# Cancer Risk Impacted by Different Types of Bread

Researchers investigated whether bread consumption increases cancer risk.

Bread is among the most consumed foods worldwide. It is a nutrient-dense food that provides shortfall nutrients; however, it can also be a source of harmful compounds formed during processing, such as polycyclic aromatic hydrocarbons, acrylamide, and heterocyclic amines. High exposure to acrylamide has been reported to cause cancer in animals.

As such, the International Agency for Research on Cancer (IARC) listed it as "probably carcinogenic to humans" in 1994. However, subsequent epidemiological studies have been inconclusive in assessing associations between acrylamide and cancer risk. Further, many breads have a moderate or high glycemic index (GI). While meta-analyses have shown some associations between high dietary GI and cancer risk, these risk estimates are generally low and inconsistent.

## Study

In the present study, researchers investigated whether bread intake is associated with cancer risk. They searched the MEDLINE and PubMed databases for relevant prospective cohort studies. Eligible studies were those reporting incidence (IRRs) or mortality (MRRs) rate ratios, relative risk (RR), odds ratios (ORs), or hazard ratios (HRs). Only studies that assessed bread as a distinct food were included, and those including bread as part of a dietary pattern or grains food group were excluded.

The Newcastle-Ottawa scale was used to assess the quality of studies. A meta-analysis was performed using studies that compared the highest with the lowest bread consumption. Since ORs, RRs, HRs, MRRs, and IRRs were calculated differently, the primary meta-analysis was restricted to studies reporting HRs (the most frequently reported outcome).

Sensitivity analyses were performed by removing one study at a time and recalculating the association to assess the robustness of results and the impact of a single study on heterogeneity and HR. Subgroup analyses by bread type were also performed. Heterogeneity was measured using I2 and $\chi 2$ statistics. Egger's regression symmetry test and funnel plots were used to assess publication bias. The study also conducted supplemental meta-analyses to reinforce primary findings, including those involving mortality rate ratios (MRRs), incidence rate ratios (IRRs), and relative risks (RRs).

## Results

Database searches identified 2,029 records. Overall, 29 studies were assessed for eligibility after title/abstract screening. Of these, 24 met the inclusion criteria, 10 of which were included in the meta-analysis. Twenty-one studies were from Europe, two from the United States (US), and one from Japan. In total, these studies included more than 1.88 million adults, with 63.2% being female.

Bread types varied across studies; bread was classified as dark, whole-grain, non-white, whole-grain rye, whole-meal, low- or high-fiber, whole-wheat, crisp, white, or other. Most data were for colorectal cancer (nine studies), breast cancer (six), and prostate cancer (four). Overall, 108 HRs, MRRs, RRs, and IRRs were reported; 79.6% were not statistically significant. No study reported an increase in cancer mortality associated with bread consumption.

Among males in one cohort, the highest non-white bread intake quartile had a 21% lower cancer mortality than those in the lowest quartile. Forty-eight outcomes were reported for colorectal cancer. Increasing the intake of whole-grain rye, non-white, or whole-grain bread by up to one slice per day was associated with a 4% to 12% reduction in colorectal cancer incidence. Conversely, white bread intake was more consistently associated with increased risks, particularly for rectal and colon cancers.

By contrast, the highest bread intake quartile was not associated with the risk of colorectal cancer in the Japanese cohort. Besides, the highest white bread intake tertile was associated with a 35% increased incidence of rectal cancer and a 22% higher incidence of colon cancer. For breast cancer, five studies reported 19 outcomes; 16 were statistically insignificant, while specific findings were cohort-dependent.

In one cohort, the highest intake of high-fiber bread was associated with a 25% reduction in breast cancer incidence relative to no bread intake. Conversely, in another cohort, daily consumption of rye bread was associated with an 80% increased breast cancer incidence relative to less than daily intake; however, whole-wheat bread intake was not associated with breast cancer in this cohort.

Bread intake was not associated with endometrial, stomach, lung, or ovarian cancers. Further, of the four studies that examined total cancer mortality, only two reported HRs; a meta-analysis of these two studies showed no associations with the consumption of whole-grain bread. The supplemental analyses corroborated these findings, showing a 10% reduction in total cancer mortality with nonwhite or wholemeal bread consumption.

Eight studies reported 14 HRs for site-specific cancers (esophageal, breast, colorectal, and prostate cancers).

The highest bread consumption group was not associated with cancer mortality or incidence. However, restricting analyses to studies that examined dark, high-fiber, whole-grain, or whole-wheat bread revealed a 14% reduction in cancer incidence. In contrast, restricting analyses to low-fiber or white bread studies resulted in a 21% increased cancer incidence or mortality with the highest consumption. In sensitivity analyses, removing any single study did not influence the results.

## Conclusion

The findings indicate that bread consumption is not linked to a higher cancer incidence or mortality. Nearly 90% of outcomes showed either no association or reduced incidence/mortality with higher bread intake. Moreover, the meta-analysis of site-specific cancers showed that bread intake was not associated with prostate, breast, or colorectal cancer risk. Notably, high whole-grain bread intake was associated with reduced colorectal cancer and total cancer mortality risk.

**Source:**

https://www.news-medical.net/news/20241120/How-different-types-of-bread-impact-cancer-risk.aspx