Background and aims Low birth weight and accelerated postnatal growth are associated with adult cardiovascular disease. In this perspective body composition and obesity can result from a disturbed energy balance due to early reprogramming of energy intake and expenditure. We hypothesise that low birth weight and accelerated growth may predispose (“program”) reduced physical fitness at 8–9 years of age.

Methods Aerobic fitness was measured using a 20 metre multi-stage shuttle run test (20m-MSRT) and neuromuscular fitness using the standing broad jump (SBJ) test and handgrip strength test was measured in 194 children (104 boys) of Dutch ethnicity at mean age 8.6 years in a prospective birth cohort.

Results Subjects with low birth weight and accelerated infant growth reached mean (±SD) 20m-MSRT levels of 3.9 which was significantly lower than (1) normal birth weight and normal infant growth (2) low birth weight and normal infant growth and (3) normal birth weight and accelerated infant growth groups (all p<0.01). Low birth weight subjects had mean grip strength of 12.3 kg (±3.0), which was significantly lower than normal weight subjects with no effect of infant growth on this relationship. There was no association of birth weight or infant growth with grip strength or SBJ.

Conclusions Low birth weight with accelerated infant weight gain was associated with diminished aerobic fitness. Higher birth weight was associated with increased neuromuscular fitness. These early changes may explain increased susceptibility to obesity and related risk factors in low birth weight and early growth accelerated children.