

18 Fever

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Body temperature is controlled by the hypothalamus. Neurons in both the preoptic anterior hypothalamus and the posterior hypothalamus receive two kinds of signals: one from peripheral nerves that transmit information from warmth/cold receptors in the skin and the other from the temperature of the blood bathing the region. These two types of signals are integrated by the thermoregulatory center of the hypothalamus to maintain normal temperature. In a neutral temperature environment, the human metabolic rate produces more heat than is necessary to maintain the core body temperature in the range of 36.5–37.5°C (97.7–99.5°F).

A normal body temperature is ordinarily maintained despite environmental variations because the hypothalamic thermoregulatory center balances the excess heat production derived from metabolic activity in muscle and the liver with heat dissipation from the skin and lungs. According to a study of >35,000 individuals ≥ 18 years of age seen in routine medical visits, the mean oral temperature is 36.6°C (95% confidence interval, 35.7–37.3°C). In light of this study, *a temperature of >37.7°C (>99.9°F), which represents the 99th percentile for healthy individuals, defines a fever.* Importantly, higher ambient temperatures are linked to higher baseline body temperatures. Additionally, body temperatures have diurnal and seasonal variation, with low levels at 8 A.M. and during summer and higher levels at 4 P.M. and during winter. Baseline temperatures are also affected by age (lower by 0.02°C for every 10-year increase in age), demographics (African-American women have temperatures 0.052°C higher than white men), and comorbid conditions (cancer is associated with 0.02°C higher temperatures; hypothyroidism is linked to temperatures lower by 0.01°C). After controlling for age, sex, race, vital signs, and comorbidities, an increase in baseline temperature of 0.15°C (or 1 standard deviation)