

PRESERVATION AND PROCESSING OF FOODS AND THE RISK OF CANCER

WCRF/AICR GRADING		DECREASES RISK		INCREASES RISK	
		Exposure	Cancer site	Exposure	Cancer site
STRONG EVIDENCE	Convincing			Processed meat ¹	Colorectum 2017
	Probable			Cantonese-style salted fish ²	Nasopharynx 2017
				Foods preserved by salting ³	Stomach 2016
LIMITED EVIDENCE	Limited – suggestive			Preserved non-starchy vegetables	Nasopharynx 2017
				Processed meat ¹	Nasopharynx 2017 Oesophagus (squamous cell carcinoma) 2016 Lung 2017 Stomach (non-cardia) 2016 Pancreas 2012
STRONG EVIDENCE	Substantial effect on risk unlikely	None identified			

- 1 The term ‘processed meat’ in the CUP refers to meats transformed through salting, curing, fermentation, smoking or other processes to enhance flavour or improve preservation.
- 2 Cantonese-style salted fish is part of the traditional diet consumed by people living in the Pearl River Delta region in Southern China. This style of fish, which is prepared with less salt than is used on the northern part of China, is allowed to ferment, and so is eaten in a decomposed state. This conclusion does not apply to fish preserved (or salted) by other means. Evidence is primarily from case-control studies, there is only one cohort study.
- 3 The term ‘foods preserved by salting’ refers mainly to high-salt foods and salt-preserved foods, including pickled vegetables and salted or dried fish, as traditionally prepared in East Asia. Evidence for foods preserved by salting and stomach cancer comes from salt-preserved foods including vegetables and fish.

Summary of CUP dose–response meta-analyses of preserved vegetable intake and the risk of cancer

Cancer	Type	Total no. of studies	No. of studies in meta-analysis	No. of cases	Risk estimate (95% CI)	Increment	I ² (%)	Conclusion ¹	Date of CUP cancer report ²
Nasopharynx ³	Preserved vegetables	14	5	3,924	1.42 (1.04–1.93)	once/week	76	Limited – suggestive: Increases risk	2017

- 1 See Definitions of WCRF/AICR grading criteria (**Section 1**: Preservation and processing of foods and the risk of cancer: a summary matrix) for explanations of what the Panel means by ‘probable’ and ‘limited – suggestive’.
- 2 Throughout this Third Expert Report, the year given for each cancer site is the year the CUP cancer report was published, apart from for nasopharynx, cervix and skin, where the year given is the year the SLR was last reviewed. Updated CUP cancer reports for nasopharynx and skin will be published in the future.
- 3 A dose–response meta-analysis of cohort studies could not be conducted in the CUP. Evidence is from a WCRF/AICR Second Expert Report published meta-analysis of *case-control studies* on preserved vegetable intake and nasopharyngeal cancer [43].

Table 5.2: Summary of CUP dose–response meta-analyses of processed meat¹ intake and the risk of cancer

Cancer	Total no. of studies	No. of studies in meta-analysis	No. of cases	Risk estimate (95% CI)	Increment/contrast	I ² (%)	Conclusion ²	Date of CUP cancer report ³
Colorectum	13	10	10,738	1.16 (1.08–1.26)	50 g/day	20	Convincing: Increases risk	2017
Nasopharynx⁴	13	10	5,434	1.46 (1.31–1.64)	<30 vs 0 g/week	–	Limited – suggestive: Increases risk	2017
Oesophagus (squamous cell carcinoma)	2	2	322	1.34 (1.00–1.81)	50 g/day	0	Limited – suggestive: Increases risk	2016
Lung	9	7	10,292	1.14 (1.05–1.24)	50 g/day	0	Limited – suggestive: Increases risk	2017
Stomach (non-cardia)	3	3	1,149	1.18 (1.01–1.38)	50 g/day	3	Limited – suggestive: Increases risk	2016
Pancreas	8	7	2,748	1.17 (1.01–1.34)	50 g/day	0	Limited – suggestive: Increases risk	2012

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- 2 See Definitions of WCRF/AICR grading criteria (**Section 1: Preservation and processing of foods and the risk of cancer: a summary matrix**) for explanations of what the Panel means by ‘convincing’ and ‘limited – suggestive’.
- 3 Throughout this Third Expert Report, the year given for each cancer site is the year the CUP cancer report was published, apart from for nasopharynx, cervix and skin, where the year given is the year the SLR was last reviewed. Updated CUP cancer reports for nasopharynx and skin will be published in the future.
- 4 A dose–response meta-analysis of cohort studies could not be conducted in the CUP as none were identified. Evidence is from a published highest versus lowest meta-analysis of *case-control studies* [7].

Summary of published pooled analyses of processed meat intake and the risk of colorectal cancer

Publication	Increment	RR (95% CI)	p value	No. of studies	No. of cases
Genetics and Epidemiology of Colorectal Cancer Consortium (GECCO) and Colon Cancer Family Registry (CCFR) [54]	1 serving/day	1.48 (1.30–1.70)	–	7 nested case-control studies	3,488
UK Dietary Cohort Consortium [55]	50 g/day	0.88 (0.68–1.15)	0.36	7 cohort studies	579

Summary of CUP dose–response meta-analyses of case-control studies for consumption of salted fish (including Cantonese-style salted fish)¹ and the risk of nasopharyngeal cancer

Cancer	Adult/ childhood	Total no. of studies	No. of studies in meta- analysis	No. of cases	Risk estimate (95% CI)	Increment/ contrast	I ² (%)	Conclusion ²	Date of CUP cancer report ³
Nasopharynx	Adult	28	12	5,391	1.31 (1.16–1.47)	1 time/ week	78	Probable: Increases risk	2017
	Childhood	16	9	1,673	1.35 (1.14–1.60)	1 time/ week	83		

- 1 Cantonese-style salted fish is part of the traditional diet consumed by people living in the Pearl River Delta region in Southern China. This style of fish, which is prepared with less salt than is used on the northern part of China, is allowed to ferment, and so is eaten in a decomposed state. This conclusion does not apply to fish preserved (or salted) by other means. Evidence is primarily from *case-control studies*, there is only one cohort study.
- 2 See Definitions of WCRF/AICR grading criteria (**Section 1:** Preservation and processing of foods and the risk of cancer: a summary matrix) for explanations of what the Panel means by ‘probable’.
- 3 Throughout this Third Expert Report, the year given for each cancer site is the year the CUP cancer report was published, apart from for nasopharynx, cervix and skin, where the year given is the year the SLR was last reviewed. Updated CUP cancer reports for nasopharynx and skin will be published in the future.

Summary of CUP meta-analyses for consumption of foods preserved by salting¹ and the risk of stomach cancer

Cancer	Salt-preserved exposure	Total no. of studies	No. of studies in meta-analysis	No. of cases	Risk estimate (95% CI)	Increment/contrast	I ² (%)	Conclusion ²	Date of CUP cancer report ³
Stomach	Vegetables	14	9	3,932	1.09 (1.05–1.13)	20 g/day	0	Probable: Increases risk	2016
	Fish	11	4	2,110	1.06 (0.98–1.15)	20 g/day	0		
	Foods	6	5	635	1.70 (1.18–2.45)	Highest vs lowest	–		

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- 2 See Definitions of WCRF/AICR grading criteria (**Section 1**: Preservation and processing of foods and the risk of cancer: a summary matrix) for explanations of what the Panel means by ‘probable’.
- 3 Throughout this Third Expert Report, the year given for each cancer site is the year the CUP cancer report was published, apart from for nasopharynx, cervix and skin, where the year given is the year the SLR was last reviewed. Updated CUP cancer reports for nasopharynx and skin will be published in the future.