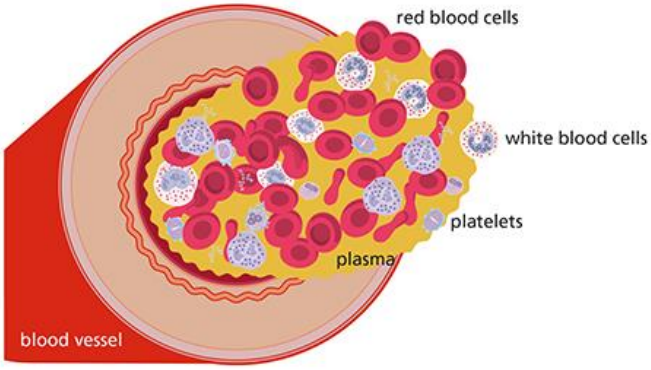
Great Ormond Street Hospital for Children
NHS Foundation Trust

Understanding your child's blood tests: information for families

Looking closely at a sample of blood in the laboratory can tell doctors a lot about our general health. Many visits to hospital involve taking blood samples – we have lots of staff who are trained and experienced in taking blood – as well as nurses and health care assistants, we also have a team of phlebotomists. This information sheet from Great Ormond Street Hospital (GOSH) describes the sort of things that blood tests can show and how they are checked in our laboratory. An Easy Read information sheet is also included for your child.



Blood is made up of blood cells suspended in a fluid called plasma. We have three main types of blood cell. Each type of blood cell has a specific job to do in the body:

- **Red blood cells** (also called erythrocytes) contain a substance called haemoglobin, which is what gives blood its colour. The role of haemoglobin is to carry oxygen from the lungs to all the body's tissues in the blood cells.
- **White blood cells** (also called leucocytes) fight off infection by attacking germs like bacteria and viruses that invade the body. There are five subtypes of white blood cell.
    - **Monocytes** are the largest cells of the blood. They fight certain infections and help other white blood cells remove dead and damaged tissues.
    - **Eosinophils** attack parasites and cancer cells and assist with allergic response.
    - **Basophils** secrete chemicals to help fight allergies and infectious agents.
    - **Neutrophils** are the more common type of white blood cell and is the sort that is a 'quick response' cell to infection.
    - **Lymphocytes** are the other type of white blood cell and also comes in two forms:
        - T cells are the attacking cells that fight off infection directly. They also regulate the immune system.
        - B cells make antibodies (proteins) that attack a specific

bug (bacterium, virus, fungus or other invader).

- **Platelets** (also called thrombocytes) are responsible for travelling to the site of an injury, making the blood clot through a complicated chain reaction and forming the scaffolding for both the scab and new tissue.

All types of blood cell are formed in the bone marrow. They start off as 'stem cells' that can turn into whichever type of blood cell is needed. This happens through another complex process called haematopoiesis.

When the blood cells are released by the bone marrow, they travel round the bloodstream and are then broken down some time later. New blood cells are being made by the bone marrow all the time to replace the old ones.

How are blood samples taken?

We always offer children and young people local anaesthetic cream or cold spray before we take a blood sample. This makes their skin numb so they don't feel the blood test so much. Read our Easy Read information *Having a blood test* with your child to know what will happen.

Why are blood tests needed?

There are thousands of different blood tests available – some more specialised than others. The most commonly ordered ones at GOSH include:

- **Full Blood Count (FBC)** – this counts the number of each type of blood cell in a sample. There are also different tests that make up a FBC, each of which looks at how many of a particular type of blood cell is present. It also measures how much haemoglobin (Hb) is in the blood. Samples for an FBC are collected in a test tube with a red top.
- **Clotting or coagulation** – this measures how long it takes for a sample of blood to clot. As well as checking for clotting problems, perhaps before an operation, it can be used to check levels of anti-coagulation medicine such as warfarin, using a test called International Normalised Ratio (INR). Samples for clotting tests are collected in a test tube with a green top.
- **Group and Save (G&S)** – this is commonly taken before an operation and shows your blood group so that donated blood is available that is compatible with yours if it is needed during an operation. Samples for Group and Save are collected in a test tube with a light blue top.
- **Urea and Electrolytes (U&E)** – your blood contains various minerals and salts which are measured in a U&E test. These include sodium, potassium and chloride. Keeping minerals and salts in balance allows the body to function as it should. Samples for U&E tests are collected in a test tube with an orange top.
- **Blood glucose** – Sugar or glucose is carried in the blood so monitoring this can show whether the body is dealing with sugar in our diet or not. This is commonly used to investigate diabetes but also to monitor the effects of treatment. A specific type of test called HbA1C looks back at the average blood sugar level over the last three months or so. Samples for blood glucose tests are collected in a test tube with a yellow top.
- **C-reactive Protein (CRP)** – this is produced by the liver and raises if you have inflammation. Inflammation may be caused as a symptom of a disease, such as arthritis, or it may suggest an infection. Samples for CRP tests are collected in a test tube with an orange top.
- **Erythrocyte Sedimentation Rate (ESR)** – this measures how quickly red blood cells fall to the bottom of a test tube. It can show signs of inflammation as higher levels of some proteins that are produced in inflammation can make the red blood cells drop faster. Samples

for ESR tests are collected in a test tube with a red top.

- **Liver function tests (LFTs)** – these are various tests that measure certain substances in the blood that indicate whether the liver is working as it should to clean the blood and remove toxins. Common LFTs at GOSH include: Alkaline phosphatase (ALP), C-reactive Protein (see above), Transaminase and Bilirubin. Samples for LFTs are collected in a test tube with an orange top.
- **Creatinine tests** – this test measures how well your kidneys are working to clear the waste product creatinine from the blood. Creatinine is formed when your muscles contract or squeeze so may be higher if you have big muscles. It is also used to monitor how your kidneys are reacting to treatment with medicines. Samples for creatinine tests are collected in a test tube with an orange top.
- **Blood cultures (BC)** – these are taken to detect the presence of bacteria or fungi in the blood. Testing is used to identify blood infection that can lead to sepsis (blood poisoning). Results provide valuable information to guide antibiotic therapy and therefore prevent serious complications. Samples are collected into a special BC bottle set.

These are just the most common types of blood test carried out at GOSH. If the doctor has ordered any other blood tests for your child, ask them which ones and what they show. You can also visit https://labtestsonline.org.uk/tests-index for an overview of blood tests.

What happens to the blood samples when they've been taken?

Once the phlebotomist has taken enough test tubes of blood, they will put a label on each one with your child's details so we can track it throughout the laboratory and can make sure the results are added to your child's medical record.

They will usually put the test tubes in a plastic bag and then either use our pneumatic tube system or call a porter to take them to our laboratories.

The laboratory staff register the samples when they arrive and then use them to carry out the tests required. This usually involves using complicated and expensive machinery that can analyse samples more quickly and accurately than a human.

When do we get the results?

Many of the tests can be done quickly but others take a little longer. This is the main reason why we take blood samples at pre-admission assessment for instance, so we can be sure that the test results are back in time for when your child goes to the operating theatre.

Test results are reported back to your doctor and added to your child's patient record ready for discussion at their next clinic appointment. Some test results are available for you to see using MyGOSH once you have signed up – details are at https://www.gosh.nhs.uk/your-hospital-visit/mygosh. If the doctor needs to speak to you before then, they will contact you.

What is a 'normal' result?

By comparing your child's test results with 'normal values' (reference ranges), you and your doctor can see if any of the test results fall outside the range. The results can be affected by many factors but can provide clues to help in your child's treatment – just ask your doctor.

What happens to the samples when all the tests are done?

Our aim is to only take enough blood for the tests we need to do so there often isn't much left when all the tests are complete. Depending on the test and sample type, leftover samples are kept in laboratory according to laboratory policy. This mean the laboratory can repeat a test if required or investigate the sample for quality and risk

assessments. Samples are disposed of safely according to laboratory's clinical waste guidelines.

How can I learn more about blood tests and how they're analysed?

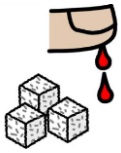
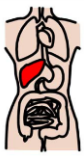
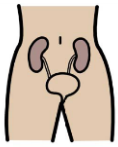
At GOSH, we work with an organisation called Harvey's Gang (http://harveysgang.com/) who run tours of our laboratories for children and young people. Ask at the Pals Office for details, ring them on 020 7829 7862 or email pals@gosh.nhs.uk

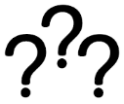
Further information and support

Please ask your doctor, nurse or phlebotomist for details of which blood tests have been requested and why.

Having a blood test – which test?

	Blood carries oxygen along with food to every part of your body. Your body needs oxygen and food to work. Blood is made up of different types of blood cell.
	• White blood cells fight off infection
	• Platelets help our blood to clot
	• Red blood cells carry oxygen around the body
	Blood cells are made in your bone marrow. This is a liquid centre in some of your bones.
	Looking at your blood under a microscope can help the doctors work out how to look after you.

	A small sample of your blood can tell your doctor a lot of things. Different tests can tell them different things.
	An FBC counts how many of each blood cell type are in the sample.
	Clotting works out how quickly your blood can form a clot to stop bleeding.
	G&S works out what your blood type is so we make sure that blood is available if you need a transfusion.
	U&E measures the amount of minerals and salts in your blood. These are important to keep your body working well.
	Blood glucose measures the amount of sugar in your blood. The sugar comes from the food you eat, including starchy food like potatoes.
	CRP looks at whether you have any swelling or inflammation in your body. It doesn't show where or what is causing it.
	ESR is another way of looking for inflammation. It measures how quickly a drop of blood goes to the bottom of a test tube.
	LFTs check how your liver is working to clean your blood. There are lots of different types of LFT looking at different things.
	Creatinine tests look at how your kidneys are working. Creatinine is a waste product that is removed by your kidneys.

	Blood cultures look for bacteria and fungi in the blood. They also help the doctors choose the right medicine to get rid of it.
	Some tests involve looking closely through a microscope at the blood sample.
	Others involve complex machinery that test and analyse the blood sample for specific substances.
	Our scientists are highly trained and experienced in testing blood samples and carry them out as quickly and reliably as they can.
	When they have the results, they are checked and then added to your medical record.
	Your doctor will be able to see the results and work out what they need to do next.
	They will tell you the results at your next clinic appointment and what they mean for you.
	Please ask us if you have any questions.