



**NEWBORN SCREENING  
OFFICE OF HEALTH PROMOTION**  
535 W. Jefferson St., 2<sup>nd</sup> Floor  
Springfield, IL 62761  
Phone: 217-785-8101  
Fax: 217-557-5396

## **Homocystinuria**

### **Information for Physicians and Other Health Care Professionals**

**Definition** Homocystinuria (HCU) is an inherited disorder of amino acid metabolism, caused by an enzymatic defect in a metabolic pathway that leads to increased levels of methionine.

**Clinical Symptoms** Typically the child with HCU is asymptomatic in the first few months of life. Clinical signs of HCU include developmental delay and ectopia lentis. Osteoporosis and predisposition to thromboembolism may be complications of the disorder.

**Newborn Screening and Definitive Diagnosis** In Illinois, newborn screening for homocystinuria is performed using tandem mass spectrometry. False positive and false negative results are possible with this screening.

**Infants with a presumptive positive screening test require prompt follow-up and, when notified of these results, the clinician should *immediately* check on the clinical status of the baby and refer the infant to a metabolic disease specialist.**

All siblings of infants diagnosed with homocystinuria should be tested; and genetic counseling services should be offered to the family.

**Treatment** Early diagnosis and prompt treatment is essential for an improved prognosis. Individuals with homocystinuria need life-long treatment, including a diet restricted in methionine and supplemented with medications. Folic acid and B12 supplements may be beneficial for some patients. Anticoagulants may also be indicated, but not typically for infants. Some individuals with HCU may respond to vitamin B6 (pyridoxine) supplements.

**Incidence** Homocystinuria has an estimated incidence of approximately one in 300,000 births.

**Inheritance Pattern** HCU is inherited in an autosomal recessive pattern. As an autosomal recessive disorder, the parents of a child with HCU are unaffected, healthy carriers of the condition, and have one normal gene and one abnormal gene. With each pregnancy, carrier parents have a 25 percent chance of having a child with two copies of the abnormal gene, resulting in homocystinuria. Carrier parents have a 50 percent chance of having a child who is an unaffected carrier, and a 25 percent chance of having an unaffected, non-carrier child. These risks hold true for each pregnancy.

**Physiology** Homocysteine is an intermediate compound in the degradation of methionine. Homocysteine is normally re-methylated to methionine. Catabolism of homocysteine is affected by a deficiency of an enzyme in this metabolic pathway; and the disorder results in elevated levels of homocysteine and methionine in body fluids.

**Key Points for Parents** Avoid overly alarming the child's parents if the diagnosis has not yet been confirmed. If the child needs additional testing or diagnostic evaluation, make certain that the parents understand the importance of following the pediatrician's and/or specialist's recommendations for additional testing and referrals.

**Follow-up After Confirmation of Diagnosis** These guidelines should be followed after a diagnosis of homocystinuria has been confirmed:

1. Parents should understand that treatment is lifelong and that compliance with dietary management and medications are imperative to the child's health, growth and development.
2. Infants and children with homocystinuria should have regular follow-up appointments with a metabolic disease specialist.
3. Long-term management, monitoring and compliance with treatment recommendations are essential to the child's well-being. A multi-disciplinary approach including the following specialities is recommended: pediatrics, genetics and nutrition. Parents should understand that treatment is not curative and that all morbidity cannot necessarily be prevented.
4. Genetic counseling services are recommended. A list of genetic counselors and geneticists whose services are available through the Illinois Department of Public Health should be given to the parents if they have not already seen a geneticist.
5. Provide a list of available support services in the community, such as the local health department, Early Intervention service providers and the University of Illinois at Chicago Division of Specialized Care for Children (DSCC).
6. Additional information about newborn screening can be found at:
  - Baby's First Test: <http://www.babysfirsttest.org/>  
Health Resource and Service Administration (HRSA), Grant no. U36MC16509, Quality Assessment of the Newborn Screening System.
  - National Center for Biotechnology Information: <http://www.ncbi.nlm.nih.gov/gtr/>  
National Center for Biotechnology Information, U.S. National Library of Medicine, 8600 Rockville Pike, Bethesda MD, 20894 USA.

