## Supplementary Table 1 Details of activPAL data collection and processing

| Item | Details |
| :---: | :---: |
| Monitor version | activPAL3 micro |
| Method and location of monitor attachment | Device was waterproofed by covering in nitrile fingercot and wrapped fully in one piece of waterproof dressing (Hypafix transparent), then attached by research staff (SC) to the anterior aspect of the mid-thigh anterior using one piece of Tegaderm dressing. Additional dressings were supplied for reattachment during the wear period. |
| Wear period and number of days | 24 hours/day for 7 consecutive days |
| activPAL software version | Version 7.2.38 |
| Settings used: <br> Sampling Frequency <br> Minimum sitting period <br> Minimum upright period <br> Minimum /maximum cadence <br> Stride Average <br> Energy Expenditure | All defaults. Selected information below: <br> 10 Hz (default) <br> 10 seconds (default) <br> 10 seconds (default) <br> 20 / 240 steps per minute (default) <br> 10 strides <br> METs $=1.25($ sitting $)$ and $1.4($ standing $)$ and MET-hrs $($ stepping $)=$ $(1.4 \times \mathbf{d})+(4-1.4) \times(\mathbf{c} / 120) \times \mathbf{d}$, where $\mathbf{d}$ is duration in hrs and $\mathbf{c}$ is cadence in steps per minute |
| Diary data collected | Time woke up, sleep during the day, time got into bed, time went to sleep, and any removal times each day |
| Type of file used for data processing | Events file |
| Method for estimating sleep/wake times | Unreported sleep/wake times were estimated from the activPAL events files by research staff (SC). Whole bouts of activity were classed as awake/not and removed/not. |
| Quality control checks | All included and excluded data were checked visually (via heatmaps) to identify any instances where it seemed movement during wake was more consistent with sleep or removal and vice versa, or if the monitor appeared to have been worn upside down. Problems were rectified individually based on best consistency between the monitor data and the diary (if available). Data deemed invalid (removal and sleep periods, all time on invalid days, selected days that failed the quality control checks) were excluded from analysis. |
| Criteria to define a valid day of observation | Worn for $\geq 10$ waking hours |
| Number and type of days required to be included in final analytic sample | At least four valid days of data |
| Data processing package used and methods used to generate key summary variables | activPAL software version 7.2.38 to create events files. |


|  | A SAS 9.4 program was used to perform quality checks and <br> determine valid data. |
| :--- | :--- |

## Supplementary Table 2 Assessment of sedentary behaviour and physical activity variables

|  | Outcome measure | Definition |
| :--- | :--- | :--- |
| Total sedentary <br> behaviour | Waking wear time, min/day | Device wear time during waking hours. |
|  | Sedentary time, min/day | Time spent in SB expressed in absolute minutes. |
|  | Sedentary time as $\%$ waking wear time, $\%$ | Time spent in SB expressed as a proportion of waking wear time. |
|  | Prolonged sedentary time, min/day |  |
|  | Prolonged sedentary time as $\%$ waking wear time, $\%$ | Time spent in SB accumulated in bouts of $\geq 30$ minutes. |
| Time spent in prolonged SB expressed as a proportion of waking wear time. |  |  |

Supplementary Table 3 Baseline characteristics of activity phenotypes ( $\mathrm{n}=69$ )

| Characteristic | Activity phenotypes |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | $\begin{gathered} \text { All } \\ (\mathrm{n}=69) \end{gathered}$ | "Couch potatoes" $(\mathrm{n}=24)$ | $\begin{gathered} \text { "Light movers" } \\ (\mathrm{n}=4) \end{gathered}$ | "Sedentary exercisers" $(\mathrm{n}=15)$ | $\begin{gathered} \text { "Busy bees" } \\ (\mathrm{n}=26) \end{gathered}$ |
| Age, years | 74 (9) | 76 (9) | 79 (8) | 70 (10) | 73 (9) |
| Sex, n males (\%) | 33 (48) | 14 (58) | 1 (25) | 6 (40) | 12 (46) |
| Employment status, n (\%) |  |  |  |  |  |
| Retired | 56 (81) | 19 (79) | 3 (75) | 14 (93) | 20 (77) |
| Part-time | 10 (15) | 5 (21) | 1 (25) | 0 | 4 (15) |
| Full-time | 3 (4) | 0 | 0 | 1 (7) | 2 (8) |
| Lung function |  |  |  |  |  |
| $\mathrm{FEV}_{1}$, L | 1.39 (0.55) | 1.27 (0.53) | 0.84 (0.19) | 1.58 (0.65) | 1.48 (0.49) |
| FVC, L | 2.66 (0.77) | 2.55 (0.74) | 2.47 (1.06) | 2.81 (0.79) | 2.70 (0.76) |
| $\mathrm{FEV}_{1} \%$ predicted | 55 (19) | 53 (21) | 41 (12) | 57 (14) | 59 (20) |
| GOLD stage, n (\%) |  |  |  |  |  |
| I and II | 35 (51) | 11 (46) | 1 (25) | 10 (67) | 13 (50) |
| III and IV | 34 (49) | 13 (54) | 3 (75) | 5 (33) | 13 (50) |
| BMI, $\mathrm{kg} / \mathrm{m}^{2}$ | 28.3 (7.5) | 26.6 (8.1) | 30.0 (10.0) | 29.1 (8.8) | 29.3 (5.9) |
| Smoking status, n (\%) |  |  |  |  |  |
| Current | 9 (13) | 4 (17) | 0 | 2 (13) | 3 (11) |
| Former | 60 (87) | 20 (83) | 4 (100) | 13 (87) | 23 (89) |
| Smoking history, pack-years | 41 (24) | 51 (28) | 41 (25) | 34 (16) | 36 (23) |
| $\geq 1$ self-reported COPD hospital admission in | 38 (55) | 12 (50) | 2 (50) | 9 (60) | 15 (58) |
| last six months, n (\%) |  |  |  |  |  |
| Comorbidities, n (\%) |  |  |  |  |  |


| Cardiometabolic | 55 (80) | 20 (83) | 3 (75) | 11 (73) | 21 (81) |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Other respiratory | 30 (44) | 11 (46) | 2 (50) | 6 (40) | 11 (42) |
| Musculoskeletal | 49 (71) | 18 (75) | 4 (100) | 9 (60) | 18 (69) |
| Mental health | 20 (29) | 7 (29) | 0 | 6 (40) | 7 (27) |
| 6MWD, m | 358 (100) | 312 (87) | 274 (70) | 392 (115) | 395 (85) |
| 6MWD \% predicted | 61 (15) | 54 (16) | 51 (10) | 63 (13) | 67 (12) |
| 6MWD < $80 \%$ predicted, n (\%) | 62 (90) | 23 (96) | 4 (100) | 13 (87) | 22 (85) |
| Mobilises with walking aid, n (\%) | 11 (16) | 5 (21) | 1 (25) | 1 (7) | 4 (15) |
| Exercise-induced oxygen desaturation ${ }^{1}$, n (\%) | 31 (45) | 16 (70) | 4 (100) | 4 (29) | 7 (27) |
| Previous pulmonary rehabilitation ${ }^{2}$, n (\%) | 19 (28) | 7 (29) | 2 (50) | 3 (20) | 7 (27) |

Values are presented as mean (SD) unless otherwise stated.
Participants were classified as "couch potatoes" if sedentary time accounted for $\geq 70 \%$ of waking wear time and they undertook <30 min/day of MVPA; "light movers" if sedentary time accounted for $<70 \%$ of waking wear time and they undertook $<30 \mathrm{~min} /$ day of MVPA; "sedentary exercisers; if sedentary time accounted for $\geq 70 \%$ of waking wear time and they undertook $\geq 30 \mathrm{~min} /$ day of MVPA; and "busy bees" if sedentary time accounted for $<70 \%$ of waking wear time and they undertook $\geq 30 \mathrm{~min} /$ day of MVPA. One participant did not have a sufficient number of valid wear days and was excluded from the analysis.
${ }^{1}$ Defined as desaturation to $<90 \%$ during a six-minute walk test. Two participants (one classified as a "couch potato" and the other as a "sedentary exerciser") received longterm oxygen therapy and were excluded from the analysis.
${ }^{2}$ Self-reported attendance to a pulmonary rehabilitation program. Participants who undertook formal exercise training in the last six months were excluded from the study.

## Supplementary Table 4 Variations in patterns of sedentary behaviour accumulation and physical activity by activity phenotypes ( $\mathrm{n}=69$ )

| Characteristic | Participants |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | $\begin{gathered} \text { All } \\ (\mathrm{n}=69) \end{gathered}$ | "Couch potatoes" $(\mathrm{n}=24)$ | $\begin{gathered} \text { "Light movers" } \\ (\mathrm{n}=4) \end{gathered}$ | "Sedentary exercisers" $(\mathrm{n}=15)$ | $\begin{gathered} \text { "Busy bees" } \\ (\mathrm{n}=26) \end{gathered}$ |
| Sedentary time |  |  |  |  |  |
| Waking wear time, min/day | 904 (78) | 879 (105) | 916 (25) | 911 (65) | 921 (55) |
| Sedentary time, min/day | 643 (105) | 704 (98) | 599 (43) | 697 (62) | 561 (79) |
| Sedentary time as \% waking wear time, \% | 71 (11) | 80 (6) | 65 (4) | 76 (4) | 61 (7) |
| Prolonged sedentary time ${ }^{1}$, min/day | 374 (142) | 474 (138) | 356 (87) | 403 (138) | 268 (60) |
| Prolonged sedentary time as \% waking wear time, \% | 41 (15) | 54 (13) | 39 (10) | 44 (14) | 29 (6) |
| Pattern of sedentary time accumulation |  |  |  |  |  |
| Usual bout duration ${ }^{2}$, min | 39 (19) | 50 (24) | 42 (22) | 38 (15) | 28 (7) |
| Longest sedentary bout duration, min | 165 (67) | 194 (82) | 191 (73) | 161 (51) | 136 (45) |
| Sedentary bouts, n/day | 47 (17) | 41 (11) | 44 (13) | 50 (24) | 51 (15) |
| Prolonged sedentary bouts ${ }^{3}$, n /day | 6 (2) | 7 (2) | 5 (1) | 7 (2) | 5 (1) |
| Sedentary breaks ${ }^{4}$, n/day | 47 (17) | 41 (11) | 44 (13) | 50 (24) | 51 (15) |
| Alpha ${ }^{5}$ | 1.30 (0.03) | 1.29 (0.03) | 1.31 (0.01) | 1.30 (0.03) | 1.32 (0.03) |
| Fragmentation Index ${ }^{6}$, bouts/hour | 4.48 (1.67) | 3.54 (1.17) | 4.42 (1.17) | 4.36 (2.25) | 5.43 (1.25) |
| Physical activity |  |  |  |  |  |
| Standing time, min/day | 197 (80) | 140 (43) | 282 (37) | 145 (35) | 267 (62) |
| Stepping time, min/day | 64 (33) | 34 (11) | 35 (12) | 70 (24) | 92 (24) |
| Time spent in purposeful stepping ${ }^{7}$, min/day | 15 (14) | 5 (4) | 4 (3) | 22 (18) | 21 (13) |
| Step count, steps/day | 4733 (2642) | 2415 (861) | 2120 (652) | 5551 (2364) | 6802 (2004) |
| Time spent in light activities ${ }^{8}$, min/day | 223 (87) | 157 (45) | 305 (30) | 168 (38) | 304 (63) |


| Time spent in light activities excluding standing, <br> min/day | $26(12)$ | $16(5)$ | $23(9)$ | $24(9)$ |
| :--- | :--- | :--- | :--- | :--- |
| Time spent in MVPA $^{9}$, min/day | $38(23)$ | $18(7)$ | $12(4)$ | $46(20)$ |

## Values are presented as mean (SD) unless otherwise stated

Participants were classified as "couch potatoes" if sedentary time accounted for $\geq 70 \%$ of waking wear time and they undertook < 30 min/day of MVPA; "light movers" if sedentary time accounted for $<70 \%$ of waking wear time and they undertook $<30 \mathrm{~min} /$ day of MVPA; "sedentary exercisers; if sedentary time accounted for $\geq 70 \%$ of waking wear time and they undertook $\geq 30 \mathrm{~min} /$ day of MVPA; and "busy bees" if sedentary time accounted for $<70 \%$ of waking wear time and they undertook $\geq 30 \mathrm{~min} /$ day of MVPA. One participant did not have a sufficient number of valid wear days and was excluded from the analysis.
${ }^{1}$ Time spent in SB accumulated in bouts of $\geq 30$ minutes.
${ }^{2}$ Duration of the sedentary bout corresponding to $50 \%$ of daily accumulated sedentary time. Higher values indicate a tendency to accumulate SB in more prolonged bouts.
${ }^{3}$ Frequency of sedentary bouts of $\geq 30$ minutes per day.
${ }^{4}$ Frequency of transitions from a seated to upright posture.
${ }^{5} \mathrm{~A}$ unitless measure that characterises the frequency distribution of sedentary bout durations. Higher values indicate a tendency to accumulate SB in shorter bouts.
${ }^{6}$ Number of sedentary bouts divided by time spent in SB. Higher values indicate an increased number of sedentary breaks relative to total sedentary time (i.e., more fragmented accumulation of SB).
${ }^{7}$ Time spent continuously stepping in bouts of $\geq 1 \mathrm{~min}$.
${ }^{8}$ Time spent standing plus time spent stepping at <3 METs
${ }^{9}$ Time spent stepping at $\geq 3$ METs.
${ }^{10}$ Participants were regarded as physically active if they engaged in $\geq 30$ minutes/day of MVPA.

## Supplementary Table 5 Baseline characteristics of participants with and without exercise-induced oxygen desaturation ( $n=67$ )

| Characteristic | Participants |  |  |
| :---: | :---: | :---: | :---: |
|  | $\begin{gathered} \text { EID } \\ (\mathrm{n}=31) \end{gathered}$ | Non-EID $(\mathrm{n}=36)$ | $p$-value |
| Age, years | 76 (8) | 72 (10) | 0.04* |
| Sex, n males (\%) | 19 (61) | 14 (39) | 0.07 |
| Employment status, n (\%) |  |  | 0.09 |
| Retired | 24 (77) | 30 (84) |  |
| Part-time | 7 (23) | 3 (8) |  |
| Full-time | 0 | 3 (8) |  |
| Lung function |  |  |  |
| $\mathrm{FEV}_{1}$, L | 1.27 (0.50) | 1.51 (0.59) | 0.08 |
| FVC, L | 2.83 (0.70) | 2.57 (0.78) | 0.17 |
| $\mathrm{FEV}_{1} \%$ predicted | 50 (19) | 60 (19) | 0.03* |
| GOLD stage, n (\%) |  |  | 0.10 |
| I and II | 12 (39) | 22 (61) |  |
| III and IV | 19 (61) | 14 (39) |  |
| BMI, $\mathrm{kg} / \mathrm{m}^{2}$ | 27.8 (8.5) | 28.4 (6.5) | 0.77 |
| Smoking status, n (\%) |  |  | 0.40 |
| Current | 3 (10) | 6 (17) |  |
| Former | 28 (90) | 30 (83) |  |
| Smoking history, pack-years | 47 (26) | 36 (22) | 0.06 |
| $\geq 1$ self-reported COPD hospital admission in last six months, n (\%) | in last six months, n (\%) |  | 0.95 |
| Comorbidities, n (\%) |  |  |  |
| Cardiometabolic | 27 (87) | 26 (72) | 0.14 |
| Other respiratory | 15 (48) | 14 (39) | 0.43 |
| Musculoskeletal | 24 (77) | 24 (67) | 0.33 |
| Mental health | 8 (26) | 10 (28) | 0.86 |
| 6MWD, m | 331 (98) | 387 (96) | 0.02* |
| 6MWD \% predicted | 57 (16) | 65 (14) | 0.03* |
| 6MWD <80\% predicted, n (\%) | 28 (90) | 32 (89) | 0.85 |
| Mobilises with walking aid, n (\%) | 4 (13) | 5 (14) | 0.91 |
| Previous pulmonary rehabilitation ${ }^{1}$, n (\%) | 12 (39) | 6 (17) | 0.04* |

Values are presented as mean (SD) unless otherwise stated.
Participants were classified as EID if they desaturated to <90\% during a six-minute walk test, and non-EID if they maintained saturations $\geq 90 \%$ during a six-minute walk test. One participant did not have a sufficient
number of valid wear days and was excluded from the analysis. Two participants received long-term oxygen therapy and were excluded from the analysis.

* $\mathrm{p}<0.05$ was considered significant.
${ }^{1}$ Self-reported attendance to a pulmonary rehabilitation program. Participants who undertook formal exercise training in the last six months were excluded from the study.


## Supplementary Table 6 Variations in patterns of sedentary behaviour accumulation and physical activity by exercise-induced oxygen desaturation (n=67)

| Characteristic | Participants |  | Difference between groups |  |
| :---: | :---: | :---: | :---: | :---: |
|  | $\begin{gathered} \text { EID } \\ (\mathrm{n}=31) \end{gathered}$ | Non-EID $(\mathrm{n}=36)$ | EID minus Non-EID | $p$-value |
| Sedentary time |  |  |  |  |
| Waking wear time, min/day | 887 (87) | 922 (66) | -35 (-72 to 2) | 0.06 |
| Sedentary time, min/day | 652 (104) | 637 (109) | 15 (-37 to 67) | 0.57 |
| Sedentary time as \% waking wear time, \% | 74 (10) | 69 (10) | 5 (-0.3 to 10) | 0.06 |
| Prolonged sedentary time ${ }^{1}$, min/day | 394 (124) | 352 (157) | 42 (-28 to 112) | 0.24 |
| Prolonged sedentary time as \% waking wear time, \% | 45 (14) | 38 (16) | 7 (-1 to 14) | 0.07 |
| Patterns of sedentary time accumulation |  |  |  |  |
| Usual bout duration ${ }^{2}$, min | 40 (15) | 37 (23) | 3 (-7 to 12) | 0.56 |
| Longest sedentary bout duration, min | 169 (65) | 157 (67) | 12 (-20 to 44) | 0.46 |
| Sedentary bouts, n/day | 44 (12) | 50 (20) | -6 (-14 to 2) | 0.12 |
| Prolonged sedentary bouts ${ }^{3}$, $n /$ day | 6 (2) | 6 (2) | 0 (-0.3 to 1.4) | 0.19 |
| Sedentary breaks ${ }^{4}$, n/day | 44 (12) | 50 (20) | -6 (-14 to 2) | 0.13 |
| Alpha ${ }^{5}$ | 1.30 (0.03) | 1.31 (0.04) | -0.01 (-0.03 to 0.01) | 0.23 |
| Fragmentation Index ${ }^{6}$, bouts/hour | 4.04 (1.17) | 4.78 (2.01) | -0.74 (-1.54 to 0.04) | 0.06 |
| Physical activity |  |  |  |  |
| Standing time, min/day | 188 (86) | 207 (76) | -19 (-59 to 21) | 0.34 |
| Stepping time, min/day | 47 (25) | 78 (32) | -31 (-45 to -17) | <0.001* |
| Time spent in purposeful stepping ${ }^{7}$, min/day | 9 (8) | 19 (17) | -10 (-16 to -4) | 0.002* |
| Step count, steps/day | 3377 (1869) | 5915 (2723) | $-2538(-3667$ to -1410) | <0.001* |
| Time spent in light activities ${ }^{8}$, min/day | 209 (93) | 237 (83) | $-28(-71$ to 15$)$ | 0.20 |


| Time spent in light activities excluding standing, | $21(10)$ | $30(13)$ | $-9(-14$ to -3$)$ |
| :--- | :--- | :--- | :--- |
| min/day |  | $0.003^{*}$ |  |
| Time spent in MVPA $^{9}$, min/day | $26(16)$ | $48(23)$ | $-22(-32$ to -13$)$ |
| Physically active $^{10}, \mathrm{n}(\%)$ | $10(26)$ | $28(74)$ | - |

## Values are presented as mean (SD) unless otherwise stated

Participants were classified as EID if they desaturated to $<90 \%$ during a six-minute walk test, and non-EID if they maintained saturations $\geq 90 \%$ during a six-minute walk test.
One participant did not have a sufficient number of valid wear days and was excluded from the analysis. Two participants received long-term oxygen therapy and were excluded from the analysis

* $\mathrm{p}<0.05$ was considered significant.
${ }^{1}$ Time spent in SB accumulated in bouts of $\geq 30$ minutes.
${ }^{2}$ Duration of the sedentary bout corresponding to $50 \%$ of daily accumulated sedentary time. Higher values indicate a tendency to accumulate SB in more prolonged bouts.
${ }^{3}$ Frequency of sedentary bouts of $\geq 30$ minutes per day.
${ }^{4}$ Frequency of transitions from a seated to upright posture.
${ }^{5}$ A unitless measure that characterises the frequency distribution of sedentary bout durations. Higher values indicate a tendency to accumulate SB in shorter bouts
${ }^{6}$ Number of sedentary bouts divided by time spent in SB. Higher values indicate an increased number of sedentary breaks relative to total sedentary time (i.e., more fragmented accumulation of SB ).
${ }^{7}$ Time spent continuously stepping in bouts of $\geq 1 \mathrm{~min}$.
${ }^{8}$ Time spent standing plus time spent stepping at $<3$ METs
${ }^{9}$ Time spent stepping at $\geq 3$ METs.
${ }^{10}$ Participants were regarded as physically active if they engaged in $\geq 30$ minutes/day of MVPA

Supplementary Table 7 Baseline characteristics of participants recruited in different seasons (n=69)

| Characteristic | Participants |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | $\begin{gathered} \text { All } \\ (\mathrm{n}=69) \end{gathered}$ | Winter $(\mathrm{n}=17)$ | Spring $(\mathrm{n}=9)$ | Summer $(\mathrm{n}=21)$ | Autumn $(\mathrm{n}=22)$ | $p$-value |
| Age, years | 74 (9) | 72 (10) | 78 (8) | 76 (9) | 71 (9) | 0.17 |
| Sex, n males (\%) | 33 (48) | 8 (47) | 4 (44) | 11 (52) | 10 (46) | 0.97 |
| Employment status, n (\%) |  |  |  |  |  | 0.73 |
| Retired | 56 (81) | 13 (76) | 7 (78) | 18 (86) | 18 (82) |  |
| Part-time | 10 (15) | 3 (18) | 2 (22) | 3 (14) | 2 (9) |  |
| Full-time | 3 (4) | 1 (6) | 0 | 0 | 2 (9) |  |
| Lung function |  |  |  |  |  |  |
| $\mathrm{FEV}_{1}, \mathrm{~L}$ | 1.39 (0.55) | 1.48 (0.50) | 1.26 (0.42) | 1.40 (0.47) | 1.38 (0.72) | 0.81 |
| FVC, L | 2.66 (0.77) | 2.79 (0.68) | 2.42 (0.77) | 2.59 (0.71) | 2.73 (0.90) | 0.65 |
| $\mathrm{FEV}_{1} \%$ predicted | 55 (19) | 58 (17) | 58 (28) | 57 (17) | 51 (20) | 0.63 |
| GOLD stage, n (\%) |  |  |  |  |  | 0.44 |
| I and II | 35 (51) | 11 (65) | 5 (56) | 11 (52) | 8 (36) |  |
| III and IV | 34 (49) | 6 (35) | 4 (44) | 10 (48) | 14 (64) |  |
| BMI, $\mathrm{kg} / \mathrm{m}^{2}$ | 28.3 (7.5) | 29.3 (8.8) | 30.2 (8.4) | 27.6 (6.7) | 27.6 (7.2) | 0.75 |
| Smoking status, n (\%) |  |  |  |  |  | 0.19 |
| Current | 9 (13) | 4 (23) | 0 | 1 (5) | 4 (18) |  |
| Former | 60 (87) | 13 (77) | 9 (100) | 20 (95) | 18 (82) |  |
| Smoking history, pack-years | 41 (24) | 44 (17) | 42 (32) | 44 (28) | 36 (22) | 0.69 |
| $\geq 1$ self-reported COPD hospital admission in | 38 (55) | 9 (53) | 6 (67) | 13 (62) | 10 (46) | 0.63 |
| last six months, n (\%) |  |  |  |  |  |  |
| Comorbidities, n (\%) |  |  |  |  |  |  |


| Cardiometabolic | 55 (80) | 15 (88) | 8 (89) | 17 (81) | 15 (68) | 0.38 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Other respiratory | 30 (44) | 6 (35) | 2 (22) | 11 (52) | 11 (50) | 0.37 |
| Musculoskeletal | 49 (71) | 15 (88) | 7 (78) | 16 (76) | 11 (50) | 0.05 |
| Mental health | 20 (29) | 7 (41) | 2 (22) | 6 (29) | 5 (23) | 0.61 |
| 6MWD, m | 358 (100) | 365 (78) | 316 (100) | 344 (74) | 385 (131) | 0.31 |
| 6MWD \% predicted | 61 (15) | 61 (10) | 58 (20) | 60 (12) | 63 (19) | 0.83 |
| 6MWD <80\% predicted, n (\%) | 62 (90) | 17 (100) | 8 (89) | 20 (95) | 17 (77) | 0.09 |
| Mobilises with walking aid, n (\%) | 11 (16) | 0 | 5 (56) | 3 (14) | 3 (14) | 0.003* |
| Exercise-induced oxygen desaturation ${ }^{1}$, n (\%) | 31 (45) | 7 (41) | 4 (50) | 9 (45) | 11 (50) | 0.95 |
| Previous pulmonary rehabilitation ${ }^{2}$, n (\%) | 19 (28) | 5 (29) | 3 (33) | 7 (33) | 4 (18) | 0.68 |

Values are presented as mean (SD) unless otherwise stated.
Participants were recruited in winter between 1 June and 31 August; in spring between 1 September and 30 November; in summer between 1 December and 28 February; and in autumn between 1 March and 31 May. One participant did not have a sufficient number of valid wear days and was excluded from the analysis.

* $\mathrm{p}<0.05$ was considered significant.
${ }^{1}$ Defined as desaturation to $<90 \%$ during a six-minute walk test. Two participants (one recruited in spring and the other in summer) received long-term oxygen therapy and were excluded from the analysis.
${ }^{2}$ Self-reported attendance to a pulmonary rehabilitation program. Participants who undertook formal exercise training in the last six months were excluded from the study.

Supplementary Table 8 Variations in patterns of sedentary behaviour accumulation and physical activity by season of the year (n=69)

| Characteristic | Participants |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | $\begin{gathered} \text { All } \\ (\mathrm{n}=69) \end{gathered}$ | Winter $(\mathrm{n}=17)$ | Spring $(\mathrm{n}=9)$ | Summer $(\mathrm{n}=21)$ | Autumn $(\mathrm{n}=22)$ | $p$-value |
| Sedentary time |  |  |  |  |  |  |
| Waking wear time, min/day | 904 (78) | 888 (68) | 881 (86) | 925 (70) | 905 (87) | 0.40 |
| Sedentary time, min/day | 643 (105) | 623 (127) | 658 (109) | 661 (89) | 634 (103) | 0.67 |
| Sedentary time as \% waking wear time, \% | 71 (11) | 70 (13) | 75 (9) | 72 (8) | 70 (12) | 0.75 |
| Prolonged sedentary time ${ }^{1}$, min/day | 374 (142) | 371 (175) | 446 (119) | 361 (134) | 358 (128) | 0.44 |
| Prolonged sedentary time as \% waking wear time, \% | 41 (15) | 42 (18) | 50 (12) | 39 (13) | 40 (15) | 0.26 |
| Pattern of sedentary time accumulation |  |  |  |  |  |  |
| Usual bout duration ${ }^{2}$, min | 39 (19) | 42 (28) | 52 (22) | 34 (13) | 35 (13) | 0.08 |
| Longest sedentary bout duration, min | 165 (67) | 159 (57) | 215 (80) | 175 (73) | 139 (50) | 0.03* |
| Sedentary bouts, n/day | 47 (17) | 44 (16) | 37 (9) | 51 (14) | 49 (20) | 0.15 |
| Prolonged sedentary bouts ${ }^{3}$, $n /$ day | 6 (2) | 6 (2) | 6 (1) | 6 (2) | 6 (2) | 0.81 |
| Sedentary breaks ${ }^{4}$, n/day | 47 (17) | 44 (16) | 37 (9) | 50 (14) | 49 (20) | 0.14 |
| Alpha ${ }^{5}$ | 1.30 (0.03) | 1.31 (0.03) | 1.29 (0.03) | 1.31 (0.03) | 1.31 (0.03) | 0.61 |
| Fragmentation Index ${ }^{6}$, bouts/hour | 4.48 (1.67) | 4.45 (1.78) | 3.38 (0.72) | 4.72 (1.55) | 4.73 (1.87) | 0.18 |
| Physical activity |  |  |  |  |  |  |
| Standing time, min/day | 197 (80) | 202 (87) | 180 (66) | 198 (66) | 201 (95) | 0.93 |
| Stepping time, min/day | 64 (33) | 63 (32) | 42 (24) | 66 (30) | 71 (36) | 0.17 |
| Time spent in purposeful stepping ${ }^{7}$, min/day | 15 (14) | 13 (9) | 10 (10) | 15 (18) | 17 (14) | 0.58 |
| Step count, steps/day | 4733 (2642) | 4658 (2295) | 3046 (1800) | 4884 (2680) | 5337 (2980) | 0.18 |
| Time spent in light activities ${ }^{8}$, min/day | 223 (87) | 227 (97) | 198 (70) | 225 (69) | 230 (103) | 0.83 |


| Time spent in light activities excluding standing, | $26(12)$ | $25(15)$ | $18(7)$ | $27(10)$ | $29(13)$ |
| :--- | :---: | :---: | :---: | :---: | :---: |
| min/day |  |  |  |  |  |
| Time spent in MVPA $^{9}$, min/day | $38(23)$ | $38(19)$ | $25(18)$ | $39(24)$ | $42(25)$ |
| Physically active $^{10}, \mathrm{n}(\%)$ | $41(59)$ | $12(71)$ | $3(33)$ | $11(52)$ | $15(68)$ |
| V |  |  | 0.29 |  |  |

## Values are presented as mean (SD) unless otherwise stated

Participants were recruited in winter between 1 June and 31 August; in spring between 1 September and 30 November; in summer between 1 December and 28 February; and in autumn between 1 March and 31 May. One participant did not have a sufficient number of valid wear days and was excluded from the analysis.

* $\mathrm{p}<0.05$ was considered significant.
${ }^{1}$ Time spent in SB accumulated in bouts of $\geq 30$ minutes.
${ }^{2}$ Duration of the sedentary bout corresponding to $50 \%$ of daily accumulated sedentary time. Higher values indicate a tendency to accumulate SB in more prolonged bouts.
${ }^{3}$ Frequency of sedentary bouts of $\geq 30$ minutes per day.
${ }^{4}$ Frequency of transitions from a seated to upright posture.
${ }^{5} \mathrm{~A}$ unitless measure that characterises the frequency distribution of sedentary bout durations. Higher values indicate a tendency to accumulate SB in shorter bouts.
${ }^{6}$ Number of sedentary bouts divided by time spent in SB. Higher values indicate an increased number of sedentary breaks relative to total sedentary time (i.e., more fragmented accumulation of SB).
${ }^{7}$ Time spent continuously stepping in bouts of $\geq 1 \mathrm{~min}$.
${ }^{8}$ Time spent standing plus time spent stepping at $<3$ METs
${ }^{9}$ Time spent stepping at $\geq 3$ METs.
${ }^{10}$ Participants were regarded as physically active if they engaged in $\geq 30$ minutes/day of MVPA.

