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Evaluation of New Dietary Guideline Recommendations on Red Meat Consumption

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Abstract

Objective: To evaluate the strength of evidence of the studies used to formulate the new dietary guideline recommendations published by the “*Annals of Medicine*” that encourage continuation of red meat consumption which contradicts existing guidelines. **Methods:** The studies used to formulate the dietary guidelines were analyzed for their quality of evidence and compared to established existing evidence that associates meat consumption with negatives health outcomes **Results:** Upon further evaluation, many biases and limitations to these studies exist and the quality of the evidence is low **Conclusion:** The new dietary guidelines published by the “*Annals of Internal Medicine*” regarding continuing meat consumption is based on low quality of evidence and should not change current recommendations to limit intake of red meat.

Introduction:

Red meat derived from animals such as cattle, pigs, goats, and sheep is significantly consumed worldwide as a major source of protein and fat.¹ Global meat consumption has increased rapidly, from about 24 kg average per capita in 1964 to 41 kg average per capita in 2015.² This is primarily due to human population growth and increasing average income driving its demand.³ It was last estimated that the United States is the third leading country after China and Australia to consume meat, with an average of 315 grams of meat consumed per day.⁴ Existing evidence highly suggests that the consumption of red meat is associated with an increased risk of all-cause mortality, cardiovascular disease and mortality, cancer, stroke and type 2 diabetes.⁵⁻¹⁰ Therefore, the latest dietary guidelines for Americans which was jointly published by the U.S. Department of Health & Human Services and the U.S. Department of Agriculture recommend limiting red and processed meat consumption.¹⁷ However, new studies released in October 2019 in the “*Annals of Internal Medicine*” contradict existing evidence by associating high red meat consumption with lower risks of these various health outcomes.¹¹⁻¹⁵ These studies were referenced to formulate a dietary guideline recommendation for the general public that advise adults to “continue current processed meat consumption”¹⁶ Thus, this brings the need to evaluate the strength of evidence of these new studies in light of recently published dietary guideline recommendations regarding red meat consumption.

Methods:

The five new studies¹¹⁻¹⁵ published by the “*Annals of Internal Medicine*” on October 1, 2019 regarding red meat consumption and their association with health outcomes were analyzed and compared to established existing evidence⁵⁻¹⁰ that associates meat consumption with negative health outcomes, as demonstrated in Table 1. The articles included five meta-analyses focused on the link between meat consumption and health outcomes such as all-cause mortality, cancer incidence, diabetes and stroke. The recommendations were developed by NutriRecs, an independent panel of 14 researchers, and utilized the GRADE (Grading of Recommendations Assessment, Development and Evaluation) process in addition to systematic review. Three of the five studies were meta-analysis of observational cohort studies. One of the studies, named “Patterns of Red and Processed Meat Consumption and Risk for Cardiometabolic and Cancer Outcomes: A Systematic Review and Meta-analysis of Cohort Studies” included 105 studies of 70 cohorts yielding 6,035,051 participants that observed the results of lower adherence to dietary patterns high in meat intake on health outcomes.¹⁰ Another study named “Red and Processed Meat Consumption and Risk for All-Cause Mortality and Cardiometabolic Outcomes: A Systematic Review and Meta-analysis of Cohort Studies” included 61 articles on 55 cohorts with a total of 4+ million participants. The results of this study were aimed at observing results of 3 servings of meat intake per week.¹⁴ The third study called “Reduction of Red and Processed Meat Intake and Cancer Mortality and Incidence: A Systematic Review and Meta-analysis of Cohort Studies” included 118 articles of 56 cohorts with 56+ million participants that aimed at 3 servings of meat intake per week but was focused on specifically cancer mortality and incidence.¹³ The fourth systematic review called “Lower Versus Higher Red Meat Intake on Cardiometabolic and Cancer Outcomes: A Systematic Review of Randomized Trials” included

one study of 48,835 women with the aim of summarizing long term meat consumption on health outcomes.¹⁵ The fifth study called “Health-Related Values and Preferences Regarding Meat Consumption” included 41 quantitative studies (such as with cross-sectional design) and 14 qualitative studies (such as interviews and focus groups).¹¹

Discussion:

The “*Annals of Internal Medicine*” released dietary guideline recommendations on unprocessed red meat and processed meat consumption from the NutriRecs Consortium. The guidelines are based on five articles and conclude with recommendations for adults to continue to consume unprocessed red meat and processed meat rather than limit its intake.¹⁶ Interestingly, these recommendations contradict the current guidelines based on longstanding evidence that demonstrate poor health outcomes associated with red meat consumption.⁵⁻¹⁰ The new studies demonstrated a link between meat consumption and lower risk of negative health outcomes, which contrasts with the findings from established studies (Table 1). Upon further evaluation, many biases and limitations to these studies exist and should be evaluated in consideration of their strength of evidence. Firstly, the dietary recommendation was based using the GRADE (Grading of Recommendations Assessment, Development and Evaluation) process. The panel consisted of only 14 members who took a very individual rather than societal approach to their guidelines. Moreover, it was based on observational studies, all of which received low to very low scores for their “certainty of evidence” mostly due to the high risk of bias, and was stated by the authors of the guidelines themselves.¹¹⁻¹⁶ One study’s unit of exposure was based on three servings per week which is quite small and likely the reason that the effect on outcome was insignificant.¹³ On the other hand, most studies in the existing literature is based on one serving

a day.⁵⁻¹⁰ Furthermore, another study included only one study in their systematic review which is insufficient for developing a conclusion.¹⁵ Another study that was referenced in the guidelines discussed human values and preferences for meat as their unit of measurement for meat consumption, which further raises the question of whether such subjective data should play a role in determining dietary guidelines.¹¹ In contrast, current guidelines are based on randomized control trials with high quality of evidence.⁵⁻¹⁰ Lastly, considerations of environmental impact and animal welfare was not considered as part of their recommendations, which is significant as environmental damage has a huge downstream effect on human health. Meat produces more carbon emissions per unit of energy in comparison to plant -based foods, ultimately contributing to pollution through usage of fossil fuels, as well as affecting climate change.¹⁸ Therefore, based on improper methodology to reach their conclusions, the new dietary guidelines published by the “*Annals of Internal Medicine*” regarding continuing meat consumption is based on low quality of evidence and should not change current recommendations to limit intake of red meat.

Table 1:

Existing evidence refuting meat consumption	New evidence supporting meat consumption
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Outcomes	Measures of Association	
All cause mortality	<p>1 serving/day of unprocessed: HR 1.13 (1.07-1.20)⁶</p> <p>1 serving/day of Processed: 1.20 (1.15-1.24)⁶</p>	<p>RR (95% CI): 0.87 (0.82-0.92)¹²</p> <p>HR (95%CI): 0.99 (0.95 -1.03)¹³</p>
Cardiovascular disease	1.32 (1.26, 1.38) ⁵	RR (95% CI): 0.87 (0.75-1.01) ¹²
Cardiovascular mortality	<p>1 serving/day of Unprocessed: HR 1.18 (1.13-1.23)⁶</p> <p>1 serving/day of processed: HR 1.21 (1.13-1.31)⁶</p>	<p>RR (95% CI): 0.86 (0.79-0.94)¹²</p> <p>RR (95% CI): 0.98 (0.91-1.06)¹²</p>
Cancer incidence		<p>RR (95% CI): 0.87 (0.75-1.01)¹²</p> <p>RR (95% CI): 3 servings/week of unprocessed: 0.93 (0.83-1.04)¹¹</p> <p>RR (95% CI): 3 servings/week of processed: 0.99 (0.89-1.09)¹¹</p>
Total cancer mortality	<p>1 serving/day of Unprocessed: 1HR .10 (1.06-1.14)⁶</p> <p>1 serving/day of processed: HR 1.16 (1.09-1.23)⁶</p>	<p>RR (95% CI): 0.89 (0.83-0.96)¹²</p> <p>RR (95% CI): 3 servings/week of unprocessed: 0.93 (0.91-0.94)¹¹</p> <p>RR (95% CI): 3 servings/week of processed: 0.92 (0.89-0.94)¹¹</p> <p>HR (95%CI): 0.95 (0.89-1.01)¹³</p>
Type 2 diabetes	≥3 servings/day RR: 1.85 (1.03–3.31) ¹⁰	RR (95% CI): 0.76 (0.68-0.86) ¹²
Stroke	RR 1.13 (1.04, 1.22) ⁷	RR (95% CI): 0.75 (0.53-1.05) ¹²

Conclusion:

The new dietary guidelines published by the “*Annals of Internal Medicine*” regarding continuing meat consumption is based on low quality of evidence and should not change current recommendations to limit intake of red meat.

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