Sometimes boys are born with an X-linked condition even though their mother is not a carrier. When this happens, it is particularly important to get specialist advice about future pregnancies.

If men who are affected with an X-linked condition have children, all of their daughters will inherit the altered gene on their X chromosome and will be carriers.

Men do not pass on their X chromosome to their sons. Therefore, if a man affected with an X-linked condition has sons, then none of the sons would be affected with the condition.

Feedback

We appreciate and encourage feedback. If you need advice or are concerned about any aspect of your care or treatment please speak to a member of staff or contact the Patient Advice and Liaison Service (PALS):

Freephone: 0800 183 0204
From a mobile or abroad: 0115 924 9924 ext. 65412 or 62301
E-mail: pals@nuh.nhs.uk
Letter: NUH NHS Trust, c/o PALS, Freepost NEA 14614, Nottingham NG7 1BR

www.nuh.nhs.uk

X-linked inheritance

Information for patients

Clinical Genetics

This document can be provided in different languages and formats. For more information please contact:

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What does X-linked inheritance mean?
X-linked inheritance describes a genetic condition or disease that is associated with a gene found on the X chromosome.

If a man has an altered gene on his X chromosome, he will be affected with the genetic condition as he has only one X chromosome and there is no working copy of the gene.

If a woman has an altered gene on one of her two X chromosomes, then she will be a carrier of that genetic condition. Female carriers are usually healthy because there is a second X chromosome with a working gene to compensate.

In certain X-linked conditions some of the female carriers may show some mild symptoms of the condition.

Implications for having children
If a woman who is a carrier of an X-linked condition has a son:

- There is a 50% (1 in 2) chance that the boy will inherit the X chromosome with the altered gene and will be affected with the condition.
- There is a 50% (1 in 2) chance that the son will inherit the X chromosome with the working gene and therefore will not be affected with the condition.

If a carrier woman has a daughter:

- There is a 50% (1 in 2) chance that the girl will inherit the X chromosome with the altered gene. If this happens, she will be a carrier, like her mother.
- There is a 50% (1 in 2) chance that the daughter will inherit the X chromosome with the working gene and therefore will not be a carrier of the condition.

What are genes and chromosomes?
Genes are a unique DNA sequence that act as instructions that tell our cells how to function and what characteristics to express. The combination of the genes we inherit makes us all unique individuals. If a gene is altered (or ‘mutated’), it can cause a genetic condition or disease. We have about 20,000 different genes, which lie on chromosomes.

Chromosomes are thread-like structures that are made up of tightly packaged DNA. We have 46 chromosomes in most cells in our body, arranged in pairs. We normally inherit one of each of the pairs of chromosomes from our mother and one from our father.

Chromosomes are numbered 1-22 according to their size. The final pair are called sex chromosomes and they are given the letters X and Y rather than numbers.

Females have two X chromosomes, one inherited from their mother and the other from their father. Males have one X chromosome (inherited from their mother) and a Y chromosome (inherited from their father), see diagram below.