



**Down's Syndrome
Association**

A Registered Charity No. 1061474

Health Series



Leukaemia

A Down's Syndrome Association publication

Our resources and Information Team are here to help

Please see our website for up-to-date information: www.downs-syndrome.org.uk

If you would like to talk about any of the issues raised in this resource, then please get in touch with our helpline by calling 0333 1212 300 or by emailing us on

info@downs-syndrome.org.uk.

Helpline Monday - Friday 10am-4pm | Telephone: 0333 1212 300

The Down's Syndrome Medical Interest Group (DSMIG)

This resource has been produced in collaboration with the Down's Syndrome Medical Interest Group (DSMIG).

DSMIG was launched in 1996 and is a registered charity. It is a network of healthcare professionals – mainly doctors – from the UK and Republic of Ireland whose aim is to share and disseminate information about the medical aspects of Down syndrome and to promote interest in the specialist management of the syndrome.

Leukaemia is a type of cancer that results in large numbers of abnormal white blood cells. These are the cells that are responsible for fighting infection in the body. Although the condition is rare it is more likely to develop in children with Down's syndrome when compared to other children in the general population.

Leukaemia is a life-threatening disease but with modern chemotherapy and other treatment there is a good outcome for many children with this diagnosis.

This resource will explain the different types of leukaemia including the symptoms these diseases cause and how they are treated in children.

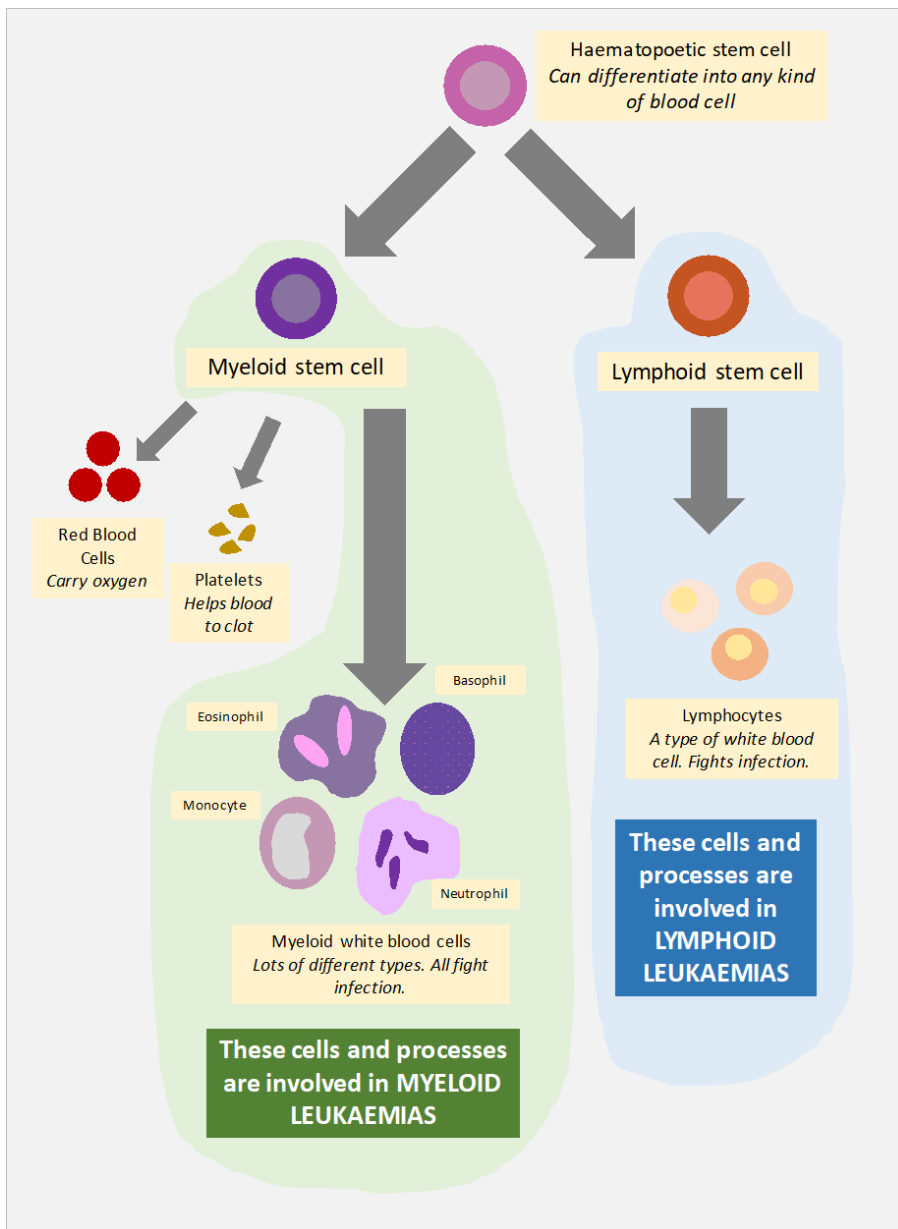
Background Information on blood cells

Blood cells are produced in the bone marrow from immature stem cells.

These stem cells are modified as they mature and develop into a variety of specialist cells with different functions. This maturation process is called haematopoiesis and it produces two different groups of cells – called myeloid cells and lymphoid cells.

Each group contains several different types of blood cell that each have different functions to keep you healthy – see diagram opposite.

Haematopoiesis



Leukaemia

Leukaemia occurs when this maturation process goes wrong and large numbers of immature cells called blasts are produced. These blasts are present in the blood stream in high numbers and can be seen when blood is looked at under a microscope. Other blood cells that are normally produced may be present in reduced numbers so children can be pale and bleed more easily.

Those affected can have no symptoms initially but can become generally unwell and develop enlarged lymph glands, liver or spleen and other symptoms. All people with leukaemia are seen in specialist centres to confirm the diagnosis and their treatment depends on the specific type of leukaemia that they have.

Types of leukaemia seen in children with Down's syndrome

Firstly, leukaemia is classified by the way the child presents; if the onset is quick it is named an acute leukaemia and if slow then it is called chronic leukaemia. Acute leukaemia is by far the most common in children with Down's syndrome.

The second classification is based on the type of cell that is involved. If this process happens in a cell from the myeloid line, the leukaemia is called myeloid leukaemia and if it happens in the lymphoid line then it is called lymphoid leukaemia. Both Acute Myeloid and Acute Lymphoid Leukaemia occur in children with Down's syndrome more commonly than in the general population and have roughly equal incidence. As the presentation, management and outcome vary between the two conditions we will discuss them separately.

In addition, some babies with Down's syndrome may have a unique condition called Transient Leukaemia of Down syndrome (TL-DS). This is a pre-leukemic syndrome and occurs in about 4-10% of new-born babies with Down's syndrome. Babies with TL-DS have an increased chance of developing Acute Myeloid Leukaemia in early childhood.

Acute Myeloid Leukaemia in children with Down's syndrome (AML)

Children with Down's syndrome are more likely to develop AML compared to children without Down's syndrome. Most commonly AML develops in children under 4 years of age with the average age at diagnosis of 21 months. This type of AML is often linked to a specific genetic abnormality in the blood cells genes called GATA1 that is only seen in children with Down's syndrome. (We will talk more about GATA1 in the section about TL-DS at the end of the article.)

Sometimes it may be hard to detect the symptoms of AML which can be subtle initially and develop over time. Symptoms may include enlarged lymph glands and/or enlarged liver and spleen, fever, increased bleeding or bruising. Children with this condition are referred urgently to Paediatric haematology and sometimes admitted to hospital for diagnosis, which will include blood tests and a bone marrow aspirate. They may also have scans and other investigations to document the extent of the body that is involved.

Treatment usually involves several courses of chemotherapy over many months. With treatment, AML in children under 4 years has a very good outcome. A study in 2006

found over 90% of children with Down's syndrome recovered from AML with few complications following low dose chemotherapy.

Children who are older than four years at the age of diagnosis with AML often have a variation of AML which sadly does not respond as well to treatment and event free survival only occurs in one third of these children.

Acute Lymphoid Leukaemia in children with Down's syndrome (ALL)

In the general population ALL is the most common of all childhood malignancies but thankfully is still a rare condition affecting less than 1 in 5000 children. Children with Down's syndrome have an increased risk of developing ALL which is estimated at about 25 times more than those without Down's syndrome. There is thought to be a link between the extra copy of chromosome 21 and the development of this disease, but it is not fully understood and is still being researched.

ALL occurs slightly later in life than AML with an average age of onset at 4.5 years. Children can present with symptoms similar to those seen in AML such as pallor due to anaemia, infections, increased bleeding resulting in bruising and a rash or bone pain.

There are several different subtypes of ALL that have different prognoses and the treatment regimes can vary depending on the specific type of leukaemia. Where possible, children will be asked to participate in current clinical trials so that we can learn more about the best treatment for children.

Previously children with Down's syndrome who had leukaemia were reported to have reduced survival rates when compared to other children as they were more prone to the side-effects of the chemotherapy such as infections. However, more recent studies have shown that with some specific treatment modifications to reduce toxicity, the survival rate in children with Down's syndrome is improving and approaching that of the general population.

Transient Leukaemia of Down's syndrome (TL-DS)

Between 4-10% of children with Down's syndrome will be born with a blood condition called TL-DS. It is also known as Transient Acute Myeloid Leukaemia (TAM) or Transient Myeloproliferative Disorder (TMD). It is similar to Leukaemia but is a temporary condition that usually resolves without any treatment as the baby gets older.

This disorder is only seen in babies with Down's syndrome and is caused by a gene abnormality in the blood cells, called GATA1. The gene abnormality causes disruption in the maturation of cells in the myeloid line and babies are born with abnormal cells in their blood, like those seen in AML.

Sometimes babies can be unwell with this condition and doctors examining the baby may pick up a large liver or spleen, see a rash or find that the liver isn't working properly with blood tests. But usually babies with TL-DS will not have with any symptoms and the condition can be missed if the baby is not tested for it.

In over 80% of cases TL-DS resolves without any treatment by 3 months of age. A few babies, who are more severely affected, may need treatment with chemotherapy.

Children with TL-DS usually respond well to therapy and most recover fully from this condition.

Why TL-DS is important?

Babies who have TL-DS are at increased risk of developing leukaemia in childhood. The exact numbers vary in the literature but about 20% of children with TL-DS will go on to develop AML under the age of 4 years.

Neonatal Guidelines produced by the Down Syndrome Medical Interest Group (DSMIG) in 2018 recommend that all children with Down's syndrome have a blood test called a full blood count and a blood film taken in the first 3 days of life. (This blood test is often taken at the same time as the genetic blood test which confirms the Down's syndrome diagnosis.) If these tests show high levels of blast cells, then further tests can be done to look at the GATA1 gene to make the diagnosis of TL-DS.

All babies with TL-DS should be referred to a haematologist and followed up with regular blood tests for the first 4 years of life. This hopes to identify leukaemia early and so improve the outcomes of any treatment.

Long term outcomes for Children with Down's syndrome and Leukaemia

A recent study followed up children who had been diagnosed with different types of leukaemia. They found that children with Down's syndrome and AML have better outcomes when compared to children without Down's syndrome who have this condition. It also found that people with Down's syndrome are less at risk of developing other "secondary cancers" as a long-term complication of treatment.

Adults

There is some debate on whether the increased risk of leukaemia continues into adulthood, but the research evidence is limited. One study of 2814 Danish individuals with Down's syndrome found no cases of leukaemia after the age of 29, suggestive that the risk decreases significantly in later life. Adults with Down's syndrome have a significantly reduced risk of developing cancer generally when compared to adults without Down's syndrome.

Summary

Leukaemia occurs when there is an abnormality in blood cell development. It is a rare condition that can occur in any child but is more common in those who have Down's syndrome. Although this is a serious disease, with current medical knowledge and treatment long-term outcomes have significantly improved over the last 20 years. Testing at birth can identify babies with Down's syndrome who are at increased risk so that they can have appropriate follow-up and earlier treatment.

It is worth remembering that although Leukaemia is more common in Down's syndrome it is still a rare disease and most children with Down's syndrome will not develop this. However, if you are worried about any unusual symptoms it is always best to discuss your concerns with your GP.

Annual health checks for people with Down's syndrome (aged 14 years plus)

In the past people with learning disabilities have not had equal access to healthcare compared to the general population. This, amongst other reasons, has given rise to poorer mental and physical health and a lower life expectancy for people with learning disabilities. Free annual health checks for adults with learning disabilities, with their GP, were introduced in 2008 as a way to improve people's quality of life.

The annual health check for people with learning disabilities is a Directed Enhanced Service (DES). This is a special service or activity provided by GP practices that has been negotiated nationally. Practices can choose whether or not to provide this service. The Learning Disability DES was introduced to improve healthcare and provide annual health checks for adults on the local authority learning disability register. To participate in this DES, staff from the GP practice need to attend a multi-professional education session run by their local Trust. The GP practice is then paid a sum of money for every annual health check undertaken.

Who can have one?

Annual health checks have been extended to include anyone with learning disabilities aged 14 years or above. So anyone with Down's syndrome aged 14 years or over can have an annual health check.

The benefits of annual health checks

- additional support to get the right healthcare
- increased chance of detecting unmet, unrecognised and potentially treatable health conditions
- action can be taken to address these health needs.

How to get an annual health check

- The GP may get in touch with the person with Down's syndrome to offer an annual health check but this doesn't always happen.
- A person with Down's syndrome and/or a supporter can ask their GP for an annual health check. You do not need to be known to social services to ask for an annual health check.

Not all GPs do annual health checks for people with learning disabilities but they should be able to provide details of other GPs in your area who offer this service.

What happens next?

- The GP practice may send out a pre-check questionnaire to be filled out before the annual health check takes place.
- The GP may arrange for the person with Down's syndrome to have a routine blood test a week or so before the annual health check.

Who attends the annual health check?

If the person with Down's syndrome (age 16 years or over) has capacity and gives their consent, a parent or supporter can attend the health check as well.

How long should an annual health check be?

Guidance from the Royal College of GPs suggests half an hour with your GP and half an hour with the Practice nurse.

What areas of health should be looked at as part of the annual health check?

We have produced a check list for GPs which contains information about what should be included as part of a comprehensive and thorough annual health check. This includes a list of checks that everyone with a learning disability should undergo as part of an annual health check and a list of checks specific to people with Down's syndrome. You can find the health check list at the 'annual health checks' section of our website under 'families and carers and 'health and wellbeing'.

What happens after the annual health check?

Your GP should tell you what they and the nurse have found during the annual health check. You should have a chance to ask any questions you have. Your GP may refer you to specialist services for further tests as appropriate. Your GP should use what they have found during your annual health check to produce a health action plan. This should set out the key actions agreed with you and (where applicable) your parent or carer during the annual health check. Your GP has to do this as part of the annual health check service.

Information about health issues for GPs

There is information at our website for GPs about some of the more common health conditions seen in people with Down's syndrome. You will find this information at the 'annual health checks' section of our website under 'families and carers and 'health and wellbeing'.

GPs learning disability register

People with learning disabilities experience poorer health compared to the rest of the population, but some ill health is preventable. Over one million people in the UK have a learning disability but only 200,000 are on their GPs learning disability register.

We know that people with a learning disability often have difficulties accessing health services and face inequalities in the service they receive. The Government is asking parents and supporters to speak to their GP and ensure their sons/daughters or the people whom they support are registered. It is hoped that this drive will ensure better and more person centered health care for people with learning disabilities.

The Learning Disability Register is a record of people with a learning disability who are registered with each GP practice. The Register is sometimes referred to as the Quality Outcomes Framework (QOF) Register.

If you are not sure you are on the Register, you can ask the receptionist at your GP Practice to check for you.

The doctor may have made a note on the record that a person has Down's syndrome but this does not automatically mean they have been put on the Register. When you speak to the GP about being registered, the needs and support of the person in health settings can be discussed. This information can be entered on the person's Summary Care Record (SCR) so that all health professionals at the practice know about their needs and how best to support them.

If the person is over 16 years of age or older, they must give their consent (see section in this resource about the Mental Capacity Act 2005):

- for information about their support needs to be added to their SCR
- to which information can be shared and with whom

It's never too early (or late) to join your GP's Learning Disability Register; you can join at any age. It's a good idea for children with a learning disability to join the learning disability register at an early age. This means adjustments and support can be put in place before they reach adult services.

Reasonable adjustments in health care

You may have heard of the term 'reasonable adjustments' and wondered what it meant. Since the Disability Discrimination Act (1995) and the Equality Act (2010) (this does not apply to Northern Ireland) public services are required by law to make reasonable adjustments to help remove barriers faced by people with disabilities when trying to use a service. The duty under the Equality Act to make reasonable adjustments applies if you are placed at a substantial disadvantage because of your disability compared to people without a disability or who don't have the same disability as you.

So for people with physical disabilities reasonable adjustments may include changes to the environment like ramps for the ease of wheelchair users. For people with learning

disabilities 'reasonable adjustments' may include easy read information, longer appointments, clearer signs at the practice, help to make decisions, changes to policies, procedures and staff training.

If a patient with Down's syndrome is NOT on their GP's Learning Disability Register then reasonable adjustments to care for that person cannot be anticipated and made.

Authors:

Dr Rhian Thomas ST 3 Paediatric Trainee

Dr Jill Ellis Consultant Community Paediatrician

Homerton University Hospital NHS Foundation Trust

The information in this resource is taken from an article published in DSA Journal 140 Autumn/Winter 2019

Publication date 2019

The Down's Syndrome Association provides information and support on all aspects of living with Down's syndrome.

We also work to champion the rights of people with Down's syndrome, by campaigning for change and challenging discrimination.

A wide range of Down's Syndrome Association publications can be downloaded free of charge from our website.

Contact us

Down's Syndrome Association

Langdon Down Centre,
2a Langdon Park, Teddington,
Middlesex, TW11 9PS

t. 0333 1212 300

f. 020 8614 5127

e. info@downs-syndrome.org.uk

e. training@downs-syndrome.org.uk

w. www.downs-syndrome.org.uk

Wales

e. wales@downs-syndrome.org.uk

Northern Ireland

e. enquiriesni@downs-syndrome.org.uk



WorkFit® is a registered trade mark of the Down's Syndrome Association. Photograph courtesy of members and supporters of the DSA.



www.dsactive.org



www.langdondownmuseum.org.uk



www.langdondowncentre.org.uk

© Down's Syndrome Association 2017