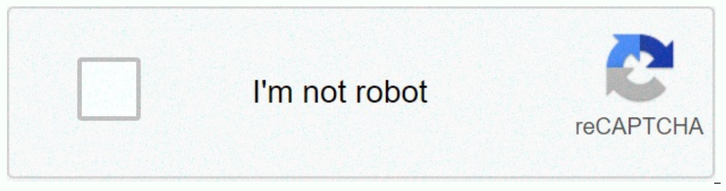

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Genetic blood disorders list

Sickle cell AnemiaThrombocytopeniaFibrinolytic DisorderCongenital Neutropenia Your body relies on blood to deliver fuel and oxygen to its billions of cells and to fight infections and other diseases. For these reasons, blood disorders can affect a multitude of bodily functions. The main components of the blood are: Red Blood Cells (RBCs), which transport oxygen throughout the body White blood cells (WBCs), which fight infection platelets, which protect against slight bleeding by helping your blood to clot plasma, the liquid part of the blood that carries blood cells, nutrients, waste, hormones and many other substances Abnormalities in any of these components or in related cells or tissues can cause a blood disorder. The disorder and its symptoms depend on exactly what has gone wrong. Low blood count or high blood count Some blood disorders - including leukemia, lymphoma, myeloma, myelodysplastic syndrome and myeloproliferative neoplasms - cause unusually low or high levels of blood cells. In some cases the blood cells do not form or mature as they should and cannot perform their normal functions. For RBC is called a low level anemia. A high level is called polycythemia. For WBCs is called a low level leukopenia. A high level is called leukocytosis. For platelets is called a low level thrombocytopenia. A high level is called thrombocytosis. Other blood abnormalities Other blood disorders have to do with a low level or complete lack of substances the body needs, such as clotting factors in hemophilia, or with the presence of unwanted substances in the blood, such as abnormal proteins in amyloidosis. There are many other specific blood disorders that occur in different ways and can have different effects on your body. Doctors start the process of diagnosing blood disorders by asking about your signs, symptoms and medical history and by examining you for signs of a blood-related problem. Based on what they find, they can recommend tests, such as blood tests, bone marrow tests and imaging tests. Because the liquid part of your blood (plasma) carries so many substances, a simple blood test can provide valuable information. Your bone marrow makes blood cells, so bone marrow testing can also be crucial. After getting the results of initial tests, your doctor may ask for additional, more specific tests to uncover additional information about your condition and determine which treatments will help. SCCA doctors have the expertise to determine exactly what your condition is so you get the most appropriate, best targeted care. Below are some of the many state-of-the-art tests SCCA doctors use to diagnose problems with blood or bone marrow. Blood tests - like a complete blood count, peripheral blood smear and flow cytometry - allow your team to control the number, volume, size, shape and types of cells in the blood. These tests also allow your doctor to check the function of your organs, such as your liver and kidneys. This may important for choosing the best treatment your disease. You may also need blood tests to check for chromosome changes that can help physicians identify and classify your disease (cytogenetic analysis) or to look for disease-related mutations in your genes (genomic testing). If your condition means you need a blood transfusion or bone marrow transplant, blood tests are also used to check that you and your donor are compatible. Stem cells in the bone marrow are responsible for making blood cells. So testing your marrow can provide important details about your blood's health. Doctors may use a thin, hollow needle to remove a sample of bone marrow fluid or tissue (bone marrow aspiration or biopsy), typically from your pelvis or sternum. A pathologist examines and evaluates the cells (using methods such as bone marrow lubrication, flow cytometry and immunohistokemi). SCCA has a team of providers that specialize in doing bone marrow procedures to ensure we collect samples safely and comfortably for any test you need. As with your blood, your team can request cytogenetic analysis and genomic testing of your marrow to look for abnormalities in your chromosomes or genes. Some blood disorders can directly affect other organs. Many of the same tests performed on blood and bone marrow samples can also be done on samples taken from your lymph nodes, liver, skin or other bodily fluids (such as the fluid around the spinal cord or lungs) to make a diagnosis. SCCA provides the full range of imaging tests you may need to help diagnose blood disorders and related health problems. These include ultrasound, computed tomography (CT) scans, magnetic resonance imaging (MRI) scans, positron emission tomography (PET) scans and scintigraphy. SCCA doctors diagnose and treat people with a wide range of blood disorders, including cancer, anemier, hemoglobinopatis, bone marrow failure syndromes, bleeding disorders, platelet disorders, blood clots, plasma cell diseases and other blood-related problems, including rare disorders like POEMS syndrome. These are some of the many blood disorders we treat. If you don't see your condition in the list, call (855)-557-0555 for more information about receiving processing here. Acute lymphoblastic leukemia (ALL) is a type of cancer of the bone marrow and blood. It is also called acute lymphocytic leukemia or acute lymphoid leukemia. Learn more about all acute myeloid leukemia (AML) is a type of cancer of the bone marrow and blood. It is also called acute myelogen leukemia or acute myelocytic leukemia. Learn more about AML Acute Promyelocyctic Leukemia (APL), a subtype of acute myeloid leukemia (AML). Cells in the bone marrow that produce blood cells (red blood cells, white blood cells and platelets) do not develop and function normally. Amyloidosis is a potentially serious and very rare disease that involves abnormal protein (amyloid) build up in your tissues and organs. Learn more about Amyloidose Anemia occurring, there are too few red blood cells in the body. At SCCA, our team team experts provide comprehensive diagnostic and medical treatment for people with this blood disorder. What is anemia? Anemia is not a disease in itself, but rather an indicator of an underlying disorder that was either inherited or acquired after birth. The causes of anemia include: Decreased production of red blood cells Red blood cells destruction (hemolysis) Increased loss of red blood cells (such as from bleeding) Anemia can be reversible or chronic. Red blood cells contain hemoglobin - an iron-rich protein that gives the blood its red color. Hemoglobin allows blood cells to transport oxygen from your lungs to the rest of your body and to carry carbon dioxide from other parts of the body back to the lungs to be exhaled. When your level of red blood cells is low, this process is impaired and your body doesn't get as much oxygen as it needs. Decreased red blood cells may occur in isolation or in combination with a decrease in other types of blood cells. Symptoms and diagnosis of anemia When your blood cannot deliver enough oxygen to the rest of your body, you may feel weak, dizzy or short of breath. You may experience chest pain, rapid or irregular heartbeat, headache, cold hands and feet, or pale skin. If anemia is mild or develops slowly over a long period of time, you may have no symptoms at all. SCCA offers a full range of services to diagnose anemia and determine the cause. Your doctor will ask about your medical history and examine you. The presence of anemia is established by a blood test, called a complete blood count (CBC) and differential, which measures the number of red blood cells and other types of cells in the blood. When investigating the cause of anemia, it is important for your doctor to measure the number of young red blood cells your body makes (reticulocyte count). This will help your doctor interpret the CBC and direct further testing. Another option to help determine the cause of anemia is a bone marrow aspiration and biopsy, where a doctor uses a hollow needle to extract small samples of bone marrow while under local anaesthetic. This allows your doctor to study your blood cell development. Anemia treatment Red blood cell transfusion can increase the number of red blood cells in patients with symptomatic anemia. Additional treatments are aimed at the underlying cause of the low red blood cell level. SCCA's team of physicians provides a comprehensive range of treatment options for anemia and the conditions that can lead to it. To find detailed information on treatments for specific types of anemia, click on one of the following ailments: Aplastic anemia Diamond-Blackfan anemia Fanconi anemia Hemolytic anemia Iron deficiency Pernicious anemia (B12 deficiency) Sickle cell disease In an aplastic anemia, the bone marrow stops producing new blood cells at the same rate resulting in deficits of all blood cell types. White blood cells fight bacteria and platelets help blood clot. Without these, the body is at risk of Bleeding. Learn more About Aplastic Annemia Autoimmune thrombocytopen purpura is a blood disorder that leads to an abnormally low level of platelets in the blood. It is also called immune thrombocytopenia (ITP). Seattle Cancer Care Alliance (SCCA) offers a wide range of services to diagnose and treat this disease and to exclude other causes of low platelets. What is ITP? ITP usually occurs because antibodies produced by your immune system mistakenly attack and destroy your platelets. Platelets are small cells in the blood which are the first step in forming a blood clot to stop the bleeding. Most often, ITP occurs without any known triggers, although it may follow a viral infection or be associated with other autoimmune diseases. It happens sometimes along with lymphoma and can be caused by some medications. There are two types of condition: acute and chronic. The acute form is more common in children and rarely lasts more than six months. Treatment is often not necessary unless your platelet count is very low or you bleed. The chronic form is more common in adults. It is considered chronic if it lasts for at least 1 year. Chronic ITP can go away and then repeat itself, even after a long remission. Symptoms and diagnosis of ITP People with ITP often bleed and bruise easily. You may have spontaneous nosebleeds or gum bleeds when brushing or flossing or during dental visits. Small blood vessels can break, causing purple bruising to appear on your skin. These bruises are called purpura. Sometimes the only sign of low platelets is the appearance of tiny bruises, or reddish-purple dots called petechiae, usually on lower legs and ankles. In other cases, the disease can cause more severe bleeding or internal bleeding that is hard to stop. Many patients report fatigue when their platelet counts are low. Women with ITP may notice unusually heavy menstrual flow. To diagnose the disease, your doctor will review your personal and family medical history and do a thorough physical exam. They will order blood tests, including a complete blood count (CBC), and other tests to rule out other causes of your symptoms. If other causes seem likely, or if your condition does not respond to treatment for ITP, your doctor may order a bone marrow biopsy to learn more about how your body makes blood cells. ITP treatment treatment for ITP depends on many factors including your age and overall health, the severity of your symptoms, your platelet count and your personal preferences. Mild cases may not need any treatment. First-line treatment is often corticosteroids, like prednisone, or if your platelet count is very low, intravenous gamma globulin, a blood component that can help increase your platelet count quickly. If these treatments do not control the condition, your doctor may suggest other medicines, including thrombopoietin receptor agonists, which may help to the production of platelets or immunosuppressant therapy, such as rituximab (Rituxan, Truxima) or (CellCept, Myfortic). In very severe cases, doctors may consider surgery to remove your spleen (splenectomy) if other treatments do not work. More information at The Platelet Disorder Support Association Chronic Lymphocytic Leukemia (CLL) is a type of cancer of the bone marrow and blood. It is also called chronic lymphoid leukemia or small lymphocytic lymphoma. Learn more about CLL Chronic myeloid leukemia (CML) is a type of cancer of the bone marrow and blood. It is also called chronic myelogen leukemia or chronic myelocytic leukemia. Learn more about CML Deep vein thrombosis (DVT) is a blood clot that forms in a vein deep in the body. It most often occurs in the lower abdomen or thigh, but can happen in other parts of the body as well. DVT can occur for several reasons, including damage to a vein, such as from a fracture or surgery, or slow blood flow, such as from lying in bed or sitting for long periods of time. Other risk factors include: Being pregnant Taking birth control pills or hormone replacement for menopause Overweight During cancer Has an inherited condition that increases your tendency to form blood clots or decreases your ability to dissolve them Many patients with DVT have more than one risk factor, but some patients may have DVT without any known risk factors. If a blood clot in a deep vein breaks loose, it can travel through your bloodstream. A blood clot that moves is called an embolus. Blood clots in veins travel towards your lungs. If a blood clot reaches your lungs and blocks blood flow there, the condition is called pulmonary embolism (PE). PE can damage your lungs or be fatal. Diamond-Blackfan anemia (DBA) occurs when your bone marrow cannot make red blood cells as it should. Red blood cells are essential for transporting oxygen from the lungs to the rest of the body. At SCCA, our team of experts offers comprehensive diagnostic and medical treatment for adults with DBA. We are also working closely with our colleagues at Seattle Children's Hospital to care for children with DBA and to switch them from pediatric care to adult care when they are ready. What is Diamond-Blackfan anemia? DBA is a genetic blood disorder that causes anemia and other abnormalities. It belongs to a group of disorders called hereditary bone marrow failure syndromes. In these disorders, the bone marrow cannot make enough healthy blood cells. People with DBA have an increased risk of certain cancers. They can also be born with malformations of the heart, genitourinary system and other parts of the body. DBA is caused by a problem with ribosomes, structures in your cells that play an important role in building proteins in the body. Mutations in ribosomal protein genes account for many DBA cases. Most often, people with the disorder inherit the abnormal gene from a parent. In other cases, a gene mutation occurs in a person without DBA family history. Symptoms and diagnosis of Diamond-Blackfan anemia Most people with DBA are diagnosed before age 1. DBA is however diagnosed in older children and adults. People with DBA typically have symptoms of anemia, such as fatigue or decreased energy, shortness of breath and pale skin. Some are short in stature, and they may be born with traits such as thumb abnormalities, distinctive facial expressions and congenital heart disease. In some people with DBA, a physical exam and lab tests reveal no signs or only subtle signs of the disease. SCCA offers a full range of dba diagnostic services. Your doctor may order some or all of the following: Blood tests - A complete blood count (CBC) and reticulocyte (immature red blood cells) count can help find the cause of anemia. In DBA, these tests show an abnormally low number of red blood cells. Occasionally, white blood cells and platelet numbers are also low. A low reticulocyte counter shows that your bone marrow does not make new red blood cells and release them into your bloodstream, as it should in response to anemia. Bone marrow aspiration and biopsy — Using a hollow needle, small bone marrow samples are taken under local anaesthetic. This allows your doctor to study your blood cell development. In DBA, doctors look for a low level of red blood cell precursors in your bone marrow. Precursor cells are stem cells that will divide to form a specific type of blood cell, such as a red blood cell. Other tests – You may have genetic tests to find mutations in DBA genes and to rule out mutations in genes associated with other hereditary types of anemia. Your doctor may also recommend other blood tests. Diamond-Blackfan anemia treatment SCCA's team of physicians provides a comprehensive range of treatment options for DBA. Corticosteroids An initial course of corticosteroid therapy increases the production of red blood cells in many people with DBA. The dosage is gradually lowered to maintain enough red blood cells while limiting side effects, such as high blood pressure, diabetes, slowed growth, low bone density and increased risk of infections. Red blood cell transfusions If you do not respond to corticosteroid therapy or you have significant side effects from steroids, the main treatment is red blood cell transfusions. If you get repeated transfusions, you may develop iron accumulation and may need medication to remove the excess iron from the body (chelation therapy), as well as tests to check for organ damage from excess iron. Bone marrow transplantation For some people with DBA, doctors consider blood or bone marrow transplantation (also called stem cells or hematopoietic cell transplantation), a procedure that replaces your hematopoietic (blood-forming) stem cells with the cells of a healthy donor. A transplant cures the blood-related abnormalities in the DBA. The Fred Hutch Bone Marrow Transplant Program at SCCA has performed more bone marrow transplants than any other institution in the world. Interdisciplinary care Because DBA and its treatments can affect many organ systems and affect your lifestyle, care involves Team. Based on your health needs, your team may include hematologists, internists, psychiatrists, psychologists, surgeons, cardiologists, endocrinologists, nurses, social workers and physical and occupational therapists. Dyskeratosis medgenita (DKC) is a genetic disease. It can cause low levels of red blood cells, white blood cells and platelets as well as other abnormalities including skin and nail changes and a predisposition to cancer. At SCCA, our team of experts offers comprehensive diagnostic and medical treatment to people with DKC. What is dyskeratosis medgenita? DKC belongs to a group of disorders called hereditary bone marrow failure syndromes. In these disorders, your bone marrow may not make enough healthy blood cells. DKC can also affect many other parts of the body. It is caused by a problem with the body's ability to maintain telomers, structures at the ends of your chromosomes. Symptoms and diagnosis of dyskeratosis medgenita DKC can be difficult to diagnose because people with the disease experience different symptoms that show up at different times in their lives. Most people with DKC have cytopenias, low levels of blood cells because their bone marrows do not produce enough blood cells. This can worsen over time and lead to bone marrow failure. You may also experience premature hair graying, hair loss, tooth abnormalities and problems with the lungs (like pulmonary fibrosis) or digestive system. Some people may have learning difficulties or mild to moderate developmental delay. Other signs and symptoms may include: A lacy-looking rash on your face, neck and chest Ridged, cracked and weakened nails White spots inside the mouth and upper neck (leukoplakia) People with DKC have an increased risk of cancer of the tongue, mouth, throat, stomach, colon, rectum, and blood and bone marrow. SCCA has experts in recognizing this disorder and offers a wide range of services to diagnose it. Your doctor will ask about your medical history and perform a physical exam looking for signs of DKC. Next, the doctor may order some of the following: Blood tests - A complete blood count (CBC) is done to check your level of each type of blood cell. Bone marrow aspiration and biopsy — Using a hollow needle, small bone marrow samples are taken under local anaesthetic. This allows your doctor to study your blood cell development. Other tests — You may have genetic tests to find mutations in DKC genes and rule out mutations in genes associated with other hereditary bone marrow failure syndromes. Your doctor may recommend other blood tests to measure the length of your telomerer. Telomeres are exceptionally short in many people with DKC. Dyskeratosis congenital treatment SCCA's team of physicians offers a wide range of treatment options for DKC and has expertise in the medical monitoring that people with DKC need. Care aims to address health problems associated with DKC; monitoring for complications, such as lung problems cancer; cancer; treatment of bone marrow failure or cancer if it occurs. Medications Doctors can treat bone marrow failure with medications that help increase your blood cell blood cell content. These include: Oxymethalone (Anadrol) — an anabolic steroid used to improve your red blood cell Erythropoietin (Epogen, Eprex, Procrit) - a drug that helps your bone marrow make more red blood cells Filgrastim (Neupogen) - also called granulocyte colony-stimulating factor, or G-CSF, a drug that helps your bone marrow make more white blood cells Bone marrow transplant So far, the only cure for bone marrow failure is blood or bone marrow transplantation (also called stem cell or hematopoietic cell transplantation). Transplants can cure bone marrow failure, but they do not cure other problems caused by DKC, such as problems with the digestive system and lungs. The Fred Hutch Bone Marrow Transplant Program at SCCA has performed more bone marrow transplants than any other institution in the world. For people with DKC, our team uses reduced-intensity conditioning regimens that we have developed specifically to reduce transplant complications. Interdisciplinary care Because DKC can affect many organ systems and affect your lifestyle, care at SCCA involves an interdisciplinary team. Based on your health needs, your team may include hematologists, internists, psychiatrists, psychologists, surgeons, cardiologists, endocrinologists, nurses, social workers and physical and occupational therapists. Eosinophilic disorders are blood disorders typically characterized by too many eosinophiles - a type of white blood cell - in the bloodstream and sometimes by the presence of eosinophiles in organs or tissues where they are not normally found. At the Seattle Cancer Care Alliance (SCCA), our team of experts provides comprehensive diagnostic and medical treatment for people with eosinophilic disorders. What is eosinophilia? Eosinophiles generally account for less than 5 percent of white blood cells circulating in the bloodstream. They help fight certain infections and they are involved in hypersensitivity reactions in the immune system. The number of eosinophiles in the blood can increase during a normal response to allergic reactions, fungal and parasitic infections, medications, and some types of cancer. An abnormal increase in eosinophilia, called eosinophilia, may be due to an acquired genetic defect in the cells that make eosinophiles (bone marrow precursor cells), or it may occur as an inappropriate response from the body to immune cells called T lymphocytes (T cells). Eosinophilia also can occur in conjunction with myeloproliferative neoplasms and lymphocysis disorders. What is hypereosinophilic syndrome? Conditions in the group of disorders known as hypereosinophilic syndrome (HES) develop when the body consistently and inappropriately produces a large number of eosinophiles without apparent underlying allergic or drug reaction or other triggers. Although it may affect someone, is more common in over 50. An unnecessary excess of eosinophiles can infiltrate and affect any organ in the body, especially the gastrointestinal tract, skin, lungs, heart, and liver. Symptoms and diagnosis of eosinophilia & hypereosinophilic syndrome Symptoms of HES depend to a large extent on the affected organs, the severity of the disease and any associated medical conditions. Common red flags include fever, rash, itching, cough, wheezing, shortness of breath, diarrhea, abnormal blood counts, and enlarged lymph nodes or organs. Because many different problems can cause a large number of eosinophiles in the blood, eosinophilia alone is not enough to diagnose HES. Instead, doctors consider several factors, including the degree and duration of eosinophilia and affect on organs. SCCA offers a full range of services for diagnosing eosinophilia and HES. Doctors use blood tests, biopsies of affected organs, and sometimes a bone marrow biopsy (examining a small sample of marrow taken with a hollow needle) to try to identify the underlying cause of the high eosinophilic level. To rule out allergic or drug reactions that may affect eosinophilic levels in the blood, your doctor may ask you to temporarily stop taking certain medications or supplements. You can also undergo allergy testing. If these steps do not reveal an underlying cause and your doctor suspects you have HES, you may have genetic tests to look for abnormal bone marrow precursor cells and abnormal T cells. Eosinophilia & hypereosinophilic syndrome treatment SCCA's team of physicians provides a wide range of treatment options for eosinophilia and HES. While treatments vary depending on the organs involved and the severity of symptoms, the goals remain the same: To reduce the number of eosinophiles To prevent organ damage To slow disease progression Your doctor may prescribe drugs that suppress the growth of eosinophiles, the effect of eosinophiles, or abnormal T cells if present. Systemic corticosteroids are often needed to combat severe rashes, water retention, and other systemic symptoms. In some patients, corticosteroids alone are enough to control the condition; others need stronger immunosuppressive treatments. In essential thrombocythemia (ET), your body has too many platelets - fragments of cells that help your blood to clot. At SCCA, our team of experts provides comprehensive diagnostic and medical treatment along with ongoing monitoring and support for people with ET and related blood disorders. What is essential thrombocythemia? ET is a type of myeloproliferative neoplasm (MPN) - the name of a group of diseases where a bone marrow problem leads to increased levels of blood cells circulating in the bloodstream. In ET, your bone marrow has too many immature cells (precursors) that turn into platelets. Your levels of white blood cells and red blood cells (hemoglobin/hematocrit on a blood test) may also be high in ET. Excess platelets lead to health problems, such as bleeding problems and Blood clots increase your risk of stroke and heart attack. About 5 in 100 people with ET later develop acute leukemia. About 15 out of 100 develop scarring in their bone marrow, called myelophibrose. Essential thrombocythemia is sometimes called primary thrombocythemia or idiopathic thrombocythemia. Symptoms and diagnosis of essential thrombocythemia Many people with ET have no symptoms when their disease is diagnosed. But a routine blood test can show high levels of platelets. Symptoms can develop as the number of platelets increases. ET symptoms may include: Headache Changes in vision Feeling dizzy or cloudy cold fingers or toes Burning, pain and redness in hands and feet Slight bruising or bleeding If ET leads to blood clots, it can cause stroke, transient ischemic attack, heart attack, deep vein thrombosis or pulmonary embolism. In addition to detecting abnormal blood counts during routine testing, your doctor may suspect ET if you have noticeable signs or symptoms. To confirm the diagnosis, you may need additional blood tests – including tests to check for gene mutations, such as JAK2 or CALR, which are common in ET – and testing your bone marrow. Learn more about diagnosing MPNs. Essential thrombocythemia treatment If you do not have any symptoms, you may not need active treatment right now. However, it is important to see your doctor regularly to monitor your condition. This procedure is called watchful waiting. ET is a chronic disease can get worse over time. SCCA's team of physicians provides a comprehensive range of treatment options for ET, including: Aspirin — used at low doses to reduce blood clot risk Hydroxyurea — a mild chemotherapy drug used to reduce your chance of blood clots if you are at high risk Anagrelide (Agrylin) — a drug that can reduce the number of platelets if hydroxyurea is not right for you Interferone — another drug that may reduce blood or bone marrow transplantation may be an option for people with severe or advanced MPNs, such as those with severe or advanced MPs. This is currently the only form of treatment that has the potential to cure MPNs. The Fred Hutch Bone Marrow Transplant Program at SCCA has performed more bone marrow transplants than any other institution in the world. Fanconi anemia (FA) is a rare, inherited blood disorder that causes your bone marrow to stop making enough new blood cells for the body to function normally. It can also cause your bone marrow to make many abnormal blood cells, which can lead to serious health problems, such as cancer. Fa can affect many of the body's organs, tissues and systems. Children who inherit the FA are at higher risk of being born with birth defects. People with FA are at higher risk of some cancers and other serious health problems. As an inherited disease, children can be tested if one of their brothers or sisters has the disease. Symptoms Anemia Bone marrow failure Birth defects in bones, eyes, ears, skin, kidneys, heart Developmental or eating problems Other symptoms of FA are related to physical physical mental development: Low birth weight Poor appetite Slower growth than other children Lower than normal height Small head size Mental retardation or learning difficulties Symptoms of adult FA in women include: Female genitalia that are less developed than normal Menstruation starts later than women who do not have FA Menopause starting earlier than women who do not have FA Difficulty getting pregnant and carrying a pregnancy to full term Symptoms of Adult FA in Men : Male genitalia are less developed May be less fertile than men who do not have the disease. Gaucher (pronounced go-SHAY) disease leads to the lack of an enzyme that breaks down a certain fat (lipid) in the body. The deficiency in turn leads to a build-up of cells swollen with the fat. These swollen cells displace normal cells in some organs and tissues. At SCCA, our team of experts provides comprehensive diagnostic and medical treatment along with ongoing monitoring and support for people with Gaucher disease. What is Gaucher's disease? Gaucher disease is an inherited genetic disorder caused by a mutation in the GBA gene. The abnormal gene reduces or stops the effect of an enzyme called beta-glucocerebrosidase. Usually, this enzyme breaks down a fat (glucosylceramide) and converts it into two components (glucose and ceramide) that we can easily treat. Without enough of the enzyme, high levels of the fat build up in cells in the spleen and liver, which are being enlarged. Both parents must carry the abnormal gene to pass Gaucher disease on their child. Symptoms and diagnosis of Gaucher disease There are three types of Gaucher disease. The most common, known as type 1 Gaucher disease, can cause an enlarged spleen and liver, anemia, slight bruising, decreased blood clots, lung disease, bone pain and fractures. Types 2 and 3 cause the same symptoms as type 1, but they also affect the central nervous system (brain and spinal cord) and can affect eye movements and cause seizures and brain damage. To diagnose Gaucher disease, doctors perform a blood test to assess enzyme activity. After the first diagnosis, many people have genetic tests to identify specific mutations in the GBA gene. This helps doctors create an effective treatment plan, and it helps families build a history of genetic traits. Gaucher disease treatment Treatment of Gaucher disease focuses on replacing the deficient enzyme or reducing the formation of the fatty substance that builds up. In most cases, people with Gaucher disease receive long-term enzyme replacement therapy by intravenous infusion every two weeks. In addition, some people respond well to medicines taken by mouth (miglustat [Zavesca] and eliglustat [Cerdelga]), which reduces the formation of glucosylceramide. More information at the National Gaucher Foundation Hemochromatosis is a disease where too much iron builds up in your body. Primary hemochromatosis, also called hereditary hemochromatosis (HHC), is hereditary disease where your body absorbs extra iron and cannot get rid of it. Secondary hemochromatosis, commonly known as secondary iron accumulation, can develop after repeated red blood cell transfusions or as a complication of certain hereditary or acquired anemias. At SCCA, our team of experts offers comprehensive diagnostic and medical treatment along with ongoing monitoring and support for people with HHC or secondary iron accumulation. What is hemochromatosis? Your body needs iron to make red blood cells. Iron is a critical component of hemoglobin, the molecule in red blood cells that transports oxygen to your tissue. Iron is also involved in enzymes that help convert blood sugar into energy in your cells, especially muscle cells. It plays a crucial role in producing new cells and recovering from disease. In HHC, a genetic defect causes your body to absorb more iron from food than you need – many times more. The profits are stored in the body, especially in your liver. Your heart, pancreas, joints, skin and endocrine glands can also store extra iron. Secondary iron accumulation usually develops with or as a complication of the following disorders, especially when they require frequent red blood cell transfusions: Severe aplastic anemia Myelodysplastic syndromes Moderate to severe thalassaemia Sickle cell disease Chronic hereditary bone marrow failure syndromes Chronic acquired bone marrow disorders If iron overload increases to toxic levels, it causes organ damage. Iron overload can make you susceptible to diseases such as cirrhosis, heart arrhythmia, heart attack, diabetes, bone and joint abnormalities and hormone deficiencies or even cause organs to fail. Symptoms and diagnosis of hemochromatosis HHC do not always cause signs, symptoms or serious problems. Still, it's important to diagnose the condition early so that doctors can monitor any effects that develop and prevent or handle organ damage. Joint pain and chronic fatigue are the most common symptoms of hemochromatosis. Other symptoms include: Abdominal Memory Lapses Heart palpitations Impaired sex drive To definitively diagnose hereditary hemochromatosis doctors check both your iron stock levels and your iron saturation percentage. Doctors also perform genetic tests to confirm or rule out hereditary hemochromatosis in patients who have symptoms or who have unexplained high iron levels. Hemochromatosis treatment The goal of treatment for hereditary hemochromatosis and secondary iron accumulation is to lower the level of iron in the body to avoid organ complications. With HHC, this is usually done by removing blood through therapeutic phlebotomy (TP), which is the same process used when donating blood, except that it occurs under a doctor's care. The number of times you need TP depends on your iron levels. Because secondary iron accumulation is often associated with severe anemia and repeated blood transfusions, TP not be used to remove excess iron in these cases. Instead, you can Need iron-binding medications to help your body secrete iron, a treatment called chelation therapy. Rarely, chelation therapy can also be used for HHC. Once your iron level has come down to normal, your doctor will develop a personalized running plan for you that may include getting your iron level tested regularly, taking TP and limiting the amount of iron you get through your diet. For detailed information on hemochromatosis research and support groups, visit the hemochromatosis website Iron Disorders Institute. Hemochromatosis Website Hemolytic Anemia is a condition in which red blood cells are destroyed before they reach the end of their normal lifespan. At SCCA, our team of experts provides comprehensive diagnostic and medical care for people with this and other forms of anemia. What is hemolytic anemia? Red blood cells are essential for transporting oxygen from the lungs to the rest of the body. Usually these cells survive for about four months. The bone marrow makes new red blood cells as needed and releases them into the bloodstream. In hemolytic anemia, the life span of red blood cells is significantly shortened because a mechanism either within the red blood cells or elsewhere in the body destroys the cells. (Destruction of red blood cells is called hemolysis.) As a result, the bone marrow must work harder than usual to replace these cells. Usually in hemolytic anemia, the bone marrow makes and releases red blood cells as it normally would, but these cells are later destroyed in the bloodstream, spleen, or liver. Hemolytic anemates can be divided into immune and non-remunerated forms. Immune hemolytic anemias are caused by antibodies generated by the patient's own immune system. Nonimmune hemolytic anemias can be caused either by defects in the red blood cells (as in thalassaemia, sickle cell disease, and hereditary sphericality) or by factors outside the red blood cells (such as when cells are destroyed by a mechanical heart valve). Symptoms and diagnosis of hemolytic anemia A doctor may suspect hemolytic anemia based on typical anemia symptoms, such as fatigue or decreased energy, shortness of breath, and pale skin, and the results of a complete physical exam. The condition is usually confirmed through blood tests. However, diagnosing the type and specific cause of anemia requires clinical expertise and advanced testing methods, some of which are only offered at institutions like SCCA, where you have access to world-class doctors and laboratory studies. Because hemolytic anemia can occur along with an underlying disease, such as lymphoma, doctors may include further studies, like imaging studies and a bone marrow biopsy (examining a small sample of the marrow taken with a hollow needle), to detect underlying disease. Hemolytic anemia treatment SCCA's team of physicians provides a comprehensive range of treatment options for all forms of hemolytic anemia. The goal of therapy is to increase the red blood cells to a safe level. Treatment depending on the cause of hemolysis. For example, when hemolysis is caused by an immune system attack on red blood cells, doctors can use steroids, intravenous immune globulin, or surgical removal of the spleen (splenectomy) to slow or stop red blood cell destruction. Haemophilia is a genetic disorder that prevents the blood from clotting normally. At SCCA, our expert team of physicians works closely with Bloodworks Northwest to provide comprehensive diagnostic and treatment options for people with haemophilia. What is haemophilia? Haemophilia is a deficiency of factor VIII (8) or factor IX (9). These proteins, or clotting factors, activate blood clots. People born with too little factor VIII have hemophilia A. Those without enough factor IX have hemophilia B. Hemophilia ranges from mild disease, which can be diagnosed in later childhood or adulthood, if there is no family history, to serious illness, which is usually diagnosed at age 2. The genes for both factor VIII and factor IX are on the X chromosome. Males who typically have an X and a Y chromosome, and females that typically have two X's, can both carry the gene that causes the disease. Men are usually more seriously affected. Females usually have milder symptoms and may have no symptoms at all. Anyone with a haemophetia can pass it on to their children. Symptoms and diagnosis of hemophilia People with mild hemophilia bleed more than expected during surgery or dental treatments or after an injury. They rarely have bleeding for no obvious reason. Patients with moderate and severe hemophilia (factor levels less than 5 percent of normal) may have recurrent bleeding in their joints and life-threatening internal bleeding, including entering the brain - even in situations that would not cause bleeding in a person with healthy clotting. Doctors most often diagnose hemophilia after a bleeding episode or due to a family history of the condition. In some cases, a pre-surgical blood test (partial thromboplastin time, PTT) may detect it. This screening test measures how long blood takes to clot. More specific tests can determine whether a long clotting time is due to haemophilia. A more common, usually milder, bleeding disorder called von Willebrand disease may resemble hemophilia. It is caused by problems with a clotting protein called von Willebrand factor. If your doctor suspects that you may have von Willebrand disease, they will order tests to confirm it because treatment for bleeding disorders depends on which protein is missing or defective. Haemophilia treatment The main treatment for haemophilia is substitution treatment with concentrated clotting factors. Regular infusions of blood clotting factor, which can be done at home, allow people with severe hemophilia to lead normal, active lives. For people with milder diseases who do not need regular infusions, replacement therapy is given before operations and other

procedures that may cause bleeding or response to bleeding sepsis. If you have mild mild A, doctors may prescribe medication desmopressinacetate (DDAVP). It causes cells in the lining of your blood vessels to release stored factor VIII, increasing the level of blood. You may also need medications that prevent the breakdown of blood clots (antifibrinolytic treatment). Some people with hemophilia develop antibodies to transfused clotting factors. The antibodies destroy the factors, making them less effective. If doctors detect antibodies to factor VIII in the blood, they may prescribe a special high-dose regimen of factor to reduce the antibody response and use alternative treatments to treat bleeding. Hereditary spherical is a genetic disorder that causes your red blood cells (RBCs) to change shape and become less flexible. These changes hinder the ability of cells to travel through your bloodstream and can lead to anemia, jaundice and an enlarged spleen. At SCCA, our team of experts provides comprehensive diagnostic and medical care for people with hereditary spherism. What is hereditary sphericality? Hereditary sphericality is caused by changes in genes that control important proteins in and on the membranes around your RBCs. The mutated genes provide instructions that weaken the cell membranes and change your RBCs from flat discs to rounder balls. The new form makes it difficult for your RBCs to pass from large arteries into narrow blood vessels, especially small capillaries. Your spleen captures and destroys the malformed cells. As a result, you have fewer red blood cells in circulation and you may develop anemia. Symptoms and diagnosis of hereditary spherical spherocytosis Hereditary Sphericality may be mild, moderate or severe. Most people with the condition develop hemolytic anemia, and people with moderate to severe forms may experience jaundice (yellowing of the skin), gallstones and an enlarged spleen (splenomegly). Doctors diagnose hereditary sphericality by testing your blood to check the number, shape and maturity of your RBCs. If more information is needed, your doctor may order a flow cytometry analysis of your RBCs or an osmotic frailty test to measure the fragility of cell membranes. Hereditary spherocytosis treatment Since there is currently no known cure for hereditary spheroid, doctors treat the condition by focusing on ways to limit symptoms and ensure your body makes enough red blood cells. SCCA's team of physicians provides a wide range of treatment options. Anemia, the most common symptom of the condition in its mildest form, is often treated with folic acid supplements that facilitate RBC production. For more severe anemia, you may need blood transfusions. People with a much enlarged spleen may need surgery to remove their spleen (splenectomy). IBMFS is a group of rare hereditary diseases with varying defects in the production of red blood cells, white blood cells, and/or platelets leading to low blood counts. Patients with some OF the IBMFS are at risk of developing both solid tumour cancer. Many of these patients also have typical changes in their physical appearance and dysfunction in several organ systems apart from the bone marrow. There are several different types of IBMFS, for example, Diamond-Blackfan Anemia, Dyskeratosis Congenita, Fanconi Anemia, and Schwachman-Diamond Syndrome. IBMFS was traditionally diagnosed in children, but with the advent of new laboratory and genetic tests, hematologists are now recognizing these disorders in adult patients presenting with abnormal blood counts or other findings. Additionally, children with these hereditary disorders now survive to adulthood and switch their care to adult hematologists. Diagnosis and process Diagnosis of one of IBMFS is made through careful consideration of a patient's history, including a detailed family history of any problems with blood counts, typical physical findings, or cancer predisposition, along with a thorough physical exam to evaluate for clinical results seen in IBMFS. In patients with a suggestive history and physical exam, bone marrow examination and further laboratory studies are important elements of diagnostic work reprocessing; the results provide an appropriate selection of further tests. All results should be interpreted carefully within the context of the entire clinical picture of the patient and the patient's family. It is important that the new diagnosis of any of IBMFS in adult patients requires adult hematologists to continue to think again of the possibility that an inherited disease may not come to medical attention until the patient reaches adulthood. Anemia occurs when your body has too few red blood cells. Iron deficiency anemia is the most common form of the condition. At SCCA, our team of experts offers comprehensive diagnostic and medical treatment for people with many types of anemia, including this type. What is iron deficiency anemia? Iron-deficiency anemia happens if your body loses more iron than usual or you don't get enough iron through your diet. Your body can lose iron if: You bleed - even if the blood loss is slow and you don't realize it. Your body has trouble absorbing iron due to a bowel surgery you have had or due to another condition, such as celiac disease. Some diets, such as vegetarian diets, can be low in iron and lead to iron deficiency if followed strictly over many years. Red blood cells contain hemoglobin, an iron-rich protein that gives the blood its red color. Hemoglobin allows blood cells to transport oxygen from your lungs to the rest of your body. When your iron level is low, this process is impaired and your tissue doesn't get as much oxygen as they need. Symptoms and diagnosis of iron deficiency anemia When your blood cannot deliver enough oxygen throughout your body, you may feel weak, dizzy or short of breath with activities that would not normally be challenging for you, such as walking up the stairs. In the case of iron deficiency anemia specifically, often notice unusual symptoms, most commonly craving for ice chips, burning in the mouth, hair loss or restless leg syndrome. If your anemia is mild or develops slowly over a long period of time, you may not notice any symptoms at all. SCCA offers a full range of services to diagnose anemia and determine the cause. Your doctor will ask about your medical history and examine you. They can diagnose low iron with simple blood tests, including a complete blood count with blood smear and iron studies (iron, iron binding capacity, transferrin saturation and ferritin). A bone marrow biopsy can help doctors assess your iron stores, but this is rarely necessary to diagnose iron deficiency. If you are low on iron, your doctor will look closely at determining the cause. You may need multiple blood tests or gastrointestinal procedures, such as an endoscopy or colonoscopy, to check for internal bleeding from a wound, polyp or other condition. Iron deficiency anemia treatment To rebuild the body's iron stores, you need iron supplements in pill form. There is also an option to get supplemental iron through an intravenous (IV) line if you cannot absorb enough iron from pills. If your doctor finds a cause of your iron deficiency, such as bleeding, you should also receive treatment to correct it. SCCA's team of physicians provides a full range of treatment options for anemia and the conditions that can lead to it. Langerhan cell histiocytosis is a rare blood disorder that is caused by an excess of white blood cells called histiocytes, which cluster together and attack skin, bones, lung, liver, spleen, gums, ears, eyes, and/or brain. The disease can range from limited involvement, which spontaneously dates back to progressive multiorgan involvement, which can be chronic and debilitating. In some cases, the disease can be life-threatening. Who gets LCH? Histiocytosis is more common in children than adults and affects 1 in 200,000 children born each year in the United States, although it can affect adults of all ages. The cause is not known in most cases. But in cases where only the lungs are involved, smoking has been heavily implicated. Symptoms and diagnosis of LCH LCH may present increased thirst and urination (diabetes insipidus) due to the involvement of an area of the brain called the pituitary gland. Other symptoms may include bone pain, especially the lower jaw, skin rash, cough or shortness of breath, weight loss, fever, and enlarged lymph nodes or spleen. The diagnosis of LCH requires a biopsy of an affected area. Biopsy is best reviewed by major academic centers as it is rare and results can be subtle. Treatment of LCH LCH is best treated at large institutions like the Seattle Cancer Care Alliance, where there will be doctors who have experience in treating this rare disease. Since it is so rare in adults, there is little research on its cause and treatment, and no standard treatment is available. Many adult treatments are based on who have been successful in treating the treatment but the results have not been good. Once the disease is localized to one or two areas, surgery and/or radiotherapy have been used. Patients with mild symptoms can be managed with steroids and some will improve without treatment. When only the lungs are involved, quitting smoking has resulted in some cures. For patients with more extensive illness and/or severe symptoms, chemotherapy is required. Hematopoietic stem cell transplantation should also be considered for patients who have a poor response to chemotherapy. Large granulated lymphocytic (LGL) leukemia is a type of chronic leukemia affecting white blood cells. At SCCA, our team of experts offers comprehensive diagnostic and medical treatment for people with LGL. In people with leukemia, the bone marrow produces abnormal (leukemia) blood cells. Learning more leukemia leukemia is the term for a low level of white blood cells. White blood cells fight infections and disease in the body. At SCCA, our team of experts offers comprehensive diagnostic and medical treatment for people with leukopenia. SCCA hematologists work closely with all our doctors to care for people whose health is affected by low white blood cells. What is leukopenia? A low number of white blood cells means that the bloodstream contains fewer infection and disease-fighting cells (leukocytes) than normal. Mild leukopenia is not uncommon among people from certain ethnic backgrounds, such as Africans and African Americans. If leukopenia is not related to normal differences among humans and is more severe, you may develop certain infections and diseases more easily because your immune system is not as strong as normal. White blood cells are made in the bone marrow, so a medicine, disease or viral infection that inhibits or slows down bone marrow function can cause the number of white blood cells to fall below normal levels. Leukopenia can also occur as a result of a chronic condition, such as a deficiency of vitamin B12 or folic acid, an autoimmune disease or a bone marrow disease, such as aplastic anemia, leukemia or myelodysplastic syndrome. Some drugs, including chemotherapy used for cancer and antibiotics, and certain other treatments, like radiotherapy, can cause leukopenia too. Symptoms and diagnosis of leukopenia Leukopenia symptoms can include fever, inflammation in and around the mouth, frequent infections and infections that do not go away. Sometimes doctors detect leukopenia before any symptoms occur - during blood work that is done for some other reason or during a routine blood test. Leukopenia can be a sign of many other diseases, so SCCA doctors are careful to look beyond the white blood cells to determine if leukopenia is the root problem or is caused by an underlying bone marrow disease or treatment for a disease. To further assess and diagnose the cause of leukopenia, your doctor will do a thorough physical exam, a complete blood count (CBC) and other blood tests as needed, such as flow cytometry, cytometry, viral studies and autoimmune markers. If blood tests cannot confirm a diagnosis, your doctor may order a bone marrow biopsy to learn more about your condition. If you receive treatment through SCCA for cancer or certain non-immunosupgic blood, bone marrow or other ailments, your doctor may check your blood regularly to detect any decreases in your blood cells. Depending on the level and cause, you may need changes to your treatment plan or need additional treatments to improve your blood counts. Leukopenia treatment When your doctors understand the cause of your low number of white blood, they will recommend treatment options to correct leukopenia and prevent infections in the meantime. Treatment may include taking a drug called a growth factor that stimulates your bone marrow to produce new, healthy white blood cells. Your doctor may also recommend vitamins or other procedures to stimulate your bone marrow and strengthen your immune system. You may need antibiotics to ward off infection. Mastocytosis is a group of rare diseases caused by the presence of too many mast cells, or (mastocytes), which are part of the immune system. They are located in connective tissue, including the skin and other areas. They release histamines into the body that alert other immune systems and are thought to play a role in wound healing. No one with too few or no mast cells has been found, leading doctors to believe that people cannot survive without mast cells. In rare cases, chemicals released by mast cells cause changes in the immune system, leading to typical allergy symptoms such as: itching, stomach cramps or anaphylaxis (shock from allergic or immune causes). The increased number of mast cells in the tissues of mastocytosis is due to acquired genetic mutations in a protein called c-kit. Since this disease is an abnormally increased growth of genetically abnormal blood cells, mastocytosis is classified as a myeloproliferative neoplasm (MPN). Symptoms and diagnosis When too many mast cells are found in the body, skin lesions may occur, like stomach discomfort, low blood pressure, fainting, bone or muscle pain, nausea and vomiting. The diagnosis can be expected from the clinical history and physical exam results. Blood and urine samples are useful for making the diagnosis and detecting the proteins produced by the mast cells called tryptase and histamine. Biopsies of affected tissues are necessary to make the diagnosis. A bone marrow biopsy is commonly done to demonstrate more widespread, or systemic, disease. Specific tests are performed on biopsy samples to detect the common mutation in the c-kit protein. Treatment Most cases of mastocytosis in adults are systemic (involving multiple sites), but are mild and do not require much treatment. Treatments aim to prevent the effects of the released disease mediators such as anti-histamines. Other medications stabilized the mast cells. Rarely have organ involvement causing low blood count, liver failure and malnutrition. For these patients, steroids and chemotherapy can be used, but there are currently no good treatments. Newer drugs are being developed that work on mutated c-kit or similar proteins. Doctors at the Seattle Cancer Care Alliance are participating in clinical trials to test these drugs. In monoclonal gammopathy of indeterminate importance (MGUS), your body makes an abnormal protein that circulates in the blood. This protein rarely causes problems. However, it may be a sign that you have another condition that needs treatment. Over time, MGUS can give rise to a serious disease, like multiple myeloma. At SCCA, our team of experts offers comprehensive diagnostic and medical treatment, including ongoing monitoring and support, to people with MGUS and related blood disorders. What is MGUS? MGUS is a condition in which plasma cells, a type of white blood cell in the bone marrow, begin to make an abnormal monoclonal protein or M protein. About 3 percent of the population over 50 has MGUS. It can occur along with a number of other conditions, such as osteoporosis, neuropathy and blood clots. In about 1 percent of cases per year, MGUS develops into multiple myeloma or another malignant blood disorder. Symptoms and diagnosis of monoclonal gammopathy Typically MGUS does not cause symptoms. Doctors usually detect it during routine blood work or tests to examine another condition you have. If the first tests show M protein, your doctor will order additional blood tests and possibly urine tests to see how M protein affects your body and to check for associated conditions. SCCA offers a wide range of services to diagnose MGUS and any related health problems you may have. When symptoms of MGUS occur, they vary depending on the effects of the M protein and any associated condition. Symptoms may include: Anemia-related symptoms, such as fatigue and weakness Bone or soft tissue pain Tingling or numbness in your feet or hands Recurrent infections Increased bruising or bleeding Weight loss Headache Vision problems MGUS treatment MGUS itself is not harmful, so it usually does not warrant treatment if it does not cause symptoms. However, because MGUS can develop into a more serious condition, it is important to closely monitor your health and level of M protein to detect and treat any problems that may arise. This procedure, called wake waiting, usually means seeing your doctor regularly for physical exams and blood work. It is also important to let your health team know between checkups if you develop new symptoms. SCCA's team of physicians provides regular monitoring for people with MGUS, as well as a wide range of treatment options for related conditions, including malignant diseases like multiple myeloma. Multiple myeloma is a or hematological, cancer that can affect your bones and kidneys as well as your levels of healthy blood cells. Learn Learning About Multiple Myelodysplastic Syndromes (MDS) is not a single disease, but a group of diseases that affect blood cell formation. In all subtypes of MDS, a chronic bone marrow problem leads to low levels of blood cells circulating in your bloodstream. Learn more about MDS Myelofibrose (MF) is a blood disorder in which fibers and blasts (abnormal stem cells) build up in your bone marrow. At SCCA, our team of experts offers comprehensive diagnostic and medical treatment along with ongoing monitoring and support for people with primary MF or MF who develop due to another condition. What is myeofibrose? Myeloofibrose is a type of myeloproliferative neoplasm (MPN) - the name of a group of diseases where a bone marrow problem leads to elevated levels of blood cells circulating in the bloodstream. In MF causes an excess of cells in the bone marrow scarring (fibrosis). This makes it hard for your marrow to produce the healthy blood cells your body needs. As a result, your body may make some blood cells in the spleen or liver to try to keep up. This can enlarge these organs. MF may occur as a result of another condition that affects your marrow, like essentially thrombocythemia or polycythemia vera, or it can happen on its own. Doctors use the name primary myelophibosis when there is no other underlying disease that causes scarring. In about 20 out of 100 patients, MF can lead to acute myeloid leukaemia. Symptoms and diagnosis of myelophibrose Some people with MF have no symptoms when their disease is diagnosed. But a routine blood test can show abnormal levels of blood cells. Or your doctor may notice signs of MF during an exam, even if you do not feel sick. Your spleen may be enlarged. Your doctor may feel this when examining your stomach. You may notice abdominal pain or fullness. You may develop anemia (low red blood cells), which can lead to weakness and fatigue. Your doctor may notice signs as brighter than normal color on your skin or mucous membranes (such as inside your mouth or lining around your eyes). MF can lead to a number of other signs or symptoms, such as slight bleeding or bruising (if you have low platelets), frequent infections (if you have low white blood cells), fever, night sweats, pain, itching and weight loss or muscle mass. To confirm the diagnosis, you may need blood tests – including tests to check for gene mutations, such as JAK2 or CALR, which are common in MF – and testing your bone marrow. Learn more about diagnosing MPNs. Myelophibosis treatment If you do not have any symptoms, you may not need active treatment right now. However, it is important to see your doctor regularly to monitor your condition. This procedure is called watchful waiting. MF is a chronic disease that can get worse over time. SCCA's team of physicians offers a comprehensive range of treatment options for MF, including JAK inhibitors, such as ruxolitinib (Jakafi) and fedratinib (Inrebic). These reduces overactive signalling by can cause the body to make too many blood cells. We also offer treatments you may need to relieve MF-related signs or symptoms, like anemia or bleeding or clotting problems. At SCCA, we also have clinical trials testing new treatments for people with MF. This is currently the only form of treatment that has the potential to cure MPNs. The Fred Hutch Bone Marrow Transplant Program at SCCA has performed more bone marrow transplants than any other institution in the world. For more information about primary MF, visit the MPN Research Foundation website. MPN Research Foundation Myeloproliferative neoplasms (MPN) are a group of diseases that affect blood cell formation. In all forms of MPN, a bone marrow problem leads to elevated levels of blood cells circulating in the bloodstream. Learn more about MPN Non-Hodgkin lymphoma (NHL) is cancer that begins in lymphocytes, white blood cells that are an important part of the body's infection-fighting immune system. Learn more About NHL Paroxysmal nocturnal hemoglobinuria (PNH) can cause unpredictable episodes of acute red blood cell destruction (hemolysis). This happens when a part of your immune system called supplement attacks red blood cells that lack certain protective proteins. At SCCA, our team of experts offers comprehensive diagnostic services, including flow cytometry, bone marrow evaluation and other special tests, as well as treatment options such as eculizumab (Soliris), a monoclonal antibody treatment, for people with PNH. What is paroxysmal nocturnal hemoglobinuria? PNH is a rare, acquired blood disorder that affects only one to two people per million. It is caused by an acquired genetic mutation in a subset of hematopoietic (blood-forming) stem cells. Hematopoietic stem cells are found mainly in the bone marrow. In PHN, the stem cells affected by the mutation and the blood cells they produce (red blood cells, white blood cells and platelets) gradually become the dominant cells in your marrow. PNH is a complex disease characterized by hemolytic crises - periods when a large number of red blood cells are destroyed. Red blood cells are essential for transporting oxygen from the lungs to the rest of the body. Stem cells with PNH mutation can also lead to ineffective production of white blood cells, which fight infection, and platelets, which help the blood to clot. Sometimes PNH occurs after healthy hematopoietic stem cells have been damaged, such as by exposure to toxins, radiation, or chemotherapy, or after the bone marrow has been suppressed by a virus or by a person's own immune system. These insults to the bone marrow can cause aplastic anemia, and PNH can occur as an outgrowth of recovery from aplastic anemia. In fact, up to 30 percent of newly diagnosed cases of PNH develop from aplastic anemia. pNH may occur spontaneously without prior bone damage. I l excessive and unexpected breakdown of red blood cells may be the only sign of the disease, with otherwise normal blood counts. PNH can lead to inappropriate blood clots (thrombosis), bone marrow failure and aplastic anemia. It increases the risk of preleukemia (myelodysplastic syndrome, MDS) and can lead to leukemia. PNH is most common in adults aged 35 to 40 years, but occasionally it affects children and adolescents or older adults. Symptoms and diagnosis of paroxysmal nocturnal hemoglobinurides hemolysis in PNH can cause acute, severe anemia associated with severe abdominal spasms, headache, back pain, weakness, occasional blood clots in unusual places in the body, and extreme fatigue. But some people with PNH experience no discomfort. The classic symptom of bloody red or brown urine (hemoglobinuria) actually occurs in less than half of those diagnosed with PNH. People with this symptom tend to describe their urine as tea or cola colored. Their urine is usually darker in the morning because it was concentrated in the bladder overnight, and clearer during the day. The discoloration occurs because damaged red blood cells leak protein hemoglobin into the bloodstream and this ends up in the urine. SCCA offers a wide range of services to diagnose PNH and related problems that can affect the bone marrow or blood cells. If your doctor suspects that you have PNH, he or she may order a series of blood tests. Flow cytometry, a highly sensitive blood test, has become standard for detection of PNH. Results from flow cytometry are usually not affected by recent blood transfusions or other factors that may alter the results of some other types of tests. In addition to flow cytometry, bone marrow biopsy (examining a small sample of marrow taken with a hollow needle) is important to understand the full nature of PNH and possible associated diseases, such as aplastic anemia or MDS. Paroxysmal nocturnal hemoglobinuride treatment SCCA's team of physicians provides a wide range of treatment options for PNH. Treatment depends to a large extent on the severity of the symptoms. Supplements and medications Some people with PNH experience no discomfort and require no treatment beyond folic acid or iron supplements to increase their production of red blood cells. For those who require more support, doctors may prescribe: Prednisone to slow down red blood cells destruction Anticoagulation medications to help prevent or treat complications from blood clots Eculizumab to help reduce the severity of hemolysis in the bloodstream, For example, you may reduce the symptoms of PNH and lower the risk of complications from blood clotting Bone marrow transplantation If you develop bone marrow failure or MDS, your doctor may recommend considering a bone marrow transplant (also called a stem cell or hematopoietic cell transplant). This procedure replaces your blood-forming stem cells with the cells of a donor. Few people with PNH need a transplant, but that's the kur. Fred Hutch Bone Marrow Transplant Program hos hos has performed more bone marrow transplants than any other institution in the world and consistently achieves survival rates that are higher than expected. Anemia occurs when your body has too few red blood cells. Perniciaous anemia is low red blood levels due to low levels of vitamin B12 (also called cobalamine). At SCCA, our team of experts offers comprehensive diagnostic and medical treatment for people with many types of anemia, including this type. What is harmful anemia? Vitamin B12 is important for many processes in the body, including cell multiplication. The production of red blood cells is particularly sensitive to low B12 levels. In perniciaous anemia, your body makes antibodies that attack cells in the stomach called parietal cells. Usually parietal cells make intrinsic factor, a protein that has to bind to B12, so your intestines can absorb this vitamin from your diet. If your parietal cells are destroyed, you don't have the inherent factor and you can't absorb enough B12 to maintain a healthy red blood cell. Red blood cells carry oxygen from the lungs to the rest of the body. When your red blood cell count is low, this process is impaired and your tissue doesn't get as much oxygen as they need. There are other reasons why your body may be low in B12, such as an imbalance in bacteria in the gut, another disease of the stomach or gut or a drug that limits how much B12 you can absorb. You can also be low in B12 if you don't get enough through your diet - for example, if you're vegan (don't eat any animal products) and you don't take B12 supplements. Low B12 for some reason can lead to anemia. Sometimes the term perniciaous anemia is used for any anemia caused by B12 deficiency; some sources use this term only for anemia caused by problems with inherent factor. Symptoms and diagnosis of perniciaous anemia When your blood cannot deliver enough oxygen throughout your body, you may feel weak, dizzy or short of breath. You may experience chest pain, rapid or irregular heartbeat, headache, cold hands and feet or pale skin. Without treatment, perniciaous anemia can lead to other health concerns, including sores or chapping in the corners of the mouth; a smooth red tongue with a reduced sense of taste; tingling or numbness from nerve damage; memory loss, dementia or other neurological conditions; heart or digestive problems. Deficiency of vitamin B12 can also lead to a decrease in other types of blood cells, such as white blood cells and platelets. SCCA offers a full range of services to diagnose anemia and determine the cause. Your doctor will ask about your medical and family history and examine you. You will have a blood test (complete blood count) to check the level of your blood cells, the amount of space your red blood cells take up in your blood (hematocrit), and the size of your red blood cells. B12 deficiency causes fewer red blood cells and a lower amount of red blood cells in the blood, but each red red cell is larger than normal. This is called macrocytosis, so this type of anemia is called macrocytic. If you have anemia, additional blood tests can help your doctor tell you what type you have. For example, blood tests can be used to check your B12 level, evaluate your body's use of B12 and look for antibodies that may be present if you have perniicide anemia. Endoscopy can also be used to check for problems in the stomach and gut that may explain decreased B12 absorption. If you want to know more about your body's ability to make healthy red blood cells, you may also need other tests. You may have a bone marrow biopsy - to remove a small sample of bone marrow to examine under a microscope. Bone marrow makes young blood-forming cells, called hematopoietic stem cells, that develop into mature white or red blood cells or platelets. You can hear doctors mention the term megaloblastic anemia. This refers to changes in your stem cells that result in larger red blood cells if you are low in B12. Perniciatic anemia treatment Treatment of perniciaous anemia requires building up and then maintaining your vitamin B12 stores. Typically, perniciaous anemia prevents normal absorption of B12 taken by mouth, so it is very likely you will need B12 supplements by injection. However, some people with perniciaous anemia can absorb some vitamin B12 orally and can take B12 in pill form. Perniotic anemia can become severe enough to require blood transfusions to increase your red blood cell level. If another condition is the cause of your lack of intrinsic factor or poor absorption of B12, you need treatment to rectify it as well. The nature and duration of treatment depends on the underlying problem. SCCA's team of physicians provides a full range of treatment options for anemia and the conditions that can lead to it. In polycythemia vera (PV), the bone marrow makes too many red blood cells. At SCCA, our team of experts provides comprehensive diagnostic and medical treatment along with ongoing monitoring and support for people with PV and related blood disorders. What is polycythemia vera? PV is a type of myeloproliferative neoplasm (MPN) - the name of a group of diseases where a bone marrow problem leads to increased levels of blood cells. At solar cells, extra red blood cells circulate in the bloodstream, making your blood thicker than normal. This usually shows up on the results of blood tests as a high hemoglobin or hematocrit level. You may also have more white blood cells and platelets than usual. These can accumulate in your spleen, causing it to enlarge. Excess blood cells can lead to health problems, such as bleeding problems and blood clots. In people over 65 years of age, PV increases the risk of stroke and heart attack. PV can lead to acute myeloid leukemia in about 5 out of 100 patients or myelophibosis in 15 out of 100 patients. Symptoms and diagnosis of polycythemia vera Some people with PV symptoms when their disease is diagnosed. But a routine blood test can show high levels of blood cells. Symptoms Symptoms develop during the number of blood cells increases. Symptoms may include: A feeling of pressure or fullness under the ribs on the left side (spleen) Headache Double vision or seeing dark or blind spots that come and go Itching all over the body, especially after being in hot or hot water Rescued face that looks like a blush or sunburn weakness Dizziness Loss for no known reason Besides detecting abnormal blood counts during routine tests , your doctor may suspect PV if you have noticeable signs or symptoms. To confirm the diagnosis, you may need additional blood tests, including tests to check for JAK2 gene mutation, which is common in PV, and testing of your bone marrow. Polycythemia vera treatment If you do not have any symptoms, you may not need any active treatment right now. However, it is important to see your doctor regularly to monitor your condition. This procedure is called watchful waiting. PV is a chronic disease that tends to get worse over time. SCCA's team of physicians provides a wide range of treatment options for PV, including: Phlebotomy - to remove blood from the body to reduce your red blood cells, relieve symptoms and reduce blood clot risk Aspirin - is used at low doses to reduce blood clot risk Hydroxyurea - a drug to reduce your production of blood cells or release blood cells from the bone marrow if you have had or are at high risk of a blood clot and have very high non-red blood cell Ruxolitinib (Jakafi) — a drug That reduces overactive signaling with proteins that can cause your body to make too many blood cells Interferon — which stimulates your immune system to help control your blood counts A blood or bone marrow transplantation may be an option for people with severe or advanced MPNs, such as PV. This is currently the only form of treatment that has the potential to cure MPNs. The Fred Hutch Bone Marrow Transplant Program at SCCA has performed more bone marrow transplants than any other institution in the world. For more information about PV, please visit the MPN Research Foundation website. MPN Research Foundation Porphyria is a group of various disorders caused by abnormalities in the chemical steps that lead to the production of heme, a substance that is important in the body. The largest amounts of heme are in blood and bone marrow, where it carries oxygen. Heme is also found in the liver and other tissues. Several enzymes are needed for the body to produce heme. If one of the enzymes is abnormal, the process cannot continue and the intermediates, porphyrin or precursors can be built up and excreted in the urine and stool. Porphyria disorders can be grouped by symptoms, whether they affect the skin or nervous system. The cutaneous porphyria affects the skin. People with cutaneous porphyria develop blisters, itching, and swelling of their skin when exposed to sunlight. The acute porphyria affects the nervous system. Symptoms acute porphyria includes pain in the stomach, limbs or back; muscle numbness, tingling, paralysis, or cramps; vomiting; constipation; personality changes or mental disorders. These symptoms appear periodically. The porphyria are inherited conditions and the genes for all enzymes in the heme route have been identified. Some forms of porphyria are due to inheriting an abnormal gene from a parent (autosomal dominant). Other forms are from inheriting an abnormal gene from each parent (autosomal recessive). The risk that people in an affected family will have the disease or transmit it to their children is quite different depending on the type. Attacks of porphyria can develop over hours or days and last for days or weeks. Porphyria can be triggered by drugs (barbiturates, sedatives, birth control pills, sedatives), chemicals, fasting, smoking, drinking alcohol, infections, emotional and physical stress, menstrual hormones, and exposure to the sun. Porphyria is diagnosed through blood, urine, and stool testing. Diagnosis can be difficult because the range of symptoms common to many disorders and interpretation of the tests can be complex. Each form of porphyria is treated differently. Treatment may include treatment with heme, giving medication to relieve symptoms, or drawing blood. People who have serious attacks may need to be hospitalized. Post-transplant lymphobocrative disorder (PTLD) ranges from indolent polyclonal prolifeoneones to aggressive lymphomas that complicate solid organ or hematopoietic transplantation. At SCCA, our team of experts provides comprehensive diagnostic and medical care for people with PTLD Venous Thromboembolism (VTE) is an umbrella designation that includes two conditions, pulmonary embolism (PE) and deep vein thrombosis (DVT). PE symptoms include: Shortness of breath Rapid heart rate or breathing chest pain, exacerbated by taking a deep breath or coughing up blood Feeling cloudy or fainting Treatment The usual treatment is anti-clotting drugs (anticoagulants) - such as heparin, enoxaparin (Lovenox), apixaban (Eliquis), dabigatran (Pradaxa), rivaroxaban (Xarelto), edoxaban (Savaysa) and warfarin (Coumadin) — given by injection or taken in tablet form. Doctors can also provide medication that dissolves blood clots (thrombolytics) into the bloodstream or even directly into a blood clot. Some people need surgery to inject medication into a blood clot, remove a blood clot or place a filter in a vein to keep blood clots from reaching the lungs. Experts at SCCA can provide information and advice to help you decide on ongoing treatment. Shwachman-Diamond Syndrome (SDS) is an inherited condition that can affect the bone marrow, pancreas, skeletal system, and other organ systems. Children with this disease typically have a lack of neutrophils (a condition called neutropenia), which makes them more prone to pneumonia, ear infections, and skin infections. SDS can also lead to a decreased number of red blood cells, called anemia, or platelets, called thrombocytopenia. A gene mutation in a majority of patients who recently discovered reveals new information about the molecular make-up and progression of this disorder. Thalassaemia is a form of anemia, which means that your body makes fewer healthy red blood cells and less hemoglobin than normal. At SCCA, our team of experts offers comprehensive diagnostic and medical treatment for people with all types of thalassaemia. What are thalassemias? Thalassemias are hereditary blood disorders that cause your body to make less hemoglobin than normal. Hemoglobin is the red protein that fills your red blood cells. It allows blood cells to transport oxygen from your lungs to the rest of your body and to carry carbon dioxide from other parts of the body back to the lungs to be exhaled. To make a molecule of hemoglobin, your body first needs to make specific parts called globin chains. There are two main types of chains, alpha and beta. Each molecule of hemoglobin needs 2 alpha chains and 2 beta chains. In thalassemias, your body can't make enough of 1 of these chains. As a result, you cannot make a normal amount of hemoglobin. Without doing enough hemoglobin, your body may not fill as many healthy red blood cells as usual. You can develop anemia, which means your tissue doesn't get as much oxygen as they need. Thalassemias happen due to a mutation in the genes used to make globins. These diseases can be passed on in families. In fact, they are the most commonly hereditary diseases in the world. Types of thalassaemia There are two main types of thalassaemia, named after the globin you have less of: alpha thalassaemia and beta thalassaemia. Alpha thalassaemias Four genes can cause alpha thalassaemia. Your thalassaemia depends on how many of these genes have mutations. Hemoglobin Bart's hydrops fetalis syndrome: This is the most severe form of alpha thalassaemia. It affects people who inherit mutations in all 4 genes. It causes severe anemia even before birth. Hemoglobin H disease: This affects people who inherit mutations in 3 out of the 4 genes. It causes moderate anemia. Alpha thalassaemia traits: This affects people who inherit mutations in 2 out of the 4 genes. It causes mild anemia. Alpha thalassaemia carrier: This affects people who inherit mutations in 1 out of the 4 genes. It usually causes no symptoms. Beta thalassaemia beta thalassaemia is divided into these groups: Beta thalassaemia major: This affects people who inherit an abnormal gene from both parents. It causes severe anemia, usually diagnosed in the first year of life. People with beta thalassaemia more need blood transfusions. Beta thalassaemia less (or trait): This affects people who inherit only 1 abnormal gene from 1 parent. It leads to very mild anemia that usually does not cause any symptoms. Beta thalassemia intermedia: This affects people who inherit an abnormal gene from both parents. It anemia, but the severity varies from person to person. You may not know you have it before in adulthood. An important subtype of thalassaemia is caused by a specific gene mutation that makes a form of hemoglobin called hemoglobin E. Hemoglobin E is common in southeast Asia. Combined with mutations that cause beta thalassaemia, it can cause severe thalassaemia. Symptoms and diagnosis of thalassemia tlassemia symptoms can range from mild to severe. If you have anemia, which means that your blood cannot deliver enough oxygen throughout your body, you may feel weak, dizzy or short of breath when exercising and you may have a pale skin. If anemia is severe, you may notice chest pain or a rapid or irregular heartbeat. Your spleen may be working overtime to help make more red blood cells. This can cause your spleen to become larger. Your doctor may notice this during an exam and you may feel unusually full after meals. If you don't have any symptoms or only mild symptoms, you might not find out you have thalassaemia unless abnormal results appear on a blood test that you have for some other reason. Some people with thalassaemia are diagnosed in childhood because: Their symptoms are severe enough to give cause for concern. They have family members with that condition. Anemia shows up on a routine blood test. Their pediatrician notices something unusual, such as not growing as expected, having an enlarged spleen or having bone abnormalities. SCCA offers a full range of thalasemia diagnostics services. Along with examining you and asking about your medical history and family history, your doctor may order blood tests. These tests can control your level of hemoglobin and the number and size of your red blood cells. Specific tests to study your hemoglobin and genetic tests can also be done to tell if you (and your family members) have thalassaemia. Thalassemia treatment SCCA's hematologists provide care to adults with all types of thalassaemia. We tailor a treatment plan for you. Your plan may include several different approaches, such as: Folic acid supplements to support your body in making red blood cell blood transfusions to increase your red blood cell level and combat the effects of anemia chelating therapy – taking medications to remove excess iron from your body Medications that increase the production of red blood cells at your bone marrow bone marrow transplant to give you stem cells that make normal hemoglobin New drugs , gene therapy or other treatments available in clinical trials Genetic counseling, if you plan to have children It is also important to receive regular care to check for and treat complications that may arise from anemia or iron overload. These may include: Heart and blood vessel problems, such as irregular heartbeat, congestive heart failure and pulmonary hypertension Liver problems, such as scarring (fibrosis or cirrhosis), due to too much iron skin complications, such as and changes in the elastic fibers of the skin (pseudoxanethoma elasticum) Early bone thinning (osteopenia and osteoporosis) Problems related to hormones, such as hypothyroidism and fertility concerns Your SCCA team works closely with you to support you in living a healthy life and to ensure that you get the care you may need from a number of specialists. Thrombocytosis and thrombocythemia are conditions in which your blood has a high number of platelets, also called thrombocytes, because a blood clot is also called a thrombosis. When another disease or condition causes a high thrombocyte count, the term thrombocytosis or secondary or reactive thrombocytosis is preferred. Thrombocythemia or primary or essential thrombocythemia is used when the cause of the high platelet count is not known. A normal platelet count ranges from 150,000 to 450,000 platelets per microsliter of blood. When platelet count is less than 1 million platelets per microliter of blood, secondary thrombocytosis is more common than primary thrombocythemia. With primary thrombocythemia, a high platelet count can occur alone or with other blood cell diseases. Platelet counts can be as low as 500,000 platelets per microliter of blood or higher than 1 million platelets per microliter of blood. This is a rare event. Most people who have a high platelet count do not have signs or symptoms, and these symptoms are rarely severe or life-threatening, but can include blood clots and bleeding. These symptoms occur mostly in people who have primary thrombocythemia. People who have primary thrombocythemia without symptoms do not need treatment as long as the condition remains stable. Others may need medication or procedures to treat it. Most people who have primary thrombocythemia will live a normal lifespan. Treatment and prospects for secondary thrombocytosis depend on the underlying cause. The thrombotic thrombocytopen purpura (TTP) is a rare blood disorder that causes blood clots to form in small blood vessels throughout the body, which can cause serious problems if they block blood vessels and restrict blood flow to the brain, kidneys, or heart. There are two main types of TTP: inherited and acquired. Acquired TTP is the more common type that occurs mostly in adults, but it sometimes affects children. The causes are unknown, but it can be triggered by conditions like pregnancy or infection or diseases like cancer, HIV, and lupus. Medical procedures such as surgery and bone marrow transplantation and certain drugs and hormone replacement therapies can induce TTP as well. In TTP, when blood clots form, there are fewer platelets in the blood. This can cause bleeding in the skin (purpura), prolonged bleeding from cuts, and internal bleeding. It also causes small blood clots to form suddenly throughout the body, including in the brain and kidneys. Symptoms are caused by blood clots, low platelet count and damaged red blood cells, purple spots called purpura on the skin or in the mouth, paleness or jaundice, fatigue or weakness, fever, rapid heart rate or shortness of breath, headache, confusion, coma, stroke or or a low amount of urine, or protein or blood in the urine. Venous thromboembolism (VTE) is a blood clot that starts in a vein. Blood clots occur when your blood thickens and blocks flow through a vessel. At SCCA, our team of experts provides comprehensive diagnostic and medical care for people who have had venous thromboembolism. SCCA hematologists work closely with all of our

doctors to care for people who are at risk, including people treated for cancer or bone marrow diseases. What is venous thromboembolism? VTE is an umbrella term that includes two conditions: Deep vein thrombosis (DVT) and pulmonary embolism (PE). DVT is a blood clot that forms in a vein deep inside the body. It most often occurs in the lower abdomen or thigh, but can happen in other parts of the body as well. DVT can occur for several reasons, including damage to a vein, such as from a fracture or surgery, or slow blood flow, such as from lying in bed or sitting for long periods of time. Other risk factors include: Being pregnant Taking birth control pills or hormone replacement for menopause Overweight During cancer Has an inherited condition that increases your tendency to form blood clots or decreases your ability to dissolve them Many patients with DVT have more than one risk factor, but some patients may have DVT without any known risk factors. If a blood clot in a deep vein breaks loose, it can travel through your bloodstream. A blood clot that moves is called an embolus. Blood clots in veins travel towards your lungs. If a blood clot reaches your lungs and blocks blood flow there, the condition is called pulmonary embolism (PE). PE can damage your lungs or be fatal. Symptoms and diagnosis of venous thromboembolism Not everyone with DVT has symptoms. When symptoms occur, they may include: Swelling of the leg pain or tenderness of the leg, often similar to the symptoms of a muscle cramp (or injury) that does not resolve increased heat in the red area or discolored skin Typically DVT affects only one leg at a time, not both. PE symptoms include: Shortness of breath Rapid heart rate or breathing chest pain, aggravated by taking a deep breath or coughing up blood Feeling cloudy or fainting To diagnose venous thromboembolism, your doctor will examine you and ask about your medical history and family history. Blood tests will be performed to check your clotting activity and you may need an imaging test, such as an ultrasound scan of the leg for DVT or a computed tomography (CT) scan of your lungs for PE. Venous thromboembolism treatment Both DVT and PE are serious conditions that can damage your lungs and other organs. They need medical treatment right away. The usual treatment is anticoagulation drugs (anticoagulants) — such as heparin, enoxaparin (Lovenox), apixaban (Eliquis), dabigatran (Pradaxa), rivaroxaban (Xarelto), edoxaban (Savaysa) and warfarin (Coumadin) — given by injection or taken in tablet form. Doctors can also give medication that dissolves blood clots bloodstream or even directly into a blood clot. Some people need surgery to inject medication into a blood clot, remove a blood clot or place a filter in a vein to keep blood clots from reaching the lungs. After the first few months of treatment for DVT or PE, the decision on whether to continue anticoagulation drugs can be complex. Venous thromboembolism experts at SCCA can provide information and advice to help you decide on ongoing treatment. Von Willebrand factor is a protein that helps blood clot. Von Willebrand disease (VWD) is the most common of all the hereditary bleeding disorders, occurring in about 1 in every 100 to 1,000 people. This disease decreases the level of this protein, or makes it work wrong, affecting the blood's ability to clot. If your blood does not clot, you may have heavy, hard-to-stop bleeding after an injury. The bleeding can damage your internal organs and in rare cases can be life-threatening. In normal circumstances, if you get an incision, you start to bleed. Small blood cells called platelets clump together (blood clot) to stop the bleeding. Von Willebrand factor acts as glue to help the platelets stick together and form a blood clot. Von Willebrand factor also carries another important protein, factor VIII, that helps your blood clot. People with hemophilia lack this protein or it doesn't work properly. VWD is more common and usually milder than hemophilia. VWD affects both males and females, while hemophilia mainly affects males. There are three large types of VWD. In type 1 VWD you have a low level of von Willebrand factor and you may have lower levels of factor VIII than normal. This is the mildest and most common form of the disease. About 3 out of 4 people who have VWD have type 1. Type 2, von Willebrand factor doesn't work as it should. Type 2 has four subtypes for the different gene mutations that cause each type. Each is treated differently. This makes knowing the exact type of VWD that you have very important. Type 3 VWD patients have no von Willebrand factor and low levels of factor VIII. Type 3 is the most severe form of VWD, but it is very rare. Early diagnosis is important. With the right treatment plan, even people with type 3 VWD can be helped to live a normal, active life. Waldenström macroglobulinemia (WM), also known as lymphobytic lymphoma, is a type of cancer of the lymphatic system. Learn more about WM WM

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