

SUPPLEMENTAL MATERIALS FOR

Mounce LT, Campbell J, Henley WE, Tejerina Arreal MC, Porter I, Valderas JM. Predicting incident multimorbidity. *Ann Fam Med*. 2018;16(4):322-329.

APPENDIX

Derivation of participant characteristics

We obtained information from the English Longitudinal Study of Ageing (ELSA) wave in 2002-03 (baseline) on participants' age, which we categorised into five-year groups, and their gender. Variables for the following socio-demographic and lifestyle characteristics were also created using data from 2002-03 (2004-05 for BMI):

Wealth - ELSA contains rich data on participants' financial circumstances. We calculated their total wealth as the sum of their private pension income, state pension income, net financial worth, net physical worth, and primary house value, minus their primary house debt from this total. The median total wealth was £166,899.7 (IQR £82,689 to £303,170.1). Total wealth was divided into quintiles for analyses.

Highest educational attainment – Participants reported their highest educational qualification achieved; no qualification, intermediate (qualifications from secondary education/high school), or degree/higher education below degree.

Living alone – ELSA collected data on all participants' cohabitants. We created a dichotomous variable for whether or not participants lived alone.

Body mass index (BMI) category – Data on participants' weight in kilograms and height in meters was collected in the nurse visit conducted during the 2004-05 ELSA wave. We derived the body mass index (BMI) for participants for whom this data was available as $\text{weight in kg} / (\text{height in m})^2$, and classified scores of <18.5 as underweight, 18.5 to <25 as normal weight, 25 to <30 as overweight, and 30 or over as obese.

Smoking behaviour – Participants reported whether they had ever smoked cigarettes, and whether they currently smoked. We created a variable to classify participants as those who had never smoked, those who smoked in the past, and current smokers.

Physical activity – We derived a four-level ordinal variable classifying the amount of physical activity participants engaged in across work and leisure activities in 2002-3, following the method proscribed in the ELSA 2010 wave documentation,(29) which follows the methodology used in the Allied Dunbar fitness survey(28) as closely as possible. The classifications were:

1. High: Performs heavy manual work, or vigorous leisure activity more than once a week.
2. Moderate: Performs physical work, or engages in moderate leisure-time activity more than once a week, or engages in vigorous activity once a week to 1–3 times a month.
3. Low: Standing occupation and engages in moderate leisure-time exercise once a week or less and no vigorous activity, or engages in mild leisure-time activity at least 1–3 times a month, moderate activity once a week or less and no vigorous activity, or has a sedentary or no occupation and engages in moderate leisure-time activity once a week or 1–3 times a month, with no vigorous activity.
4. Sedentary: Not working or sedentary occupation and engages in mild exercise 1–3 times a month or less, with no moderate or vigorous activity.

We combined the low and sedentary categories due to low frequencies.

Social detachment - Social detachment is a multidimensional construct. Four domains were derived in 2002-03 according to the method proscribed in the ELSA 2010 wave documentation(29):

- Individuals were defined as detached from 'civic participation' if they were not a member of; a political party, trade union or environmental group, a tenants' or neighbourhood group or neighbourhood watch, a church or religious group, or a

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charitable organisation, and did not do voluntary work at least once in the preceding year.

- Individuals were defined as detached from ‘leisure activities’ if they were not a member of; an education, arts or music group or evening class, a social club, a sports club, gym or exercise class, or other organisation, club or society.
- Individuals were defined as detached from ‘cultural engagement’ if they did not go to a cinema, art gallery or museum, or a theatre, concert or opera performance at least once in the preceding year.
- Individuals were defined as detached from ‘social networks’ if they reported not having any friends, children or other immediate family, or if they had friends, children or other immediate family, but had contact with all of them (meeting, phoning or writing) less than once a week.

This method classifies individuals who are detached from at least three domains as being socially detached, and a variable was created for whether participants met this criterion.

Locus of control – Participants’ were asked to rate the extent of their agreement with the statement “I feel what happens in my life is often determined by factors beyond my control” using a 6-point Likert scale. Those opting for any of the three ‘agree’ ratings were classified as having an ‘external’ locus of control, whereas those who disagreed were classified as having an ‘internal’ locus of control.