Hemophilia A and B are called X-linked recessive conditions, meaning the gene that causes hemophilia is on the X chromosome. Males have one X chromosome (XY), and females have two X chromosomes (XX). Therefore, hemophilia usually affects males. When a male has inherited a gene that causes hemophilia on his X chromosome he does not produce the clotting factor he needs because the Y chromosome does not provide information for the production of factor VIII or IX. When a female inherits a gene that causes hemophilia on one of her X chromosomes, she has a second X chromosome, and therefore one normal gene that produces clotting factor and compensates for the hemophilia gene. These females are said to be carriers of hemophilia.

Men who have hemophilia pass on the hemophilia to all (100%) of their daughters; therefore all of their daughters are carriers. None of their sons receive the father’s X-chromosome with the abnormal gene, so none will have hemophilia.

Women who are carriers have a 50% chance to pass the hemophilia gene on to their children. Each son of a carrier has a 50% chance to have hemophilia and each daughter has a 50% chance to be a carrier. If a woman who is a carrier is pregnant (gender unknown), she has a 25% chance to have a son with hemophilia, a 25% chance to have a daughter who is a carrier, and a 50% chance to have a son or daughter who does not have hemophilia and is not a carrier. If her first child is a male who does not have hemophilia, there is still a 50% chance that the next male may have hemophilia. The chance to pass on the hemophilia gene is the same with each pregnancy, whether her previous children have hemophilia or are carriers.

Women who are carriers may experience bleeding symptoms, as they may have factor levels low enough to be in the mild range of deficiency. Females who carry hemophilia should have their factor (VIII or IX) levels checked to ensure they have adequate levels for normal blood clotting. See the “Hemophilia Carrier Fact Sheet” for additional information regarding women who are carriers or at risk to be carriers of hemophilia.

We encourage our patients and their parents to make their family members aware of how hemophilia is inherited and their chances to have hemophilia or have a child with hemophilia. This allows family members to make informed decisions about their care, and obtain the proper treatment and information.

If you are a carrier, but do not have a known family history of hemophilia, it is still possible that there are other women in your family who carry the gene for hemophilia. Therefore, it is possible that there are other family members at risk.

Genetic testing is available for individuals with hemophilia and women at risk of being carriers. See the “Hemophilia Genetic Testing Fact Sheet” for additional information.

Please contact the Center’s genetic counselor at 317-871-0000 or toll-free 1-877-256-8837 to discuss this information further or if assistance can be provided.