

In Large US Study Higher Red Meat Intake Links to Greater Diabetes Odds

Researchers examined the associations between total, processed, and unprocessed red meat intake and [diabetes](#) and evaluated the statistical substitution effects of alternative protein sources for red meat.



Study

This cross-sectional observational analysis used data from the National Health and Nutrition Examination Survey (NHANES) 2003-2016, conducted by the National Center for Health Statistics (NCHS) of the [Centers for Disease Control and Prevention](#) (CDC). NHANES employs multistage probability sampling designed to represent the non-institutionalized U.S. population. After excluding individuals with missing data, implausible energy consumption, or unknown diabetes status, 34,737 adults aged 18 years and older were included.

Dietary intake was assessed using up to two 24-hour dietary recalls collected with the United States Department of Agriculture (USDA) Automated Multiple-Pass Method, which may not fully reflect usual long-term [dietary intake](#) and may introduce measurement error or recall bias. Red meat was classified as processed (e.g., sausages, frankfurters, luncheon meats) or unprocessed (e.g., beef, pork, lamb), and intake was measured in servings per day.

Diabetes was defined by self-report of physician diagnosis, fasting plasma glucose ≥ 126 mg/dL, glycated hemoglobin (HbA1c) $\geq 6.5\%$, or use of antidiabetic medications. Covariates included age, sex, race/ethnicity, education, [poverty income ratio](#) (PIR), body mass index (BMI), smoking, alcohol intake, physical activity measured in metabolic equivalent of task (MET) minutes per week, psychological distress, food insecurity, and overall dietary factors.

Researchers used logistic regression models to estimate adjusted odds ratios (ORs) and 95% [confidence intervals](#) (CIs). Substitution analyses were conducted to assess the impact of reducing red meat intake by half a serving per day through modeled dietary replacements, rather than observed behavioral changes.

Findings

Among 34,737 participants with a mean age of 45.8 years, 10.5% had diabetes. Individuals in the highest quintile of total red meat intake consumed a median of 5.72 ounces per day and were more likely to be younger, male, non-Hispanic White, married, and physically active. They also

had higher BMI and higher intake of calories, [alcohol](#), and sugary drinks than those in the lowest quintile.

After adjusting for demographics, lifestyle, socioeconomic status, and dietary habits (including fruit, vegetables, poultry, fish, eggs, dairy, plant-based protein, [whole grains](#), coffee, sugary drinks, and BMI), red meat consumption was significantly associated with an increased odds of diabetes, but this association does not establish a causal relationship.

Compared to participants with the lowest red meat intake, those in the highest quintile of total red meat intake had increased odds of diabetes, OR 1.49; 95% CIs 1.22-1.81; P-trend <0.001. Similar findings were observed for processed red meat intake, OR 1.47; 95% CIs 1.17-1.84; P-trend = 0.001, and unprocessed [red meat](#) intake, OR 1.24; 95% CIs 1.06-1.44; P-trend = 0.006.

Overall, these results indicate that the [health consequences](#) of dietary patterns depend on both the item being reduced and the item being substituted. In repeated analyses, each additional serving of total red meat per day corresponded to 16% higher odds of diabetes, OR 1.16; 95% CIs 1.07-1.25. Likewise, approximately 10% higher odds were associated with each serving of processed or unprocessed red meat consumed. No significant interaction was observed between red meat consumption and PIR, food insecurity, sex, age, or psychological distress.

Conclusion

In this nationally representative sample of [U.S. adults](#), higher intakes of total, processed, and unprocessed red meat were independently associated with an increased risk of diabetes.

The associations persisted after accounting for BMI and overall diet quality. Replacing red meat with plant-based protein sources, poultry, dairy products, and [whole grains](#) was associated with a lower odds of diabetes, but not with a proven risk reduction.

Plant-based proteins showed the strongest statistical association in [substitution models](#). These results illustrate that diet is a potentially modifiable factor associated with diabetes prevalence, although the cross-sectional design precludes conclusions regarding prevention or causation.

Potential biological explanations discussed in the research include the roles of saturated fat, heme iron, sodium, [nitrates](#), and inflammation-related metabolic pathways. However, these mechanisms were not directly tested in this study.

Because this was a cross-sectional [observational study](#), reverse causation and residual confounding remain possible, and the study could not distinguish between type 1 and type 2 diabetes.

Source:

<https://www.news-medical.net/news/20260215/Higher-red-meat-intake-links-to-greater-diabetes-odds-in-large-US-study.aspx>