Table E.1.4.a. People who have been diagnosed with cancer, relationship between physical activity and health-related outcomes

Questions: What is the association between **physical activity** and health-related outcomes? Is there a dose response association (volume, duration, frequency, intensity)? Does the association vary by type or domain of PA?
Population: People who have been diagnosed with cancer
Exposure: Greater volume, duration, frequency, or intensity of physical activity
Comparison: No physical activity or lesser volume, duration, frequency, or intensity of physical activity
Outcome: All-cause mortality, cancer-specific mortality, risk of cancer recurrence or second primary cancer

Systematic review evidence **Review credibility**	**No. of studies/ Study design** **No. of participants**	**Quality Assessment**					**Description of evidence** **Summary of findings**	**Certainty**	**US PAGAC evidence** ***(39)***
		Risk of bias	**Inconsistency**	**Indirect-ness†**	**Imprecision**	**Other**			
All-cause mortality									
Friedenreich 2019 *(12)* Moderate	136 RCTs and observational studies[a] N=NR[a]	No serious risk of bias	No serious inconsistency	No serious indirectness	No serious imprecision	Dose-response relationship between prediagnosis PA dose and ACM for breast cancer	Higher **pre-diagnosis** PA was protective for ACM among those with breast (HR = 0.82 [95% CI 0.76 to 0.87], 19 studies), colorectal (HR = 0.80 [95% CI, 0.74 to 0.87], 10 studies), hematologic ((HR = 0.84 [95% CI 0.79 to 0.89], 3 studies), and prostate cancer (HR = 0.89 [95% CI0.82 to 0.98), 2 studies). No statistically significant association between pre-diagnosis PA and ACM was found for esophagus, female reproductive, melanoma, or stomach cancer. Higher **postdiagnosis** PA was protective for ACM following breast cancer (HR = 0.58 [95% CI, 0.58 [95% CI 0.52 to 0.65], 17 studies), childhood cancer (HR = 0.79 [95% CI 0.62 to 1.00], 1 study), colorectal cancer (HR = 0.63 [95% CI 0.050 to 0.78], 10 studies), gynaecologic cancer (HR = 0.66 [95% CI, 0.49 to 0.88], 4 studies), glioma (HR = 0.64 [95% CI 0.46 to 0.91], 1 study), hematologic cancer (HR = 0.60 p95% CI 0.51 to 0.69], 2 studies), kidney cancer (HR = 0.60 [95% CI 0.38 to 0.95], 1 study), lung cancer (HR = 0.76 [95% CI 0.60 to 0.97], 2 studies), prostate cancer (HR = 0.60 [95% CI, 0.46 to 0.79], 5 studies), and stomach cancer (HR = 0.75 [95% CI 0.61 to 0.93], 1 study). No	MODERATE[b]	11 ESRs Moderate evidence indicates that greater amounts of physical activity after diagnosis are associated with lower risks of breast cancer-specific mortality and all-cause mortality in **female breast cancer survivors**. **PAGAC Grade: Moderate** 8 ESRs Moderate evidence indicates that greater amounts of physical activity after diagnosis are associated with lower risks of colorectal cancer-specific mortality and all-cause mortality in **colorectal cancer survivors**. **PAGAC Grade: Moderate.** 2 ESRs Limited evidence suggests an inverse association between highest versus lowest levels of physical activity after diagnosis and all-cause mortality in prostate cancer survivors. **PAGAC Grade: Limited.**

							statistically significant association between postdiagnosis PA and ACM was found was esophagus cancer.		
Systematic review evidence **Review credibility**	**No. of studies/ Study design** **No. of participants**	**Quality Assessment**					**Description of evidence** **Summary of findings**	**Certainty**	**US PAGAC evidence *(39)***
		Risk of bias	**Inconsistency**	**Indirect-ness**	**Imprecision**	**Other**			
Cancer-specific mortality									
Friedenreich 2019 *(12)* Moderate	136 RCTs and observational studies N=NR[a]	No serious risk of bias	No serious inconsistency	No serious indirectness	No serious imprecision	Evidence of small study's effect for postdiagnosis PA and colorectal cancer-specific mortality	Meta-analysis found reduced hazards of mortality for those in the highest vs. lowest levels of **pre-diagnosis** total recreational PA for all cancers combined (cancer-specific mortality (HR = 0.82 [95% CI; 0.79 to 0.86], 33 studies), breast cancer (HR = 0.86 [95% CI, 0.78 to 0.94], 23 studies), colorectal cancer (HR = 0.80 [95% CI, 0.74 to 0.87], 14 studies), hematologic cancer (HR = 0.82 [95% CI 0.76 to 0.90], 6 studies), liver cancer (HR = 0.78 [95% CI 0.66 to 0.92], 3 studies), lung cancer (HR = 0.81 [95% CI 0.75 to 0.87], 5 studies), and stomach cancer (HR = 0.74 [95% CI 0.58 to 0.95], 4 studies). No statistically significant relationship was found between pre-diagnosis PA levels and cancer-specific mortality for bladder, brain, esophagus, gynaecologic, kidney, melanoma, pancreas, or prostate cancer. Meta-analysis found reduced hazards of mortality for those in the highest vs. lowest levels of **postdiagnosis** total recreational PA for all cancers combined (cancer-specific mortality (HR = 0.63 [95% CI 0.53 to 0.75], 4 studies), breast cancer (HR = 0.63 [95% CI 0.50 to 0.75], 13 studies), colorectal cancer (HR = 0.62 [95% CI 0.44 to 0.86], 6 studies), and prostate cancer (HR = 0.70 [95% CI 0.55 to 0.90], 4 studies).	MODERATE[b]	11 ESRs Moderate evidence indicates that greater amounts of physical activity after diagnosis are associated with lower risks of breast cancer-specific mortality and all-cause mortality in female breast cancer survivors. **PAGAC Grade: Moderate** 8 ESRs Moderate evidence indicates that greater amounts of physical activity after diagnosis are associated with lower risks of colorectal cancer-specific mortality and all-cause mortality in colorectal cancer survivors. **PAGAC Grade: Moderate.** 2 ESRs Moderate evidence indicates an inverse association between highest versus lowest levels of physical activity after diagnosis and prostate cancer-specific mortality in prostate cancer survivors. **PAGAC Grade: Moderate.**
Risk of cancer recurrence or second primary cancer									
No systematic review identified									Insufficient evidence is available to determine whether physical activity after diagnosis is associated with risk of breast cancer recurrence or second primary breast cancer. **PAGAC Grade: Not assignable.** Insufficient evidence is available to determine whether physical activity after diagnosis is associated with risk of colorectal cancer recurrence

	or second primary colorectal cancer. **PAGAC Grade: Not assignable.** Insufficient evidence is available on the association between physical activity level and prostate cancer recurrence or progression. **PAGAC Grade: Not assignable.**

Abbreviations: ACM = all-cause mortality; CI = confidence interval; HR = hazards ratio; NR = not reported; PA = physical activity; PAGAC = physical activity guidelines advisory committee

[†] Serious indirectness indicates measurement of intermediate/indirect outcomes or heterogeneity in exposures and comparisons assessed; certainty of evidence was not always downgraded for indirectness if it was not judged to impact the certainty in the findings for the outcome evaluated in the review

[s] 136 total studies included; each analysis includes fewer studies
[b] Certainty of evidence downgraded given combination of experimental and observational designs