HEMAWARE

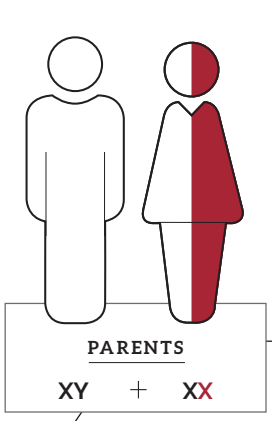
Hemophilia Genetics 101

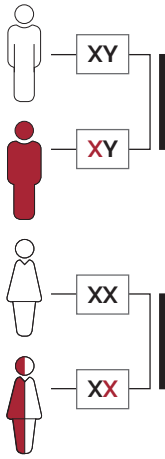
WHAT CAUSES HEMOPHILIA? The condition is caused by a problem in one of the genes (factor VIII or factor IX) that tells the body to make the clotting factor proteins needed to form a blood clot. These genes are located on the X chromosome. Males have one X and one Y chromosome (XY), and females have two X chromosomes (XX). As a genetic disorder, hemophilia can be passed on to a child. The scenarios below illustrate how this happens.

HEMOPHILIA INHERITANCE PATTERN

Scenario 1

The **mother** is a carrier of the hemophilia gene, and the **father** does not have hemophilia.





SONS

50% chance each son will have hemophilia

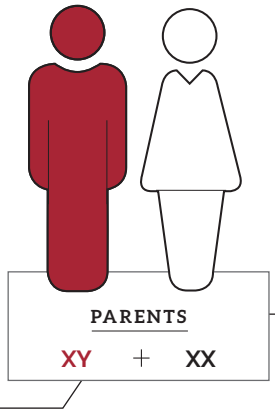
DAUGHTERS

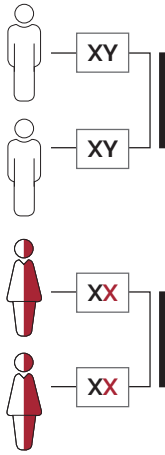
50% chance each daughter will be a carrier of the hemophilia gene

HEMOPHILIA INHERITANCE PATTERN

Scenario 2

The **father** has hemophilia, and the **mother** does not carry the hemophilia gene.





SONS

0% chance sons will have hemophilia

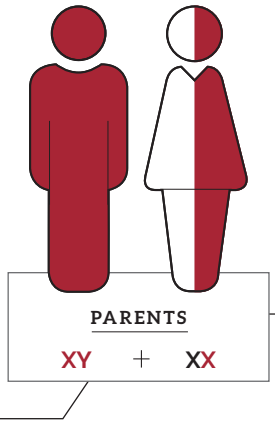
DAUGHTERS

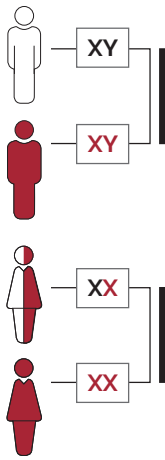
100% chance daughters will carry the hemophilia gene

HEMOPHILIA INHERITANCE PATTERN

Scenario 3

The **father** has hemophilia, and the **mother** is a carrier of the hemophilia gene.





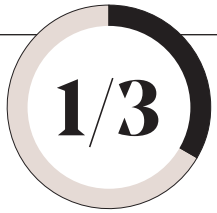
SONS

50% chance each son will have hemophilia

DAUGHTERS

100% chance each daughter will be a carrier of the hemophilia gene

50% chance each daughter will have hemophilia



Proportion of people diagnosed with hemophilia who have no family history of the bleeding disorder. In these cases, it's thought the cause is a change (called a mutation) in the gene's instructions for making clotting factor protein. This change can prevent the clotting protein from working properly, or the protein may be missing altogether.