

Prader-Willi syndrome (pronounced PRAH-der-WILL-ee) is a rare, complex genetically-based medical disorder. First identified in 1956 by Swiss physicians Drs. Prader, Willi, and Labhart, PWS is the most common genetic cause of obesity and one of the ten most common conditions seen in genetics clinics.

PWS occurs randomly in about 1 in 12,000-20,000 live births. Symptoms result from an abnormality on chromosome 15. The two most common types of PWS are Deletion and Uniparental Disomy (UPD). There is no known cause in almost all cases, and little risk of inheritance; genetic testing is available if more children are desired.

### CLINICAL FEATURES

#### First Stage—Failure to Thrive

Low birth weight and subsequent failure to thrive, severe muscle weakness (hypotonia), difficulty feeding, and delayed developmental milestones characterize the initial stage. Because of the weak muscle tone, motor planning deficits and swallowing issues, infants are often unable to nurse or suck and require special feeding techniques. The milestones of lifting the head, sitting up, crawling, and walking tend to be delayed. On average, without growth hormone treatment, independent sitting is achieved at around 12-13 months, walking at 24-30 months, and tricycle riding at 4 years. Without oral motor/speech therapy, the first words typically appear at around 21 months, with sentences at around 3½ years.

#### Second Stage—Hyperphagia

The next stage usually begins in toddlerhood when a preoccupation with food and the hyperphagia drive to eat begin. Life becomes dominated by an unrelenting drive for food. People with PWS do not experience normal satiety and can eat a tremendous amount of food without feeling ill. In addition to the drive for food, metabolism is at almost half the normal rate. If the diet and food environment are not strictly controlled, the individual with PWS will quickly become obese. Behavioral problems typically begin at about the time hyperphagia begins.

### CHARACTERISTICS

**Abnormal growth:** There is a deficiency in the production and/or utilization of growth hormone. Unless treated with growth hormone medication, persons with PWS are typically short in stature, have small hands and feet, and other subtle dysmorphic facial features.

**Anxiousness:** Almost all persons with PWS experience high levels of anxiousness. It is vital to reduce the stressors in the environment to the extent possible in order to reduce behavioral problems.

**Behavioral challenges:** Biochemical abnormalities in the brain cause increased anxiousness and emotional dysregulation, resulting in disruptive behaviors including temper tantrums, verbal and physical aggression, and/or property destruction.

**Body temperature dysregulation:** The body's ability to regulate internal body temperature is often impaired. Most persons with PWS don't have an elevated temperature despite illness or infection.

**Cognitive limitations:** IQs range from 40 to 100. Despite IQ, persons with PWS have impaired judgment. Many individuals have learning disabilities, including Nonverbal Learning Disorder.

**Dental problems:** PWS causes low saliva production which results in thick, sticky saliva, soft tooth enamel, cavities, and gum disease. Products designed to treat dry mouth symptoms can improve or eliminate these symptoms.

**Gastric & Bowel Problems:** Gastroparesis (slow emptying stomach) and a slow emptying bowel are common. Often there is an inability to vomit despite severe illness. Stomach perforation or stomach tissue necrosis can result if there is unrestricted access to food.

**High pain threshold:** Most persons with PWS have a high tolerance for pain and are often unaware of injury or infection.

**Hyperphagia:** Persons with PWS experience a life-threatening biochemical drive to eat that is not satiated despite the quantity of food eaten. Treatment currently consists of restricted access to food, adhering to the PWS Principles of Food Security, continuous supervision, and potential use of Vykat XR, the first FDA approved medication targeting the hyperphagia symptom in PWS.

**Hypotonia:** Infants generally exhibit severe muscle weakness. Muscle tone improves as the child ages but individuals never develop normal muscle strength and often fatigue easily. Treatment consists of growth hormone medication, physical therapy, occupational therapy, and daily exercise.

**Incomplete sexual development:** Babies are typically born with small genitalia. Male babies are often born with undescended testes and require orchidopexy surgery. Without sex hormone treatment in adolescence, most adolescents do not produce sufficient sex hormones to progress through puberty.

**Orthopedic Issues:** Scoliosis, kyphosis, hip dysplasia, foot pronation, and other orthopedic abnormalities are common.

**Psychiatric issues:** There is a higher rate of psychiatric problems in persons with PWS than seen in the general population.

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**Metabolic issues:** Metabolism is about half the normal rate therefore people with PWS will gain a considerable amount of weight on considerably fewer calories than the typical population. Fat tends to accumulate on the lower torso, buttocks, hips, thighs, and abdomen. Uncontrolled obesity can lead to high blood pressure, respiratory difficulties, heart disease, diabetes, and death. Caloric intake must be significantly reduced while preserving adequate nutrition. Consultation with a dietitian knowledgeable about PWS is recommended.

**Respiratory and sleep issues:** Physical, muscular, and neurological factors can contribute to severe symptoms. Central Sleep Apnea is common in infants under age 2 years. Obstructive Sleep Apnea is common, especially in individuals who are overweight and can cause excessive daytime sleepiness and exacerbate behavior problems.

**Skin picking:** Persons with PWS often pick at their skin which, if not managed, can result in infection.

**Social skills deficits:** Difficulties developing social skills may lead to social isolation. Early Intervention programs should include social skills therapy. Individuals with higher levels of insight may be more aware of their differences or limitations which can lead to depression. Parents and care providers often experience social isolation.

**Speech and language problems:** Hypotonia and intellectual ability affect speech and language. Apraxia of Speech, also known as dyspraxia, is common. Oral-motor therapy in infancy and therapies targeted to treat dyspraxia are recommended.

**Strength, balance and coordination:** Along with physical challenges caused by weaker muscle tone, underdeveloped vestibular and proprioceptive systems often result in poor balance and coordination. Sensory Integration-based occupational and physical therapies are recommended to improve balance, coordination, and strength.

**Swallowing abnormalities:** Swallowing problems are common and can contribute to aspiration events from infancy through adulthood, and crease the risk of choking. Supervision while eating is necessary.

**Other characteristics:** Sensitivity to medications, especially anesthesia; gall bladder problems; eye abnormalities including strabismus, myopia, amblyopia.

## TREATMENT

**There is no cure for PWS—yet. There are, however, effective therapies and treatment strategies that can help manage or reduce some of the symptoms... And there is hope.**

The outlook for persons diagnosed with PWS is more hopeful today than ever before. With proper food control and supervision, individuals with PWS can have a normal life expectancy and accomplish many of the things their “typical” peers do — attend school, enjoy community activities, even move away from the family home to a PWS-designated residential setting. Research continues to offer hope for medications and treatments to better manage the multitude of symptoms caused by this complex disorder. To learn more about PWS contact the Prader-Willi California Foundation or the national Prader-Willi Syndrome Association | USA.



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## Early Diagnosis and Therapies

Genetic testing is used to diagnose PWS. Early diagnosis gives parents the opportunity to begin critical therapies and interventions as early as possible including proper nutritional intake; growth hormone treatment; orthopedic management; sensory integration-based therapies, and social skills and behavioral therapies.

## Growth Hormone Therapy

Growth hormone treatment in children with PWS is standard of care to improve linear growth, normalize hand and foot size, and, when administered prior to age 1, help normalize facial features. Growth hormone is beneficial throughout adulthood to improve muscle tone, respiratory function, cognitive function, decrease body fat, improve overall body composition, increase bone mineral density, and improve overall physical performance.

## Weight Control

While a hallmark symptom of PWS is hyperphagia – the insatiable drive to obtain food – *no one with PWS is destined to become obese*. With proper nutrition, physical activity, and supervision, people with PWS can maintain a healthy weight. In 2025 the FDA approved Vykat XR, the first medication targeting PWS’s hyperphagia symptom. While Vykat XR is effective for many patients, it is not effective for all, and adherence to the Principles of Food Security *must* continue to be strictly controlled every day. Restricting calories while providing for necessary nutrition is essential. Daily exercise should begin early and become part of the lifestyle. Weight management should include environmental barriers to food such as locks on the refrigerator and food pantries, no access to money that could purchase food, and continuous supervision to ensure absolute control of food intake.

## Behavior Management

Implementing PWS-specific behavior management strategies and interventions as early as possible is crucial. These include establishing structure and routines, anticipating and preparing for changes in the schedule, implementing the Principles of Food Security, utilizing the Empathy Intervention, and incorporating other PWS behavioral management strategies. PWCF provides PWS behavioral training.

## Special Education Services

Federal law requires states to provide services to children who are disabled, including children with PWS. Services may include special instruction, occupational therapy, physical therapy, speech therapy, social skills therapy, psychological testing, and counseling.

## Specialized Residential Services

Persons with PWS must live and work in settings that provide for their unique physiological and neurocognitive symptoms in order to ensure their health and safety.