The CUP Panel's judgements

This matrix summarises the CUP Panel's judgements on the strength of the evidence causally relating diet, nutrition and physical activity with the risk of cancer of the sites reviewed and with weight gain, overweight or obesity.

The evidence is presented by outcome (in rows) and by exposure (in columns). It shows judgements of 'convincing', 'probable', 'limited – suggestive' and 'substantial effect on risk unlikely', but not 'limited – no conclusion'. Judgements of 'convincing' and 'probable' are normally strong enough to support a Recommendation, while judgements of 'limited – suggestive' generally are not.

Each conclusion on the likely causal relationship between an exposure and an outcome (cancer or weight gain, overweight and obesity), forms a part of the overall body of evidence that is considered during the process of making Cancer Prevention Recommendations. Any single conclusion does not represent a Recommendation in its own right. The Cancer Prevention Recommendations are based on a synthesis of all these separate conclusions, as well as other relevant evidence.

World Cancer Research Fund | American Institute for Cancer Research

Summary of conclusions

CUP Continuous Update Project
Analysing research on cancer prevention and survival

2018

Wholegrains, vegetables and fruit

2018	Wholegrains	Refined grains	Foods containing dietary fibre	Aflatoxins	Non-starchy vegetables (greater intake)	Non-starchy vegetables (low intake)	Preserved non-starchy vegetables	Fruit (greater intake)	Fruit (low intake)	Citrus fruit	Non-starchy vegetables & fruit	Foods containing carotenoids	Foods containing beta-carotene	Foods containing vitamin C	Foods containing isoflavones	Non-starchy vegetables or fruit (aggregated) [18]
MOUTH, PHARYNX, LARYNX 2018					Limited – suggestive decreases risk											
NASOPHARYNX 2017 (SLR)					Limited – suggestive decreases risk		Limited – suggestive increases risk									
OESOPHAGUS (ADENOCARCINOMA) 2016					Limited – suggestive decreases risk											
OESOPHAGUS (SQUAMOUS CELL CARCINOMA) 2016					Limited – suggestive decreases risk			Limited – suggestive decreases risk								
LUNG 2017					Limited – suggestive decreases risk (4)			Limited – suggestive decreases risk (4)				Limited – suggestive decreases risk (11)	Limited – suggestive decreases risk (13)	Limited – suggestive decreases risk (15)	Limited – suggestive decreases risk (17)	
STOMACH 2016									Limited – suggestive increases risk (7)	Limited – suggestive decreases risk (9)						
PANCREAS 2012																
GALLBLADDER 2015																
LIVER 2015				Convincing increases risk (3)												
COLORECTUM 2017	Probable decreases risk		Probable decreases risk (2)			Limited – suggestive increases risk (6)			Limited – suggestive increases risk (8)					Limited – suggestive decreases risk (16)		
BREAST PREMENOPAUSE 2017					Limited – suggestive decreases risk (5)							Limited – suggestive decreases risk (12)				
BREAST POSTMENOPAUSE 2017					Limited – suggestive decreases risk (5)							Limited – suggestive decreases risk (12)				
OVARY 2014																
ENDOMETRIUM 2013																
CERVIX 2017 (SLR)																
PROSTATE 2014													Substantial effect on risk unlikely (14)			
KIDNEY 2015																
BLADDER 2015											Limited – suggestive decreases risk (10)					
SKIN 2017 (SLR)																
AERODIGESTIVE CANCERS [20] (AGGREGATED) 2016–2018																Probable decreases risk (19)
RISK OF WEIGHT GAIN, OVERWEIGHT OR OBESITY 2018 [81, 82]	Limited – suggestive decreases risk	Limited – suggestive increases risk (1)	Probable decreases risk								Limited – suggestive decreases risk					

Meat, fish and dairy products; Preservation and processing of foods

2018	Red meat [21]	Processed meat [22]	Foods containing haem iron	Fish	Cantonese-style salted fish	Grilled (broiled) or barbecued (charbroiled) meat and fish	Dairy products	Diets high in calcium	Foods preserved by salting
MOUTH, PHARYNX, LARYNX 2018									
NASOPHARYNX 2017 (SLR)	Limited – suggestive increases risk	Limited – suggestive increases risk			Probable increases risk (25)				
OESOPHAGUS (ADENOCARCINOMA) 2016									
OESOPHAGUS (SQUAMOUS CELL CARCINOMA) 2016		Limited – suggestive increases risk							
LUNG 2017	Limited – suggestive increases risk	Limited – suggestive increases risk							
STOMACH 2016		Limited – suggestive increases risk (23)				Limited – suggestive increases risk			Probable increases risk (29)
PANCREAS 2012	Limited – suggestive increases risk	Limited – suggestive increases risk							
GALLBLADDER 2015									
LIVER 2015				Limited – suggestive decreases risk					
COLORECTUM 2017	Probable increases risk	Convincing increases risk	Limited – suggestive increases risk (24)	Limited – suggestive decreases risk			Probable decreases risk (26)		
BREAST PREMENOPAUSE 2017							Limited – suggestive decreases risk (27)	Limited – suggestive decreases risk	
BREAST POSTMENOPAUSE 2017								Limited – suggestive decreases risk	
OVARY 2014									
ENDOMETRIUM 2013									
CERVIX 2017 (SLR)									
PROSTATE 2014							Limited – suggestive increases risk (28)	Limited – suggestive increases risk	
KIDNEY 2015									
BLADDER 2015									
SKIN 2017 (SLR)									
AERODIGESTIVE CANCERS [20] (AGGREGATED) 2016–2018									
RISK OF WEIGHT GAIN, OVERWEIGHT OR OBESITY 2018 [81, 82]									

Non-alcoholic drinks; Alcoholic drinks

2018	Arsenic in drinking water [30]	Mate [31]	Coffee	Tea	Sugar sweetened drinks	Alcoholic drinks [35]
MOUTH, PHARYNX, LARYNX 2018		Limited – suggestive increases risk	Limited – suggestive decreases risk			Convincing increases risk
NASOPHARYNX 2017 (SLR)						
OESOPHAGUS (ADENOCARCINOMA) 2016						
OESOPHAGUS (SQUAMOUS CELL CARCINOMA) 2016		Probable increases risk				Convincing increases risk
LUNG 2017	Convincing increases risk					Limited – suggestive increases risk
STOMACH 2016						Probable increases risk (36)
PANCREAS 2012						Limited – suggestive increases risk (36)
GALLBLADDER 2015						
LIVER 2015			Probable decreases risk			Convincing increases risk (36)
COLORECTUM 2017						Convincing increases risk (37)
BREAST PREMENOPAUSE 2017						Probable increases risk (38)
BREAST POSTMENOPAUSE 2017						Convincing increases risk (38)
OVARY 2014						
ENDOMETRIUM 2013			Probable decreases risk (32)			
CERVIX 2017 (SLR)						
PROSTATE 2014						
KIDNEY 2015	Limited – suggestive increases risk					Probable decreases risk (39)
BLADDER 2015	Probable increases risk			Limited – suggestive decreases risk		
SKIN 2017 (SLR)	Probable increases risk		Limited – suggestive decreases risk (33)			Limited – suggestive increases risk (40)
AERODIGESTIVE CANCERS [20] (AGGREGATED) 2016–2018						
RISK OF WEIGHT GAIN, OVERWEIGHT OR OBESITY 2018 [81, 82]					Convincing increases risk (34)	

Other dietary exposures

2018	Healthy dietary patterns	'Mediterranean type' dietary pattern	'Western type' diet	'Fast foods'	Glycaemic load	Foods & drinks containing fructose	Foods containing saturated fatty acids	Foods containing retinol	Vitamin D (food containing, serum, supplements)	Low plasma alpha-tocopherol concentrations	Low plasma selenium concentrations	High-dose beta-carotene supplements	Beta-carotene	Calcium supplements	Multivitamin supplements
MOUTH, PHARYNX, LARYNX 2018	Limited – suggestive decreases risk (41)														
NASOPHARYNX 2017 (SLR)															
OESOPHAGUS (ADENOCARCINOMA) 2016															
OESOPHAGUS (SQUAMOUS CELL CARCINOMA) 2016															
LUNG 2017								Limited – suggestive decreases risk (47)				Convincing increases risk (49)			
STOMACH 2016															
PANCREAS 2012						Limited – suggestive increases risk (46)	Limited – suggestive increases risk								
GALLBLADDER 2015															
LIVER 2015															
COLORECTUM 2017									Limited – suggestive decreases risk (48)					Probable decreases risk (52)	Limited – suggestive decreases risk (53)
BREAST PREMENOPAUSE 2017															
BREAST POSTMENOPAUSE 2017															
OVARY 2014															
ENDOMETRIUM 2013					Probable increases risk (45)										
CERVIX 2017 (SLR)															
PROSTATE 2014										Limited – suggestive increases risk	Limited – suggestive increases risk		Substantial effect on risk unlikely (51)		
KIDNEY 2015															
BLADDER 2015															
SKIN 2017 (SLR)												Substantial effect on risk unlikely (50)			
AERODIGESTIVE CANCERS [20] (AGGREGATED) 2016–2018															
RISK OF WEIGHT GAIN, OVERWEIGHT OR OBESITY 2018 [81, 82]		Probable decreases risk (42)	Probable increases risk (43)	Probable increases risk (44)											

Physical activity; Body fatness and weight gain; Height and birthweight; Lactation/having been breastfed

2018	Physical activity [54]	Vigorous physical activity	Walking	Sedentary behaviours	Screen time	Adult body fatness	Body fatness in young adulthood	Adult weight gain	Adult attained height [73, 74]	Greater birthweight [74]	Lactation [78]	Having been breastfed
MOUTH, PHARYNX, LARYNX 2018						Probable increases risk (62)						
NASOPHARYNX 2017 (SLR)												
OESOPHAGUS (ADENOCARCINOMA) 2016	Limited – suggestive decreases risk (55)					Convincing increases risk (62)						
OESOPHAGUS (SQUAMOUS CELL CARCINOMA) 2016	Limited – suggestive decreases risk (55)											
LUNG 2017	Limited – suggestive decreases risk											
STOMACH 2016						Probable increases risk (63)						
PANCREAS 2012						Convincing increases risk (62)			Probable increases risk			
GALLBLADDER 2015						Probable increases risk (64)						
LIVER 2015	Limited – suggestive decreases risk					Convincing increases risk (65)						
COLORECTUM 2017	Convincing decreases risk (56)					Convincing increases risk (62)			Convincing increases risk			
BREAST PREMENOPAUSE 2017	Limited – suggestive decreases risk (57)	Probable decreases risk (57)				Probable decreases risk (66)	Probable decreases risk (71)		Convincing increases risk	Probable increases risk (76)	Probable decreases risk (79)	
BREAST POSTMENOPAUSE 2017	Probable decreases risk (57)	Probable decreases risk (57)				Convincing increases risk (66)	Probable decreases risk (71)	Convincing increases risk (72)	Convincing increases risk		Probable decreases risk (79)	
OVARY 2014						Probable increases risk (67)			Convincing increases risk		Limited – suggestive decreases risk	
ENDOMETRIUM 2013	Probable decreases risk			Limited – suggestive increases risk (59)		Convincing increases risk (68)			Probable increases risk			
CERVIX 2017 (SLR)						Limited – suggestive increases risk (69)						
PROSTATE 2014						Probable increases risk (70)			Probable increases risk			
KIDNEY 2015						Convincing increases risk (62)			Probable increases risk			
BLADDER 2015												
SKIN 2017 (SLR)									Limited – suggestive increases risk / Probable increases risk (75)	Limited – suggestive increases risk (77)		
AERODIGESTIVE CANCERS [20] (AGGREGATED) 2016–2018												
RISK OF WEIGHT GAIN, OVERWEIGHT OR OBESITY 2018 [81, 82]	Probable decreases risk (58)		Convincing decreases risk	Limited – suggestive increases risk (60)	Probable increases risk / Convincing increases risk (61)						Limited – suggestive decreases risk	Probable decreases risk (80)

Conclusions Key

- Convincing decreases risk
- Probable decreases risk
- Limited – suggestive decreases risk
- Convincing increases risk
- Probable increases risk
- Limited – suggestive increases risk
- Substantial effect on risk unlikely

Exposure Group Key

- Wholegrains, vegetables and fruit
- Meat, fish and dairy products
- Preservation and processing of foods
- Non-alcoholic drinks
- Alcoholic drinks
- Other dietary exposures
- Physical activity
- Body fatness and weight gain
- Height and birthweight
- Lactation/having been breastfed

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Abbreviation: SLR, systematic literature review.

dietandcancerreport.org

Footnotes

1 Refined grains refers to the grains themselves, or products of such grains, that have been mechanically processed to remove one or more of the bran, germ or endosperm. This is in contrast to wholegrains (or their products) which contain all three constituents.

2 The evidence for foods containing dietary fibre and colorectal cancer includes both foods that naturally contain fibre and foods that have had fibre added.

3 The evidence for aflatoxins and liver cancer relates to foods that may be contaminated with aflatoxins and includes cereals (grains) as well as pulses (legumes), seeds, nuts and some vegetables and fruit. The studies reported on elevated levels of biomarkers of aflatoxin exposure.

4 People who smoke or used to smoke tobacco.

5 The Panel's conclusion for non-starchy vegetables (greater intake) and breast cancer relates to evidence for breast cancer overall (menopausal status not specified). The observed association was in oestrogen receptor-negative (ER-negative or ER-) breast cancer only.

6 Although the dose-response meta-analysis for colorectal cancer showed a statistically significant decreased risk with increased consumption of non-starchy vegetables, a non-linear relationship was apparent which showed a significant increased risk at intakes of 100 grams or less per day when compared with an intake of 200 grams per day.

7 An increased risk of stomach cancer was not apparent when the data for fruit were analysed assuming a linear response but became apparent when conducting a non-linear analysis which showed a significant increased risk at intakes below 45 grams per day when compared with an intake of about 100 grams per day.

8 Although the dose-response meta-analysis for colorectal cancer showed a statistically significant decreased risk with increased consumption of fruit, a non-linear relationship was apparent which showed a significant increased risk at intakes of 100 grams or less per day when compared with an intake of 200 grams per day.

9 Stomach cardia cancer only.

10 The evidence for non-starchy vegetables and fruit and bladder cancer relates to combined consumption of vegetables and fruit.

11 The evidence for foods containing carotenoids and lung cancer is derived from studies on dietary intake and serum levels.

12 The Panel's conclusion for foods containing carotenoids and breast cancer relates to the evidence for breast cancer overall (menopausal status not specified). The evidence is derived from studies on dietary intake and serum or plasma levels, and includes both foods that naturally contain carotenoids and foods that have had carotenoids added.

13 The evidence for foods containing beta-carotene and lung cancer is derived from studies on dietary intake and serum levels.

14 The evidence for beta-carotene and prostate cancer is derived from studies on dietary intake and serum or plasma levels, as well as studies on supplement use (20, 30 and 50 milligrams per day).

15 The evidence for foods containing vitamin C and lung cancer in people who smoke tobacco is derived from studies on dietary intake.

16 The Panel's conclusion is for foods containing vitamin C and colon cancer. No conclusion was drawn for foods containing vitamin C and rectal cancer.

17 The evidence for foods containing isoflavones and lung cancer in people who have never smoked tobacco is derived from studies on dietary intake.

18 Aggregated exposure which contains evidence from the following exposures: non-starchy vegetables (greater intake), non-starchy vegetables (low intake), fruit (greater intake), fruit (low intake) and citrus fruit.

19 The Panel notes that while the evidence for links between individual cancers and non-starchy vegetables or fruit is limited, the pattern of association is consistent and in the same direction, and overall the evidence is more persuasive of a protective effect: greater consumption of non-starchy vegetables or fruit probably protects against a number of aerodigestive cancers.

20 'Aerodigestive cancers' include: mouth, pharynx and larynx, nasopharynx, oesophagus (squamous cell carcinoma and adenocarcinoma), lung, stomach and colorectal.

21 The term 'red meat' in the CUP refers to beef, veal, pork, lamb, mutton, horse and goat.

22 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.

23 Non-cardia stomach cancer only.

24 The term 'haem iron' refers to iron attached to a haemoprotein, which is found only in foods of animal origin. Foods that contain haem iron include red and processed meat, fish and poultry.

25 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 in 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.

26 The evidence for dairy products and colorectal cancer includes total dairy, milk and cheese and dietary calcium intakes.

27 The evidence for dairy products and premenopausal breast cancer includes total dairy and milk intakes.

28 The evidence for dairy products and prostate cancer includes total dairy, milk, cheese and yogurt intakes.

29 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.

30 The International Agency for Research on Cancer (IARC) has judged arsenic and inorganic arsenic compounds to be carcinogenic to humans (Group 1). Drinking water contaminated with arsenic is also classed separately as a human carcinogen (Group 1). Water can become contaminated by arsenic as a result of natural deposits present in the earth, volcanic activity, or agricultural, mining and industrial practices. Countries particularly affected by higher levels of arsenic in drinking water include Bangladesh, China and India.

31 Mate, an aqueous infusion prepared from dried leaves of the plant Ilex paraguariensis, is traditionally drunk scalding hot through a metal straw in parts of South America. In 2016, an IARC Working Group declared that drinking very hot beverages, including mate, above 65 degrees is probably carcinogenic to humans (Group 2A).

32 The effect of coffee on the risk of endometrial cancer is observed with both caffeinated and decaffeinated coffee so cannot be attributed to caffeine.

33 Basal cell carcinoma (men and women) / malignant melanoma (women).

34 Sugar sweetened drinks are defined here as liquids that are sweetened by adding free sugars, such as sucrose, high fructose corn syrup and sugars naturally present in honey, syrups, fruit juices and fruit juice concentrate. This includes, among others, sodas, sports drinks, energy drinks, sweetened waters, cordials, barley water, and coffee- and tea-based beverages with sugars or syrups added. This does not include versions of these drinks which are 'sugar free' or sweetened only with artificial sweeteners.

35 Alcoholic drinks include beers, wines, spirits, fermented milks, mead and cider. The consumption of alcoholic drinks is graded by IARC as carcinogenic to humans (Group 1).

36 The conclusions for alcoholic drinks and cancers of the liver, stomach and pancreas were based on evidence for alcohol intakes above approximately 45 grams of ethanol per day (about three drinks a day). No conclusions were possible for these cancers based on intakes below 45 grams of ethanol per day.

37 The conclusion for alcoholic drinks and colorectal cancer was based on alcohol intakes above approximately 30 grams of ethanol per day (about two drinks a day). No conclusion was possible based on intakes below 30 grams of ethanol per day.

38 No threshold level of alcohol intake was identified in the evidence for alcoholic drinks and breast cancer (pre and postmenopause).

39 The conclusion for alcoholic drinks and kidney cancer was based on alcohol intakes up to approximately 30 grams of ethanol per day (about two drinks a day). There was insufficient evidence to draw a conclusion for intakes above 30 grams of ethanol per day.

40 Basal cell carcinoma and malignant melanoma.

41 Judgements relate to healthy dietary patterns as marked by greater healthy dietary indices. These indices produce an integrated score to assess adherence to healthy eating or lifestyle recommendations or patterns. They are characterised by factors such as healthy weight management; engagement in physical activity; limiting intake of foods and drinks that promote weight gain; limiting intake of red and processed meat; limiting intake of alcoholic drinks; and a higher intake of wholegrains, vegetables and fruit.

42 There are recognised scores for quantifying adherence to a 'Mediterranean type' dietary pattern but it is unclear exactly what such a diet comprises. It generally describes a diet rich in fruits and vegetables, with modest amounts of meat and dairy, some fish and wine, and rich in unrefined olive oil. Traditionally it is also associated with high levels of physical activity. Currently most countries around the Mediterranean do not consume such a diet.

43 Such diets are characterised by high intakes of free sugars, meat and dietary fat, which are probably the factors responsible for the effects on weight. The overall conclusion includes all these factors.

44 'Fast foods' are readily available convenience foods that tend to be energy dense, and are often consumed frequently and in large portions. Most of the evidence on fast foods is from studies of foods such as burgers, fried chicken pieces, chips (French fries), and high-calorie drinks (containing sugars, such as cola, or fat, such as shakes), as typically served in international franchise outlets. Many other foods can also be prepared quickly, but the speed of preparation is not the important factor, even though it is characteristic of this group of foods.

45 The glycaemic load of a food may be calculated by multiplying the glycaemic index of a food, expressed as a percentage, by the number of grams of carbohydrate in a serving of the food.

46 The evidence for foods and drinks containing fructose and pancreatic cancer includes both foods naturally containing fructose, and foods which have had fructose added during preparation or processing.

47 The evidence for foods containing retinol and lung cancer is derived from studies on dietary intake and serum or plasma levels.

48 The evidence for vitamin D and colorectal cancer is derived from studies on dietary intake, supplements and serum or plasma levels.

49 The evidence for high-dose beta-carotene supplements and lung cancer (people who smoke or used to smoke tobacco) is derived from studies using high-dose supplements (20 to 30 milligrams per day or 50 milligrams per day on alternate days for beta-carotene; 25,000 international units per day for retinol).

50 The evidence for beta-carotene and non-melanoma skin cancer is derived from one study on plasma levels, as well as studies on high-dose supplement use (50 milligrams per day and 50 milligrams per day on alternate days).

51 The evidence for beta-carotene and prostate cancer is derived from studies on dietary intake and serum or plasma levels, as well as studies on high-dose supplement use (20, 30 and 50 milligrams per day).

52 The evidence for calcium supplements and colorectal cancer is derived from studies using supplements at a dose >200 milligrams per day.

53 Definitions and categorisation of multivitamin supplements are not standardised across studies.

54 The exposure of physical activity includes evidence for all types of activity and all intensity levels.

55 The evidence for physical activity and oesophageal cancer includes unspecified, adenocarcinoma and squamous cell carcinoma.

56 The evidence for physical activity and colorectum is for colon cancer only – no conclusion was drawn for rectal cancer.

57 In addition to physical activity, there was sufficient evidence for the Panel to make a separate judgement for vigorous-intensity physical activity and breast cancer (pre and postmenopause).

58 Aerobic physical activity only.

59 The evidence for sedentary behaviours and endometrial cancer was marked by sitting time.

60 Sedentary behaviours comprise both high levels of physical inactivity and low levels of physical activity.

61 With the available evidence the Panel were able to draw separate conclusions for adults and children: adults, probable – increases risk; children, convincing – increases risk. Screen time is a marker of sedentary behaviour and may also be associated with low levels of physical activity, consumption of energy dense snacks and drinks and exposure to marketing of such foods and drinks.

62 Conclusions for adult body fatness were based on evidence marked by body mass index (BMI), waist circumference and waist-hip ratio.

63 Stomach cardia cancer only. Conclusions for adult body fatness were based on evidence marked by BMI.

64 Conclusions for adult body fatness were based on evidence marked by BMI. Adult body fatness may act indirectly, through gallstones, or directly, either after gallstone formation or in their absence, to cause gallbladder cancer. It is not yet possible to separate these effects.

65 Conclusions for adult body fatness were based on evidence marked by BMI.

66 Evidence for the link between body fatness and breast cancer is presented separately for the risk of pre and postmenopausal breast cancer because of the well-established effect modification by menopausal status. Conclusions for adult body fatness were based on evidence marked by BMI, waist circumference and waist-hip ratio.

67 Conclusions for adult body fatness were based on evidence marked by BMI. There is no evidence of effect modification by menopausal status for body fatness and the risk of ovarian cancer so the evidence for all women (irrespective of menopausal status) is presented together. The effect of adult body fatness on the risk of ovarian cancer may vary according to tumour type, menopausal hormone therapy use and menopausal status.

68 The conclusion for adult body fatness and endometrial cancer was based on evidence marked by BMI (including BMI at age 18 to 25 years), weight gain, waist circumference and waist-hip ratio. There is no evidence of effect modification by menopausal status for body fatness and the risk of endometrial cancer so the evidence for all women (irrespective of menopausal status) is presented together.

69 Conclusions for adult body fatness were based on evidence marked by BMI (for BMI ≥29 kg/m² only). There is no evidence of effect modification by menopausal status for body fatness and the risk of cervical cancer so the evidence for all women (irrespective of menopausal status) is presented together.

70 Conclusions for adult body fatness were based on evidence marked by BMI, waist circumference and waist-hip ratio. The effect of adult body fatness on the risk of prostate cancer was observed in advanced, high-grade and fatal prostate cancers.

71 Evidence for the link between body fatness and breast cancer is presented separately for the risk of pre and postmenopausal breast cancer because of the well-established effect modification by menopausal status. Evidence for body fatness in young adulthood and breast cancer (pre and postmenopause) comes from women aged about 18 to 30 years and includes evidence marked by BMI.

72 Evidence for the link between weight gain and breast cancer is presented separately for the risk of pre and postmenopausal breast cancer because of the well-established effect modification by menopausal status.

73 Adult attained height is unlikely to directly influence the risk of cancer. It is a marker for genetic, environmental, hormonal and nutritional factors affecting growth during the period from preconception to completion of growth in length.

74 The evidence shows that, in general, the taller people are during adulthood and the more people weighed at birth, the higher their risk of some cancers. A better understanding of the developmental factors that underpin the associations between greater growth and cancer risk is needed.

75 Malignant melanoma, probable – increases risk. Basal cell carcinoma, limited – suggestive increases risk.

76 Birthweight is a marker for prenatal growth, reflecting a combination of factors including fetal nutrition, and is also a predictor of later growth and maturation – for example age at menarche – which are themselves determinants of breast cancer risk.

77 Malignant melanoma only.

78 In the CUP, the term 'lactation' refers to the process by which the mother produces milk to breastfeed. Evidence about cancer risk, and risk of weight gain, overweight and obesity, presented here relates to effects on the mother who is breastfeeding and not to effects on the child who is being breastfed.

79 The Panel's conclusion for lactation and breast cancer relates to evidence for breast cancer overall, either pre or postmenopause (which was not always specified in studies). The CUP uses the term 'breast cancer (unspecified)' in this case. The separate evidence for lactation and pre or postmenopausal breast cancer was less conclusive but consistent with the overall finding.

80 The evidence relates principally to excess weight gain, overweight and obesity in childhood but overweight and obesity in childhood tends to track into adult life.

81 The factors identified in the matrix as increasing or decreasing risk of weight gain, overweight or obesity do so by promoting excess energy intake (positive energy balance, increased risk) relative to the level of energy expenditure (in particular physical activity), or appropriate energy balance (decreased risk), through a complex interplay of physiological, psychological and social influences.

82 The evidence for conclusions relating to risk of weight gain, overweight and obesity comes mostly from studies of adults, except where specified. However, the Panel judged that the conclusions for adults, unless there is evidence to the contrary, also apply to children. Relates to children aged 5 years and over.