

# Which factors increase the risk of an infant becoming an overweight child?

## Evidence-based answer

Variables that increase the risk of overweight in childhood include formula feeding, high birth weight, high rate of weight gain in the first 4 months of life, low socioeconomic status, and maternal

obesity (strength of recommendation [SOR]: **A**, systematic reviews and consistent cohort studies). No single risk factor predicts overweight, and not all infants with risk factors become overweight children.

## Evidence summary

The Centers for Disease Control and Prevention defines overweight in children as weight-for-length greater than the 95th percentile for sex in children younger than 24 months and body mass index (BMI) greater than the 95th percentile for age and sex in children >24 months.

### Breastfeeding is protective

Breastfed infants are less likely to be overweight later in life than infants fed formula. A meta-analysis of 9 studies found that 7 showed a significantly lower risk of overweight among children who were breastfed (odds ratio [OR]=0.78; 95% confidence interval [CI], 0.71-0.85).<sup>1</sup>

Four of the studies demonstrated that longer duration of breastfeeding offered greater protection than shorter duration. Two of the 4 studies defined longer duration as more than 6 months, 1 defined it as more than 3 months, and 1 examined breastfeeding for periods of less than 1 week, 1 week to 1 month, 2 to 3 months, 4 to 6 months, 7 to 9 months, and longer than 9 months, showing a duration-

dependent decrease in risk. The other studies in the meta-analysis evaluated never-breastfed vs ever-breastfed infants.<sup>1</sup>

### Higher birth weight increases risk

Several meta-analyses report that birth weight is an early risk factor for later overweight. One found a positive association between birth weight and overweight in childhood in 9 of 11 studies.<sup>2</sup> Another meta-analysis found a positive association in 25 of 28 studies that examined birth weight and BMI in childhood.<sup>3</sup> These descriptive meta-analyses didn't calculate pooled odds ratios (ORs) because of heterogeneity of the ages included and methods used to measure obesity.

A high rate of weight gain in infancy is also a risk factor for later overweight. One descriptive meta-analysis reported that 13 of 15 studies found a positive association between weight gain in the first year of life and overweight later in childhood, although overall OR and relative risk weren't reported.<sup>4</sup> A large cohort study found that each 100 g per month increase in weight gain above the mean

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## FAST TRACK

**Risk factors for overweight in childhood include formula feeding, high birth weight, low socioeconomic status, and maternal obesity.**

(820 g per month) during the first 4 months of life increased the odds of overweight at 7 years of age by 38% (OR=1.38; 95% CI, 1.32-1.44).<sup>5</sup>

### Socioeconomic status is a factor

Low socioeconomic status in infancy or early childhood increases the risk of childhood overweight, perhaps because of less breastfeeding and more smoking, among other factors.<sup>6,7</sup> Socioeconomic status was determined using the International Standard Classification of Occupations; children whose parents worked at unskilled manual labor jobs or were unemployed were considered in the lowest socioeconomic group.<sup>6,7</sup>

A Brazilian study found that children born in the lowest socioeconomic group had BMI measurements at 18 years of age that were an average of 1.21 kg/m<sup>2</sup> higher than children in the highest socioeconomic group ( $P < .05$ ). The study controlled for birth weight, maternal smoking, gestational age, and level of schooling eventually achieved by the child.<sup>8</sup>

**Maternal overweight or obesity** during the child's infancy also increases the risk of childhood overweight.<sup>9,10</sup> Infants of obese parents were more likely to be overweight at 7 years, compared with children whose mothers were normal weight (OR=10.44; 95% CI, 5.11-21.23).<sup>9</sup>

### Recommendations

The American Academy of Pediatrics (AAP) cites prevention of overweight as a potential benefit of breastfeeding.<sup>11</sup> The American Academy of Family Physi-

cians notes that obese mothers should be especially encouraged to breastfeed.<sup>12</sup> The American Medical Association-AAP Expert Panel recommends breastfeeding; safe, free movement; and no television for infants to decrease the risk of later overweight.<sup>13</sup> ■

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