

Non-Communicable Diseases Watch

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衛生防護中心
Centre for Health Protection



衛生署
Department of Health

A 'Meaty' Matter

Key Messages

- ※ Meat contains important and essential nutrients that are required for growth and health throughout life. If consumed in moderation, it can be part of a healthy diet.
- ※ Excessive meat consumption, in particular red and processed meat, has been implicated in various chronic diseases including obesity, cardiovascular diseases, type 2 diabetes and colorectal cancer.
- ※ A survey in 2016 revealed that about one quarter (25.2%) of community-dwelling adults aged 18-64 consumed more than 6 taels of red and white meat on average a day. Moreover, about one-tenth (10.4%) of respondents reported that they on average consumed processed meat 4 or more days a week in the 30 days before enumeration.
- ※ For optimal health, adults in general are advised to keep daily consumption of lean meat, fish, egg and alternatives to about 5 – 8 taels. For red meat, limit consumption to less than 13 taels per week. Avoid processed or cured meat and associated products.



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A ‘Meaty’ Matter

Driven by efficient industrial methods of producing and processing livestock and poultry for food, and the change in people’s lifestyles and eating habits caused by economic development and urbanisation, global meat consumption is on the rise.¹ Depending on the concentration of myoglobin (an iron- and oxygen-binding protein) present in the muscle tissue, meat can broadly be categorised into red and white meat. In most cases, the muscle meat obtained from livestock (such as beef, pork and lamb) is classified as red meat for higher concentrations of myoglobin; poultry and most fish are considered as white meat due to lower myoglobin concentrations. As shown in Table 1, myoglobin concentrations generally are higher in beef and lower in poultry with lamb and pork having intermediate concentrations. However, different myoglobin concentrations can be found in different cuts of the same animal.²

Table 1: Myoglobin concentrations by meat source

Meat source	Myoglobin concentration (grams / kilogram of lean meat)
Beef	3.0 – 9.0
Lamb	4.0 – 6.0
Pork	2.2 – 6.0
Veal	1.0 – 2.5
Poultry	
– dark meat (thigh)	1.0 – 3.0
– light meat (breast)	0.1 – 0.4

Source: Feiner 2006.

Associations of Meat Consumption and Health

Meat as a component of a healthy diet contains important and essential nutrients that are required for growth and health throughout life. For most people, meat is the preferred dietary source of protein, essential fatty acids (such as omega-3

fatty acids), minerals (in particular iron, zinc and selenium) and vitamins (in particular vitamin B12 which can only be found in animal products).³ A balanced diet with moderate amounts of meat can play a key role in preventing (iron or vitamin B12 deficiency) anaemia.¹ Despite its nutritional richness, a strong body of scientific evidence links excessive meat consumption, particularly of red and processed meat, with an increased risk of obesity (including central obesity),^{4, 5} cardiovascular diseases including heart disease and stroke,^{6, 7} type 2 diabetes,^{8, 9} colorectal cancer,^{10, 11} and earlier death.^{12, 13}

Several biological mechanisms may explain the association between excessive meat consumption and increased chronic disease risk.⁶⁻¹³ Meat contains substantial amounts of saturated fats and cholesterol that can promote build-up of fatty plaques inside the arterial walls. Saturated fatty acids can also impair insulin sensitivity, affect glucose uptake in tissue and increase diabetic risk. Processed and cured meats often contain added ingredients, including salt, nitrites and other preservatives. While excessive salt intake increases the risk of hypertension, nitrites can react with stomach acid and other chemicals to form cancer-causing nitrosamines. The haem iron in red meat not only can catalyse the formation of nitrosamine compounds, but also increase oxidative stress and insulin resistance. Some chemical compounds (such as heterocyclic amines and polycyclic aromatic hydrocarbons) arising from meat cooked at high temperature can cause cancer too. In fact, processed meat was classified as a Group I carcinogen by the International Agency of Cancer Research. Furthermore, meat is devoid of dietary fibre which is important for digestive health.

Pattern of Meat Consumption among People in Hong Kong

In Hong Kong, meat (fresh, chilled or frozen) forms a central part of many people's diets. According to the Healthy Eating Food Pyramid, adults in general are recommended to consume 5 – 8 taels (about 188 – 300 grams) of lean meat, fish, egg and alternatives every day,¹⁴ and one tael of meat is approximately the size of a table tennis ball. The Chinese Dietary Guideline 2016 published by the Chinese Nutrition Society also recommends residents in China to consume 280 – 525 grams (about 7.5 – 14 taels) of fish and 280 – 525 grams of meat and poultry a week.¹⁵ Specifically for red meat, the World Cancer Research Fund recommends meat-eaters to consume less than 500 grams (about 13 taels) (cooked weight) a week, very little if any to be processed.¹⁶

Telephone surveys conducted by the Department of Health (DH) revealed that the proportion of community-dwelling people aged 18-64 reported consuming 4 taels or more of red meat a day increased from 16.1% in 2009 to 18.0% in 2016, while the proportion of people reported consuming 4 taels or more of white meat a day decreased from 14.1% to 11.1% over the same period. Overall, about one quarter (25.2%) of people aged 18-64 reported that they consumed more than 6 taels of meat on average a day in 2016. Moreover, about one-tenth (10.4%) of them reported that they on average consumed processed meat 4 or more days a week in the 30 days before enumeration (Table 2).¹⁷

Table 2: Pattern of meat consumption among community-dwelling adults aged 18-64, 2009 and 2016

	2009 ⁺	2016 ⁺⁺
Red meat consumption* (average number of taels per day)		
Less than 2	42.9%	42.6%
2-4	41.0%	39.5%
More than 4	16.1%	18.0%
White meat consumption** (average number of taels per day)		
Less than 2	51.0%	57.1%
2-4	34.9%	31.8%
More than 4	14.1%	11.1%
Red and white meat consumption (average number of taels per day)		
Less than 4	47.4%	48.5%
4-6	25.0%	26.3%
More than 6	27.6%	25.2%
Processed meat consumption*** (average number of days per week)		
1 day or less	66.3%	63.3%
2-3 days	23.4%	26.3%
4 or more days	10.4%	10.4%

Notes: *Red meat includes pork, beef, and lamb; **White meat includes poultry and fish; ***Processed meat includes canned meat, cured meat or smoked meat, such as luncheon meat, ham, sausages, bacon and Chinese preserved meat.

Base: All respondents excluding those with unknown/missing information. ⁺ All respondents in 2009 = 2 185; ⁺⁺ All respondents in 2016 = 4 071.

Source: Behavioural Risk Factor Surveillance System of DH.

Healthier and Greener Living by Eating Less Meat

Being a meat-eater or vegetarian is a matter of personal choice. However, the basic principles of what constitutes a healthy diet for adults remain the same (Box 1). With careful planning, either a meat-containing diet or vegetarian diet can be healthy and provides essential nutrients for normal body functioning. For meat-eaters, they should be aware that cancer risk increases with the amount of processed meat and red meat consumed. Reducing the consumption of processed meat can also help reduce sodium (salt) intake, which brings additional health benefits by reducing the risk of hypertension.

Box 1: Constitution of a Healthy Diet for Adults^{14, 18}

- Including the five basic food groups (i.e. grains; fruit; vegetables; meat along with fish, eggs and legumes; milk and milk products);
- At least 400 grams (5 servings) of fruit and vegetables a day;
- Less than 10% of daily total energy intake from free sugars. For a person of healthy body weight consuming approximately 2 000 calories per day, it is equivalent to about 50 grams (or 12 teaspoons). For additional health benefits, a further reduction to below 5% of total energy intake is recommended;
- Less than 30% of total energy intake from fats i.e. about 60 grams per day for a 2 000 calories meal plan. Unsaturated fats are preferable to saturated fats. Industrial trans fats are not part of a healthy diet;
- Less than 5 grams of salt (equivalent to approximately 1 teaspoon) per day.

Here are some healthier ways of eating meat—

- ✓ Know the recommended limits. Keep daily consumption of lean meat, fish, egg and alternatives to about 5 – 8 tael. For red meat, limit consumption to less than 13 tael (cooked weight) per week. Avoid processed or cured meat and associated products.
- ✓ Opt for lean meat. Before cooking and eating, remove skin and trim all visible fat from meat and poultry.
- ✓ Choose low-fat, low salt marinades, such as ginger, garlic, herbs or lemon juice.
- ✓ Use low-fat cooking methods. Opt for steaming, boiling and stewing instead of frying or deep-frying. Avoid adding extra oil. Drain the fat after cooking.
- ✓ Do not burn the meat, and cut the burnt bits off before serving.
- ✓ Keep serving size moderate, and serve with plenty of seasonal fresh or cooked vegetables.

It is also noteworthy that agriculture and food productions account for 10% – 20% of greenhouse-gas emission and livestock farming is responsible for fourth-fifth of these emissions. Therefore, eating meat less often (e.g. going meat-free one to two days a week) or in smaller portions can yield co-benefits for health and tackling climate change. Such change can reduce individuals' carbon footprint on one hand and decrease the chance of developing chronic diseases on the other hand. For more information about a healthy diet, please visit the Change for Health website of DH at <http://www.change4health.gov.hk/>, or call the 24-hour Health Education Hotline at 2833 0111.

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Food Loss and Food Waste

1/3 Food produced for human consumption is lost or wasted globally.

Global quantitative food losses and waste for each commodity group per year:

30%  CEREALS

20%  DAIRY PRODUCTS

35%  FISH AND SEAFOOD

45%  FRUITS AND VEGETABLES

20%  MEAT

20%  OILSEEDS AND PULSES

45%  ROOTS AND TUBERS

Food loss and food waste refer to the decrease of food in subsequent stages of the food supply chain intended for human consumption. Food is lost or wasted throughout the supply chain, from initial production down to final household consumption.

The decrease may be accidental or intentional, but ultimately leads to less food available for all. Food that gets spilled or spoiled before it reaches its final product or retail stage is called food loss. This may be due to problems in harvesting, storage, packing, transport, infrastructure or market/price mechanisms, as well as institutional and legal frame-works.

Food and Agriculture Organization of the United Nations estimates that one-third of food produced for human consumption is lost or wasted globally, which amounts to about 1.3 billion tons per year including cereals, dairy products, fruits, vegetables and meat etc.

To reduce food waste, consumers could shop smartly and buy only the amount of food they need. When eating out, ask for smaller portions to prevent plate waste and overeating.

For more information about food loss and waste reduction, please visit <http://www.fao.org/food-loss-and-food-waste/en/>, or the Food Wise Hong Kong Campaign website <http://www.foodwisehk.gov.hk/en/>.

Non-Communicable Diseases (NCD) WATCH is dedicated to promote public's awareness of and disseminate health information about non-communicable diseases and related issues, and the importance of their prevention and control. It is also an indication of our commitments in responsive risk communication and to address the growing non-communicable disease threats to the health of our community. The Editorial Board welcomes your views and comments. Please send all comments and/or questions to so_dp3@dh.gov.hk.

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