Education Moderates Genetic and Environmental Influences on Body Mass Index – Findings from the Consortium on Interplay of Genes and Environment across Multiple Studies (IGEMS)

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Statement of Timeliness: This is a brand-new consortium consisting of a unique group of twin studies on aging and mental health, with cohorts from the United States, Sweden, and Denmark. The combination of broad age range, heavy enrichment of older participants, and participant access to very different health care systems should make results of especial interest to conference attendees.

Objective: Assessment of how different environmental conditions impact genetic influences on obesity.

Obesity is a world-wide health problem with important consequences for aging. Twin studies have increased our understanding of the origins of obesity by quantifying the overall contributions of genetic and environmental factors to individual differences in body mass index (BMI). Yet rather than being constant, other variables may moderate the magnitudes of genetic and environmental influences on BMI. For example, rates of obesity tend to be higher in those with less education, and in a previous study of Danish adult twins, variance in BMI attributable to genetic and familial and individual-specific environmental influences was moderated by education so that it was greater in those with less education. Using eight twin studies in different age groups (two U.S., four Swedish, and two Danish) in aggregate, including 15,797 individuals (mean age 64 years, range 25-102), we replicated some but not all of these moderating effects. There were differences in average BMI and level of education across studies, age, and sex, as well as differences in degree of association between education and BMI. For example, correlations between education and BMI ranged from -.05 in middle-aged American men to -.19 in middle-aged Danish men and -.07 in younger Swedish women to -.18 in the oldest sample of Swedish women. These differences impacted how education moderated the genetic and environmental influences. Overall, education should be considered in developing strategies to reduce obesity, but appropriateness of specific strategies may vary with local educational and health care conditions as well as with age.