

An ECG (heart rate) line graphic is positioned at the top of the page. It features a white line on the left that transitions into a red line on the right. The background is a blue gradient with a subtle grid of white lines.

COMMON METHODOLOGICAL LIMITATIONS OF RED MEAT RESEARCH

Research assessing red meat and health is prone to several methodological limitations. The common characterization of “red and processed meat” as one food category can lead to the misinterpretation of the evidence related to unprocessed red meat. As can reliance on epidemiological studies that use “a priori” research methods based on dietary indexes that pre-assign unprocessed red meat as a ‘negative’ dietary component. It is important to recognize how these methodological issues impact the interpretation of research related to red meat and health.

Key Points

1. Studies often group “red and processed meat” into one category despite their different nutritional profiles and degree of processing. This inappropriate grouping can lead to incorrect conclusions about unprocessed red meat and health outcomes.
2. Much of the evidence assessing red meat and health comes from epidemiological (observational) studies that cannot establish cause and effect.
3. ‘A priori’ research methods are often used to examine dietary patterns in prospective cohort studies. Many studies use dietary indexes or scores that pre-assign red and processed meat as ‘negative’ dietary components, along with other ‘negative’ dietary components such as refined grains, and sugar-sweetened foods and beverages.

Unprocessed red meat and processed meat should be treated as separate food categories

Unprocessed red meat and processed meat have different nutritional profiles

Unprocessed red meat and processed meat differ in their nutrient profiles, ingredients, degrees of processing and processing methods, and should not be viewed as equivalent.¹⁻³ Researchers recognized over 15 years ago that it is important to differentiate between unprocessed red meat and processed meat.² However, the term ‘red and processed meat’ continues to be used in nutrition research. This can lead to misinterpretation, bias, and erroneous conclusions about unprocessed red meat, that can influence nutrition guidance. The inclusion of red and processed meat in analyses limits conclusions about the independent effects of unprocessed red meat.

Red meat and processed meat can differ in their calorie, dietary fat, sodium, iron, and additive contents for example.² Processed meats can be cured, salted, or smoked (as in ham or bacon) and may have higher proportions of fat added to the meat (as in sausages).³ Meta-analyses examining unprocessed red meat and processed meat consumption separately suggest they differ in their effects on cardiometabolic health outcomes² and all-cause mortality outcomes.^{3,4}

Foods classified as processed meat can be derived from red meat or poultry

Varied use of the term ‘meat’ creates confusion among researchers, health professionals, and policy makers.⁵ The term “red and processed meat” may be interpreted as unprocessed red meat and processed red meat; however, processed meat can be derived from either red meat (such as beef or pork) or poultry (such as chicken or turkey), or combinations thereof.⁵ In other words, processed meat can include more than processed red meat, and can also include poultry-based deli meats, chicken or turkey bacon, hot dogs, and sausages, and chicken nuggets for example.

A recent analysis highlights that nutrition researchers may classify all processed meat as processed red meat, in using the term “red and processed meat”, which overestimates red meat consumption and underestimates poultry consumption.⁶ In other words, the misclassification of meat skews intake estimates, and can give the false impression that people eat more red meat than they do. Heterogeneity in the meat terminology used in studies was found to meaningfully alter U.S. population intake estimates of red meat and poultry, and this misclassification of meat intakes hinders the interpretation of research regarding meat and chronic disease risk.⁶

Much of the evidence on red meat and health is epidemiological with inherent limitations

Much of the evidence examining red meat consumption and health comes from observational studies. Observational studies cannot be relied on to establish causation, just associations.

Self-reported dietary intake data is prone to recall bias and reporting errors

Many observational studies rely on food frequency questionnaires, with responses collected only once, at the start of the study (baseline) to assess long-term diet.⁷ Others collect dietary data at limited time points. Self-reported dietary intake data is prone to recall bias and reporting errors.

Observational studies are prone to residual confounding due to other factors

While observational studies attempt to adjust for other dietary and lifestyle factors (such as physical activity, smoking, or alcohol intake) that may be correlated with red meat intake, residual confounding often persists, making it difficult to isolate any independent effects of red meat. The small increases in relative risk reported in some studies may be due to residual confounding.⁸

‘A priori’ research methods are commonly used in studies assessing eating patterns

Many observational studies use ‘a priori’ research methods based on dietary indexes or scores with pre-determined definitions, such as the Healthy Eating Index, the DASH Diet score, or the Mediterranean Diet score.⁷ Red meat and processed meats are systematically pre-assigned as ‘negative’ dietary components to limit, along with other ‘negative’ dietary components such as refined grains, and sugar-sweetened foods and beverages. This makes it difficult to evaluate an independent effect of unprocessed red meat on health outcomes.

References:

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