What is personalised care in haematological (blood) cancers?

Haematological cancers, also called blood cancers, are cancers that affect the blood, bone marrow (the place in the body that makes blood) and the lymphatic systems. Examples of blood cancers include leukaemia, lymphoma and multiple myeloma.[1,2]

Just as every person is unique, so is their blood cancer.[2–4] This is why personalised care is critical. It allows an individual, together with their healthcare team, to **tailor treatment options that are best suited to them**, taking into account their cancer's **genetic information**, along with their unique **lifestyle, values** (i.e. preferred outcomes or treatment goals) and their overall **environment** (for example, exposure to toxins like cigarette smoke).[5–7]

Moving towards personalised cancer care

A better understanding of the biology of blood cancers, as well as advances in cancer tests and treatment options, has helped move care from a **traditional**, 'one size fits all' approach to a **precision** approach. This marks an important step towards making progress with **personalised** care.[3–13]

Everyone with the same type of blood cancer was **managed the same, with traditional treatments** (chemotherapy and/or bone marrow transplantation)[13,14]

Decisions about treatment can be based on the blood cancer's **genetic information**[4,5,7,8,12,13,15]

Decisions about treatment may be based on the blood cancer's **genetic information**, along with the person's **lifestyle, values** (i.e. preferred outcomes or treatment goals) and overall **environment**[5–7]

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Testing blood cancers is key for personalised care

Testing an individual's blood cancer, at diagnosis or throughout their treatment, can **reveal important genetic information**. This information can help make sure an individual is being given the **best suited treatment plan**.[4,12,16]

Biopsy

A sample of the blood cancer is collected, usually by a **bone marrow biopsy** or **bone marrow aspiration biopsy**[4,17–20]

Liquid biopsy is a new non-invasive approach that examines fluids (for example, blood)[20]

Genetic information

Tests can detect the blood cancer's **genetic information**[4,10,12,17,21]

Test results

Test results can reveal important information about a blood cancer (but results are not always conclusive)[4,21,22]

Personalised treatment

Knowing the genetic information in a blood cancer may help **guide treatment options** and personalise treatment[10,15,16,21–31]

Biopsies usually involve collecting a sample of the cancer from the bone marrow.[17–20,32] This can be done by taking a solid piece of bone marrow **(bone marrow biopsy)** or a liquid portion of bone marrow **(bone marrow aspiration)**.[3,17,32] Once collected, the sample can be analysed.[20,32]

DNA and/or RNA profiling is an established test that can analyse the genetic information of blood cancers.[4,10,16,27,30,31,33] This approach looks at certain biomarkers found in the DNA and/or RNA of the blood cancer, which may inform about treatment options or reveal important information about the cancer.[21,22]

Comprehensive genomic profiling, also known as CGP, is a type of profiling test that can detect multiple biomarkers at the same time.[13,21,22,33]

What are biomarkers?

Biomarkers are molecules found in cells (e.g. genes) that provide important information about a person's blood cancer.[12] Blood cancer biomarkers are being investigated.[12]

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Why should I get tested?

Testing is key to implementing personalised care for people with blood cancer.[12,27,30,33–34] **Predicting how people will respond to a certain treatment** is just one way that understanding the genetic information of a blood cancer might help personalise care.[21,22,26,30]

How might understanding a blood cancer's genetic information help predict treatment responses?

- The problem with using the same traditional treatments for everyone is that some people do not respond as well as hoped, particularly to chemotherapy[4,25]
- The presence of certain genetic information can help predict whether a blood cancer will respond well to treatment, or not respond at all (treatment resistance)[3,21,22,25,27,28,33,35]
- This can help remove the guesswork from care and help avoid unnecessary treatments and side effects[17]

Other ways of personalising treatment based on a blood cancer's genetic information

Understanding the genetic information may provide a better picture of a person's blood cancer and establish a more **accurate diagnosis**. This could help guide care plans and allow people to learn more about their cancer.[3,4,10,21,23,31,33]

If a blood cancer has a certain biomarker, **personalised treatments** (such as targeted treatments or immunotherapies) may be selected to target the biomarker.[4,21,22,25,26]

Testing for certain pieces of genetic information that are present in blood cancer can help **monitor treatment responses** to ensure a treatment is working.[27,31,37,38] Doctors can test for small amounts of blood cancer cells, known as measurable residual disease (MRD). If no MRD is detected, the treatment is likely effective. If MRD is detected, an alternative treatment may be selected.[3,4,11,17,27,36–39]

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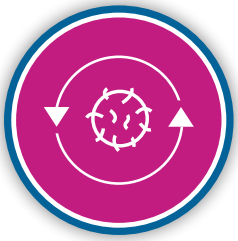

For those who have completed treatment, MRD can make it easier to **predict if a cancer may return (recurrence)**.[3,31,36] This can help detect the blood cancer earlier, which could potentially help an individual get appropriate care earlier.[3,31]

Testing large samples of blood cancer cells can help pinpoint which pieces of genetic information or biomarkers are responsible for the cancer developing or progressing. This can help **researchers better understand every blood cancer and potentially develop new treatments** that can target the genetic information.[3,21,23,29,34,40] CGP can be helpful because it can analyse large quantities of data from one sample.[21,23]

Understanding the genetic information of your blood cancer may help you receive the right treatment, at the right time[15,16,23,26,28]

Potential benefits of personalised cancer care

Personalised care can provide better suited treatments and better ways to manage blood cancers.[5,7,34] It has the potential to help people avoid unnecessary treatments that don't work for them and allow them to start the right treatment earlier.[36] If used in practice, personalised care could lead to:

- Better **health outcomes**[16,34]
- Improved **quality of life** with less impact on daily routines[41]
- **Financial benefits** for people with cancer and health systems by enabling the use of more effective treatments earlier[36,42]
- Broader benefits to **society** through improved health and wellbeing, and more efficient use of healthcare resources[42]

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What's next for personalised care in blood cancers?

Liquid biopsies are a new diagnostic approach that can analyse different components of a cancer from a sample of bodily fluids (for example, blood).[18,20] As only a simple test is needed, liquid biopsies are non-invasive. This means they may be less painful and more convenient than bone marrow biopsies.[17,19,43]

Liquid biopsies can detect small pieces of genetic information that have leaked from the cancer into the bloodstream, known as **circulating tumour DNA**, or **ctDNA**. ctDNAs can reveal important information about a cancer.[43] There are several possible uses for ctDNA-mediated liquid biopsies, and their **role in personalised care for blood cancers is promising**.[4,18–20] For example:

ctDNA can provide a **clearer snapshot** about a person's blood cancer that may be missed with traditional biopsies. More complete genetic information can improve overall understanding of blood cancers and guide treatment decisions.[4,17,19]

The convenience of liquid biopsies means ctDNA can be **measured repeatedly**. This may allow for real-time monitoring of treatment responses, resistance and earlier detection of recurrence, which can potentially enable earlier intervention.[4,17–19]

Liquid biopsies could be **used with CGP tests** in the future. This could help detect multiple biomarkers of ctDNAs from a single blood sample, potentially allowing for a better selection of suitable treatments.[4,40,44]

For these reasons, ctDNA-mediated liquid biopsies may be used with, or instead of, traditional approaches in the future.[4,12,17–19] However, more research and data are needed to fully use this approach in routine care of blood cancers.[4,17,19,20]

Getting tested and giving your consent to share your cancer's genetic information can help you and others benefit from personalised care

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