

Guidance on Salt and Cancer Risk

Key Messages

Salt is a compound of the elements sodium and chlorine, and is commonly used to flavour and preserve foods. Most of the salt we eat comes from processed and packaged foods, such as sauces, processed meats, stock cubes and soups as well as breads and cereals.

Both salt and salt preserved foods are *probably* associated with an increased risk of stomach cancer. Salt is also a leading cause of high blood pressure and cardiovascular disease.

The Cancer Society supports the recommendation made by the Ministry of Health Food and Nutrition Guidelines for Healthy Adults that people choose foods low in salt, and recommends that people avoid adding salt at the table or in cooking.

The Cancer Society supports the efforts to reduce population salt intakes, particularly through reducing salt levels in processed and takeaway foods.

For general health and wellbeing, people should aim to consume no more than 2300mg of sodium (6g of salt) per day. Ways to limit salt intake include purchasing no added salt or low salt foods in the supermarket, flavouring foods with herbs and spices instead of salt, eating more fresh fruit and vegetables and limiting processed and takeaway foods.

Background

Salt contains both sodium and chlorine, and is chemically known as sodium chloride. Salt is commonly used to flavour and preserve foods. Before refrigeration was common, large amounts of salt were needed to prevent foods from spoiling. In recent times the need for salt in foods has decreased.

Salt is the main source of sodium in the diet, which is essential for the body to function normally. However, the requirement for sodium in the body is much less than the amount usually eaten. Most of the salt eaten comes from processed and packaged foods, such as sauces, processed meats, stock cubes and soups as well as breads and cereals (Table 1).¹

Salt in our diet also comes from the salt added at the table and in cooking. Table salts often include additives like anti-caking agents to stop the salt crystals from sticking together. Salt can also be flavoured with things like celery or garlic.

High amounts of salt in the diet have been linked with stomach cancer.² Salt is also a leading cause of high blood pressure and increases the risk of cardiovascular disease and increases the risk of stroke and mortality from cardiovascular disease.³

Table 1. Sodium (Na) content per 100g of different foods.¹

Food	Na (mg)	Food	Na (mg)	Food	Na (mg)
Bread, white	451	Devon (luncheon)	844	Salami, Danish	1495
Gravy	468	Beef sausages	910	Spam	1539
Meat pie	500	Chicken noodle soup	922	Leg ham	1650
Sponge cake	610	Tomato sauce	938	Pretzels	1980
Butter	610	Biscuit, cheese	955	Bacon, fried	2000
Pad Thai noodles	610	Dim sim, fried	1091	Vegemite	3000
Hamburger, plain	614	Cheese, feta	1107	Oyster Sauce	3790
Cheese, cheddar	662	Corned beef	1190	Anchovy	5480
Mayonnaise	700	Cream cheese	1249	Soy sauce	6555
Margarine	780	Smoked salmon	1266	Fish sauce	7990
Cornflakes	815	Italian dressing	1330	Stock cube	18400
Scone, plain	820	Olive, green or black	1472	Table salt	38178

Table 2. Main sources of salt in processed foods.⁴

Food Category	% contribution to salt intake from processed foods
Cereal and cereal products	32
Cereal based products and dishes	17
Meat, poultry and game products and dishes	21
Milk products and dishes	5
Savoury sauces and condiments	8
All other foods	17

Salt and Cancer Prevention: Epidemiological Evidence

In 2007 the World Cancer Research Fund (WCRF) released a comprehensive report on food and the prevention of cancer.² This report found that both salt and salt preserved foods are *probably* associated with an increased risk of stomach cancer.² This finding is consistent with other recent review articles,^{5,6} and the World Health Organization (WHO) report published in 2003, which classified salt preserved foods and salt as *probably* causing stomach cancer.⁷

Although it is difficult to measure salt intake, the effect of salt on stomach cancer is thought to be mainly due to a regular intake of salted and salt preserved foods rather than salt per se.² In Japan and other Asian countries, where these foods are eaten widely, the incidence of stomach cancer is high.² Other countries where traditional diets include substantial amounts of salty (rather than salt preserved foods) also have high rates of stomach cancer.²

The WCRF recommends that people avoid salt preserved, salted or salty foods, and that foods be preserved using methods that do not involve salt (eg. refrigeration, freezing, drying, bottling, canning and fermentation).²

Potential Mechanisms of Action

Experimental studies suggest that salt may be linked to stomach cancer because a high intake of salt may directly damage the stomach lining or increase endogenous N-nitroso compound formation.⁸

There is also some research which suggests that salt intake may cause stomach cancer only in those who have both *Helicobacter pylori* infection and been exposed to a chemical carcinogen.²

Other considerations

The iodine content of New Zealand soils is low and as a consequence locally produced foods are also low in iodine. Goitre, which is caused by low iodine levels, used to be endemic in New Zealand until the introduction of iodised salt.⁹

A lack of iodine in the diet can also cause hypothyroidism,¹⁰ and there is some concern it may increase the risk of thyroid cancer.¹¹

Recent evidence from a number of studies has indicated that the iodine status of New Zealanders is now declining to the point where intervention is again required to ensure that iodine deficiency disorders do not once again widely affect the New Zealand population. The Australia New Zealand Food Regulation Ministerial Council decided to proceed with mandatory fortification commencing in September 2009. The mandatory replacement of non-iodised salt with iodised salt in breads is the preferred option to address the re-emergence of iodine deficiency in New Zealand. The salt iodisation level is in the range of 25-65 mg of iodine per kg of salt. This range is the same as the current iodised table salt range.⁹

The Ministry of Health's Food and Nutrition Guidelines for Healthy Adults: A background paper (Ministry of Health, 2003) recommends choosing iodised salt when using salt, but do not recommend increasing overall salt intake.¹²

Current consumption levels in New Zealand adults

Assessment of sodium intake by dietary assessment methods is difficult because people add discretionary salt, and cooked meals may have an unknown salt content. For this reason salt has not been included in dietary surveys.

Sodium excretion in the urine is the best indicator of sodium intake.¹² A regional study in New Zealand found a mean sodium excretion of 3105mg per day. This amount corresponds to a mean sodium intake of 3473mg per day.¹³ The results show an estimated intake well above the RDI (920 to 2300mg).

Recommendations

The Cancer Society:

- supports the recommendation made by the Ministry of Health Food and Nutrition Guidelines for Healthy Adults that people choose food low in salt.
- recommends that people avoid adding salt at the table or in cooking.*
- recommends that any salt that is used should be iodised.

The Nutrient Reference Values (NRVs) for Australia and New Zealand recommend an upper limit 2300mg of sodium a day for adults, with an adequate intake of 460-920mg per day of sodium.¹⁴

To reduce the current level of cardiovascular disease, the National Heart Foundation recommends that all New Zealanders reduce their salt intake by about 3g of salt per day (about 1150mg sodium), which is approximately 1½ teaspoons of salt.¹² People with hypertension or those with, or at risk of, cardiovascular disease should reduce their salt intake to less than 4g a day.³

Therefore, for general health and wellbeing, people should aim to consume no more than 2300mg of sodium (6g of salt) per day.

* This includes table salt, rock salt, sea salt, salt flakes, pink salt, chicken salt, onion salt, celery salt, garlic salt, MSG and stock cubes and powders

Reducing Salt Intake

People can limit their salt intake by purchasing no added salt or low salt foods in the supermarket. A low salt food contains less than 120mg of sodium per 100g.³ Reduced salt products can be purchased too if these are the lowest salt options available.

Products with the Heart Foundation Tick can be good options for consumers as they meet strict standards set by the National Heart Foundation for the amount of sodium/salt they contain.³

Other ways people can lower the amount of salt they eat is by:

- eating more fresh fruit and vegetables
- flavouring foods with herbs and spices instead of salt
- limiting takeaway foods
- reducing intake of dehydrated foods, such as seasoning mixes and soups
- cutting back on the amount of pre-packaged sauces and condiments used
- swapping salty snacks like pretzels, salted nuts and potato chips for fruit, low fat yoghurt or low salt crackers
- limiting consumption of processed meats, such as sausages and salami
- choosing fish canned in spring water rather than fish canned in brine
- Buying bread that has not had salt added to it, or making bread at home in a bread machine.

It is important to keep in mind that some foods, such as wholegrain bread, do contain salt, but still contribute important nutrients to the diet and may help to lower the risk of certain cancers.

The evidence for salt and cancer risk is mainly related to stomach cancer. The incidence of this cancer in New Zealand is not particularly high and has been falling over recent years.¹⁵ However, since salty, processed foods are often also high in fat reducing salt intake by limiting processed foods (eg. meat pies, biscuits and processed meats) and takeaway items confers the most benefits. This ensures nutritional intake is not compromised and the energy density of the diet is lowered, thereby helping to maintain a healthy body weight, which is associated with a lower risk of certain cancers.

Future Research

In the future, there is a need for more studies that:

- investigate further the mechanisms behind salt intake and stomach cancer risk.
- determine the effect of low sodium salts / salt substitutes, such as those that contain potassium chloride on cancer risk.

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References

1. Food Standards Australia and New Zealand. NUTTAB 2006 (Australian Food Composition Tables). Barton, Food Standards Australia and New Zealand. 2006.
2. The World Cancer Research Fund and American Institute for Cancer Research. *Food, nutrition, physical activity and the prevention of cancer: a global perspective*. Washington DC: AICR. 2007.
3. National Heart Foundation of Australia. Position Statement: The relationships between dietary electrolytes and cardiovascular disease. Australia, National Heart Foundation of Australia. 2006.
4. Food Standards Australia and New Zealand. Considerations of mandatory fortification with iodine for Australia and New Zealand: Dietary assessment report (main report). Barton, Food Standards Australia and New Zealand. 2008.
5. Key TJ, Schatzkin A, Willett WC, Allen NE, Spencer EA, Travis RC. Diet, nutrition and the prevention of cancer. *Public Health Nutrition*. 2004; **7**(1A): 187-200.
6. Tsugane S. Salt, salted food intake, and risk of gastric cancer: epidemiologic evidence. *Cancer Science*. 2005; **96**(1): 1-6.
7. World Health Organization. Diet, nutrition and the prevention of chronic diseases. Geneva, WHO. 2003.
8. Kelley JR, Duggan JM. Gastric cancer epidemiology and risk factors. *Journal of Clinical Epidemiology*. 2003; **56**(1): 1-9.
9. <http://www.moh.govt.nz/moh.nsf/indexmh/nutrition-iodine>. (Accessed 27 November 2008).
10. Australian Population Health Development Principal Committee (APHDPC). The prevalence and severity of iodine deficiency in Australia. Australian Health Ministers Advisory Committee.
11. Stavrou EP, Baker DF, McElroy HJ, Bishop JF. Thyroid Cancer in New South Wales. Sydney, The Cancer Institute NSW. 2008.
12. Ministry of Health. 2003. *Food and Nutrition Guidelines for Healthy Adults: A background paper*. Wellington. Ministry of Health.
13. Thomson CD, Colls AJ. 1998. Twenty-four Hour Urinary Sodium Excretion in Seven Hundred Residents of Otago and Waikato. Report prepared for Ministry of Health. Dunedin: Department of Human Nutrition. University of Otago.
14. National Health and Medical Research Council. Nutrient Reference Values for Australia and New Zealand including Recommended Dietary Intakes. Canberra, Australia, Commonwealth Department of Health and Ageing. 2006.
15. New Zealand Health Information Service. 2007. Cancer: New Registrations and Deaths 2004. Wellington: Ministry of Health.