

## Age moderation of individual differences in chronic medical illness burden

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Measuring physical health co-morbidity is crucial in geriatric populations. Across 10 IGEMS studies, we developed a harmonized measure of chronic medical illness burden based on the modified Cumulative Illness Rating Scale (CIRS). The IGEMS-CIRS score is the number of organ systems in which a medical condition is reported, with cancer and stroke coded separately (maximum score = 13).

Using data from 27,742 individuals aged 40-90 (including 8743 complete MZ, DZ, and OS twin pairs), we characterized score levels in men and women separately by age and tested an age moderation model using Purcell's (2002, *Twin Res Hum Genet*, 5, 554-571) method of moderating covariance.

IGEMS-CIRS scores increased linearly with age; those aged 80+ indicated on average 2 more affected systems compared to those <50. Women scored higher than men, with no age x sex interaction in mean scores. The age moderation model showed significant quadratic age moderation on variance and means for men and women. Sex limitation models suggested that the age moderation was significantly different by sex. For both sexes, total variance was highest at approximately age 65. Women had a greater contribution from genetic variance compared to men. In the best fitting model, for men, both raw genetic and raw non-shared environmental variance showed an inverted U-shaped curve; for women, the inverted U was seen for non-shared environment, with genetic variance decreasing with age.

IGEMS-CIRS provides a useful measure of co-morbidity. Individual differences are most pronounced in the 60s, possibly reflecting variability in onset age of illnesses indexed by the CIRS score; by age 80, all older adults typically suffer from one or more chronic condition. Sex differences in age moderation results may reflect sex differences in chronic conditions predominant in men versus women, or sex differences in genetic versus environmental bases of the most common chronic illnesses.

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