

childhood. Highest in newborn infants, the BMR closely relates to the proportion of surface area to body mass, which changes as the body increases in size. In both sexes, the proportion decreases progressively to maturity. The BMR is slightly higher in boys at all ages and further increases during pubescence over that in girls.

The rate of metabolism determines the caloric requirements of the child. The basal energy requirement of infants is about 108 kcal/kg of body weight and decreases to 40 to 45 kcal/kg at maturity. Water requirements throughout life remain at approximately 1.5 ml/calorie of energy expended. Children's energy needs vary considerably at different ages and with changing circumstances. The energy requirement to build tissue steadily decreases with age following the general growth curve; however, energy needs vary with the individual child and may be considerably higher. For short periods (e.g., during strenuous exercise) and more prolonged periods (e.g., illness) the needs can be very high.

Nursing Alert

Each degree of fever increases the basal metabolism 10%, with a correspondingly increased fluid requirement.

Temperature

Body temperature, reflecting metabolism, decreases over the course of development (see inside back cover). Thermoregulation is one of the most important adaptation responses of infants during the transition from intrauterine to extrauterine life. In healthy neonates, hypothermia can result in several negative metabolic consequences, such as hypoglycemia, elevated bilirubin levels, and metabolic acidosis. Skin-to-skin care, also referred to as *kangaroo care*, is an effective way to prevent neonatal hypothermia in infants.

Unclothed, diapered infants are placed on the parent's bare chest after birth, promoting thermoregulation and attachment ([Galligan, 2006](#)). After the unstable regulatory ability in the neonatal period, heat production steadily declines as the infant grows into childhood. Individual differences of 0.5° F to 1° F are normal, and occasionally a child normally displays an unusually high or low temperature. Beginning at approximately 12 years old, girls display a temperature that remains relatively stable, but the temperature in