



Endocrinology Referral Guidelines

Children's Specialty Group



Breast Development in an Infant or Toddler

Baby girls (and boys) often have breast buds (thelarche). In girls, these grow bigger during the first 6 to 18 months of life, but are usually regressing (growing softer) by 2 years of age. This is a normal physiologic process involving transient activation of the hypothalamic-pituitary-gonadal axis. Of course, progressive breast bud development at this age can alternatively signify a pathologic process (i.e. precocious puberty).

In order to identify whether evaluation by an endocrinologist is needed, we suggest:

- Determining the patient's growth rate, with accurate length measurements obtained at least 4 months apart. Unusually rapid growth, "crossing curves upward," does not occur in physiologic thelarche.
- Obtaining a x-ray of the left hand and wrist if the patient is older than 2 years old or a hemiskeleton x-ray if the patient is less than 2 years old. Please be sure to have the family bring a digital copy of the x-ray to their appointment if it is obtained outside of the CHKD system.

The reasons a child should be seen by an endocrinologist are listed below:

- Growth rate is rapid and bone age is 2 or more standard deviations advanced
- Pubic hair occurs in addition to breast buds
- Child is beyond their second birthday with breast buds that are continuing to be firm to palpation and are increasing in size

Pubic Hair Development in a Child

Children may have pubic hair with no significant hormonal abnormality. Usually such children have a normal growth rate and no advancement of bone age, which is called benign premature adrenarche. Of course, progressive pubic hair development at an early age could, instead, signify a pathologic process (i.e. precocious puberty, congenital adrenal hyperplasia or adrenal tumor).

In order to identify whether evaluation by an endocrinologist is needed, we suggest:

- Determining the patient's growth rate, with accurate length measurements obtained at least 4 months apart. Unusually rapid growth, "crossing curves upward," does not occur in benign premature adrenarche.
- Obtaining a bone age x-ray of the left hand and wrist if the patient is older than 2 years old or a hemiskeleton x-ray if the patient is less than 2 years old. Please be sure to have family bring a digital copy of the x-ray to their appointment if it is obtained outside of the CHKD system.

The child should be seen by an endocrinologist if:

- Their growth rate is rapid and their bone age is 2 or more standard deviations advanced.
- Their growth rate is slow for their age.
- Axillary hair, facial hair, hypertension or acne is present.
- The thickness and curl of pubic hair increases over time.
- Breast buds have developed in addition to pubic hair.
- The clitoris or penis is enlarged in addition to pubic hair.



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Concern for Diabetes / Abnormal HgbA1C Test

Please consider the following points if you are referring a patient due to concern for diabetes or an abnormal HgbA1C test:

- We recommend measuring glucose to diagnosis diabetes, as Hemoglobin A1C is not an appropriate screening tool for diabetes in children.
- Although Insulin levels are commonly measured, they are rarely useful. We discourage the measurement of insulin levels in children.
- Diabetes is present in the patient if they have the following results:
 - Fasting blood glucose ≥ 126 mg/dL
 - Oral glucose tolerance > 200 mg/dL at 2-hours
 - Random blood glucose ≥ 200 mg/dL
- The child should be seen by an endocrinologist if they have the following results:
 - Fasting blood glucose >100 mg/dL (pre-diabetes / impaired fasting glucose)
 - Oral glucose tolerance >140 mg/dL at 2-hours (pre-diabetes / impaired glucose tolerance)
 - Random blood glucose >200 mg/dL
 - Hemoglobin A1C values above 6.5% (If HgbA1C is $<6.5\%$, then some other method of documenting hyperglycemia should be sought prior to referral, such as fasting glucose or an oral glucose tolerance test.)

Abnormal Thyroid Function Test

An abnormal thyroid function test is a very common reason for referral to our practice, but are not always clinically necessary. We recommend measuring only TSH when screening for childhood thyroid disease. TSH is the gold standard and is considered possibly abnormal if the level is <0.5 mcU/mL or >5 mcU/mL. T4 or free-T4 is not needed when screening for thyroid disease. Free-T4 is the source of much confusion because the assay is frequently prone to interfering substances. Free-T4 performed by "equilibrium dialysis" can clarify whether a low free-T4 is meaningful or not. T3 measurement is also not needed when screening for thyroid disease. T3 levels vary widely and are not relevant if the TSH is normal. Free-T3 should never be measured as it is very expensive and does not add any meaningful information beyond the typical Total-T3 assay.

The child should be seen by an endocrinologist for the following reasons/results:

- Any thyroid gland enlargement, asymmetry or nodule
- TSH is <0.1 mcU/mL at any time
- TSH > 10 mcU/mL at any time
- TSH is < 0.5 mcU/mL on two specimens at least 4 weeks apart
- TSH > 5 mcU/mL on two specimens at least 4 weeks apart
- Free-T4 by equilibrium dialysis is < 0.8 ng/dL



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Obesity

The epidemic of childhood obesity is well known to all pediatric healthcare providers. However, referrals to endocrinology for childhood obesity that are not clinically necessary delay patients with true endocrinologic disorders from being treated in a timely fashion. It should also be noted that Endocrinology does not have access to dietitians unless the child has diabetes and we are not a substitute for a dietitian consultation. Although there are true endocrine disorders that cause obesity, these are exceptionally rare and can typically be detected by reviewing the child's growth curve. If referred, we are happy to exclude the rare endocrinologic disorders that cause obesity in children.

The child should be seen by an endocrinologist for the following reasons/results:

- Fasting blood glucose ≥ 100 mg/dL (pre-diabetes)
- Random blood glucose > 200 mg/dL (diabetes)
- Oral glucose tolerance ≥ 140 mg/dL at 2-hours (pre-diabetes / impaired glucose tolerance)
- HgbA1C $\geq 6.5\%$ (concerning for diabetes)
- The child is unusually short and obese or if growth failure if present despite rapid weight gain (i.e. hypothyroidism, Cushing Syndrome, growth hormone deficiency, Prader-Willi Syndrome)