Patient Information: *RUNX1* gene

Why have I been given this information sheet?
You have been given this information sheet because you had genetic testing. This tested a sample of your blood cancer. Your cancer sample has shown an alteration in a gene called *RUNX1*. This information sheet will help you understand what this means.

This gene alteration may partly explain why you have blood cancer. It may be used to help guide your treatment plan. The *RUNX1* gene alteration may only be present in your cancer cells. It is also possible that it is a gene alteration you were born with. In this case, there may be an inherited cause for your cancer. You have the option of further tests to try to clarify this. If you are found to have an inherited gene alteration you will be referred to your local Clinical Genetics service. They will help you understand what this means for you and your family.

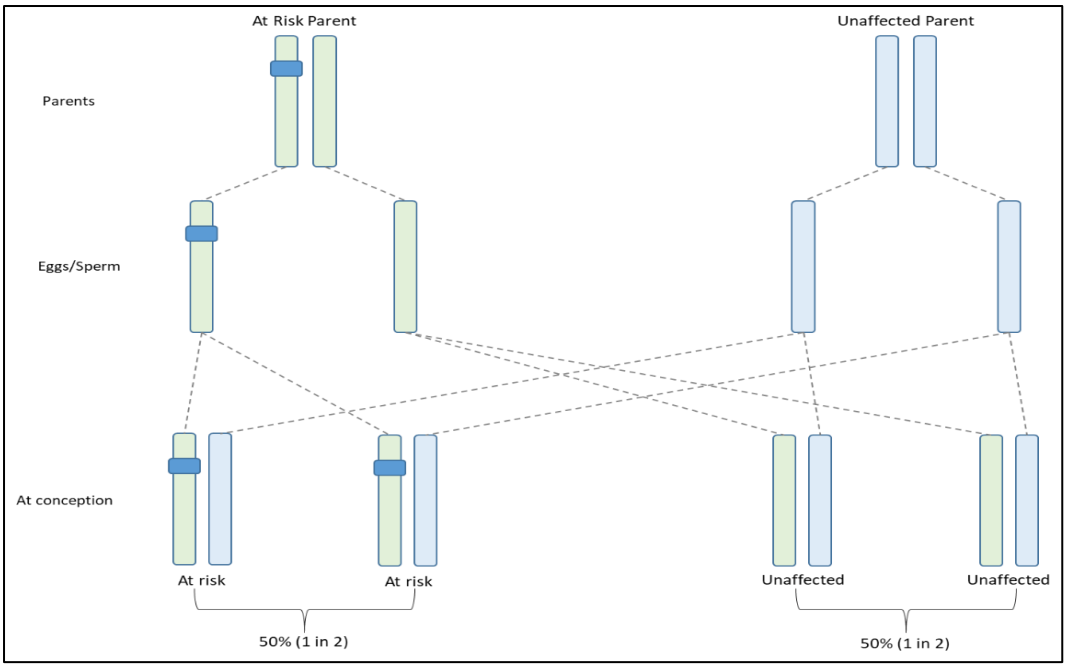
How often is blood cancer hereditary?
Most blood cancers do not have an inherited cause. Occasionally, blood cancer is linked to family history. Even if there is only one person in the family with blood cancer, it can sometimes still have an inherited cause.

We know of some gene alterations linked to an increased risk of blood cancer. Different words are used to describe these. These include “mutation,” “disease-causing alteration”, or “pathogenic variant.” The most up to date scientific term is “pathogenic variant.” This describes a gene alteration that is linked to an increased health risk.

What are the risks associated with inherited pathogenic variants in *RUNX1*?
People who inherit a pathogenic variant in *RUNX1* have an increased risk of thrombocytopaenia (low platelet count). They can bleed easily and can take longer to stop bleeding. They should avoid medicines that can affect bleeding. It can also make some procedures more risky, for example surgery and labour in pregnancy. Sometimes people with this condition are severely affected. They are managed by a specialist team to help reduce bleeding risks.

People who inherit a pathogenic variant in *RUNX1* have an increased risk of bone marrow problems and blood cancers. The lifetime risk of developing a *RUNX1*-associated blood cancer is around 25-50% (25 to 50 people out of 100). In a recent study, many people with an inherited *RUNX1* pathogenic variant reported an allergic condition or an autoimmune disorder, like eczema. The risks linked to this gene are not the same in all families.

Information for family members when a *RUNX1* pathogenic variant is hereditary
We have two copies of the *RUNX1* gene. The children of someone with a *RUNX1* pathogenic variant have a 50% (1 in 2) chance of inheriting it. This is shown in the diagram below.



If your relatives are worried, they can ask for advice from their local genetics service. Testing is usually offered to close relatives first. This means parents, siblings and children. Testing is then offered to the wider family once we know which side it has come from, or which relatives are at risk. Sometimes a person can be the first person in a family to be born with a pathogenic *RUNX1* variant. This person can then pass it on to their children.

What can you do about risks linked to an inherited *RUNX1* pathogenic variant?

People at risk of bleeding problems will have a referral to a specialist. It will be to a specialist doctor called a haematologist. This is available on the NHS. They can tell you about medications and activities that are safe. People at risk can also register with the UK Haemophilia Centre. This provides specialist advice and healthcare.

People at risk may be offered a blood test to look for blood problems early. This test is limited in what it can find. People at an increased risk will be given the chance to talk through the pros and cons of this test.

It is important know what symptoms to look out for. The signs of a blood cancer are often non-specific. They include tiredness, weight loss and fever. They also include excess bruising and bleeding. It is important to tell your GP about your genetic test result when you report any symptoms. Everyone can reduce their cancer risk by having a healthy diet and weight. Not smoking and drinking less alcohol also help.

Genetic testing in family members

Having a predictive genetic test for the inherited *RUNX1* variant found in your family is a personal choice. Not everyone wants to know about their cancer risk. The first step to genetic testing is a referral to a local genetics service. A GP can make this referral. A genetics appointment can be used to talk it through. After discussion people can make their own choice. Genetic testing may be used to help find out if a relative could be a match as a bone marrow donor.

Insurance

In the UK, there is a Code on Genetic Testing and Insurance. Insurance companies can only ask for the results of a predictive genetic test in limited circumstances. More information is on the Association of British Insurers website: https://www.abi.org.uk/. If you are taking out insurance, we suggest using an accredited insurance broker. This is important for life, critical illness, or income protection. Carefully read the small print when taking out insurance.

Resources and support

Having a genetic test can sometimes increase anxiety. You can talk to your healthcare team about concerns. If you have already been referred to the Clinical Genetics service, you can contact your genetics doctor or genetic counsellor.

Information, practical & emotional support for families affected by any type of leukaemia, Myelodyplastic Syndrome (MDS) or Myelodyplastic Neoplasm (MPN): https://leukaemiacare.org.uk

Reliable information and caring support about Myelodyplastic Syndrome (MDS) or Chronic Myelomonocytic Leukaemia (CMML): https://mdspatientsupport.org.uk

The *RUNX1* Research Program (RRP) is committed to funding world-class, innovative and cross-disciplinary cancer research to find a cure for those individuals with hereditary *RUNX1* variants. RRP also supports, informs, educates and connects patients and healthcare providers in the *RUNX1* community: https://runx1-fpd.org

UK CANCER GENETICS GROUP

CanGene CanVar

Leukaemia Care
YOUR Blood Cancer Charity

MDS UK
Supporting Patients with Bone Marrow Failure
www.mdspatientsupport.org.uk

runx1
The *RUNX1* Research Program