in the risk of breast cancer for eggs in the second and fourth quintiles in comparison to the first quintile.

Milk did not appear to be associated with breast cancer. HRs for breast cancer risk from drinking whole milk increased nonlinearly across quintiles, and the fourth but not fifth quintile was significantly different from the first and second quintiles [9]. A moderate relationship between predicted semiskim milk consumption and breast cancer risk (HR: 1.04; 95% CI: With the continuous model, the same value (1.09) was also found for each 150 g/d [10]. Only a few centers had access to data on milk subtypes: for entire fat milk, information were accessible for 286,576 ladies (6678 bosom disease cases); 245,873 women’s data were available for semiskim milk (6118 breast cancer cases).

### Discussion

In this prospective study of 319,826 European women and 7119 cases of breast cancer, we found no consistent association between breast cancer risk and the investigated meat, egg, or dairy foods. These discoveries concur with the 2007 master board report of the World Disease Exploration Asset and the consequence of a pooled investigation of forthcoming partners [11]. The propensity for high

**Table 1:** Women and breast cancer cases of European prospective investigation into cancer and nutrition (EPIC) cohort by country.

| Country                          | Participants per cohort | Age at enrollment 1 | Age at end of follow-up1 | Breast cancer cases per cohort | Duration1 | Duration per cohort |
|----------------------------------|-------------------------|---------------------|--------------------------|--------------------------------|-----------|---------------------|
|                                  | n                       | y                   | y                        | n                              | y         | person-years        |
| Denmark                          | 28,571                  | 56.2                | 63.8                     | 822                            | 7.7       | 2,14,842            |
| France                           | 63,088                  | 51.5                | 62.5                     | 2272                           | 11.9      | 6,91,567            |
| Germany                          | 27,804                  | 48.4                | 56.7                     | 457                            | 8.3       | 2,26,510            |
| Greece                           | 12,899                  | 51.8                | 59.3                     | 103                            | 7.9       | 93,832              |
| Italy                            | 30,239                  | 50.8                | 59.1                     | 670                            | 8.7       | 2,55,538            |
| Norway                           | 33,250                  | 47.9                | 53.9                     | 441                            | 6.1       | 1,98,456            |
| Spain                            | 24,789                  | 47.7                | 57.5                     | 319                            | 9.8       | 2,40,836            |
| Sweden                           | 24,744                  | 50.3                | 61.8                     | 648                            | 10.8      | 2,57,185            |
| Netherlands                      | 26,333                  | 52.5                | 61.4                     | 567                            | 8.9       | 2,27,662            |
| United Kingdom, general          | 14,455                  | 54.1                | 63.2                     | 423                            | 9.2       | 1,30,141            |
| United Kingdom, health conscious | 33,654                  | 40.5                | 48.7                     | 397                            | 8.4       | 2,76,038            |
| Total                            | 3,19,826                | 50.8                | 59.6                     | 7119                           | 8.8       | 28,12,610           |

**Table 2:** Mean intakes of meat, eggs, and dairy products in women participating in the European prospective investigation into cancer and nutrition (EPIC) overall and by EPIC center.

| Country and participants per cohort       | Red meat     | Poultry      | Processed meat | Eggs          | All types of milk | Whole milk    | Semiskim milk | Skim milk    | Cheese       | Butter       |
|---|--------------|--------------|----------------|---------------|-------------------|---------------|---------------|--------------|--------------|--------------|
|   | g/d          | g/d          | g/d            | g/d           | g/d               | g/d           | g/d           | g/d          | g/d          | g/d          |
| Denmark (28,571)                          | 46.41 ± 0.07 | 17.09 ± 0.04 | 25.42 ± 0.05   | 16.62 ± 0.05  | 177.92 ± 0.94     | 19.03 ± 0.24  | 76.03 ± 0.61  | 58.51 ± 0.82 | 29.78 ± 0.07 | 2.33 ± 0.03  |
| France (63,088)                           | 43.91 ± 0.08 | 19.16 ± 0.04 | 29.18 ± 0.03   | 14.09 ± 0.02  | 90.70 ± 0.39      | 5.95 ± 0.13   | 58.66 ± 0.33  | 12.59 ± 0.17 | 45.30 ± 0.06 | 8.75 ± 0.02  |
| Germany (27,804)                          | 35.88 ± 0.10 | 14.41 ± 0.03 | 39.09 ± 0.07   | 11.77 ± 0.03  | 99.67 ± 0.48      | 31.84 ± 0.36  | NA            | NA           | 29.45 ± 0.06 | 12.90 ± 0.06 |
| Greece (12,899)                           | 29.24 ± 0.09 | 13.62 ± 0.07 | 6.19 ± 0.04    | 9.70 ± 0.03   | 104.19 ± 0.50     | 59.31 ± 0.36  | NA            | NA           | 40.16 ± 0.13 | 0.52 ± 0.02  |
| Italy (30,239)                            | 47.66 ± 0.11 | 23.27 ± 0.05 | 20.70 ± 0.05   | 9.47 ± 0.02   | 121.39 ± 0.49     | 33.49 ± 0.36  | 59.18 ± 0.41  | 5.60 ± 0.222 | 39.02 ± 0.07 | 1.68 ± 0.01  |
| Norway (33,250)                           | 44.94 ± 0.07 | 12.86 ± 0.05 | 34.93 ± 0.07   | 15.31 ± 0.04  | 177.10 ± 0.73     | NA            | NA            | NA           | 39.20 ± 0.06 | 2.48 ± 0.03  |
| Spain (24,789)                            | 44.57 ± 0.13 | 27.50 ± 0.06 | 28.08 ± 0.07   | 21.80 ± 0.06  | 298.56 ± 0.73     | 126.12 ± 0.73 | 11.79 ± 0.31  | 79.20 ± 0.74 | 13.88 ± 0.06 | 0.34 ± 0.01  |
| Sweden (24,744)                           | 40.20 ± 0.06 | 7.58 ± 0.03  | 39.65 ± 0.07   | 15.70 ± 0.073 | 189.28 ± 0.63     | 40.26 ± 0.41  | 68.81 ± 0.53  | 57.26 ± 0.54 | 30.92 ± 0.06 | 1.09 ± 0.02  |
| Netherlands (26,333)                      | 42.46 ± 0.09 | 13.30 ± 0.05 | 35.80 ± 0.09   | 13.63 ± 0.03  | 203.68 ± 0.84     | 19.67 ± 0.26  | 111.72 ± 0.71 | 13.02 ± 0.24 | 33.08 ± 0.08 | 4.46 ± 0.04  |
| United Kingdom, general (14,455)          | 28.11 ± 0.10 | 22.65 ± 0.10 | 21.45 ± 0.09   | 10.32 ± 0.06  | 232.54 ± 0.77     | 29.68 ± 0.61  | 122.27 ± 1.09 | 40.54 ± 0.70 | 11.37 ± 0.05 | 4.39 ± 0.05  |
| United Kingdom, health conscious (33,654) | 7.28 ± 0.04  | 9.85 ± 0.07  | 5.77 ± 0.04    | 9.20 ± 0.04   | 194.93 ± 0.56     | 26.83 ± 0.30  | 93.68 ± 0.64  | 41.71 ± 0.45 | 13.87 ± 0.03 | 5.65 ± 0.03  |
| Total (319,826)                           | 38.38 ± 0.04 | 16.52 ± 0.02 | 27.03 ± 0.03   | 13.55 ± 0.01  | 162.12 ± 0.23     | 33.34 ± 0.13  | 71.25 ± 0.20  | 36.76 ± 0.18 | 31.71 ± 0.03 | 4.77 ± 0.01  |

handled meat admission to be related with expanded bosom malignant growth risk in all ladies was viewed as huge in postmenopausal ladies (at enrollment) when pre-and postmenopausal ladies were dissected independently. In a similar vein, only premenopausal women who consumed butter were significantly more likely to develop breast cancer than those who did not.

Higher intakes of whole and semi skim (but not skim) milk were associated with an increased risk of breast cancer, but there was no evidence of a dose-response relationship or consistency across models [12]. We found significant between-country heterogeneity and found that high red meat consumption was associated with increased breast cancer risk in some countries, despite the fact that red meat consumption was not associated with a risk of breast cancer [13]. In countries where red meat was cooked at a high temperature in a high percentage of cases, further analysis revealed a significant association between the risk of breast cancer and this country-to-country heterogeneity. Although epidemiologic studies that have examined the association of meat preparation methods with breast cancer risk have produced conflicting results, high-temperature cooking, particularly on an open flame, increases the formation of potentially carcinogenic products like heterocyclic amines and polycyclic aromatic hydrocarbons [14]. A positive portion reaction connection between the force of meat cooking and bosom disease risk was found in a US companion study, while a Danish populace based settled case-control concentrate on found a positive relationship of bosom malignant growth with red meat consumption, which was bound to broiled meat, and was particularly clear when the meat was "great". The hypothesis that consumption of meat cooked at high temperatures is linked to an increased risk of postmenopausal breast cancer was not supported by a more recent prospective cohort study [15].

## Conclusion

In conclusion, we emphasize that the EPIC study failed to consistently identify consumption of meat, eggs, or dairy products as significant breast cancer risk factors; However, the difficulties mentioned above all point to a null result, so the lack of consistent association between eating animal products and breast cancer risk should be interpreted with caution. There was no consistent linear

trend between the premenopausal and postmenopausal groups of women regarding the possible adverse effects on breast cancer risk suggested by butter and processed meat consumption. The significance of high-temperature cooking as a factor in the association between red meat intake and breast cancer risk should be further investigated in subsequent studies, as should attempts to characterize associations between diet and the development of particular types of breast cancer.

## Acknowledgement

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## Conflict of Interest

None

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