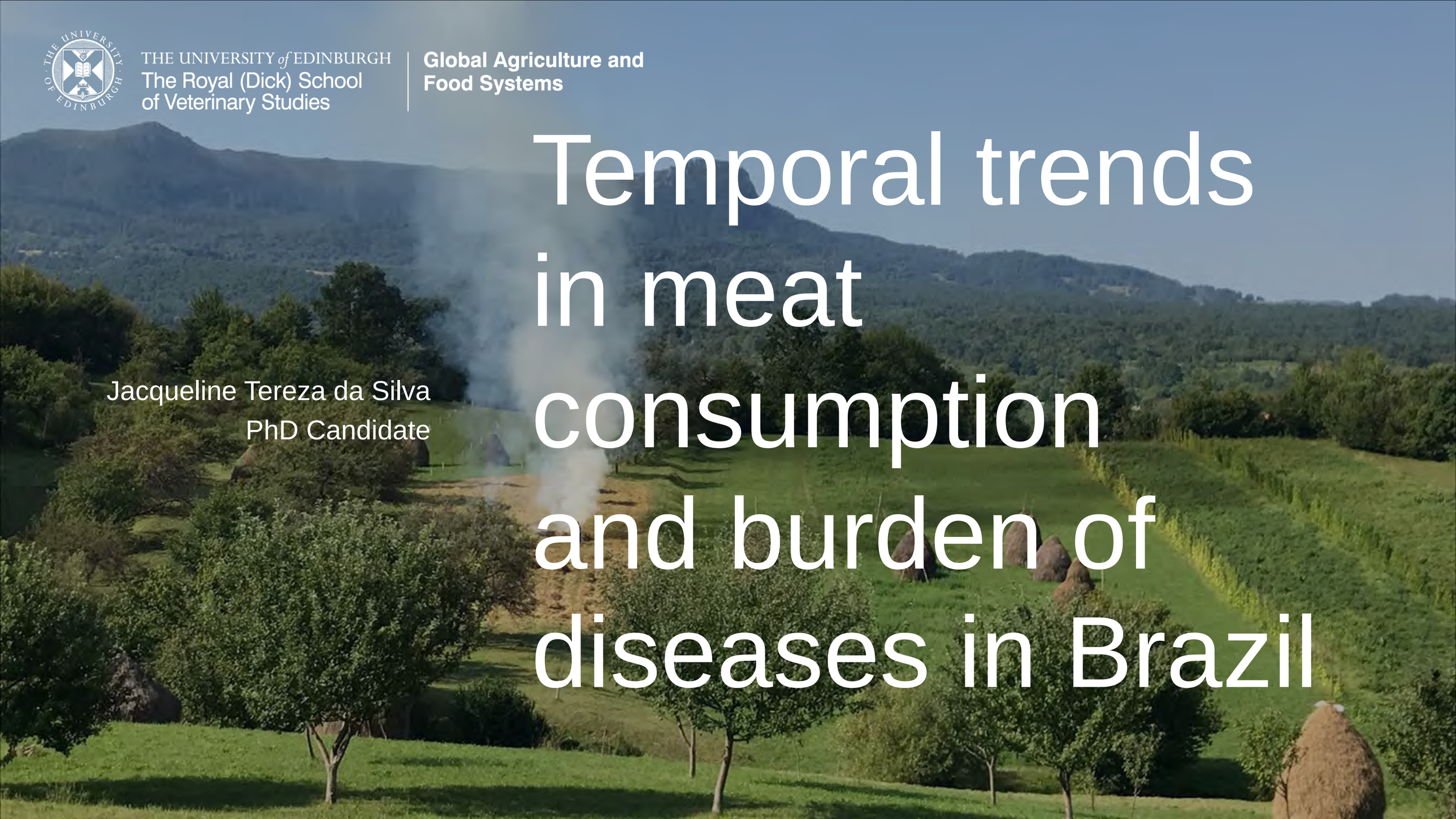
THE UNIVERSITY of EDINBURGH
The Royal (Dick) School of Veterinary Studies

Global Agriculture and Food Systems

The Future of Livestock in Global Food Systems

Symposium 2025



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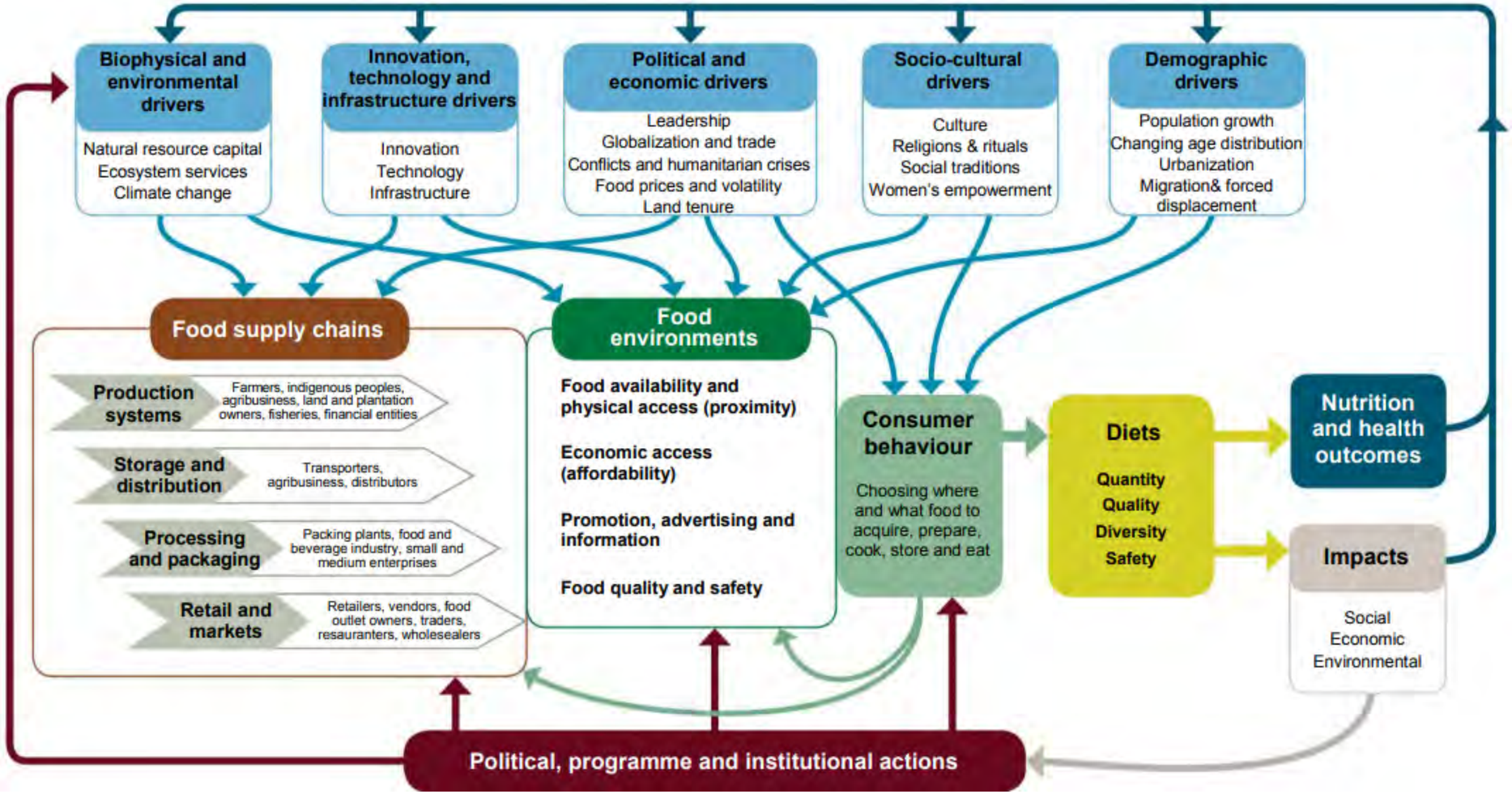
Temporal trends in meat consumption and burden of diseases in Brazil

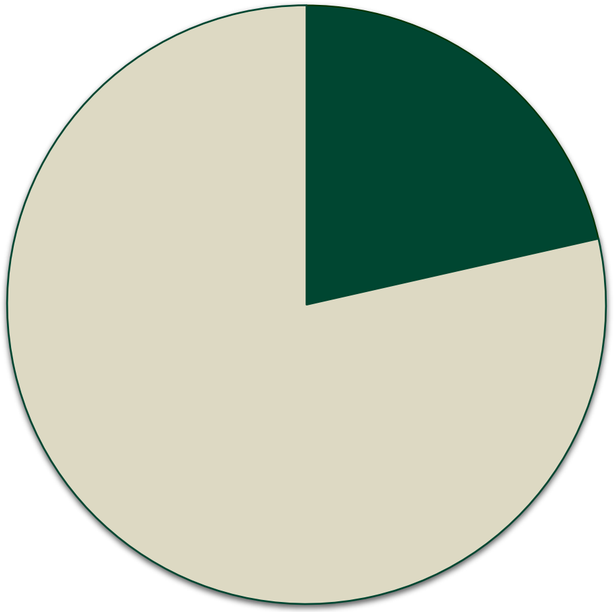
Jacqueline Tereza da Silva
PhD Candidate

Conceptual framework of food systems for diets and nutrition. HLPE, 2017.

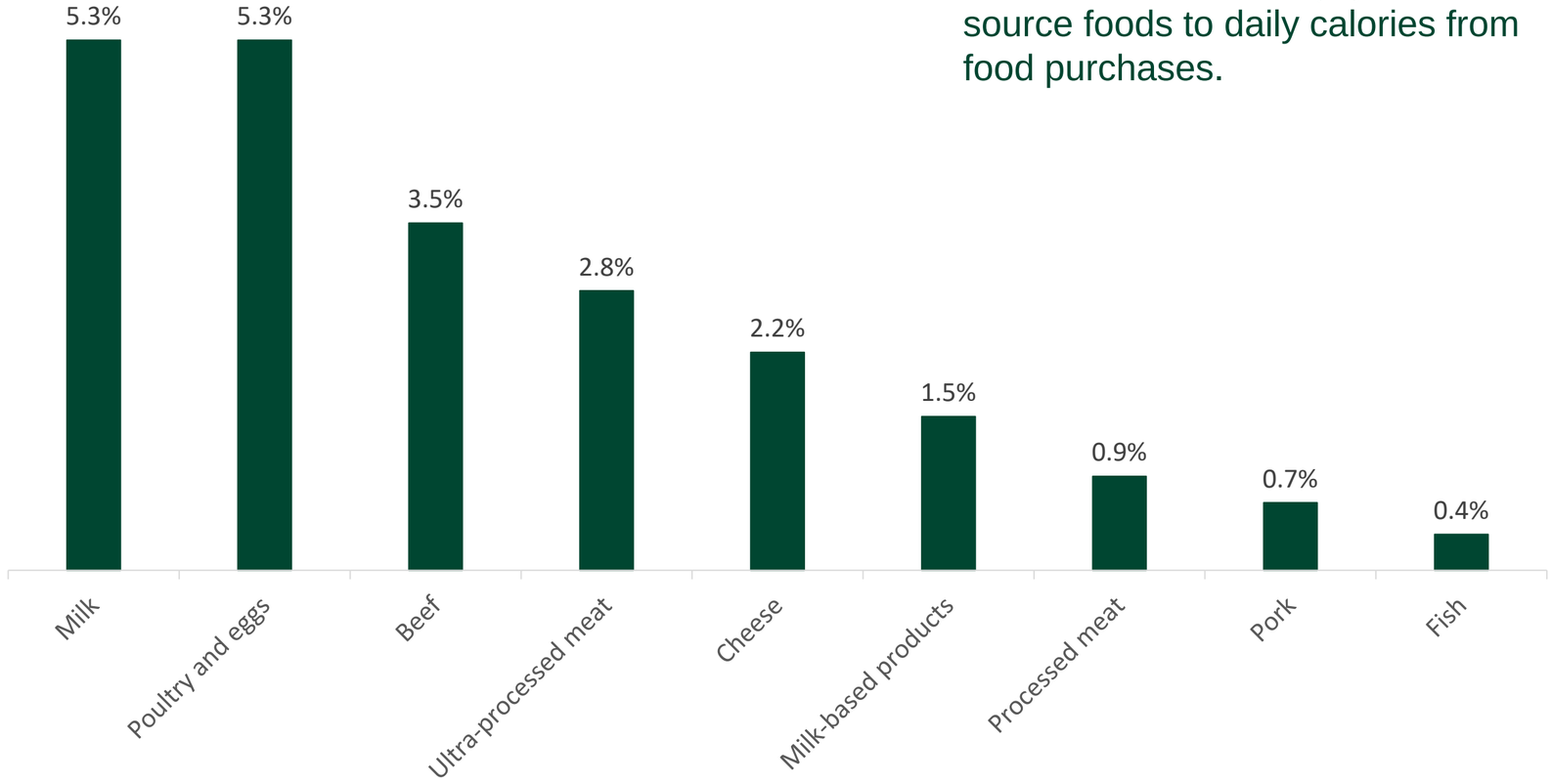


How significant is livestock in the Brazilian diet?

Livestock products make up 23% of the diet



Values are the share (%) of animal source foods to daily calories from food purchases.



Has it always been like that?

Share (%) of unprocessed, processed, and ultra-processed animal products to daily calories from food purchases.

NOVA food group	1987	1996	2003	2009	2017	Change
Unprocessed/minimally processed	15.5	16.8	15.0	14.7	15.2	-2%
Processed	1.6	1.8	2.0	2.2	3.0	88%
Ultra-processed	1.1	2.1	3.4	3.9	4.3	291%
Total	**18.2**	**20.7**	**20.4**	**20.8**	**22.5**	**24%**

Excessive meat consumption

40% of the population eat more than 70 grams of red meat per day

Gender
Male = 44%
Female = 36%

Income quintiles
1 = 34%
2 = 37%
3 = 39%
4 = 43%
5 = 44%

Age groups
10 – 19 years = 36%
20 – 29 years = 41%
30 – 39 years = 43%
40 – 49 years = 41%
50 – 59 years = 41%
60 – 69 years = 38%
70 years or more = 36%

What are the health implications?

Excessive red and processed meat consumption

Mortality

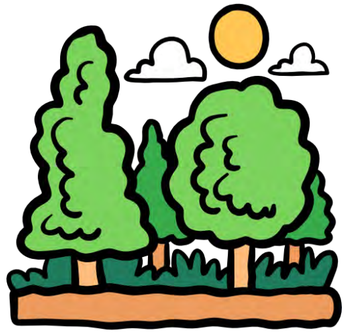
Disease	Red meat	Processed meat
Type 2 diabetes mellitus	2.4%	2.4%
Ischemic heart disease	12.3%	13.6%
Colorectal cancer	1.5%	1.5%

Societal burden colorectal cancer

US$ 245 million
3.5% (US$ 8.5 million) = red meat consumption
5.1% (US$ 12.6 million) = processed meat

https://doi.org/10.1016/j.puhe.2024.02.029

What are the drivers of these dietary trends?



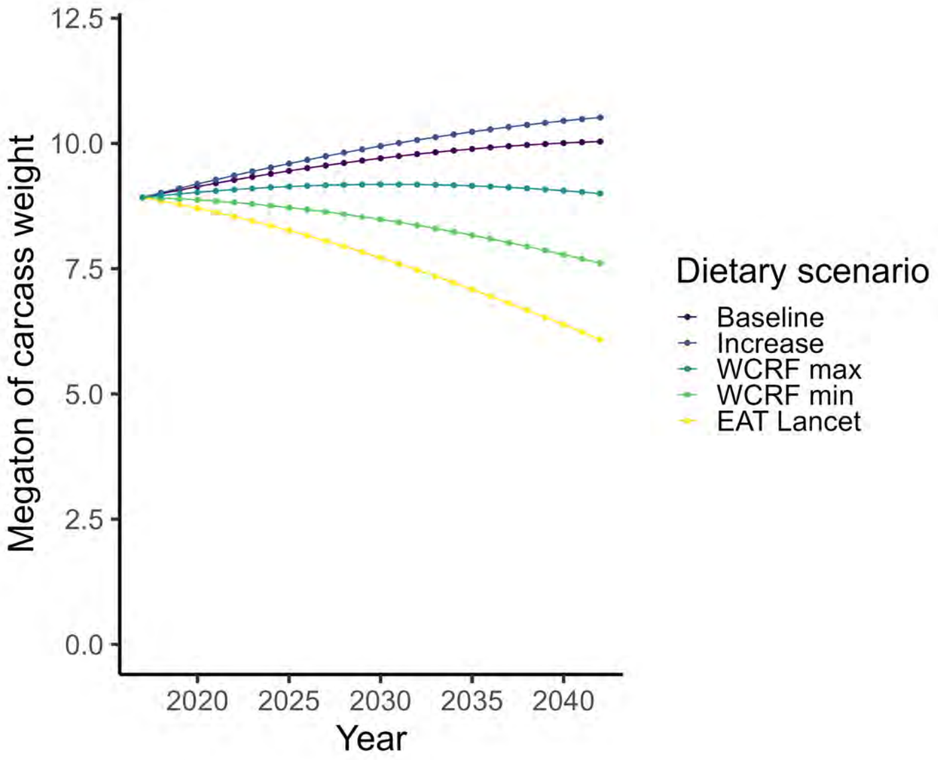
Biophysical and environmental
Biodiversity hotspot
Vast territorial extension

Political and economic
GDP and employment
Power concentration
Lobby
Political campaigns

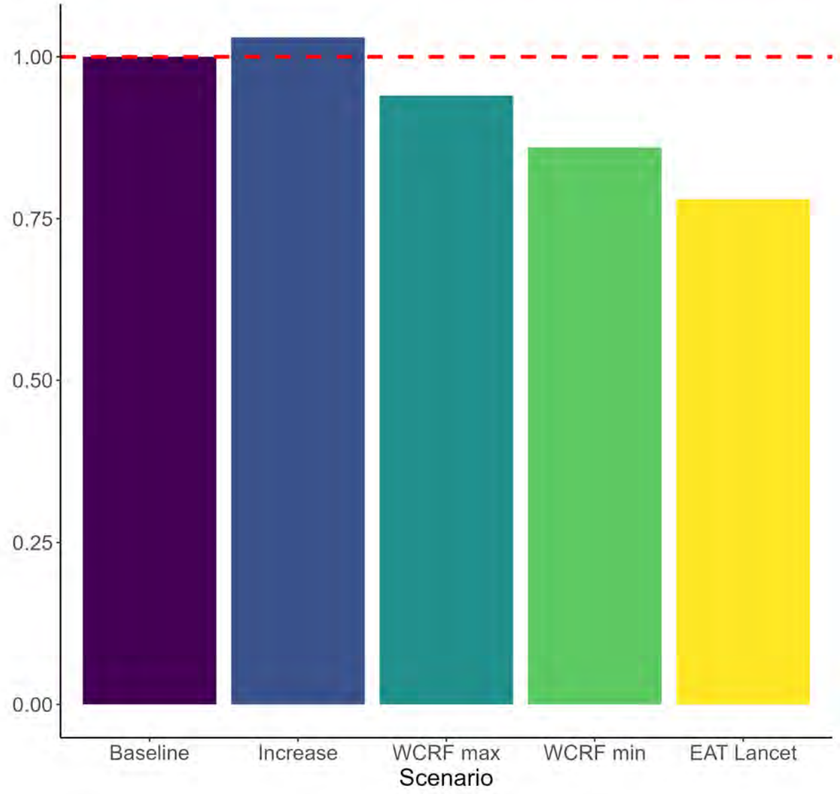
Socio-cultural
Culinary traditions
Symbol of prosperity

Can current trends be reversed?

Beef demand



Gross margins (for farmers)



Key points

- Political, economic, social and cultural factors enable excessive meat consumption in Brazil
- Excess is observed across gender, age group and income levels
- While fresh meat consumption has been stable, processed and ultra-processed meat consumption has increased substantially
- Time for degrowth? Structural changes allowing for alternative sources of income and employment are needed
- What would you add here?

Thank you

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Human health co-benefits and trade-offs for transitioning to plant-forward diets

Lindsay Jaacks

What is a ‘plant-forward diet’?

“Animal foods” in the UK context generally refers to:

- Chicken, pork, beef, lamb
- Milk, cheese, yogurt, butter
- Eggs
- Fish and shellfish

Examples of plant-forward meals

Corn chowder

Beans on toast

Chickpea chicken curry

FORBES > BUSINESS

BREAKING

Eating Red And Processed Meat—And Even Chicken—Could Increase Risk Of Diabetes, Research Finds

Robert Hart Forbes Staff

Robert Hart is a London-based Forbes senior reporter.

Follow

Aug 20, 2024, 06:30pm EDT

TOPLINE Consuming meat, particularly red and processed meat, and even poultry like chicken and turkey may increase the risk of developing type 2 diabetes in the future, according to a new study published on Tuesday, adding to growing evidence linking meat and ultra-processed foods to health issues including heart disease, cancer, depression, anxiety and even premature death.

News • Health • Healthy eating

World's most nutritious meat is 'healthier' than some vegetables and fruit

Pork fat, also known as lard, has been rated as more healthy than a lot of green foods - and it's also more nutritious than most other animal products.

NEWS By Unzela Khan GAU Content Editor & Sophie Law Deputy Editor Spare Time

15:52, 6 APR 2025

Bookmark

News › Scottish News › Climate change

Scots urged to cut down on red meat to beat climate change

If people who currently too much of foods like steak, lamb and bacon cut down to recommended levels, it would be help tackle emissions, Food Standards Scotland said.

NEWS By Dan Vevers

04:30, 8 MAR 2024

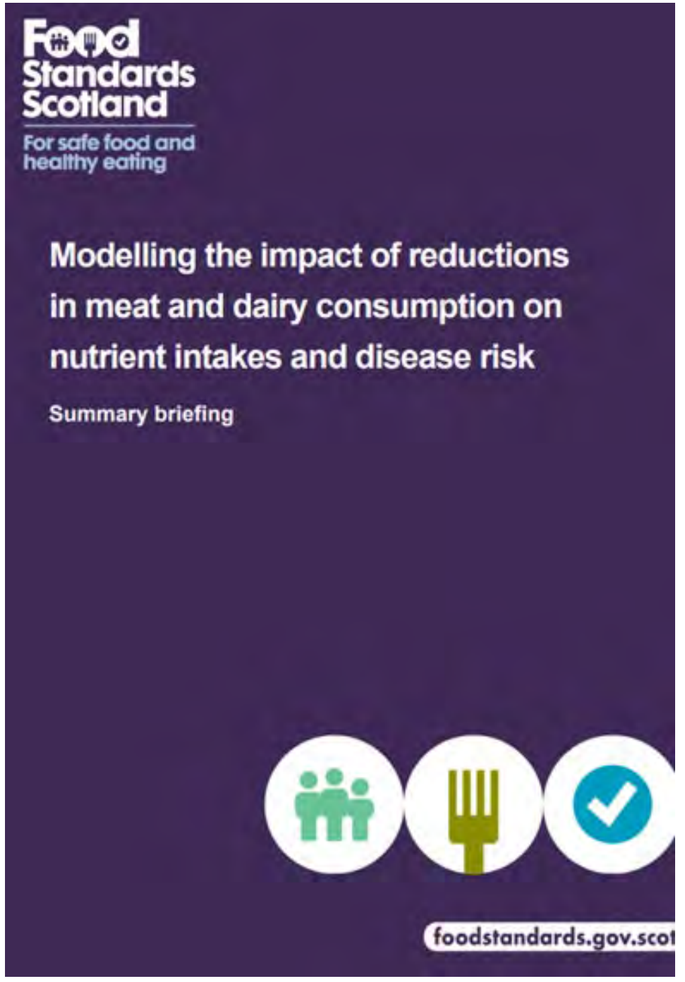
Bookmark Comments 33

Plans to slash meat and dairy consumption pose health risk, finds study

By Ian Quinn | 11 March 2024 | undefined

Study cautions on meat reduction for vulnerable populations

7th March



Whether reducing meat and dairy consumption is ‘good’ or ‘bad’ for your nutrition depends on what you currently eat and what (if anything) you eat instead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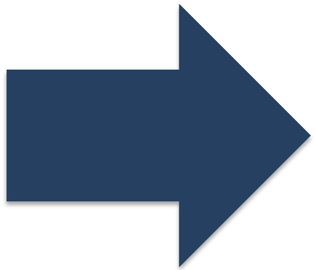
ORIGINAL
AND BEST



Ingredients
Carbonated Water, Sugar, Acid (Citric Acid), Flavourings (Including Caffeine, Ammonium Ferric Citrate & Quinine), Sweeteners (Aspartame, Acesulfame K), Preservative (E211), Colours (Sunset Yellow FCF, Ponceau 4R).

?

Healthful plant-based diet index

10% increase →
9% (CI: 5-13%) **lower risk** of diabetes

Unhealthful plant-based diet index

No significant association with risk of diabetes

Chen et al. *Diabetes Care* 2021;44:663-71

Most evidence on the health effects of plant-forward diets is based on low / infrequent consumption of plant-based meat and dairy alternatives

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Plant-based UPFs linked with higher risk of cardiovascular disease

by Ryan O'Hare
11 June 2024

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Heavily processed plant-based foods may be worse for heart health than less-processed foods.

New analysis of the health impacts of plant-based ultra-processed foods (UPFs) has found they may pose a higher risk for cardiovascular diseases compared to less-processed plant-based foods.

The research, led by the University of São Paulo and involving Imperial College London, used data from more than 118,000 people. It suggests that while plant-based diets are linked with reduced disease risk,

WHAT ARE 'PLANT-BASED UPFS'?

In this study the researchers looked at both plant-based and animal-based ultra-processed foods (UPFs).

They categorised 'plant-based foods' as composing exclusively or primarily of plant origin.

This included items such as fruits, vegetables, grains, bread, cakes and sweets, and sweetened beverages.

Plant-based dietary patterns and ultra-processed food consumption: a cross-sectional analysis of the UK Biobank

Kiara Chang,[a,] Jennie C. Parnham,[a] Fernanda Rauber,[b,c] Renata B. Levy,[b,c] Inge Huybrechts,[d] Marc J. Gunter,[d,e] Christopher Millett,[a,f] and Eszter P. Vamos[a]*

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[e]Department of Epidemiology and Biostatistics, School of Public Health, Imperial College London, London, United Kingdom
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eClinicalMedicine
2024;78: 102931

Published Online xxx
https://doi.org/10.1016/j.eclinm.2024.102931

Summary

Background Dietary shift towards more plant-based options is increasingly popular, but the quantity of ultra-processed foods (UPFs) they contain is largely unknown. This study assessed the level of UPF and minimally processed food consumption among regular and low red meat eaters, flexitarians, pescatarians, vegetarians and vegans in a large dataset of United Kingdom (UK) adults.

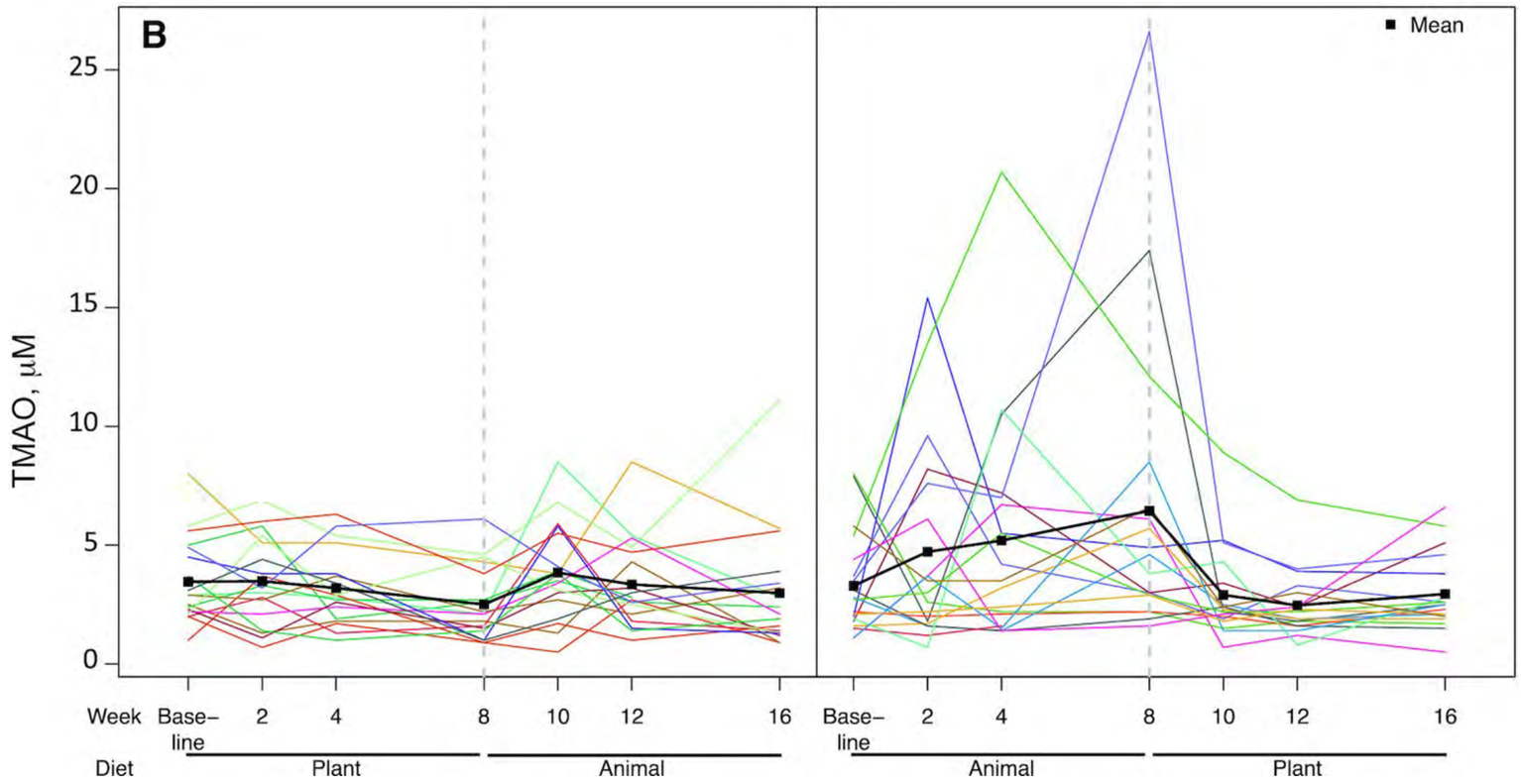
Chang et al. *eClinicalMedicine* 2024;78:102931

Study With Appetizing Plant food-Meat Eating Alternative Trial (SWAP-MEAT)

- 36 participants were instructed to consume ≥2 servings/day of plant-based alternative meat (‘Plant’) compared with animal meat (‘Animal’) for 8 weeks each, while keeping all other foods and beverages as similar as possible
  - All Plant products were supplied by Beyond Meat
  - All Animal products were grass-fed (80% lean, 20% fat) and supplied by a San Francisco-based organic foods delivery service
  - Products: burger, beef mince, breakfast sausage, hot Italian sausage, Brat sausage, grilled chicken strips, lightly seasoned chicken strips
- Funded by Beyond Meat

Crimarco et al. *American Journal of Clinical Nutrition* 2020;112(5):1188-1199

Impact on TMAO (emerging risk factor for cardiovascular disease and some cancers)



Crimarco et al. *American Journal of Clinical Nutrition* 2020;112(5):1188-1199

Singapore-based study similar to SWAP-MEAT

- 82 participants were instructed to substitute their habitual protein-rich foods with fixed quantities of either animal-based meats or their corresponding plant-based meat alternatives provided by the research team
  - Meat products: beef mince, pork mince, chicken breast, burger patty, sausage, chicken nuggets
  - Corresponding plant products: 1) Impossible Beef (Impossible Foods), 2) OmniMeat Mince (OmniFoods), 3) Chickened Out Chunks (The Vegetarian Butcher), 4) Beyond Burger (Beyond Meat), 5) Beyond Sausage Original Brat (Beyond Meat), and 6) Little Peckers (The Vegetarian Butcher)
- Funded by Pinduoduo Incorporated
- No significant health effects observed

Toh et al. *American Journal of Clinical Nutrition* 2024;119(6):1405-16

Public Health Priorities

- What is the prevalence of micronutrient deficiencies?
  - UK (National Diet and Nutrition Survey)
    - Anaemia affects 9% of girls 11-18 years
    - Iodine deficiency affects 15% of men and 19% of women

- What are the leading causes of morbidity and mortality?
  - UK
    - Dementia & Alzheimer's, heart disease, strokes, lung cancer

Maximum red meat intake (g/day)	Estimated % with iron intake below LRNI		Estimated % with zinc intake below LRNI	
	Men	Women	Men	Women
180	0.9	25	3.9	3.9
70	1.0	26	5.5	3.9
50	1.0	27	9.5	5.0
0	2.8	32	29	20

Scientific Advisory Committee on Nutrition (SACN) Iron and Health report (2010), Table 12

Whether reducing meat and dairy consumption is ‘good’ or ‘bad’ for your nutrition depends on what you currently eat and what (if anything) you eat instead

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