

pubertal changes in girls, *Arch Dis Child* 44[235]:291-303, 1969; and Daniel WA, Paulshock BZ: A physician's guide to sexual maturity, *Patient Care* 13:122-124, 1979.)

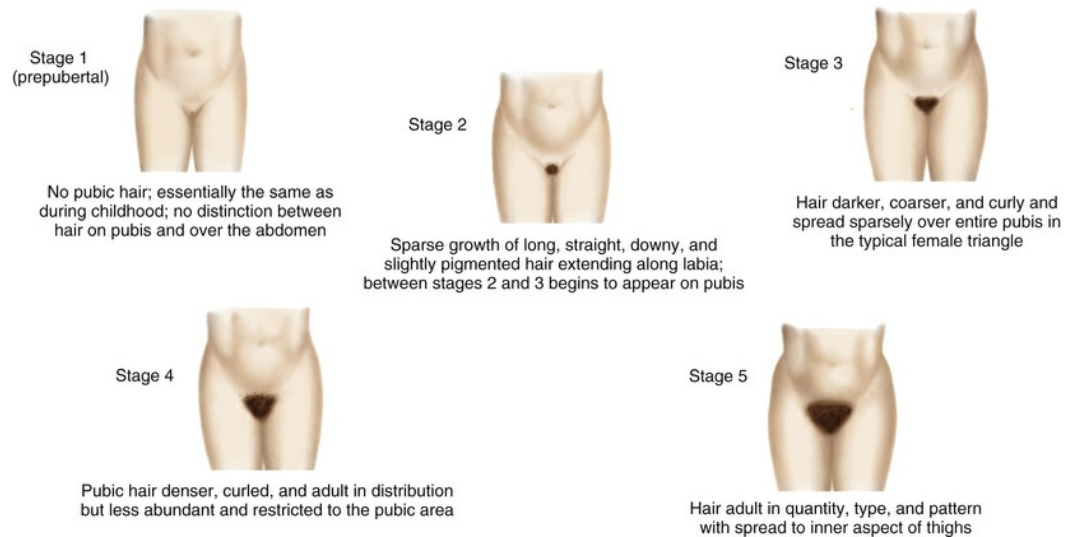


FIG 15-2 Growth of pubic hair in girls. (Modified from Marshall

WA, Tanner JM: Variations in pattern of pubertal changes in girls, *Arch Dis Child* 44[235]:291-303, 1969; and Daniel WA, Paulshock BZ: A physician's guide to sexual maturity, *Patient Care* 13:122-124, 1979.)

The initial appearance of menstruation, or **menarche**, occurs about 2 years after the appearance of the first pubescent changes, approximately 9 months after attainment of peak height velocity, and 3 months after attainment of peak weight velocity. There is evidence that girls are developing secondary sex characteristics at a younger age among various ethnicities. The explanation for this is not yet clear but appears to be influenced by being overweight as well as environmental influences ([Currie, Ahluwalia, Godeau, et al, 2012](#)). The normal age of menarche ranges from $10\frac{1}{2}$ to 15 years, with the average age being 12 years, 8 months for Caucasian girls, and 12 years 2 months for African-American girls ([Cabrera, Bright, Frane, et al, 2014](#)). Ovulation and regular menstrual periods usually occur 6 to 14 months after menarche. Girls may be considered to have **pubertal delay** if breast development has not occurred by 13 years old ([Villanueva and Argente, 2014](#)).

Sexual Maturation in Boys