ACE(Angiotensin Converting Enzyme)

Why Get Tested?

To sometimes help diagnose and monitor sarcoidosis and to help distinguish it from other diseases which show similar symptoms

When To Get Tested?

When you have granulomas (masses of inflammatory cells) that create small bumps under the skin, a lingering cough, red watery eyes and/or other symptoms suggestive of sarcoidosis. When you have active sarcoidosis in order to follow its progress

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

None

Acetylcholine Receptor (AChR) Antibody

Why Get Tested?

To help diagnose myasthenia gravis (MG) and to distinguish between MG and other conditions with similar symptoms; sometimes to monitor MG

When To Get Tested?

When you have symptoms that suggest MG, such as a progressively drooping eyelid, double vision, difficulty chewing or swallowing, and/or weakness in specific muscles

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

None

Acid-Fast Bacillus (AFB) Testing

Why Get Tested?

To help identify a mycobacterial infection; to diagnose tuberculosis (TB) or to monitor the effectiveness of treatment

When To Get Tested?

If you have symptoms, such as a long lasting cough, weight loss, fever, chills, and weakness that your doctor thinks may be due to TB or another mycobacterial infection. If your doctor suspects that you have active TB or wants to monitor the effectiveness of TB treatment.

Sample Required?

Usually, three separate spit (sputum) samples are collected early in the morning on different days. If you are unable to produce a sputum sample, a bronchoscope may be used to collect fluid during a procedure called a bronchoscopy. In children, stomach washings/aspirates may be collected. Depending on symptoms, urine, cerebral spinal fluid (CSF), other body fluids, small samples of tissue samples may be biopsied and used to help identify an infection.

Test Preparation Needed?

None

ACTH Test

Why Get Tested?

To diagnose adrenal and pituitary diseases such as Cushing's syndrome, Cushing's disease, Addison's disease, adrenal tumours, and pituitary tumours; usually done as a diagnostic test once an abnormal cortisol level is detected

When To Get Tested?

If your doctor has discovered that you have abnormal or inappropriate cortisol levels. ACTH will help to sort out the possible cause of the abnormal cortisol result.

Sample Required?

A blood sample taken from a vein in your arm. Samples for ACTH were regarded as unstable but newer evidence has demonstrated that samples are stable for 24h. There may be local variations in collection protocols, so please follow any advice given by your healthcare professional or local laboratory. Samples cannot usually be collected at a GP surgery, and are usually collected in a hospital with a laboratory on site.

Test Preparation Needed?

Samples for ACTH are typically taken in the morning, about 9 am There may be local variations in collection protocols, so please follow any advice given by your healthcare professional or local laboratory.

Adenosine Deaminase

Why Get Tested?

To help detect or rule out a *Mycobacterium tuberculosis* infection in pleural fluid in order to assist in the diagnosis of tuberculosis; rarely to detect the infection in other body fluids such as peritoneal fluid or cerebrospinal fluid (CSF)

When To Get Tested?

When a doctor suspects that someone with chest pain, coughing, and/or difficulty breathing has tuberculosis that has spread from their lungs to the pleurae (lining around the lungs)

Sample Required?

A volume of pleural fluid is collected by a doctor using a procedure called thoracentesis; other body fluids are collected using other procedures

Test Preparation Needed?

None required

Albumin

Why Get Tested?

To screen for liver or kidney disease especially in hospitalised patients

When To Get Tested?

If your doctor thinks you have symptoms of liver or kidney disease or prior to a planned surgery

Sample Required?

A blood sample is usually taken by a needle from a vein in the arm

Test Preparation Needed?

No test preparation is needed

Alkaline Phosphatase (ALP) Test

Why Get Tested?

To screen for or monitor treatment for a liver or bone disorder

When To Get Tested?

As part of liver function tests, bone profile tests or when a person has symptoms of a liver or bone disorder

Sample Required?

A blood sample is taken by needle from a vein in the arm

Test Preparation Needed?

Fasting is preferred but not essential for this test. Eating a meal can increase the ALP level slightly for a few hours in some people. It is usually better to do the test after fasting overnight. In this case, only water is permitted.

Acute Viral Hepatitis Testing

Why Get Tested?

To detect and diagnose an infection with a hepatitis virus

When To Get Tested?

When you have symptoms of hepatitis and a viral infection is suspected to be the cause; when you have been exposed to one or more of the three most common hepatitis viruses: Hepatitis A, B, or C

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

None

ADH and Copeptin

Why Get Tested?

To investigate the cause of polyuria polydipsia syndrome, i.e. excessive urination and excessive drinking. Rarely this may be due to deficiency of, or lack of response to, ADH.

Diagnosis of conditions of ADH excess is usually based on clinical history and other laboratory tests, such as blood and urine osmolality as well as electrolytes.

When To Get Tested?

ADH or copeptin may be requested if the results of initial investigation of polyuria polydipsia syndrome are inconclusive. ADH and copeptin are usually only measured as part of stimulation testing; either the water deprivation test or the saline infusion test. ADH or copeptin analysis on a random, or unstimulated, sample is rarely required.

Sample Required?

A blood sample is obtained by inserting a needle into a vein in the arm.

Test Preparation Needed?

Alcohol and some medications (including diuretics) can interfere with ADH and copeptin secretion, or ADH action. Talk to your doctor to identify any medications that should be discontinued before the test.

The water deprivation test and saline infusion test have specific preparation requirements. Talk to your doctor to determine what preparation is required for these tests.

AFP Tumour Marker Test

Why Get Tested?

To screen for and monitor therapy for certain cancers of the liver and testes

When To Get Tested?

If your doctor suspects that you have certain cancers of the liver or testes, if you are under treatment for them, or have previously been treated for one of these cancers. It may also be used if chronic hepatitis or cirrhosis of the liver is suspected.

Sample Required?

A blood sample taken from a vein in the arm

Test Preparation Needed?

None

Alanine aminotransferase (ALT) Test

Why Get Tested?

To screen for liver disease

When To Get Tested?

If your doctor thinks that you have symptoms of a liver disorder

Sample Required?

A blood sample will be taken from a vein in the arm

Test Preparation Needed?

No test preparation is needed, although you should inform your doctor about any drugs you are taking

Aldosterone and Renin

Why Get Tested?

To see if your aldosterone or renin levels are abnormal; to detect hyperaldosteronism (overproduction of aldosterone) or hypoaldosteronism (underproduction of aldosterone)

When To Get Tested?

If your doctor finds an electrolyte imbalance or you develop symptoms of hyperaldosteronism, such as high blood pressure or muscle weakness

Sample Required?

A blood sample taken from a vein in your arm or a 24-hour urine sample

Test Preparation Needed?

You may be asked to adhere to an unrestricted salt diet prior to the test or to temporarily discontinue one or more medications. The amount of salt in the diet and medicines, such as over-the-counter pain relievers of the non-steroid class (such as Nurofen and Hedex), diuretics (water pills), beta blockers, steroids, angiotensin-converting enzyme (ACE) inhibitors, and oral contraceptives can affect the test results. Many of these drugs are used to treat high blood pressure. Your doctor will tell you if you should change the amount of sodium (salt) you ingest in your diet, your use of diuretics or other medications, or your exercise routine before aldosterone and renin are tested. Your doctor will also want to know if your serum potassium level is low as this would affect the aldosterone level.
Please follow any instructions you are given, as this is important to ensure the validity of test results.

ALK Mutation (Gene Rearrangement)

Why Get Tested?

To detect an *ALK* gene rearrangement in tumour tissue in order to guide non-small cell lung cancer therapy

When To Get Tested?

When you have been diagnosed with non-small cell lung cancer and your healthcare professional is considering a therapeutic management plan that may include an ALK kinase inhibitor such as crizotinib, ceritinib and alectinib.

Sample Required?

A fresh tumour tissue sample is obtained through a biopsy procedure or sometimes collected during surgery. The tumour tissue is typically evaluated by a pathologist prior to testing.

Test Preparation Needed?

Usually no preparation is needed

Allergy Testing

Why Get Tested?

To test for suspected allergies.

When To Get Tested?

When you have symptoms such as hives, dermatitis, rhinitis (nasal blockage, sneezing), red itchy eyes, asthma, or severe reactions such as anaphylaxis that your doctor suspects may be caused by an allergy

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

None

Alpha-1 Antitrypsin(A1AT,AAT)

Why Get Tested?

To help diagnose the cause of early onset emphysema and/or liver disease. To establish the risk of developing alpha-1 antitrypsin-related emphysema and/or liver disease and the likelihood of other family members inheriting the risk.

When To Get Tested?

When you show signs of liver disease as an infant, young child or adult, when you develop emphysema (a disease that damages the lungs) before age 40, or when you have a close relative with alpha-1 antitrypsin deficiency

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

No test preparation is needed

Ammonia(NH3)

Why Get Tested?

To detect elevated concentrations of ammonia in the blood, to help diagnose severe liver disease and certain genetic urea cycle disorders, to investigate changes in consciousness, or to help diagnose hepatic encephalopathy and Reye's syndrome

When To Get Tested?

If a patient experiences mental changes or lapses into a coma of unknown origin; if an infant or child experiences frequent vomiting and increased lethargy as a newborn or about a week after a viral illness

Sample Required?

A blood sample taken from a vein or artery in your arm

Test Preparation Needed?

Avoid smoking cigarettes prior to collection of the specimen and follow any other instructions that you are given

Amniotic Fluid Analysis

Why Get Tested?

To detect and diagnose some birth defects, genetic diseases, and chromosome abnormalities in a foetus, especially if pregnancy screening tests are abnormal; to help diagnose and monitor haemolytic disease in a foetus

When To Get Tested?

Between 15 and 20 weeks of gestation to test for genetic diseases, chromosome abnormalities, and open neural tube defects; when it is suspected that a foetus has haemolytic disease, about every 14 days

Sample Required?

A sample of amniotic fluid is obtained using a procedure called amniocentesis

Test Preparation Needed?

You may be instructed to have a full or empty bladder prior to amniocentesis

Amylase Test

Why Get Tested?

To diagnose pancreatitis or other pancreatic diseases

When To Get Tested?

If you have symptoms of a pancreatic disorder, such as severe abdominal pain, fever, loss of appetite or nausea

Sample Required?

A blood sample taken from a vein in the arm. Very rarely a urine sample may be required.

Test Preparation Needed?

No test preparation is needed

ANCA/MPO/PR3 Antibodies

Why Get Tested?

To test for certain autoimmune disorders, specifically small vessel vasculitities such as as Granulomatosis with polyangitis (GPA formerly known as Wegners Granulomatosis [WG]), microscopic polyangitis (MPA), Churg-Strauss Syndrome (CSS) and a few others

When To Get Tested?

When your doctor thinks that you have symptoms, such as a “vasculitic” rash or chest/kidney symptoms that may be due to a vascular inflammatory disorder; In patients who are known to have antineutrophil cytoplasmic antibodies (ANCA) associated small vessel vasculitis, ANCA measurement is sometimes used to monitor response to therapy

Sample Required?

A blood sample taken from a vein in your arm

Anti-dsDNA

Why Get Tested?

To help diagnose and monitor systemic lupus erythematosus (SLE)

When To Get Tested?

When you have symptoms associated with SLE and a positive ANA test; periodically when you have been diagnosed with SLE

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

None

Anti-LKM-1

Why Get Tested?

To help diagnose autoimmune hepatitis and distinguish it from other causes of liver injury

When To Get Tested?

When you have hepatitis that your healthcare professional suspects may be due to an autoimmune-related process

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

None

Anti-Mullerian Hormone

Why Get Tested?

In the UK, measurement of anti-Müllerian hormone (AMH) has three generally accepted uses (based on published evidence):

- To help guide treatment of women undergoing assisted conception procedures.

- As part of an investigation of abnormal sexual development in babies and children.
- AMH may also be used to monitor the response to treatment for some types of ovarian tumours.

When To Get Tested?

Some women are tested when they are referred for assisted conception procedures e.g. in vitro fertilisation (IVF). The result can help the doctor to provide appropriate treatment which is individualised to the patients' needs.

As part of an extended newborn screen, when an infant has ambiguous genitalia (i.e. it is not clear whether the baby is a boy or a girl).

AMH may be tested to monitor the response to treatment and tumour recurrence in women with an AMH-secreting ovarian tumour.

Sample Required?

A blood sample taken from the vein in your arm or from a heel prick in an infant

Test Preparation Needed?

No test preparation is needed

Anticentromere Antibody

Why Get Tested?

To detect the presence of anticentromere antibodies; to help diagnose limited cutaneous systemic sclerosis

When To Get Tested?

When you have one or more symptoms that suggest limited cutaneous systemic sclerosis, also known as CREST syndrome

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

No test preparation is needed

Antimitochondrial Antibody and AMA M2

Why Get Tested?

To help diagnose primary biliary cholangitis (PBC)

When To Get Tested?

When a doctor suspects that a person may have primary biliary cholangitis

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

No test preparation is needed

Antinuclear Antibody (ANA) Test

Why Get Tested?

To help diagnose systemic lupus erythematosus (SLE) (commonly called lupus), drug induced SLE-like syndrome, Sjogren's syndrome, scleroderma and certain other autoimmune connective tissue diseases

When To Get Tested?

If your doctor thinks that you have symptoms of SLE, drug-induced lupus, Sjogren's syndrome, scleroderma or another autoimmune connective tissue disease

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

None needed; however, some drugs interfere with the test, so tell your doctor about any medications you are taking.

Antiphospholipid Antibodies

Why Get Tested?

To help investigate inappropriate clot formation; to help determine the cause of recurrent miscarriage; to evaluate a prolonged PTT (partial thromboplastin time); as part of an evaluation for antiphospholipid antibody syndrome, as part of the evaluation of patients with connective tissue disease.

When To Get Tested?

When you have a prolonged PTT test; when you have had recurrent unexplained venous or arterial blood clots; when you have had recurrent miscarriages, especially in the second and third trimesters; if you have lupus or a related connective tissue disease.

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

None

Antithrombin

Why Get Tested?

To help investigate the cause of recurrent or inappropriate blood clotting; to help diagnose an antithrombin deficiency

When To Get Tested?

Preferably a couple of months after a thrombotic episode and not whilst taking, or for at least 6 weeks after taking anticoagulants. Occasionally testing may be requested if you are not responding as your doctor expected to heparin anticoagulation therapy

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

No test preparation is needed.

Apo A (Apolipoprotein A-I)

Why Get Tested?

To determine whether or not you have adequate levels of apo A-I, to diagnose people with specific apo A deficiency and to help determine your risk of developing coronary heart disease (CHD).

When To Get Tested?

This is not a routinely performed test and is currently limited to hospital specialists, and specialist testing laboratories. It can be measured when you have hyperlipidaemia and/or a family history of CHD or peripheral vascular disease; when your doctor is trying to assess your risk of developing heart disease; when apo A deficiency is suspected and when you are monitoring the effectiveness of lipid treatment and/or lifestyle changes.

Sample Required?

Typically, a blood sample is obtained by inserting a needle into a vein in your arm. As an alternative, particularly in paediatric care, the blood sample is taken from the fingertip.

Test Preparation Needed?

No test preparation is needed; however, since this test may be performed at the same time as a lipid profile, fasting for at least 12 hours may be required.

Apo B

Why Get Tested?

To help evaluate your risk of developing cardiovascular disease (CVD) and to diagnose people with specific Apo B disorders.

When To Get Tested?

This is a non-standard test currently limited mostly to hospital specialists. It can be measured when you have a personal or family history of heart disease and/or high concentrations of lipids in the blood (hyperlipidaemia) and your doctor is trying to determine your risk of developing CVD; sometimes measured to help monitor treatment for hyperlipidaemia or to help diagnose a rare apo B deficiency.

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

No special preparation is needed for an apolipoprotein B test

Apolipoprotein E (Apo E) Genotyping

Why Get Tested?

To help confirm a diagnosis of Type III hyperlipoproteinaemia (also known as dysbetalipoproteinaemia, remnant disease or broad beta disease). Outside of routine clinic practice e.g. for research purposes, it can be used to help confirm a diagnosis of late onset Alzheimer's Disease (AD) in a symptomatic adult

When To Get Tested?

This is a non-standard test currently limited mostly to hospital specialists. It can be measured if your doctor suspects that your high cholesterol and triglyceride concentrations may be due to a genetically inherited disorder, or if you have specific types of xanthomas (yellowish raised patches) on your skin (particularly palms, knees and elbows).

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

No test preparation is needed

aPTT

Why Get Tested?

As part of an investigation of a bleeding or thrombotic episode. To help evaluate your risk of excessive bleeding prior to a surgical procedure although numerous studies have shown that it cannot accurately estimate risk of bleeding in all patients. To monitor unfractionated heparin anticoagulant therapy

When To Get Tested?

When you have unexplained bleeding or thrombosis (a blood clot). When you are on unfractionated or intravenous (IV) heparin anticoagulant therapy. Sometimes as part of a pre-surgical screen

Sample Required?

A blood sample is taken by needle from a vein in the arm

Test Preparation Needed?

None

Arbovirus Testing

Why Get Tested?

To determine the cause of meningitis or encephalitis, rash or illness causing a fever that occurs after exposure to insects such as mosquitoes and ticks, usually during travel to warmer countries; to investigate the source of epidemics and track their spread

When to Get Tested?

When you have symptoms suggesting an arbovirus infection, after insect bites or other exposure to these viral infections

Sample Required?

A blood sample drawn from a vein in your arm or cerebrospinal fluid collected from a lumbar puncture

Test Preparation Needed?

None

Aspartate aminotransferase (AST) Test

Why Get Tested?

To detect liver damage

When To Get Tested?

If your doctor thinks that you have symptoms of a liver disorder

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

None

Autoantibodies

What are they?

Antibodies are proteins produced by a person's immune system that help the body to recognise and get rid of infection. Autoantibodies are antibodies that recognise parts of our own body. Autoantibodies can be found in healthy people, particularly as we get older, but they are also found in some autoimmune diseases. In a few specific diseases, autoantibodies are actually causing the disease e.g. Grave's disease, myasthenia gravis.

As the immune system develops, it learns to tolerate components of our own body ("self"). There are also regulatory mechanisms that prevent the immune system attacking "self". However, sometimes these processes fail and the immune system may start attacking our own body, resulting in inflammation and damage, and causing autoimmune disease. Autoantibodies can be a marker of the disease e.g. tissue transglutaminase antibodies in coeliac disease, or can be actually causing the disease directly e.g. by blocking hormones acting on the thyroid gland, resulting in Grave's disease.

The reasons that autoimmune diseases develop are not completely understood, but are thought to involve a genetic predisposition combined with an environmental trigger, such as a viral illness or a prolonged exposure to certain toxic chemicals. Some families have a high prevalence of autoimmune conditions; however, individual family members may have different autoimmune disorders or may never develop one. Researchers believe that there may also be a hormonal component, as many autoimmune conditions are more common in women of childbearing age.

The type of autoimmune disorder or disease that occurs and the amount of destruction done to the body depends on which systems or organs are targeted by

the immune system. Disorders that primarily affect a single organ, such as the thyroid in Graves disease or Hashimoto thyroiditis, are often easier to diagnose as they frequently present with organ-related symptoms. Autoimmune diseases that affect multiple organs or systems, called systemic autoimmune disease, can be much more difficult to diagnose and hence there can sometimes be delays in diagnosis. The signs and symptoms they cause can be multifold and non-specific e.g. arthritis-type joint pain, fatigue, fever, rashes, cold or allergy-type symptoms, weight loss, and muscle pain or weakness. Additional complications may include vasculitis and anaemia. Signs and symptoms will vary from person to person and they can vary over time, tapering off and then flaring up unexpectedly. To complicate the situation, some people may have more than one autoantibody or even more than one autoimmune disorder. There are also people who have an autoimmune disorder without a detectable autoantibody. These circumstances can make it difficult to identify the prime cause and arrive at a diagnosis.

B Vitamins

Why Get Tested?

To screen for and detect moderate to severe vitamin B deficiencies

When To Get Tested?

When someone has symptoms that may be due to a B vitamin deficiency, is at risk for a deficiency, or has a condition associated with malabsorption. However, most people at risk are treated with vitamin B complex and do not require testing.

Sample Required?

A blood sample taken from a vein in your arm.

Test Preparation Needed?

The blood sample is usually collected in the morning after an overnight fast, and preferably before taking any medication.

B-cell Immunoglobulin Gene Rearrangement

Why Get Tested?

To help diagnose a B-cell lymphoma; to detect and evaluate residual cancer cells

When To Get Tested?

When a doctor thinks that you may have a B-cell lymphoma; sometimes to evaluate the effectiveness of treatment or to evaluate for recurrent disease

Sample Required?

A bone marrow, tissue (biopsy), or body fluid sample collected by your doctor; sometimes a blood sample drawn from a vein in your arm

Test Preparation Needed?

None

B-Type Natriuretic Peptide (BNP) Test

Why Get Tested?

To help determine whether symptoms such as breathlessness are due to heart failure

When To Get Tested?

If you have symptoms of heart failure such as breathlessness, fatigue and/or swelling (oedema) of the legs

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

None

Bacterial Wound Culture

Why Get Tested?

To detect a bacterial wound infection, to determine which specific bacteria are present, and to isolate and grow the bacteria for subsequent susceptibility testing

When To Get Tested?

When your wound is hot, swollen or there is redness around the area. A sign of wound infection can also be increasing or continual pain and when the wound itself is not healing as quickly as expected.

Sample Required?

Usually a sterile swab used to collect cells or pus from the site of the suspected infection. Occasionally aspirations of fluid from deeper wounds into a syringe and/or a tissue biopsy may be required.

Test Preparation Needed?

No test preparation is needed.

BCR-ABL

Why Get Tested?

To help diagnose and monitor the treatment of chronic myeloid leukaemia (CML) and a type of acute lymphoblastic leukaemia (ALL)

When To Get Tested?

When you have results of a FBC and/or signs and symptoms that suggest that you may have leukaemia; periodically when you are being treated for CML or BCR-ABL-positive ALL

Sample Required?

A blood sample taken from a vein in your arm or a bone marrow sample collected using a bone marrow aspiration and/or biopsy procedure

Test Preparation Needed?

Beta-2 Glycoprotein 1 Antibodies

Why Get Tested?

To help investigate inappropriate blood clot formation; to help determine the cause of recurrent miscarriage; as part of an evaluation for antiphospholipid syndrome (APS)

When To Get Tested?

When you have had one or more unexplained blood clots in a vein or artery; when you have had recurrent miscarriages, especially in the second and third trimesters, if you have a connective tissue disease such as SLE (systemic lupus erythematosus) which can be associated with APS.

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

None

Beta-2 Microglobulin Kidney Disease

Why Get Tested?

Beta-2 microglobulin (B2M) is not a frequently requested test in the UK, however it may be used to detect and localise kidney damage and follow kidney disorders.

When To Get Tested?

The test is rarely requested when investigating kidney disease due to poor specificity. However it may be requested when you have symptoms and signs associated with kidney dysfunction; due to possible cadmium kidney toxicity. However the main use of B2M in the UK is in multiple myeloma (see the Beta-2 Microglobulin Tumour Marker article) not in kidney disease.

Sample Required?

A blood sample drawn from a vein in your arm and/or a random or 24-hour urine sample.

Test Preparation Needed?

None

Beta-2 Microglobulin Tumour Marker

Why Get Tested?

To help evaluate the severity and prognosis of certain cancers, including multiple myeloma and lymphoma

When To Get Tested?

When you have been diagnosed with multiple myeloma or certain other cancers; sometimes to monitor disease activity and treatment

Sample Required?

/node/297A blood sample is obtained by inserting a needle into a vein in the arm. A 24-hour urine sample may also be collected. Rarely, a CSF sample may be collected from the lower back using a procedure called a lumbar puncture or spinal tap

Bicarbonate

Why Get Tested?

Usually as part of a renal profile (collection of tests which help investigate kidney function), to screen for an electrolyte or acid-base imbalance in conditions known to cause such disturbances or to monitor a known imbalance

When To Get Tested?

May be part of a routine blood test that includes electrolyte measurements or may be requested by your doctor if you have a medical condition or are experiencing symptoms that could indicate problems with the acid-base balance of your body

Sample Required?

A blood sample taken from a vein in the arm

Bilirubin

Why Get Tested?

To screen for, detect and monitor liver disorders and haemolytic anaemia. To monitor neonatal jaundice and help detect certain rare genetic disorders in sick babies.

When To Get Tested?

If your doctor thinks you have symptoms or signs of liver damage, liver disease, bile duct blockage, haemolytic anaemia or a liver-related metabolic problem. In sick babies with jaundice.

Sample Required?

In adults, blood is collected by needle from a vein in the arm. In newborns, a few drops of blood are usually collected from a heel-prick. Sometimes in newborns bilirubin is estimated by placing a device on the skin called a transcutaneous bilirubin meter. This device is non-invasive, but in some situations it will need to be followed up by a blood test.

Test Preparation Needed?

No test preparation is necessary. The blood sample should ideally be protected from bright light before analysis.

Blood Culture

Why Get Tested?

To check for the presence of a systemic infection. The UK National Institute for Health and Care Excellence (NICE) guidance NG51 recommends that all patients with suspected sepsis should have a sample collected for blood culture testing.

When To Get Tested?

When you have signs or symptoms of sepsis like fever, chills, feeling sick, confusion and tiredness which may develop during another illness, such as a urinary tract infection (UTI), pneumonia or a skin infection

Sample Required?

Two or more blood samples taken from separate sites (commonly from veins in your arms) into special bottles which contain a solution to help bacteria and yeast cells grow

Blood Film

Why Get Tested?

To find out if red blood cells, white blood cells, and platelets are normal in appearance and number; to distinguish between different types of white blood cells and to determine their relative percentages in the blood; to help diagnose a range of deficiencies, diseases, and disorders involving blood cell production, function and destruction; to monitor cell production and cell maturity in diseases such as anaemia, leukaemia, during chemo/radiation therapy, or in the evaluation for haemoglobin variants.

When To Get Tested?

When FBC results are abnormal, a blood film with manual WBC differential is done to look for abnormal or immature cells; when a doctor suspects a deficiency, disease, or disorder that can affect blood cell production; when you are being treated for a disease with medications that may have an affect on blood cell production.

Sample Required?

A blood sample taken from a vein in your arm or by pricking a finger, ear or, in the case of an infant, a heel.

Blood Gas Tests

Why Get Tested?

To determine if you have an imbalance in the amount of oxygen gas (O_2) or carbon dioxide gas (CO_2) in your blood or an acid-base imbalance (i.e. if your blood is too acidic/ alkaline), which may indicate a respiratory (lung/breathing), metabolic, or kidney disorder

When To Get Tested?

If your doctor suspects that you have symptoms of an oxygen/carbon dioxide imbalance or an acid-base imbalance. These include difficulty breathing, shortness of breath, or rapid breathing (hyperventilation). You may also be tested to monitor the effectiveness of oxygen therapy (used when you have a condition that causes an oxygen shortage) and during operations to monitor your blood's oxygen and carbon dioxide levels. If you have chronic obstructive pulmonary disease (COPD) this test may be used to assess if you need long term oxygen therapy.

Sample Required?

A blood sample collected from an artery, usually the radial artery in the wrist (located on the inside of the wrist, below the thumb, where you can feel your pulse). A capillary blood from a heel-prick may be used for babies

Test Preparation Needed?

Typically, none. However, if you are on oxygen therapy, the O_2 may either be turned off for 20 to 30 minutes before the collection for a "Room Air" test or, if this cannot be tolerated or if the doctor wants to check your oxygen levels with the O_2 on, the amount of oxygen being taken will be recorded.

Blood Ketones

Why Get Tested?

To determine whether excessive ketones are present in the blood, to detect diabetic ketoacidosis (DKA), to detect alcoholic ketoacidosis and to monitor ketogenic diet therapy used in the treatment of epilepsy.

When To Get Tested?When you have symptoms associated with ketoacidosis or being monitored on a ketogenic diet.
Sample Required?

A blood sample taken from a vein in your arm or a drop of blood from your finger.

Blood Typing

Why Get Tested?

To determine ABO blood group and RhD type

When To Get Tested?

When you need to be transfused with blood or blood components or when you donate blood at a donation centre; pregnant women are tested to determine the risk of Rh incompatibility between the mother and foetus

Sample Required?

A blood sample taken from a vein in your arm or from a heelprick in the case of an infant

Bone Markers

What is bone?

Bone is a living, growing tissue that is continuously being regenerated at a rate of about 10% a year. It is made up largely of collagen, a protein that gives the bone its tensile strength and framework, and calcium phosphate, a mineralised complex that hardens the bone. This combination of collagen and calcium makes bone strong and yet flexible enough to bear weight and to withstand stress. More than 99% of the body's calcium is contained in the bones and teeth. The remaining 1% is found in the blood.

Throughout your lifetime, old bone is constantly being removed (resorption) and replaced by new bone (formation). During early childhood and in the teenage years, new bone is added faster than old bone is removed. As a result, bones become larger, heavier, and denser. Bone formation happens faster than bone resorption until you reach your peak bone mass (maximum bone density and strength), in your mid-twenties. After that, bone resorption begins to happen faster than bone formation. Bone loss is accelerated in women in the first few years after the menopause and continues into the postmenopausal years.

Accordion Title
About Bone Markers

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What diseases affect the bone?

Osteoporosis. Osteoporosis, or porous bone, is a disease characterised by low bone mass and structural deterioration of bone tissue. This means you may be more likely to get fragility fractures of the hip, spine, and wrist. Osteoporosis develops when bone resorption occurs too rapidly and bone formation fails to keep up. It is more likely to develop if your bones do not achieve their optimal mass during your bone-building years. Men (1 in 10) as well as women (1 in 4 over the age of 60) suffer from osteoporosis, a disease that can be largely prevented and treated.

Paget's disease. Paget's disease is a chronic disorder that typically results in enlarged and deformed bones. In this disease, the breakdown and formation of bone tissue is excessive. As a result, bone can weaken, resulting in bone pain, arthritis, deformities, and fractures. It may be inherited, since the disease has been known to appear in more than one family member and some genes have been discovered which might cause the disease. It may also be caused by a "slow virus" infection that is in your body for many years before symptoms appear. Paget's disease is rarely diagnosed in people under 40 years of age. Men and women are affected equally and can occur in any ethnic group.

Bone metastasis. Cancer cells that leave the (primary) tumour and enter the bloodstream can take up residence in nearly every tissue of the body. Bones are one

of the most common sites for these circulating cells to settle and start growing again. Metastases can occur in bones that are near or far from the primary tumour site. Metastatic bone disease is not the same as primary bone cancer. Primary bone cancer refers to a cancer that starts in bone. Bone metastasis and primary bone cancer differ in their risk factors, treatments, and outlook. Primary bone cancer is much less common than bone metastasis. Bone metastasis is one of the most frequent causes of pain in patients with cancer.

About half of all people who have cancer (except those with skin cancer) develop bone metastasis at some point in the course of their disease. Breast, prostate, kidney, lung, pancreas, bowel, stomach, thyroid, and ovarian cancers account for most metastases to bones. The spine is the area most often affected by bone metastasis, followed by the pelvis, hip, upper leg bones (femurs), and the skull.

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What tests are used to detect a problem with bone?

Usually, bone problems are detected by radiology tests such as X-rays or magnetic resonance imaging (MRI). Bone density (mass) using special types of very low dose X-rays is used for fracture risk assessment and the diagnosis of osteoporosis. Bone problems can also be detected by ultrasound scans that use high-frequency sound waves.

Bone markers, which are signs of the bone turnover process, are sometimes used as an aid to bone density testing when doctors are evaluating whether or not you have a bone disease. The process involves measuring markers of bone resorption, such as the telopeptides (CTX) and urine pyridinolines (PYR, DPD), and markers of bone formation, such as bone-specific alkaline phosphatase (ALP), procollagen (P1NP) and osteocalcin. Bone resorption markers can be measured in blood or urine. Bone formation markers are measured in blood.

Most often, bone markers are used to monitor therapy for bone disease and to help your doctor determine if your body is responding to treatment. Bone markers can enable your doctor to tell if you are responding to bone-strengthening therapy in a much shorter time period than the X-ray types of bone density testing. This way, your therapy can be altered if you are not responding properly to it.

There is also some evidence that bone markers can help doctors to predict which breast and prostate cancer patients are at high risk for bone metastases. Bone markers may also be able to predict a patient's response to therapy for a bone-loss condition.

When are these tests requested?
In some cases, bone markers are requested with other bone mineral density tests to diagnose a bone disease. Usually, however, bone markers are requested periodically to monitor patients who already have a diagnosed bone condition and who are undergoing therapy to see how well they are responding to treatment.

Bone Marrow Aspiration and Biopsy

Why Get Tested?

To evaluate the type, quantity, and maturity levels of the cells present in the marrow; to evaluate the structure of the marrow; and sometimes to collect a sample of marrow for more specific testing

When To Get Tested?

When a patient is anaemic without an obvious cause and/or has a condition or cancer that may be affecting blood cell production; as a means of helping find out how advanced a cancer is; sometimes when a doctor is investigating a fever of unknown origin, especially when the patient is immuno-compromised

Sample Required?

A bone marrow sample collected primarily from the hip bone (pelvis); sometimes collected from the sternum (breast bone) in adults or the tibia (shin bone) in infants

BRCA-1 and BRCA-2 (Breast Cancer Gene 1 and 2) Tests

Why Get Tested?

To assess the risk of developing breast and/or ovarian cancer

When To Get Tested?

If a BRCA1/2 mutation is present in a family member; if you have a very strong family history of breast and/or ovarian cancer; if you have had a breast cancer under the age of 35 that is hormone receptor negative

Sample Required?

A blood sample taken from a vein in the arm

C-peptide

Why Get Tested?

To monitor insulin production by the beta cells in the pancreas and to help determine the cause of hypoglycaemia (low blood sugar) or assessment of insulin resistance (which can help diagnose the type of diabetes mellitus a person has or the severity of the metabolic syndrome).

When To Get Tested?

If you have diabetes mellitus and your doctor wants to see if you are producing any of your own insulin, if you are thought to be insulin resistant (when your body does not respond properly to insulin), or to help establish if it is time to add insulin injections to your current treatment. Your doctor also may request a C-peptide blood test if you have an episode of low blood sugar, called hypoglycaemia.

Sample Required?

A blood sample taken from a vein in your arm and sometimes a 24-hour urine sample is taken, or urine sample 2 hours after your largest meal of the day is taken.

Test Preparation Needed?

Fasting for 8 to 10 hours before blood testing may be required, alternatively a meal stimulus or symptoms present thought to be due to hypoglycaemia.

C-Reactive Protein (CRP)

Why Get Tested?

To identify the presence of inflammation, to determine its severity, and to monitor response to treatment.

When To Get Tested?

When your doctor suspects that you might be suffering from an inflammatory disorder (as with certain types of arthritis and autoimmune disorders or inflammatory bowel disease) or to check for the possibility of infection (especially after surgery)

Sample Required?

A blood sample taken from a vein in your arm

CA 15-3 Test

Why Get Tested?

To monitor the response to treatment of breast cancer and to watch for recurrence of the disease

When To Get Tested?

When you have been or are being treated for breast cancer

Sample Required?

A blood sample taken from a vein in your arm

Caeruloplasmin

Why Get Tested?

Blood caeruloplasmin levels are measured; to help diagnose Wilson's disease or conditions associated with copper deficiencies

When To Get Tested?

When you have , tiredness, tummy pain, behavioural changes, tremors, or other symptoms that your doctor thinks may be due to Wilson's disease or copper deficiency. At intervals when monitoring a copper related disease or its treatment.

Sample Required?

A blood sample taken from a vein in your arm

Calcitonin

Why Get Tested?

To help diagnose and monitor C-cell hyperplasia and medullary thyroid cancer (MTC); to screen those at risk for MTC because of multiple endocrine neoplasia type 2 (MEN 2) or other mutations in the RET oncogene

When To Get Tested?

If your doctor suspects that you have MTC, if you are being treated for MTC, or if a family member has MTC or MEN 2

Sample Required?

Ideally after an overnight fast, a blood sample is obtained by inserting a needle into a vein in the arm. The sample may need to be collected on ice and must be sent to the laboratory for immediate processing.

Test Preparation Needed?

After an overnight fast, a blood sample is obtained by inserting a needle into a vein in the arm. The sample may need to be collected on ice and must always be transferred to the laboratory for immediate processing.

It is important that the person taking the sample follows the instructions of the local laboratory as different laboratories may require different specimen types. Please contact the local laboratory for details.

Calcium Test

Why Get Tested?

To determine the concentration of calcium in your blood

When To Get Tested?

In persons with kidney, bone, parathyroid, or nerve disease, or if symptoms of abnormal calcium levels are present. To evaluate the effectiveness of being treated for abnormal calcium levels. Finally, to monitor levels in critically ill patients.

Sample Required?

A blood sample taken from a vein in your arm; a urine collection may also be requested when blood calcium concentration is abnormal. Urine calcium measurements may also be requested if you have kidney stones.

Test Preparation Needed?

Current practice does not require fasting or any other test preparation. However, it is advisable that prolonged tourniquet use and fist clenching during collection of the blood sample should be avoided as this may affect the generated result.

Calprotectin

Why Get Tested?

To detect intestinal inflammation; to distinguish between inflammatory bowel disease (IBD) and non-inflammatory bowel conditions (e.g. Irritable Bowel Syndrome, IBS); to monitor IBD activity

When To Get Tested?

When you have bloody or watery diarrhoea, abdominal cramps, with or without fever, lasting more than a few days

Sample Required?

A stool sample collected in a clean container

CALR Mutation

Why Get Tested?

To help diagnose bone marrow disorders known as myeloproliferative neoplasms (MPNs), in which the bone marrow produces too many of one or more types of blood cells

When To Get Tested?

When you have abnormal results on a full blood count (FBC) and your healthcare professional suspects that you may have a bone marrow disorder, especially essential thrombocythaemia (ET) or primary myelofibrosis (PMF)

Sample Required?

A blood sample taken from a vein in your arm or sometimes a sample of bone marrow

Cancer Antigen 125 (CA125) Test

Why Get Tested?

To monitor treatment for ovarian cancer or to investigate for a possible ovarian cancer.

When To Get Tested?

Before starting therapy for ovarian cancer or if at high risk for developing ovarian cancer, and at intervals during and after treatment. CA 125 may also be request by your GP if you have persistent or frequent symptoms that may be caused by ovarian cancer.

Sample Required?

A blood sample taken from a vein in the arm

Cancer Antigen 19-9 (CA 19-9) Test

Why Get Tested?

To help tell the difference between cancer of the pancreas and bile ducts and other conditions; to monitor response to pancreatic cancer treatment and to watch for recurrence.

When To Get Tested?

When your doctor suspects that you have pancreatic cancer and during or following pancreatic cancer treatment.

Sample Required?

A blood sample is obtained by inserting a needle into a vein in the arm.

Carbamazepine

Why Get Tested?

To determine the concentration of carbamazepine in the blood to establish an appropriate dose and to maintain a therapeutic level

When To Get Tested?

At the beginning of treatment to monitor the concentration of the drug in the blood. When indicated to detect low or high (potentially toxic) concentrations.

Sample Required?

A blood sample taken from a vein in your arm

Carcinoembryonic Antigen (CEA)

Why Get Tested?

In the presence of certain cancers, CEA may be used to monitor the effect of treatment and recurrence of disease

When To Get Tested?

Before starting cancer treatment as well as at intervals during and after therapy

Sample Required?

A blood sample taken from a vein in the arm

Cardiac Biomarkers

What are cardiac biomarkers?

Cardiac biomarkers are substances that are released into the bloodstream when heart muscle is damaged or stressed. Measurement of these biomarkers is used to help diagnose, assess risk and manage people with the acute coronary syndrome (ACS), a potentially life-threatening condition characterised by the sudden onset of persistent pain in the chest, one or both arms, shoulders, stomach or jaw, shortness of breath, nausea, sweating and dizziness. The commonest cause of the syndrome is a heart attack (also called a myocardial infarction or MI) in which heart muscle cells die from insufficient blood flow caused by the narrowing or blockage of one of

the heart's coronary arteries. However, similar symptoms may be caused by unstable angina and by other cardiac and non-cardiac conditions. Between 60% and 80% of patients taken to hospital with chest pain are found not to have had a heart attack.

Cardiac biomarker tests are requested immediately when a patient with symptoms of ACS is admitted to hospital as an emergency. Together with evidence from an electrocardiogram (ECG) and/or imaging investigations, increasing levels over time of a cardiac biomarker can help to identify those who have had a heart attack, allowing early treatment of their condition. Biomarker measurements have been studied in other roles such as monitoring the success of coronary angioplasty or 'clot-busting' drugs but have not been adopted in standard care.

Laboratory Tests

The current cardiac biomarker test of choice is troponin. A diagnosis of myocardial infarction can be made when raised and increasing troponin levels are found together with clinical evidence of ACS and ECG or imaging evidence of reduced blood supply to heart muscle (ischaemia). Without evidence of ischaemia, possible causes of rising troponin concentrations include myocarditis (inflammation of the heart muscle), acute heart failure, an arrhythmia (abnormal heart rhythm) or pulmonary embolism (blood clot lodged in the lung). Other biomarkers are being discovered and studied but as yet none are used in standard clinical care outside of research trials.

Other biomarker tests:

- BNP (or NT-proBNP) - released from heart muscle that is stretched, so is usually used to recognise heart failure. An increased level after a heart attack implies heart muscle strain and an increased risk of recurrent events but is not measured routinely during heart attack management.

Phased out biomarkers - these tests are no longer recommended for evaluating people with suspected heart attack:

- CK and CK-MB
- AST
- LDH
- Myoglobin

Cardiac Risk Assessment

Why Get Tested?

As we get older we all have some risk of developing 'hardening of the arteries' (atheroma) which can lead to cardiovascular disease – a heart attack or stroke for example. Factors that increase the risk are used in cardiac risk assessment which calculates the probability of cardiovascular disease developing within a defined period. This can then provide guidance on your personal risk and the steps that should be taken to reduce your risk.

When To Get Tested?

NHS GP practices invite patients aged between 40 and 75 who are not already being treated for heart disease, diabetes or kidney disease to attend for cardiac risk assessment. The assessment is repeated every five years. If you are also known to have higher cardiac risk e.g. familial hypercholesterolaemia, then other risk factors may be screened for but risk calculation will not be done as you will already be eligible for treatment to reduce risk.

Sample Required?

First, you are asked to answer questions about the three kinds of risk factor. If you have a strong family history (your mother, father, sister or brother having had a heart attack or angina before 60) it is likely that your immediate family of all ages will also be invited to attend for risk assessment.

Your blood pressure is taken and your height and weight are measured. Height and weight are used to calculate your body mass index (BMI) as a measure of obesity.

Blood is also taken for lipids, HbA1c and renal function. Urine can also sometimes be requested for look for albuminuria.

Test Preparation Needed?

No preparation is required. Traditionally fasting samples were used for lipids and glucose. Nowadays HbA1c has largely replaced glucose and is not affected by fasting status. Lipids may be abnormal just after a meal but this indicates worse cardiovascular risk therefore non-fasting specimens are not only acceptable but also preferred.

Cardiolipin Antibodies

Why Get Tested?

To help investigate unexplained blood clot formation, to help determine the cause of recurrent miscarriage, or as part of an evaluation for antiphospholipid syndrome

When To Get Tested?

When you have had one or more unexplained venous or arterial thrombotic episodes; when you have had recurrent miscarriages, especially in the 2nd and 3rd trimesters

Sample Required?

A blood sample taken from a vein in your arm

Catecholamines, plasma and urine

Why Get Tested?

To help diagnose or rule out a phaeochromocytoma or other neuroendocrine tumour

When To Get Tested?

If you have symptoms of persistent or episodic high blood pressure such as severe headaches, rapid heart rate and sweating

Sample Required?

A 24-hour urine sample (collected into a bottle containing a small amount of acid) or possibly a blood sample taken from a vein in the arm

Note: These tests are affected by certain drugs, foods, and stresses. Inform your doctor of any medicines you are taking and follow any instructions you are given for things to do or foods to avoid before sample collection.

Test Preparation Needed?

No preparation is required before collecting a urine sample.

For a blood sample you may be asked to lie down and rest quietly for 15-30 minutes prior to sample collection, and your blood may be collected while you are lying down. In other circumstances, you may just be seated upright with little or no rest time before the sample collection.

CCP

Why Get Tested?

To help in the diagnosis of rheumatoid arthritis (RA) and differentiate it from other types of arthritis; sometimes to help evaluate the prognosis of a patient with RA

When To Get Tested?

If a patient has joint inflammation and/or undiagnosed or undifferentiated inflammatory polyarthritis (symptoms which may suggest but do not yet meet the criteria of RA) and the doctor suspects RA

Sample Required?

A blood sample taken from a vein in your arm

CD4 and CD8

Why Get Tested?

Most often, this test is done to measure the strength of your immune system if you've been diagnosed with HIV infection. Occasionally it may be used with other conditions.

When To Get Tested?

If you've been diagnosed with HIV, soon after you are first diagnosed to get a baseline assessment of your immune system; 2-8 weeks after starting anti-HIV therapy and then every three to four months if you continue therapy

Sample Required?

A blood sample taken from a vein in your arm

Cervical Cytology

Why Get Tested?

To screen for early abnormalities (pre-cancer) which, if left untreated, could lead to cervical cancer.

When To Get Tested?

In England, all woman between the ages of 25 and 64 are invited for a free cervical screening test every three to five years, depending on age.
In Wales those between 20 and 64 are eligible for screening at 3 yearly intervals.
In Scotland those between 20 and 60 are eligible for screening 3 at yearly intervals.
In Northern Ireland those between 20 and 64 are eligible for screening at 5 yearly intervals.
In the Republic of Ireland those between 25 and 44 are eligible for screening at 3 yearly intervals and those between 45 and 60 at 5 yearly intervals.

Sample Required?

Cells from the cervix (neck of the womb)

Test Preparation Needed?

You may be asked to refrain from sexual intercourse for 24-48 hours before the test, avoid using vaginal creams or foams in the 48 hours before the test and book the test appointment 10-14 days after the beginning of your last menstrual period.

CF Gene Mutation Testing

Why Get Tested?

To detect cystic fibrosis (CF) genetic mutations to establish CF carrier status or to establish the diagnosis of CF in an individual

When To Get Tested?

When a newborn baby has no stools in the first 24 to 48 hours of life (meconium ileus) or when a person has symptoms of CF; if a person has a positive sweat chloride or an immunoreactive trypsin test or a close relative who has been diagnosed with CF; or when a patient is undergoing genetic counselling and wants to find out if they are a CF carrier. In addition, high risk carrier couples may have the test prior to *in vitro* fertilization so that the test can be carried out before implantation.

Sample Required?

A blood sample taken from an infant's heel; a spot of blood that is put onto filter paper; or a blood sample taken from a vein in the arm

Chickenpox and Shingles Tests

Why Get Tested?

You may need a test to look for the varicella zoster virus (VZV) if your doctor suspects that you have, or have recently had, chickenpox or shingles and needs to confirm the diagnosis. You may be tested for antibodies to VZV to check immunity to the varicella zoster virus after exposure to the virus or before receiving immunosuppressive drugs

When To Get Tested?

Tests for VZV virus are carried out when the doctor wants to distinguish between an active VZV infection and another cause, for example if a person has unusual (atypical) and/or severe symptoms. Tests for VZV antibodies are commonly performed to check for immunity to VZV before a person starts immunosuppressive treatments, or when a pregnant woman, immune-compromised person, or very young baby has been exposed to someone with active VZV infection

Sample Required?

A swab from a blister (vesicle) or the throat, blood, cerebrospinal fluid, or other body fluid or tissue can be analysed to detect DNA from the VZV virus itself. A blood sample is taken, normally from a vein in your arm, for VZV antibody tests.

Chlamydia Test

Why Get Tested?

To screen for or diagnose chlamydia infection

When To Get Tested?

If you are sexually active and have one or more risk factors for developing chlamydia, or have symptoms of infection e.g. discharge from the vagina or penis.

Sample Required?

A urine sample or a swab of cells or secretion from the infected area is required

Test Preparation Needed?

Tell your healthcare provider about any use of antibiotics or, for women, douches or vaginal creams; you may be asked to avoid using these within 24 hours before testing vaginal samples since they may affect test results. Menstruation will not affect results. For a urine sample, you may be instructed to wait one to two hours after you last urinated before collecting the sample. Follow any instructions you are given.

Chloride Test

Why Get Tested?

To determine if there is a problem with your body's acid-alkali (pH) balance and to monitor treatment

When To Get Tested?

If your doctor thinks that you have an electrolyte imbalance

Sample Required?

A blood sample taken from a vein in the arm or a urine sample

Cholesterol Test

Why Get Tested?

To screen for risk of developing cardiovascular disease (disease, of heart and blood circulation) or to monitor treatment with cholesterol modifying drugs.

When To Get Tested?

As part of a cardiovascular health check, or if you are taking (or are about to start) treatments which lower cholesterol.

Sample Required?

Testing for cholesterol requires a blood sample. Most often, the blood sample is collected from a vein in the arm or by a fingerprick.

To obtain an accurate result, it is better to have your cholesterol tested by a professional than to use a home cholesterol test.

Test Preparation Needed?

No fasting is needed for a cholesterol test.

Sometimes a fasting sample is required for a full lipid profile including cholesterol.

Cholinesterase Test

Why Get Tested?

To find out if you are likely to have temporary paralysis after being given a muscle relaxant called suxamethonium during surgery. This temporary paralysis is called suxamethonium apnoea.

To screen for exposure to the effects of organic phosphorus insecticides.

When To Get Tested?

If you or a close relative have experienced suxamethonium apnoea after a surgical operation.

To indicate possible insecticide poisoning with recent or frequent use of organic phosphorus insecticides. Occupational exposure can occur in workers involved with agriculture or the organic chemical industry.

Sample Required?

A blood sample taken from a vein in your arm

Chromogranin A

Why Get Tested?

To help diagnose and monitor carcinoid tumours and other neuroendocrine tumours

When To Get Tested?

When you have symptoms suggestive of a carcinoid tumour such as flushing, diarrhoea, and/or wheezing. When your doctor thinks you may have a carcinoid or other neuroendocrine tumour

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

You may be required to fast overnight prior to the specimen being taken and to temporarily discontinue certain medication beforehand. Please check the local laboratory instructions with your doctor prior to blood being taken.

Ciclosporin

Why Get Tested?

To determine the concentration of ciclosporin in your blood in order to establish a dose regime, maintain therapeutic levels, and detect toxic levels

When To Get Tested?

As soon as ciclosporin therapy begins, usually daily or 2-3 times a week, and periodically after that as dose is adjusted or maintained

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

None. Typically drawn 12 hours after the last dose; on mornings when you are scheduled to have your ciclosporin level checked, do not take the medicine until after your blood is drawn.

CK-MB Test

Why Get Tested?

This test is not in routine use, it was historically used to help diagnose a a heart attack but since been replaced by the superior marker troponin.

When To Get Tested?

No longer in routine clinical use

Sample Required?

A blood sample taken from a vein in the arm

Clopidogrel (CYP2C19 Genotyping)

Why Get Tested?

To help evaluate your likely response to the antiplatelet drug clopidogrel by detecting variations in the gene (*CYP2C19*) that codes for one of the enzymes that metabolises the drug; clopidogrel is prescribed for people who are at risk of a heart attack or stroke to help prevent harmful blood clots from forming.

When to Get Tested?

A healthcare professional may request this test prior to prescribing clopidogrel for you or during the initial treatment phase and sometimes when you are taking clopidogrel and are not responding as expected.

Sample Required?

A blood sample drawn from a vein in your arm

***Clostridium difficile* and *C. difficile* Toxin Testing**

Why Get Tested?

To detect the presence of an infection caused by toxin-producing *Clostridium difficile*

When To Get Tested?

When a hospital patient over 2 years old or an outpatient over 65 years old has acute diarrhoea that has no other obvious cause, especially during or following treatment with antibiotics.

Sample Required?

A fresh unformed stool sample that has not been contaminated with urine or water

Coagulation Cascade

There are two descriptions of what may be referred to using the term "coagulation cascade".

1. The first is the **physiological coagulation cascade** which is used to describe a very complex step by step process that occurs in the body *(in vivo*) when a blood vessel is injured. Several special proteins known as coagulation factors are activated one after the other in a "cascade" effect. The end result is a blood clot that creates a barrier over the injury site, protecting it until it heals. This process also involves a feedback system that regulates clot formation in the body so that clots are removed when the injury site is healed.

Although not a definitive illustration of this process that takes place when a wound or vessel injury occurs, we have provided a diagram of the physiologic coagulation cascade below. It depicts the complex nature of what happens in the body when bleeding occurs.

2.The second definition refers to the series of protein (coagulation factor) activations that occur in vitro when **coagulation testing** is performed in the laboratory. A sample of blood is tested by adding substances that begin the coagulation process and the time that it takes for the sample to begin to clot is measured.
The PTT measures those protein factors that are part the cascade often referred to as the intrinsic and common pathways: XII, XI, IX, VIII, X, V, II, and fibrinogen as well as prekallikrein (PK) and high molecular weight kininogen (HK). The PT test measures the factors that make up the extrinsic and common pathways: VII, X, V, II and Fibrinogen. These two screening tests help to diagnose defects or deficiencies in coagulation factors.

At one time the physiological cascade and the testing cascade were thought to be the same. It is now known that there are important differences between the two. A diagram is provided below of the **testing coagulation cascade** that shows the factors that make up the intrinsic, extrinsic, and common pathways.

Coagulation Factors

Why Get Tested?

To determine whether one or more of your coagulation factors are decreased, absent or increased.

When To Get Tested?

When you have unexplained or prolonged bleeding, an abnormal Prothrombin Time (PT) or Activated Partial Thromboplastin Time (aPTT) test, or have a relative with a hereditary coagulation factor deficiency; you may be tested when your doctor wants to monitor the severity of a factor deficiency and/or the effectiveness of treatment

Sample Required?

A blood sample taken from a vein in your arm

Coeliac Disease Tests

Why Get Tested?

- To help in making a diagnosis of coeliac disease
- Monitoring diagnosed patients to assess the effectiveness and degree of adherence to a gluten-free diet.
- To exclude coeliac disease as a cause or association in some other diseases.

When To Get Tested?

There are different categories of patients who may get tested.

1. Patients who have symptoms suggestive of coeliac disease should be tested. These symptoms may include, for example:

- chronic diarrhoea
- abdominal pain
- weight loss
- anaemia
- poor growth or chronic irritability in an infant or child

2. Patients with known coeliac disease may be tested by their doctor to help assess the effectiveness and observance of a gluten-free diet.
3. Patients with type 1 diabetes mellitus and autoimmune thyroid disease at diagnosis.
4. First degree relatives of people with coeliac disease.
5. Patients with metabolic bone disorder (e.g., osteoporosis), reproductive health problems and unexplained neurological symptoms.

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

Follow your doctor's instructions. For diagnosis, ingestion of gluten-containing foods for a time period, such as several weeks, is necessary. The test is accurate only if a gluten-containing diet is eaten during the testing process. If the patient is following a normal diet (containing gluten) it is advisable to eat some gluten in more than 1 meal every day for at least 6 weeks before testing.

For monitoring, no preparation is necessary.

Complement

Why Get Tested?

To determine whether complement system proteins are contributing to increased infection frequency or autoimmune disease. To monitor the activity of certain autoimmune diseases. To help diagnose hereditary angioedema.

When To Get Tested?

When you have recurrent (usually bacterial) infections, unexplained episodes of swelling, or symptoms related to certain autoimmune disorders. Periodically to help monitor a known long term disease such as systemic lupus, that affects the complement system.

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

No test preparation is needed for complement C3 and C4 measurements. For testing complement activity, the sample must be sent to the laboratory very quickly for processing.

Continuous Glucose Monitoring

Why Get Tested?

To monitor your blood sugar (glucose) concentrations; to evaluate changes and trends in your glucose concentration over time

When To Get Tested?

NHS funding for CGM is restricted to people with difficult to manage diabetes mellitus. Short term use may be available from a clinic if they own a device for short

term use to help guide insulin therapy. Long term use is restricted to specific individuals as per NICE guidance. For adults this primarily involves difficulty with low blood glucose (hypoglycemia), or high despite testing by finger prick at least 10 times a day. For children the rules are slightly less restrictive. The purpose of CGM is to help the patient and team control blood sugars better and avoid too many finger prick tests.

Sample Required?

A continuous glucose monitoring (CGM) device includes a small sensor wire that is inserted beneath the skin of the abdomen or the upper arm and held in place with an adhesive patch. The sensor measures glucose in the space around cells (interstitial space). CGM measures glucose at frequent intervals and sends the results wirelessly to a device that is attached to your clothing or in some cases to a smart phone. These digital readouts let you know your equivalent blood glucose level in real time.

Copper

Why Get Tested?

To measure the amount of copper in the blood, urine, or liver; to help diagnose and monitor Wilson's disease; sometimes to identify copper deficiencies and excesses

When To Get Tested?

When you have jaundice, fatigue, abdominal pain, behavioural changes, tremor, or other symptoms that your doctor thinks may be due to Wilson's disease or, rarely, to copper deficiency or excess; at intervals when you are being treated for a copper-related condition

Sample Required?

A blood sample taken from a vein in your arm and/or a 24-hour urine sample; sometimes a liver biopsy sample

Coronavirus (COVID-19) Testing

Why Get Tested

Severe Acute Respiratory Syndrome Coronavirus 2 (SARS CoV-2), which causes Coronavirus Infection Disease 2019 (COVID-19) has caused a pandemic and public health emergency due to rapid human-to-human transmission. It was first described in China in late December 2019 and the first UK case was seen a month later. It is from a family of viruses called coronaviruses. There are other coronaviruses known to cause human disease: NL63, 229E, HKU1, OC43, Severe acute respiratory syndrome (SARS), and Middle East respiratory syndrome (MERS).

There are two main types of test for COVID-19:

- A swab test – this is the ‘have I got it?’ test (to test current infection).
- An antibody test – this is the ‘have I had it?’ test (to test for past infection.)

Testing is very important. It gives information about how many people in the country have, or have had, COVID-19 infection. This means that it is possible to work out who needs to be treated for COVID-19, as well as to separate those with COVID-19 infection from other patients (to prevent onward infection). It can also be used to monitor the trend and spread of cases in a population, to determine what public health and societal interventions might be needed, and to assess the effectiveness of interventions, such as vaccines.

When To Get Tested

Swab tests (for current infection) are most reliable if done within the first 3 days after symptoms start. The government has now said that anyone with symptoms can be tested.It is recommended that symptomatic patients have a swab test using nucleic acid amplification (NAAT), rather than a lateral flow test (see below).

Antibody tests (for past infection) are most likely to be helpful a few weeks after the symptoms have started. Research is trying to identify the best time for testing.

Sample Required?

Swab tests for current infection are tested with a swab to the throat and/or nose. This is usually done by a healthcare professional, but home test kits are also available. This video gives further information on how to take a self-test swab.

Other samples, such as sputum, may be tested if a patient is in hospital. Saliva testing may be used in some settings.

Antibody tests need a blood sample.

Test Preparation Needed?

None

Cortisol Test

Why Get Tested?

To help diagnose Cushing’s syndrome or Addison’s disease (primary adrenal insufficiency) or secondary adrenal insufficiency.

When To Get Tested?

If your doctor suspects an underactive, or damaged adrenal gland with too little production of cortisol, or a condition that could result in the body producing too much cortisol. Ensure your healthcare professional is aware if you are currently or recently have been taking steroid medication (such as hydrocortisone, prednisone, prednisolone, dexamethasone), as these can affect test results.

Sample Required?

Typically, a blood sample will be taken by a syringe with needle from a vein in the arm, but sometimes urine or saliva may be tested. Blood should ideally be collected between 8-9am when blood cortisol concentrations should be near their nocturnal peak. A second sample may be taken late in the evening when cortisol should be at its lowest concentration (about midnight). Samples collected at these times allow the doctor to evaluate the daily pattern of cortisol secretion (the diurnal variation). This pattern may be disrupted with excess cortisol production – the maximum amount may still be at or near normal concentrations, but concentrations may not fall as they should throughout the day. A single morning sample may be sufficient to detect decreased concentrations of cortisol.
Sometimes urine is tested for cortisol (urinary free cortisol); this requires collecting all urine produced during a day (24-hour urine). This sample will reflect the total amount of cortisol produced in the 24 hour period but will not allow doctors to evaluate variations in the pattern of cortisol secretion.
If a saliva sample is required for testing, the sample will be collected by inserting a swab into the mouth and waiting a few minutes while the swab becomes saturated with saliva. Your doctor may have different methods for saliva collection. Please follow any instructions that you are given.

Test Preparation Needed?

Some preparation for the test may be needed. Follow any instructions that are given as far as timing of the sample collection, resting, and/or any other specific pre-test preparation.
A saliva test requires special care in obtaining the sample. You may be instructed to refrain from eating, drinking or brushing your teeth for a period of time (often between 15 to 30 minutes) prior to the test. Please discuss the instructions given by your local laboratory with your doctor and ensure you follow any instructions given.
A stimulation or suppression test requires that you have a baseline blood sample taken and are then given a specified amount of a drug. Subsequent blood samples are drawn at specific times. Please follow any instructions that you are given.

Creatine Kinase (CK) Test

Why Get Tested?

To detect and monitor muscle damage and to help diagnose conditions associated with muscle damage

When To Get Tested?

If you have muscle aches or pain, tenderness, weakness and swelling after muscle damage, particularly if your urine becomes dark reddish-brown in colour

Sample Required?

A blood sample taken from a vein in the arm

Creatinine

Why Get Tested?

To determine if your kidneys work normally and to monitor treatment for kidney disease

When To Get Tested?

As part of a routine blood test if you have non-specific health complaints or if your doctor thinks that you may have kidney disease; at intervals to monitor treatment for kidney disease or kidney function while on certain medicines

Sample Required?

A blood sample is taken from a vein in the arm. Spot urine or 24-hour urine sample collection is needed for the measurement of urine creatinine.

Creatinine Clearance

Why Get Tested?

To help detect and evaluate kidney dysfunction or decreased blood flow to the kidneys

When To Get Tested?

Your doctor will request this test if he/she thinks that you may have a problem affecting how your kidneys work, such as a blockage within the kidney, damage to the kidneys, dehydration or fluid loss, or another disease, such as congestive heart failure. Creatinine clearance may also be measured before you are given certain drugs which rely on good kidney function in order to allow the drugs to be removed from the body. Another way of measuring how well your kidneys are working, commonly used across the UK, includes the “estimated glomerular function rate“ (eGFR) which is calculated from a single blood sample taken from a vein in your arm. This is an ‘estimation’ as there is no direct or simple way of measuring kidney function.

Sample Required?

Two samples are needed, both a urine sample (all the urine is collected over a 24-hour period) and a blood sample taken from a vein in your arm.

Cryoglobulin

Why Get Tested?

To determine if symptoms like sensitivity of extremities to cold is due to the presence of abnormal proteins called cryoglobulins in the blood

When To Get Tested?

When a person has symptoms such as a rash, bruising, pain, weakness, joint pain, and/or paleness and coolness of the extremities that occur at cold temperatures

Sample Required?

A blood sample taken from a vein in your arm, kept at body temperature until tested in the laboratory.

CSF Analysis

Why Get Tested?

To diagnose a disease or condition affecting the central nervous system (CNS) such as bleeding within the brain or skull, cancer, autoimmune disorder or infection

When To Get Tested?

When your doctor suspects that your symptoms are due to a condition or disease involving your central nervous system

Sample Required?

A sample of cerebrospinal fluid (CSF) is collected by a doctor from the lower back using a procedure called a lumbar puncture or spinal tap

Test Preparation Needed?

The patient should empty their bladder and bowels prior to the sample collection. It will be necessary to lie still in a curled-up foetal position during the test and to lie quietly for a time period after the collection.

Cystatin C

Why Get Tested?

To assess your kidney function if you have known or suspected kidney disease, but only in specific circumstances when traditional kidney function tests are misleading. It is used to calculate how well your kidneys are able to filter waste products from the blood.

When To Get Tested?

When your doctor suspects that you may have decreased kidney function but blood creatinine measurements are not reliable because of circumstances specific to you. It may be measured at intervals over a longer time to monitor your kidney function.

Sample Required?

A blood sample taken from a vein in your arm

Cytomegalovirus (CMV)

Why Get Tested?

If your doctor suspects you presently have, or recently had, a cytomegalovirus (CMV) infection or if it is important to know if you have ever had a CMV infection – such as prior to receiving an organ transplant

When To Get Tested?

When a young adult, a pregnant female, or an immune-compromised patient has typical symptoms that suggest a CMV infection (tiredness, fever, jaundice); when a newborn has multiple congenital anomalies, unexplained jaundice or anaemia, and/or when an infant has seizures or developmental problems that may be due to CMV

Sample Required?

The sample required depends on whether testing is being done to determine the presence of antibody or to detect the virus itself and on the health status of the patient. Antibody testing requires a blood sample, obtained by inserting a needle into a vein in the arm. Viral detection may be done on a variety of samples, including urine, blood, or sputum. Some samples may require a special procedure to collect amniotic fluid, duodenal fluid, cerebrospinal fluid, or body tissue (biopsy).

Test Preparation Needed?

No test preparation is needed.

D-dimer

Why Get Tested?

To help diagnose or exclude thrombotic (blood clot producing) or bleeding diseases and conditions.

When To Get Tested?

When you have symptoms of a disease or condition that
causes acute and/or chronic inappropriate blood clot formation such as: DVT (Deep Vein Thrombosis), PE (Pulmonary Embolism), or DIC (Disseminated Intravascular

Coagulation), and to monitor the progress and treatment of DIC and other thrombotic conditions.

Sample Required?

A blood sample taken from a vein in your arm.

Test Preparation Needed?

None

DHEAS

Why Get Tested?

DHEAS is measured to evaluate adrenal function and certain adrenal tumours, and to investigate the cause of virilisation (showing features of male hormones) or excess facial and body hair (hirsutism) in girls and women or early (precocious) puberty in boys.

When To Get Tested?

The measurement of DHEAS is used very infrequently in the UK as other tests can be more helpful. A doctor may measure DHEAS in those with signs or symptoms that may be due to the presence or too much male hormone.

It is sometimes used in the investigation of Cushing's syndrome.

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

No test preparation is needed

Digoxin

Why Get Tested?

To determine if the amount of digoxin in your blood is at an appropriate level or to detect potentially toxic levels

When To Get Tested?

Soon after the start of digoxin therapy and at regular intervals to ensure that drug levels are within the desired range and are not low or at toxic concentrations

Sample Required?

A blood sample collected from a vein in your arm

Test Preparation Needed?

No special preparation is needed, but timing of the sample for testing is important. When you have your blood taken, tell the healthcare professional when you took your last dose of digoxin. You may want to write down the exact time at which you took your dose and when the blood was taken. This information will be useful if your doctor has any questions about your results.

Direct Antiglobulin Test

Why Get Tested?

To help diagnose the cause of haemolytic anaemia as caused by autoimmune disease or induced by drugs; to investigate a transfusion reaction; to diagnose haemolytic disease of the foetus and neonate

When To Get Tested?

When your doctor wants to find out the cause of your haemolytic anaemia; when you have had a blood transfusion recently and are experiencing symptoms of a transfusion reaction; or when a newborn shows signs of haemolytic disease of the foetus and neonate (HDFN).

Sample Required?

The test is performed on a sample of blood obtained from a vein in the arm using a needle. This is a process which may be referred to as ‘venepuncture’.

Test Preparation Needed?

None

Direct LDL Cholesterol

Why Get Tested?

To help determine your risk of developing heart disease and to monitor lipid-lowering lifestyle changes and drug therapies; to accurately determine your low-density lipoprotein cholesterol (LDL-C) concentration when you have raised triglyceride concentrations

When To Get Tested?

As a follow-up to a lipid profile if your triglycerides are significantly elevated; at regular intervals to monitor efforts to lower LDL concentrations

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

No test preparation is needed. Your doctor might recommend that you fast (water only) for 14 hours prior to the test so that other related substances can be measured in the same sample.

Drugs of Abuse

Why Get Tested?

To detect or exclude the presence of commonly abused and/or illegal drugs. This may be carried out for a number of reasons including screening for pre-employment purposes or to comply with a drug rehabilitation programme.

When To Get Tested?

- If you apply for a job where drug screens are carried out as a routine. People with drug and alcohol problems have worse records for accidents and absenteeism; for this reason some employers screen job applicants prior to appointment.
- If you have admitted having a drug problem and are enrolled in a detoxification or drug rehabilitation scheme where testing is part of the programme.
- If you believe you may have taken a drug accidentally or been given a drug without consent (e.g. drink spiking).
- If you are admitted to hospital in an emergency and doctors think that your treatment could be improved if drug abuse could be proved or excluded.
- If you take part in a sport at a professional level.
- If you apply for an insurance policy – some companies perform limited drug screening on applicants.
- For legal reasons (e.g. child custody cases).

Sample Required?

A random urine sample is usually collected for detection of drugs of abuse although they can be detected in blood, sweat, saliva, breast milk and hair samples.

Test Preparation Needed?

Some prescription and over-the-counter drugs may give a positive screening result; before you are tested, indicate any medications that you have taken and/or for which you have prescriptions.

eGFR - estimated Creatinine Clearance

Why Get Tested?

In the UK, the National Institute for Health and Care Excellence (NICE) guidance (CG182) states: “Whenever a request for serum creatinine measurement is made, clinical laboratories should report an estimate of GFR (eGFR)”

When To Get Tested?

As a practical test to look for evidence of kidney dysfunction. To monitor changes in kidney function in long term/chronic medical conditions.

Sample Required?

eGFR is an estimate of actual glomerular filtration rate and may be calculated using your age, weight, height, gender, ethnicity, serum creatinine and/or serum cystatin C (requires a blood sample from a vein in your arm)

Test Preparation Needed?

NICE guidelines advise people not to eat any meat in the 12 hours before having a blood test for eGFR creatinine. Recent evidence also suggests that fish should not be eaten before having a blood test.

Electrolytes and Anion Gap

Why Get Tested?

To detect a problem with the body's electrolyte balance.

When To Get Tested?

As part of routine blood testing, or when your doctor suspects that you have an imbalance of one of the electrolytes (usually sodium or potassium), or if your doctor suspects an acid-base imbalance. Electrolytes may also be checked if you are prescribed certain drugs, particularly diuretics or ACE inhibitors.

Sample Required?

A blood sample taken from a vein in the arm or in some cases, a urine sample

Test Preparation Needed?

Emergency and Overdose Drug Testing

Why Get Tested?

To detect, measure, and occasionally to monitor drugs that may have been taken in overdose or are causing acute overdose symptoms; results from emergency and overdose drug testing are used mainly to help treatment. If results are needed for legal proceedings, then special legal (forensic) procedures must be followed for sample collection, storage, and testing.

When To Get Tested?

If a drug overdose is suspected, or when a person has symptoms such confusion, difficulty breathing, feeling sick, agitation, fits, changes in heart rhythm, or increased

temperature that the Accident and Emergency (A&E) doctor thinks may be drug-related; at intervals to monitor a drug overdose

Sample Required?

A blood sample taken from a vein in your arm, a urine sample, or sometimes a breath sample; rarely, saliva or another body fluid

Test Preparation Needed?

None

ENA Panel

Why Get Tested?

To help diagnose and distinguish between autoimmune disorders as well as to monitor autoimmune disease progression

When To Get Tested?

When your antinuclear antibody (ANA) test is positive; when you have symptoms that suggest an autoimmune disorder; when monitoring the activity of an autoimmune disorder

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

None

Epstein-Barr Virus Antibodies

Why Get Tested?

The usual reason to test for EBV is to help diagnose glandular fever (also known as Infectious Mononucleosis). Some people may also be tested for EBV if they are having treatment that weakens the immune system, such as immunosuppressive medication or a transplant.

When To Get Tested?

If you have symptoms of glandular fever (fevers, tiredness, swollen lymph nodes, sore throat)

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

No test preparation is needed

Erythrocyte Sedimentation Rate (ESR)

Why Get Tested?

To detect and monitor the activity of inflammation as an aid in the diagnosis of the underlying cause

When To Get Tested?

When your doctor thinks that you might have a condition that causes inflammation and to help diagnose and follow the course of this, especially temporal arteritis or polymyalgia rheumatica

Sample Required?

A blood sample taken from a vein in the arm

Test Preparation Needed?

None

Erythropoietin

Why Get Tested?

Either to help tell the difference between polycythaemia vera and secondary polycythaemia or to help tell the difference between different types of anaemia. It also shows whether the amount of erythropoietin being produced is appropriate for the level of anaemia present

When To Get Tested?

If a patient has an elevated red blood cell count or an anaemia that the doctor suspects may be caused by decreased red blood cell production

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

None

Ethanol

Why Get Tested?

To find out if a person has drunk alcohol and to measure the amount of alcohol present in the body

When To Get Tested?

When a patient has symptoms that suggest drunkenness or alcohol toxicity, or when a person is suspected of breaking drinking-related laws or as part of a drug testing panel for pre-employment or other purposes.

Sample Required?

Ethanol (Ethyl alcohol) can be measured in a blood or urine sample, in breath or (rarely) in saliva. Blood, urine, and saliva samples must be sent to a laboratory for analysis. A breath sample is analysed immediately on site using a breath analyser ("breathalyser").

Test Preparation Needed?

None

Factor V Leiden Mutation and PT 20210 Mutation

Why Get Tested?

To determine whether you have an inherited gene mutation that increases your risk of developing a venous thromboembolism (blood clot)

When To Get Tested?

If you have a strong family history of thrombosis associated with these mutations; if you have unexplained thrombosis that requires further investigation

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

No test preparation is needed.

Faecal Immunochemical Test

Why Get Tested?

To screen for bleeding from the gut/intestine, which may be an indicator of bowel cancer

When To Get Tested?

The test is used to screen for bowel cancer especially as part of the National Bowel Cancer Screening Programme. Outside of the Screening Programme the test is also widely available to GPs following the publication of the NICE Guidelines on the recognition of suspected cancers (NG12). Patients with symptoms that are suspicious of gut cancer will usually be asked to complete a FIT test before being referred for other investigations such as colonoscopy.

Sample Required?

One sample of faeces collected into a special container.

You collect a sample yourself, in the privacy of your own bathroom, using a special kit. The actual collection method varies between manufacturers. Read all the instructions very carefully before starting to collect your sample.

Test Preparation Needed?

For the FIT test, there are no dietary, drug, or dental procedure restrictions. However, avoid collecting samples during a menstrual period. The test uses antibodies to detect only human blood from the lower digestive tract (colon).
For all tests, follow the instructions that are provided by the doctor or included in the test kit.

Ferritin Test

Why Get Tested?

To help assess the levels of iron stored in your body

When To Get Tested?

When your doctor suspects that you have either too little or too much iron in your system

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

You may be instructed to fast for 12 hours before the test; in this case, only water is permitted.

Fibrinogen

Why Get Tested?

To determine whether your fibrinogen level is adequate to allow normal blood clotting, to help diagnose disseminated intravascular coagulation (DIC), to help determine whether you have an inherited fibrinogen deficiency or abnormality.

Sometimes as a non-specific marker of inflammation in the blood. Very occasionally to help evaluate your risk of developing cardiovascular disease

When To Get Tested?

When you have unexplained or prolonged bleeding, an abnormal Prothrombin Time (PT) or activated Partial Thromboplastin Time (aPTT) test, or have a relative with a hereditary fibrinogen deficiency or abnormality. To evaluate whether certain abnormalities in a Full Blood Count are due to inflammation or are self-generated. When your doctor wants additional information to help evaluate your risk of developing heart disease

Sample Required?

A blood sample taken from a vein in your arm, or sometimes, via a finger prick (mainly performed in children)

Test Preparation Needed?

None

First Trimester (Combined) Screen for Down's Syndrome and other fetal anomalies

Why Get Tested?

To assess the risk of a foetus having a chromosomal abnormality, such as Down's syndrome (trisomy 21).

When To Get Tested?

Usually between 11 and 14 weeks of pregnancy

Sample Required?

A blood sample taken from a vein in your arm. Measurement of nuchal translucency (NT) requires a special ultrasound examination to be performed.

Test Preparation Needed?

You may be requested to have a full bladder when having the nuchal translucency ultrasound performed. Having a full bladder when you attend for your scan usually makes it easier to see the baby clearly and measure the nuchal translucency.

Fructosamine

Why Get Tested?

To help monitor your diabetes over time, especially if it is not possible to monitor using the HbA1c test; to help determine the effectiveness of changes to your diabetic treatment plan

When To Get Tested?

When you are diabetic and your doctor wants to evaluate your average blood glucose level over the last 2-3 weeks

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

No test preparation is needed.

FSH Test

Why Get Tested?

To evaluate the function of your pituitary gland, which regulates the hormones that control your reproductive system

When To Get Tested?

If you are having difficulty getting pregnant or are having irregular menstrual periods (in order to identify or rule out ovarian failure/menopause in women and sperm production failure in men); if your doctor thinks that you have symptoms of a pituitary, ovarian, testicular or hypothalamic disorder; when your doctor suspects that a child has delayed or earlier than expected sexual maturation (or delayed or early growth).

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

No special preparation is required for the test, but the blood sample should be taken at the start of a woman's cycle (days 1 to 4 if the cycles are regular)

FT3

Why Get Tested?

To help diagnose hyperthyroidism and to monitor it's treatment

When To Get Tested?

If you get an abnormal thyroid stimulating hormone (TSH) or free thyroxine (FT4) result

Sample Required?

A blood sample taken from a vein in the arm

Test Preparation Needed?

None needed; however, certain medications can interfere with the FT3 test, so tell your doctor about any drugs that you are taking

FT4

Why Get Tested?

To diagnose hypothyroidism or hyperthyroidism in adults and to monitor response to treatment

When To Get Tested?

When you have symptoms of an underactive (hypothyroidism) or overactive (hyperthyroidism) thyroid gland

Sample Required?

A blood sample taken from a vein in the arm

Test Preparation Needed?

No test preparation is necessary

Full Blood Count (FBC)

Why Get Tested?

Commonly requested as part of a general screen in a patient who is unwell to screen for a variety of disorders, such as anaemia and infection, inflammation nutritional status and bleeding

When To Get Tested?

As determined by your doctor; there are many illnesses which will affect the full blood count (FBC) and the result may help to make a diagnosis

Sample Required?

A blood sample taken from a vein in the arm or a finger-prick or heel-prick (newborns)

Test Preparation Needed?

None

Fungal Tests

Why Get Tested?

To detect a fungal infection, to determine which specific fungus or fungi are present, and sometimes to isolate and grow the fungi for subsequent susceptibility testing

When To Get Tested?

When the doctor suspects that you have a skin, lung, or systemic fungal infection; sometimes after treatment to monitor its effectiveness

Sample Required?

The sample collected depends upon the suspected location(s) of the infection. For superficial infections, the sample may include scrapings of the skin, clipped or shaved nail or hair, vaginal swabs, or a urine sample. For deeper tissue, organ or systemic infections, the sample may involve the collection of blood from a vein, sputum from the lungs, and/or the collection of a tissue biopsy. If meningitis is suspected, a sample of cerebrospinal fluid may be collected.

G6PD

Why Get Tested?

To see whether you have an inherited deficiency of Glucose-6-Phosphate Dehydrogenase (G6PD), necessary to keep red blood cells healthy

When To Get Tested?

If a child has long term jaundice as a newborn and no other cause can be identified; when you have had one or more bouts of haemolysis (break-up of red blood cells, which may cause jaundice, dark urine or anaemia), particularly if the haemolysis follows "oxidative" stress caused by some medicines, foods, or infections

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

None required

Gamma-Glutamyl transferase (GGT) Test

Why Get Tested?

To screen for liver disease or alcohol abuse; and to help your doctor tell whether a raised concentration of alkaline phosphatase (ALP) in the bloodstream is due to liver or bone disease

When To Get Tested?

If your doctor thinks that you have symptoms of a liver disorder/disease

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

None required

Gastrin

Why Get Tested?

To detect an overproduction of gastrin, to help diagnose Zollinger-Ellison syndrome (ZE syndrome), to help diagnose multiple endocrine neoplasia type 1 (MEN-1) and to monitor for recurrence of a gastrin-producing tumour (gastrinoma)

When To Get Tested?

When you have peptic ulcers and/or diarrhoea and abdominal pain that your doctor suspects is caused by excess gastrin; periodically to monitor for a gastrinoma recurrence

Sample Required?

A blood sample taken from a vein in your arm.

Test Preparation Needed?

You should fast for 12 hours and avoid alcohol for 24 hours before the test. Your doctor may also ask you to stop taking certain stomach medications for several days before the test.

Genetic Tests for Targeted Cancer Therapy

What are genetic tests for targeted cancer therapy?

Genetic tests for targeted cancer therapy detect mutations (changes) in the DNA of cancer cells. Knowing whether the cancer has a particular mutation can help guide the type of treatment that a person receives. The presence or absence of certain mutations can predict who may benefit from certain drugs and who is not likely to respond.

Cancer is the uncontrolled growth of abnormal cells. Multiple factors may contribute to this uncontrolled growth. One such factor is the malfunctioning of proteins involved in controlling cell growth and maturation. The proteins usually malfunction as a result of a mutation in the DNA of the gene that codes for that protein. Some mutations may result in a defective protein that cannot stop cell growth while other mutations may produce a protein with altered function that stimulates cell growth. The net result is unchecked growth and division of these abnormal cells (cancer).

Medical researchers have long studied these changes in genes in order to better understand cancer and to develop drugs to fight it. Their goal has been to create drugs that disrupt a specific step in cancer growth, while doing minimal damage to normal cells. These are called targeted drugs or targeted therapy. What researchers have noted is that specific types of cancer are frequently associated with specific genetic mutations. Not every cancer will have them, but a significant percentage will, and cancers with these mutations usually have a more predictable response to certain drug treatments compared to cancers without these mutations.

These findings have led to two important developments:

- Cancer drugs that inhibit or target very specific proteins associated with certain cancers (two examples are tyrosine kinase inhibitors and epidermal growth factor receptor (EGFR) antibodies.)
- Genetic tests to detect the presence of mutations in cancer tissue that tell a healthcare practitioner whether the person being tested is likely to benefit from a specific therapy

Medical researchers continue to explore the genetics of cancer and to look for opportunities to develop new therapies. Additionally, some cancers eventually stop responding to certain therapies and develop resistance to that therapy. Genetic research may offer insights into how resistance to therapy occurs.

Why is this testing important?

Standard treatment for cancer usually involves surgery, chemotherapy, radiation therapy, or some combination of these. Treatment with chemotherapy drugs and radiation aims to slow the growth of cancer, keep it from spreading, and kill any cancerous cells that have spread to other parts of the body (metastasized).

Chemotherapy works by attacking cells that are actively growing and dividing. Radiation therapy kills cancer cells by damaging their genes and preventing them from growing and dividing. Both types of therapy can affect all cells that are growing and dividing, including normal cells. This often leads to harmful side effects, and these treatments require careful adjustment to maximize the killing of cancer cells while minimizing the damage to healthy tissue.

Targeted therapy is a newer type of cancer treatment that offers healthcare practitioners and their patients the opportunity to use a drug that has a greater effect on cancerous tissue, reducing many of the side effects associated with standard therapy. It is based on the fact that the genetic makeup of the cancer cells is different than the normal cells around them. Targeted therapy aims to disrupt specific steps or

processes that are somewhat unique to the growth of cancer cells. Testing the cancer cells taken from patients in a biopsy prior to initiating drug therapy may be necessary to determine the cancer's likely response to certain drugs.

Targeted cancer drugs are expensive, and they generally only work in patients whose cancer has the genetic makeup that they have been developed to work against. Genetic testing prior to beginning therapy is necessary to match the treatment up with the patients and cancers likely to benefit from them.

Examples of targeted cancer drugs for which tests are available include:

- Drugs that bind to receptors on the cell surface and block growth signalling to the cell
- Drugs that are small molecules that cross the cell membrane and block the signals for growth at the receptor's active site

Testing

How is genetic testing for targeted cancer therapy used?

These genetic tests are used to help guide treatment for certain cancers. They help to inform a healthcare practitioner as to whether certain targeted cancer drugs may or may not work.

Genes are the basic units of genetic material, the segments of DNA that usually code for the production of specific proteins. Alterations in DNA are called genetic variants (also polymorphisms or mutations) and occur throughout the population. Variants or mutations are largely inherited and affect all cells, but they can occur later in life, because of exposures to radiation, toxins, or for unknown reasons, and these mutations may result in cancer.

In a variety of cancers, there may be a mutation that leads to an increased amount of a particular protein present in the tumour tissue or to production of a protein that has altered activity. Tumours that have these mutations may tend to grow more aggressively, be more likely to spread (metastasize), and/or may be more resistant to standard chemotherapy. Sometimes, however, the changes in the protein also make the tumours candidates for therapy that targets the changed protein ("targeted therapy"). Genetic tests for cancer therapy detect the mutations that code for these proteins, thus identifying tumours that may be susceptible to targeted therapy.

Conversely, genetic tests may also identify tumours that will not respond to targeted therapy. Certain mutations, when present, make the cancer cells resistant to the drug and targeted therapy will not be used for treatment.

When are the tests requested?

Testing may be ordered as part of an initial workup of particular cancers or performed on those with certain cancers that are not responding to chemotherapy. It requires a sample of the tumour tissue, and if a sample is available from a previous biopsy used for diagnosis, it can be done on that sample.

The tests are usually performed only once. However, testing may be done more than once if a patient's tumour progresses while on therapy to see if the tumour has acquired mutations that are resistant to the therapy.

Tests

Each genetic test for a specific targeted cancer therapy identifies mutations in a single gene, and test results are specific to the gene and the targeted therapies * Gene names are typically abbreviated for ease of use because full names are often several words long.

Type of Cancer	Gene Tested*	Interpretation of Test Result
Breast cancer	Her2/neu	When present, likely response to tra
Chronic myelogenous leukaemia (CML)	ABL1	Nonresponsive to imatinib when mut
	BCR-ABL	When present, can be measured pe to targeted drug
Bowel cancer	KRAS	When mutation present, likely resist inhibitor
	BRAF	Poor prognosis when mutation prese
Gastrointestinal stromal tumour (GIST)—rare tumours of the digestive tract	KIT	Depending on mutation present, bet therapy, increased dose of imatinib response to sunitinib, or possible res
	PDGFRA	When mutation present, less likely t
Melanoma	BRAF	Better response to vemurafenib whe metastatic melanoma
Myeloproliferative neoplasms (MPNs)	JAK2	When mutation present, may be mea responsiveness to treatment (e.g., R
Non-small cell lung cancer (NSCLC)	EGFR	Best response to tyrosine kinase inh erlotinib in those with certain mutatio
	EML4-ALK	If ALK is present, may respond to Al crizotinib
	ROS1	If ROS1 is present, ALK kinase inhib
	KRAS	Poorer prognosis when certain muta tyrosine kinase inhibitors, and poor r platinum/vinorelbine therapy
	PDL1	Likely response to immunotherapy
Cancers of unknown origin—cancers detected in unusual body sites and thought to have spread (metastasized) from another location	Several genes evaluated together (genomic array or profile)	Helps determine the organ or body p originated in order to help guide trea

Usually, the cancer drugs and genetic tests listed in the table above have been developed concurrently and the tests are referred to as companion diagnostics. These are laboratory tests that are developed specifically to provide information that is essential for the safe and effective use of a corresponding therapeutic product. In

many cases, results from these tests are needed for healthcare practitioners to be able to make decisions regarding treatment of their patients.

Cancers associated with a strong family history and those that occur at a young age may have different characteristics than those that develop sporadically in adults. For instance, paediatric cases of GIST are very different to adult cases and do not typically have KIT or PDGFRA mutations.

Only common mutations are tested. A negative test result does not rule out the possibility that a person has a less common mutation. To rule out the possibility that the mutation was not present in the sample tested, additional samples may be needed.

Some tests for specific gene mutations in certain types of cancer are available on a limited basis and/or not used routinely for medical purposes. These genetic tests may, however, be used in research settings and their utility in medical care may evolve as research progresses. Some examples include:

- Colon cancer: PIK3CA and NRAS
- Melanoma: KIT and NRAS
- Myeloproliferative neoplasms: PDGFRA

Glucose Tests

Why Get Tested?

To determine whether or not your blood glucose level is within normal ranges; to screen for, diagnose, and monitor diabetes, and to monitor for the presence of hypoglycaemia (low blood glucose) and hyperglycaemia (high blood glucose)

When To Get Tested?

If you have symptoms suggesting hypoglycaemia or hyperglycaemia, or if you are pregnant. If you have diabetes, you may be required to monitor glucose levels several times a day using a self-monitoring device.

Sample Required?

A blood sample taken from a vein in your arm or, for self-monitoring, a drop of blood from your finger. A few diabetic patients may use a continuous glucose monitor which is a small sensor wire inserted beneath the skin of the abdomen that measures blood glucose every five minutes.

Test Preparation Needed?

For screening purposes, fasting is generally recommended (nothing to eat or drink except water) for at least 8 hours (generally 8-10 hours fasting) before a blood glucose test. Those who have been diagnosed with diabetes and are monitoring their

glucose levels are often tested both while fasting and after meals. For random and timed tests, follow the instructions given to you by your healthcare professional.

There is another test called an oral glucose tolerance test (OGTT). It requires that the person fasts (as described above) for the first blood sample and then drink a liquid containing a specified amount of glucose; a further blood sample is then taken after 2 hours. This test is commonly offered to pregnant patients for diagnosis of diabetes in pregnancy (gestational diabetes).

Gonorrhoea Test

Why Get Tested?

To screen for *Neisseria gonorrhoeae*, which causes the sexually transmitted disease (STD) gonorrhoea

When To Get Tested?

If you have symptoms of gonorrhoea or are pregnant

Sample Required?

A swab of secretion or discharge from the infected area.

Testing is available at genito-urinary medicine (GUM) clinics , sexual health centres, contraceptive centres and some GP surgeries.

Test Preparation Needed?

Please tell your doctor or healthcare professional about the use of antibiotics or, for women, douches or vaginal creams within 24 hours before testing vaginal samples, as they may affect test results. For a urine sample, you may be instructed to wait one to two hours after you last urinated before collecting a urine sample. Follow any instructions you are given.

Gram Stain

Why Get Tested?

To identify the cause of a bacterial infection so appropriate treatment can be given

When To Get Tested?

Seek advice from your doctor if you have an area of inflamed, red or a painful skin, a wound which does not seem to be healing or any other concerns which might lead you to believe you may have a bacterial infection

Sample Required?

A skin swab or fluid/pus (if present) from the site of infection

Test Preparation Needed?

None

Growth Hormone

Why Get Tested?

Growth hormone (GH) is produced by the pituitary, situated at the base of the brain, behind the bridge of your nose and has growth promoting properties. It is measured to check if there is under or overproduction. In addition it is used to examine the function of the pituitary and to monitor the effectiveness of treatment.

When To Get Tested?

The evaluation of GH status is based on clinical findings, medical history, imaging and biochemical tests. Slow growth in height and delayed development (in children),whilst decreased bone density and/or muscle strength, and increased lipids (in adults) could all be related to insufficient GH production. Symptoms suggestive of gigantism in children or acromegaly in adults may be a result of excess GH production. It is also measured as part of an evaluation of pituitary function.

Sample Required?

After an overnight fast, several blood samples are taken at timed intervals from veins in your arm, as part of a stimulation or suppression test. Pre-adolescents require priming prior to performing a stimulation test. A sample is usually taken for measurement of insulin-like growth factor-1 (IGF-1) on the baseline sample. When monitoring treatment for GH excess a single sample of blood may be drawn following a fast.

Test Preparation Needed?

In healthy adults GH is released in bursts throughout the day, it rises sharply 3-4 hours after a meal and within 60 minutes after the onset of sleep making random GH results in general uninterruptable. GH may be measured after stimulation or suppression testing. Fasting levels are used to monitor treatment for GH excess.

What is being tested?

GH is needed for a child's normal growth and development. It promotes growth of the long bones from birth through puberty. Children with insufficient GH production grow more slowly and are small in size for their age; one of the first symptoms of growth hormone deficiency (GHD). It should be noted that short stature can also be related to familial traits or other genetic disorders. Constitutional delay (i.e.

temporary delay in growth of no obvious cause) is the most common cause of short stature in childhood.

An excess of GH is most often due to a benign GH-secreting pituitary tumour i.e. a tumour that has not spread to other tissues, although larger tumours can have other effects e.g. headaches and impaired vision Gigantism is a disorder resulting from long-term secretion of too much GH, which increases the growth of muscle, bones and connective tissue in childhood or adolescence before the end of puberty. This results in a child becoming excessively tall (e.g. over 2.1 meters). Children with excessive GH production may also have thickening of their facial features, general weakness, delayed puberty, and headaches.

In adults GH plays a role in regulating bone density, muscle mass, and lipid metabolism. Deficiencies can lead to decreased bone densities, lower muscle mass, and altered lipid concentrations. Excess GH in adults can lead to acromegaly, with bone and skin thickening. Symptoms such as sweating, fatigue, headaches and joint pain can be subtle at first. Increased GH concentrations can lead to enlargement of the hands, feet, facial bones and internal organs and carpal tunnel syndrome (trapped nerves). If untreated, acromegaly in adults and gigantism in children can lead to complications such as type 2 diabetes, increased cardiovascular disease risk, high blood pressure, arthritis, and in general, a decreased life span.

GH stimulates the secretion of the true growth factors, most notably IGF-1. The concentration of which represents the secretion of GH in the previous few days. This is measured prior to stimulation or suppression tests used to diagnose GH abnormalities and to monitor treatment.

How is the sample collected for testing?
A GH suppression or stimulation tests is performed after fasting for 10 to 12 hours when a blood sample is taken from a vein in the arm. Under medical supervision, a standard glucose solution is given to the patient to drink (for a suppression test), or an intravenous (IV) injection of a solution of insulin, glucagon, arginine, clonidine or GH releasing hormone (GHRH, for a stimulation test) is given through a vein in your arm. Blood samples are then taken from your veins at timed intervals. GH is measured on each sample collected to look at the change in levels over time. Sometimes it is necessary to perform a second test.

During treatment for growth hormone excess a sample of blood may be taken, following a fast, to monitor growth hormone production.

Is any test preparation needed to ensure the quality of the sample?
Samples collected for stimulation or suppression tests are collected after fasting. Pre-adolescents are usually primed with sex steroids prior to a stimulation test.

- **5-Hydroxyindoleacetic acid (5-HIAA)**

Why Get Tested?

To help diagnose a serotonin-secreting carcinoid tumour or to monitor treatment of a serotonin-secreting carcinoid tumour

When To Get Tested?

When you have symptoms suggestive of a carcinoid tumour such as flushing, diarrhoea, and/or wheezing. For individuals with a known serotonin-secreting carcinoid tumour, 5-HIAA may be monitored at intervals following treatment to check the treatment is reducing the carcinoid tumour.

Sample Required?

A 24-hour urine sample; rarely a random urine sample

Test Preparation Needed?

You may be instructed to avoid certain foods and medications prior to this test. Please follow any instructions you are given.

17-Hydroxyprogesterone

Why Get Tested?

To screen for, detect, and monitor treatment for congenital adrenal hyperplasia (CAH) due to a deficiency in the 21-hydroxylase enzyme; sometimes to help rule out other conditions.

When To Get Tested?

1. in some countries as part of a routine newborn screen
2. when an infant has atypical genitalia i.e. it is unclear if the child is male or female
3. when a young female has hirsutism (excess hair) or other symptoms of virilisation
4. when a child has premature sexual development
5. periodically to monitor CAH treatment
6. in ‘salt-wasting’ presentations in infants
7. rarely in investigation of infertility

Sample Required?

A blood sample is obtained by inserting a needle into a vein in the arm or by pricking the heel of an infant.

A saliva sample can be obtained by asking the patient to spit into a small container. Saliva samples may be suitable for analysis in some specialist laboratories.

Test Preparation Needed?

There is no preparation such as fasting for this test, but the doctor may request an early morning collection. The doctor may also request that blood be collected in the first half of a woman's menstrual cycle.

Haemoglobin

Why Get Tested?

If you have anaemia (too few red blood cells) or polycythaemia (too many red blood cells), to assess its severity, and to monitor response to treatment

When To Get Tested?

As part of a full blood count (FBC), which may be requested for a variety of reasons

Sample Required?

A blood sample collected from a vein in your arm or by a finger-prick (children and adults) or heel-prick (newborns)

Test Preparation Needed?

Ideally you should be reasonably hydrated when having a haemoglobin test or the result may be inaccurately high.

Haemoglobinopathy Evaluation

Why Get Tested?

To investigate haemoglobinopathy as the cause of signs and symptoms; to screen for a haemoglobin disorder

When To Get Tested?

As follow up to abnormal results on a full blood count (FBC) and/or blood film; when you have symptoms of haemolytic anaemia such as weakness and fatigue and your doctor suspects that you have an abnormal form of haemoglobin (haemoglobinopathy); when you have a family history of haemoglobinopathy; as part of newborn screening

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

None

Haptoglobin

Why Get Tested?

To help detect and evaluate haemolytic anaemia

When To Get Tested?

When you have signs of jaundice, or of anaemia such as weakness, paleness, or breathlessness that the doctor suspects may be due to red blood cell destruction (haemolytic anaemia).

Sample Required?

A blood sample taken from a vein in your arm.

Test Preparation Needed?

No test preparation is needed.

HbA1c Test

Why Get Tested?

To monitor average blood glucose levels in someone with diabetes and to help treatment decisions. It can also be used to make a diagnosis of type 2 diabetes and to identify prediabetes.

When To Get Tested?

When first diagnosed with diabetes and then at least twice a year

Sample Required?

A blood sample taken from a vein in the arm

HDL Cholesterol Test

Why Get Tested?

To screen for risk of developing cardiovascular disease (heart disease, stroke and related diseases); to monitor treatment

When To Get Tested?

Aged 40 as part of a routine cardiovascular health check, or if you are already thought to be at risk of cardiovascular disease for another reason (including already having suffered from cardiovascular disease).

Sample Required?

Testing for HDL cholesterol requires a blood sample. Most often, the blood sample is collected by venepuncture (using a needle to collect blood from a vein in the arm). Occasionally a fingerprick test can be used, although this is not commonly available in GP practices or hospitals in the UK.

Test Preparation Needed?

No fasting is needed for an HDL-cholesterol test, or the full lipid profile. On the other hand, there may be circumstances when fasting is still required, so you should follow the instructions given by your health care team.

Heavy Metals

Why Get Tested?

To screen for, detect, and monitor excessive exposure to specific heavy metals

When To Get Tested?

Periodically when you work with heavy metals, or when your doctor suspects that you may have been exposed. If you have a metal-on-metal hip prosthesis, depending upon the size and type of implant, you may need annual blood monitoring of metal ions (e.g. chromium and cobalt). Consult your doctor for further advice.

Sample Required?

A blood sample taken from a vein in your arm or a 24-hour urine sample; rarely, a hair sample, tissue sample, or other body fluid sample

Helicobacter Pylori Test

Why Get Tested?

To diagnose an infection with *Helicobacter pylori* that can cause peptic ulcers

When To Get Tested?

If you have gastrointestinal pain or symptoms of an ulcer

Sample Required?

A stool sample, blood sample from a vein, tissue biopsy of the stomach lining, or urea breath test

Test Preparation Needed?

No special preparation is needed for the blood test. For the urea breath test and if submitting a stool or having a biopsy you may be instructed to refrain from certain medications. If undergoing endoscopy, you may be instructed to fast after midnight the night prior to the procedure. Please follow any instructions given to you by a healthcare professional.

Heparin Anti-Xa

Why Get Tested?

To monitor low molecular weight heparin (LWMH) therapy and sometimes to monitor unfractionated heparin (UFH) therapy

When To Get Tested?

When you are being treated with LMWH or UFH and your doctor wants to monitor the amount of heparin in your blood

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

No test preparation is needed, although the timing of the test is important

What is being tested?

This test measures the effect of low molecular weight heparin (LMWH) or unfractionated heparin (UFH) in the blood by measuring anti-Xa activity. Heparin is an anticoagulant, a drug that inhibits blood clotting. Heparin molecules vary in size and activity. UFH includes a broad range of sizes, while LMWH consists of a narrower range of smaller heparin molecules. There are several types of LMWH available and each one is slightly different. UFH is usually given intravenously (I.V.) and LMWH is usually given by a subcutaneous injection to people who have inappropriate blood clots (thrombi) and/or are at an increased risk of developing them.

Blood clotting is a normal response to blood vessel or tissue injury. It is a process that involves a sequential activation of proteins that regulate blood clot development. A variety of acute and chronic risk factors, including surgery, pregnancy and some oral contraceptives, serious illnesses and immobility are associated with inappropriate blood clot (thrombus) formation in veins – especially in the legs. These clots can obstruct blood flow and cause pain and swelling in the affected area. Pieces of the blood clot can break off and travel to the lungs - causing pulmonary embolism.. Heparin can also inhibit blood clot formation in diseased arteries, which sometimes cause heart attacks or strokes.

Heparin, through its action on a protein called Antithrombin, interferes with the clotting process by accelerating the inhibition of coagulation factors, particularly factors Xa and IIa (thrombin). UFH, which affects both Xa and IIa, is more variable in its inhibitory activity, and must be closely monitored using a variety of tests including the APTT, ACT or less commonly by anti-Xa. Complications may include bleeding, and sometimes a serious complication called “HIT” (Heparin Induced Thrombocytopenia) causing a low platelet count and thrombosis at the same time. UFH is usually given in a hospital setting. High doses of UFH are given during surgery requiring cardiopulmonary bypass.

LMWH has more anti-Xa action than anti-IIa activity and the response to it is more predictable. It may be given in either an outpatient or hospital setting. Routine

monitoring of LMWH is seldom required but when it is monitored, the anti-Xa test is used.

How is the sample collected for testing?

A blood sample is obtained by inserting a needle into a vein in the arm, most commonly taken three to four hours after your heparin injection to check the 'peak' level.

Is any test preparation needed to ensure the quality of the sample?

No test preparation is needed other than correct timing.

Heparin-induced Thrombocytopenia Antibody

Why Get Tested?

To detect antibodies against the anticoagulant heparin, to help diagnose immune-mediated heparin-induced thrombocytopenia (HIT II). There is also a non-immune mediated HIT (type I) that occurs when heparin binds directly to platelets, causing activation; it is more common than type II but is transient and a milder form.

When To Get Tested?

When you are receiving heparin therapy and your platelet count significantly decreases (thrombocytopenia), especially when you also have new blood clots (thrombosis)

Sample Required?

A blood sample taken from a vein in your arm

What is being tested?

This test detects and measures antibodies that are produced by some people when they are treated with heparin. Heparin is a common anticoagulant that is given intravenously or through subcutaneous injections to prevent the formation of blood clots (thrombosis) or as an initial treatment for those who have a blood clot, to prevent the clot from enlarging. It is often given during some operations, such as cardiopulmonary bypass, when the risk for developing blood clots is high. Small amounts of heparin are frequently used to flush out catheters and intravenous lines to keep clots from forming in them.

When a person is given heparin, the drug can combine with a substance found in platelets called platelet factor 4 (PF4) and form a complex. In some people, the body's immune system recognises the heparin-PF4 complex as "foreign" and produces an antibody directed against it. This antibody can activate platelets and lead to a drop in the number of platelets, a condition known as heparin-induced thrombocytopenia (HIT). It may also lead to the development of new thrombosis or worsening thrombosis.

Platelets are cells that are an important part of the blood clotting system. When a blood vessel is injured and leaks blood, platelets are activated and clump together at the site of the injury, and work with coagulation factors to promote clot formation and stop the bleeding.

Not everyone on heparin produces HIT antibodies, and not everyone with HIT antibodies develops a low platelet count, but about 1% to 5% of those with the antibodies do. In HIT, the antibodies bind to the heparin-PF4 complexes, which then attach to the surface of platelets. This activates the platelets, which in turn, triggers the release of more PF4. This starts a cycle that can cause a rapid and significant drop (e.g., 50% or more) in the number of platelets in the blood. Usually, a decrease in platelets results in a higher risk of bleeding, but in HIT, the activation of platelets by HIT antibodies can paradoxically lead to new and progressive blood clot formation in the veins and arteries. This occurs in about 30% to 50% of those who have the HIT antibody and thrombocytopenia.

This condition, associated with the presence of HIT antibody, low platelet count, and excessive clotting, is formally called immune-mediated heparin-induced thrombocytopenia or HIT type II. It typically develops about 5-10 days after a person starts heparin therapy but may also develop rapidly, within 1-2 days, if a person has been treated with heparin in the last 3 months and starts treatment again.

How is the sample collected for testing?

A blood sample is obtained by inserting a needle into a vein in the arm.

Is any test preparation needed to ensure the quality of the sample?

No test preparation is needed.

Hepatitis A Virus Antibodies

Why Get Tested?

To diagnose an infection with hepatitis A virus, or to find out the need for or the response to hepatitis A vaccination

When To Get Tested?

If you have symptoms of an infection with or have been exposed to the hepatitis A virus; to detect previous infection or vaccination

Sample Required?

A blood sample taken from a vein in your arm

Hepatitis B Virus Antibodies

Why Get Tested?

To detect, diagnose and follow the course of an infection with hepatitis B virus (HBV) or to determine if the vaccine against hepatitis B has produced the desired level of immunity

When To Get Tested?

If you have symptoms of a hepatitis B infection or are likely to have been exposed to the virus; if you have chronic liver disease (possibly due to some other cause), if you have received the vaccine, if you were born to a mother who was HBV positive or if you are being treated for HBV

Sample Required?

A blood sample taken from a vein in your arm

Hepatitis C Virus Antibodies

Why Get Tested?

To screen for and diagnose a hepatitis C virus infection and to monitor treatment of the infection

When To Get Tested?

If you may have been exposed to/have risk factors for the hepatitis C virus, such as through contact with infected blood, sexual relations with an infected person, IV drug use or you have symptoms associated with liver disease

Sample Required?

A blood sample taken from a vein in your arm

What is being tested?

Hepatitis C is a virus that can infect and damage the liver. In most cases, it is contracted through exposure to blood (usually from sharing contaminated needles while injecting drugs or, before 1992, through a blood transfusion), through sex with an infected person, via healthcare occupational exposure and it can also be passed from mother to baby.

Many people who are infected with Hepatitis C are not aware they are as acute infection produces few to mild non-specific symptoms. However Hepatitis C can also exist as a chronic (longstanding) infection and you can show no signs of this for a number of years (even decades) but it can then cause significant liver damage. About 65-75% of those infected can develop chronic liver disease with 20-30% of these developing cirrhosis over many years.

Hepatitis C antibody is produced by the body in response to exposure to the hepatitis C virus (HCV). The most common test for HCV looks for these antibodies in your blood. Some first line tests are also looking for the hepatitis C antigen, which the

virus itself produces, as well as your antibody response. Other tests detect the presence of and actual amount of virus present or determine the specific subtype of virus.

HER-2 testing

Why Get Tested?

To determine whether a cancer, usually a breast cancer, is positive for HER-2 gene amplification or protein expression, which helps to guide treatment and determine outcome. HER-2 evaluation is also used in the assessment of some other cancer types including gastric and oesophageal cancer.

When To Get Tested?

If you have been diagnosed with a cancer which may be responsive to treatment with HER-2 targetted therapy and your doctor wants to determine whether the HER-2 gene is amplified in the tumour.

Sample Required?

A sample of cancer tissue obtained during a biopsy. Generally this test is done on the biopsy taken for initial diagnosis and a second biopsy is not necessary. While HER-2 levels can be assessed in a blood sample, this is not usually done as treatment decisions rely on testing of the cancer cells in biopsy material.

Herpes Testing

Why Get Tested?

To screen for or diagnose infection with herpes simplex virus

When To Get Tested?

If you have symptoms of an infection with herpes simplex virus

Sample Required?

Your doctor will take a swab or scraping from a blister or sore in the mouth or genital area.

Histamine

Why get tested?

To help confirm a diagnosis of anaphylaxis or symptomatic mastocytosis. However, due to the need for blood samples to be processed extremely quickly after the blood is taken, this test is rarely performed.

When To Get Tested?

When you have symptoms such as flushing, nausea, throat swelling or low blood pressure that may be due to a life-threatening allergic reaction; sometimes when your health care practitioner suspects that you have mastocytosis.

Sample required?

A blood sample drawn from a vein in your arm or a 24-hour urine collection. The blood sample must be spun and frozen within 5 minutes of collection.

Test preparation needed?

None for anaphylaxis, but timing of the sample very soon after the beginning of symptoms is important. If testing is done for other conditions, you may be instructed to refrain from taking antihistamine and other medications. This should be discussed with your healthcare professional.

HIV 1 Viral Load

Why Get Tested?

To monitor the status of HIV 1 disease in conjunction with other lab tests and physical disease progression and to guide therapy. Your viral load levels are usually used as an indicator of how well your immune system is dealing with HIV. If you are on anti-HIV treatments, it can be an indicator of how well the treatments are working.

When To Get Tested?

When first diagnosed with HIV 1, frequently at the start of therapy, and every 3-12 months during lifelong therapy thereafter, or as your doctor recommends. Patients with viral loads consistently <50 copies/mL are likely to be tested less often than patients whose virus level is less well controlled.

Rarely your doctor may also ask for the test;

- If you have had an indeterminate HIV 1/2 antibody/antigen result
- You are at risk and have symptoms of acute HIV, irrespective of the HIV 1/2 antibody/antigen result

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

No test preparation is needed.

HIV Antibody and HIV Antigen (p24)

Why Get Tested?

To determine if you are infected with human immunodeficiency virus (HIV)

When To Get Tested?

When you think you may have been exposed to the virus; once a year if you are at risk of being exposed to the virus; when you doctor thinks your symptoms may be due to HIV; before becoming pregnant or during pregnancy

Sample Required?

A blood sample collected from a vein in your arm or from a fingerprick; some tests can also be performed on urine or saliva (spit)

What is being tested?

Human immunodeficiency virus (HIV) infects the cells of a person's immune system and is the cause of AIDS (acquired immunodeficiency syndrome).

When a person becomes infected with HIV, through exposure to the blood or body fluids of an infected individual, the virus begins to reproduce very rapidly. So, during the first few weeks of infection, the amount of virus (viral load) in the blood can be quite high.

The immune system responds by producing antibodies directed against the virus and these begin to be detected in the blood around 3-4 weeks after exposure to the virus. As the level of HIV antibody increases, the viral load in the blood decreases.

This early HIV infection may cause no symptoms or sometimes a flu-like or glandular fever-type illness. The only way to determine whether a person has been infected is through HIV testing. Modern HIV screening tests detect HIV antigens (parts of the virus itself, usually a protein called the p24 antigen) and/or antibodies produced in response to an HIV infection.

Two main test types are available for HIV screening:

- Combination HIV antibody and HIV antigen test— this is the recommended screening test for HIV and is available only as a blood test. By detecting both antibody and antigen, the combination test increases the likelihood that an infection is detected soon after exposure. These tests can detect HIV infections in most people by 2-6 weeks after exposure.
- HIV antibody testing— This test takes a little longer to become positive after an exposure but can be carried out on blood or oral fluid. HIV antibody tests can detect infections in most people 3-12 weeks after exposure.

HIV Resistance Testing

Why Get Tested?

If you have been diagnosed with HIV, this test can be used to help doctors select the right drugs for treating the infection.

When To Get Tested?
Before starting HIV treatment (anti-retroviral therapy), or if your HIV viral load increases (or does not decrease) even though you are receiving anti-retroviral therapy
Sample Required? A blood sample taken from a vein in your arm

HLA Testing

Why Get Tested?

To identify which human leukocyte antigen (HLA) genes and antigens a person has inherited. Either to;

1) Match donors and recipients of organ and bone marrow transplants and to detect antibodies to HLA antigens that would cause transplants to be unsuccessful

2) Confirm the diagnosis of a disorder which only affects individuals of a certain HLA type

3) Predict the likelihood of an adverse drug reaction associated with a specific HLA type

When To Get Tested?

Most often, transplant recipients are tested when it is determined that they need an organ or bone marrow transplant, prior to seeking and selecting a suitable donor; potential donors are tested when they are being evaluated for compatibility with a specific recipient or are signing up with a national donor registry.

If someone is suspected of having a clinical disorder associated strongly with a given HLA type, testing may be undertaken as part of the diagnostic workup.

If a clinician plans to start a drug which has serious side effects, associated with a specific HLA type, testing would be done before the medicine is prescribed or rarely as part of investigating an unusual reaction.

Sample Required?

A blood sample drawn from a vein in your arm; sometimes, for HLA typing, a swab from the inside of the cheek (buccal swab) or a saliva sample.

Test Preparation Needed?

When providing a saliva sample you should not eat, drink, smoke or chew gum for 30 minutes prior to giving a sample.

HLA-B27

Why Get Tested?

To find out whether you have human leucocyte antigen B27 (HLA-B27) on the surface of your cells; to help assess whether you might have an autoimmune disorder associated with the presence of HLA-B27

When To Get Tested?

When you have symptoms of chronic inflammation, pain, and stiffness in certain areas of your body, such as your back, neck, and chest, or the interior portion of your eyes uveitis, especially if you are male and the symptoms began between late teens and your early 30s

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

None

Hormone Receptor Status

Why Get Tested?

To determine whether a breast cancer tumour is positive for oestrogen and/or progesterone receptors, which helps to guide treatment and determine prognosis

When To Get Tested?

If you have been diagnosed with breast cancer and your doctor wants to determine whether the tumour's growth is influenced by the hormones oestrogen and/or progesterone

Sample Required?

A sample of breast cancer tissue obtained during a biopsy or a tumour removed surgically during a lumpectomy or mastectomy

Test Preparation Needed?

None

HPV Test

Why Get Tested?

To screen for infection with high risk types of genital human papilloma virus, which are associated with cervical cancer.

When To Get Tested?

If you are a sexually active female, or have symptoms of HPV infection (genital warts), or have an irregular cervical screening.

Sample Required?

A sampling of cells from the cervical area

Test Preparation Needed?

It is recommended that you do not use tampons or vaginal creams, deodorants, or medications for 2 days before the test. Some healthcare professionals may request that you refrain from sex for 24 to 48 hours before the test. Reschedule the test if you are having your period (menstruating). You may be asked to empty your bladder before the examination.

hs-CRP

Why Get Tested?

May be used to predict your risk of developing heart disease

When To Get Tested?

The hs-CRP test is fairly new, and many UK laboratories don't perform this test yet. Experts still don't agree on how often this test should be requested for a healthy population. Current UK guidelines on cardiovascular disease risk assessment do not recommend the use of hs-CRP testing.

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

None required

HTLV

Why Get Tested?

Antibodies (serology): To determine whether someone is infected with HTLV, either as a general screen, following potential contact with the virus, or as part of an investigation into the cause of a person's illness (for example leukaemia or neurological disorders).

Molecular Tests: To confirm diagnosis when antibody tests are inconclusive, to assess risk of development of HTLV-associated complications; to aid diagnosis of HTLV-associated diseases; to monitor infection and treatment.

When To Get Tested?

When you have signs or symptoms that suggest that you may have an HTLV-associated condition, especially when you have identified risk factors; rarely when you have donated blood and been told that you are positive for HTLV

Sample Required?

- Blood taken via a venepuncture from the arm (usual - almost always this is the sample taken)
- Cerebrospinal fluid taken from the lower back via a lumbar puncture (uncommon)
- Biopsy of abnormal tissue e.g. a lymph node or skin (uncommon)

Test Preparation Needed?

No special patient preparation is required for these tests

Human chorionic gonadotrophin (hCG) Test

Why Get Tested?

To confirm and monitor pregnancy or to diagnose trophoblastic disease or germ cell tumours

When To Get Tested?

Most pregnancy tests can be carried out from the first day of a missed period. Some sensitive pregnancy tests can be done even before you miss a period, from as early as 8 days after conception. However if you test too soon you may get a false negative test result. If you have a negative test but think you might be pregnant, you can repeat the test after a few days. To be confident that a negative result is correct, wait at least 21 days after you last had unprotected sex.

A doctor or nurse may request a pregnancy test if they think that your symptoms suggest ectopic pregnancy, a miscarriage, trophoblastic disease or germ cell tumours.

Human chorionic gonadotrophin (hCG) is also tested as part of the prenatal screening program for Down's syndrome.

Sample Required?

Either a urine sample or a blood sample taken from a vein in the arm.

Test Preparation Needed?

None needed; however, do not drink large amounts of fluid before collecting a urine sample for a pregnancy test because overly dilute urine may result in a false negative test result.

IGF-1

Why Get Tested?

To identify diseases and conditions caused by deficiencies and overproduction of growth hormone (GH), to detect disease of the pituitary gland, and to monitor the effectiveness of growth hormone replacement treatment

When To Get Tested?

As part of an evaluation of pituitary function;
1. When you are growing more slowly than normal, have short stature, have delayed development (in children) or decreased bone density, reduced muscle strength, and increased lipids (in adults), all of which suggest insufficient GH and IGF-1 production
2. When you have symptoms of gigantism (in children) or acromegaly (in adults) that suggest excess GH and IGF-1 production
3. During and after treatment for GH abnormalities

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

In general, no test preparation is needed; however, since this test may be performed at the same time as others, fasting for at least 12 hours may be required.

Immunophenotyping

Why Get Tested?

To help diagnose and classify a leukaemia or lymphoma; to help guide treatment; to detect and evaluate residual cancer cells

When To Get Tested?

When a doctor thinks that you may have leukaemia or lymphoma; when you have been diagnosed with leukaemia or lymphoma, but the specific subtype is unknown; sometimes to evaluate the effectiveness of treatment or to evaluate for recurrent disease

Sample Required?

A blood sample taken from a vein in your arm; sometimes a bone marrow, tissue, or fluid sample collected by your doctor

Test Preparation Needed?

None

Immunoreactive Trypsin

Why Get Tested?

To screen for cystic fibrosis (CF) in newborn infants

When To Get Tested?

As part of a newborn screening test

Sample Required?

A blood sample taken from an infant's heel, a spot of blood that is put onto filter paper

Test Preparation Needed?

None

Influenza (Flu) Tests

Why Get Tested?

To determine whether or not you have an influenza infection; to help doctor make treatment decisions; to help determine whether or not the flu has spread to your community; to identify the type or strain of flu virus that you have; to monitor the strains of flu virus circulating in the community

When To Get Tested?

If your doctor wants to determine whether your flu-like symptoms are due to flu, another virus, or other causes. Usually only patients with severe infection are tested. When influenza is at a high level in the community, doctors will often diagnose respiratory infections as influenza based on symptoms, without taking a sample to test.

Sample Required?

Usually a nose/throat swab or a nasopharyngeal aspirate

Test Preparation Needed?

None

Insulin

Why Get Tested?

To help determine the cause of low blood glucose (hypoglycaemia), diagnose an insulinoma (insulin-producing tumour), and to help evaluate insulin production.

When To Get Tested?

If you have hypoglycaemia, if you have symptoms suggesting insulin is being inappropriately produced by your body, and rarely if you have diabetes and your doctor wants to monitor your insulin production

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

You may be asked to fast for 8 hours before the blood sample is collected, but occasionally a healthcare professional may do the test in very specific circumstances, for example, a glucose tolerance test. In some cases, a healthcare professional may request that you fast longer.

Iron

Overview

Serum iron is usually performed alongside other tests, including serum ferritin, transferrin and transferrin saturation. Please see 'iron tests' for further information.

Iron Tests

Why Get Tested?

To evaluate your body's current store of iron

When To Get Tested?

Serum iron blood tests are not performed routinely. Most often, serum iron levels are tested if your doctor thinks that you might have too much iron in your blood. A high iron level can be due to a genetic condition, multiple or extensive blood transfusions, or rarely due to ingestion of an overdose of iron (usually in children).

Previously, serum iron was also commonly requested when iron deficiency was suspected. However, it is now recommended that the amount of stored iron (in the form of ferritin) rather than serum iron is measured to aid diagnosis of iron deficiency anaemia. Ferritin analysis gives a measure of body iron stores and is a better

indicator of iron deficiency than measuring the iron in blood. However, serum iron blood tests can help to identify when anaemia is due to a long-term (chronic) illness.

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

Your doctor may request that you fast for 12 hours prior to some iron blood tests. In this case, only water is permitted. You should not take any iron tablets for 24 hours before the test. Iron is absorbed rapidly from food or tablets, and can make your blood iron levels falsely high.

Islet Autoantibodies in Diabetes

Why Get Tested?

To aid in the classification of type 1 diabetes

When To Get Tested?

Recently after you have been diagnosed as having diabetes but only if the healthcare professional cannot clearly determine if you have type 1 diabetes, type 2 diabetes or rare genetic diabetes (maturity onset diabetes of the young; MODY).

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

None

JAK2 Mutation

Why Get Tested?

To help diagnose bone marrow disorders characterised by overproduction of one or more types of blood cells known as myeloproliferative neoplasms (MPNs)

When To Get Tested?

When your doctor suspects that you may have a bone marrow disorder, including polycythaemia vera, essential thrombocythaemia, or primary myelofibrosis

Sample Required?

A blood sample taken from a vein in your arm; sometimes a sample of bone marrow

Test Preparation Needed?

None

Kidney Stone Analysis

Why Get Tested?

Finding out what a kidney stone is made of can help to determine the underlying cause and guide treatment to prevent further stones forming

When To Get Tested?

A stone can be analysed either after a surgeon has removed it from your urinary tract or if you catch a stone that has come out of your urinary tract when passing urine

Sample Required?

A stone filtered from your urine or surgically removed from your urinary tract by a doctor

Test Preparation Needed?

None

Kidney Stone Risk Panel

Why Get Tested?

To help determine the underlying reason for developing a kidney stone; to help guide and monitor treatment; to determine the risk of developing more stones.

When To Get Tested?

When you have had two or more kidney stones and a healthcare professional wants to evaluate your risk of developing additional kidney stones; when you have developed one kidney stone and have a high risk of developing more stones; when the stone is found to be of unusual composition.

Sample Required?

A 24-hour urine sample; frequently, two separate 24-hour urine samples are collected. An additional fresh, random sample of urine may be needed and a blood test may be taken at the same time.

Test Preparation Needed?

None

Lactate

Why Get Tested?

To help detect hypoxia and other diseases that cause excess production or reduced removal of lactate from the blood

When To Get Tested?

If you have symptoms such as rapid breathing, sickness, and sweating that suggest a lack of oxygen or an acid/base imbalance; if your doctor suspects that you may have an inherited metabolic or mitochondrial disorder

Sample Required?

A blood sample taken from a vein in your arm; sometimes a blood sample collected from an artery and, rarely, a sample of cerebrospinal fluid collected from the spine

Test Preparation Needed?

Fasting may or may not be required. Ask your doctor. You may also be told not to exercise for a period of time before this test.

Lactose Tolerance Tests

Why Get Tested?

To help diagnose lactose intolerance in individuals who have difficulties digesting dairy products, or sometimes as part of an investigation of malabsorption conditions

When To Get Tested?

When you have symptoms such as abdominal pain, bloating, gas, and diarrhoea starting within a few hours after consuming milk and other dairy products

Sample Required?

A series of breath samples exhaled into a collector, or a series of blood samples drawn from a vein in your arm

Test Preparation Needed?

Overnight fasting is required; nothing but water is permitted. Avoid strenuous activities and smoking several hours before testing. You may be instructed to brush your teeth and/or rinse your mouth with water prior to and during the breath test.

LDH

Why Get Tested?

To help identify the cause and location of tissue damage in the body, and to monitor its progress. LDH is elevated in a wide variety of conditions reflecting its wide spread tissue distribution. Historically, has been used to help diagnose and monitor a heart attack, but troponin has replaced LDH in this role.

When To Get Tested?

Along with other tests, when your doctor suspects that you have an acute or chronic condition that is causing tissue or cellular destruction and wants to identify and monitor the problem.

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

None

LDL Cholesterol Test

Why Get Tested?

To determine your chances of developing cardiovascular disease or to detect genetic cholesterol conditions.

When To Get Tested?

Aged 40 as part of a routine cardiovascular health check, or if you are already thought to be at risk of cardiovascular disease for another reason, or to monitor your response to treatments which lower LDL cholesterol (LDL-C). Alternatively if there is a family history of premature cardiovascular disease and a suspected genetic cholesterol condition.

Sample Required?

The test for LDL-C uses a blood sample. Most often, the blood sample is collected by venepuncture (using a needle to collect blood from a vein in the arm). Occasionally a fingerprick test can be used, although this is not commonly available in GP practices or hospitals in the UK.

Test Preparation Needed?

A test for LDL-C typically requires a 12-hour fast, with only water permitted during this time. Strictly speaking, if LDL-C is being measured directly, rather than calculated using an equation (see below, Common Questions), fasting is not necessary but most labs only calculate it. Also it has been shown that as long as triglycerides are not significantly raised non-fasting results can be used to calculate the LDL-C therefore most of the time fasting is not required. Follow any instructions you are given.

Lead Test

Why Get Tested?

To screen for elevated concentrations of lead in your blood

When To Get Tested?

If you may have been exposed to lead where you live or work; children especially should be tested as they may have inhaled dust or ingested substances that could contain lead (e.g., from paint chips or water from lead pipes found in older housing). It is also important that pregnant women who think they may have been exposed also get tested due to the risk of maternal to fetal transfer of lead through the placenta.

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

None

Levetiracetam

Why Get Tested?

In some cases, to determine the concentration of levetiracetam in the blood to establish an individualised dose; to detect toxicity or verify that a person is taking the medication as prescribed (compliance /adherence); to monitor changes that may affect drug clearance and/or kidney function

When To Get Tested?

In some cases, at the start of treatment when establishing dosage; when indicated to detect low or excessive (potentially toxic) concentrations; when a person has decreased kidney function; occasionally to verify compliance /adherence

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

None

LH Test

Why Get Tested?

To evaluate the function of your pituitary gland, which regulates the hormones that control your reproductive system

When To Get Tested?

If a couple are having difficulty achieving a pregnancy or a woman is having irregular menstrual periods or when a child has delayed or earlier than expected sexual maturation.

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

None

Lipase Test

Why Get Tested?

To diagnose and monitor pancreatitis or other pancreatic disease

When To Get Tested?

When you have symptoms of a pancreatic disease, such as severe abdominal pain, fever, loss of appetite or nausea

Sample Required?

A blood sample taken from a vein in the arm

Test Preparation Needed?

None

Lipid Profile

Why Get Tested?

To assess your risk of developing cardiovascular disease (heart disease, stroke and related diseases); to monitor treatment

When To Get Tested?

Between ages 40 and 75 years as part of a routine cardiovascular health check, or if you are already thought to be at risk of cardiovascular disease for another reason, or if you are starting on or taking lipid-modifying treatments (e.g. statins).

Sample Required?

Testing for your lipid profile reequires a blood sample. Most often, the blood sample is collected by venepuncture (using a needle to collect blood from a vein in the arm). Occasionally a fingerprick test can be used, although this is not commonly available in GP practices or hospitals in the UK.

Test Preparation Needed?

Before 2014, fasting samples were used for a lipid profile, but since then fasting is no longer routinely required. However, fasting may still be needed in some circumstances, so you should follow your doctor's advice.

Lithium

Why Get Tested?

To determine the lithium concentration in the blood in order to maintain an appropriate level or to detect lithium toxicity

When To Get Tested?

At regular intervals to monitor lithium levels; as needed to detect low or toxic concentrations

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

None

Liver Blood Tests

Why Get Tested?

To screen for and monitor liver disease

When To Get Tested?

When you have symptoms of a liver disorder such as jaundice or have been exposed to substances that can cause liver damage such as a paracetamol overdose, or routine monitoring of many medications

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

None

Lp(a)

Why Get Tested?

As part of a targeted screen for cardiovascular disease (coronary artery disease (CAD) and cerebrovascular disease) risk assessment.

When To Get Tested?

Your doctor may request Lp(a) measurement if you have a family history of premature cardiovascular disease or elevated Lp(a) or if you develop cardiovascular disease at a young age, particularly in the absence of conventional risk factors

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

No test preparation is needed.

Lupus Anticoagulant

Why Get Tested?

To help evaluate a prolonged activated partial thromboplastin time (aPTT) and/or a thrombotic episode, to help determine the cause of recurrent fetal loss, as part of an evaluation for antiphospholipid syndrome. Not a diagnostic test for lupus (SLE).

When To Get Tested?

When you have a prolonged aPTT test. When you have had a venous or arterial thromboembolism. When you have had recurrent miscarriages, especially in the 2nd and 3rd trimesters.

Sample Required?

A blood sample is obtained by inserting a needle into a vein in the arm.

Test Preparation Needed?

None

Lyme Disease Tests

Why Get Tested?

To see if you have been exposed to the bacterium that causes Lyme disease

When To Get Tested?

If you show symptoms of Lyme disease, especially if they appear some weeks after a painless bite from a small tick or you have recently been in woodland or long grass

Sample Required?

A blood sample taken from a vein in the arm

Test Preparation Needed?

None

Magnesium

Why Get Tested?

To measure the concentration of magnesium in your blood and to help determine the cause of abnormal calcium and/or potassium levels

When To Get Tested?

If you have symptoms (such as weakness, irritability, cardiac arrhythmia, nausea, and/or diarrhoea) that may be due to too much or too little magnesium or if you have abnormal calcium or potassium levels

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

None

Measles and Mumps Tests

Why Get Tested?

To diagnose a measles or mumps infection; to establish whether a person has immunity to measles or mumps due to a previous infection or to vaccination; to confirm a measles or mumps case and investigate its source

When To Get Tested?

When a person has symptoms or complications that a doctor suspects are due to a measles or mumps infection; whenever it is necessary or desired to determine measles or mumps immunity

Sample Required?

A blood sample drawn from a vein in your arm for measles or mumps antibody testing; to detect the virus itself, sample may be blood, urine, nasopharyngeal

aspirate/washing, throat swab, swab of the inside of the cheek (buccal swab), cerebrospinal fluid, or other body tissue

Test Preparation Needed?

Prior to collection of a buccal swab for mumps, the salivary gland located in front of and below the ear (parotid gland) is massaged. For other specimens, no test preparation is needed.

Mercury

Why Get Tested?

To detect excessive exposure to mercury

When To Get Tested?

When you have symptoms of mercury poisoning, to evaluate a known exposure to mercury, or to monitor occupational exposure to mercury

Sample Required?

A blood sample taken from a vein in your arm and/or a urine collection

Test Preparation Needed?

None

Methotrexate

Why Get Tested?

To detect and evaluate toxic concentrations of methotrexate

When To Get Tested?

At specific timed intervals after a high dose of methotrexate to monitor blood concentrations and guide treatment, and whenever symptoms suggest methotrexate toxicity

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

None, but timing of the sample for testing is important; when having your blood taken, tell the healthcare professional when your last dose of methotrexate was taken or given.

Methylmalonic Acid

Why Get Tested?

To help detect vitamin B12 deficiency when results of Vitamin B12 testing are equivocal and there is a high clinical suspicion of deficiency; to help diagnose methylmalonic acidaemia, a rare inherited metabolic disorder

When To Get Tested?

If you have a vitamin B12 concentration in the low end of the normal range and/or unexplained symptoms of neuropathy, such as numbness and tingling in the hands and feet or unexplained macrocytosis (large blood cells)

Sample Required?

A blood sample taken from a vein in your arm; or a random or 24-hour urine sample

Test Preparation Needed?

You may be instructed to fast before sample collection for this test.

Monospot Test

Why Get Tested?

To get screened for/to diagnose infectious mononucleosis (glandular fever).

When To Get Tested?

If you have symptoms of mononucleosis, including fever, sore throat, swollen glands, and fatigue. (The monospot test is not useful to detect Epstein-Barr virus (EBV) in children less than four years old of age.)

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

No test preparation is needed.

MRSA Screening

Why Get Tested?

To detect MRSA (Meticillin resistant *staphylococcus aureus*) carrier status

When To Get Tested?

When your doctor wants to determine if you are a MRSA carrier (bacteria are present on the skin and maybe multiplying but you have no evidence of an active infection) or to determine if you have an active MRSA infection (bacteria invades the skin or deeper tissues and multiplies) or to determine if MRSA are still present after an infection has been treated with appropriate antibiotic therapy.

MRSA screening may also be requested before hospital elective surgery procedures or during emergency hospital admissions.

Sample Required?

Swab of nose. Occasionally swab of wound infection site, groin, or skin lesion swab

Test Preparation Needed?

None

MTHFR

Why Get Tested?

To evaluate the cause of elevated homocysteine levels; sometimes to help determine your risk of thrombosis or premature cardiovascular disease (CVD)

When To Get Tested?

When you have elevated homocysteine levels; sometimes when a close relative has MTHFR gene mutations or has developed CVD or thrombosis at an early age

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

None

Mycophenolic Acid

Why Get Tested?

To determine the concentration of mycophenolic acid (MPA) in the blood in order to monitor levels, and prevent toxicity

When To Get Tested?

As soon as mycophenolate therapy begins and whenever the dose is changed. May be requested frequently at first, then at regular intervals. Whenever excess or deficient levels of MPA are suspected.

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

None

Mycoplasma

Why Get Tested?

To detect an active or recent mycoplasma infection. There are two different types of infections caused by Mycoplasma: one respiratory (*M. pneumoniae*) and one in the genital tract (*M. genitalium* and other species)

When To Get Tested?

When your doctor suspects that your respiratory or systemic symptoms are caused by a mycoplasma infection

OR

When a genital infection may be caused by mycoplasma or ureaplasma

Sample Required?

A blood sample drawn from a vein in your arm, a throat swab, sputum sample, body fluid or tissue sample; urine and occasionally, genital or urethral swab

Test Preparation Needed?

None

Myoglobin Test

Why Get Tested?

This test is not in routine use, it was historically used to help diagnose muscle injury but has since been replaced by the superior marker creatine kinase (CK), which is measured in blood.

When To Get Tested?

No longer in routine clinical use.

Sample Required?

A blood sample taken from a vein in the arm or a random urine sample

Test Preparation Needed?

None

Nicotine/Cotinine

Why Get Tested?

To detect the presence or measure the quantity of nicotine or cotinine in blood, urine, saliva, or sometimes hair. To find out whether someone uses tobacco or has been exposed to second-hand smoke. Rarely, it can be used to check for acute nicotine poisoning.

When To Get Tested?

Whenever someone requires confirmation of tobacco usage or exposure to second-hand smoke. Rarely when nicotine overdose is suspected.

Sample Required?

Usually a urine sample is collected, but sometimes a blood sample (from a vein in your arm) or a saliva sample is collected. Rarely a hair sample is collected.

Test Preparation Needed?

None

Non-HDL Cholesterol Test

Why Get Tested?

To help with estimating risk of developing cardiovascular disease (heart disease, stroke and related diseases); to monitor treatments which lower cholesterol.

When To Get Tested?

Aged 40 as part of a routine cardiovascular health check, or if you are already thought to be at risk of cardiovascular disease for another reason, or if you are taking (or are about to start) treatments which lower cholesterol.

Sample Required?

A blood sample taken from a vein in the arm, or occasionally a fingerprick

Test Preparation Needed?

No fasting is needed when having non-HDL cholesterol checked. However, you should follow your doctor's advice as fasting might be needed for other tests being performed.

Non-Invasive Prenatal Testing (NIPT)

Why Get Tested?

To assess the risk of a pregnant woman's developing baby (foetus) having certain chromosome disorders, such as Down's Syndrome. Following a large, multicentre study in the UK (RAPID study) demonstrating the benefits of the test the UK National Screening Committee (NSC) have recommended NIPT be introduced as an additional test into the existing NHS Fetal Anomaly Screening Programme as part of an ongoing evaluation.

Please see the Antenatal Results and Choices website for more information on accessing the test privately.

When To Get Tested?

Organisations such the American College of Obstetrics and Gynaecology and the International Society for Prenatal Diagnosis currently recommend the test but only in women who are categorised as high risk for having a baby with a chromosome disorder.

The test is most accurate during or after the 10th week of pregnancy.

Sample Required?

A blood sample taken from a vein in the mother's arm. The test is termed "Non-invasive" because obtaining the sample carries very little risk to the mother or baby, unlike procedures such as Amniocentesis and Chorionic Villus Sampling (CVS).

Test Preparation Needed?

None

OCP

Why Get Tested?

To determine whether you have a parasite infecting your gastrointestinal tract.

When To Get Tested?

- When you have diarrhoea that lasts more than a few days and/or have blood or mucous in your loose stools
- Have drunk stream or lake water while camping, or have travelled outside of the United Kingdom
- Visited a farm or been in contact with sheep

Sample Required?

A fresh or preserved stool sample, sometimes multiple samples collected on different days.

Test Preparation Needed?

None

Oestrogen

Why Get Tested?

To measure or monitor your oestrogen levels if you are a woman who has unexplained abnormal menstrual cycles, abnormal or heavy bleeding, infertility problems, symptoms of menopause, or any other hormonal alterations.

When To Get Tested?

When your doctor thinks that you have symptoms of a hormone imbalance, absent or abnormal periods, as part of infertility investigations, and unusual and/or early sex organ development (male and female), or gynecomastia (breast development in males)

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

None

Osmolality (Osmolarity)

Why Get Tested?

Serum and urine osmolality may be measured together to investigate the cause of a low serum sodium concentration (hyponatraemia), high serum sodium concentration (hypernatraemia), a high or low urine output or excessive thirst. Serum osmolality may also be measured when ingestion of toxic alcohols, such as methanol and ethylene glycol, are suspected. Very rarely stool osmolality is measured to help determine the cause of diarrhoea.

When To Get Tested?

Serum and urine osmolality may be tested in patients with a low serum sodium concentration, a high serum sodium concentration, an unusually high urine output, an unusually low urine output or excessive thirst.

Serum osmolality should be tested if toxic alcohol poisoning is suspected.

Stool osmolality may rarely be tested in patients with diarrhoea.

Sample Required?

A blood sample taken from a vein in your arm; a spot urine sample taken at the same time usually helps the doctor to interpret the results. Local protocols should be followed for fluid deprivation tests when investigating diabetes insipidus. Faecal osmolality requires either a 24-hour collection or freshly passed diarrhoeal stool (faecal osmolal gap).

Test Preparation Needed?

If required, follow any instructions provided (e.g. paired serum and urine samples before treating low sodium, first morning urine, fluid restriction and timed sampling for a fluid deprivation test). Inform your health care provider of all medications you are taking, for example mannitol.

Paracetamol

Why Get Tested?

In order to assess risk of liver damage after overdose and to decide on the need for protective antidote treatment. The antidote (N-acetyl cysteine) needs to be given within 15 hours of the overdose to be most effective.

When To Get Tested?

At least 4 hours after a single overdose, or as soon as possible if more than one overdose has been taken within the last 1 or 2 days

Sample Required?

A blood sample taken from a vein usually in an arm

Test Preparation Needed?

None

Parvovirus B19

Why Get Tested?

To determine if you have, or recently had, a parvovirus B19 infection and if you are at an increased risk of complications from this viral infection

When To Get Tested?

When a pregnant woman has been exposed to someone with parvovirus B19; when a person, especially an immune-compromised person, has persistent or severe anaemia

Sample Required?

A blood sample is taken from a vein in your arm to test for the presence of parvovirus B19 antibody. To detect the virus itself a blood or rarely a bone marrow sample is required.

Test Preparation Needed?

None

PCV

Why Get Tested?

If your doctor suspects that you have anaemia (too few red blood cells), polycythaemia (too many red blood cells), or dehydration

When To Get Tested?

As part of a full blood count (FBC), a general blood screening test which may be requested for a variety of reasons

Sample Required?

A blood sample taken from a vein in your arm or by a finger-prick (children and adults) or heel-prick (newborns)

Test Preparation Needed?

None

Pericardial Fluid Analysis

Why Get Tested?

To help diagnose the cause of inflammation of the pericardium and/or fluid accumulation around the heart

When To Get Tested?

When a doctor suspects that someone has a condition associated with inflammation of the pericardium and/or fluid accumulation around the heart

Sample Required?

A sample of fluid is collected from the pericardial sac by a doctor with a syringe and needle using a procedure called a pericardiocentesis

Test Preparation Needed?

None

Peritoneal Fluid Analysis

Why Get Tested?

To help diagnose the cause of peritonitis and/or peritoneal fluid accumulation (ascites)

When To Get Tested?

When a doctor suspects that someone with abdominal pain and swelling, nausea, and/or fever has a condition associated with inflammation of the peritoneum (peritonitis) or peritoneal fluid accumulation

Sample Required?

A peritoneal fluid sample obtained by inserting a needle into the abdominal cavity

Test Preparation Needed?

You will be asked to empty your bladder prior to sample collection.

Pertussis

Why Get Tested?

To detect and diagnose a *Bordetella pertussis* infection

When To Get Tested?

When you have persistent, sharp spasms or fits of coughing (paroxysms) that the doctor suspects is due to pertussis (whooping cough); when you have symptoms of a cold and have been exposed to someone with pertussis

Sample Required?

A nasopharyngeal (NP) swab or a nasal aspirate; occasionally, a blood sample taken from a vein in your arm

Test Preparation Needed?

No test preparation is needed.

Pharmacogenetic Tests

What is pharmacogenetics?

We don't all respond to the same drugs in the same way. Sometimes a drug will work for one person and not for another, or may cause different side-effects in different people. Our individual responses can be due to the genes we have inherited. With respect to drugs, our unique genetic make-up and our individual characteristics may mean that a drug that is effective for one person is less effective

for another, or that a drug that is safe for one person may be dangerous for another person—even at the same dose.

Most drugs are broken down (metabolized) in the body by various enzymes. In some cases, an active drug is made inactive (or less active) through metabolism. In other cases, an inactive (or less active) drug is made more active through metabolism. The challenge in drug therapy is to make sure that the active form of a drug stays present just long enough to do its job. However, some people have enzymes that don't work in quite the same way as other people, and they may metabolize the drug too quickly or too slowly or not at all — meaning that it may be gone before it has its intended effect, or it may hang around for too long and build up beyond safe levels, leading to side-effects.

A person's response to a drug may also be related to variation in the way in which a drug reaches or interacts with the part of the body where it has to have an effect – for example, in a protein that the drug binds to in order to produce its particular effect. Also, individuals may experience severe side-effects (known as hypersensitivity reactions) from some drugs due to variations in the proteins involved in the body's immune response.

Pharmacogenomics is the study of genetic variability that causes differences in individual responses to medications. By analysing the genes that are linked to the the enzymes that metabolize a drug that is to be prescribed or in it interacting the part of the body where it has its effect, a doctor may decide to raise or lower the dose, or even to use a different drug. The decision about which drug to prescribe may also be influenced by other drugs the patient is taking, to avoid interactions between drugs.

The terms "pharmacogenetics" and "pharmacogenomics" are sometimes used interchangeably. There are subtle differences between the two terms, and no consensus on their exact definitions. In general, pharmacogenomics refers to the overall study of the various genes that contribute to drug response, while pharmacogenetics is the study and evaluation of the inherited difference that affect an individual's response to drugs. The term pharmacogenetics will be used in this article

Phenobarbital

Why Get Tested?

To find out if the phenobarbital level in the blood is at an appropriate level for an individual patient

When To Get Tested?

At regular intervals to monitor phenobarbital levels in the blood and if needed to detect low or toxic levels

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

None

Phenytoin

Why Get Tested?

To determine phenytoin concentration in the blood, to maintain an appropriate level, and to detect phenytoin toxicity

When To Get Tested?

At regular intervals to monitor, as needed to detect low or toxic concentrations

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

None

Phosphate

Why Get Tested?

To evaluate the level of phosphate in your blood and to aid in the diagnosis of conditions known to cause abnormally high or low levels

When To Get Tested?

As a follow-up to an abnormal calcium concentration, if you have a kidney disorder or uncontrolled diabetes, if you are taking calcium or phosphate supplements or have a nutritional problem

Sample Required?

A blood sample taken from a vein in your arm, or a fasting or timed urine collection (usually a 24-hour sample)

Test Preparation Needed?

Overnight fasting may be required for a blood sample; follow any instructions that you are given.

Plasma Free Metadrenalines (Metanephrines)

Why Get Tested?

To help diagnose or rule out a phaeochromocytoma

When To Get Tested?

When you have persistent or episodic high blood pressure and symptoms such as headaches, rapid heart rate, and sweating

Sample Required?

A blood sample is obtained by inserting a needle into a vein in the arm.

Test Preparation Needed?

Not required. Please inform your healthcare professional of any medication (prescription and non prescription) that you are taking.

Plasma viscosity

Why Get Tested?

Plasma viscosity measurement can be used to assess the viscosity, or the 'thickness' of the blood. The viscosity of plasma (the liquid part of the blood) is affected by the presence of proteins that can be produced in normal response to infection or inflammation, or proteins that are produced abnormally in certain diseases (paraproteins). Measuring the viscosity of blood may be used to indirectly detect and monitor inflammation and can aid in the diagnosis and monitoring of many conditions.

When To Get Tested?

Plasma viscosity is a specialised test that is usually only available in larger, specialist laboratories. If your doctor thinks that you might have a condition that causes inflammation they may use this test to help diagnose and follow the course of this condition, especially temporal arteritis or polymyalgia rheumatica. Production of paraproteins is associated with some disease states, including Waldenström macroglobulinaemia. Production of high levels of paraproteins may lead to a condition called 'hyperviscosity syndrome'. Measurement of plasma viscosity maybe used to help diagnose this condition along with clinical presentation and fundoscopic examination to assess the retinal veins.

Sample Required?

A blood sample taken from a vein in the arm.

Test Preparation Needed?

No test preparation is needed.

Platelet Count

Why Get Tested?

To count the number of platelets present in blood. This may be performed if there are symptoms of a bleeding disorder, an unexplained blood clot, or to check that the is working as it should.

When To Get Tested?

The platelet count is performed as part of a full blood count (FBC) analysis, which may be carried out as a general screen during routine healthcare examinations or for the diagnosis or monitoring of diseases that affect the blood and bone marrow.

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

None

Platelet Function Tests

Why Get Tested?

To help determine the cause of, or potential for, excessive bleeding and/or to diagnose a platelet function disorder; to monitor and evaluate platelet function; to monitor the presence and effectiveness of anti-platelet medications

When To Get Tested?

When you bruise easily or experience excessive or prolonged bleeding; when you are taking medications that can alter platelet function; prior to or during certain surgeries.

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

You may be instructed to refrain from taking drugs that can affect the function of normal platelets and hence the results of these tests, such as aspirin, non-steroidal anti-inflammatory drugs (NSAIDs), or any over-the-counter medications that contain drugs such as these. The most common NSAIDs include ibuprofen, naproxen and cyclo-oxygenase-2 (COX-2) inhibitors. However, do not stop taking your medications unless instructed to do so by your health care provider.

Pleural Fluid Analysis

Why Get Tested?

To help diagnose the cause of inflammation of pleurae (pleuritis, pleurisy), accumulation of fluid in the pleural space (pleural effusion), or possible malignancy

When To Get Tested?

When a doctor suspects that someone with chest pain, coughing, and/or difficulty breathing has a condition associated with pleuritis and/or pleural effusion

Sample Required?

A volume of pleural fluid is collected by a doctor using a procedure called thoracentesis, in part to relieve pressure and for diagnostic purposes

Test Preparation Needed?

None

Porphyrins

Why Get Tested?

To help diagnose and sometimes to monitor porphyrias (a group of mainly inherited disorders involving disturbance in the formation of haem, a component of haemoglobin)

When To Get Tested?

If a patient has symptoms that suggest an acute porphyria (such as abdominal pain, tingling in hands or feet, and/or confusion or hallucinations) or a cutaneous (skin) porphyria (such as reddening, blistering, or scarring on sun-exposed skin)

Sample Required?

A blood sample taken from a vein in your arm, a random urine sample and a small stool sample, preferably collected whilst symptoms are occurring

Test Preparation Needed?

None required, but preferably collect the samples whilst symptoms are occurring

Potassium Test

Why Get Tested?

To determine if the concentration of potassium in your blood is within normal range.

When To Get Tested?

Blood potassium concentrations are frequently measured as part of routine health screening and in the clinical investigation of many diseases. It is measured in those who take diuretics or heart medications, and in the investigation of high blood pressure and kidney disease. It is also used to monitor patients on kidney dialysis or diuretic therapy, and patients receiving intravenous therapy on a drip

Sample Required?

A blood sample taken from a vein in the arm

Test Preparation Needed?

None

Prealbumin Test

Why Get Tested?

To help assess patients with malnutrition and to monitor patients receiving nutrition support

When To Get Tested?

If your doctor suspects you are malnourished because of a poor diet, infection or an eating disorder. This test is not widely available, and samples may need to be sent to specialist laboratory.

Sample Required?

A blood sample taken from a vein in the arm

Test Preparation Needed?

None

Procalcitonin

Why Get Tested?

To help diagnose sepsis in a person who is critically ill; to help determine the risk of severe sepsis leading to septic shock in a person who has sepsis; to distinguish bacterial from non-bacterial infections.

When To Get Tested?

When someone is seriously ill and a doctor wants to distinguish between sepsis and other causes of the illness; to help guide treatment in a patient with sepsis

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

None

Progesterone Test

Why Get Tested?

Most commonly, progesterone is requested during the investigation of infertility, to look for the presence of ovulation. It may also be used to help diagnose an ectopic or failing pregnancy or in the investigation of abnormal uterine bleeding.

When To Get Tested?

At specific times during a woman's menstrual cycle (period) to determine whether/when she is ovulating and producing eggs, and sometimes during early pregnancy if symptoms suggest an ectopic or failing pregnancy

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

None

Prolactin

Why Get Tested?

To determine whether or not your prolactin concentrations are higher (or occasionally lower) than normal

When To Get Tested?

When you have symptoms of an elevated prolactin, such as galactorrhoea (breast milk production, not during pregnancy) and/or visual disturbances and headaches; as part of investigation for female and male infertility; for follow up of low testosterone in men

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

None

Prostate-Specific Antigen (PSA)

Why Get Tested?

To help detect and to monitor prostate cancer

When To Get Tested?

If you have symptoms of prostate disease, such as difficulty in passing urine, straining or taking long time while urinating, hesitancy, weak flow, terminal dribbling or passing urine more frequently than usual especially during the night.

Sample Required?

A blood sample taken from a vein in the arm at any time of the day

Test Preparation Needed?

Avoid ejaculation for 48 hours before sample collection as this has been associated with elevated prostate specific antigen (PSA) levels; the sample should also be collected prior to your healthcare professional performing a digital rectal exam (DRE) and prior to or 6 weeks after a prostate biopsy. PSA may remain high for many months following a urinary tract infection, and for 48 hours following vigorous exercise, especially riding a bicycle).

Protein C and Protein S

Why Get Tested?

To help evaluate a thrombotic episode, to determine whether you may have an inherited or acquired Protein C or Protein S deficiency

When To Get Tested?

When you have had an unexplained thromboembolism (a blood vessel blocked by a blood clot), when your newborn has a severe clotting disorder, such as disseminated intravascular coagulation (DIC) or purpura fulminans. Sometimes when a close relative has an inherited Protein C or Protein S deficiency

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

No test preparation is needed.

Protein Electrophoresis and Immunofixation Electrophoresis

Why Get Tested?

To help diagnose and monitor tumours of the antibody producing cells (B lymphocytes) and to diagnose and monitor deficiencies of the immune system

When To Get Tested?

If your doctor suspects that you have a condition that affects the antibody concentrations in the blood either by abnormal production or excessive loss

Sample Required?

A blood sample taken from a vein in your arm; sometimes a random or 24-hour urine sample

Test Preparation Needed?

None

PSEN1 Test

Why Get Tested?

To screen for a rare mutation in the PSEN1 gene known to be associated with Early Onset Familial Alzheimer's Disease (EOFAD)

When To Get Tested?

If you are an adult who has symptoms of dementia and a strong family history of early onset Alzheimer's Disease (AD that begins before age 60-65) or if you are an adult with no symptoms but with an identified PSEN1 genetic mutation (and EOFAD) in your family

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

None

PT

Why Get Tested?

To help diagnose a bleeding disorder; to help estimate the severity of liver disease. A tightly controlled version of the PT called the International Normalised Ratio (INR) is used to measure the effect of anticoagulant drugs such as warfarin.

When To Get Tested?

No test preparation is needed. If the patient is receiving anticoagulant therapy, the specimen should be collected before the daily dose is taken. It is essential the blood is taken quickly and smoothly and that the anticoagulant bottle is filled exactly to the designated mark or the result may be inaccurate.

Sample Required?

A blood sample taken from a vein in the arm

Test Preparation Needed?

None needed, although if you are receiving anticoagulant therapy, the sample should be collected before taking your daily dose.

Quantitative Immunoglobulins

Why Get Tested?

To help evaluate a person's immune system status; to detect and monitor an excess or deficiency in one or more of the immunoglobulin classes (IgG, IgA, and IgM)

When To Get Tested?

When you have recurrent infections and/or chronic diarrhoea; when your healthcare professional suspects an immunoglobulin deficiency; periodically to monitor a condition that affects immunoglobulin levels that may be genetic or acquired (HIV/AIDS, multiple myeloma), as part of the investigation of anaemia and bone pain with raised ESR (multiple myeloma, Waldenstrom’s macroglobulinaemia).

Sample Required?

A blood sample drawn from a vein in your arm; sometimes a cerebrospinal fluid (CSF) or saliva sample

Test Preparation Needed?

None

RAS (KRAS and NRAS, all RAS) testing

Why Get Tested?

To determine whether a cancer, usually a large bowel (colorectal) cancer is positive for KRAS or NRAS gene mutation, which helps to guide treatment and determine outcome. RAS gene mutation analysis is also used in the assessment of some other cancer types including head and neck cancer.

When To Get Tested?

If you have been diagnosed with a cancer and your doctor wants to determine whether the KRAS and NRAS genes are mutated in the tumour. If the KRAS or NRAS genes are mutated, the cancer will not be responsive to treatment with RAS targetted therapy.

Sample Required?

A sample of cancer tissue obtained during a biopsy. Generally this test is done on the biopsy taken for initial diagnosis and a second biopsy is not necessary.

Test Preparation Needed?

None

Red Blood Cell (RBC) Antibody Identification

Why Get Tested?

To identify the specific antibody present when a direct antiglobulin test (DAT) or indirect antiglobulin test (IAT) is positive; to help identify the cause of a transfusion reaction or the cause of haemolytic disease of the foetus and neonate (HDFN)

When To Get Tested?

Red cell antibody identification will be performed when an antibody screen using the IAT is found to be positive during a routine ‘group and save’ investigation which may be performed as a routine antenatal screening tests, prior to a blood transfusion or prior to surgery where a blood transfusion may be required; when a person has a positive DAT following a suspected transfusion reaction or is suspected to have an autoimmune haemolytic anaemia; when a newborn has HDFN.

Sample Required?

The test is performed on a sample of blood obtained from a vein in the arm using a needle. This is a process which may be referred to as ‘venepuncture’.

Test Preparation Needed?

None

Red Blood Cell (RBC) Antibody Screen

Why Get Tested?

To detect antibodies directed against red blood cell antigens

When To Get Tested?

When preparing for a blood transfusion; during pregnancy and at delivery.

Sample Required?

The test is performed on a sample of blood obtained from a vein in the arm using a needle. This is a process which may be referred to as ‘venepuncture’.

Test Preparation Needed?

None

Red Blood Cell Count

Why Get Tested?

To evaluate any change in the number of red blood cells in your blood

When To Get Tested?

As part of a full blood count (FBC), which may be requested for a variety of reasons.

Sample Required?

A blood sample taken from a vein in your arm or by a finger-prick (children and adults) or heel-prick (newborns)

Test Preparation Needed?

Keep well hydrated by drinking fluids one to two days prior to blood collection

Red Cell Indices

MCV, MCH, MCHC, and RDW

Mean Cell Volume (MCV), Mean Cell Haemoglobin (MCH), Mean Cell Haemoglobin Concentration (MCHC) and Red Cell Distribution Width (RDW) are measurements relating to the volume, size and haemoglobin content of red cells in the blood. These are measured or calculated as part of a full blood count (FBC) analysis, which may be carried out as a general screen during routine healthcare examinations or for the diagnosis or monitoring of diseases that affect the blood and bone marrow.

The MCV, MCH, MCHC and RDW provide information on the overall size and volume of the circulating red cell mass and so can help in the diagnosis or monitoring of conditions affecting the red cell size and shape.

To learn more about the FBC and these individual components, please review the FBC page, especially "The Test: How is it used?" and "The Test: What does the test result mean?" (RBC Evaluation) sections.

Renal Panel

Why Get Tested?

To help diagnose and manage conditions affecting kidney (renal) function; may be used as part of general health screening or to screen someone who is at risk of developing kidney disease, or to follow someone with known kidney disease.

When To Get Tested?

When you have signs and symptoms that suggest that you may have a condition affecting the function of your kidneys; when you are being treated for kidney disease; when you have certain risk factors for kidney disease, such as high blood pressure or diabetes.

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

You may be instructed to fast for 8-12 hours (no food, only water) prior to the test, but this is rare.

Reticulocyte Count

Why Get Tested?

To help evaluate the bone marrow's ability to produce red blood cells (RBCs) and to help distinguish between anaemia related to blood loss or destruction and anaemia related to decreased RBC production; to help monitor bone marrow response and the return of normal marrow function following chemotherapy, bone marrow transplant, or post-treatment follow-up for iron deficiency anaemia

When To Get Tested?

When you have a decreased (or increased) RBC count, haemoglobin, haematocrit or platelet count and your doctor wants to evaluate bone marrow activity

Sample Required?

A blood sample obtained by inserting a needle into a vein in the arm or sometimes from pricking a finger or the heel in the case of infants.

Test samples are collected into sample tubes containing EDTA preservatives.

Test Preparation Needed?

No test preparation is needed. Blood sample can be collected at any time of the day, before or after a meal.

Rheumatoid Factor

Why Get Tested?

To help diagnose rheumatoid arthritis (RA) and Sjögren's syndrome

When To Get Tested?

When your doctor thinks that you have symptoms suggestive of RA or Sjögren's syndrome

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

None required

RSV (Respiratory Syncytial Virus)

Why Get Tested?

To determine whether an infant, an elderly patient, or an immunocompromised patient has respiratory syncytial virus (RSV) and to help determine whether or not RSV season has started in your community

When To Get Tested?

When it is RSV season (late autumn until early spring) and your doctor wants to determine whether your runny nose, congestion, coughing and/or difficulty breathing are due to RSV or to other causes

Sample Required?

Usually a nasal aspirate; occasionally a nasopharyngeal (NP) or a throat swab

Test Preparation Needed?

None

Rubella Test

Why Get Tested?

To determine if you have had a recent or past infection with the rubella virus, or to check that you are protected from the rubella virus

When To Get Tested?

If you have symptoms of rubella infection or are pregnant and had contact with someone with a rash and are unsure of your vaccination history to rubella.

Sample Required?

A blood sample taken from a vein in the arm (this may need to be repeated after 7 days), oral fluid, a throat swab, or other more invasive samples such as amniotic fluid depending on symptoms.

Test Preparation Needed?

None

Salicylate

Why Get Tested?

To detect aspirin overdose and guide hospital treatment or to monitor aspirin therapy of inflammatory disease such as rheumatoid arthritis to guard against overdosage

When To Get Tested?

When you have symptoms such as nausea, rapid breathing, ringing in the ears (tinnitus), or confusion that may be from taking too much aspirin or medications with salicylate ingredients; when it is suspected that your child may have ingested a significant quantity of a salicylate; at regular intervals when monitoring an overdose; sometimes on a regular basis if you take a salicylate on prescription for rheumatoid arthritis or another autoimmune disorder

Sample Required?

A blood sample taken from a vein usually in an arm

Test Preparation Needed?

None, but your doctor may ask when you last took a salicylate and the amount taken. If you regularly take a prescription salicylate, your doctor may want to collect blood just prior to your next dose (trough level). Tell your doctor about any other medications you are taking.

Second trimester maternal screening

Why Get Tested?

To assess the risk of a fetus having certain chromosomal abnormalities, such as Down syndrome (trisomy 21) or Edward's syndrome (trisomy 18).

When To Get Tested?

In most centres women will be offered first trimester screening between 11-13 weeks, although for some it may be carried out in the second trimester, usually between 14 and 20 weeks of pregnancy.

Sample Required?

A blood sample taken from a vein in the arm. The results from the laboratory may be combined with the results from an ultrasound scan to improve the overall effectiveness of the screening test.

Test Preparation Needed?

None

Selenium

Why Get Tested?

To measure the amount of selenium in the blood (serum/plasma) in order to identify/diagnose deficiency/toxicity or to monitor the response to supplementation

When To Get Tested?

When you have symptoms that may suggest selenium deficiency or toxicity. Following guidelines for the screening of malnutrition or if at risk of malnutrition.

Sample Required?

A blood sample taken from a vein in your arm.

Test Preparation Needed?

None

Semen Analysis

Why Get Tested?

To investigate to see if there is a problem with your fertility. This is often performed if you are in a heterosexual relationship and your partner is having trouble becoming pregnant.

It is also necessary after a vasectomy operation to ensure that the sterilisation operation was successful and that you are no longer fertile. This test is called a post-vasectomy semen analysis (PVSA).

When To Get Tested?

Semen analysis - When you think you might have a fertility problem. This is usually undertaken one year after trying to conceive with natural intercourse.

Post-vasectomy semen analysis – 12 weeks after the vasectomy with at least 20 ejaculations since the operation.

Sample Required?

A semen sample collected in a sterile container provided by the laboratory or doctor. It is important that the specimen container has been tested to ensure it is not toxic to sperm.

Test Preparation Needed?

In order for the test to be reliable, you may need to abstain from masturbation or sex for two to seven days before the sample is collected. You should follow the instructions given to you by the laboratory or your doctor.

Serotonin

Why Get Tested?

To help diagnose a serotonin-secreting carcinoid tumour

When To Get Tested?

When you have symptoms suggestive of a carcinoid tumour such as flushing, diarrhoea and/or wheezing

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

No test preparation is needed.

Sex Hormone Binding Globulin (SHBG)

Why Get Tested?

To evaluate whether the concentration of SHBG is affecting the amount of testosterone available to the body's tissues.

When To Get Tested?

When your total testosterone results do not fit well with clinical signs and suggest deficient or excessive testosterone production.

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

None

Shiga toxin-producing *Escherichia coli*

Why Get Tested?

To determine if your gastrointestinal symptoms are due to an infection caused by *Escherichia coli* bacteria that produce Shiga toxin

When To Get Tested?

When you have acute diarrhoea that is persistent, severe and/or bloody

Sample Required?

A fresh liquid or unformed stool sample that does not contain urine or water, collected in a clean dry container; a rectal swab may be collected from infants. Stool and rectal swab may be placed in transport media for delivery to laboratory.

Test Preparation Needed?

None

Sickle Cell Test

Why Get Tested?

To screen for the presence of sickle cell trait or to confirm the presence of sickle cell disease

When To Get Tested?

If you are of Afro-Carribean descent to determine if you carry one or both genes for sickle cell disease and for antenatal screening. There are other ethnic minorities in whom the sickle gene is found and should be tested if index of clinical suspicion is high.

Sample Required?

A blood sample taken from a vein in the arm. In children, a blood sample from a finger-prick or heel-prick

Test Preparation Needed?

None; however, if this test is used for diagnosis, the sample should not be taken after a recent blood transfusion

Sirolimus

Why Get Tested?

To determine the concentration of sirolimus in the blood in order to establish a dosing strategy, maintain therapeutic levels, and detect toxic levels

When To Get Tested?

As soon as sirolimus therapy begins and whenever dose is changed. Frequently at first, then at regular intervals to monitor concentrations over time. Whenever excess or deficient levels are suspected

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?
Have the sample collected immediately prior to the next dose, or as directed by your doctor

Smooth Muscle Antibody

Why Get Tested?

To help diagnose autoimmune hepatitis and distinguish it from other causes of liver injury or disease

When To Get Tested?

When a patient has hepatitis or a liver disorder that the doctor suspects may be due to an autoimmune-related process

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

None

Sodium Test

Why Get Tested?

To determine if concentrations of sodium are normal, too high (hypernatraemia) or too low (hyponatraemia) as part of diagnosis and monitoring the treatment of related illnesses

When To Get Tested?

In routine medical examination to investigate causes of dehydration, oedema, problems with blood pressure, or non-specific symptoms; as part of routine laboratory evaluations, or to monitor certain long-term conditions, like high or low blood pressure

Sample Required?

A blood sample is taken by needle from the arm. In some cases, a random urine sample or a 24 hour collection may be required.

Test Preparation Needed?

None

Soluble Mesothelin-Related Peptides

Why Get Tested?

To monitor progression or recurrence of a rare cancer called mesothelioma; this cancer affects the membranes that surround the lungs, heart, and abdominal cavity. Most cases of mesothelioma are associated with asbestos exposure.

When To Get Tested?

After you have been diagnosed with mesothelioma, this test may be requested to follow response to treatment at anytime during or after treatment.

Sample Required?

A blood sample taken from a vein in the arm.

Test Preparation Needed?

None

Soluble Transferrin Receptor

Why Get Tested?

To detect iron deficiency anaemia and distinguish it from anaemia caused by chronic illness or inflammation

When To Get Tested?

When iron deficiency anaemia is suspected

Sample Required?

A blood sample drawn from a vein in your arm

Test Preparation Needed?

None

Sputum Culture

Why Get Tested?

To detect and identify the cause of bacterial respiratory tract infections; to monitor the effectiveness of treatment

When To Get Tested?

Most respiratory tract infections get better without treatment, however if your symptoms get worse or you begin to feel very unwell consult your GP. Also see your GP if you notice you begin to cough up blood, cough persisting over 3 weeks, you are pregnant, over 65 years old, weakened immune system or you have a long term health condition.

Sample Required?

A fresh sputum sample (deep respiratory secretions, not saliva), usually collected first thing in the morning.

Test Preparation Needed?

Rinse mouth out with water prior to collection

Stool Culture

Why Get Tested?

To determine whether you have pathogenic bacteria in your gastrointestinal tract.

When To Get Tested?

When you have diarrhoea that lasts more than a few days and/or have blood or mucous in your loose stools.

Sample Required?

A fresh stool sample in a container provided by your healthcare professional

Test Preparation Needed?

None

Susceptibility Testing

Why Get Tested?

To determine the likelihood that a particular antibiotic or antifungal drug will be effective in stopping the growth of the bacteria or fungi causing your infection

When To Get Tested?

As follow up to a positive bacterial or fungal culture; when you have an infection and one or more types of bacteria or fungi have been grown and isolated in a culture

from a sample obtained from the site of suspected infection; when your infection is not responding to treatment

Sample Required?

A sample of a pure culture of bacteria or fungi grown and isolated from an infected body site

Test Preparation Needed?

None

Sweat Chloride Test

Why Get Tested?

To diagnose cystic fibrosis (CF)

When To Get Tested?

When an infant or child has symptoms that suggest cystic fibrosis, such as frequent respiratory infections and chronic cough, persistent diarrhoea, foul-smelling bulky greasy stools, and malnutrition, or following abnormal results in the newborn screening (blood spot) test for CF.

Sample Required?

A sweat sample collected using a special sweat stimulation procedure

Test Preparation Needed?

None. However, you may be instructed to avoid applying creams or lotions to your skin 24 hours before the test. Also, it is important to be well-hydrated before undergoing the procedure.

Synacthen Test

Why Get Tested?

To help diagnose Addison's disease. To assess adrenal and pituitary gland function.

When To Get Tested?

When a doctor suspects that the adrenal gland is not producing enough cortisol. When a doctor suspects that the pituitary gland is not producing enough adrenocorticotrophic hormone (ACTH).

Sample Required?

A blood sample is collected and then a small amount of synacthen is injected into a vein or muscle. A further blood sample is taken after 30 minutes and/or 60 minutes.

Test Preparation Needed?

Exogenous steroids (glucocorticoids) should be stopped at least 24 hours before the test e.g. prednisolone, and inhaled steroids should not be taken the morning of the test. Those taking oestrogen replacement or the oral contraceptive containing oestrogen should ideally stop 6 weeks prior to the test (alternative forms of contraception should be used). Please discuss with your healthcare professional prior to the test being performed.

Synovial Fluid Analysis

Why Get Tested?

To help diagnose the cause of joint inflammation, pain, and/or swelling

When To Get Tested?

When one or more of your joints are swollen, red, and/or painful

Sample Required?

A sample of synovial fluid is collected by a doctor from the affected joint with a syringe and needle using a procedure called a joint aspiration. The sample is called a joint aspirate.

Test Preparation Needed?

Consult with your doctor about test preparation. Synovial fluid collection and analysis may be performed after fasting or at random.

Syphilis Test

Why Get Tested?

To see whether a person has syphilis caused by a bacteria called *Treponema pallidum*, and how far the disease has progressed. This information helps the doctors to choose the best possible treatment. Timely diagnosis of the infection also helps to cure the disease early and decrease the chances of complications.

When To Get Tested?

If you have symptoms of syphilis or
you have another Sexually transmitted disease (STD) or
you have a partner who has syphilis or
if you are pregnant or
to monitor the treatment of syphilis or
if you are involved in high risk sexual activities.

Sample Required?

Yes.

Blood - Most common method used for testing is doing a blood test by taking blood from your vein. Your body produces antibodies (a type of protein) when infected with syphilis. This antibody can be tested and measured in your blood to diagnose syphilis.

Swab/scrape – If you have a sore/ulcer then a swab can be taken from that to test under the microscope for the bacteria (less commonly done nowadays) or it can be tested for bacterial genetic material (PCR, polymerase chain reaction)

CSF - In certain cases, if syphilis involves the brain, doctors can put a needle through your back to tap some fluid (CSF, Cerebrospinal fluid), which can be tested for infection.

Test Preparation Needed?

None

T-Cell Receptor Gene Rearrangement

Why Get Tested?

To help diagnose a T-cell lymphoma; sometimes to detect and evaluate residual cancer cells

When To Get Tested?

When a doctor thinks that you may have a T-cell lymphoma; when a doctor would like to assess whether treatment has been effective and/or whether lymphoma has recurred

Sample Required?

A bone marrow, tissue such as a lymph node (biopsy), or body fluid sample collected by your doctor; sometimes a blood sample drawn from a vein in your arm

Test Preparation Needed?

None

Tacrolimus

Why Get Tested?

To measure the concentration of tacrolimus in the blood in order to establish the correct dose, maintain therapeutic levels and detect toxic levels

When To Get Tested?

As soon as tacrolimus therapy begins, frequently at first then at regular intervals to monitor concentrations over time

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

Have the sample collected 12 hours after the last dose and/or immediately prior to the next dose or as directed by your doctor.

Tau Protein

Why Get Tested?

To help identify cerebrospinal fluid (CSF) fluid leaking from the skull.

When To Get Tested?

If there is a watery discharge from your nose or ear (rhinorrhoea or otorrhoea) after you have suffered a skull fracture or after brain surgery.

Sample Required?

A sample of the suspicious watery discharge is collected into a plastic tube and at the same time a blood sample is also collected.

Test Preparation Needed?

None

TB Skin Test

Why Get Tested?

To help determine whether or not you may have been exposed to and become infected by the *Mycobacterium tuberculosis* () bacteria

When To Get Tested?

- When you have diseases or conditions that weaken your immune system and put you at a greater risk of developing active tuberculosis.
- When you have had close contact with someone who has active TB, or work or live in a high risk environment.
- When you have lived for a period of time in a foreign country where TB may be more common.
- Sometimes as part of an examination prior to starting a new job (such as a healthcare worker).

Sample Required?

No sample is required. A small amount of purified protein derivative (PPD) solution is injected just under the first layer of skin of your inner forearm.

Test Preparation Needed?

None

Testosterone Test

Why Get Tested?

To find out if testosterone levels are abnormal in a male or female patient. Measurement may help to explain why a man has difficulty in getting an erect penis (erectile dysfunction), the inability of your partner to get pregnant (infertility), premature or delayed puberty, or masculine physical features if you are women. In a women it is used to investigate polycystic ovarian syndrome (PCOS). More recently it has been used to investigate the so-called Male Menopause.

When To Get Tested?

If you are man and your doctor thinks that you may be infertile or if you are unable to get or maintain an erection

If you are a boy with either early or delayed sexual maturity

If you are a female but have male traits, such as a low voice or excessive body hair (hirsutism), or are infertile or have no periods or if they are irregular

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

None

Theophylline and Caffeine

Why Get Tested?

To measure the amount of theophylline or caffeine in the blood, to establish an appropriate dose and to maintain an appropriate level

When To Get Tested?

At the start of drug therapy and at regular intervals to monitor the drug's levels; when indicated, to detect low or possibly toxic concentrations

Sample Required?

A blood sample taken from a vein in your arm or from pricking an infant's heel

Test Preparation Needed?

No specific test preparation is needed

Therapeutic Drug Monitoring

What is therapeutic drug monitoring?

Therapeutic drug monitoring is the measurement of specific drug concentrations in the blood at timed intervals, in order to maintain a relatively constant concentration of the medication in the circulation. Monitored drugs tend to have a narrow "therapeutic index" – the difference between the toxic and therapeutic doses of medications. For some drugs, maintaining this steady concentration in the blood cannot be achieved by simply giving a standard dose of medication to everyone. Each person will absorb, metabolise, utilise, and eliminate drugs at different rates based upon their age, general state of health, genetic makeup, and the influence of other medications that they are taking. These factors may change over time and vary from day to day or with various disease states.

Not all medications require therapeutic drug monitoring. Most drugs have a wide therapeutic index and can be prescribed using standard dosing schedules. The effectiveness of these treatments has been evaluated, but routine monitoring of the concentration of the drug in the bloodstream is not required. Examples of drugs that do not require concentration monitoring include high blood pressure (hypertension) medications and many of the antibiotics given to treat bacterial infections. If an infection resolves with a given antibiotic or if blood pressure is lowered with the prescribed blood pressure medication, then the treatments have been effective.

Why is it important?
Many of the drugs that require therapeutic monitoring are taken for a lifetime. They must be maintained at steady concentrations year after year while the person ages and goes through life events that may alter that individual's drug level, including pregnancies, temporary illnesses, infections, emotional and physical stresses, accidents, and surgical operations. Over time, people may acquire other chronic conditions that also require lifetime medication and these may affect the processing of their monitored drugs. Examples of these conditions include cardiovascular disease, kidney disease, thyroid disease, liver disease, and HIV/AIDS.

Therapeutic drug monitoring follows the effects of these changes and is used to keep the dose of drug right. It can identify patient noncompliance (when the person does not take the medication regularly as prescribed) and can detect the effects of other drugs, which may cause drug concentrations that are higher or lower than expected at a given dosage. Thus, thereapeutic drug monitoring helps to personalise dosage to fit the specific needs of a patient. Along with tests such as urea, creatinine, and liver function tests, monitoring can help to identify any changes in the body's

ability to metabolise and eliminate therapeutic drugs. Testing can also determine how a medication interacts with other prescribed drugs.

How are these tests used?

Not all drug levels need to be monitored. These tests are used to monitor blood concentrations of particular drugs that have a narrow dose range in which the drug is effective but not toxic. In addition, some drugs require monitoring because the amount of drug administered does not correlate well with the amount of drug that reaches the bloodstream. Sometimes, the way that a particular drug is absorbed and metabolised can vary from person to person, or the physical or health status of a person can affect the drug level in the blood.

Through years of testing, the optimum ‘therapeutic ranges’ for effective drug concentrations in the blood have been determined. Within these concentration ranges, most people will be effectively treated without excessive side effects or symptoms of toxicity. The drug dosage necessary to reach this concentration must be determined for each individual. When a person starts on a monitored drug (or returns to it after an absence), the healthcare professional adjusts the dose upwards and tests blood concentrations frequently until the appropriate steady level is achieved. If someone's levels are too high, the healthcare professional will lower the dosage. Often, each different dosage level will take a short period of time to stabilise, so these corrections up and down may take place over a few days or weeks. It is important that people work closely with their healthcare professional during this process and not make their own adjustments or stop taking their medication. Abrupt changes can sometimes worsen conditions and cause acute symptoms.

When are they requested?
Concentrations of monitored drugs are often tested frequently when a person is first put on a drug. Once a person's results are in the therapeutic range and his or her clinical signs indicate that the treatment is appropriate, then the healthcare professional may monitor the drug at less frequent intervals as needed to ensure that the drug concentration stays in the therapeutic range. The frequency of testing required will depend on the drug and on the needs of the patient. If treatment does not appear to be fully effective, or if the person has excessive side effects or signs of toxicity, then the healthcare professional will request testing aimed at adjusting the drug dosage and maintaining levels within the therapeutic range. Monitoring may also take place during illness or other changed circumstances such as pregnancy. Sometimes, the healthcare professional may need to re-evaluate the use of a specific medication and consider switching to another type of drug to better fit the person's condition.

The timing of blood collection is an important part of therapeutic drug monitoring. After a person takes a dose of drug, the amount in the blood rises for a short period of time, reaches a peak and then begins to fall, usually reaching its lowest level (the ‘trough level’) just before the next dose. For the drug to be most effective, peak levels should be below toxic concentrations and trough levels should remain in the therapeutic range. Through experience and studies, healthcare professionals know when to expect peaks and troughs and will request blood sample collections as either trough levels (usually collected just before the next dose), peak levels (for

which timing varies depending on the drug), or sometimes as a randomly timed level. Consistent and accurate interpretation of the results depends on the timing of sample collection, so it is important to be clear when your blood sample needs to be taken in relation to when you took the drug. If you are unable to take your medication or have blood collected at the appropriate time, then you should talk to your healthcare professional before the sample is collected.

Throat Infection Test

Why Get Tested?

To diagnose a possible bacterial infection of the throat (usually *Streptococcus pyogene*)

When To Get Tested?

If you have a sore throat and fever and your doctor thinks it may have a bacterial cause (although most sore throats are caused by viruses and won't require antibiotics)

Sample Required?

A swab brushed against your throat and tonsils

Test Preparation Needed?

None

Thyroglobulin Test

Why Get Tested?

To monitor treatment of some types of thyroid cancer and to look for return of the cancer

When To Get Tested?

Once treatment for thyroid cancer has been completed, before and after radioactive iodine therapy for thyroid cancer, and at varying intervals to monitor for recurrence.

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

No fasting or special preparation is required before the test. In order to increase the ability of the test to pick up very small amounts of remaining thyroid cells some patients may be asked to stop taking their thyroid hormone replacement tablets prior to the test or be given injections (recombinant TSH) in an attempt to stimulate

thyroglobulin production. Dietary supplement rich in vitamin B7 (Biotin) should not be taken in the day before the test in order to avoid test interference that many lead to false results. Please follow any instructions you are given by your Doctor, prior to having this blood test.

Thyroid Antibodies

Why Get Tested?

To help diagnose and monitor autoimmune thyroid diseases and to distinguish these from other forms of thyroiditis, and thyroid disease; to help guide treatment decisions

When To Get Tested?

If you have an enlarged thyroid gland (goitre) and/or if your other thyroid function tests (such as Free T3, Free T4, and TSH) indicate thyroid dysfunction; if there are clinical features to suggest thyroid disease; in some patients with related autoimmune diseases

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

None

Thyroid Function Tests

Why Get Tested?

To help check how the thyroid gland is working, to diagnose thyroid disorders and to monitor the response to treatment.

When To Get Tested?

As part of a health check-up when symptoms suggest the thyroid gland has either reduced or increased activity. Alternatively during a course of treatment for a disorder of the thyroid gland.

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

None needed; however, certain medications can interfere with the tests, so tell your doctor about any drugs that you are taking.

Thyroid-Stimulating Hormone (TSH)

Why Get Tested?

To screen for and diagnose thyroid disorders; to monitor treatment of hypothyroidism and hyperthyroidism

When To Get Tested?

For screening: All newborns are screened for congenital hypothyroidism. There is currently no recommendation in the UK for routine screening of adults.
When a patient has symptoms of hypo- or hyperthyroidism and/or an enlarged thyroid. For monitoring treatment of the thyroid as directed by your healthcare professional.
In patients with thyroid cancer who have undergone total removal of the thyroid and are taking levothyroxine (synthetic thyroxine (T4)).

Sample Required?

A blood sample taken from a vein in the arm. For neonatal screening blood is collected by pricking the heel

Test Preparation Needed?

None required

TIBC, UIBC and Transferrin

Why Get Tested?

To learn about your body's iron stores

When To Get Tested?

When your doctor suspects you may have too much or too little iron in your body because of a variety of conditions

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

You may be instructed to fast for 12 hours before the test; in this case, only water is allowed.

TORCH Test

Why Get Tested?

The TORCH panel may be used to screen for several infectious diseases that can cause birth defects in the foetus during pregnancy and illness in adults. It is not a compulsory or pre-made testing panel but such acronym is often used to remember which tests to request.

When To Get Tested?

If you become ill while pregnant or if potential problems are noted during your pregnancy (i.e. intrauterine growth retardation, intrauterine death and suspected congenital infection) or if a baby is born with congenital abnormalities that may be caused by an infection with one of these diseases

Sample Required?

A blood sample is taken from a vein in the arm by needle or by heel prick for infants

Test Preparation Needed?

None

Total Protein Test

Why Get Tested?

Mostly forms a part of a liver function test profile, and not often requested in isolation. It can be used to calculate globulin which may indicate activation or depletion of immune system (immunoglobulin). Can help indicate certain liver, kidney disorders and several other diseases.

When To Get Tested?

Rarely required alone. Forms part of other test profiles such as liver function tests.

Sample Required?

A blood taken from a vein

Test Preparation Needed?

None

TPMT

Why Get Tested?

The detection of patients who are at risk of developing severe side effects if treated with the thiopurine drugs, azathioprine, mercaptopurine and thioguanine

When To Get Tested?

Prior to thiopurine drug treatment

Sample Required?

A single blood sample taken from a vein in your arm

Test Preparation Needed?

There are no special preparations needed to collect the blood.

Before taking a sample for TPMT activity, patients may be advised that DNA confirmation may be performed. The only known implication for the genetic variation in TPMT expression is intolerance to thiopurine drugs.

Trace Elements

Why Get Tested?

To detect and monitor a mineral deficiency or excess; sometimes to evaluate your nutritional status

When To Get Tested?

When you have symptoms or signs of a specific mineral deficiency or excess; as indicated when you have a condition that affects mineral absorption, use, or storage

Sample Required?

A blood sample drawn from a vein in your arm; sometimes a random or 24-hour urine sample; rarely, a tissue sample, or another body fluid sample

Test Preparation Needed?

Please check with your doctor to find out if you are required to fast before your test is performed.

Trichomonas Test

Why Get Tested?

To diagnose an infection with *Trichomonas vaginalis*

When To Get Tested?

If you have symptoms of infection or have had unprotected sex and are concerned you may be at risk of an STI (sexually transmitted infection).

Sample Required?

A swab of secretions taken from the vagina in women or the urethra in men. A urine sample can also be used in men.

Test Preparation Needed?

None

Triglycerides

Why Get Tested?

As part of a full lipid profile to assess the risk of developing cardiovascular disease, or to look for an underlying cause for a condition called pancreatitis

When To Get Tested?

As part of a lipid profile during a medical examination, after a diagnosis of pancreatitis, or if you are being treated for high triglycerides

Sample Required?

A blood sample taken from a vein in the arm

Test Preparation Needed?

None. Fasting is not routinely required when checking triglyceride concentration (the guidance on this changed in 2014). However, there may be circumstances when fasting is still required, so follow your doctor's advice.

Troponin Test

Why Get Tested?

To see if you have had a heart attack or damage to your heart muscle

When To Get Tested?

If you are having chest pain that may be due to a heart attack.

Sample Required?

A blood sample taken from a vein in the arm

Test Preparation Needed?

None

Tryptase

Why Get Tested?

To help diagnose anaphylaxis, mastocytosis (too many abnormal mast cells), or mast cell activation syndrome

When To Get Tested?

When you have symptoms such as flushing, nausea, throat swelling, or low blood pressure that may be due to a life-threatening allergic reaction; when your healthcare professional suspects that you have mastocytosis or mast cell activation syndrome.

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

None, but timing of the sample soon after the beginning of symptoms can be important.

Tumour Markers

What are they?

Tumour markers are substances, usually proteins, produced by the body in response to cancer growth or by cancer tissue itself. Their detection and measurement in blood plasma, urine or tissue can help to detect and aid diagnosis of some types of cancer, predict and monitor response to treatment and detect recurrence. Recently advances have allowed mutations in cell genetic material (DNA, RNA) to be used as tumour markers to help diagnosis and to determine the prognosis and guide targeted treatment of a few cancers. Research in progress on tumour markers includes analysis of cell-free RNA released into the circulation by cancers and on methods of trapping circulating intact cancer cells for genetic investigation.

Some limitations of tumour markers are that

- none has sufficiently high sensitivity and specificity to be used to screen the general population
- few are specific for one type of cancer
- many are raised in non-cancerous conditions
- not all patients with a cancer of one type have raised concentrations in the bloodstream of its specific tumour marker
- some cancers have no associated tumour marker

Consequently, they cannot be used alone to diagnose cancer but must be considered in conjunction with a patient's medical history, physical examination and other laboratory and imaging tests. A definitive diagnosis of cancer is made by examining a biopsy specimen under a microscope.

Why are they done?

Tumour markers often have more than one purpose. Examples of tumour markers found on this web site are listed below in three groups according to their primary purpose, with comments on associated cancers and non-cancerous conditions that can cause abnormal values. More details about each individual tumour marker can be found by clicking on its name.

1. To monitor

Some blood tumour markers are used to monitor the success of treatment by a falling concentrations and to detect recurrence by an increase, but are not used for diagnosis. They include:

CA 15-3 (cancer antigen 15-3) is rarely raised when breast cancer is localised but is raised in about three-quarters of those in whom it has spread to other organs. CA 15-3 may also be raised in bowel cancer, lung cancer, cirrhosis, hepatitis and benign breast disease.

CA 19-9 (cancer antigen 19-9) is raised in most patients with advanced pancreatic cancer but may also be raised in bowel cancer, lung cancer, gall bladder cancer and such benign diseases as gall stones, pancreatitis, cystic fibrosis and liver disease.

CEA (carcinoembryonic antigen) is not normally present in the bloodstream but may appear in many kinds of cancer. It is commonly measured in bowel cancer, but has been used to monitor patients with cancers of the lung, breast, liver, pancreas, stomach and ovary. It can also appear in benign conditions such as liver disease and inflammatory bowel disease.

SMRP (soluble mesothelin-related peptides) concentrations are raised in malignant mesothelioma, a rare cancer of the membranes that cover the outside of internal organs and line the body cavities including the chest, the abdomen and the heart. The test is used to monitor rather than to diagnose the condition.

Thyroglobulin is made only in the thyroid gland. Following treatment of thyroid cancer by complete removal or destruction of the gland, plasma thyroglobulin concentration usually drops to very low or undetectable. It is monitored to assess the completeness of removal and to detect recurrence of disease.

2. To help diagnose and to monitor

Some tumour markers help to suggest a diagnosis as well as to monitor the success of treatment and to detect recurrence. They include:

AFP (alpha-fetoprotein) concentration is raised in most patients with cancer of the liver, some patients with cancer of the testis and occasionally in other cancers. It is also increased in chronic hepatitis and cirrhosis of the liver, conditions which can go on to develop liver cancer. Patients with cirrhosis may be monitored for a further increase in AFP as an indication for an ultrasound, CT or MRI scan to detect the development of liver cancer.

BCGR (B-cell immunoglobulin gene rearrangement) detection in bone marrow cells or tissue biopsy can be used to supplement routine examination of the cells in the diagnosis of B-cell lymphoma.

BCR-ABL mutation detection in blood cells or bone marrow cells is used to supplement microscopic and chromosomal examination of the cells to diagnose chronic myeloid leukaemia (CML) and a type of acute lymphoblastic leukaemia (ALL). It is also used to monitor response to treatment, to check for the development of treatment-resistant mutations and, in patients in remission, to monitor for recurrence.

CA 125 (cancer antigen 125) is raised in plasma in about 80% of women with ovarian cancer but can also be raised in pregnancy, during menstruation, endometriosis and pelvic inflammatory disease. It can help with the diagnosis of ovarian cancer: Raised CA 125 concentrations in women with suggestive symptoms are an indication for ultrasound examination of the abdomen and pelvis.

Calcitonin is raised in plasma in medullary cancer of the thyroid gland and usually in its non-cancerous precursor, C-cell hyperplasia. Concentrations may also occasionally be raised with lung, breast and pancreatic cancers, insulinomas and leukaemias. Raised concentrations support the diagnosis in patients with suspected thyroid cancer and are an indication for ultrasound or CT scans and confirmation by thyroid biopsy.

CgA (chromogranin A) is raised in plasma in benign and malignant tumours of the neuroendocrine system such as carcinoid tumour and phaeochromocytoma. In a patient with characteristic symptoms, a raised concentration indicates the presence of a tumour but not its type or location. CgA concentrations may be raised in liver disease, inflammatory bowel disease and renal disease, but patients with these conditions do not have characteristic neuroendocrine symptoms.

Gastrin **concentration** is increased by hyperplasia of gastrin-producing cells and by gastrin-producing tumours (gastrinomas) in the pancreas or duodenum, but rarely in other parts of the body. More than 50% of gastrinomas are malignant. Gastrin concentrations normally rise as a response to low gastric (stomach) acid, for example after taking antacids. The combination of a high fasting gastrin concentrations with high gastric acidity is diagnostic of gastrinoma. A variety of imaging techniques may be necessary to locate tumours which are often very small.

hCG (human chorionic gonadotropin) is produced in pregnancy by the placenta, and its presence/absence in urine is used as a pregnancy test. Concentrations in plasma peak about the tenth week of pregnancy then fall gradually. Plasma and urine hCG concentrations increase in placental cell disorders ranging from benign molar pregnancies to malignant conditions such as choriocarcinoma.

Monoclonal immunoglobulins are not normally present in plasma or urine. In multiple myeloma and Waldenström's macroglobulinaemia a single plasma cell becomes malignant and its clone of daughter cells secretes immunoglobulin (antibody) of a single chemical structure. This marker is recognised by serum protein electrophoresis as a single band. Sometimes the smaller light chain part of the

immunoglobulin is produced in excess and is detected in the urine as Bence Jones protein.

PSA (prostate-specific antigen) is often raised in plasma in prostate cancer, but is also raised in BPH, a benign increase in size (hypertrophy) of the gland, and in gland inflammation (prostatitis). Diagnosis requires prostate ultrasound and biopsy.

TCGR (T-cell receptor gene rearrangement) detection in bone marrow cells or tissue biopsy can be used to supplement routine examination of the cells in the diagnosis of T-cell lymphoma.

3. To assess prognosis and guide treatment

A few tumour markers are used to assess the likely course and outcome of a cancer and to indicate the probability of response to a specific treatment. They include:

HER-2 (human epidermal growth factor receptor-2) testing is carried out on breast cancer tissue obtained by biopsy or during surgery. The positive results obtained in 25-30% of tumours are associated with faster growth, failure to respond to some treatments and a poorer outlook. However, a proportion of positive tumours respond to HER-2 targeted treatment with drugs such as trastuzumab (Herceptin®).

Hormone receptor status (oestrogen and progesterone receptors) is determined on breast cancer tissue obtained by biopsy or at operation. An oestrogen and progesterone receptor positive cancer is likely to respond to anti-hormone treatment with drugs such as tamoxifen, but response is less likely if the tumour is also HER-2 positive.

RAS gene mutations (KRAS and NRAS mutations) are tested for on colon cancer tissue obtained by biopsy. Patients with metastases whose tumour shows no RAS mutations benefit from treatment with anti-epithelial growth factor receptor antibodies such as cetuximab which improve their response to chemotherapy.

U&E

U&E and EUC are commonly used abbreviations of urea and electrolytes and are requested when assessing kidney (renal) function and electrolyte balance. Urea may or may not be included in the routine profile used by your local laboratory. Creatinine is frequently included and so the request may be just **U&E** or some combination of the letters **E/U/C**. For more information on the tests included please follow the blue links above which will take you to the relevant parts of our website.

Unvalidated or misleading laboratory tests

Below is a review of laboratory tests that are frequently misused and promoted direct to consumers for unvalidated purposes. If you have suggestions to add to this list please send them to us at: Contact Us

For more information about how to check if a laboratory is accredited and operating safely: Laboratory accreditation – the basis for confidence

Please see our article here for more information on how laboratory tests are validated, how they should be used and how results should be interpreted.

LIVE BLOOD CELL ANALYSYS

Method: A sample of blood is taken and observed under a microscope. Practitioners claim to be able to diagnose a wide variety of conditions by visual inspection of the 'live' (or more accurately dying) cells. This technique should not be confused with conventional microscopic analysis by accredited medical laboratories e.g. for blood films.

Evidence: There is no evidence that this technique is able to reliably diagnose disease. Studies have shown that different practitioners diagnose completely different conditions from the same blood sample and life-threatening conditions, such as leukaemia, are frequently missed during analysis. The advertising standards authority (ASA) has upheld numerous complaints about practitioners of live blood cell analysis who have made unsubstantiated medical claims. The 2013 ASA statement on the topic states: "CAP is yet to see any evidence for the efficacy of this therapy.."

Comment: Live blood cell practitioners are not regulated professionals and they require no qualifications to be able to offer tests to the general public. The procedure is widely considered to be inaccurate and misleading and it is not offered by any accredited laboratories in the UK. The majority of the conditions that practitioners claim to be able to diagnose can be reliably diagnosed by conventional, evidenced-based techniques available for free through the NHS.

SALIVARY HORMONE ANALYSYS

Method: A number of websites now offer salivary hormone analysis direct to consumers for the diagnosis of a range of conditions. This usually involves the vendors sending a collection kit in the post so you can collect saliva and post it back to them for analysis. The collection kits and the accompanying instructions for collection vary considerably between vendors. It is often unclear where and how the analysis is being carried out and whether the laboratory doing the analysis is accredited.

Evidence: There is evidence that salivary cortisol [late-night sample] is a valid and useful test in specific circumstances, such as for the diagnosis of Cushing's syndrome or for monitoring patients on hydrocortisone treatment. Analysis of 17-hydroxyprogesterone and androstenedione may also be useful for monitoring the treatment of some conditions of the adrenal gland, such as congenital adrenal hyperplasia (CAH).

For all other salivary hormone tests, including those for reproductive hormones (testosterone, progesterone, oestrogens), thyroid hormones (TSH, FT4, FT3), additional adrenal hormones (DHEA, aldosterone) and other hormones, such as

melatonin, there is little or no evidence that testing is useful. Concentrations of these hormones in saliva fluctuate unpredictably, meaning tests are unable to reliably diagnose disease and results are often misleading. In addition, there is not sufficient evidence that salivary concentrations of cortisol and DHEA are useful in the diagnosis of adrenal gland insufficiency (Addison's disease).

Comment: Even when performed by an accredited laboratory, hormone testing using saliva is unreliable for diagnosing many of the conditions that it is advertised for. In most cases there are simple blood tests available free of charge through NHS providers that can reliably diagnose these conditions and in some cases no tests are required at all.

Saliva tests may be misleading and when used inappropriately may lead to inappropriate or even harmful treatments. Results of tests should always be interpreted in conjunction with a clinical examination by a qualified medical doctor and saliva tests should never be used in isolation to diagnose or exclude any condition.

Urea Test

Why Get Tested?

To evaluate kidney function and monitor the effectiveness of dialysis

When To Get Tested?

If you have non-specific symptoms that may suggest a kidney problem or if you are suddenly ill or have a long term illness that may cause or be made worse by kidney disease

Sample Required?

A blood sample taken from a vein in the arm

Test Preparation Needed?

None

Uric Acid Test

Why Get Tested?

To detect high levels of uric acid, which could be a sign of the condition gout, or to monitor uric acid levels when undergoing chemotherapy or radiotherapy; to detect high levels of uric acid in the urine in order to diagnose the cause of kidney stones and to monitor those with gout who are at risk of developing such stones. Uric Acid is also measured as part of the assessment of pre-eclampsia.

When To Get Tested?

When you have joint pain or other symptoms that your doctor suspects may be due to gout; when monitoring certain chemotherapy or radiation therapies for cancer; when you have recurrent kidney stones; when you have gout or are otherwise at risk for kidney stone formation

Sample Required?

A blood sample taken from a vein in the arm or a 24-hour urine sample

Test Preparation Needed?

None may be needed however some institutions recommend fasting. Follow any instructions you are given.

Urinalysis

Why Get Tested?

To look for metabolic and kidney disorders and for urinary tract infections

When To Get Tested?

On admission to a hospital; preparation for surgery; as part of a medical examination; or when evaluating a new pregnancy. It may be done if you have tummy or back pain, frequent or painful urination, or blood in the urine

Sample Required?

Sample of urine (20-50 mls) in a sterile container; the first urine passed in the morning is the most valuable

Test Preparation Needed?

None

Urine Albumin to Creatinine Ratio or ACR

Why Get Tested?

To be screened for the early detection of kidney disease occurring as a complication of diabetes or hypertension (high blood pressure)

When To Get Tested?

Annually after a diagnosis of diabetes or hypertension

Sample Required?

A urine sample. You will be asked to collect either an early morning or random sample of urine in which albumin and creatinine will be measured. The results are

expressed as an albumin/creatinine ratio or ACR for short. The use of this ratio allows the albumin concentration to be related to the dilution of urine (as indicated by the creatinine concentration) which can depend on how much fluid you have consumed that day. ACR measurement in random urine samples has been shown to be just as good as the measurement of albumin alone in 24 hour urine samples and is much more convenient for the person being tested.

Test Preparation Needed?

None

Urine Culture

Why Get Tested?

To diagnose a urinary tract infection (UTI)

When To Get Tested?

If you experience symptoms of a UTI, such as pain during urination, the need to urinate more frequently or cloudy urine.

Sample Required?

A mid-stream "clean" urine sample

Test Preparation Needed?

Generally none, but you may be instructed not to urinate for at least one hour before the test and/or to drink a glass of water 15-20 minutes before sample collection.

Urine Metadrenalines (Metanephrines)

Why Get Tested?

To help diagnose or rule out a phaeochromocytoma or other neuroendocrine tumour

When To Get Tested?

When you have symptoms of increased catecholamine release, such as persistent or episodic high blood pressure, severe headaches, rapid heart rate, and sweating.

Sample Required?

A 24 hour urine sample

Test Preparation Needed?

Foods such as coffee (including decaffeinated), tea, chocolate, vanilla, bananas, oranges and other citrus fruits should be avoided for several days prior to the test

and during collection. There are also many medications that can potentially affect test results. Talk to your doctor about any prescriptions and over-the-counter drugs and supplements that you are taking. Wherever possible, those that are known to interfere should be discontinued prior to and during sample collection. Emotional and physical stresses and vigorous exercise should be minimised prior to, and during, test collection as they can increase catecholamine secretion.

Urine Protein and Urine Protein to Creatinine Ratio

Why Get Tested?

To detect excessive protein escaping into the urine, to help evaluate and monitor kidney function, and to detect kidney damage

When To Get Tested?

As part of a routine check-up, as a follow-up to a previous positive urine protein test, or if you have a disorder or disease that frequently affects the kidney

Sample Required?

A random urine sample is collected in a clean container. For a 24-hour urine collection, all of the urine is collected for a 24-hour period. It is important that the sample be refrigerated during this time period. There should be no preservative in the container.

Test Preparation Needed?

None

Valproic acid

Why Get Tested?

To measure the amount of valproic acid in the blood and to maintain an effective level

When To Get Tested?

To detect low or excessive (potentially toxic) levels

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

None

Vancomycin

Why Get Tested?

To measure and monitor the concentration of vancomycin in the blood

When To Get Tested?

At the start of vancomycin treatment and intervals during treatment

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

None, but timing of the sample for testing is important; follow any instructions provided

Vanillylmandelic Acid (VMA)

Why Get Tested?

To help diagnose or rule out a neuroblastoma and to monitor the effectiveness of treatment

When To Get Tested?

When your child has symptoms consistent with neuroblastoma

Sample Required?

A 24-hour urine sample is preferred; sometimes a random urine sample is acceptable

Test Preparation Needed?

Though the test is affected by caffeine and certain drugs this is not usually relevant in children.

Very Low Density Lipoprotein (VLDL)

When to get tested?

This test is not in routine use in the United Kingdom

What is being tested?

Very low density lipoprotein is one of the three major lipoprotein particles. The other two are high density lipoprotein (HDL) and low density lipoprotein (LDL). Each particle contains a mixture of cholesterol, triglyceride and protein, but in varying

amounts unique to each type of particle. VLDL contains the highest amount of triglyceride and is called a triglyceride rich lipoprotein. VLDL particles are released into the blood by the liver and circulate in the bloodstream, ultimately being converted into LDL as they lose triglyceride having carried it to other parts of the body.

There's no simple, direct way to measure VLDL which is why it's normally not measured during routine lipid testing.

The VLDL cholesterol concentration can be measured directly using a technique called ultracentrifugation. However, this technique is not straightforward and not usually done in clinical laboratories. This test is generally carried out in specialist laboratories, most often for research purposes.

Vitamin A

Why Get Tested?

To detect vitamin A deficiency or toxicity

When To Get Tested?

When a person has symptoms suggesting vitamin A deficiency or excess, or is at risk of vitamin deficiency such as patients on nutrition supplements.

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

A fasting blood sample is required, and no alcohol should be consumed for 24 hours before sample collection.

Vitamin B12 and Folate

Why Get Tested?

To help diagnose the cause of anaemia or neuropathy (nerve damage), to evaluate nutritional status in some patients, to monitor effectiveness of treatment for B12 or folate deficiency

When To Get Tested?

When you have large red blood cells, specifically when you have symptoms of anaemia and/or of neuropathy. When you are being treated for vitamin B12 or folate deficiency

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

Fasting is not required for a standard vitamin B12 test. Certain medicines and pregnancy may affect the test results; your heathcare professional will advise you on which ones to stop taking.

Vitamin D

Why Get Tested?

To investigate a problem related to bone metabolism or parathyroid function, possible vitamin D deficiency, malabsorption, before commencing specific bone treatment and to monitor some patients taking vitamin D.

When To Get Tested?

Your doctor may request a vitamin D measurement in the following situations:

- If you are found to have an abnormal calcium, phosphate, and/or parathyroid hormone (PTH) concentration in the blood.
- As part of the investigation of some forms of bone disease or muscle weakness/pain.
- If you have disease of the gastrointestinal tract that could result in malabsorption.
- If you are receiving certain anticonvulsant drugs.

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

None required

Vitamin K

Tests for vitamin K are not widely available within the UK and are rarely requested. They are not typically used to screen for or help diagnose vitamin K deficiencies because a lack of vitamin K is usually discovered when unexpected or excessive bleeding or easy bruising occurs. The primary test used to investigate the bleeding is the prothrombin time (PT). If the result of the PT is prolonged and it is suspected to be due to low levels of vitamin K, then oral supplements or injections of the vitamin will be administered. If the bleeding is resolved and the PT/INR results return to normal, then vitamin K deficiency is assumed to be the cause.

von Willebrand Factor

Why Get Tested?

To help determine the cause of unexplained excessive or repeated episodes of bleeding, to diagnose von Willebrand disease (VWD), and to distinguish between different types of VWD

When To Get Tested?

When you have a personal or family history of heavy, prolonged, and/or spontaneous bleeding; when your healthcare professional suspects that you may have a bleeding disorder

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

None

Warfarin Sensitivity Testing

Why Get Tested?

To determine whether you have *CYP2C9* and/or *VKORC1* genetic variations and are likely to need lower, or less commonly, higher than average doses of the anticoagulant drug warfarin

When To Get Tested?

A health practitioner might order this test prior to prescribing warfarin for you if there is a history of warfarin resistance in your family, or more commonly, a health practitioner may sometimes order it when you are being treated with warfarin and have had bleeding or clotting episodes or difficulties in achieving a therapeutic dose of warfarin as determined by blood monitoring.

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

None

West Nile Virus

Why Get Tested?

To determine the cause of viral meningitis or encephalitis that occurs during the summer season; to detect the presence of West Nile Virus (WNV)

When To Get Tested?

When a patient has symptoms suggesting WNV such as headache, fever, stiff neck, and muscular weakness and a diagnosis of encephalitis and/or meningitis; also used as a screen for WNV in donated units of blood

Sample Required?

Cerebrospinal fluid (CSF) collected from a spinal tap and/or a blood sample taken from a vein in your arm

Test Preparation Needed?

None

White Blood Cell Count

Why Get Tested?

If your doctor thinks that you might have an infection, inflammatory illness, immune deficiency, bone marrow disease or allergy and; to monitor treatment

When To Get Tested?

As part of a full blood count (FBC), which may be requested for a variety of reasons

Sample Required?

A blood sample taken from a vein in your arm or from a finger-prick or in babies a heelprick

Test Preparation Needed?

None

White Blood Cell Differential Count

Why Get Tested?

To diagnose an illness affecting your immune system, such as an infection, inflammatory illness, immune deficiency, or tumour such as leukaemia or lymphoma

When To Get Tested?

As part of a full blood count (FBC), which may be requested for a variety of reasons

Sample Required?

A blood sample taken from a vein in your arm or by a finger-prick (children and adults) or heel-prick (infants)

Test Preparation Needed?

None

Zinc

Why Get Tested?

To measure the amount of zinc in the blood (serum/plasma) in order to identify/diagnose deficiency or to monitor response to supplementation

When To Get Tested?

When you have symptoms that may suggest zinc deficiency e.g hair loss, poor wound healing

Sample Required?

A blood sample taken from a vein in your arm or rarely a 24 hour urine sample

Test Preparation Needed?

No test preparation is needed (although fasting results are preferred as zinc concentrations can decrease after meals)

Zinc Protoporphyrin

Why Get Tested?

To screen for and monitor chronic exposure to lead; as an aid in the diagnosis of iron deficiency in children

When To Get Tested?

When you have been chronically exposed to lead, or when your doctor suspects lead poisoning

Sample Required?

A blood sample taken from a vein in your arm

Test Preparation Needed?

No test preparation is needed.