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Seizure Disorders

Seizures are caused by abnormal electrical activity of nerve tissues in the brain. There are many causes of seizures, including genetic and environmental. Some environmental causes of seizure disorders include head injury, brain tumors, ischemic injury and infections. The recurrence risk (the chance for a relative to be affected) in disorders of environmental origin is not increased above the general population risk of 1%.

Seizures with a genetic cause may be isolated or may occur as part of a more medically complicated genetic disorder. There are over 140 distinct genetic syndromes in which seizures occur. Examples of these genetic syndromes include: tuberous sclerosis, mitochondrial diseases and metabolic disorders. Recurrence risks can vary by diagnosis, so a genetics evaluation is recommended to accurately identify a syndromic diagnosis.

Most seizure disorders are not caused by a genetic syndrome, but can still be a result of a genetic mutation. Emerging research on the genetics of seizure disorders has found mutations that affect the normal activity of the nerve pathways of the brain. Such mutations may be inherited or new to the family. Increasingly, genetic testing will be important in determining the cause of seizure disorders.

The complex interactions between genetic susceptibility and environmental factors are still poorly understood. For those with otherwise unexplained seizure disorders the best predictors for recurrence risk still rely on review of the family history and the observed rates of recurrence in at-risk families. The risk for seizure disorders is greater for first-degree relatives (parents, sibling, and children) of the affected individual and is lower for more distant relatives. Recurrence risks are estimated to be greater if there are two or more relatives with a seizure disorder and may be influenced by seizure type, age of onset, and which parent is affected.

Affected Relative	Recurrence Risk
Sibling	2.5%
Sibling <10 years	6%
Sibling >25 years	1-2%
saParent	4%
Both parents	~15%
1 Parent & 1 Sibling	~10%

Despite these risks, it is important to remember that greater than 90% of people with seizure disorders do not have any affected relatives and most parents with seizure disorders do not have children with seizure disorders.

Febrile seizures (seizures that occur with fever) occur in 2-3% of the population. The risk of febrile seizures is increased in siblings, offspring, nieces and nephews of individuals with febrile seizures. The risk to siblings ranges from 8-15%. A child who has febrile seizures has a 2.5% lifetime risk of developing a seizure disorder.

Testing: See Genetests.org. Tests are indicated by seizure type, age of onset, progression, other clinical findings and directed by a neurologist or a medical geneticist. Prenatal diagnosis is limited.

Additional Information
Medline Plus: http://www.nlm.nih.gov/medlineplus/seizures.html