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Growth Hormone Deficiency and Related Diagnoses

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APPLICATION STATEMENT

The application of the Clinical Coverage Guideline is subject to the benefit determinations set forth by the Centers for Medicare and Medicaid Services (CMS) National and Local Coverage Determinations and state-specific Medicaid mandates, if any.

DISCLAIMER

The Clinical Coverage Guideline (CCG) is intended to supplement certain standard WellCare benefit plans and aid in administering benefits. Federal and state law, contract language, etc. take precedence over the CCG (e.g., Centers for Medicare and Medicaid Services [CMS] National Coverage Determinations [NCDs], Local Coverage Determinations [LCDs] or other published documents). The terms of a member's particular Benefit Plan, Evidence of Coverage, Certificate of Coverage, etc., may differ significantly from this Coverage Position. For example, a member's benefit plan may contain specific exclusions related to the topic addressed in this CCG. Additionally, CCGs relate exclusively to the administration of health benefit plans and are NOT recommendations for treatment, nor should they be used as treatment guidelines. Providers are responsible for the treatment and recommendations provided to the member. The application of the CCG is subject to the benefit determinations set forth by the Centers for Medicare and Medicaid Services (CMS) National and Local Coverage Determinations, and any state-specific Medicaid mandates. Links are current at time of approval by the Medical Policy Committee (MPC) and are subject to change. Lines of business are also subject to change without notice and are noted on www.wellcare.com. Guidelines are also available on the site by selecting the Provider tab, then "Tools" and "Clinical Guidelines".

BACKGROUND

Adults^{1,2}

Growth Hormone Deficiency (GHD) is a rare disorder characterized by the inadequate secretion of growth hormone (GH) from the anterior pituitary gland, a small gland located at the base of the brain that is responsible for the production of several hormones. There are three subdivisions of GHD – acquired, congenital and idiopathic. GHD can be present from birth (congenital), resulting from genetic mutations or from structural defects in the brain. It can also be acquired later in life as a result of trauma, infection, radiation therapy, or tumor growth within the brain. A third category has no known or diagnosable cause (idiopathic). Childhood-onset GHD may be all three: congenital, acquired, or idiopathic. It results in growth retardation, short stature, and maturation delays reflected by the delay of lengthening of the bones of the extremities that is inappropriate to the chronological age of the child. Adult-onset

GHD is most often is acquired from a pituitary tumor or trauma to the brain but may also be idiopathic. It is characterized by a number of variable symptoms including reduced energy levels, altered body composition, osteoporosis (reduced bone mineral density), reduced muscle strength, lipid abnormalities such as increased LDL cholesterol, insulin resistance, and impaired cardiac function. Treatment for GHD requires daily injections of recombinant human growth hormone (rHGH).

Patients with GHD that have no known cause are diagnosed as having idiopathic GHD. Genetic tests may reveal a congenital anomaly, but are often considered unnecessary after confirmation of GHD since they will have no effect on treatment. However, it is recommended that children be retested for GHD when they transition from pediatric to adult care since GH levels may normalize upon reaching adulthood. The level of GH considered normal for an adult is much lower than that for a child, especially one undergoing the pubertal growth spurt.

The somatotroph cells of the anterior pituitary gland produce growth hormone (GH), which is stimulated by GH-releasing hormone (GHRH) and inhibited by somatostatin, both of which are produced by the hypothalamus. GH deficiency in adults usually manifests as reduced physical performance and impaired psychological well-being. The goals of GH therapy in adults are to improve conditioning and strength, improve quality of life, and decrease the burden of associated medical conditions such as cardiovascular disease and reduced bone mineral density.

Patients with GH deficiency usually have a history of pituitary tumors that may have been treated with surgery or radiation, or they may have a history of head trauma. Some patients also have manifestations of deficiency of the other pituitary hormones such as gonadal, adrenal, and thyroid hormones. The symptoms of GH deficiency in adults are often nonspecific. Reported symptoms include low physical and mental energy, decreased muscle strength and exercise tolerance, increased weight or difficulty losing weight, poor memory, emotional instability, and impaired sleep. Some patients are asymptomatic.

Evaluation for GH deficiency is recommended in patients with hypothalamic-pituitary disease, surgery or irradiation in these areas, head trauma, or the presence of other pituitary hormone deficiencies. For patients with childhood-onset GH deficiency, retesting for GH deficiency is indicated after achievement of adult height to determine the need to continue therapy. In these patients, discontinuing GH therapy for at least 1 month is recommended before retesting. Patients with congenital or irreversible hypothalamic-pituitary structural abnormalities do not require retesting for GH deficiency. Differential diagnoses include adrenal insufficiency, hypogonadism and hypothyroidism.

Diagnoses and Workup – Adults

Because body mass index (BMI) can influence the GH response, the following criteria are used to establish the diagnosis of GH deficiency when using the GHRH-arginine test:

- Peak GH level is less than 11.1 mcg/L in patients with BMI <25
- Peak GH level is less than 8.1 mcg/L in patients with BMI³ 25 and <30
- Peak GH level is less than 4.1 mcg/L in patients with BMI³ 30

In patients with GH deficiency of hypothalamic origin (such as irradiation), GHRH can stimulate the pituitary and therefore yields falsely normal results. In such cases using alternative stimulation tests is recommended. The glucagon test can be used if GHRH is not available or the GHRH-arginine test is normal in the context of a high suspicion for GH deficiency and using ITT is contraindicated. MRI of the hypothalamic-pituitary region may be used to define the anatomy of this region for the presence of tumors or structural abnormalities. Dual-energy x-ray absorptiometry (DXA) may be used to assess bone mineral density.

Treatment for Adults

Growth hormone (GH) replacement therapy is provided in the form of recombinant growth hormone. Follow-up is usually planned at intervals of 1-2 months when the dose of GH can be adjusted by increments of 0.1-0.2 mg/day based on the clinical response, serum IGF-1 levels, and side effects. Longer time intervals and smaller dose increments are suggested for older patients. Serum IGF-1 levels are the main determinant for adjusting the dose of GH. No studies are available to guide this decision. A commonly used target is the upper half of the normal range appropriate for age and sex, unless significant side effects develop.

Once maintenance doses of GH are achieved, follow-up is provided at intervals of 6 months. Monitoring includes clinical evaluation, assessment of side effects, and measurement of serum IGF-1, fasting glucose, and lipid profile. Quality of life (QOL) is also assessed using standardized questionnaires. If the initial bone mineral density findings, measured by DXA scan, are abnormal, repeat testing at intervals of 2-3 years is recommended. GH therapy can also be continued indefinitely if benefits such as significant improvement in quality of life and objective improvements in biochemistry and body composition are observed. If no objective or subjective benefits are seen after 1 year of treatment, discontinuation of GH therapy should be considered.

Growth hormone (GH) replacement therapy is provided in the form of recombinant growth hormone. Starting dose of GH depends on the age and clinical condition of the patient. A dose regimen that is based on age along with dose titration has been associated with less adverse effects compared with a weight-based regimen. The following regimen is suggested:

- Age younger than 30 years: 0.4-0.5 mg/day (may be higher for patients transitioning from pediatric treatment)
- Age 30-60 years: 0.2-0.3 mg/day
- Age >60 years or those with diabetes mellitus or prediabetes: 0.1-0.2 mg/day

For patients with adherence issues, a less frequent dose regimen such as alternate days or three times per week using the same total weekly dosage can be used. The goals of pharmacotherapy are to restore normal growth hormone levels and to reduce morbidity. The main therapeutic goal of growth hormone treatment in children with GHD is to enable short children to achieve normal height, with early improvement of the psychosocial difficulties related to short stature.

The FDA has approved the use of somatropin (Nutropin [Genentech]) Humatrope [Lilly], Genotropin [Pfizer], Saizen [EMD Serono], Norditropin [Novo Nordisk], Tev-Tropin [Teva], and Omnitrope [Sandoz] for the treatment of GHD.

Related Disorders

Symptoms of the following can be similar to those of GHD. Comparisons may be useful for a differential diagnosis:

- Small for gestational age (SGA)
- Short stature homeobox-containing gene (SHOX) deficiency
- Idiopathic short stature (ISS)
- Noonan syndrome
- Prader-Willi syndrome (PWS)
- Primary growth hormone insensitivity (GHI)

Children and Adolescents²

Patient history in those with suspected GHD should focus on:

- **Birth weight and length.** Intrauterine growth retardation is an issue in the differential diagnosis and should be apparent from the birth history.
- **Height of parents.** Calculation of the sex-adjusted mid-parental height (or "target height) aids in evaluating a child's genetic potential.

NOTE: For boys, calculate the sex-adjusted mid-parental height by adding 2.5 in or 6.5 cm from the mean of the parents' heights. For girls, subtract 2.5 in or 6.5 cm from the mean of the parents' heights. This sex-adjusted midparental height represents the statistically most probable adult height for the child, based on parental contribution.

- **Height of parents.** Calculation of the sex-adjusted mid-parental height (or "target height) aids in evaluating a child's genetic potential.
- **Timing of puberty in parents.** Constitutional delay in growth and maturation may have a family history.

- **Previous growth points.** A child's growth pattern is an important part of the workup for short stature. Previous growth data may be obtained from physicians' offices, schools, or heights plotted on a door at home. If the growth rate is normal (about 2 in./year [5 cm per year] from age 3 to onset of puberty), the child's short stature most likely is caused by a normal variant, such as familial short stature or constitutional delay in growth and maturation. If growth rate is slow, a pathological cause for short stature is more likely.
- **General health of child.** Exclusion of chronic disease as the cause of short stature is imperative.
- **Nutritional history.** Malnutrition is the most common cause of short stature worldwide.

Differential Diagnoses

- Achondroplasia Imaging
- Constitutional Growth Delay
- Familial (genetic) short stature
- Growth Hormone Resistance
- Hyposomatotropism
- Noonan Syndrome
- Panhypopituitarism
- Pediatric Hypothyroidism
- Psychosocial Short Stature
- Short stature accompanying systemic disease
- Short stature as part of a genetic syndrome
- Short stature from abuse and neglect
- Short stature related to a metabolic abnormality (e.g., renal tubular acidosis, poorly controlled diabetes mellitus)
- Short stature related to endocrinopathy (eg, hypothyroidism, Cushing syndrome)
- Silver-Russell Syndrome
- Turner Syndrome

Treatment

Initially, growth hormone was injected intramuscularly. When time recombinant human growth hormone [rhGH] became available in the mid-1980s, it was shown to be as effective when administered as a subcutaneous injection. This is the current practice. Early in its use, GH was administered twice weekly; this was increased to 3 times per week when the higher frequency was shown to result in an increased growth response. At about the time of the transition from cadaveric growth hormone to rhGH, daily injections (6-7 injections per week) were shown to yield an even better growth response than administering injections 3 times per week. Daily administration is now common.

Although growth hormone is normally secreted in multiple peaks during the day and mostly at night, a single daily injection of recombinant growth hormone can provide physiologic replacement. In order for growth hormone replacement to be effective, other pituitary deficiencies should be treated. Response to growth hormone therapy is measured (every 3 - 6 months) by sequential height determinations and by occasional bone age determinations.

Laboratory Studies

The following laboratory studies should be conducted to determine GHD:

- **Thyroxine and thyroid-stimulating hormone** to exclude hypothyroidism as a cause of growth failure.
- **Serum electrolytes.** A low bicarbonate level may indicate renal tubular acidosis, which can result in growth failure. Abnormal electrolytes may indicate renal failure.
- **CBC count and sedimentation rate** may be helpful if inflammatory bowel disease is suspected.
- **Insulinlike growth factor 1 (IGF-1) and IGF-binding protein 3 (IGFBP-3)** are both GH-dependent. Low values suggest GHD. A low value alone is not diagnostic because IGFs are sensitive to other factors such as nutritional state and chronic systemic disease.

- **Karyotype.** Girls with otherwise unexplained short stature should have a karyotype study to rule out Turner syndrome. Although many girls with Turner syndrome are diagnosed from signs upon physical examination, the only recognizable feature of many girls with the condition is short stature. Girls with mosaic karyotypes or karyotypes with isochromosomes tend to exhibit fewer signs specific to Turner syndrome. Many girls with Turner syndrome, and particularly those with mosaic karyotypes and karyotypes other than 45,X, do not demonstrate the striking stigmata associated with Turner syndrome. Boys in which there is clinical suspicion of a possible genetic etiology of the growth disorder have about the same likelihood of having an abnormal karyotype as is seen in girls being evaluated for Turner syndrome.

Imaging Studies

Individuals diagnosed with GHD should undergo an MRI of the head to exclude a brain tumor (e.g., craniopharyngioma). Approximately 15% of patients with GHD have an abnormality of the pituitary gland (e.g., ectopic bright spot, empty or small sella).

Other Tests

Comparison of a left hand and wrist radiograph to standards can be used to estimate skeletal maturation. With familial short stature, bone age is comparable to chronological age. Bone age is usually delayed in children with constitutional growth delay, malnutrition, and endocrine causes of short stature (e.g., hypothyroidism, cortisol excess, GHD). Bone age also allows determination of growth potential as adult stature may be estimated from the Bayley-Pinneau tables. Growth hormone response to insulin is the most reliable test for GHD. Before accepting GHD diagnosis, many insurance companies require a documented failure to demonstrate a growth hormone response (with a growth hormone level >10 ng/mL) after presentation of 2 provocative stimuli. Provocative stimuli include insulin-induced hypoglycemia, arginine, levodopa (L-dopa), clonidine, and glucagon.

Medications

Growth hormone replacement is used to treat GHD. Purified polypeptide hormone of recombinant DNA origin. In children whose epiphyses are not yet fused, GH replacement usually causes significant increase in growth velocity (averaging 10-11 cm/y during first y of therapy). Response wanes each y, but growth velocity continues at faster than pretreatment rates. A long-acting depot preparation designed for monthly or bimonthly SC injection was available but is not off the market. Other long-acting preparations are currently under investigation. For a complete list of updated agents used, consult <http://emedicine.medscape.com/article/923688-medication#2>.

Outpatient Care

Most pediatric endocrinologists see patients who are receiving growth hormone therapy 2-4 times per year. The most important reasons for follow-up are to monitor growth progress and to adjust growth hormone dosage. Growth rate usually increases most during the first year of treatment, with an average increase of 8-10 cm/y (often called "catch-up" growth). Progressive growth slows over the next several years e.g., waning effect). A growth rate appearing to slow more than expected should prompt investigation for a medical cause (e.g., hypothyroidism) or another diagnosis (e.g., inflammatory bowel disease). Follow-up may also be needed to assure patient compliance with the growth hormone injections.

Possible Complications

While adverse events from GH therapy are rare, the following complications have been recognized:

- Carbohydrate metabolism;
- Benign intracranial hypertension (pseudotumor cerebri);
- Fluid homeostasis;
- Skeletal and joint problems;
- Prepubertal gynecomastia; and
- Leukemia

Growth Charts

Growth charts for infants, children and adolescents are posted at the following internet sites:

National Center for Health Statistics - http://www.humatrope.com/Documents/pdf/growth_chart_both.pdf

Centers for Disease Control & Prevention – http://www.cdc.gov/nchs/about/major/nhanes/growthcharts/clinical_charts.htm#Clin%202

Professional Organizations⁴

In 2003, the **American Association of Clinical Endocrinologists (AACE)** published the position statement *Growth Hormone Usage in Short Children*. AACE has maintained that responsible use of GH involves consulting a physician, who can determine whether such therapy is indicated by appropriate diagnostic testing and proof of GH deficiency in children with open epiphyses. No additional updates have been made by the AACE.⁵

The **National Institute for Health and Clinical Excellence (NICE)** published guidance in 2010 related to human growth hormone (somatropin) for the treatment of growth failure in children. Highlights include:⁶

- Somatropin (recombinant human growth hormone) is recommended as a treatment option for children with growth failure associated with any of the following conditions:
 - Growth hormone deficiency
 - Turner syndrome
 - Prader–Willi syndrome
 - Chronic renal insufficiency
 - Born small for gestational age with subsequent growth failure at 4 years of age or later
 - Short stature homeobox-containing gene (SHOX) deficiency
 - Noonan syndrome
 - HIV-associated failure to thrive, AIDS associated wasting syndrome, or cachexia
 - Idiopathic short stature, also called non-growth hormone-deficient short stature
- Treatment with somatropin should always be initiated and monitored by a pediatrician with specialist expertise in managing growth hormone disorders in children. The choice of product should be made on an individual basis after informed discussion between the responsible clinician and the patient and/or caregiver about the advantages and disadvantages of available products. Therapeutic need and adherence to treatment should also be discussed.
- Treatment with somatropin should be discontinued if any of the following apply:
 - Growth velocity increases less than 50% from baseline in the first year of treatment
 - Final height is approached and growth velocity is less than 2 cm total growth in 1 year
 - There are insurmountable problems with adherence
 - Final height is attained
 - Attained height at any age is greater than or equal to the 5th percentile for adults (65 inches for men and 60 inches for women) using the latest publicly available CDC Growth Charts.
 - Closed epiphyseal plates in the hand and wrist as determined by a bone age X-ray.

For patients with Prader–Willi syndrome, evaluation of response to therapy should also consider body composition. Treatment should not be discontinued by default. The decision to stop treatment should be made in consultation with the patient and/or caregiver either by a pediatrician with specialist expertise in managing growth hormone disorders in children or an adult endocrinologist, if care of the patient has been transferred from pediatric to adult services.

In 2000, the **Growth Hormone Research Society (GHR)** published the *GHR Consensus Guidelines for the Diagnosis and Treatment of Growth Hormone (GH) Deficiency in Childhood and Adolescence*. The guidelines note that patients with proven GHD should be treated with recombinant hGH as soon as possible after the diagnosis is made. The primary objectives of the therapy of GHD are normalization of height during childhood and attainment of normal adult height. Normally growing patients with craniopharyngioma and GHD should be considered for therapy with GH for metabolic and body composition benefits and for enhancement of pubertal growth.⁷

Together, the **International Societies of Pediatric Endocrinology (SPE) and Growth Hormone Research Society (GHR)** published the 2007 consensus statement *Management of the Child Born Small for Gestational Age Through to Adulthood*. The diagnosis of SGA should be based on accurate anthropometry at birth including weight, length, and head circumference. Early surveillance in a growth clinic is recommended for those with lack of catch-up. Early intervention with GH for those with severe growth retardation should be considered. Long-term surveillance of all those who receive GH is essential. In view of the cognitive impairment reported in some children born SGA, early neurodevelopment evaluation and interventions are warranted in at-risk children. Endocrine and metabolic disturbances in the SGA child are recognized, but there is no evidence to recommend routine investigation of all SGA children. Significant gaps in knowledge exist with regard to the genesis of metabolic profile and outcome in SGA children. Research studies using genomic, proteomic, and/or metabolomic approaches are likely to identify risk factors related to fetal and postnatal growth that generate insulin resistance and associated complications.⁸

Quality of Life - Adult Growth Hormone Deficiency Assessment (QoL-AGHDA)¹⁰

1 point for each "yes" answer:

- I have to struggle to finish jobs.
- I feel a strong need to sleep during the day.
- I often feel lonely even when I am with other people.
- I have to read things several times before they sink in.
- It is difficult for me to make friends.
- It takes a lot of effort for me to do simple tasks.
- I have difficulty controlling my emotions.
- I often lose track of what I want to say.
- I lack confidence.
- I have to push myself to do things.
- I often feel very tense.
- I feel as if I let people down.
- I find it hard to mix with people.
- I feel worn out even when I've not done anything.
- There are times when I feel very low.
- I avoid responsibility if possible.
- I avoid mixing with people I don't know well.
- I feel as if I am a burden to people.
- I often forget what people have said to me.
- I find it difficult to plan ahead.
- I am easily irritated by other people.
- I often feel too tired to do the things I ought to do.
- I have to force myself to do all the things that need doing.
- I often have to force myself to stay awake.
- My memory lets me down.

Dosage. According to guidelines, for the first 2 to 3 months dosage adjustments should be made after monthly assessments of serum levels of IGF-1, and in response to the presence of adverse effects, until a maintenance dose is achieved. As a condition of continued authorization, WellCare requires at least annual reassessment of serum levels of IGF-1 in adults and appropriate dosage adjustments, as GH requirements may decrease with age.

POSITION STATEMENT

Applicable To:

- Medicaid
- Medicare

Contraindications, Limitations and Exclusions

WellCare considers GH therapy experimental and investigational in persons with any of the following contraindications for which the safety of GH therapy has not been established:

- Benign intracranial hypertension (BIH); **OR**
- Critically ill persons (e.g., after complications following open heart or abdominal surgery, multiple trauma, acute respiratory failure or similar conditions); **OR**
- Diabetic retinopathy; **OR**
- Persons with evidence of tumor activity. In persons with tumors, anti-tumor therapy must be completed before initiating GH therapy; **OR**
- Persons with known hypersensitivity to GH or to any of its excipients; **OR**
- Women who are pregnant or lactating.

The following are experimental and investigational for the following indications due to a lack of medical literature to establish efficacy for these indications:

- Amyotrophic lateral sclerosis
- Anabolic therapy to enhance body mass or strength for professional, recreational or social reasons
- Anti-aging
- Burn injuries
- Cerebral palsy
- CHARGE (Coloboma, Heart defect, Atresia choanae, Retarded growth and development, Genital hypoplasia, Ear anomalies/deafness) syndrome
- Chondrodystrophy
- Chronic catabolic states, including inflammatory bowel disease, pharmacologic glucocorticoid administration, and respiratory failure
- Chronic fatigue syndrome
- Congestive heart failure
- Constitutional delay of growth and development
- Corticosteroid-induced pituitary ablation
- Crohn's disease
- Cystic fibrosis
- Depression
- Down syndrome and other syndromes associated with short stature and increased susceptibility to neoplasms (e.g., Bloom syndrome, Fanconi syndrome)
- Fibromyalgia
- Fracture healing
- Glucocorticoid-induced growth failure
- Growth hormone insensitivity (partial or complete)
- Growth retardation due to amphetamines (e.g., Adderall, Ritalin)
- Hypochondroplasia
- Hypophosphatemia (e.g., hypophosphatemic rickets)
- Infertility/in-vitro fertilization
- HIV lipodystrophy
- Hypertension
- Intra-uterine growth restriction not meeting diagnostic criteria for small for gestational age children
- Ischemic heart disease
- Isochromosome Yp defect
- Juvenile rheumatoid arthritis
- Kabuki syndrome
- Muscular dystrophy
- Neurosecretory growth hormone dysfunction
- Non-classic congenital adrenal hyperplasia
- Obesity/morbid obesity
- Osteogenesis imperfecta
- Osteoporosis
- Post bariatric surgery
- Post-traumatic stress disorder
- Precocious puberty
- Pseudohypoparathyroidism
- Russell-Silver syndrome (that does not result in small for gestational age)
- Skeletal dysplasias (e.g., achondroplasia, kyphomelic dysplasia)
- "Somatopause" in older adults
- Spina bifida
- Stem cell mobilization
- Wound healin

Tesamorelin (Egrifta). WellCare considers tesamorelin (Egrifta) cosmetic for the reduction of excess abdominal fat in HIV-infected persons with lipodystrophy, and experimental and investigational for other indications.

Coverage

Growth Hormone Deficiency in Children and Adolescents

Growth hormone replacement **is considered medically necessary** for children and adolescents when one of the criterion listed below (items 1 through 7) are met:

1. *Idiopathic Growth Hormone Deficiency (GHD)*

GH replacement **is considered medically necessary** for children and adolescents with GH deficiency (e.g., insufficient GH secretion and growth failure) when the following criterion are met:

- Failure to respond to at least 2 standard GH stimulation tests[^], defined as a serum GH level (peak level) of less than 10 nanograms per milliliter (ng/ml) (20 mU/liter), after stimulation with insulin, levodopa, arginine, propranolol, clonidine, or glucagon.* (However, 1 abnormal GH test is sufficient for children with defined CNS pathology, history of irradiation, multiple pituitary hormone deficiency (MPHD) or a genetic defect affecting the GH axis); **AND**
- For member's who have insufficient GH secretion (fail to respond to stimulation tests), appropriate imaging (magnetic resonance imaging (MRI) or computed tomography (CT)) of the brain with particular attention to the hypothalamic-pituitary region is necessary to exclude the possibility of a tumor; **AND**
- Member meets at least one of the following criteria is met:
 - Child has severe growth retardation with height standard deviation score (SDS) more than 3 SDS below the mean for chronological age and sex; **OR**
 - Child has moderate growth retardation with height SDS between -2 and -3 SDS below the mean for chronological age and sex and decreased growth rate (growth velocity (GV)** measured over 1 year below 25th percentile for age and sex); **OR**
 - Child exhibits severe deceleration in growth rate (GV** measured over 1 year -2 SDS below the mean for age and sex); **OR**
 - Child has decreasing growth rate combined with a predisposing condition such as previous cranial irradiation or tumor; **OR**
 - Child exhibits evidence of other pituitary hormone deficiencies or signs of congenital GHD (hypoglycemia, microphallus).

Note: Additional laboratory testing of children without classic GHD to diagnose "partial" GHD, or other abnormalities of GH secretion or bioactivity, is not considered medically necessary. (Includes over-night hospitalization for testing of spontaneous GH secretion).

Note: Measurement of insulin-like growth factor I (IGF-I) is considered medically necessary to determine adequacy of GH therapy in adults and children. However, the diagnosis of GH deficiency should not rely solely on IGF-I measurements, but must be confirmed by provocative tests solely for GH secretion. Measurement of IGF binding protein-2 (IGFBP-2), IGF binding protein-3 (IGFBP-3), and the acid labile subunit of IGF-I are considered experimental and investigational.

* For persons with thyroid deficiency, WellCare will only accept results of GH secretion tests that are performed after thyroid deficiency is adequately treated because GH secretion may be subnormal merely as a result of hypothyroidism.

** Growth velocity (GV) should be tracked over at least 1 year.

[^] Both stimulation tests may be performed simultaneously. Documentation of normal thyroid function (TSH) is needed at the time of growth hormone stimulation testing to rule out hypothyroidism which can result in a spuriously abnormal growth hormone stimulation tests. Hypothyroidism is indicated by an elevated serum TSH, which is defined as a TSH concentration above the upper limit of the normal TSH reference range, which is typically 4 to 5 mU/L in most laboratories.

2. *Chronic Renal Insufficiency*

GH replacement prior to renal transplantation **is considered medically necessary** for children and adolescents diagnosed with chronic renal insufficiency and growth retardation who meet the following:

- Member's nutritional status has been optimized, metabolic abnormalities have been corrected, and steroid usage has been reduced to a minimum; **AND**

- Member meets one or more of the following:
 - Severe growth retardation with height SDS more than 3 SDS below the mean for chronological age and sex; **OR**
 - Moderate growth retardation with height SDS between -2 and -3 SDS below the mean for chronological age and sex and decreased growth rate (GV measured over 1 year below 25th percentile for age and sex); **OR**
 - Exhibits severe deceleration in growth rate (GV measured over 1 year -2 SDS below the mean for age and sex).

Note: Resumption of GH therapy is not considered medically necessary until at least 1 year after the transplant to allow time to ascertain whether catch-up growth will occur.

3. *Turner's Syndrome*

GH replacement **is considered medically necessary** for children with Turner's syndrome and growth retardation and meet all of the following:

- Turner's syndrome diagnosis is confirmed by chromosome analysis; **AND**
- Member meets one or more of the following:
 - Severe growth retardation with height SDS more than 3 SDS below the mean for chronological age and sex; **OR**
 - Moderate growth retardation with height SDS between -2 and -3 SDS below the mean for chronological age and sex and decreased growth rate (GV measured over 1 year below 25th percentile for age and sex); **OR**
 - Exhibits severe deceleration in growth rate (GV measured over 1 year -2 SDS below the mean for age and sex).

4. *Prader Willi Syndrome*

GH replacement **is considered medically necessary** for children with a diagnosis of Prader Willi syndrome and growth retardation who meet all of the following:

- Diagnosis of Prader Willi syndrome is confirmed by appropriate genetic testing; **AND**
- Member meets one or more of the following:
 - Severe growth retardation with height SDS more than 3 SDS below the mean for chronological age and sex; **OR**
 - Moderate growth retardation with height SDS between -2 and -3 SDS below the mean for chronological age and sex and decreased growth rate (GV measured over 1 year below 25th percentile for age and sex); **OR**
 - Exhibits severe deceleration in growth rate (GV measured over 1 year -2 SDS below the mean for age and sex).

5. *Small for Gestational Age (SGA) Children*

GH supplementation **is considered medically necessary** for children born small for gestational age, and who meet all of the following:

- Child was born small for gestational age, defined as birth weight or length 2 or more standard deviations below the mean for gestational age; **AND**
- Child fails to manifest catch up growth by age of 2 years, defined as height 2 or more SDS below the mean for age and sex.

Note: Growth curves plotting growth from birth through age 3 should be submitted for evaluation.

6. *Noonan Syndrome*

GH therapy **is considered medically necessary** for pre-pubertal children with short stature associated with Noonan syndrome who meet all of the following:

- Height 2 SDS or more below the mean for chronological age and sex; **AND**
- GV measured over 1 year prior to initiation of therapy of 1 or more SDS below the mean for age & sex.

7. *Children with Short Stature Homeobox-Containing Gene (SHOX) Deficiency*

GH therapy **is considered medically necessary** for the treatment of short stature or growth failure in children with SHOX deficiency whose epiphyses are not closed.

Discontinuation of Therapy (for items 1 through 7 above)

GH therapy will be **considered not medically necessary** when any of the following criteria is met:

- Expected final adult height has been reached; **OR**
- If there has been a poor response to treatment, generally defined as an increase in growth velocity of less than 50 % from baseline, in the 1st year of therapy. In children with Prader-Willi syndrome, evaluation of response to therapy should also take into account whether body composition (i.e., ratio of lean to fat mass) has significantly improved; **OR**
- Increase in height velocity is less than 2 cm total growth in 1 year of therapy; **OR**
- There are persistent and uncorrectable problems with adherence to treatment

Note: At completion of linear growth (e.g., growth rate less than 2 cm/year), available guidelines indicate that GH treatment should be stopped for at least 3 months, and GH status should be re-assessed to determine whether continued GH treatment into adulthood is necessary. The member will be re-evaluated 3 or more months after discontinuation of GH therapy to determine if the member fulfills medical necessity criteria for GH treatment at adult doses as set forth below.

Growth Hormone Deficiency in Adults

Growth hormone replacement **is considered medically necessary** for adults when one of the criterion listed below (items 1 through 6) are met:

1. *Destructive Lesions of the Pituitary*

GH treatment of adults with documented GH deficiency **is considered medically necessary** when all of the following are met:

- Member has GH deficiency as a result of hypothalamic or pituitary disease (e.g., panhypopituitarism, pituitary adenoma, trauma, cranial irradiation, pituitary surgery) and at least one other hormone deficiency diagnosed (except for prolactin deficiency); **AND**
- Member is already receiving adequate replacement therapy for any other pituitary hormone deficiencies; **AND**
- Member has a severe GH deficiency, defined as a peak GH response of less than 9 mU/liter (3 ng/ml) during an insulin tolerance test or a cross-validated GH threshold in an equivalent test (growth hormone releasing hormone, arginine, or glucagon); **AND**
- Member has a perceived impairment of quality of life (QoL), as demonstrated by a reported score of at least 11 in the disease-specific 'Quality of life assessment of growth hormone deficiency in adults' (QoL-AGHDA) questionnaire (see below).

WellCare considers this treatment medically necessary for an initial 9 months, allowing for an initial 3-month period of GH dose titration, followed by a 6-month therapeutic trial period. Subsequent GH treatment is

considered medically necessary only if, upon subsequent testing of the effect of this treatment, the member demonstrates a QoL improvement of 7 or more points in QoL-AGHDA score (see below).

2. *Adults Who Were GH Deficient as Children/Adolescents*

- For adolescents and adults younger than age 25 years with childhood-onset GH deficiency (including idiopathic isolated growth hormone deficiency (IIGHD) or multiple pituitary hormone deficiencies, including growth hormone (MPHD)) who have completed linear growth (growth rate less than 2 cm per year), GH treatment at adult doses is considered medically necessary only in those who have failed to respond to at least 2 standard GH stimulation tests, defined as a peak GH response of less than 9 mU/liter (3 ng/ml) during an insulin tolerance test and one other cross-validated GH test (growth hormone releasing hormone, arginine, or glucagon). For adults having a low IGF-1 (a marker of GH response) concentration (standard deviation score less than -2), failure to respond to only 1 standard GH stimulation test is required. In these members, GH supplementation at adult doses is considered medically necessary until adult peak bone mass is achieved (between 25 and 30 years of age).

Note: Consistent with available guidelines, WellCare requires, as a condition of continued authorization of GH therapy at adult doses, that GH therapy be stopped for at least 3 months after completion of linear growth (i.e., growth rate less than 2 cm/year), and that GH status should be reassessed. As a condition of continued authorization, WellCare requires re-assessment of GH status after GH treatment is stopped for at least 3 months before initiating GH supplementation at adult doses. WellCare will re-evaluate the member 3 or more months after discontinuation of GH therapy to determine if the member fulfills medical necessity criteria for GH treatment at adult doses.

- For adults over age of 25 years with childhood onset GH deficiency (IIGHD or MPHD), GH treatment at adult doses is considered medically necessary if they meet all of the following criteria:
 - Member has failed to respond to at least 2 standard GH stimulation tests, defined as a peak GH response of less than 9 mU/liter (3 ng/ml) during an insulin tolerance test and one other cross-validated GH test (growth hormone releasing hormone, arginine, or glucagon). For members having a low IGF-1 (a marker of GH response) concentrations (SDS less than -2), failure to respond to only 1 standard GH stimulation test is required; **AND**
 - Member has a perceived impairment of QoL, as demonstrated by a reported score of at least 11 in the disease-specific 'Quality of life assessment of growth hormone deficiency in adults' (QoL-AGHDA) questionnaire (see below).

3. *Adults Who Develop GH Deficiency in Early Adulthood*

- GH treatment at adult doses is considered medically necessary for selected members who develop isolated GH deficiency (IIGHD or MPHD) in adolescence or early adulthood, after linear growth is completed but before the age of 25 years. GH treatment at adult doses is considered medically necessary only in those who have failed to respond to at least 2 standard GH stimulation tests, defined as a peak GH response of less than 9 mU/liter (3 ng/ml) during an insulin tolerance test and one other cross-validated GH test (growth hormone releasing hormone, arginine, or glucagon). For adults having a low IGF-1 (a marker of GH response) concentration (SDS less than -2), failure to respond to only 1 standard GH stimulation test is required. In these members, GH supplementation at adult doses is considered medically necessary until adult peak bone mass is achieved (between age 25 and 30).
- Following achievement of peak bone mass between 25 and 30 years of age, continued GH treatment is considered medically necessary for adults who meet all of the following criteria:
 - Member has a severe GH deficiency: GH treatment at adult doses is considered medically necessary only in those who have failed to respond to at least 2 standard GH stimulation tests, defined as a peak GH response of less than 9 mU/liter (3 ng/ml) during an insulin tolerance test and one other cross-validated GH test (growth hormone releasing hormone, arginine, or glucagon). (For adults having a low IGF-1 (a marker of GH response) concentration (SDS less than -2), failure to respond to only 1 standard GH stimulation test is required); **AND**

- Member has a perceived impairment of QoL, as demonstrated by a reported score of at least 11 in the disease-specific 'Quality of life assessment of growth hormone deficiency in adults' (QoL-AGHDA) questionnaire (see below).
- 4. *AIDS-Related Wasting.* WellCare considers GH supplementation to be medically necessary for HIV-infected persons with involuntary weight loss of greater than 10 % of pre-illness baseline body weight or BMI less than 20 kg/m², in the absence of a concurrent illness or medical condition other than HIV infection that would explain these findings, and who have failed to adequately respond or are intolerant to anabolic steroids (e.g., Megace).⁹
- 5. *Growth Hormone for Short Bowel Syndrome.* WellCare considers GH supplementation to be medically necessary for persons with short bowel syndrome who depend on intravenous parenteral nutrition for nutritional support. Growth hormone treatment of short bowel syndrome for more than 4 weeks is considered experimental and investigational as administration of GH for more than 4 weeks duration has not been adequately studied for this indication. There is insufficient evidence of the effectiveness of repeat courses of GH for short bowel syndrome.
- 6. *Pegvisomant (Somavert).* WellCare considers pegvisomant (Somavert) medically necessary for the treatment of acromegaly in members who have had an inadequate response to surgery and/or radiation therapy and/or other medical therapies, or for whom these therapies are inappropriate.

Continued Authorization

The continued medical necessity of GH therapy is reviewed at least annually to determine whether GH therapy continues to be medically necessary. The annual medical necessity review focuses on response to therapy, whether discontinuation criteria are met, whether there are any major changes in clinical status affecting the medical necessity of GH supplementation, and verification that the person continues to follow-up with the provider and receive appropriate re-evaluations and care.

CODING

Covered CPT Codes - This list may not be all inclusive

70450 - 70470	Computed tomography, head or brain; without contrast material (70450)
70551 - 70553	Magnetic resonance (eg, proton) imaging, brain (including brain stem); without contrast material (70551)
80422	Glucagon tolerance panel; for insulinoma This panel must include the following: Glucose (82947 : Insulin (83525 x 3)
80428	Growth Hormone Stimulation Panel (e.g. Arginine Infusion, L-Dopa Administration) This panel must include the following: Human growth hormone (HGH) (83003 x 4)
80430	Growth Hormone Suppression Panel (Glucose Admin) This panel must include the following: Glucose (82947 x 3) Human growth hormone (HGH) (83003 x 4)
80434	Insulin tolerance panel; for ACTH insufficiency This panel must include the following: Cortisol (82533 x 5) Glucose (82947 x 5)
80435	Insulin tolerance panel; for growth hormone deficiency This panel must include the following: Glucose (82947 x 5) Human growth hormone (HGH) (83003 x 5)
81331	SNRPN/UBE3A (small nuclear ribonucleoprotein polypeptide N and ubiquitin protein ligase E3A) (eg, Prader-Willi syndrome and/or Angelman syndrome), methylation analysis
81400	Molecular pathology procedure, Level 1
81402	Molecular pathology procedure, Level 3
81404	Molecular pathology procedure, Level 5
83003	Growth hormone, human (HGH) (somatotropin)
84305	Somatomedin

Covered HCPCS Code

J2941	Injection, somatotropin, 1mg
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Covered ICD-10-CM diagnosis codes - when criteria is met

B20	Human immunodeficiency virus [HIV] disease
C71.0-C71.9	Malignant neoplasm of brain, unspecified (C71.9)
C75.1	Malignant neoplasm of pituitary gland
C75.2	Malignant neoplasm of craniopharyngeal duct
C79.31	Secondary malignant neoplasm of brain
D33.0-D33.2	Benign neoplasm of brain, supratentorial (D33.0)
D35.2	Benign neoplasm of pituitary gland
D35.3	Benign neoplasm of craniopharyngeal duct
D44.3	Neoplasm of uncertain behavior of pituitary gland
D44.4	Neoplasm of uncertain behavior of craniopharyngeal duct
E16.2	Hypoglycemia, unspecified
E22.0-E22.9	Hyperfunction of pituitary gland, unspecified (E22.9) Hypopituitarism (E23.0) Disorder of pituitary gland, Disorder of pituitary gland, unspecified (E23.7)
E23.0-E23.7	
E24.1	Nelson's syndrome
E34.3	Short stature due to endocrine disorder
E34.4	Constitutional tall stature
E78.71	Barth syndrome
E78.72	Smith-Lemli-Opitz syndrome
E89.3	Postprocedural hypopituitarism
K91.2	Postsurgical malabsorption, not elsewhere classified
M62.50	Muscle wasting and atrophy, not elsewhere classified, unspecified site
M89.121-M89.18	(M89.18) Physeal arrest, other site (M89.121) Complete physeal arrest, right proximal humerus
N18.1-N18.9	Chronic Kidney Disease, stage 1(N18.1) Chronic kidney disease, unspecified (N18.9)
P05.00-P05.09	Newborn light for gestational age, unspecified weight (P05.00) (P05.09) Newborn light for gestational age, 2500 Newborn light for gestational age, unspecified weight (P05.00)
P05.10-P05.19	Newborn small for gestational age, unspecified weight (P05.10)
Q55.62	Hypoplasia of penis
Q87.1	Congenital malformation syndromes predominantly associated with short stature
Q87.2	Congenital malformation syndromes predominantly involving limbs
Q87.3	Congenital malformation syndromes involving early overgrowth
Q87.5	Other congenital malformation syndromes with other skeletal changes
Q87.81	Alport syndrome
Q87.89	Other specified congenital malformation syndromes, not elsewhere classified
Q89.8	Other specified congenital malformations
Q96.0-Q96.9	(Q96.0) Karyotype 45, X (Q96.9)Turner's syndrome, unspecified
R62.52	Short stature (child)
R64	Cachexia
Z92.3	Personal history of irradiation

Coding information is provided for informational purposes only. The inclusion or omission of a CPT, HCPCS, or ICD-10 code does not imply member coverage or provider reimbursement. Consult the member's benefits that are in place at time of service to determine coverage (or non-coverage) as well as applicable federal / state laws.

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MEDICAL POLICY COMMITTEE HISTORY AND REVISIONS

Date	Action
8/24/2018	<ul style="list-style-type: none"> • Approved by MPC. Added 2 additional criterion points (Growth Hormone for Short Bowel Syndrome; and Pegvisomant [Somavert]).
8/3/2017, 10/6/2016 10/17/2015	<ul style="list-style-type: none"> • Approved by MPC. No changes. • Approved by MPC. New.