**Supplementary file 4. Risk of bias summary.**

| Study                          | Confounding | Selection of participants | Classification of physical activity | Departures from the intended interventions | Missing data | Measurement of mortality | Selective reporting | Overall bias |
|-------------------------------|-------------|---------------------------|-------------------------------------|---------------------------------------------|--------------|--------------------------|--------------------|--------------|
| Ammitzbøll 2016               | +           | +                         | ?                                   | -                                           | +            | +                        | +                  | +            |
| Bao 2015                      | +           | +                         | ?                                   | +                                           | +            | +                        | +                  | +            |
| Bertram 2011                  | +           | +                         | ?                                   | -                                           | +            | +                        | +                  | +            |
| Bradshaw 2014                 | +           | +                         | -                                   | +                                           | ?            | +                        | +                  | +            |
| Chen 2011                     | +           | +                         | ?                                   | +                                           | +            | +                        | +                  | +            |
| de Glas 2014                  | +           | +                         | ?                                   | -                                           | +            | +                        | +                  | +            |
| Holick 2008                   | +           | -                         | ?                                   | -                                           | +            | +                        | +                  | -            |
| Holmes 2005                   | -           | +                         | ?                                   | -                                           | +            | +                        | +                  | -            |
| Irwin 2008                    | -           | +                         | ?                                   | -                                           | +            | +                        | +                  | -            |
| Irwin 2011                    | +           | +                         | ?                                   | +                                           | +            | +                        | +                  | +            |
| Maliniak 2018                 | +           | +                         | ?                                   | -                                           | +            | +                        | +                  | +            |
| Sternfeld 2009                | -           | -                         | ?                                   | -                                           | +            | +                        | +                  | -            |
| Glenn 2015                    | -           | +                         | ?                                   | -                                           | +            | +                        | +                  | -            |
| Gregg 2003                    | -           | +                         | ?                                   | -                                           | +            | +                        | +                  | -            |
| Hu 2004                       | -           | +                         | -                                   | +                                           | +            | +                        | +                  | -            |
| Sluik 2012                    | -           | +                         | ?                                   | -                                           | +            | +                        | +                  | -            |
| Sone 2013                     | -           | +                         | ?                                   | -                                           | +            | +                        | +                  | -            |
| Tanasescu 2003                | +           | +                         | ?                                   | +                                           | +            | +                        | +                  | +            |
| Cheng 2018                    | -           | +                         | ?                                   | -                                           | +            | +                        | +                  | -            |
| Garcia-Aymerich 2006          | -           | +                         | ?                                   | -                                           | +            | +                        | +                  | -            |
| Gerber 2011                   | +           | +                         | ?                                   | -                                           | +            | +                        | +                  | +            |
| Janssen 2006                  | +           | +                         | ?                                   | -                                           | +            | +                        | +                  | +            |
| Lahtinen 2018                 | +           | +                         | ?                                   | +                                           | +            | +                        | +                  | +            |
| Moholdt 2017                  | +           | +                         | ?                                   | +                                           | ?            | +                        | +                  | +            |
| Mons 2014                     | -           | +                         | ?                                   | -                                           | +            | +                        | +                  | -            |
| Stewart 2017                  | -           | +                         | ?                                   | -                                           | ?            | +                        | +                  | -            |
| Tian 2017                     | -           | -                         | -                                   | +                                           | +            | +                        | +                  | +            |
| Wannamethee 2000              | +           | +                         | ?                                   | +                                           | +            | +                        | +                  | +            |

+ Low: comparable to a well-performed RCT; + Moderate: sound evidence but not comparable to a well-performed RCT; - Serious: the study has some important problems; **Critical: the study is to critical to provide any useful evidence and should not be included in any synthesis; ? No information: not enough information to reach a judgment.