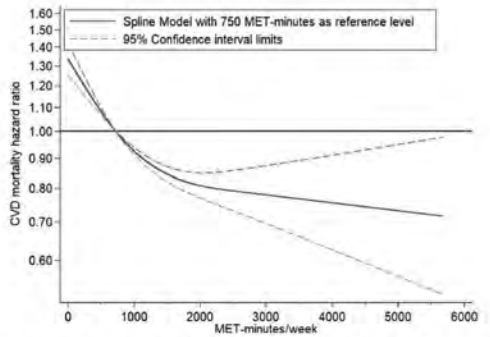
***Table B.1.b. CVD mortality: Association between physical activity and CVD mortality among adults (in alphabetical order by author)***

See the Supplementary materials for description of evidence of US PAGAC by outcome

| Systematic review evidence<br><br>Review credibility | No. of studies/ Study design<br><br>No. of participants | Quality Assessment<br>Risk of bias | Inconsistency | Indirectness† | Imprecision | Other | Description of evidence<br><br>Summary of findings | Certainty |
|---|---|---|---|---|---|---|---|---|
| Blond 2019 *(11)*<br><br>Moderate | 48 prospective cohort studies<br><br>N=NR | No serious risk of bias | Serious inconsistency | No serious indirect-tness | No serious imprecision | Possible publication bias<br><br>Evidence of a dose-response relationship | Five studies used accelerometers to measure PA while all other studies used self-reported PA. Eight measures included occupational PA. Most studies focused on MVPA or leisure-time PA.<br><br>An inverse relationship was found between **PA** and **CVD mortality** (*p* non-linearity <0.001). The mortality risk was lower for all PA levels above the recommended level compared with the recommended level (750 MET min/week). Compared with 750 MET min/week, those participating in 2000 MET min/week (4 hrs/week) had a statistically significantly lower risk of all-cause mortality (HR = 0.81 [95% CI, 0.77 to 0.85]) with an ARD = -5 deaths per 10,000 person years [95% CI, -6 to -4 deaths).<br><br>  <br><br>**Figure 3** Dose–response relationship between physical activity and cardiovascular disease (CVD) mortality. Dose–response relation b metabolic equivalent of task (MET) min/week (with 750 MET min/week as the reference) and mortality risk estimated with restricted cu regression and generalised least square trend estimation for summarised dose–response data.<br><br>**Table 1** Mortality HRs with 750 metabolic equivalent of task (MET) min/week as reference and estimated absolute rate differences per 10 person years<br><br>| MET min/week | | 0 | 500 | 1000 | 2000 | 3000 | 4000 | 5000 | 6000 |<br>|---|---|---|---|---|---|---|---|---|---|<br>| Running (5 mph)* | | 0 hour/week | 1 hour/week | 2 hours/week | 4 hours/week | 6 hours/week | 8 hours/week | 10 hours/week | 12 hou |<br>| CVD mortality | Studies | 15 | 18 | 18 | 17 | 8 | 2 | 2 | NA |<br>| | Participants* | 579 901 | 986 340 | 279 319 | 286 717 | 111 007 | 19 489 | 5488 | NA |<br>| | PY* | 7 721 115 | 9 761 494 | 3 860 943 | 3 796 251 | 1 165 769 | 274 344 | 65 089 | NA |<br>| | Total cases* | 12 318 | 30 196 | 8618 | 8661 | 3258 | 486 | 87 | NA |<br>| | HR (95% CI) | 1.34 (1.26 to 1.42) | 1.08 (1.07 to 1.10) | 0.93 (0.91 to 0.94) | 0.81 (0.77 to 0.85) | 0.78 (0.69 to 0.87) | 0.75 (0.63 to 0.91) | 0.73 (0.56 to 0.95) | NA |<br>| | ARD (95% CI)‡ | 8 (6 to 10) | 2 (2 to 2) | −2 (−2 to −1) | −5 (−6 to −4) | −5 (−8 to −3) | −6 (−9 to −2) | −7 (−11 to −1) | NA |<br><br>Five studies used accelerometers to measure PA while all other studies used self-reported PA. Eight measures included occupational PA. Most studies focused on MVPA or leisure-time PA.<br><br>An inverse relationship was found between **PA** and **CVD mortality** (*p* non-linearity <0.001). The mortality risk was lower for all PA levels above the recommended level compared with the recommended level (750 MET min/week). Compared with 750 MET min/week, those participating in 2000 MET min/week (4 hrs/week) had a statistically significantly lower risk of all-cause mortality (HR = 0.81 [95% CI, 0.77 to 0.85]) with an ARD = -5 deaths per 10,000 person years [95% CI, -6 to -4 deaths). | MODERATE[a] |

| Systematic review evidence<br><br>Review credibility | No. of studies/ Study design<br><br>No. of participants | Quality Assessment | | | | | Description of evidence<br><br>Summary of findings | Certainty |
|---|---|---|---|---|---|---|---|---|
| | | Risk of bias | Inconsistency | Indirectness † | Imprecision | Other | | |
| Dinu 2019 *(19)*<br><br>Low | 9 prospective cohort studies<br><br>N=177,239 | Serious risk of bias | No serious inconsistency | Serious indirectness | No serious imprecision | None | All studies evaluated the effects of mixed mode (cycling and/or walking) active commuting on health outcomes. Exposure levels of active commuting were variably reported as minutes spent walking or cycling for transportation per day, as dichotomized variables (yes or no), or as METs with the reference category as no active commuting in most studies. Follow-up ranged from 4 to 25 years.<br><br>There was no significant association between **active commuting** and **CVD mortality** compared with those participating in no active commuting (RR = 0.94 [95% CI 0.85 to 1.05], 9 studies). | LOW[b] |
| O'Donovan 2017[c] *(51)*<br><br>Good quality[d] | 9 cohort studies<br><br>N=37,059 | No serious risk of bias | No serious inconsistency | No serious indirectness | Serious imprecision | None | Compared with those who met PA guidelines[e] and whose HDL-C was normal, CVD mortality risk was not significantly elevated in those who did not meet PA guidelines and whose HDL-C was normal (adjusted HR = 1.11 [95% CI, 0.82 to 1.52]); CVD mortality risk was elevated among those who did not meet PA guidelines and whose HDL-C was low (adjusted HR = 1.63 [95% CI 1.16 to 2.27]) compared with those meeting recommendations and with normal HDL-C. | LOW[f] |
| Siahpush 2019[g] *(63)*<br><br>Good quality[d] | Pooled cohort analysis<br><br>N=68,706 | No serious risk of bias | No serious inconsistency | No serious indirectness | No serious imprecision | None | Smokers who reported meeting aerobic and strengthening PA guidelines[h] (adjusted HR = 0.54 [95% CI, 0.39 to 0.76]), those meeting only aerobic PA guidelines (adjusted HR = 0.85 [95% CI 0.72 to 0.99]), and those meeting only strengthening exercise guidelines (HR = 0.63 [95% CI 0.43 to 0.93]) had significantly lower risk of CVD mortality than those not meeting both recommendations. | MODERATE[i] |
| Stamatakis 2018[j] *(65)*<br><br>Good quality[d] | Pooled cohort analysis<br><br>N=80,306 | No serious risk of bias | No serious inconsistency | No serious indirectness | No serious imprecision | None | There was no association between participation in any strength exercises vs. no participation (adjusted HR = 0.88 [95% CI, 0.71 to 1.08]) or meeting vs. not meeting the strength exercise guideline[k] (adjusted HR = 0.92 [95% CI 0.72 to 1.12]) and CVD mortality, including analysis limited to own-bodyweight exercises and gym-based exercises. | MODERATE[l] |

Abbreviations: ARD = absolute rate difference; CI = confidence interval; CVD = cardiovascular disease; HDL-C = high-density lipoprotein cholesterol; HR = hazards ratio; MET =metabolic equivalent of task; min = minutes; MVPA = moderate-to-vigorous intensity physical activity; NR = not reported; RR = risk ratio; SB = sedentary behaviour

† 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

[a] Certainty of evidence upgraded given no serious risk of bias of included studies and evidence of dose-response relationship; however, serious inconsistency (high between study variance, $I^2$>77%) present; possible small studies effects/publication bias not judged as sufficient to warrant additional downgrading
[b] Certainty of evidence not upgraded given serious risk of bias (not appropriately adjusting for confounding) and indirectness in comparisons of exposures
[c] Not a systematic review. Pooled analysis of 9 population-based cohorts
[d] Quality rated based on the Newcastle-Ottawa Scale (NOS) for assessing the quality of nonrandomised studies in meta-analyses *(77)*
[e] 150 min/week of moderate-intensity leisure time PA, or at least 75 min/week of vigorous-intensity leisure-time PA, or any combination of moderate- and vigorous-intensity PA equivalent to at least 7.5 MET-h/week
[f] Certainty of evidence not upgraded given imprecision in estimates of effects (wide confidence interval representing range in results)
[g] Not a systematic review. Pooled analysis of 1998-2009 National Health Index Survey and linked National Death Index
[h] 150 min/week of moderate-intensity leisure time PA, or at least 75 min/week of vigorous-intensity leisure-time PA, or an equivalent combination and performing strengthening exercises ≥2 times/week

[I] Certainty of evidence upgraded given no serious limitations in included evidence
[J] Not a systematic review. Pooled analysis of 11 cohorts of the Health Survey for England and the Scottish Health Survey and linked to the British National Health Service Central Registry for data on mortality
[K] Performing strengthening exercises ≥2 times/week
[L] Certainty of evidence upgraded given no serious limitations in included evidence and evidence of dose-response relationship