*Model Specification*

All statistical models estimated in the present study can be expressed as nested in the specification of a multilevel (mixed) bivariate growth curve model shown in equation (1). The covariance matrix of the random terms assumes multivariate normality (2), as do residuals (3).

 (1)

 (2)

 (3)

Where

 - Score of individual *i* at time *t* on measure m (p = pulmonary, c = cognitive)

 - Level-1random intercept, initial level of measure *m*

**- Level-1 random slope, rate of change of measure *m*

 - Level-1 residual of the score on measure *m* at time *t* of the individual *i*.

****– Level-2 residual of the random intercept

**– Level-2 residual of the random slope

 - (co)variances of random components

- (co)variances of level-1 residuals

,  - Matrices of level-2 predictors of the intercept and slope of measure *m,* entered in the following order: age, education, height, smoking, carding, diabetes.