

Appendix 1 to Ingvild Særvold Bruserud, Ninnie Helén Bakken Oehme, André Madsen, Karen Rosendahl, Robert Bjerknes, Mathieu Roelants, Pétur B. Júlíusson. Puberty starts earlier. *Journal of the Norwegian Medical Association* 2022; 142. doi: 10.4045/tidsskr.21.0210.

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Box 1: Clinical assessment methods used to assess pubertal development in girls and boys.

Pubic hair	<i>The pubic hair stages (P) (girls and boys) (1, 2)</i>
Tanner P1	Prepubertal stage: the hair over the pubes is not further developed than that over the anterior abdominal wall, i.e. no pubic hair.
Tanner P2	Sparse growth of long, slightly pigmented downy hair, straight or only slightly curled appearing chiefly along the labia in girls, or at the base of penis in boys.
Tanner P3	Considerably darker, coarser, and more curled. The hair spreads sparsely over the junction of the pubes.
Tanner P4	Hair is now adult in type, but the area covered by it is still considerably smaller than in most adults. There is no spread to the medial surface of the thighs.
Tanner P5	Adult in quantity and type, distributed as an inverse triangle in both women and men. Spread to the medial surface of the thighs.
Breast development	Girls (1).
Tanner B1	Prepubertal, elevation of papilla only.
Tanner B2	Breast bud stage; elevation of breast and papilla as a small mound, enlargement of areola diameter.
Tanner B3	Further enlargement of the breast and areola, with no separation of their contours.
Tanner B4	Projection of the areola and papilla to form a secondary mound above the level of the breast.
Tanner B5	The mature stage; the projection of the papilla only, due to recession of the areola to the general contour of the breast
Testicle growth	Boys (2,3).
	The testicular volume is usually determined with a Prader orchidometer, and attainment of a testicular volume (TV) of 4 ml is considered as the onset of male puberty (7). In the Bergen Growth Study 2, ultrasound was applied to calculate testicular volume by assessing the length, width and depth of the (right) testicle. A testicular volume of ≥ 2.7 ml defines the pubertal onset when measured with ultrasound (3).

Table 1

New Norwegian age references for breast development, menarche, testicular volume and pubic hair development for girls and boys participating in the Bergen Growth Study 2 in 2016.

	Girls (N=703) – age (years) (5)	
	Median*	± 2 SD
Tanner B2+	10.4	8.0-12.7
Tanner B3+	11.4	9.5-13.8
Tanner B4+	12.5	10.7-NA
Tanner B5+*	14.7	11.3-NA
Tanner P 2+	10.9	8.5–13.3
Tanner P 3+	11.9	9.7-13.8
Tanner P 4+	13.1	10.5-15.7
Tanner P 5+*	15.1	11.4-NA
Menarche	12.7	11.0–16.2
	Boys (N=514) – age (years) (4)	
	Mean*	± 2 SD
TV ≥ 4ml	11.7	9.5-13.8
Tanner P 2+	11.8	9.3-14.2
Tanner P 3+	12.7	10.4-14.9
Tanner P 4+	13.7	11.7-15.2
Tanner P 5+*	14.4	12.6-16.3

* Data was not normally distributed for the girls, therefore the median is used. NA: Non-applicable. TV: testicular volume. P: pubic hair.

1. Marshall WA, Tanner JM. Variations in pattern of pubertal changes in girls. Arch Dis Child 1969; 44: 291–303.
2. Marshall WA, Tanner JM. Variations in the pattern of pubertal changes in boys. Arch Dis Child 1970; 45: 13–23.
3. Oehme NHB, Roelants M, Saervold Bruserud I et al. Reference data for testicular volume measured with ultrasound and pubic hair in Norwegian boys are comparable with Northern European populations. Acta Paediatr 2020; 109: 1612–9.