

Estrogens, Estrone (E1) and Estradiol (E2), Fractionated, Serum

Reference Range

ESTRONE (E1)

CHILDREN*

1-14 days: Estrone levels in newborns are very elevated at birth but will fall to prepubertal levels within a few days.

Males

Tanner Stages#	Mean Age	Reference Range
Stage I (>14 days and prepubertal)	7.1 years	Undetectable-16 pg/mL
Stage II	11.5 years	Undetectable-22 pg/mL
Stage III	13.6 years	10-25 pg/mL
Stage IV	15.1 years	10-46 pg/mL
Stage V	18 years	10-60 pg/mL

#Puberty onset (transition from Tanner stage I to Tanner stage II) occurs for boys at a median age of 11.5 (+/- 2) years. For boys there is no proven relationship between puberty onset and body weight or ethnic origin. Progression through Tanner stages is variable. Tanner stage V (adult) should be reached by age 18.

Females

Tanner Stages#	Mean Age	Reference Range
Stage I (>14 days and prepubertal)	7.1 years	Undetectable-29 pg/mL
Stage II	10.5 years	10-33 pg/mL
Stage III	11.6 years	15-43 pg/mL
Stage IV	12.3 years	16-77 pg/mL
Stage V	14.5 years	17-200 pg/mL

#Puberty onset (transition from Tanner stage I to Tanner stage II) occurs for girls at a median age of 10.5 (+/- 2) years. There is evidence that it may occur up to 1 year earlier in obese girls and in African American girls. Progression through Tanner stages is variable. Tanner stage V (adult) should be reached by age 18.

*The reference ranges for children are based on the published literature,(1,2) cross-correlation of our assay with assays used to generate the literature data and on our data for young adults.

ADULTS

Males	10-60 pg/mL
Females	
Premenopausal	17-200 pg/mL
Postmenopausal	7-40 pg/mL

Conversion factor

E1: pg/mL x 3.704=pmol/L (molecular weight=270)

Estrogens, Estrone (E1) and Estradiol (E2), Fractionated, Serum

Reference Range

ESTRADIOL (E2)

CHILDREN*

1-14 days: Estradiol levels in newborns are very elevated at birth but will fall to prepubertal levels within a few days.

Males

Tanner Stages#	Mean Age	Reference Range
Stage I (>14 days and prepubertal)	7.1 years	Undetectable-13 pg/mL
Stage II	12.1 years	Undetectable-16 pg/mL
Stage III	13.6 years	Undetectable-26 pg/mL
Stage IV	15.1 years	Undetectable-38 pg/mL
Stage V	18 years	10-40 pg/mL

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Females

Tanner Stages#	Mean Age	Reference Range
Stage I (>14 days and prepubertal)	7.1 years	Undetectable-20 pg/mL
Stage II	10.5 years	Undetectable-24 pg/mL
Stage III	11.6 years	Undetectable-60 pg/mL
Stage IV	12.3 years	15-85 pg/mL
Stage V	14.5 years	15-350 pg/mL**

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ADULTS

Males	10-40 pg/mL
Females	
Premenopausal	15-350 pg/mL**
Postmenopausal	<10 pg/mL

**E2 levels vary widely through the menstrual cycle.

Conversion factor

E2: pg/mL x 3.676=pmol/L (molecular weight=272)