

# **SUPPLEMENTAL MATERIAL**

## Data S1.

### Supplemental Results

The three-class and four-class provided the best fit based on BIC (Table S3). The three and four-class models shared two class with similar distribution of chronic conditions: *minimal disease* and *musculoskeletal diseases-lung disease-depression*. The three-class model identified a third class comprising higher prevalence of hypertension, diabetes, kidney disease, and low cognition. The four-class model further distinguished hypertension, diabetes, and kidney disease from low cognition. Since ASCVD risk profile of individuals with hypertension, diabetes, and kidney disease (*cardio-metabolic*) may differ from those with *low cognition*, the four-class model provided the best clinical interpretability and was selected. Table S4 and Figures S1 and S2 provide a comparison of the distribution and count of chronic conditions within classes for the three and four-class models.

**Table S1. Cut-offs for Grip Strength by Sex and Height.**

| <b>Sex</b> | <b>BMI (kg/m<sup>2</sup>)</b> | <b>Strength (kg)</b> |
|------------|-------------------------------|----------------------|
| Female     | ≤ 23                          | ≤ 17                 |
| Female     | 23.1 - 26                     | ≤ 17.3               |
| Female     | 26.1 - 29                     | ≤ 18                 |
| Female     | > 29                          | ≤ 21                 |
| Male       | ≤ 24                          | ≤ 29                 |
| Male       | 24.1 - 26                     | ≤ 30                 |
| Male       | 26.1 - 28                     | ≤ 30                 |
| Male       | > 28                          | ≤ 32                 |

**Table S2. Cut-offs for Gait Speed by Sex and BMI.**

| <b>Sex</b> | <b>Height (m)</b> | <b>Speed (m/s)</b> |
|------------|-------------------|--------------------|
| Female     | $\leq 1.59$       | $\leq 0.65$        |
| Female     | $> 1.59$          | $\leq 0.76$        |
| Male       | $\leq 1.73$       | $\leq 0.65$        |
| Male       | $> 1.73$          | $\leq 0.76$        |

**Table S3. Latent Class Analyses Models Statistics.**

|            | <b>2-Class</b> | <b>3-Class</b> | <b>4-Class</b> | <b>5-Class</b> | <b>6-Class</b> | <b>7-Class</b> |
|------------|----------------|----------------|----------------|----------------|----------------|----------------|
| AIC        | 32916          | 32765          | 32735          | 32730          | 32730          | 32735          |
| BIC        | 33037          | 32949          | 32982          | 33041          | 33105          | 33173          |
| Chi-Square | 737            | 712            | 656            | 462            | 365            | 307            |

**Table S4. Characteristics of Community-Dwelling Older Adults According to 3-Class Multimorbidity Patterns.**

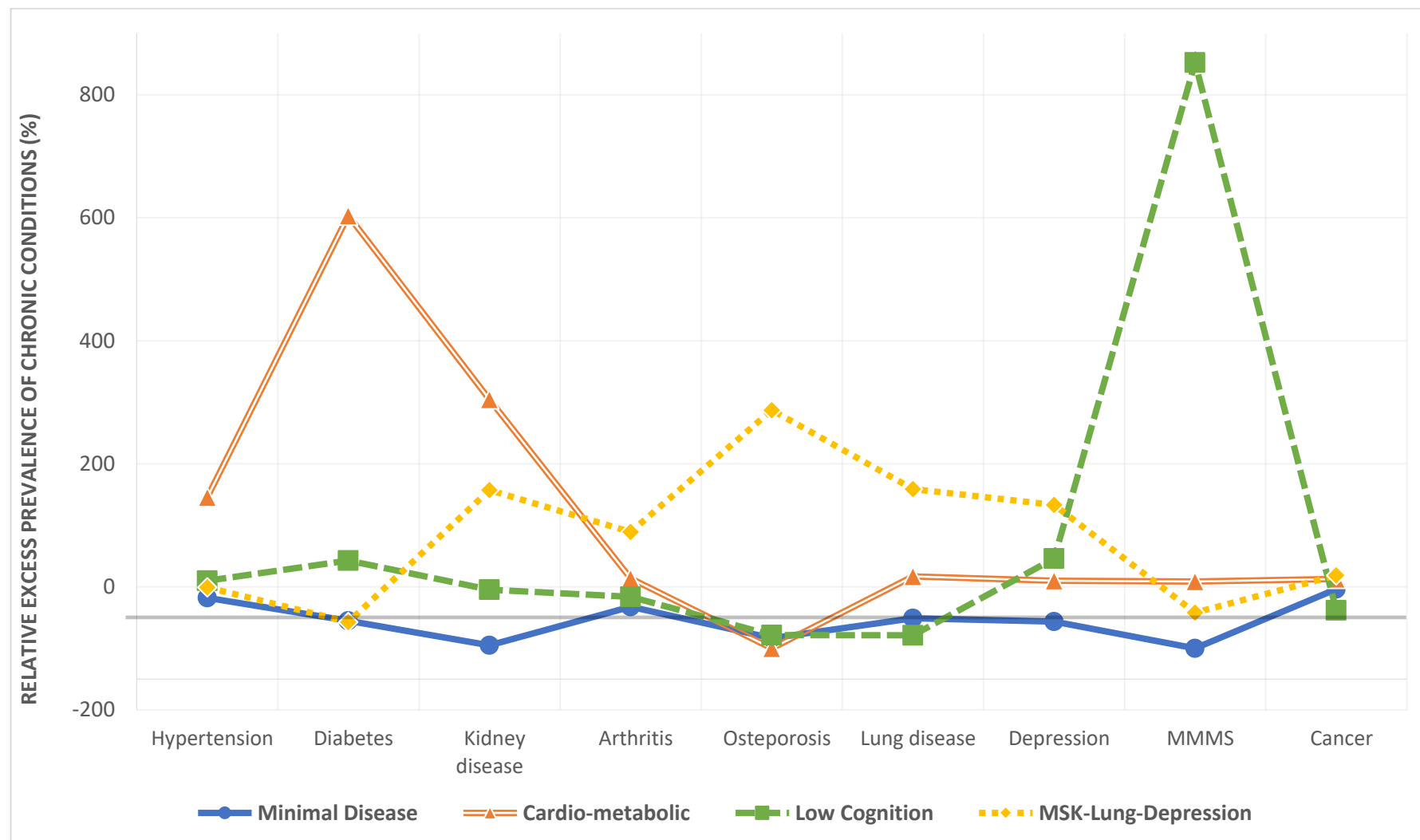
| Characteristics                    | Overall      | Comorbidity Patterns |              |                            |
|------------------------------------|--------------|----------------------|--------------|----------------------------|
|                                    |              | Minimal Disease      | MSK-Lung-Dep | Cardio-metabolic-Cognition |
| Sample size (%)                    | 4249         | 2701                 | 923          | 625                        |
| Age, years (%)                     | 72.4 (5.4)   | 72.0 (5.2)           | 72.5 (5.3)   | 73.7 (6.1)                 |
| Male (%)                           | 1643 (38.7)  | 1173 (43.4)          | 204 (22.1)   | 266 (42.6)                 |
| <b>Race (%)</b>                    |              |                      |              |                            |
| Black                              | 643 (15.1)   | 321 (11.9)           | 113 (12.2)   | 209 (33.4)                 |
| <b>Chronic conditions (%)</b>      |              |                      |              |                            |
| Hypertension                       | 1718 (40.4)  | 843 (31.2)           | 365 (39.5)   | 510 (81.6)                 |
| Diabetes                           | 585 (13.8)   | 142 (5.3)            | 30 (3.3)     | 413 (66.1)                 |
| Kidney disease                     | 88 (2.1)     | 0 (0.0)              | 44 (4.8)     | 44 (7.0)                   |
| Arthritis                          | 2155 (50.7)  | 941 (34.8)           | 883 (95.7)   | 331 (53.0)                 |
| Osteoporosis                       | 337 (7.9)    | 34 (1.3)             | 300 (32.5)   | 3 (0.5)                    |
| Lung disease                       | 959 (22.6)   | 272 (10.1)           | 536 (58.1)   | 151 (24.2)                 |
| Depression                         | 821 (19.3)   | 197 (7.3)            | 418 (45.3)   | 206 (33.0)                 |
| Low cognition                      | 445 (10.5)   | 129 (4.8)            | 40 (4.3)     | 276 (44.2)                 |
| Cancer                             | 586 (13.8)   | 353 (13.1)           | 155 (16.8)   | 78 (12.5)                  |
| <b>Other PCE variables</b>         |              |                      |              |                            |
| Cholesterol, mg/dL (sd)            | 212.9 (38.7) | 212.6 (38.4)         | 215.2 (37.7) | 210.7 (41.6)               |
| HDL, mg/dL (sd)                    | 55.7 (15.9)  | 55.7 (15.8)          | 58.5 (16.0)  | 51.6 (14.9)                |
| Systolic blood pressure, mmHg (sd) | 136.3 (21.4) | 134.3 (20.3)         | 135.3 (21.2) | 146.2 (23.3)               |
| Hypertension treated (%)           | 1626 (38.3)  | 815 (30.2)           | 359 (38.9)   | 452 (72.3)                 |
| Active smoker (%)                  | 535 (12.6)   | 328 (12.1)           | 131 (14.2)   | 76 (12.2)                  |

**Table S5. Characteristics of Community-Dwelling Older Adults According to 4-Class Multimorbidity Patterns (using eGFR-MDRD).**

| Characteristics                    | Minimal Disease | Low Cognition | MSK-Lung-Depression | Cardiovascular Risk |
|------------------------------------|-----------------|---------------|---------------------|---------------------|
| Sample size (%)                    | 2614            | 323           | 949                 | 363                 |
| Age, years (%)                     | 71.7 (5.0)      | 76.1 (6.8)    | 72.6 (5.3)          | 73.4 (5.9)          |
| Male (%)                           | 1125 (43.0)     | 169 (52.3)    | 203 (21.4)          | 146 (40.2)          |
| <b>Chronic conditions (%)</b>      |                 |               |                     |                     |
| Hypertension                       | 288 (11.0)      | 139 (43.0)    | 117 (12.3)          | 99 (27.3)           |
| Diabetes                           | 872 (33.4)      | 128 (39.6)    | 355 (37.4)          | 363 (100.0)         |
| Kidney disease                     | 221 (8.5)       | 64 (19.8)     | 58 (6.1)            | 242 (66.7)          |
| Arthritis                          | 12 (0.5)        | 12 (3.7)      | 35 (3.7)            | 81 (22.3)           |
| Osteoporosis                       | 881 (33.7)      | 129 (39.9)    | 899 (94.7)          | 246 (67.8)          |
| Lung disease                       | 18 (0.7)        | 6 (1.9)       | 313 (33.0)          | 0 (0.0)             |
| Depression                         | 265 (10.1)      | 10 (3.1)      | 542 (57.1)          | 142 (39.1)          |
| Low cognition                      | 193 (7.4)       | 86 (26.6)     | 416 (43.8)          | 126 (34.7)          |
| Cancer                             | 0 (0.0)         | 323 (100.0)   | 40 (4.2)            | 82 (22.6)           |
| <b>Frailty components (%)</b>      |                 |               |                     |                     |
| Low grip strength                  | 212.8 (38.3)    | 210.1 (41.7)  | 215.1 (37.6)        | 210.5 (41.7)        |
| Low gait speed                     | 55.5 (15.8)     | 54.8 (15.8)   | 58.7 (16.1)         | 50.3 (14.1)         |
| Low activity                       | 134.6 (20.7)    | 139.9 (22.3)  | 135.3 (21.0)        | 147.3 (22.7)        |
| Exhaustion                         | 820 (31.4)      | 122 (37.8)    | 356 (37.5)          | 328 (90.4)          |
| Weight loss                        | 305 (11.7)      | 48 (14.9)     | 133 (14.0)          | 49 (13.5)           |
| <b>Other PCE variables</b>         |                 |               |                     |                     |
| Cholesterol, mg/dL (sd)            | 483 (18.5)      | 119 (36.8)    | 281 (29.6)          | 104 (28.7)          |
| HDL, mg/dL (sd)                    | 580 (22.2)      | 160 (49.5)    | 333 (35.1)          | 152 (41.9)          |
| Systolic blood pressure, mmHg (sd) | 443 (16.9)      | 115 (35.6)    | 214 (22.6)          | 116 (32.0)          |
| Hypertension treated (%)           | 214 (8.2)       | 79 (24.5)     | 279 (29.4)          | 112 (30.9)          |
| Active smoker (%)                  | 268 (10.3)      | 39 (12.1)     | 120 (12.6)          | 52 (14.3)           |

Kidney disease determined using eGFR calculated using MDRD with cut-off  $\leq 45$  mL/min. The overall prevalence of kidney disease was 3.3% in the cohort compared to 2.1% using self-report. Unweighted Kappa comparing LCA classification using self-report vs MDRD: 0.90 (0.88, 0.91), almost perfect agreement.

**Figure S1. Chronic Condition Profiles of Relative Excess Prevalence of Chronic Conditions Compared to Population Prevalence for 4-Class Model.**





**Figure S2. Chronic Condition Profiles of Relative Excess Prevalence of Chronic Conditions Compared to Population Prevalence for 3-Class Model.**

