Early Infancy as a Critical Period for Development of Obesity

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The current obesity epidemic has affected even the youngest children in our societies, also in the first months of life. Infancy is a period of rapid growth in stature, and in neurocognitive, motor, and social development. Weight gain in the first 6 months is primarily gain in fat, whereas fat-free mass accumulates preferentially after that age. These observations, combined with numerous animal experiments, raise the possibility that the early postnatal period may be critical to development of healthful energy homeostasis and thus prevention of obesity and related conditions.

Meta-analyses of several observational studies now show that rapid weight gain in the first half of infancy predicts later obesity as measured by body mass index. These associations are consistent for obesity at different ages and for people born in many decades of the 20th century. More recent epidemiologic studies have shown the same pattern for prediction of direct measures of adiposity and blood pressure. Follow-up studies of subsets of participants in feeding trials of premature and small-for-date infants agree with these observations.

Despite the mounting consistency of results, several questions remain to be answered before clinical or public health implications are clear. These include the need: (1) for body composition data, not just weight and length, in infancy; (2) for data from the developing world where stunting and wasting coexist with obesity, and from racial/ethnic minorities; (3) to identify the modifiable determinants of gain in adiposity in the early weeks of life that also underlie long-term risks of obesity-related sequelae; (4) to mount interventions to modify these determinants; (5) to examine tradeoffs of more vs. less rapid weight gain for different outcomes, e.g., for cardiometabolic vs. neurocognitive outcomes, and (6) to incorporate any interventions that prove to be efficacious into clinical and public health practice in a cost-effective manner.