

# National Disease Registration Service (NDRS)

Haematology – An Introduction  
v3 August 2024

Welcome to this NDRS training module on Haematology – An Introduction, which is designed to help Cancer Administration staff gain a better understanding of Haematological diseases, the terminology used by the clinical teams and where to find guidance on the codes to use.

## Agenda

- Introduction to Haematology
- Which Conditions to Record
- Summary
- Acknowledgements

This module may be paused at any time

Additional modules are available for:

- Leukaemia
- Lymphoma
- Myeloma



We're going to give you a brief introduction to the circulatory system and Haematological diseases. We'll then look at guidance on recording them in your cancer data management system. This module should be used in conjunction with the disease-specific training modules for Leukaemia, Lymphoma and Myeloma, as well as the reference PDF: Haematology - Appendix A, Classification. This module can be paused at any time.

# Introduction

**In this section we will cover:**

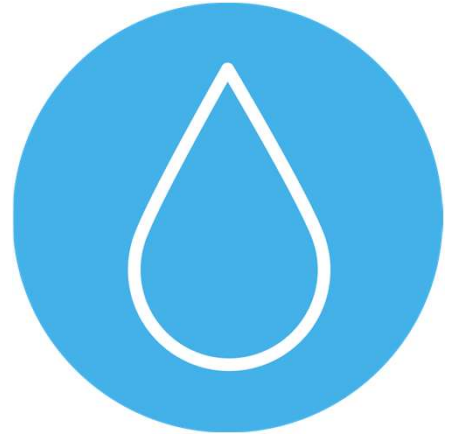
- Types of Haematological Disease
- The Circulatory System
- The Lymphatic System
- The Cardiovascular System
- Haematopoiesis – how blood cells develop

Firstly, we'll look at the various types of Haematological disease

## Types of Haematological Disease

Haematological malignancies can be classed into four main categories

- Leukaemia – malignancy of the leucocytes that results in abnormal bone marrow & blood
- Lymphoma – malignancy of the lymphocytes, white blood cells that are also part of the body's immune response system
- Plasma cell neoplasms – plasma cells are a particular type of lymphocyte
- Myelodysplastic Syndromes (MDS), Myeloproliferative Neoplasms (MPN) and MDS/MPN – diseases of immature myeloid blood cells within the bone marrow



The four main categories of Haematological disease are Leukaemia, Lymphoma, Plasma cell neoplasms and Myelodysplastic or Myeloproliferative neoplasms

## The Circulatory System

### Lymphatic System

Lymph nodes  
Lymph vessels  
Lymph

We'll now look at the circulatory system, which is comprised of the Lymphatic system, containing Lymph fluid...

## The Circulatory System

### Lymphatic System

Lymph nodes  
Lymph vessels  
Lymph

### Cardiovascular System

Heart  
Blood vessels  
Blood

... and the cardiovascular system containing blood

# The Circulatory System

## Transport

The blood system maintains a continuous flow of blood through the body delivering oxygen in red cells, nutrients and hormones to organs and body tissues. At the same time, it removes carbon dioxide and other waste products produced by the body from peripheral tissues

The circulatory system as a whole performs three main functions, the first of which is transport. By transporting blood around the system, a constant exchange of oxygen for carbon dioxide and other waste products is maintained...

## The Circulatory System

### Transport

The blood system maintains a continuous flow of blood through the body delivering oxygen in red cells, nutrients and hormones to organs and body tissues. At the same time, it removes carbon dioxide and other waste products produced by the body from peripheral tissues

### Protection

The lymphatic system protects the body from disease by producing white blood cells which fight infections and destroy bacteria. The blood also protects by producing cells called platelets to coagulate the blood after injury thereby sealing a wound

The second function is protection: White blood cells fight infections, while platelets allow the blood to clot in order to close wounds...

## The Circulatory System

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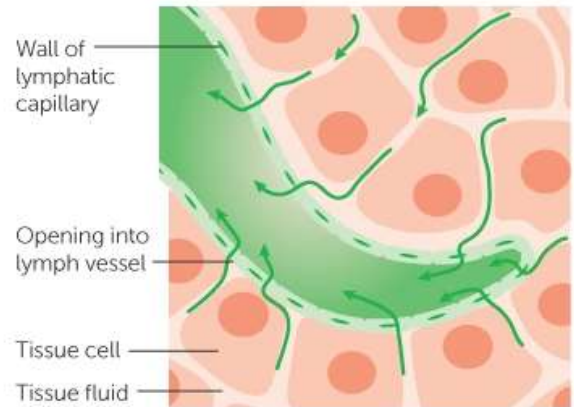
### Regulation

The cardiovascular system has a vital role in maintaining homeostasis (a state of balance between the bodily systems). It acts as a regulator of temperature, fluid & electrolyte balance and pH regulation through the action of components in the blood

... and the final function is regulation. Temperature, fluid-&-electrolyte balance and pH are all regulated via the blood.

## The Lymphatic System

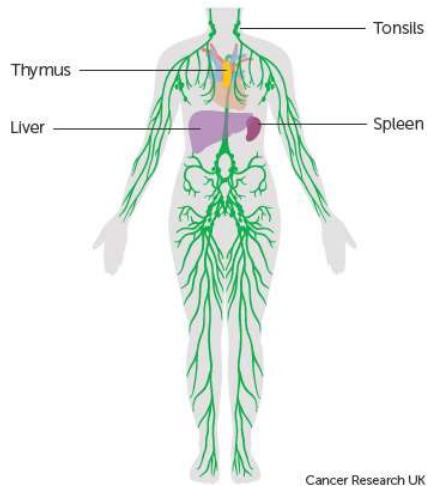
- Lymph vessels follow a very similar path to that of blood vessels that helps fluids move around within the body
- Lymph is clear, watery fluid which is found throughout the body and seeps out through the capillary walls flowing around all the cells picking up fats, bacteria, and other unwanted materials



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The lymphatic system goes all over the body, in much the same way as blood vessels. The lymph fluid seeps from the tissue cells of the body into the lymph vessels, taking unwanted materials with it.

## The Lymphatic System



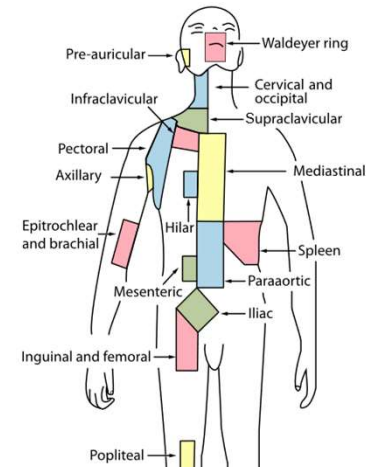
- Lymph nodes are the lymphatic system's filters. There are approximately 600-800 lymph nodes in the human body
- Lymph nodes consist of lymphoid tissues. They filter the lymph (the fluid in the lymphatic system) and also help to produce lymphocytes, which recognise abnormal cells and respond by producing antibodies to attack

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The lymph nodes, of which there may be up to 800 in an adult human, are primarily filters although they also help in the production of Lymphocytes.

## The Lymphatic System

- Lymph nodes are distributed throughout the body and generally occur in groups along the larger lymphatic vessels. Some of the named groups are shown here
- Bundles of lymphatic cells can also be found in tissues and organs other than lymph nodes, meaning that, although rare, organ-confined lymphoma is possible

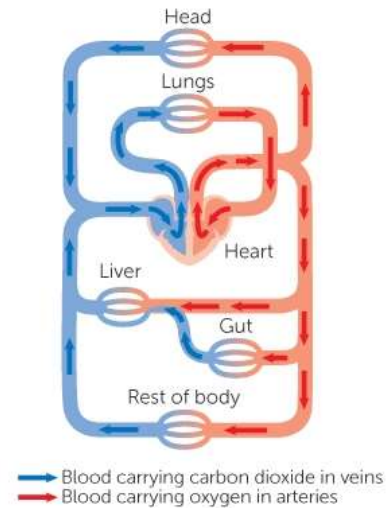


[http://training.seer.cancer.gov/ss\\_module08\\_lymph\\_leuk/lymph\\_unit02\\_sec02\\_reg\\_ins.html](http://training.seer.cancer.gov/ss_module08_lymph_leuk/lymph_unit02_sec02_reg_ins.html)

The nodes are distributed throughout the body, mostly along the main lymphatic vessels. Areas of lymphatic tissue are sometimes also found outside the lymphatic system meaning that organ-confined lymphoma is possible

## The Cardiovascular System

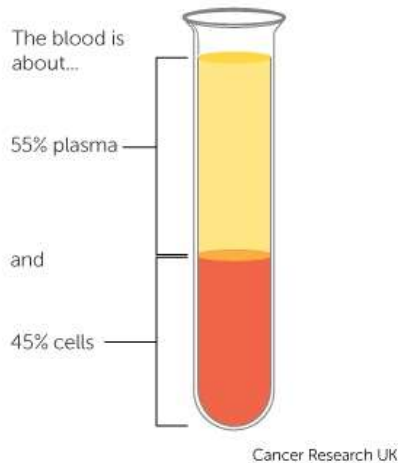
- The heart weighs about 250gms and it beats between 60 - 80 times per minute in a healthy adult
- There are two types of blood vessels:
  - Arteries transport oxygenated blood and nutrients to the tissues of the body.
  - Veins carry carbon dioxide and waste products away from the tissues of the body



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In the cardiovascular system the heart pumps oxygenated blood into the arteries, while the veins carry the de-oxygenated blood, plus waste products, back towards the heart

## The Cardiovascular System



Blood has different components:

- Plasma consists mainly of water but also contains proteins, hormones, organic salts, glucose and fat particles
- Red blood cells transports oxygen from the lungs to the cells of the body
- White blood cells form part of the immune system
- Platelets help the blood to clot

A surprisingly low percentage of the blood is actual blood cells, less than half. The rest is comprised of water, proteins, fats and other materials

## Haematopoiesis

There are different types of marrow within the bones: red and yellow

Blood cells are manufactured within the red bone marrow. Different types of blood cells are produced to perform specialised functions in the blood

Haematopoiesis is the term for the production, multiplication and specialisation of the blood cells

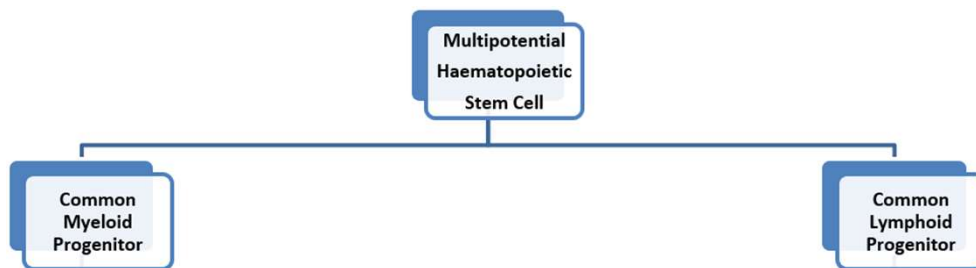
- White blood cells (part of the immune system)
- Red blood cells (these carry oxygen to the tissues of the body)
- Platelets (clotting cells)

**Haematopoiesis is the term for the production and specialisation of blood cells within the red bone marrow. Some blood cells make up part of the immune system, while others carry oxygen or form clots to assist in wound healing.**

## Haematopoiesis – Stem Cells

Within the red marrow, when a stem cell divides into two, one copy remains as a stem cell while the other becomes a progenitor cell – a cell that goes on to make other specialised cells

This progenitor cell will be committed to either the myeloid or lymphoid line



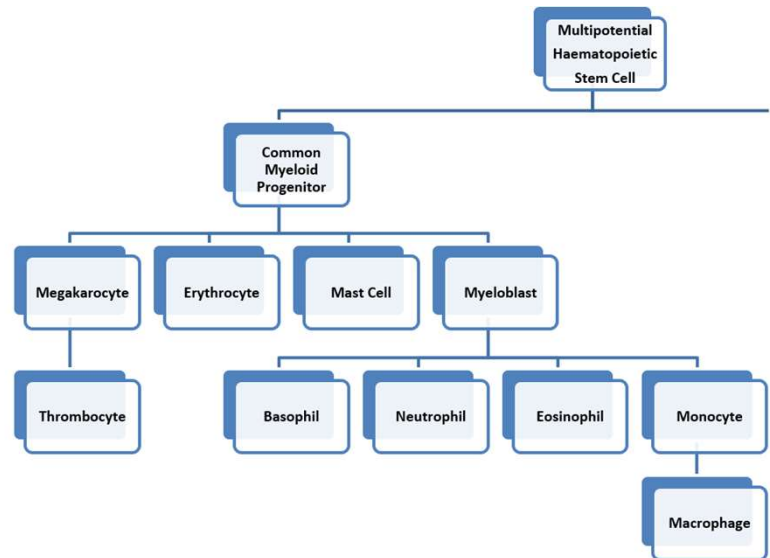
All blood cells within the red bone marrow have their roots in a very specific type of stem cell. Whenever one of these stem cells divides into two, one of the resulting cells will be a progenitor cell. This progenitor cell uses the same method when dividing and will go on to make either myeloid or lymphoid cells, depending on the line it's been committed to. Some cells are formed directly from the progenitor cells...

## Haematopoiesis – Myeloid Cells

The myeloid stem cell line produces a range of myeloid white blood cells

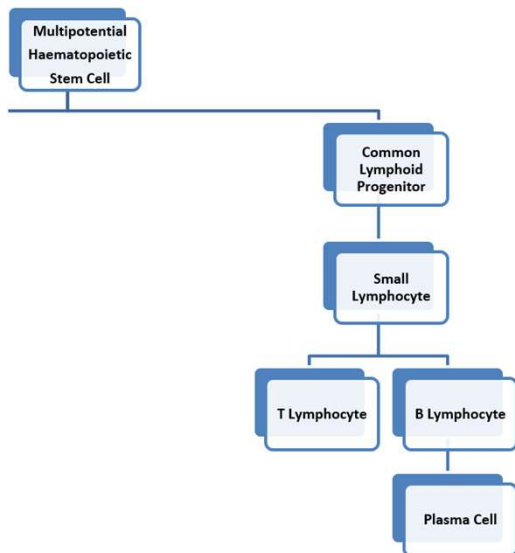
It also produces:

- Red blood cells (also known as erythrocytes)
- Megakaryocytes which are in turn the precursors to platelets (thrombocytes)



... such as red blood cells, sometimes called erythrocytes, which are only one cell division away from the myeloid progenitor cell. Other specialised cells can take multiple steps to manufacture...

## Haematopoiesis – Lymphoid Cells



The lymphoid stem cell produces two types of lymphoid white blood cells:

- T lymphocytes (which include natural killer or NK cells)
- B lymphocytes (which can also differentiate into Plasma cells)

.. for instance, B lymphocytes, which themselves may produce plasma cells when they divide.

## Haematopoiesis

Two different cell lines means two morphological groups of malignancies

All myeloid malignancies are derived from the myeloid cell line and all lymphoid and plasma cell malignancies are derived from lymphoid cell line

### Myeloid Neoplasms

- Myeloid leukaemia
- Myelodysplastic syndromes
- Myeloproliferative neoplasms

### Lymphoid Neoplasms

- Lymphoblastic and lymphocytic leukaemia
- Lymphoma
- Plasma cell neoplasms (including Myeloma)

Myeloid neoplasms are specific to the Myeloid line of cells while Lymphoid neoplasms will only occur in Lymphoid cells. It should be noted that Myeloma is a disease of the plasma cells and as such is classified as a Lymphoid neoplasm. Leukaemias may occur in either cell line. For more information on Haematological disease, please see the disease-specific training modules for Leukaemia, Lymphoma and Myeloma

## Recording Haematological Disease

### **In this section we will cover:**

- Codes to Use
- Which Conditions to Record

So how are these diseases recorded in your cancer data management system?

## Recording Haematological Disease - Codes to Use

Haematological diseases are classified based on their particular morphologies. Your clinical team will be able to give you the exact diagnosis description

We have provided a document to help you accurately record these diseases, available as a PDF only: Haematology – Appendix A, Classification

- This may be downloaded from: <https://digital.nhs.uk/ndrs/data/cancer-data-training-materials>

### Appendix A - Classification

ICD03_DATASET	ICD03_CODE	ICD03_WH0_DESC	ICD10_CODE	ICD10_DESC
AML	S670/3	Acute basophilic leukaemia	C92.7	Other myeloid leukaemia
AML	9840/3	Acute erythroid leukaemia	C94.0	Acute erythroid leukaemia
AML	9910/3	Acute megakaryoblastic leukaemia	C94.2	Acute megakaryoblastic leukaemia
AML	9891/3	Acute monoblastic and monocytic leukaemia	C93.0	Acute monoblastic/monocytic leukaemia
AML	9861/3 C	Acute myeloid leukaemia, NOS	C92.0	Acute myeloblastic leukaemia [AML]
AML	9867/3	Acute myelomonocytic leukaemia	C92.5	Acute myelomonocytic leukaemia
CORE ONLY	9931/3	Acute panmyelosis with myelofibrosis	C94.4	Acute panmyelosis with myelofibrosis
AML	9866/3	Acute promyelocytic leukaemia with t(15;17)(q22;q12) PML-RARA	C92.4	Acute promyelocytic leukaemia [PML]
AML	9801/3	Acute undifferentiated leukaemia	C95.0	Acute leukaemia of unspecified cell type
Other Lymphomas	S627/3	Adult T-cell leukaemia/lymphoma	C91.5	Adult T-cell lymphoma/leukaemia [ATLL; T-lymphoblast]

Exact classification of Haematological disease uses ICD-O-3 morphology. Always refer to your clinical team for the correct diagnosis description. The description will be listed in Haematology – Appendix A, Classification, available as a searchable PDF to download. This Appendix will provide you with both ICD10 codes and the relevant ICD-O-3 morphology codes to use.

## Recording Haematological Disease - Which Conditions to Record

- If in any doubt as to whether you should be recording a haematology diagnosis, please refer to the latest COSD User Guide, Appendix C
- For guidance on the required staging system, please refer to the latest COSD User Guide, Appendix E
- <https://digital.nhs.uk/ndrs/data/data-sets/cosd#downloads>

For guidance on which conditions require a COSD record, please ensure you have access to the COSD User guide. You can download the User Guide by clicking on this link and selecting the COSD version appropriate to your trust.

## Recording Haematological Disease - Which Conditions to Record

DCB1521 Amd13/2019 – COSD v9.1.3 – User Guide

ICD-O-3	ICD-O-3 WHO Description	ICD-10 4 <sup>th</sup> Edition	ICD10 Description	Clinical data set	WHO DISEASE GROUP
9740/1 A	Cutaneous mastocytosis	D47.0	Histiocytic and mast cell tumours of uncertain and unknown behaviour	CORE ONLY	1
9740/1 B	Extracutaneous mastocytoma	D47.0	Histiocytic and mast cell tumours of uncertain and unknown behaviour	CORE ONLY	1
9740/3	Mast Cell Sarcoma	C96.2	Malignant mast cell tumour	CORE ONLY	1
9741/1	Indolent systemic mastocytosis	D47.0	Histiocytic and mast cell tumours of uncertain and unknown behaviour	CORE ONLY	1
9741/3	Systemic mastocytosis (including systemic mastocytosis with ANNMID or aggressive systemic mastocytosis)	C96.2	Malignant mast cell tumour	CORE ONLY	1
9742/3	Mast Cell Leukaemia	C94.3	Mast cell leukaemia	CORE ONLY	1
9875/3	Chronic Myelogenous Leukaemia, BCR-ABL1 positive	C92.1	Chronic myeloid leukaemia [CML], BCRABL-positive	CML	1
9875/3 A	Chronic Myelogenous Leukaemia, Accelerated Phase	C92.1	Chronic myeloid leukaemia [CML], BCRABL-positive	CML	1
9875/3 B	Chronic Myelogenous Leukaemia, Blastic Phase	C92.1	Chronic myeloid leukaemia [CML], BCRABL-positive	CML	1

In addition to all C coded Haematological malignancies, Appendix C of the COSD User Guides list a further 18 conditions that are D/E coded in ICD 10

All listed Haematology C/D/E ICD 10 codes require a COSD submission which must include the ICD-O-3 morphology code

As well as all C coded conditions, Haematology requires a COSD record for certain D coded, and one E coded condition which are listed in the COSD User Guide, Appendix C. Please bear in mind that the ICD-O-3 morphology code must be included in the COSD record.

## Recording Haematological Disease - Which Conditions to Record

### Remember:

There is no clash with CWT – The addition of a D/E code diagnosis for Haematology will exclude the pathway from any CWT targets and the CWT submission.

If in doubt, check the CWT / COSD guidance.

Your cancer management system will automatically exclude these additional COSD diagnoses from the CWT submission so there is **no** clash between CWT and COSD.

# Summary

To Summarise...

## Summary

- Haematological diseases fall into four main categories: Leukaemia, Lymphoma, Plasma Cell Neoplasms and Myelodysplastic / Myeloproliferative disorders

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## Summary

- Haematological diseases fall into four main categories: Leukaemia, Lymphoma, Plasma Cell Neoplasms and Myelodysplastic / Myeloproliferative disorders
- Blood cells are manufactured in the red bone marrow. These cells will belong to either the Myeloid line or the Lymphoid line

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## Summary

- Haematological diseases fall into four main categories: Leukaemia, Lymphoma, Plasma Cell Neoplasms and Myelodysplastic / Myeloproliferative disorders
- Blood cells are manufactured in the red bone marrow. These cells will belong to either the Myeloid line or the Lymphoid line
- The Myeloid line includes some types of white blood cells, red blood cells and platelets
- The Lymphoid line includes specific types of white blood cells: T cells (some of which are Natural Killer cells) and B cells. Lymphomas and plasma cell neoplasms (including myeloma) always appear in cells of the Lymphoid line
- Leukaemias may appear in cells of either line

Myeloid neoplasms will always appear in myeloid cells, Lymphomas will always appear in lymphoid cells while Leukaemias may arise in either cell line.

## Summary

- The classification of Haematological disease is complex and relies on multiple factors. Your clinical team will be able to provide you with the exact diagnosis description. The Haematology Appendix A, Classification will guide you on the codes to record for ICD10 and ICD-O-3 morphology

Haematology classification is complicated and usually relies on a number of test results to allow the clinical team to provide you with an exact diagnosis description. The searchable PDF: Haematology Appendix A, Classification will guide you to the correct ICD10 diagnosis- and ICD-O-3 morphology-codes for that diagnosis.

## Summary

- The classification of Haematological disease is complex and relies on multiple factors. Your clinical team will be able to provide you with the exact diagnosis description. The Haematology Appendix A, Classification will guide you on the codes to record for ICD10 and ICD-O-3 morphology
- If a Haematological disease is diagnosed it may or may not be classified as malignant. Please refer to the COSD User Guide (Appendix C) for the full list of conditions that must be recorded

Not all haematological conditions are C coded as malignant in ICD10. Please refer to the COSD user guide, Appendix C for the full list of conditions to record

## Summary

- Additional guidance on recording COSD data including morphology, topography, staging and recording a diagnosis can be found at: <https://digital.nhs.uk/ndrs/data/cancer-data-training-materials>
- For Haematology, this includes disease specific modules for Leukaemia, Lymphoma and Myeloma as well as a searchable PDF: Haematology - Appendix A, Classification
- Staging data sheets can also be downloaded from the NDRS website for clinical use: <https://digital.nhs.uk/ndrs/data/cancer-data-training-materials/staging-sheets>

Additional training modules as well as Staging sheets for clinical use may be downloaded from the NDRS website.

## Summary

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Do please remember, guidance **is** available on our website. You can download the COSD User Guide by clicking on this link and selecting the COSD version appropriate to your trust.

## Acknowledgements

Many thanks to Cancer Research UK for the use of their images within this training module



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## Questions?

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If you have any questions on the information contained within this module or about COSD in general, do please feel free to email your regional Data Liaison Manager