

Autosomal Recessive Inheritance

In determining whether a pattern of autosomal recessive (AR) inheritance is present, several issues may need to be considered:

Characteristics of Autosomal Recessive Inheritance

- Clinical findings occur where mutations are present in both copies of a gene pair.
- When parents are both carriers - that is, each carries a gene mutation in one gene and has a normal copy of the other gene - their children each have a 25% chance of being affected. Of the children who are unaffected, 2/3 will be carriers.
- If only one parent is a carrier, children will not be affected.
- Siblings of a person with the condition have a 25% chance of being affected.

Pitfalls in Providing Genetic Counseling for Autosomal Recessive Inheritance

- **Lack of family history.** There is usually no family history of similarly affected family members since autosomal recessively conditions are most likely to occur in siblings rather than in preceding generations; and in small families, multiple affected siblings are uncommon.
- **Autosomal recessive disease in sequential generations.** Occasionally autosomal recessive conditions occur in sequential generations: if the autosomal recessive condition allows a person to reach adulthood and to have children, *and* if the carrier rate for the condition is high, a person with the condition may marry a carrier; their children would have a 50% chance of inheriting the condition.
- **Misassigned paternity.** If the biologic father of an affected individual is someone other than the person assumed to be the father, misleading carrier test results might occur (the apparent father would usually not be a carrier) and risk of additional affected children could be misstated.
- **Uniparental disomy.** If a couple in which only one partner is a

carrier has an affected child, it may rarely be due to uniparental disomy: in this case both gene mutations are inherited from the parent who is a carrier, due to an error in the formation of sperm or ovum.

- ***De novo* mutations.** Although also rare, *de novo* mutations can account for ~1% of gene mutations in some disorders and thus provide another explanation for the birth of an affected child when only one parent is a carrier.