

Information for Patients and Families

# X-linked Inheritance

## What are Genes?

Genes are the unique set of instructions inside our bodies which make each of us an individual. There are many thousands of different genes, each carrying a different instruction. If a gene is altered, it can cause a genetic condition. This gene alteration is sometimes known as a **gene variant**.

## What does X-linked inheritance mean?

X-linked conditions occur when an altered gene is located on the **X chromosome**.

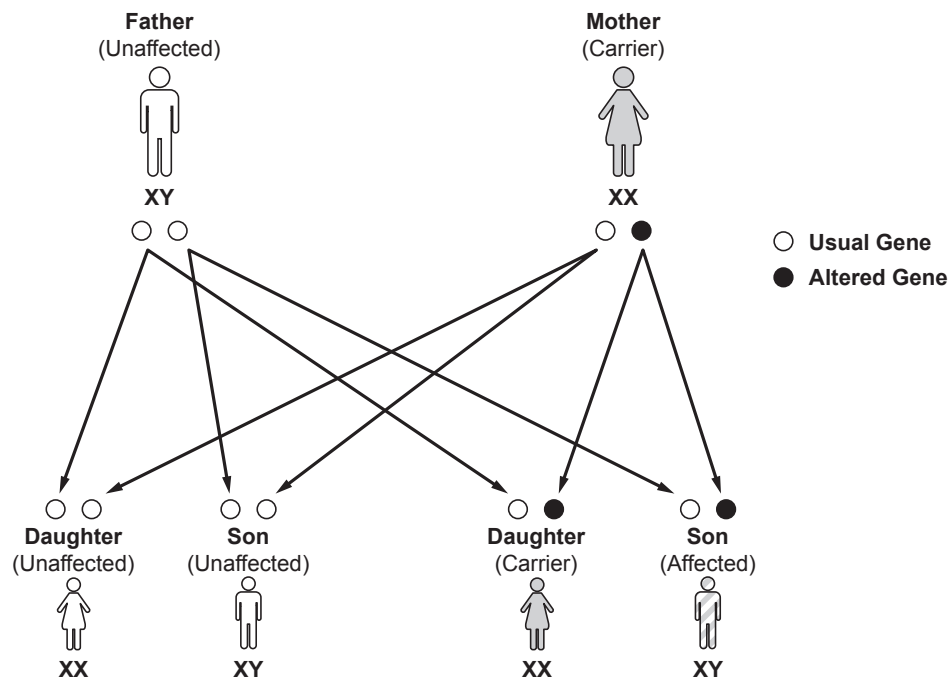
- Women have two X chromosomes. If a woman has an altered gene on one of her X chromosomes, then she will usually be a healthy carrier. She is healthy because she has a second copy of the gene on her other X chromosome that can usually compensate. However, in some conditions, the second copy may not compensate completely, and she may have mild symptoms.
- Men have one X and one Y chromosome. If a man has an altered gene on his X chromosome, he will be affected by the condition, as he does not have a second X chromosome to compensate.

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## Having children

The diagram below shows an X-linked pattern of inheritance.



If a woman who is a carrier has children:

- Each son has a 50% (1 in 2) chance of inheriting the altered gene and being affected.
- Each daughter has a 50% (1 in 2) chance of inheriting the altered gene and being a carrier, like her mother

If a man with an X-linked condition has children:

- All of his daughters will inherit the altered gene and be carriers.
- None of his sons will inherit the condition, because fathers pass on their Y chromosome to sons, not their X chromosome.

Sometimes boys are born with X-linked conditions even though their mothers are not carriers. When this happens, it is particularly important for her to get specialist advice about future pregnancies.

## Further information

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