

PHYSICAL ACTIVITY AND THE RISK OF CANCER

WCRF/AICR GRADING		DECREASES RISK		INCREASES RISK	
		Exposure	Cancer site	Exposure	Cancer site
STRONG EVIDENCE	Convincing	Physical activity ¹	Colorectum (colon) 2017 ²		
	Probable	Physical activity ¹	Breast (postmenopause) 2017 ³ Endometrium 2013		
		Vigorous-intensity physical activity	Breast (premenopause) 2017 ³ Breast (postmenopause) 2017 ³		
LIMITED EVIDENCE	Limited – suggestive	Physical activity ¹	Oesophagus 2016 ⁴ Lung 2017 Liver 2015 Breast (premenopause) 2017 ³	Sedentary behaviours	Endometrium 2013 ⁵
STRONG EVIDENCE	Substantial effect on risk unlikely	None identified			

- 1 The exposure of physical activity includes evidence for all types of activity and all intensity levels.
- 2 The evidence for physical activity and colorectum is for colon cancer only – no conclusion was drawn for rectal cancer.
- 3 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).
- 4 The evidence for physical activity and oesophageal cancer includes unspecified, adenocarcinoma and squamous cell carcinoma.
- 5 The evidence for sedentary behaviours and endometrial cancer was marked by sitting time.

Types of physical activity

Type	Includes
Total physical activity	All types of physical activity including recreational and occupational as well as transport (walking and travelling by bicycle, for example, in commuting to work) and household (cooking, shopping, cleaning, vacuuming, sweeping and washing).
Recreational	Exercise, sports and other forms of physical training. Recreational physical activity may be aerobic, such as walking, running, cycling, dancing and other activities that increase oxygen uptake, or anaerobic, such as resistance training using weights, which increases muscle strength and mass [7].
Occupational	Any physical activity at work. Occupations may be sedentary or involve light, moderate or vigorous-intensity physical activity.

Intensity of physical activity according to the Department of Health in the UK [8]

Intensity	Examples
Vigorous	Aerobic dancing, fast cycling (12 to 14 miles per hour), swimming, tennis and running
Moderate	Brisk walking, vacuuming, painting or decorating, mowing the lawn and cycling (10 to 12 miles per hour)
Light	Standing, ironing, cleaning or dusting, and walking at a slow pace

Summary of CUP highest versus lowest meta-analyses of physical activity¹ and the risk of cancer

Cancer	Type of physical activity	Total no. of studies	No. of studies in meta-analysis	No. of cases	Risk estimate (95% CI)	Conclusion ²	Date of CUP cancer report ³
Colorectum (colon) ⁴	Total	13	12	8,396	0.80 (0.72–0.88)	Convincing: Decreases risk	2017
	Recreational	21	20	10,258	0.84 (0.78–0.91)		
Breast (postmenopause) ⁵	Total	9	8	11,798	0.87 (0.79–0.96)	Probable: Decreases risk	2017
	Recreational ⁶ (dose–response)	22	5	18,486	0.98 (0.97–0.99)		
	Recreational	22	17	> 24,253	0.87 (0.81–0.94)		
	Occupational	9	8	22,352	0.89 (0.83–0.96)		
Endometrium	Recreational	9	9	3,600	0.73 (0.58–0.93)	Probable: Decreases risk	2013
	Occupational	5	5	5,826	0.79 (0.71–0.88)		
Oesophagus ⁷	Recreational	5	4	1,366	0.85 (0.72–1.01)	Limited – suggestive: Decreases risk	2016
Lung	Total	5	5	1,457	0.90 (0.77–1.04)	Limited – suggestive: Decreases risk	2017
Liver ⁸	Different types of physical activity	3	–	–	Significant decreased risk in two studies	Limited – suggestive: Decreases risk	2015
Breast (premenopause) ⁵	Total	4	4	1,837	0.93 (0.79–1.08)	Limited – suggestive: Decreases risk	2017
	Recreational ⁶ (dose–response)	12	3	2,331	0.96 (0.90–1.03)		
	Recreational	12	10	> 3,901	0.93 (0.74–1.16)		
	Occupational	6	6	4,494	0.82 (0.59–1.15)		

- 1 The exposure of physical activity includes evidence for all types of activity and all intensity levels.
- 2 See Definitions of WCRF/AICR grading criteria (**Section 1**: Physical activity and the risk of cancer: a summary matrix) for explanations of what the Panel means by ‘convincing’, ‘probable’, 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 The evidence for physical activity and colorectum is for colon cancer only – no conclusion was drawn for rectal cancer.
- 5 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). For more information see **Section 5.2**.
- 6 Dose–response meta-analyses (per 10 metabolic equivalent [MET]-hours/week) were conducted for recreational physical activity and breast cancer (pre and postmenopause). Heterogeneity (I^2) was 69% and 0%, respectively.
- 7 The evidence for physical activity and oesophageal cancer includes unspecified, adenocarcinoma and squamous cell carcinoma.
- 8 A dose–response or highest versus lowest meta-analysis of cohort studies could not be conducted in the CUP for physical activity and the risk of liver cancer as the studies reported on different types of physical activity. Three studies were identified [52–54]. Two of the three studies reported a statistically significant decreased risk when comparing the highest with the lowest level of recreational physical activity (Relative risk [RR] 0.88 [0.81–0.95]; $n = 169$ diagnoses [53]) or walking (RR 0.70 [0.54–0.91] for men and RR 0.54 [0.37–0.78] for women; $n = 377$ deaths and 143 deaths, respectively [54]).

Summary of CUP highest versus lowest and dose–response meta-analyses of vigorous-intensity physical activity¹ and the risk of cancer

Cancer	Analysis type	Total no. of studies	No. of studies in meta-analysis	No. of cases	Risk estimate (95% CI)	Increment	I ² (%)	Conclusion ²	Date of CUP cancer report ³
Breast (premenopause) ⁴	Highest vs. lowest	6	6	4,452	0.83 (0.73–0.95)	–	–	Probable: Decreases risk	2017
	Dose–response		3	1,473	0.91 (0.83–1.01)	30 mins/day	0		
Breast (postmenopause) ⁴	Highest vs. lowest	12	11	20,171	0.90 (0.85–0.95)	–	–	Probable: Decreases risk	2017
	Dose–response		3	3,293	0.94 (0.86–1.02)	30 mins/day	0		

- 1 The exposure of vigorous-intensity physical activity includes evidence for all types of activity performed at a vigorous level of intensity.
- 2 See Definitions of WCRF/AICR grading criteria (**Section 1**: Physical activity 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.
- 4 In addition to vigorous-intensity physical activity, the Panel made a separate judgement for physical activity and breast cancer (pre and postmenopause). For more information, see **Section 5.1**.

Summary of CUP highest versus lowest meta-analysis of sedentary behaviours and the risk of endometrial cancer

Cancer	Total no. of studies	No. of studies in meta-analysis	No. of cases	Risk estimate (95% CI)	Conclusion ¹	Date of CUP cancer report ²
Endometrium³	3	3	1,579	1.46 (1.21–1.76)	Limited – suggestive: Increases risk	2013

- 1 See Definitions of WCRF/AICR grading criteria (**Section 1**: Physical activity and the risk of cancer: a summary matrix) for explanations of what the Panel means by ‘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 The evidence for sedentary behaviours and endometrial cancer was marked by sitting time.