



# Fact Sheet

## Wolf-Hirschhorn Syndrome

**Information retrieved from:** <http://wolfhirschhorn.org/>; <http://fdna.com/resource-center/conditions-and-diseases/wolfhirschhorn-syndrome>; <http://ghr.nlm.nih.gov/condition/wolf-hirschhorn-syndrome>; and <http://www.primehealthchannel.com/wolf-hirschhorn-syndrome.html>

**What is Wolf-Hirschhorn syndrome?** Wolf-Hirschhorn syndrome (WHS) is a condition that causes malformations in many parts of the body due to a genetic chromosome deletion. The syndrome was first defined in 1961 by Herbert L. Cooper and Kurt Hirschhorn who described a child with a distinct facial appearance. Subsequent genetic studies revealed the chromosomal deletion. In 1965, the syndrome was published in reports by Wolf and Hirschhorn. The prevalence of Wolf-Hirschhorn syndrome is estimated to be 1 in 50,000 births, and it occurs in individuals of all ethnic backgrounds. However, this number may be an underestimate because of the diversity of symptoms, misdiagnosis or rarity of diagnosis, and WHS not being an inherited condition. For unknown reasons, Wolf-Hirschhorn syndrome occurs in about twice as many females as males.

**What is the cause of Wolf-Hirschhorn syndrome?** WHS is caused by a deletion of genetic material near the end of the short (p) arm of chromosome 4. This chromosomal change is sometimes referred to and written as 4p-. The size of the deletion varies among affected individuals, and studies suggest that larger deletions tend to result in more severe intellectual disability and physical abnormalities than smaller deletions. *WHSC1*, *LETM1*, and *MSX1* are the deleted genes in people with the disorder's typical signs and symptoms. Absence of these genes plays a significant role early on beginning with slow fetal growth and development. After birth, infants may have problems feeding and gaining weight. Due to underdeveloped and low muscle tone, the child's motor skills such as sitting, standing, and walking may be significantly delayed.

**What makes Wolf-Hirschhorn syndrome not an inherited condition?** About 87% of cases are not inherited versus 13% which are inherited. In the inherited cases, there is a 2-to-1 instance of maternal transmission versus paternal. The vast majority of WHS cases result from a chromosomal deletion that occurs as a random (de novo) event during the formation of reproductive cells (eggs or sperm) or in early embryonic development. A small percentage of people affected with Wolf-Hirschhorn syndrome have it as a result of an unusual chromosomal abnormality such as a ring chromosome 4. Ring chromosomes occur when a chromosome breaks in two places, and the ends of the chromosome arms fuse together to form a circular

structure. The genes located near the ends of the chromosomes are lost in this process.

In the remaining cases of WHS, an affected individual inherits a copy of chromosome 4 with a deleted segment. In these cases, one of the individual's parents carries a chromosomal rearrangement between chromosome 4 and another chromosome. This rearrangement is called a *balanced translocation*. No genetic material is gained or lost in a balanced translocation, so these chromosomal changes usually do not cause any health problems. However, translocations can become *unbalanced* as they are passed to the next generation. Some of the individuals who inherit this unbalanced translocation end up with the syndrome.

**What are the general physical characteristics of WHS?** A typical pattern of change can be seen at each stage of growth. Prominent characteristics include head size; facial features (see table below); profound intellectual disabilities; seizures (50% of individuals); low muscle tone and poor muscle development; very short stature; malformations of the hands, feet, chest, and spine; heart defects; and urinary and genital malformations or underdevelopment of the organs. Additional features of Wolf-Hirschhorn syndrome include dry or blotchy skin, vision challenges (such as coloboma, which involves missing or partially formed eye tissue) that may cause visual impairment/blindness, dental problems such as missing teeth, cleft palate and/or cleft lip, low set malformed ears, and hearing loss. Care should be taken to determine the educational needs of the child and whether he or she will qualify as a child with deaf-blindness.

**What is the treatment for WHS?** The underlying disorder has no known treatment. To manage symptoms, treatment consists of supportive medical care and intervention for feeding difficulty, seizure control, skeletal, ophthalmic, heart, and ear anomalies. Another important treatment is a multidisciplinary team approach which includes sign language and speech and communication therapy. The services of a teacher of the visually impaired, a certified Orientation and Mobility Specialist, and/or a teacher of the deaf will need to be determined by the child's school district. If there is a combined vision and hearing loss, the child should be referred to the state's Deafblind Project for its service support.

**Where can people find additional information about Wolf-Hirschhorn syndrome?**

<http://emedicine.medscape.com/article/950480-overview>  
<http://rarediseases.about.com/cs/chromosome345/a/042404.htm>  
<http://4p-supportgroup.org/>

**For more information about the CO Services for Children and Youth with Combined Vision and Hearing Loss**

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*Fact Sheets from the Colorado Services to Children and Youth with Combined Vision and Hearing Loss Project are to be used by both families and professionals serving individuals with vision and hearing loss. The information applies to children, birth through 21 years of age. The purpose of the Fact Sheet is to give general information on a specific topic. More specific information for an individual student can be provided through personalized technical assistance available from the project. For more information call (303) 866-6681 or (303) 866-6605. Updated: 4/13*