

Meat alternatives & health: What are the facts?

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What is the role of meat alternatives in our diets?

A common question asked of plant-based meat alternatives: are they truly a healthier choice?

This guide seeks to answer that question in brief with the most up-to-date facts and figures illustrating current Australian and New Zealand dietary patterns, the impacts of the proteins we're consuming, and how alternatives like plant-based meat play a role in improving individual and public health.

An in-depth exploration of this topic can be found in Food Frontier's 2020 report, [Plant Based Meat: A Healthier Choice?](#)



Meat consumption in Australia and New Zealand

We're some of the world's most avid meat-eaters: in 2021, Australians **consumed nearly double the red meat recommended** by the Australian Dietary Guidelines¹ and both Australians and New Zealanders consumed nearly double the OECD² global average for red meat.

With consumption rising worldwide, the UN Food and Agriculture Organization projects the **global demand for meat to increase 73% by 2050**³, presenting a significant need and opportunity for both traditional protein producers and for alternatives to conventional meat.



Impacts of overconsumption of conventional meat on individual health

Overconsumption of red meats, particularly processed meats, is linked to the incidence of multiple non-communicable lifestyle-related diseases (NCDs) such as:

- type 2 diabetes mellitus,
 - many cancers
 - and cardiovascular diseases -
- the leading causes of death in Australia.⁴

Just under half of Australians (47 percent) have one or more NCDs,⁵ while NCDs are the highest cause of mortality in New Zealand.⁶ The burden of lifestyle related NCDs is expected to rise into the future, placing additional strain on the Australian⁷ and New Zealand⁸ healthcare systems over the coming decades.

The evidence linking gastrointestinal cancers and the overconsumption of red and processed meats is particularly strong. In 2015, the International Agency for Research on Cancer (IARC) reviewed more than 800 epidemiological studies that investigated the links between cancer and consumption of red and processed meat.⁹ Their findings led to the classification of processed red meat as "carcinogenic to humans" (Group 1 Carcinogen) and of red meats as "probably carcinogenic to humans" (Group 2A Carcinogen). In 2022, French health authorities further confirmed the link between nitrates added to processed meat and colon cancer.¹⁰



What do the experts say?

Given the links between high consumption of red meat, particularly processed meat, and many NCDs, various government and non-governmental health and nutrition organisations recommend restricting intake of these meats on the basis of what these organisations consider 'strong evidence':¹¹

- The **World Cancer Research Fund**¹² and the **American Institute of Cancer Research**¹³ recommend consuming no more than 300g of red meat a week on average and suggest that very little of it be processed. 
- The **World Health Organization (WHO)** recommends moderate consumption of processed meat (e.g., sausages, salami, bacon and ham) for cancer prevention.¹⁴ 

- In 2019, the **Australian Heart Foundation** revised their dietary guidelines to recommend that Australians get most of their protein from plant-based sources, as well as fish and seafood, rather than poultry and red meat. For the first time, the Heart Foundation recommended a specific limit on red meat consumption: no more than three lean serves (totalling 350 grams) of unprocessed beef, pork, lamb or veal a week.¹⁵
- The **Australian Dietary Guidelines (ADGs)** provide specific recommendations to adult men to consume about 20 percent less red meat (based on consumption levels at the time of the publication in 2013).¹⁶



For consumers seeking to reduce their meat consumption or move towards a more plant-centric way of eating, public health experts have also noted that plant-based meats can serve as a transitional food in line with global health authorities' recommendations.

The availability of plant-based alternatives in familiar centre-of-plate formats - like a plant-based mince for a bolognese or a plant-based sausage for a BBQ - allows consumers options to reduce their meat consumption without requiring major behavioural changes.

Recent studies have underscored this perspective, highlighting the importance of protein alternatives like plant-based meats as an "important 'stepping stone' for dietary change"²¹ by providing "opportunities to help consumers shift to a lower meat diet."²²



Shifting consumer diets

Although the region has traditionally had high rates of meat consumption, Australian and New Zealand consumers are increasingly considering the impact of their dietary choices on their health:

- 42% of Aussies and 34% of Kiwis are eating less meat than they were previously – or none at all – and naming 'health' as the number one reason to do so.¹⁷
- These figures represent more than ten million people in Australia and over a million in New Zealand who are either Flexitarians or Meat-Reducers – both actively limiting their consumption of meat – or Vegetarians and Vegans, who are entirely meat-free.

“Processed plant-based foods like veggie sausage, bacon, or vegan cheese can be useful for some to use as transition foods, because they provide the taste of the animal products people are accustomed to consuming, with fewer health risks.”^{23,24}

Hana Kahleova, PhD., M.D., author of the European Prospective Investigation into Cancer and Nutrition (EPIC)-Oxford study



What's the role of protein products like plant-based meat?

Evidence shows that a diet rich in whole foods, such as vegetables, legumes, nuts, wholegrains and fruits, as well as limited animal products, is associated with the best health and environmental outcomes^{18,19} - however the reality is that only 5.4% of Australians consume the recommended servings of fruit and vegetables each day.²⁰

Despite decades of health education campaigns encouraging increased consumption of fruits and vegetables, busy lifestyles and other factors mean consumers often favour foods that perform on convenience, taste and price, with health as a secondary consideration.



Meat alternatives: nutrition fast facts

In 2020, Food Frontier and Accredited Practising Dietitian Teri Lichtenstein, conducted a nutritional analysis of 95 plant-based meat products available in Australia and New Zealand across six categories, a figure that at the time represented all products in the most relevant and popular categories.

The analysis compared the plant-based meats with equivalent animal meat products²⁵, finding that plant-based meats have, on average:

- ✓ **Higher or comparable protein** than their animal meat equivalents in five out of six categories.
- ✓ **Lower kilojoules, lower fat and considerably lower saturated fat**, than animal meat equivalents across all categories (animal meats surveyed had anywhere from double to five times the amount of saturated fats than plant-based meats on average).

- ✓ **Less sodium than animal meat equivalents across most categories.** In some categories, this comparison is significant. For example, animal meat sausages have 47% more sodium on average than plant-based meat sausages. Porcine bacon has 99% more sodium than plant-based bacon, on average.
- ✓ **4.6g of health-promoting fibre on average per serving** (in products listing dietary fibre), which is 18 percent of the AI for women and 15 percent for men. Increased fibre intake is associated with a decreased risk of cardiovascular events, colorectal cancer, incidence of diabetes, and all-cause mortality.^{26,27,28,29,30,31,32,33,34,35}

Fibre is found in cereals, fruits and vegetables and in almost all plant-based meat alternatives in the Australian and New Zealand markets, however it is absent in meat. Most Australians and New Zealanders do not consume enough fibre, falling well short of national dietary guidelines.^{36,37}

Processing and ingredients: While plant-based meats have been criticised for containing additives, similarly processed animal meat products like sausages and burgers contain many of these same additives, and a similar number of additives. On average, plant-based meats contain five additives, while similar animal meat products on average contain four additives. Both animal and plant-based meats (as well as most packaged and processed foods) most commonly contain additives in the category of 'emulsifiers, stabilisers and thickeners' to achieve the different formats and textures consumers want, from schnitzels to sausages and more.³⁸



Impacts of conventional meat on public health: zoonotic disease

Zoonotic diseases, or 'zoonoses', are pathogenic animal diseases that infect humans and are considered one of the most significant threats to contemporary public health by the World Health Organization, UN Food and Agriculture Organization and The World Organisation for Animal Health.³⁹ Research has concluded that zoonosis emergence is closely linked to the intensification of industrial animal agricultural practices, such as land clearing.⁴⁰

Studies have shown that densely populated industrial pig farms had higher incidences of influenza A viruses, and were a facilitator for the evolution of the 2009 H1N1 'swine flu' pandemic influenza A virus,^{41,42} while intensive poultry operations have been directly linked to the evolution and spread of avian influenza A outbreaks, colloquially known as 'bird flu'.^{43,44} The COVID-19 pandemic is also a zoonotic outbreak, with a market in China selling live animals identified by experts as the likely transmission site between humans and animals.⁴⁵

LEARN MORE: To read more detail about Food Frontier's health and nutrition report and its findings, download the full report at:

[Plant Based Meat: A Healthier Choice?](#)

- ¹ Lean meat and poultry, fish, eggs, tofu, nuts and seeds and legumes/ beans [Internet]. Canberra: National Health and Medical Research Council (NHMRC), Department of Health (AU); 2017 Jun 13. Available from: <https://www.eatforhealth.gov.au/food-essentials/five-foodgroups/lean-meat-and-poultry-fish-eggs-tofu-nuts-and-seeds-and>
- ² Organisation for Economic Co-operation and Development (OECD) (FR) Meat consumption (Indicator) [Internet]. 2021. Available from: <https://data.oecd.org/agroutput/meat-consumption.htm>. OECD meat consumption data was utilised in line with Australian Government use of OECD data for determining meat consumption, in addition to allowing for comparison across Australia.
- ³ Food and Agriculture Organization of the United Nations. World Livestock 2011 - Livestock in food security. [Internet] Rome: FAO. 2011 Dec Available from: <https://www.fao.org/3/i2373e/i2373e00.htm>
- ⁴ Australian Bureau of Statistics (ABS). Causes of death, Australia, 2019 [Internet]. Canberra: ABS; 2020 Oct 23 ABS Cat. No.:3303.0. Available from: <https://www.abs.gov.au/statistics/health/causes-death/causes-death-australia/2019>
- ⁵ AIHW. Australia's health 2018, 3.3 Chronic conditions [Internet]. Canberra: AIHW; 2018. Available from: <https://www.aihw.gov.au/getmedia/6bc8a47f-c251-4ac4-9c05-140a473efd7b/aihw-aus-221-chapter-3-3.pdf.aspx>
- ⁶ Ministry of Health (NZ). Health and independence report 2017: The Director-General of Health's annual report on the state of public health [Internet]. Wellington: Ministry of Health (NZ); 2018 Jul. Available from: <https://www.health.govt.nz/system/files/documents/publications/health-and-independence-report-2017-v2.pdf>
- ⁷ Australian Institute of Health and Welfare (AIHW). Australian burden of disease study: Impact and causes of illness and death in Australia 2015 [Internet]. Canberra: AIHW; 2019 Cat. no: BOD 22. Available from: <https://www.aihw.gov.au/reports/burden-of-disease/burden-disease-study-illness-death-2015/contents/table-of-contents>
- ⁸ Global burden of disease study provides important insights into the health of New Zealanders [Internet]. Wellington: Ministry of Health (NZ); 2020 Feb 25. Available from: <https://www.health.govt.nz/news-media/news-items/global-burden-disease-study-provides-important-insights-health-new-zealanders>
- ⁹ International Agency for Research on Cancer (IARC) (FR). IARC Monographs evaluate consumption of red meat and processed meat [Internet]. Lyon: WHO; 2015 Oct 26 [cited 2020 Jun 23]. Available from: https://www.iarc.fr/wp-content/uploads/2018/07/pr240_E.pdf
- ¹⁰ Charcuterie's link to colon cancer confirmed by French authorities. The Guardian. [Internet] July 2022. Available from: <https://www.theguardian.com/world/2022/jul/12/charcuterie-link-colon-cancer-confirmed-french-authorities>
- ¹¹ Ekmekcioglu C, Wallner P, Kundi M, Weisz U, Haas W, Hutter HP. Red meat, diseases, and healthy alternatives: A critical review. Crit Rev Food Sci Nutr [Internet]. 2018];58(2):247-61. Available from: <https://www.tandfonline.com/doi/full/10.1080/10408398.2016.1158148>
- ¹² World Cancer Research Fund. Limit red and processed meat. [Internet] 2022. Available from: <https://www.wcrf.org/diet-activity-and-cancer/cancer-prevention-recommendations/limit-red-and-processed-meat/>
- ¹³ American Institute of Cancer Research. Limit Consumption of Red and Processed Meat. [Internet] 2022. Available from: <https://www.aicr.org/cancer-prevention/recommendations/limit-consumption-of-red-and-processed-meat/>
- ¹⁴ WHO/Food and Agriculture Organization of the United Nations (FAO). Diet, nutrition and the prevention of chronic diseases: Report of the joint WHO/FAO expert consultation [Internet]. Rome: WHO; 2003 Available from: <https://www.who.int/dietphysicalactivity/publications/trs916/download/en/>
- ¹⁵ New advice from the Heart Foundation on meat, dairy and eggs [Internet]. Melbourne: Australian Heart Foundation; 2019. Available from: <https://www.heartfoundation.org.au/media-releases/new-advice-from-the-heart-foundation-on-meat>
- ¹⁶ NHMRC. Australian dietary guidelines [Internet]. Canberra: NHMRC; 2013 Available from: <https://www.eatforhealth.gov.au/guidelines>
- ¹⁷ King T, Weber J. Hungry for plant-based: Australian consumer insights [Internet]. Brisbane: Colmar Brunton; 2019 Oct 29 [cited 2020 Jul 13]. Available from: <https://www.foodfrontier.org/resources/>. Highlights report jointly published by Colmar Brunton, Food Frontier and Life Health Foods.
- ¹⁸ The EAT-Lancet Commission on Food, Planet, Health. The Planetary Health Diet. [Internet] 2020. Available from: <https://eatforum.org/eat-lancet-commission/the-planetary-health-diet-and-you/>
- ¹⁹ Hemler EC, Hu FB. Plant-based diets for personal, population, and planetary health. Adv Nutr [Internet]. 2019 [cited 2020 Jun 23];10(4):S275-83. Available from: https://academic.oup.com/advances/article/10/Supplement_4/S275/5624061
- ²⁰ ABS. Australian health survey: Nutrition first results - Foods and nutrients, 2011-12 [Internet]. Canberra: ABS; 2014 [cited 2020 Jul 20]. ABS Cat. No.: 4364.0.55.007. Available from: <https://www.abs.gov.au/ausstats/abs@nsf/Lookup/by%20Subject/4364.0.55.007~2011-12~Main%20Features~Meat%20poultry%20and%20game%20products%20and%20dishes~724>
- ²¹ Alae-Carew C. et al. The role of plant-based alternative foods in sustainable and healthy food systems: Consumption trends in the UK. Science of the Total Environment. [Internet] 10 Feb 2022; 807(3):151041. Available from: <https://www.sciencedirect.com/science/article/pii/S0048969721061192>
- ²² Stoll-Kleemann S & Schmidt U. Reducing meat consumption in developed and transition countries to counter climate change and biodiversity loss: a review of influence factors. Regional Environmental Change. [Internet] 2016; 17,1261–1277. Available from: <https://link.springer.com/article/10.1007/s10113-016-1057-5>
- ²³ Monaco E. Plant-based meat dubbed 'useful transition food' for a healthier way of life, study finds [Internet]. Los Angeles: Organic Authority; 2018 Jun 4 Available from: <https://www.organicauthority.com/buzz-news/plant-based-meat-dubbed-useful-transition-food-for-a-healthier-way-of-life>
- ²⁴ Michail N. Plant-based meat substitutes are 'useful transition foods' for a healthier diet [Internet]. UK: Food Navigator; 2018 Jun 1 Available from: <https://www.foodnavigator.com/Article/2018/06/01/Plant-based-meat-substitutes-are-useful-transition-foods-for-a-healthier-diet>
- ²⁵ Kalocsay K, King T, Lichtenstein T, Weber J. Plant-Based Meat: A Healthier Choice? Melbourne: Food Frontier; [Internet] 2020 Aug 12. Available from: <https://www.foodfrontier.org/resources/>
- ²⁶ Fayet-Moore F, Cassettari T, Tuck K, McConnell A, Petocz P. Dietary fibre intake in Australia. Paper I: Associations with demographic, socio-economic, and anthropometric factors. Nutrients [Internet]. 2018;10(5):599. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5986479/>
- ²⁷ Chuang SC, Norat T, Murphy N, Olsen A, Tjønneland A, Overvad K, et al. Fiber intake and total and cause-specific mortality in the European prospective investigation into cancer and nutrition cohort. Am J Clin Nutr [Internet]. 2012;96(1):164-74. Available from: <https://academic.oup.com/ajcn/article/96/1/164/4571422>
- ²⁸ Ludwig DS, Pereira MA, Kroenke CH, Hilner JE, Van Horn L, Slattery ML, et al. Dietary fiber, weight gain, and cardiovascular disease risk factors in young adults. JAMA [Internet]. 1999 [cited 2020 Jun 25];282(16):1539-46. Available from: <https://jamanetwork.com/journals/jama/fullarticle/192034>
- ²⁹ Pereira MA, O'Reilly E, Augustsson K, Fraser GE, Goldbourt U, Heitmann BL, et al. Dietary fiber and risk of coronary heart disease: A pooled analysis of cohort studies. Arch Intern Med [Internet]. 2004;164(4):370-6. Available from: <https://jamanetwork.com/journals/jamainternalmedicine/fullarticle/216689> doi: 10.1001/archinte.164.4.370
- ³⁰ Li S, Flint A, Pai JK, Forman JP, Hu FB, Willett WC, et al. Dietary fiber intake and mortality among survivors of myocardial infarction: Prospective cohort study. BMJ [Internet]. 2014];348:g2659. Available from: https://www.researchgate.net/publication/261998925_Dietary_fiber_intake_and_mortality_among_survivors_of_myocardial_infarction_Prospective_cohort_study_OPEN_ACCESS
- ³¹ Threapleton DE, Greenwood DC, Evans CE, Cleghorn CL, Nykjaer C, Woodhead C, et al. Dietary fibre intake and risk of cardiovascular disease: Systematic review and meta-analysis. BMJ [Internet]. 2013;347:f6879. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3898422/>
- ³² Wolk A, Manson JE, Stampfer MJ, Colditz GA, Hu FB, Speizer FE, et al. Long-term intake of dietary fiber and decreased risk of coronary heart disease among women. JAMA [Internet]. 1999;281(21):1998-2004. Available from: <https://jamanetwork.com/journals/jama/fullarticle/vol/281/pg/1998>
- ³³ Ascherio A, Rimm E, Hernan M, Giovannucci EL, Kawachi I, Stampfer MJ, et al. Intake of potassium, magnesium, calcium, and fiber and risk of stroke among US men. Circulation [Internet]. 1998 [cited 2020 Jun 25];98(12):1198-204. Available from: https://www.ahajournals.org/doi/full/10.1161/01.cir.98.12.1198?url_ver=Z39.88-2003&rft_id=ori:rid:crossref.org&rft_dat=cr_pub%20%20pubmed
- ³⁴ Key TJ, Thorogood M, Appleby PN, Burr ML. Dietary habits and mortality in 11 000 vegetarians and healthconscious people: Results of a 17 year follow up. BMJ [Internet]. 1996;313(7060):775-9. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2352199/>
- ³⁵ Pietinen P, Rimm EB, Korhonen P, Hartman AM, Willett WC, Albanes D, et al. Intake of dietary fiber and risk of coronary heart disease in a cohort of Finnish men: The Alpha-Tocopherol, Beta-Carotene Cancer Prevention Study. Circulation [Internet]. 1996 [cited 2020 Jun 25];94(11):2720-7. Available from: https://www.ahajournals.org/doi/full/10.1161/01.cir.94.11.2720?url_ver=Z39.88-2003&rft_id=ori:rid:crossref.org&rft_dat=cr_pub%20%20pubmed
- ³⁶ Fibre in food [Internet]. Melbourne: Department of Health and Human Services, State Government of Victoria; 2018. Available from: <https://www.betterhealth.vic.gov.au/health/healthyliving/fibre-in-food>. Australians consume on average 20-25g of fibre daily, while the Australian Heart Foundation recommends that adults should consume at least 25-30g daily.
- ³⁷ Nutrition Research Australia/Deloitte Access Economics. Healthcare and productivity savings from increased intake of grain fibre in New Zealand [Internet]. Sydney: Nutrition Research Australia; 2017. p. 23. Available from: <https://www2.deloitte.com/content/dam/Deloitte/nz/Documents/Economics/dae-nz-fibre-economics.PDF>. New Zealanders consume on average 18-23g of fibre daily, falling short of their national guidelines (adopted from the Australian National Health and Medical Research Council)
- ³⁸ Kalocsay K, King T, Lichtenstein T, Weber J. Plant-Based Meat: A Healthier Choice? Melbourne: Food Frontier; [Internet] 2020 Aug 12. Available from: <https://www.foodfrontier.org/resource/plant-based-meat-a-healthier-choice/>
- ³⁹ Belay ED (2017) Zoonotic Disease Programs for Enhancing Global Health Security Emerging Infectious Diseases 1: S65–S70. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5711319/>
- ⁴⁰ Jones BA et al. (2013) Zoonosis emergence linked to agricultural intensification and agroecological change. Proceedings of the National Academy of Sciences 110 (21) 8399-8404; <https://www.pnas.org/doi/full/10.1073/pnas.1208059110>
- ⁴¹ Smith GJ, Vijaykrishna D, Bahl J, et al. Origins and evolutionary genomics of the 2009 swine-origin H1N1 influenza A epidemic. Nature 2009; 459:1122–5. 12 Available from: <https://www.nature.com/articles/nature08182>
- ⁴² Escalera-Zamudio M et al. Characterization of an influenza A virus in Mexican swine that is related to the A/ H1N1/2009 pandemic clade. Virology. 2012; 433:176–82. Available from: <https://pubmed.ncbi.nlm.nih.gov/22921315/>
- ⁴³ Webster R & Hulse D. Controlling avian flu at the source. Nature. 2005; 435(7041): 415–416. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7095291/>
- ⁴⁴ Zanella A. Avian influenza attributable to Serovar H7N1 in light layers in Italy. Avian Dis. [Internet] 2003; 47(3 Suppl):1177-80 Available from: <https://pubmed.ncbi.nlm.nih.gov/14575137/>
- ⁴⁵ Worobey et al. The Huanan Seafood Wholesale Market in Wuhan was the early epicenter of the COVID-19 pandemic. Science. [Internet] 2022 Jul 26. 377: 6609. 951-959. Available from: <https://www.science.org/doi/full/10.1126/science.abb8715>