

**Supplementary table 1** The EX-MED Cancer Sweden exercise program

| <b>Program structure<sup>a</sup>:</b> You will combine both aerobic and resistance exercises in the same session. Each session consists of four blocks with three exercises per block, 2 strength/1 aerobic. You will need a resistance band. Aim for an overall RPE of 14-18 according to the Borg’s scale (6-20). |                                   |                                                                                                     |                                                                        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| Structure <sup>b</sup>                                                                                                                                                                                                                                                                                              | Exercises <sup>c</sup>            | Time                                                                                                | Comments                                                               |
| <b>Block 1</b>                                                                                                                                                                                                                                                                                                      | 1. Squat with shoulder press      | 40 sec each, rest 20 sec<br>3 rounds, rest 1 min<br>between each round<br>2 min rest before block 2 | Place resistance band under feet for shoulder press                    |
|                                                                                                                                                                                                                                                                                                                     | 2. Hip raise                      |                                                                                                     |                                                                        |
|                                                                                                                                                                                                                                                                                                                     | 3. High knees                     |                                                                                                     |                                                                        |
| <b>Block 2</b>                                                                                                                                                                                                                                                                                                      | 1. Reverse lunge with one-arm row | 40 sec each, rest 20 sec<br>3 rounds, rest 1 min<br>between each round<br>2 min rest before block 3 | Attach the resistance band to something sturdy like a door             |
|                                                                                                                                                                                                                                                                                                                     | 2. Core rotation                  |                                                                                                     | Attach the resistance band to something sturdy like a door             |
|                                                                                                                                                                                                                                                                                                                     | 3. Skaters                        |                                                                                                     |                                                                        |
| <b>Block 3</b>                                                                                                                                                                                                                                                                                                      | 1. Single-leg deadlift            | 40 sec each, rest 20 sec<br>3 rounds, rest 1 min<br>between each round<br>2 min rest before block 4 |                                                                        |
|                                                                                                                                                                                                                                                                                                                     | 2. Forward lunge with chest press |                                                                                                     | Attach the resistance band to something sturdy like a door             |
|                                                                                                                                                                                                                                                                                                                     | 3. Cross-country skiing           |                                                                                                     |                                                                        |
| <b>Block 4</b>                                                                                                                                                                                                                                                                                                      | 1. Push-up                        | 20 sec each, rest 10 sec<br>3 rounds, rest 1 min<br>between each round                              | Can be done on knees, toes, against a bench or standing against a wall |
|                                                                                                                                                                                                                                                                                                                     | 2. Back extension with lat pull   |                                                                                                     |                                                                        |
|                                                                                                                                                                                                                                                                                                                     | 3. Squat with side stretch        |                                                                                                     |                                                                        |
| <b>Compliment this program with other physical activity at moderate intensity, such as brisk walking, cycling, swimming, so that you reach at least 150 minutes per week.</b>                                                                                                                                       |                                   |                                                                                                     |                                                                        |

*RPE* Rating of Perceived Exertion

<sup>a</sup>The exercise program consisted of two supervised sessions of 60 minutes per week.

<sup>b</sup>All sessions started with a 5-minute warm-up and concluded with a 5-minute stretch.

<sup>c</sup>Variations of the exercises were allowed and the personal trainer made adaptations based on individual response. Intensity and load were manipulated using body weight, resistance bands (light and medium), and by varying the number of repetitions. The original program was complimented with photos of each exercise and the Borg RPE scale.

**Supplementary table 2** Within-group differences in HRQOL, fatigue, physical activity levels and physiological outcomes

|                                                                                                |    | Adjusted within group differences |         |                           |         |
|------------------------------------------------------------------------------------------------|----|-----------------------------------|---------|---------------------------|---------|
|                                                                                                |    | WGDs Baseline to 3 months         |         | WGDs Baseline to 6 months |         |
|                                                                                                |    | Mean (95% CI)                     | P value | Mean (95% CI)             | P value |
| <b>EORTC QLQ-C30</b>                                                                           |    |                                   |         |                           |         |
| Summary score                                                                                  | EX | 3.01 (0.88-5.14)*                 | 0.002   | 2.37 (0.38-4.37)*         | 0.015   |
|                                                                                                | CG | 2.06 (0.04-2.09)*                 | 0.044   | 3.179 (1.00-5.36)*        | 0.002   |
| Global health status                                                                           | EX | 4.25 (-0.43-8.93)                 | 0.089   | 1.16 (-2.67-4.99)         | 0.551   |
|                                                                                                | CG | 2.82 (-1.58-7.22)                 | 0.300   | 3.93 (-0.85-8.71)         | 0.147   |
| Physical functioning                                                                           | EX | 3.48 (0.64-6.31)*                 | 0.010   | 1.86 (-0.80-4.51)         | 0.232   |
|                                                                                                | CG | -0.55 (-3.10-1.99)                | 1.000   | 0.65 (-2.06-3.36)         | 1.000   |
| Emotional functioning                                                                          | EX | 2.16 (-2.38-6.70)                 | 0.762   | 1.54 (-2.72-5.79)         | 0.834   |
|                                                                                                | CG | 3.31 (-1.09-7.72)                 | 0.197   | 3.57 (-1.08-8.21)         | 0.197   |
| Role functioning                                                                               | EX | 5.65 (0.24-11.07)*                | 0.037   | 3.40 (-1.66-8.47)         | 0.263   |
|                                                                                                | CG | 4.27 (-0.64-9.57)                 | 0.099   | 7.364 (1.81-12.91)*       | 0.005   |
| Cognitive functioning                                                                          | EX | 2.67 (-1.38-6.77)                 | 0.275   | 3.89 (-0.46-8.24)         | 0.096   |
|                                                                                                | CG | 3.93 (-0.70-7.48)                 | 0.125   | 3.81 (-0.64-7.48)         | 0.120   |
| Social functioning                                                                             | EX | 8.44 (2.96-13.93)*                | 0.001   | 8.50 (2.93-14.08)*        | 0.001   |
|                                                                                                | CG | 9.71 (4.11-15.31)*                | 0.000   | 8.61 (3.28-13.95)*        | 0.001   |
| Fatigue                                                                                        | EX | -4.85 (-9.44 to -0.25)*           | 0.035   | -2.84 (-7.14-1.46)        | 0.276   |
|                                                                                                | CG | -1.51 (-5.29-2.26)                | 0.432   | -5.41 (-10.10 to -0.71)*  | 0.018   |
| Dyspnoea                                                                                       | EX | -3.03 (-9.08-3.02)                | 0.522   | -4.19 (-10.67-2.30)       | 0.364   |
|                                                                                                | CG | -1.27 (-6.59-4.06)                | 0.641   | -4.07 (-10.70-2.55)       | 0.422   |
| Insomnia                                                                                       | EX | -6.07 (-12.36-0.23)               | 0.063   | -3.89 (-9.80-2.02)        | 0.279   |
|                                                                                                | CG | -1.75 (-7.67-4.17)                | 1.000   | -2.77 (-9.20-3.67)        | 0.908   |
| <b>Fatigue (Piper fatigue scale)</b>                                                           |    |                                   |         |                           |         |
| Behaviour/daily life fatigue                                                                   | EX | -0.20 (-0.63-0.23)                | 0.584   | -0.36 (-0.79-0.12)        | 0.234   |
|                                                                                                | CG | -0.01 (-0.39-0.37)                | 1.000   | -0.12 (-0.59-0.36)        | 1.000   |
| Emotional/affective fatigue                                                                    | EX | -0.19 (-0.67-0.29)                | 1.000   | -0.13 (-0.57-0.32)        | 1.000   |
|                                                                                                | CG | -0.13 (-0.60-0.35)                | 1.000   | -0.10 (-0.53-0.34)        | 1.000   |
| Sensory/physical fatigue                                                                       | EX | -0.35 (-0.84-0.14)                | 0.256   | -0.29 (-0.75-0.17)        | 0.305   |
|                                                                                                | CG | -0.24 (-0.70-0.22)                | 0.479   | -0.35 (-0.85-0.14)        | 0.266   |
| Cognitive fatigue                                                                              | EX | -0.21 (-0.59-0.17)                | 0.446   | -0.24 (-0.64-0.16)        | 0.466   |
|                                                                                                | CG | -0.09 (-0.45-0.28)                | 1.000   | -0.14 (-0.55-0.27)        | 1.000   |
| Total fatigue                                                                                  | EX | -0.22 (-0.61-0.17)                | 0.503   | -0.23 (-0.63-0.17)        | 0.503   |
|                                                                                                | CG | -0.10 (-0.47-0.27)                | 1.000   | -0.17 (-0.57-0.24)        | 0.982   |
| <b>Self-efficacy of exercise (Self-Efficacy of Exercise questionnaire)</b>                     |    |                                   |         |                           |         |
| SEE score                                                                                      | EX | -10.03 (-16.78 to -3.28)*         | 0.001   | -7.04 (-13.36 to -0.73)   | 0.301   |
|                                                                                                | CG | -5.62 (-11.95-0.71)               | 0.093   | -7.63 (-14.51 to -0.75)   | 0.489   |
| <b>Patient-reported physical activity (Godin–Shephard Leisure-Time Exercise Questionnaire)</b> |    |                                   |         |                           |         |
| Moderate-vigorous intensity aerobic exercise (min/week)                                        | EX | 64 (30-98)*                       | <0.001  | 26 (-2-53)                | 0.071   |
|                                                                                                | CG | 15 (-15-45)                       | 0.371   | 35 (0-70)*                | 0.050   |
| Resistance exercise (min/week)                                                                 | EX | 51 (36-67)*                       | <0.001  | 10 (-3-22)                | 0.124   |

|                                         |    |                         |        |                         |        |
|-----------------------------------------|----|-------------------------|--------|-------------------------|--------|
|                                         | CG | 14 (1-29)*              | 0.049  | 22 (6-38)*              | 0.003  |
| <b>Cardiorespiratory fitness</b>        |    |                         |        |                         |        |
| Estimated VO2max (ml/kg/min)            | EX | 0.90 (0.08-1.72)*       | 0.026  | 0.87 (0.09-1.67)*       | 0.026  |
|                                         | CG | 0.15 (-0.71-1.01)       | 1.000  | 0.07 (-0.67-0.8)        | 1.000  |
| <b>Physical strength and function</b>   |    |                         |        |                         |        |
| Leg press (kg)                          | EX | 10.7 (7.2-14.3)*        | <0.001 | 12.3 (8.4-16.1)*        | <0.001 |
|                                         | CG | 8.5 (4.9-12.0)*         | <0.001 | 10.4 (6.4-14.3)*        | <0.001 |
| Chest press (kg)                        | EX | 2.4 (1.5-3.4)*          | <0.001 | 2.5 (1.5-3.6)*          | <0.001 |
|                                         | CG | 1.3 (0-2)*              | 0.004  | 1.6 (0.6-2.7)*          | 0.001  |
| Handgrip right (kg)                     | EX | 1.9 (0.8-3.1)*          | <0.001 | 3.2 (2.0-4.4)*          | <0.001 |
|                                         | CG | 1.3 (0.3-2.3)*          | 0.012  | 2.7 (1.5-4.0)*          | <0.001 |
| Handgrip left (kg)                      | EX | 2.1 (1.0-3.6)*          | <0.001 | 3.6 (2.5-4.8)*          | <0.001 |
|                                         | CG | 1.2 (0.3-2.2)*          | 0.012  | 2.8 (1.6-4.0)*          | <0.001 |
| Sit to stand (sec. to complete 5 reps.) | EX | -1.19 (-1.65 to -0.72)* | <0.001 | -1.06 (-1.51 to -0.62)* | <0.001 |
|                                         | CG | -0.70 (-1.1 to -0.26)*  | 0.001  | -1.10 (-1.58 to -0.62)* | <0.001 |
| <b>Body composition</b>                 |    |                         |        |                         |        |
| Body fat (%)                            | EX | 0.03 (-0.45-0.51)       | 1.000  | -0.12 (-0.64-0.40)      | 1.000  |
|                                         | CG | 0.14 (-0.33-0.61)       | 0.57   | 0.49 (-0.10-1.08)       | 0.145  |
| Fat mass (kg)                           | EX | 0.08 (-0.46-0.60)       | 1.000  | -0.15 (-0.71-0.41)      | 1.000  |
|                                         | CG | 0.06 (-0.43-0.56)       | 0.803  | 0.51 (-0.11-1.14)       | 0.141  |
| Lean mass (kg)                          | EX | -0.17 (-0.38-0.03)      | 0.124  | -0.06 (-0.23-0.11)      | 0.464  |
|                                         | CG | -0.08 (-0.28-0.13)      | 1.000  | -0.09 (-0.23-0.13)      | 1.000  |

EX, exercise group; CG, control group. Models were adjusted for the baseline value of the outcome, stratification factors (that is, cancer type and history of chemotherapy yes/no), age and sex, and included all available data. \*Indicates significant differences ( $P < 0.05$ ).

**Supplementary table 3** Per-protocol-analysis of the effects of the EX-MED Sweden exercise intervention on HRQOL, fatigue, physical activity levels and physiological outcomes

|                                                                                                         |        | Adjusted between group differences<br>Per-protocol-analysis |                  |                             |                  |
|---------------------------------------------------------------------------------------------------------|--------|-------------------------------------------------------------|------------------|-----------------------------|------------------|
|                                                                                                         |        | BGDs at 3 months                                            |                  | BGDs at 6 months            |                  |
|                                                                                                         |        | Mean (95% CI)                                               | p value          | Mean (95% CI)               | p value          |
| <b>EORTC QLQ-C30</b>                                                                                    |        |                                                             |                  |                             |                  |
| Summary score                                                                                           | EXvsCG | 0.57 (-1.51-2.64)                                           | 0.592            | -1.23 (-3.32-0.86)          | 0.247            |
| Global health status                                                                                    | EXvsCG | 3.29 (-1.31-7.88)                                           | 0.161            | -1.79 (-6.44-2.87)          | 0.451            |
| Physical functioning                                                                                    | EXvsCG | <b>4.59 (1.81-7.37)*</b>                                    | <b>0.001</b>     | 1.48 (-1.33-4.23)           | 0.302            |
| Emotional functioning                                                                                   | EXvsCG | -3.00 (-7.29-1.30)                                          | 0.171            | -2.69 (-7.04-1.69)          | 0.226            |
| Role functioning                                                                                        | EXvsCG | 2.64 (-2.30-7.56)                                           | 0.294            | -4.36 (-9.36-0.65)          | 0.088            |
| Cognitive functioning                                                                                   | EXvsCG | 0.26 (-3.41-3.92)                                           | 0.890            | -0.46 (-4.17-3.25)          | 0.809            |
| Social functioning                                                                                      | EXvsCG | -1.56 (-6.73-3.61)                                          | 0.553            | -1.03 (-6.26-4.21)          | 0.700            |
| Fatigue                                                                                                 | EXvsCG | -4.40 (-8.88-0.09)                                          | 0.055            | 1.42 (-3.13-5.96)           | 0.541            |
| Dyspnoea                                                                                                | EXvsCG | -0.86 (-7.12-5.41)                                          | 0.788            | -0.52 (-6.90-5.86)          | 0.873            |
| Insomnia                                                                                                | EXvsCG | -0.41 (-6.42-5.61)                                          | 0.894            | 0.61 (-5.48-6.70)           | 0.844            |
| <b>Fatigue (Piper fatigue scale)</b>                                                                    |        |                                                             |                  |                             |                  |
| Behaviour/daily life fatigue                                                                            | EXvsCG | -0.04 (-0.50-0.41)                                          | 0.852            | 0.05 (-0.51-0.41)           | 0.830            |
| Emotional/affective fatigue                                                                             | EXvsCG | 0.16 (-0.31-0.64)                                           | 0.527            | 0.12 (-0.36-0.60)           | 0.603            |
| Sensory/physical fatigue                                                                                | EXvsCG | -0.01 (-0.50-0.47)                                          | 0.959            | 0.09 (-0.39-0.58)           | 0.705            |
| Cognitive fatigue                                                                                       | EXvsCG | 0.01 (-0.38-0.40)                                           | 0.970            | -0.07 (-0.46-0.32)          | 0.723            |
| Total fatigue                                                                                           | EXvsCG | 0.04 (-0.36-0.44)                                           | 0.851            | 0.03 (-0.36-0.44)           | 0.878            |
| <b>Self-efficacy of exercise</b> (Self-Efficacy of Exercise questionnaire)                              |        |                                                             |                  |                             |                  |
| SEE                                                                                                     | EXvsCG | 1.91 (-4.50-8.32)                                           | 0.558            | 5.58 (-0.94-12.01)          | 0.093            |
| <b>Patient-reported physical activity</b> (Godin–Shephard Leisure-Time Physical Activity Questionnaire) |        |                                                             |                  |                             |                  |
| Moderate-vigorous intensity aerobic exercise (min/week)                                                 | EXvsCG | <b>68 (36-100)*</b>                                         | <b>&lt;0.001</b> | 14 (-17-46)                 | 0.373            |
| Resistance exercise (min/week)                                                                          | EXvsCG | <b>22 (7-37)*</b>                                           | <b>0.004</b>     | -12 (27-3)                  | 0.114            |
| <b>Cardiorespiratory fitness</b>                                                                        |        |                                                             |                  |                             |                  |
| Estimated VO2max (ml/kg/min)                                                                            | EXvsCG | <b>1.09 (0.26-1.91)*</b>                                    | <b>0.010</b>     | <b>0.93 (0.08-1.77)*</b>    | <b>0.033</b>     |
| Estimated VO2max (L/min)                                                                                | EXvsCG | 0.05 (-0.02-0.12)                                           | 0.150            | 0.04 (-0.03-0.11)           | 0.293            |
| <b>Physical strength and function</b>                                                                   |        |                                                             |                  |                             |                  |
| Leg press (kg)                                                                                          | EXvsCG | <b>3.9 (0.1-7.6)*</b>                                       | <b>0.044</b>     | 2.3 (-1.5-6.2)              | 0.246            |
| Chest press (kg)                                                                                        | EXvsCG | <b>1.4 (0.4-2.4)*</b>                                       | <b>0.006</b>     | 1.0 (0.0-2.0)               | 0.051            |
| Handgrip right (kg)                                                                                     | EXvsCG | 0.7 (-0.4-1.9)                                              | 0.203            | 0.6 (-0.6-1.8)              | 0.304            |
| Handgrip left (kg)                                                                                      | EXvsCG | 0.9 (-0.2-2.0)                                              | 0.094            | 1.1 (0.0-2.2)               | 0.052            |
| Sit to stand (sec. to complete 5 reps.)                                                                 | EXvsCG | <b>-0.6 (-1.1 to -0.2)*</b>                                 | <b>0.006</b>     | -0.1 (-0.5-0.4)             | 0.802            |
| <b>Body composition</b>                                                                                 |        |                                                             |                  |                             |                  |
| Body fat (%)                                                                                            | EXvsCG | -0.3 (-0.9-0.2)                                             | 0.234            | <b>-1.0 (-1.6 to -0.5)*</b> | <b>&lt;0.001</b> |
| Fat mass (kg)                                                                                           | EXvsCG | -0.2 (-0.8-0.3)                                             | 0.421            | <b>-1.2 (-1.7 to -0.6)*</b> | <b>&lt;0.001</b> |
| Lean mass (kg)                                                                                          | EXvsCG | -0.1 (-0.3-0.1)                                             | 0.379            | 0.0 (-0.2-0.2)              | 0.846            |

EX, exercise group; CG, control group. Models were adjusted for the baseline value of the outcome, stratification factors (that is, cancer type and history of chemotherapy yes/no), age and sex, and included all available data. \*Indicates significant differences ( $P < 0.05$ ). Significant BGDs are in bold.