

FEMALE FACTORS

Information for young women with bleeding disorders

VWD

FAQS

JADE'S STORY

PERIODS

HAEMOPHILIA

WHAT DO I TELL MY OTHER
DOCTOR OR DENTIST?

RARE CLOTTING FACTOR DEFICIENCIES



HAEMOPHILIA FOUNDATION AUSTRALIA

About this booklet

This booklet is an introduction to bleeding disorders in females designed for young women. It aims to explain bleeding disorders in detail in a way that is easy to understand for you, your family, partner or friends.

Bleeding disorders covered in this booklet include:

- Haemophilia A and haemophilia B
- Carrying the gene for haemophilia A and haemophilia B
- Von Willebrand disease
- Rare clotting factor deficiencies including platelet function disorders.

Treatment is only described briefly in this resource, and will be covered in more depth in a separate booklet.

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This resource may be printed or photocopied for education purposes.

Acknowledgements

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The menstrual cycle diagram was originally published by Jean Hailes (jeanhailes.org.au) and has been reproduced and adapted with permission.

Quotes and personal stories in this booklet were contributed by young Australian women with bleeding disorders or who carry the gene.

We thank them for their generosity in sharing their experiences.

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Note: Apart from the photograph of Jade with Jade's Story, all photographs used in this booklet are stock images for illustration only.

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Important Note: This booklet was developed by Haemophilia Foundation Australia for education and information purposes only and does not replace advice from a treating health professional. Always see your health care provider for assessment and advice about your individual health before taking action or relying on published information.

What is a bleeding disorder?

Bleeding disorders are rare health conditions where a person's blood doesn't clot properly.

This means that if someone with a bleeding disorder starts to bleed, for example from an injury, surgery or from having their period, they might bleed for longer than other people because their blood takes longer to clot (stop running). This can happen because there is a problem with the blood clotting - for example, not enough clotting factor in the blood or it doesn't work the way it should.

The clotting process

A clotting factor is an ingredient (a protein) in the blood that controls bleeding.

Many different clotting factors work together in a chain of chemical reactions to stop bleeding. This is called the clotting process or 'haemostasis'. There are over 20 different proteins and other substances involved in the clotting process.

Types of bleeding disorders

The most common inherited bleeding disorders are von Willebrand disease (VWD) and haemophilia.

Von Willebrand disease (VWD)

Von Willebrand disease (also called *von Willebrand disorder* or *VWD*) is caused by low levels of von Willebrand factor or because the von Willebrand factor doesn't work properly.

Haemophilia

There are two types of inherited haemophilia:

- Haemophilia A - caused by low levels of clotting factor VIII (8)
- Haemophilia B - caused by low levels of clotting factor IX (9).

Rare clotting factor deficiencies

Rare clotting factor deficiencies are another group of inherited bleeding disorders.

They are caused by low levels of other factors and include:

- Factor I (1) deficiency – often called *fibrinogen deficiency*
- Factor II (2) deficiency
- Factor V (5) deficiency
- Combined factor V (5) and VIII (8) deficiency
- Factor VII (7) deficiency
- Factor X (10) deficiency
- Factor XI (11) deficiency
- Factor XIII (13) deficiency.

Inherited platelet function disorders

Inherited platelet function disorders are conditions where platelets, rather than clotting factors, don't work the way they should, resulting in a tendency to bleed or bruise. Platelets are very small cells circulating in the blood, which stick to the walls of damaged blood vessels to promote clotting. Inherited platelet disorders include Bernard-Soulier syndrome, Glanzmann thrombasthenia and storage pool deficiencies.



These bleeding disorders - von Willebrand disease (VWD), haemophilia, rare clotting factor deficiencies and inherited platelet disorders - are caused by changes to the genes responsible for blood clotting. The changed genes are passed down from parent to child and so the bleeding disorders are referred to as genetic or inherited disorders. People with bleeding disorders are nearly always born with them.

The exceptions are acquired haemophilia and acquired VWD, which mostly occur in adulthood. These conditions are different to inherited bleeding disorders and are very rare (see page 21).

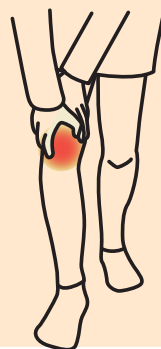
Symptoms

Common symptoms of bleeding disorders in females are:

- Bruising easily
- Heavy periods
- Pain with periods
- Pain with ovulation (when an egg is released from the ovary half-way between periods)
- Bleeding or oozing that lasts for a long time after surgery, dental procedures including tooth extractions, medical procedures, injuries or accidents
- Bleeding from the gums, usually after trauma/injury (more common with VWD)
- Frequent nosebleeds, or nosebleeds that are difficult to stop (more common with VWD)
- Heavy bleeding that lasts longer than expected after childbirth (particularly when bleeding increases 3 days or more after giving birth)
- Bleeding that lasts longer than expected after cuts
- Anaemia (low red blood cell count/low blood iron levels)

“ I mainly experience issues during dental surgery - excessive bleeding, swelling and bruising. Occasionally I come up with bruises and I’m not sure why! But on a daily basis, haemophilia doesn’t affect my life. ”

Rarely, females with very low clotting factor levels (such as severe haemophilia or VWD or rare clotting factor deficiencies) may also have:



- Joint and muscle bleeds which can occur often and cause swelling and pain
- Bleeding episodes that seem to happen for no obvious reason.



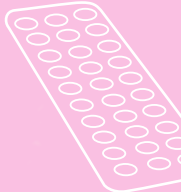

“ I have always had heavy periods from a young age, and breakthrough bleeding, which I now know to be ovulation bleeding, but I also get regular gum and throat bleeding episodes as well as the occasional nose bleed. I’ve also always bruised easily, and often without injury. ”

Because girls start having periods in puberty, symptoms of a mild or moderate bleeding disorder are often more obvious from an earlier age in girls than in boys.

Women's bleeding explained

What is normal?

Period pain is considered 'normal' if:

- The pain is manageable or goes away if you take simple period pain medication 
- It is only there for a few days before and on the first one or two days of your period 
- It goes away if you use the contraceptive pill (particularly if you use the pill continuously and skip your periods) 
- You are able to do all of your normal daily activities such as going to school or work, or playing sport. 



If your period pain does not fit the description of 'normal' and is so bad that it stops you doing what you would normally do on a daily basis, such as going to school or work, it is important to talk to your doctor or gynaecologist.



Has something Changed?

It is important not to assume that any change to your menstrual cycle is related to your bleeding disorder. This includes new bleeding between periods (spotting), new severe lower tummy pain or other new symptoms. There are many women's health issues (e.g. endometriosis or fibroids) that are common among girls and women generally. Discuss any new symptoms that concern you with your doctor or gynaecologist (women's health doctor) so they can be properly checked out.



Heavy periods

(*Heavy menstrual bleeding*)

Heavy periods are also called 'heavy menstrual bleeding'. Doctors may also use the terms 'abnormal uterine bleeding' or 'menorrhagia'. It can be difficult to define what heavy periods are because what different girls and women call 'heavy' can vary. It partly depends on what you or your family are used to, and how much your period interferes with your everyday life. Here are some signs that suggest that a period is 'heavier' than average.

- Soaking through a super tampon or pad every two hours or less, or needing to change protection or put a towel under you or flooding the bed during the night



- Periods that last for longer than 8 days

- Bleeding with clots bigger than a 50 cent piece



- Cramping and pain in the lower abdomen (tummy)
- Constant tiredness.

Heavy periods can lead to low red blood cells or iron levels in the blood (anaemia), which can cause tiredness, shortness of breath, pale skin colour and poor concentration.

Stress can also influence how you feel and in turn, how much your hormones go up and down. These changes in hormones can then affect your pattern of menstrual bleeding.

Girls and young women, even when they don't have a bleeding disorder, commonly have heavy and irregular periods when their periods begin. This is because it can take some time for the hormones which drive menstruation to settle down into a 'normal' cycle after periods first start. All girls and young women with or without a bleeding disorder may have some improvement in heavy bleeding after the first few cycles. However, if you have a bleeding disorder you are more likely to continue to experience heavy bleeding that is a problem.

It is important to seek help early, before periods cause problems with normal school and social activities. If a family or their doctor suspects that a young girl has a bleeding disorder it may be valuable to consult with her doctor before her periods start.

Premenstrual syndrome (PMS)

Symptoms other than pain might develop as a result of the effects of hormones involved in getting your period.

These symptoms, also known as premenstrual syndrome, may begin a few days before your period, but usually settle after the first few days

They include:

- Headaches
- Nausea with or without vomiting
- Feeling dizzy or fainting
- Digestive problems, such as diarrhoea or constipation
- Premenstrual symptoms, such as tender breasts and a swollen abdomen, which can continue throughout your period.

Dysmenorrhoea

(period pain)

Dysmenorrhoea is the medical name for painful periods and can affect any female, not just if you have a bleeding disorder. However, girls and women who have bleeding disorders are more likely to have dysmenorrhoea.

Periods are the result of hormonal changes that lead to shedding the lining of the uterus (womb). This process uses a whole combination of chemicals that can cause a range of symptoms that can be quite uncomfortable but are just the side effects of these chemicals (known as prostaglandins and chemokines). One of those symptoms is painful periods, especially if your period is heavy.

Pain with heavy periods includes:

- More cramps, if you are passing larger clots
- Pain when you go to the toilet and urinate (wee) or open your bowels (poo) during your period
- Pain when you are moving about on heavy days.

Any girl or woman with dysmenorrhoea can experience these symptoms.

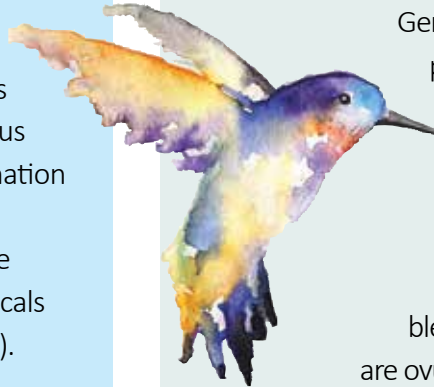


It is thought that the period pain that comes with heavy periods is due to a back spill of blood into the fallopian tubes that lead away from the uterus. Almost all girls and women spill a little bit of blood back through their fallopian tubes into the part of their abdomen that is called their peritoneal cavity (their insides). If you bleed heavily, you probably have more back spill, which will cause more period pain and other related problems.

Mid-cycle pain

(‘Mittelschmerz’)

Women and girls can also have pain in the middle of their menstrual cycle during ovulation, when the egg is released from the ovary. This pain is sometimes called ‘Mittelschmerz’, the German word meaning ‘middle pain’, and is usually a pain on one side of your lower abdomen (tummy) that you have midway between periods. Women and girls can also have a little bit of bleeding or spotting when they are ovulating.



This mid-cycle pain can be more severe in some women and girls with bleeding disorders as they can lose a larger amount of blood at ovulation than other women would and this bleeding can contribute to pain.

It is very uncommon but sometimes this bleeding can cause a type of cyst to form on the ovary (called a corpus luteum cyst). Prolonged bleeding into an ovarian cyst causes it to expand, which may cause pelvic pain. Sometimes blood can leak from the cyst into the abdomen (haemorrhagic ovarian cyst). Most of the time this can be relieved with rest, pain relief and factor concentrate replacement. It would be unusual to need surgery for this problem.

If you have unusually severe lower abdominal pain that is not settling with simple pain relief it is important you see your doctor as soon as possible. There are other causes of lower abdominal pain that are not related to bleeding disorders. This includes some which are very serious and can be a medical emergency, such as appendicitis or an ectopic pregnancy (where the fertilised egg grows outside the uterus, usually in a fallopian tube).

Anaemia

Women and girls with bleeding disorders who have heavy periods are at risk of low levels of iron in the blood which can lead to anaemia (low red blood cells or low haemoglobin). They can feel unwell, faint, dizzy, tired, and short of breath. Looking pale is also a common sign of low iron levels.

If you have these symptoms it is important to get iron levels checked by your doctor who might suggest iron supplements. The prescribing doctor will decide if these iron supplements are to be taken by mouth or via injection. If your iron deficiency is very mild they may just suggest changes to your diet.



Bleeding after sex

Bleeding occasionally occurs when any young woman has sex for the first time. This is caused by a little tear in the hymen, the rim of tissue at the lower end of the vagina, when it is not quite stretchy enough to allow sex to occur comfortably. The amount of bleeding that occurs varies for each young woman. If bleeding after sex keeps happening or lasts for several days each time, talk to your doctor or your Haemophilia Treatment Centre (HTC).

If you are embarrassed about talking to your doctor or HTC team, remember they are health professionals and are trained to help you deal with issues like this.



Endometriosis

Women with bleeding disorders have an increased chance of having a condition called endometriosis, where cells like those in the lining of the uterus grow in the pelvis outside the uterus and can bleed during menstrual periods. This is because women with bleeding disorders often bleed more and for a longer time during menstruation and blood is likely to move backwards from the uterus into the abdomen via the fallopian tubes. Endometriosis can cause pain and long, heavy or irregular periods or spotting between periods.

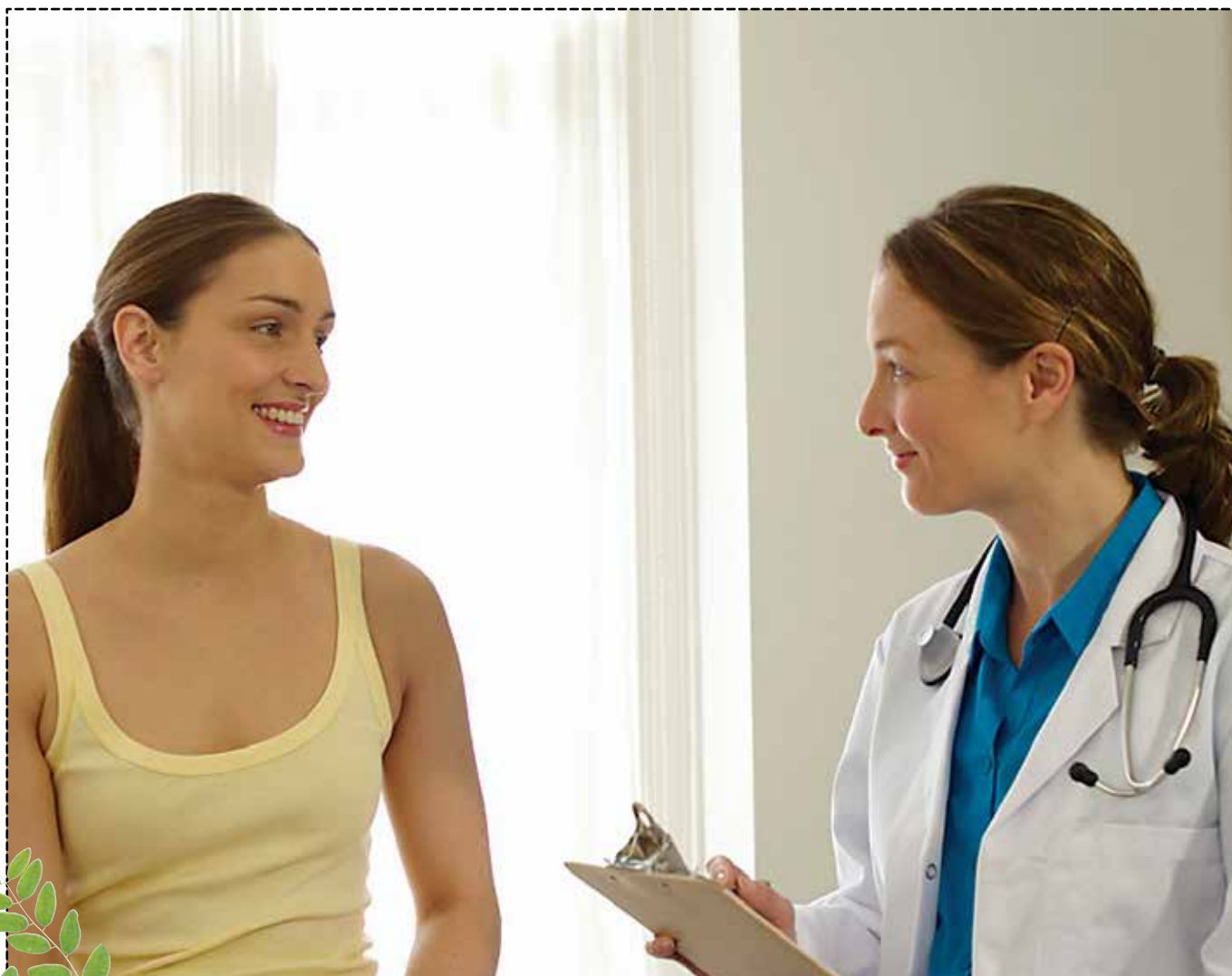
Managing the bleeding caused by your bleeding disorder can reduce or prevent endometriosis.



Remember:

Not all period symptoms are due to having a bleeding disorder - they can also be symptoms of health problems that any girl or woman might experience.

You may need to see a gynaecologist (women's health doctor) for specialist advice. So that they have the whole picture, make sure they know you have a bleeding disorder and ask them and your Haemophilia Treatment Centre to consult with each other.



Keeping a diary

It can be helpful to keep a diary of your periods and how you're feeling to record what you are experiencing. Bring this with you and show your doctor or the treatment team at the Haemophilia Treatment Centre when you have appointments.

Types of diaries

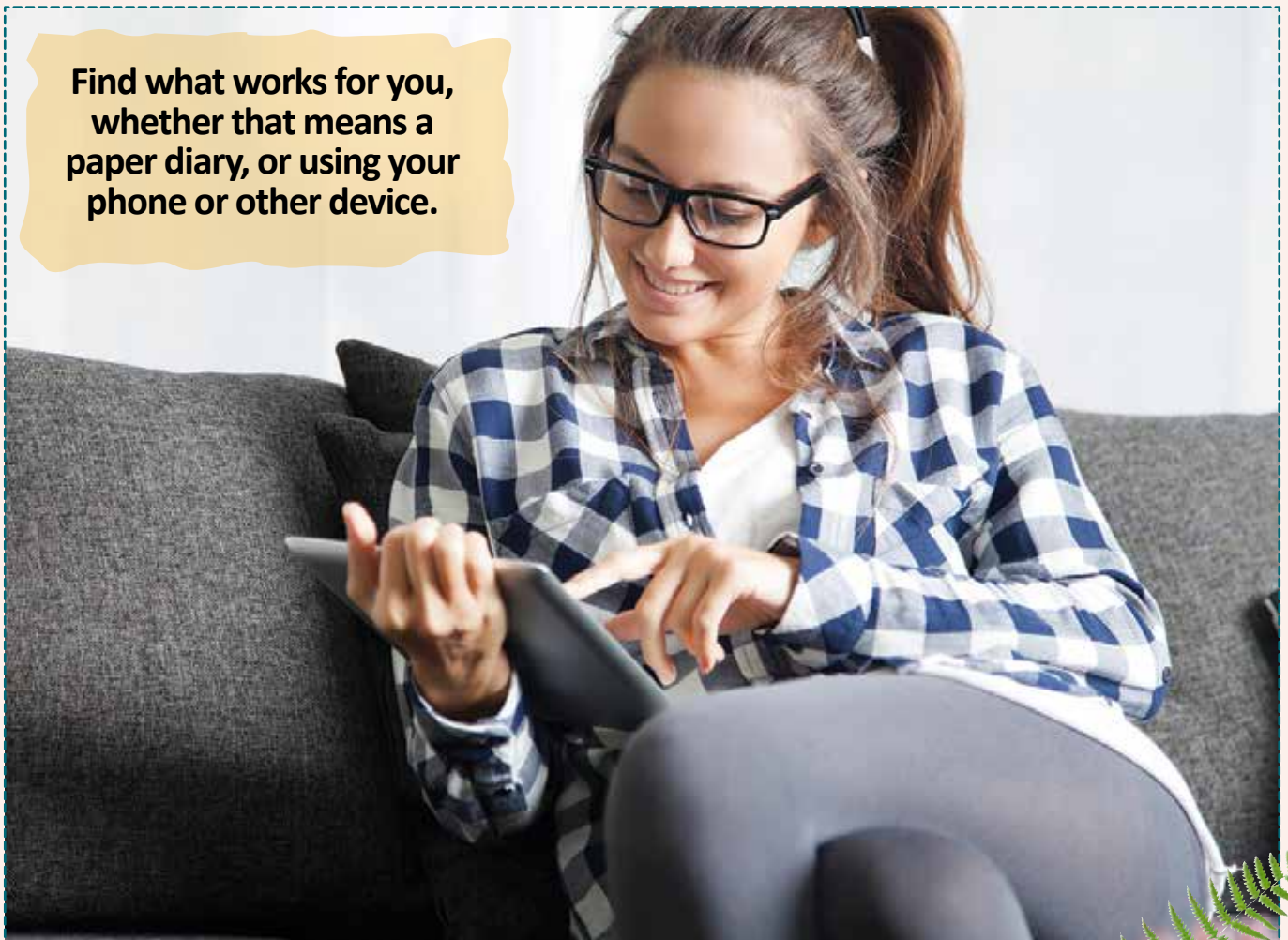
You might want to use the Menstrual Assessment Chart, which records how much you are bleeding, including any bleeding between periods. You can find it under GIRLS on the Factored In website (www.factoredin.org.au) or on the Canadian Hemophilia Society website - www.hemophilia.ca.

There are also a few smartphone apps that you can use to record your menstrual cycles, and your Haemophilia Treatment Centre can recommend one that is designed for women and girls with bleeding disorders.

“ I keep a record of my symptoms to be able to identify, along with my team at the HTC, any bleeding patterns, causes of increased bleeding and this helps me to predict major bleeds sometimes and prepare for them. ”

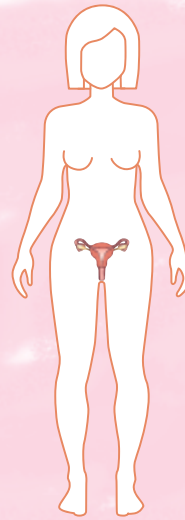
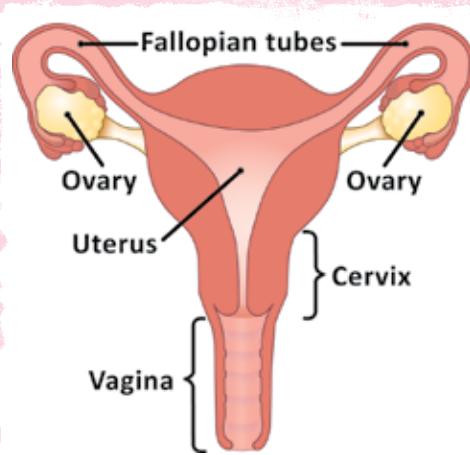
“ I started tracking and keeping record of not only my bleeds and bruises but my activity, joint pain and even diet. It was only through recording this and paying significant attention to my lifestyle that I realised patterns in both my menstrual cycle and lifestyle habits. ”

Find what works for you, whether that means a paper diary, or using your phone or other device.

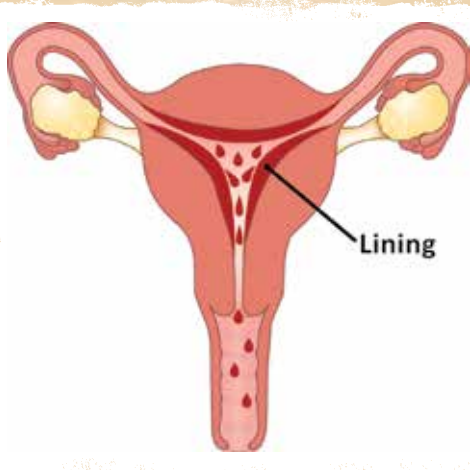


How does the menstrual cycle happen?

This shows a typical 28-day **menstrual cycle** from one period to the next. If your cycle is shorter or longer then ovulation may happen sooner or later.

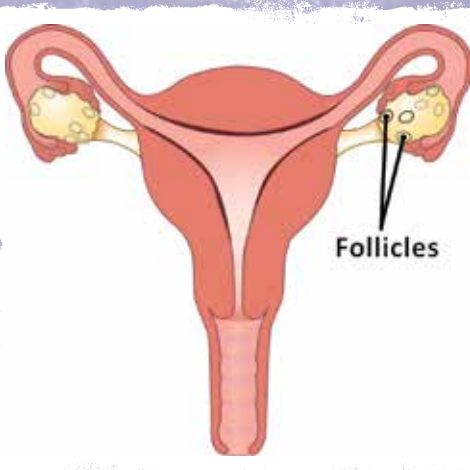


Day 1-6



- Day 1 is the first day of the menstrual cycle and if you are not pregnant, your period begins.
- Hormones from the brain cause the ovary to produce little sacs of fluid (follicles) containing immature eggs.
- Blood flows out of the cervix (neck) of the uterus, and then out of the body through the vagina usually for the next 3-7 days.

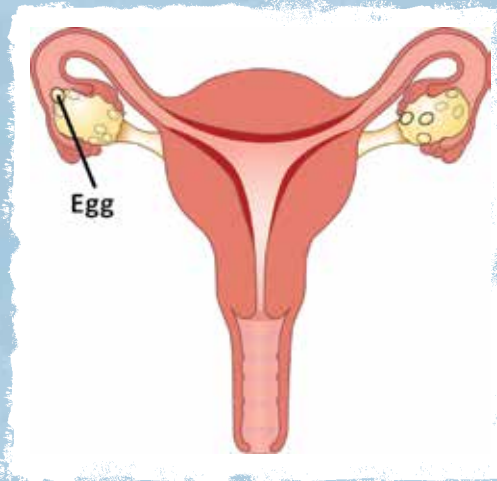
Day 7-14



- Bleeding has normally stopped by now.
- One follicle grows to produce an egg.
- The lining of the uterus gets thicker in case a fertilised egg is implanted there.

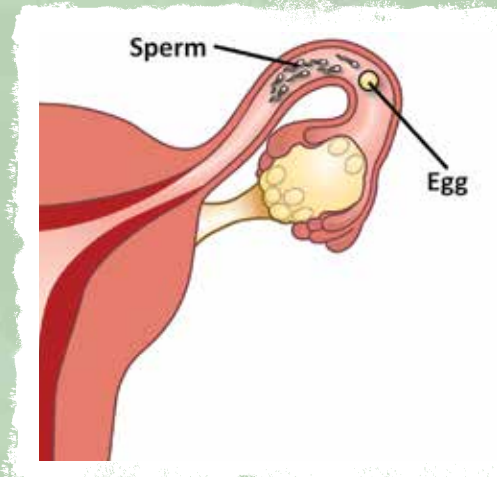


Day 14



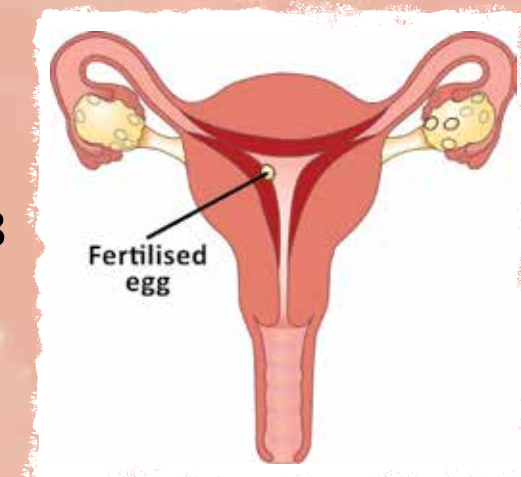
- Hormones cause the fully grown egg to burst out of the follicle and leave the ovary. This is called **ovulation**.

Day 15-20



- The egg travels down the fallopian tube towards the uterus.
- This is when pregnancy can happen.
- If you have had sex recently and the egg meets one of many sperm produced by a man, the egg may be fertilised.
- Once an egg is fertilised it moves down the tube and attaches to the wall of the uterus where it will grow into a baby.

Day 20-28



- If the egg is fertilised you will not get your period and different pregnancy hormones will be released by the body.
- If the egg is **not** fertilised the hormone levels will start to go down.
- Then the lining of the uterus starts to break down and separate from the wall.
- This causes your period to begin again.

Source: Jean Hailes for Women's Health. Yarning about periods (menstrual cycle). Melbourne: Jean Hailes, 2014. <jeanhailes.org.au> Adapted with permission.

Von Willebrand disease



Von Willebrand disease (also called **von Willebrand disorder** or **VWD**) is an inherited bleeding disorder. People with VWD have a problem with a protein in their blood called von Willebrand factor (VWF) that helps control bleeding. They do not have enough of the protein or it does not work the way it should. This means that it takes longer for blood to clot and for bleeding to stop.

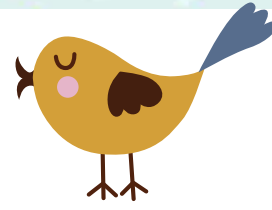
VWD is the most common inherited bleeding disorder worldwide. It affects both females and males equally. It is thought that up to 1 in 100 people have VWD, but most people with it have few or no symptoms and only a small number of them have been diagnosed. Many people with VWD may not know they have the bleeding disorder because their bleeding symptoms are very mild and it may cause little or no disruption to their life.

In comparison to the number of people with the mild form of VWD, the form of VWD causing moderate bleeding problems is uncommon, and the severe form of VWD is rare. But any bleeding that occurs with VWD needs to be assessed and treated.

How serious is VWD?

It depends on the type of VWD and the level of von Willebrand factor in the person's blood. Most people have such mild symptoms that they are not aware they have the disorder. Others only realise they have a bleeding problem when they have heavy bleeding after a serious accident or a dental or surgical procedure.

However, with all forms of VWD there can be bleeding problems. Some people with VWD bleed quite often, eg with



nosebleeds, bruising and heavy periods. A smaller number of people have the severe form of VWD and may also experience joint and muscle bleeds, similar to haemophilia.

There is no cure for VWD. It is a lifelong condition but with appropriate treatment VWD can be managed effectively.

Different types of VWD

There are three main types of von Willebrand disease. Bleeding symptoms can vary from person to person within each type.

Type 1 VWD is the most common form. Around 80% of people with VWD have this form. In type 1 VWD, the von Willebrand Factor (VWF) works normally, but there is not enough of it.

Symptoms are usually mild, depending on the level of VWF in the blood. However, some people with type 1 can have very low levels of VWF and have severe bleeding problems.

In type 2 VWD, the amount of VWF in people's blood is often normal but the VWF doesn't work properly. Type 2 VWD is divided into subtypes 2A, 2B, 2M and 2N. Certain subtypes may be treated differently, which makes knowing the exact type of VWD you have very important.

Type 3 VWD is very rare. People with type 3 VWD have very little or no VWF in their blood and also have low factor VIII (8) levels. Bleeding can occur often, be more severe and can also include joint and muscle bleeding.

It is important to remember that any bleeding is significant and is important even with a mild condition.



Bleeding symptoms of VWD

The symptoms of VWD vary greatly from person to person. Even members of the same family may have different symptoms. The type of VWD and the level of von Willebrand factor in the person's blood determine the severity and type of bleeding symptoms. However, there can be bleeding problems with all types of VWD. Bleeding often involves the mucous membranes, (the delicate tissues that line body passages) such as the nose, mouth, uterus, vagina, stomach and intestines.

The **more common symptoms of VWD** are:

- Frequent nosebleeds, or nosebleeds that are hard to stop
- Bruising easily
- Very heavy periods, or periods that last more than 8 days
- Bleeding for a long time from small cuts
- Bleeding from the gums, usually after trauma/injury
- Bleeding that continues for a long time after injury, surgery or dental work.

Less common symptoms that older people might experience are:

- Blood in faeces (poo) due to bleeding in the intestines or stomach
- Blood in urine due to bleeding in the kidneys or bladder.

People with severe forms of VWD, particularly type 3 VWD, may also have other bleeding problems similar to severe haemophilia, such as:

- Bleeding episodes that happen for no obvious reason
- Bleeding into joints and muscles which can cause swelling and pain.



Women with VWD sometimes have abnormally heavy bleeding in the first couple of weeks after giving birth. They may also have quite a bit of bleeding between periods with ovulation (when the ovary releases an egg).

Sometimes the kind of symptoms a person with VWD experiences can change over their lifetime. For example, as a child they may have nosebleeds and bruise easily, but find this occurs less often as they grow older. However, their type of VWD will not change.

How do you get VWD?

Von Willebrand disease (VWD) is usually inherited.

The way each of us makes von Willebrand factor (VWF) in our body is coded into one of our genes, called the VWF gene. This gene has been inherited from genetic information from both our mother and father.

If there is a mutation in the gene causing VWD, this can then be passed down from parent to child, in the same way as other genetic information like the colour of their hair or their eyes. The altered VWF gene is often called a *VWD gene*. A parent can pass on the altered VWF gene even if they don't have symptoms.

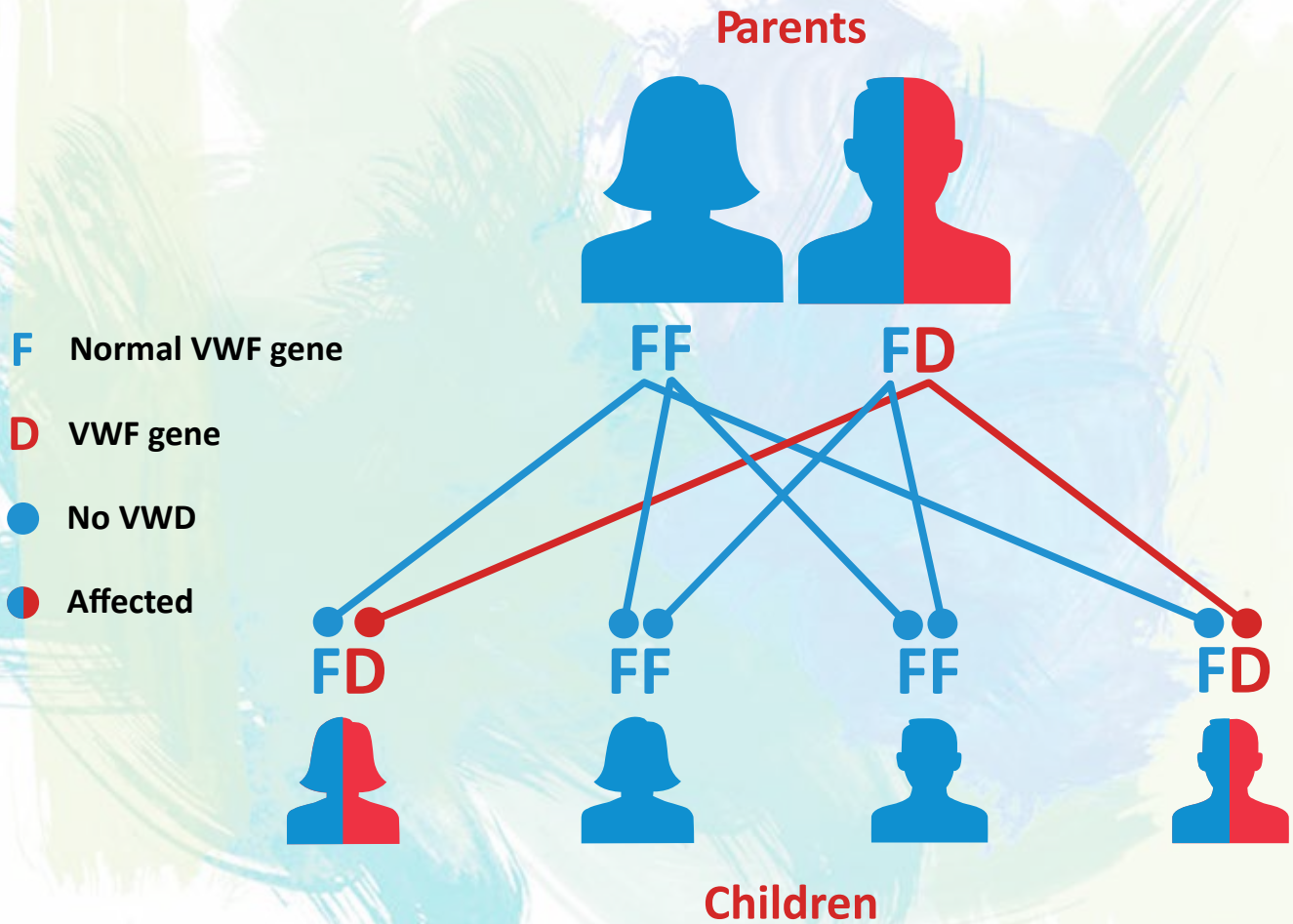
All of us have two copies of each gene, one inherited from each parent. Genes are carried in our chromosomes. The VWF gene is located on an ordinary chromosome (autosome), not on a sex chromosome, like haemophilia. Sex chromosomes decide whether we are male (XY) or female (XX). This means that VWD affects males and females in equal numbers, unlike haemophilia which usually occurs in more males than females – so both sons and daughters can inherit VWD. Their symptoms can be different to their parents or to their brothers and sisters.

How is VWD inherited?

There are two main inheritance patterns for VWD:

In most type 1 and type 2A, 2B and 2M VWD, the VWD gene is **dominant**.

Autosomal **dominant** inheritance pattern



This means that if one parent has a VWD gene, they have a **1 in 2 (50%)** chance of passing the gene on to each of their children. They or their children may or may not have symptoms.



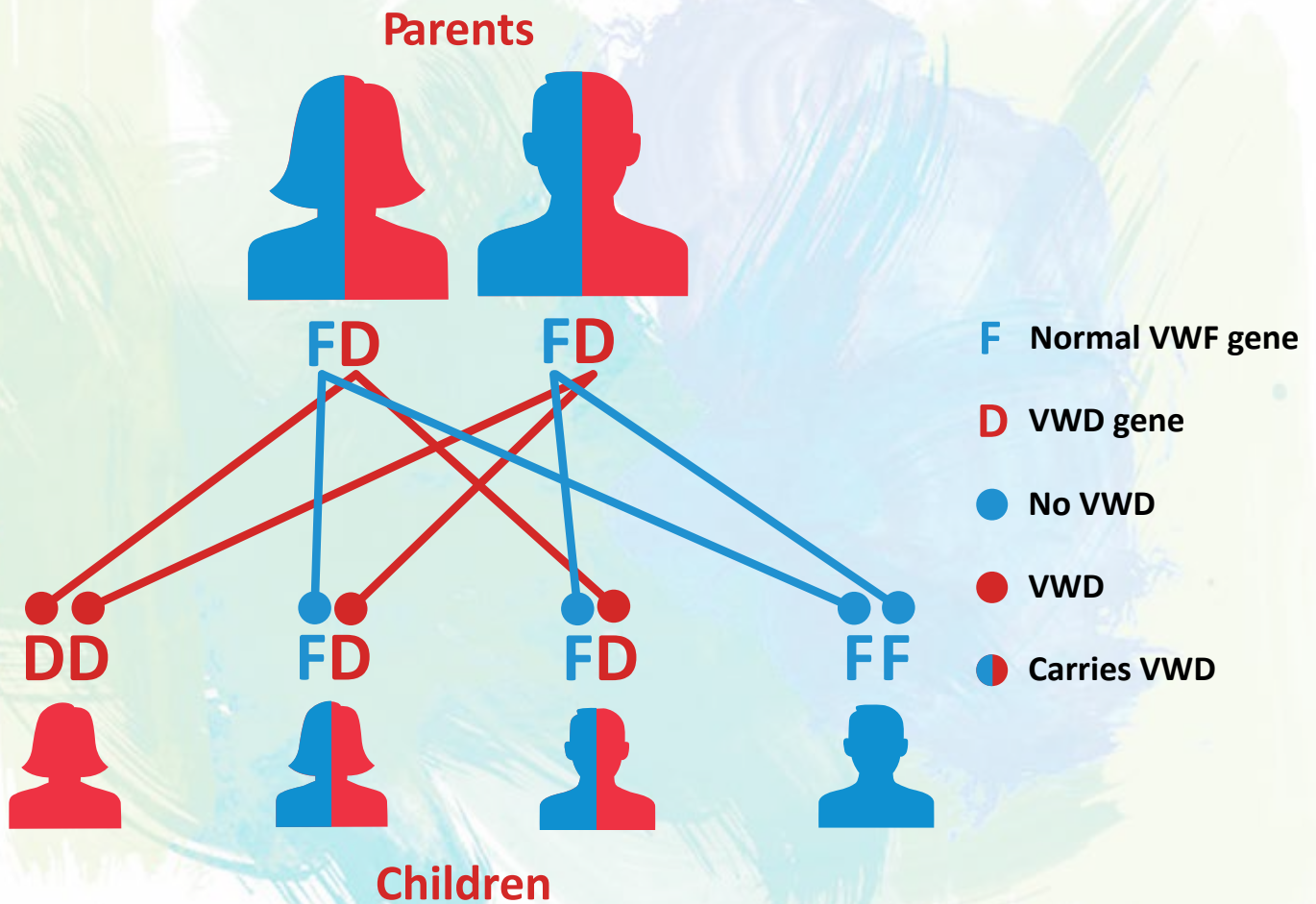
If a child who has inherited autosomal dominant VWD (eg, has type 1 or type 2A, 2B or 2M VWD) has children, each of their children has a **1 in 2 (50%)** chance of inheriting the altered VWF gene. Their children would typically have a symptom pattern similar to their affected parent.





In type 3 and type 2N, the VWD gene is **recessive**. If both parents carry this type of VWD, they may have no or mild symptoms.

Autosomal **recessive** inheritance pattern



Inheritance of Von Willebrand Disorder Type 2N and 3

Source: Adapted from Goodeve AC, James P. Von Willebrand disease. GeneReviews Oct 5 2017, viewed 1 August 2018. < <https://www.ncbi.nlm.nih.gov/books/NBK7014/> >

With their children:

- There is a **1 in 4 (25%)** chance that their children could inherit a copy of the VWD gene from both of them and have symptoms, usually moderate to severe.
- There is a **1 in 2 (50%)** chance that their children will inherit only one copy of the VWD gene from them and carry the gene but may have no or only mild symptoms, like their parents.



- There is also a **1 in 4 (25%)** chance that their children will not inherit the VWD gene at all.



If a child has inherited autosomal recessive VWD (eg, has type 3 or type 2N VWD), their children will **ALL** inherit a copy of the altered VWF gene and are known as **obligate carriers**. Their children may or may not have symptoms.



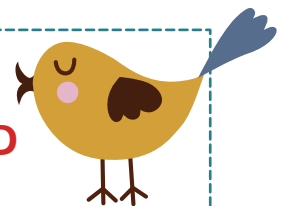


If one member of a family is diagnosed with VWD, the doctor may recommend testing other members to see whether they have VWD as well.

“ My mother was diagnosed with Von Willebrand’s about 15 years ago after an operation and advised my sister and me to get tested. It turned out that I have Type 1 but my sister doesn’t. ”

“ In my family it seems as though everybody has it! Myself and two of my three brothers were diagnosed at birth, and recently we found out that my oldest brother also has it, although much more mildly. Since I have a more severe form, it’s likely that my mum is also a carrier- she doesn’t experience any bleeding problems herself, but her own mother was a severe bleeder. ”

No family history of VWD



Sometimes there is no family history of VWD. A baby can have a genetic mutation, or change in one of their genes, before they are born. Although their parents and their brothers and sisters do not have the VWD gene, the child will be able to pass the VWD gene on to their own children in the future.

Haemophilia A & haemophilia B

What does it mean to carry the gene for haemophilia?

Everyone has the genes responsible for making factor VIII (8) and factor IX (9). These factors are necessary for blood to clot.

There are two types of haemophilia and they both have the same symptoms:

- **Haemophilia A** is the most common and is caused by not having enough of clotting factor VIII (8)
- **Haemophilia B** is caused by not having enough of clotting factor IX (9)

Haemophilia is caused by a change (often called a mutation) in the factor VIII or IX gene. This altered gene is commonly called the 'haemophilia gene'.

Cells and chromosomes

Every person has millions of cells that make up their body. At the centre of each cell are 46 chromosomes arranged in pairs. The chromosomes contain the person's genetic information or 'genes', which determine the person's individual characteristics, such as the colour of their hair or their eyes.

Sex determination

Everyone has a pair of 'sex' chromosomes, which decide what gender they are. Each parent contributes one of these chromosomes to their children. Females have two X chromosomes, and receive one from each parent. Males have one X chromosome, which they receive from their mother, and one Y chromosome, which they receive from their father.

Haemophilia

The genes for making factor VIII (8) and IX (9) are located on the X chromosome.

Women and girls with an altered factor VIII or IX gene are often described as "carrying the gene" or a "carrier".



Photo by Daria Shevtsova from Pexels

Because **females** have two copies of the factor VIII or IX genes, one inherited from each parent, women and girls with an altered gene usually have another copy that functions normally. This helps factor VIII and IX to work properly in the blood clotting process and is often enough to control bleeding.

Most often a female who carries the gene will have normal clotting factor levels. In some cases she will have mildly reduced clotting factor levels. Sometimes her factor levels can be low enough to be classified as having haemophilia, usually mild haemophilia. In a few very rare cases girls and women can have extremely low factor levels and have severe haemophilia.

However, the Y chromosome does not have a gene to produce these factors. **Males** with an altered factor VIII or IX gene on their X chromosome do not have another factor VIII or IX gene to help with blood clotting and will have haemophilia.

Inheritance

If you are a female who carries the gene for haemophilia or you are a male with haemophilia, you will have an alteration in your factor VIII (8) or IX (9) gene. This altered gene may be passed on to your children.

If you are a female who carries the gene, there is a 50% chance with each of your pregnancies that you will pass the altered gene onto your baby:

- If you have a son who inherits the gene, he will have haemophilia.
- If you have a daughter who inherits the gene, she will carry the gene too.

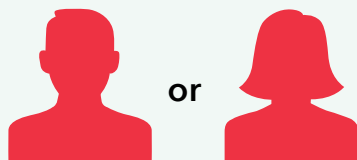
If you are a male with haemophilia:

- **All (100%) of your daughters** will inherit the altered gene from you and will carry the gene
- **None of your sons** will have haemophilia.

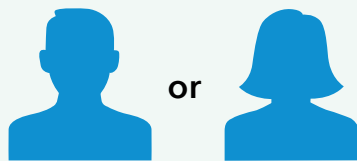
This is tricky stuff to understand!

The diagram below might help. The **red** males are those with haemophilia; the **red** and **blue** females carry the gene - they have the X chromosome with the genetic alteration, and one unaltered X chromosome.

Haemophilia genetic inheritance

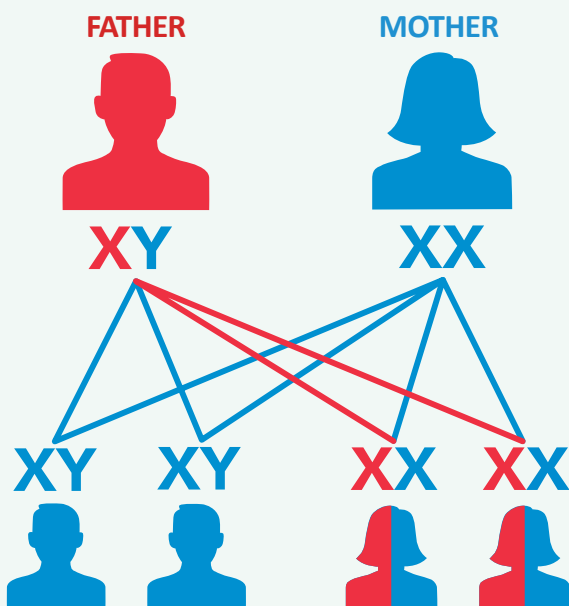


has an X chromosome with the "haemophilia" genetic alteration.



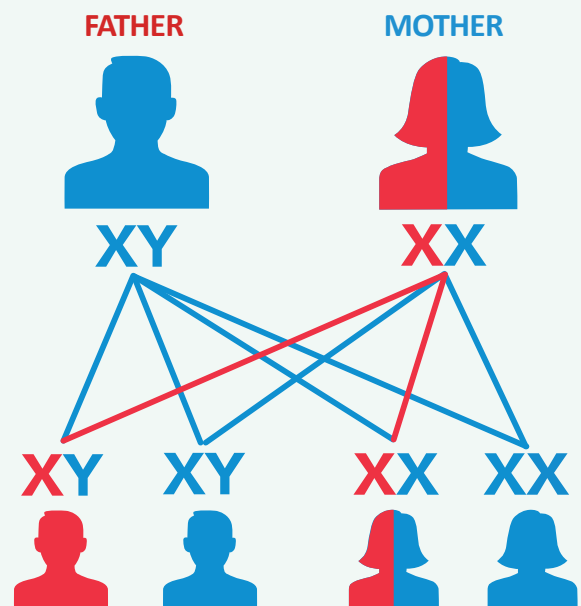
has an unaltered X chromosome.

When the father has haemophilia and the mother is unaffected



None of the sons will have haemophilia. All of the daughters will carry the gene. Some might have symptoms or have haemophilia.

When the mother carries the altered gene causing haemophilia and the father is unaffected



There is a 50% chance at each birth that a son will have haemophilia. There is a 50% chance at each birth that a daughter will carry the gene. Some might have symptoms or have haemophilia.

No family history



Because haemophilia is inherited, it occurs in families, and the altered gene is passed down from parent to child. However, **in about one third of all cases there is no family history of the disorder**. This situation can happen when a new genetic mutation occurs during a baby's conception. When the child is born they will have the altered gene and can pass it on to their children. Another possibility is that the genetic mutation might actually have occurred in the mother's conception so that when the mother of a child with haemophilia is tested, she finds she carries the gene.

If someone is diagnosed with haemophilia or as being a carrier, other members of their family may be affected too. Confirming a diagnosis often includes checking the family history for bleeding problems. Other family members, including females, may also need to be tested.

If you would like more information about inheritance, read the **Haemophilia booklet** by visiting the webpage: <https://www.haemophilia.org.au/about-bleeding-disorders/haemophilia> Or request a copy of the booklet from your Haemophilia Treatment Centre.

Bleeding symptoms

Most girls and women who carry the altered gene causing haemophilia do not have symptoms of a bleeding disorder. If at least one of their X chromosomes has a factor VIII or IX gene that works, their body can usually produce normal or near normal levels of clotting factor and they do not have bleeding problems.

However, some females who have the gene may have a bleeding tendency. These girls and women used to be described as symptomatic carriers. If a female's factor levels fall in the range for mild haemophilia (5 – 40% of normal clotting factor), she is now recognised as having

mild haemophilia. In very rare cases, a few females have particularly low factor levels causing them to have moderate or severe haemophilia.

Some females with factor levels between 40% and 60% may also experience abnormal bleeding.

Females with very low clotting factor levels may also have:

- Bleeding episodes that happen for no obvious reason.
- Bleeding into joints and muscles which can cause swelling, loss of movement and pain.

FACTOR LEVELS AND SEVERITY

The normal level of factor VIII or IX in a person's blood is between 50% and 150%

Mild haemophilia 5 – 40% of normal clotting factor

Moderate haemophilia 1 – 5% of normal clotting factor

Severe haemophilia Less than 1% of normal clotting factor

Female bleeding patterns

In males with haemophilia the severity is nearly always the same within the same family. This means, for example, a grandfather and a grandson will both have severe haemophilia. However, factor levels in girls and women who have the altered gene are unpredictable and can vary between family members. For example, a father with severe haemophilia can have a daughter with mild haemophilia, or if two sisters carry the gene, one can have normal factor levels, and the other can have low factor levels and have mild haemophilia.

Why does this happen?

This is because of a process called **lyonization**.

The lyonization process usually occurs very early in female embryo development. All females have two copies of the X chromosome. In lyonization each cell in the female embryo randomly turns off (inactivates) one of the X chromosomes. This is to “balance out” the amount of X chromosome material in each cell in a female’s body so that females do not end up with a doubling up of their genetic material.

What happens in haemophilia?

Because the lyonization process is random, usually it is an approximately 50:50 chance as to which X chromosome is inactivated. But sometimes (due

to random chance) the ratio may be skewed (for example, 70:30). This means:

- If the normal X chromosome (without the haemophilia gene mutation) is turned off more often than the X chromosome with the haemophilia gene mutation then a girl or woman’s clotting factor level can be low.
- If the X chromosome with the haemophilia gene mutation is turned off more often than the normal X chromosome then a girl or woman’s clotting factor level can even be at the higher end of the normal range.

It is important to understand that this is a random process and it is different in each female. This is why two sisters who both carry the gene for haemophilia can have very different clotting factor levels. This process also helps to explain why approximately 20-30% of women and girls who have the haemophilia gene alteration have a reduced clotting factor level.

When females have low factor levels, particularly when their factor levels are very low or equivalent to their male relatives with haemophilia, this may be due to other rare genetic conditions. This is a very complex area and the girl or woman would need to have specialised advice and genetic testing in liaison with a Haemophilia Treatment Centre.

Photo by Bahaa A. Shawqi from Pexels



The calico cat

The calico cat is often used to help explain lyonization (X chromosome inactivation).



The coat of a calico cat is a mix of orange, black and white fur. Calico cats are nearly always female and so they have two X chromosomes. The gene for the orange fur is on one X chromosome and the gene for the black fur is on the other X chromosome. When these cats are an embryo, each of their cells will turn off one of their X chromosomes.

If the X chromosome with the gene for black fur is turned off, the cell will create orange fur. If the X chromosome with the gene for orange fur is turned off, the cell will create black fur.

The amount of black and orange fur on a calico cat will depend on how many of either the black or orange X chromosomes are inactivated (turned off).

Because the X chromosomes are turned off randomly, the fur coat of every calico cat will have a different pattern of orange and black. The white colour is created by another gene.

Source: LeMieux, J. Calico Cats Are A Walking Genetics Lesson. American Council on Science and Health, July 27, 2016. Available from: <https://www.acsh.org/news/2016/07/27/calico-cats-are-a-walking-genetics-lesson>

Other bleeding disorders

Rare clotting factor deficiencies

Rare clotting factor deficiencies are another group of inherited bleeding disorders, caused when the body does not produce enough of a certain clotting factor, or when the factor does not work properly. Less is known about these disorders because they are very uncommon. In fact, many have only been discovered in the last 40 years.

Both females and males can be affected by rare clotting factor deficiencies.

Rare clotting factor deficiencies include:

- Factor I (1) deficiency – often called *fibrinogen deficiency*
- Factor II (2) deficiency
- Factor V (5) deficiency
- Combined factor V (5) and VIII (8) deficiency
- Factor VII (7) deficiency
- Factor X (10) deficiency
- Factor XI (11) deficiency
- Factor XIII (13) deficiency.



Photo by Bess Hamitt from Pexels

Symptoms

The particular pattern of bleeding symptoms in rare clotting factor deficiencies depends on the type of deficiency. It can also depend on the type of genetic alteration a person has inherited (called a *phenotype*). In some factor deficiencies, the symptoms can also be mild, moderate or severe depending on the amount of factor in the person's blood.

Finding out more about your disorder

If you have a rare clotting factor deficiency or inherited platelet disorder, ask your HTC for an information brochure that is specifically about your type of bleeding disorder.

There is also more information about RARE CLOTTING FACTOR DEFICIENCIES and INHERITED PLATELET DISORDERS on these websites if you look under BLEEDING DISORDERS:

- World Federation of Hemophilia – www.wfh.org
- Canadian Hemophilia Society - www.hemophilia.ca

Inheritance

Most of these conditions are inherited in what is known as an **autosomal recessive** pattern (like the inheritance pattern for VWD on page 13). This means that the person with the rare factor deficiency has nearly always inherited an altered gene from both parents. Some are found more often in areas of the world or communities where marriage between close relatives is common. In other families, parents may not be aware that they have the gene because they have few or no symptoms and it can be very unexpected when their child is diagnosed.

Exceptions are factor XI (11) deficiency and some types of factor I (1) deficiency, which can be inherited in either an **autosomal recessive** or **autosomal dominant** pattern (like the VWD inheritance patterns on pages 13-14).

Inherited platelet function disorders

Examples of inherited platelet function disorders are:

- Glanzmann's Thrombasthenia
Affects the fibrinogen receptor
- Bernard-Soulier syndrome
Affects the von Willebrand factor (VWF) receptor

In platelet function disorders, the platelet plug does not form properly, leading to a tendency to bleed for longer than normal or bruise easily. Since platelets have many roles in blood clotting, platelet function disorders can cause bleeding that ranges from mild to severe.

Acquired haemophilia and VWD

Nearly all people with haemophilia and von Willebrand disease (VWD) are born with these health conditions. These are called inherited bleeding disorders. However, a person can develop a different kind of haemophilia or VWD throughout life, usually as an adult, although this is very rare. This is known as an acquired bleeding disorder.

Acquired haemophilia can occur when a person's immune system produces antibodies that mistakenly target their own factor VIII. It is very rare but can sometimes occur in older people and young women who are in the later stages of pregnancy or have recently given birth. The bleeding pattern is different to inherited haemophilia and it is usually curable with treatment.



Acquired von Willebrand disease can also occur but is extremely rare.

Acquired bleeding disorders are not inherited or passed on to children. Men and women are equally likely to be affected by an acquired bleeding disorder.

If you have an acquired bleeding disorder, ask your HTC for more information about your disorder.

Factor deficiency	How rare? (estimates)	Inheritance	Severity of bleeding
Factor I (1): Afibrinogenemia	5 in 10 million people	Autosomal recessive	Usually mild, except in afibrinogenemia.
Hypofibrinogenemia	Not available	Autosomal recessive or dominant	Some can experience thrombosis (blood clots in veins or arteries) instead of bleeding
Dysfibrinogenemia	1 in 1 million people	Autosomal recessive or dominant	
Factor II (2)	1 in 2 million people	Autosomal recessive	Usually mild. Moderate to severe when factor levels are low
Factor V (5)	1 in 1 million people 1 in 100,000 in some populations, including Israel, Iran and Italy	Autosomal recessive	Usually mild. Moderate to severe when factor levels are low
Combined Factor V (5) and Factor VIII (8)	1 in 1 million people	Autosomal recessive (very rarely, factor VIII deficiency can be inherited separately from only one parent)	Usually mild
Factor VII (7)	1 in 500,000 people	Autosomal recessive	Severe when factor levels are low
Factor X (10)	1 in 1 million people	Autosomal recessive	Moderate to severe when factor levels are low
Factor XI (11)	1 in 100,000 people	Autosomal recessive or dominant	Variable
Factor XIII (13)	1 in 3 million people	Autosomal recessive	Moderate to severe when factor levels are low
Bernard-Soulier Syndrome	1 in 1 million people	Autosomal recessive	Variable (usually moderate to severe) ¹
Glanzmann thrombasthenia	1 in 1 million people	Autosomal recessive	Variable (usually moderate to severe) ²

Source: Adapted from National Blood Authority. Australian Bleeding Disorders Registry Annual Report 2015-16. NBA: Canberra, 2017; World Federation of Hemophilia. Characteristics of rare clotting factor deficiencies. WFH; Montreal, 2014.

Working with your Haemophilia Treatment Centre

If you have a bleeding disorder, or carry the gene, it is important to see a haematologist who specialises in bleeding disorders. In Australia these haematologists can be found at Haemophilia Treatment Centres. There is at least one specialist Haemophilia Treatment Centre in every state and territory in Australia, located in major public hospitals.

Going to a Haemophilia Treatment Centre

If you have bleeding symptoms that are causing problems for you, your doctor may suspect that you have a bleeding disorder and refer you to a Haemophilia Treatment Centre. Or you may have a family history of males and females in your family with a bleeding disorder. If you have bleeding symptoms as well, it is recommended that you or your parents talk to your GP (family doctor) about a referral to a Haemophilia Treatment Centre.

Diagnosis and treatment of haemophilia, von Willebrand disease (VWD) and rare clotting factor deficiencies are a specialised area of medicine.

It is important to have a referral to a Haemophilia Treatment Centre where a team of health professionals who are experts in providing treatment and care to people with bleeding disorders can make sure you're getting the best care and information. In Australia nearly all of these Centres are part of public hospitals, where attendance is free for Australians with bleeding disorders and their close relatives.



What is comprehensive care?

Haemophilia Treatment Centres have a comprehensive care approach.

This means:

- They have a team of haematologists (doctor qualified to manage blood diseases), nurses, social workers, psychologists and physiotherapists who have expertise in caring for people with bleeding disorders and their partners and families.
- The Centre has access to specialised laboratory and diagnostic testing and can give referrals to other services such as genetic testing and counselling.
- The team can work with other services you might need such as paediatricians (children's health doctors), gynaecologists (women's health specialists) and obstetricians (for pregnancy and childbirth).
- **Comprehensive care is important for anyone with a bleeding disorder.**

If you are 16 years or older you can attend the Haemophilia Treatment Centre on your own but often it is useful to bring along a support person such as a parent, or other family member. This decision will depend on factors such as your ability to understand your condition, and whether you feel confident to ask questions and make decisions about your own health care. You might simply like some support during your appointment. You can always call the Haemophilia Treatment Centre first to discuss whether to come in on your own or with support.

It's often helpful to write down any questions before your appointment and bring them with you. That will help you remember to ask about things that are important to you.

As well as the care from your Haemophilia Treatment Centre, it is important to have specialist gynaecological care over your lifetime to manage any women's health issues that occur. These may or may not be related to your bleeding disorder, but in some cases having a bleeding disorder (or bleeding symptoms) may make a gynaecological condition worse.

Your medical team

Ideally all your doctors should work together on planning your health care. The team could include:

- A haematologist (doctor qualified to manage blood diseases) and who specialises in bleeding disorders.
- A gynaecologist (women's health specialist)
- A general practitioner (your GP or family doctor)
- A paediatrician (children's health specialist)
- An obstetrician (pregnancy and childbirth specialist) when this is relevant to you or your family situation.

Your regular GP is important for looking after aspects of your health that may not be associated with your bleeding symptoms and to recognise when it's time to involve the Haemophilia Treatment Centre.



“ I would highly recommend anyone who thinks their bleeding isn't normal to seek further help. Speak to the team, get whatever help they can offer. ”

“ Listen to your body. YOU are the expert when it comes to YOUR bleeding symptoms. If you think something isn't right, speak up and see someone. ”



Diagnosing a bleeding disorder

Bleeding disorders can be difficult to diagnose. Repeated testing may be needed to confirm the diagnosis. Understanding the laboratory test results is complex and needs to be done by a haematologist and laboratory with experience in bleeding disorders.

Diagnosis can be tricky if you have heavy bleeding with your periods and a bleeding disorder. It can be hard to know if:

- Your bleeding disorder is causing the heavy periods
Or
- You have a women's health problem that is unrelated to your bleeding disorder.
Or
- Your bleeding disorder is making another problem worse.



The timing of the testing can also be important. Some tests can be affected by the natural rise and fall of your hormones in your menstrual cycle or taking the contraceptive pill and other factors such as stress, exercise or pregnancy.

Your GP or your Haemophilia Treatment Centre might refer you to a gynaecologist to help understand what is happening with you. This is an important step to rule out any other problems or issues that may not be related to your bleeding problems. It also allows your GP, Haemophilia Team and gynaecologist to work as a team. They will communicate with you and each other about the diagnosis and a treatment plan tailored to you and your situation. Sometimes it can take a while to unravel your diagnosis and to develop a treatment plan that works best for you. This might require more tests and trying out different medications, doses and even combinations of medications.





Diagnosing VWD

VWD can be difficult to diagnose and repeated testing may be needed to confirm the diagnosis. Understanding the laboratory test results is complex and needs to be done by specialists with experience in VWD.

Many people's symptoms are mild and they may not be diagnosed until they have a major bleeding problem such as surgery or an injury. However if they have a severe form of VWD, they will usually have major bleeding problems as a baby or small child and will often be diagnosed within their first year of life.

Diagnosing VWD involves:

- **A personal history of abnormal bleeding or bruising from mucous membranes** (such as the nose, mouth, uterus, vagina, stomach and intestines) or from the skin after injury, trauma or surgery *and*
- **A family history of bleeding problems** *and*
- **Specialised laboratory test results for VWD**

How were you diagnosed?

“ I was diagnosed as a baby. I had fallen and cut my lip and it bled all night. My mum woke to me in my blood-soaked cot and I was taken to hospital by ambulance. I was diagnosed by the time we left the hospital. ”

Pregnancy and testing

Most women with VWD do not have a problem with delivering a healthy baby. With the most common form of VWD (mild type 1), pregnancy will very often cause blood levels of VWF (von Willebrand factor) to increase into the normal range by the last three months of pregnancy, so that bleeding complications during pregnancy and childbirth are far less likely. Women with rarer or more severe forms of VWD are much more likely to need treatment to reduce the risk of bleeding problems during delivery.

It is a good idea to talk to your HTC and your obstetrician before you get pregnant, and to ask them to liaise with each other. You might like to speak to a genetic counsellor. Ask your haematologist if there needs to be any special care with having tests like amniocentesis. If you have VWD and are pregnant, you would need to be monitored and have blood tests for your VWF levels during your last three months of pregnancy. This is to plan for childbirth, a safe delivery for you and your baby and for any treatments you might need to prevent possible heavy bleeding in the weeks after delivering the baby when your factor levels return to their usual level.



Diagnosing haemophilia

If you know, or your family history suggests, that you might carry the gene causing haemophilia, it is important to have at least one visit to the Haemophilia Treatment Centre. This is to discuss your individual health situation and can include:

- **Clotting factor level testing to see whether you need a treatment plan.**

Factor level testing is a good idea before you start menstruating (getting your period), or if you are having heavy periods. The initial treatment options for heavy periods are generally similar whether or not you have a bleeding disorder, but there may be other treatment options that are appropriate if your clotting factor level is low. Factor level testing is also really important before medical procedures such as dental work or surgery. Just keep in mind that having a test for clotting factor levels does not tell you if you carry the gene for haemophilia.

You can have normal levels but still carry the altered gene.

- **Genetic testing to see if you have the gene**

This includes discussing the pros or cons about having a genetic test to know for sure before you have testing (sometimes called 'genetic counselling'). Then if you go on with testing, it will identify whether you have the gene or not.

- **Planning a pregnancy and things to think about.**

You can find out options to reduce the chance of passing the gene onto your children, and how to plan for a safe pregnancy and delivery. It's really important that you find out about these options **before** you become pregnant.

How were you diagnosed?

“ My grandfather was a haemophiliac, so I had clotting factor tests done at 5 years and genetic testing in my 20s. ”

“ We received additional genetic testing when I was 20 roughly which determined we were in fact carriers. ”

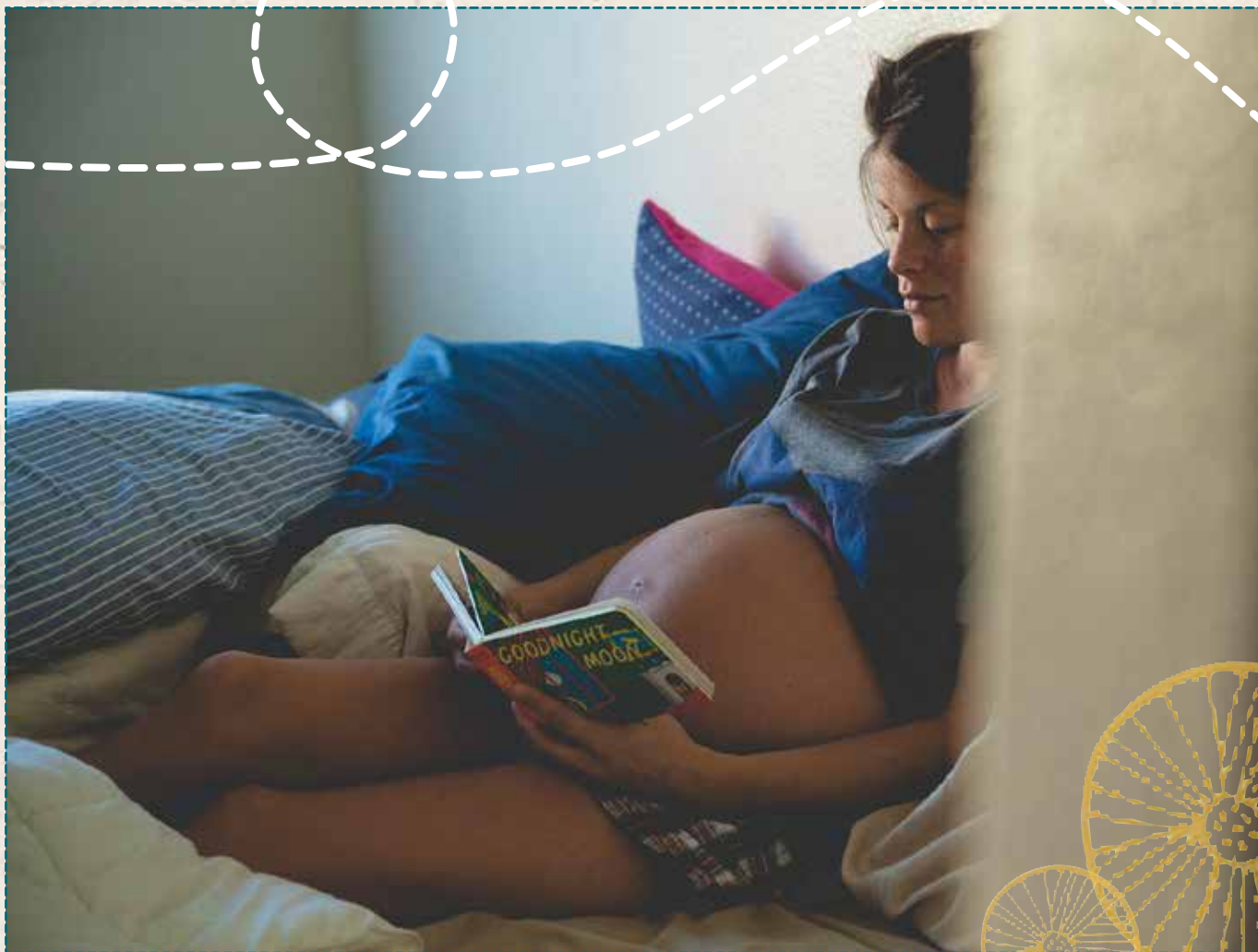
When to have clotting factor level testing

Clotting factor level testing is recommended for:

- All girls and women who have the gene for haemophilia
- Girls and women who are very likely to have the gene because of their family's history of haemophilia.

Ideally factor level testing should be done early in life, but the exact timing of the blood test is an individual decision.

A good time to collect the blood for a clotting factor level test can be at the same time as a blood test for another reason. If a young girl is already going to have a blood test, parents can contact the Haemophilia Treatment Centre who can arrange the form to collect the extra sample of blood for clotting factor testing at the same time.



Surgery or dentistry

If you are having planned surgery (such as removal of tonsils and adenoids) or dental procedures you **must** have your clotting factor levels tested. If your level is low your Haemophilia Treatment Centre will put a management plan in place to make sure the procedure can proceed safely.

Before periods start

You and your parents may also prefer to have your factor levels checked before your periods start, to be prepared and well-informed about the possibility of heavy periods.

Pregnancy

It is particularly important to have had clotting factor level testing before you become pregnant. If your factor VIII level is low and you become pregnant, you will also need more factor level testing. Usually factor VIII levels go up during pregnancy, so another test might need to be done to see if the level is high enough for a safe birth. If not, clotting factor

concentrates or other treatment might be needed. Factor IX does not change during pregnancy so testing does not need to be repeated.

Other times for testing

Talk to your haemophilia team about other times you might need to have your clotting factor level done again. This would depend on your individual situation, and could relate, for example, to treatment, pregnancy or surgery.

It is important to remember that **normal factor VIII or factor IX levels will not tell you whether you have the altered gene causing haemophilia**. Many females who carry the gene have normal factor levels. Finding out your clotting factor level helps you and your Haemophilia Treatment Centre decide if you need to develop a treatment plan specifically for you. If your levels are normal a separate genetic test is needed to find out if you have the gene.



Genetic testing for haemophilia

Genetic testing shows if a girl or woman has the altered gene for haemophilia.

Deciding to have genetic testing is a personal decision and needs to be thought about carefully. The Haemophilia Treatment Centre can help with this.

A common time for genetic testing is when a young woman reaches childbearing age. It is important you understand the process and the meaning of genetic testing. This includes understanding how knowing your status might affect you, particularly in relation to current or future relationships, and for possible pregnancies.

Finding out whether you have the gene is a process which takes time, sometimes many months. Knowing before you get pregnant gives you the chance to think about family planning options that can lower the

chance of passing on the altered gene. Many of these options aren't available if you don't know whether you have the gene before becoming pregnant.

Talk to your Haemophilia Treatment Centre about when testing is right for you. The Haemophilia Treatment Centre can help with information and advice about genetic testing and can provide a referral to a genetic counsellor, if needed.

Remember: genetic testing is not the same as clotting factor testing which only tells you whether your clotting factor levels are within normal range. Clotting factor level tests do not test for the gene.

For more information about genetic testing and counselling, visit the Women with bleeding disorders section on the HFA website - www.haemophilia.org.au/women.



Diagnosing rare clotting factor deficiencies

Most rare clotting factor deficiencies are diagnosed through a variety of blood tests, including tests to measure the amount of particular clotting factors in the blood. It is best if these are ordered by a specialist doctor (haematologist) at a Haemophilia Treatment Centre, who will use a specialist coagulation laboratory to do this kind of testing. The haematologist may need to request very specific tests, for example, a test for factor XIII (13) deficiency because factor XIII deficiency will not show up in routine clotting factor tests. The tests are complex and the specialist doctor will have to look closely at the results and may need to rule out other bleeding disorders.

How were you diagnosed?

“ I had a heel prick as a baby and it wouldn't stop bleeding. ”

Diagnosing inherited platelet disorders

To have an inherited platelet disorder diagnosed, you will need to see a specialist doctor at a Haemophilia Treatment Centre. The specialist will talk to you, and your parents if they are present, about your health and history of bleeding.

You will also need to have a series of blood tests, including tests that measure how well the platelets “aggregate” (stick to each other) in response to various stimuli (things that cause a reaction). Quite a few blood tubes need to be collected for these tests and the results can be affected by many factors in the process of collection, transport to the laboratory and testing. This may mean that repeated testing is necessary before your doctor is satisfied that a diagnosis of a platelet function disorder is appropriate.



Treatment plans

Most women and girls with bleeding disorders don't need regular treatment, but it is important that they have a treatment plan ("action plan") in case urgent treatment is needed (e.g., for urgent surgery or following an injury).

There are a number of situations where treatment may be required:

- To reduce or manage bleeding problems with your periods
- To reduce or manage other bleeding problems (eg. recurrent nosebleeds)
- In preparation for surgery, medical procedures, dental treatment or giving birth
- After an injury or accident

There are several different types of treatment for bleeding disorders.

The type of treatment that will be most useful may vary at different times and will depend on your individual diagnosis and situation. Your haematologist will look at all of this and will involve other doctors (for example a gynaecologist) and members of the Haemophilia Team (for example a physiotherapist). Together they will consider your thoughts and wishes before recommending the best treatment option for you. They may also need to reassess the treatment plan from time to time.

If you have a lot of problems with bleeding symptoms, the Haemophilia Treatment Centre may ask you to visit regularly to develop and monitor a treatment plan, but this will depend on your individual situation.

How does your treatment plan help you?

“ Having a treatment plan meant I was no longer missing out on events, days at work and life in general because of bleeds. I was able to start living a “normal” life, and have treatment when needed. ”

“ Recently my treatment plan changed to include prophylaxis after I developed joint damage. Starting prophylaxis has helped me recognise the minor bleeding issues I had been ignoring now that they are absent. ”

“ Try to be as open as possible about your symptoms with your HTC team. They cannot provide appropriate treatment for symptoms that you keep to yourself. ”





What are the types of treatments used?

- **Protection, Rest, Ice, Compression and Elevation (PRICE):** These steps are important to minimise swelling or bruising. PRICE is a simple treatment for minor soft tissue injuries that may lead to bruising or haematoma (large bruises with a lump).
- **Tranexamic acid** is an oral medication (anti-fibrinolytic) that can be useful in managing heavy periods, nosebleeds and after minor injuries or procedures in the mouth, eg dental work.
- **Hormonal therapies** (for example, the contraceptive pill or the Mirena IUD/ intrauterine device) for problematic menstrual bleeding are prescribed with input from a gynaecologist.
- **DDAVP (Desmopressin)** is a laboratory-made version of a hormone that raises the levels of factor VIII and von Willebrand factor. It may be useful in managing bleeding or before surgery in girls and

women who have a reduced factor VIII level or who have certain subtypes of VWD. It sometimes works well in treating platelet storage pool deficiencies. Not all young women and girls respond to this medication, so your Haemophilia Treatment Centre may arrange for you to have a test dose first with some blood tests afterwards to check your response.

- **Clotting factor concentrates** may be required to treat or prevent bleeds, or before surgery in girls and women with haemophilia and with some rare clotting factor deficiencies. It's also given to young women and girls with VWD who do not respond adequately to DDAVP. This is infused (injected) into a vein. Multiple infusions may be needed over a number of days depending on your clotting factor level and the procedure being done. Some girls and women with severe bleeding disorders have 'prophylaxis', which is regular treatment to prevent bleeds.





Factor concentrates for haemophilia A and B are 'recombinant', which means they are synthetic, made by genetic engineering. The factor concentrate that is currently available for VWD in Australia is made from the plasma (pale yellow fluid part) in human blood, but is then highly purified and treated.

In some rare bleeding disorders a specific clotting factor concentrate has not yet been developed or is not suitable for treatment. Other blood products may be used:

- **Fresh frozen plasma** is made from the plasma (pale yellow fluid part) in human blood. It contains the range of proteins (factors) needed to help blood to clot. It is stored frozen and thawed for treatment, when it is infused (injected) into a vein. In Australia it is sometimes used to treat rare clotting factor deficiencies, such as factor V (5) deficiency.
- **Cryoprecipitate** is also made from the plasma (pale yellow fluid part) in human blood and is infused (injected) into a vein. It contains specific blood clotting proteins (factors) including fibrinogen, factor VIII (8), factor XIII (13) and von Willebrand factor. In Australia it would only be used in an emergency when other suitable products are not available.
- **Platelet transfusion** may be required for more severe inherited platelet function disorders. To avoid reactions to platelets, the transfusions are

often carefully matched to the individual person. This requires specialised testing which can take some weeks.

Other forms of treatment

- Treatment can also involve **exercise guided by a haemophilia physiotherapist**, especially if you have had an injury or have pain in your joints or muscles. This can help to prevent bleeds and protect joints, and keep muscles strong. If you have a joint or muscle bleed, the physiotherapist can also give advice to help reduce pain and a program of advice and exercises to rehabilitate the joint or muscles around where you had the bleed back to full function. General exercise is a common recommendation as another approach to dealing with pain during your period.
- **Pain management:** talk to your specialist doctor (haematologist) before you take any medications containing ibuprofen (e.g., Nurofen™) or aspirin – these medications may worsen your bleeding tendency. Doctors usually recommend paracetamol (e.g, Panadol™) for initially managing pain with a bleeding disorder, but if you feel that something else is needed it is important to discuss this with your haematologist or pain specialist. Heat packs and rest may also help with period pain. If you are having problems with joint pain or other pain that is not period pain, talk to your HTC team or your local GP – there might be a few different issues to take into account.

Registering with your Haemophilia Treatment Centre

If you have bleeding symptoms, registering and staying in contact with your local Haemophilia Treatment Centre is an important part of managing your bleeding disorder.

If you move interstate, touch base with your new Haemophilia Treatment Centre to give them your

details and to see how the system works locally. Let your Haemophilia Treatment Centre know if you change any of your contact details so they can keep you up to date with the latest news, workshops or events. It is important they have your latest contact details so that information about appointments (or any other information you request) are sent to the correct address. You can find contact details of HTC's in Australia on the HFA website at www.haemophilia.org.au.

If you move overseas for a long period, eg with study or work or permanently, make sure you research your new local Treatment Centre and get in touch before you leave home. Talk to your Haemophilia Treatment Centre about what you will need to do when you move and how to register with your new HTC.

For details of HTC's in other countries, click on the FIND A TREATMENT CENTRE button on the World Federation of Hemophilia website – www.wfh.org.

ABDR and an ABDR patient card

The **Australian Bleeding Disorders Registry (ABDR)** is the online system used by Haemophilia Treatment Centres to manage and record the treatment and care of their patients.

The **ABDR patient card** explains your diagnosis (for example, mild haemophilia A), what treatment should be given and who should be contacted for further advice. It is the size of a credit card and fits in a wallet or purse. Keep the ABDR patient card on you for quick reference.

Previously all females who carried the gene for haemophilia and had reduced factor levels were registered in the ABDR as 'symptomatic carriers', but this has recently changed. Girls and women who carry the gene and have factor levels of less than 40% will now be registered as having haemophilia. Some girls and women who carry the gene for haemophilia have bleeding symptoms but their factor levels are between 40% and 60%

and are higher than a person with haemophilia. These girls and women are registered as 'symptomatic carriers' in the ABDR.

MyABDR is the app and website that people with bleeding disorders who are on home treatment use to record their treatments and bleeding episodes. If you use MyABDR, your MyABDR entries are added directly to your patient record in the ABDR every time you sync. The main purpose of MyABDR is for people with bleeding disorders to share information about their use of clotting factor concentrates at home or bleeding episodes with their Haemophilia Treatment Centre.

“ If I experience a serious bleed I will note it in myABDR ”



What do I tell my other doctor or dentist?

Bleeding disorders are relatively rare conditions. Most doctors and dentists are not familiar with treatments for bleeding disorders and will not know about your treatment plan.

Although bleeding disorders in females are slowly becoming more well-known, many doctors, nurses and other health professionals still do not realise that girls and women can have inherited bleeding disorders. This can be an added challenge for young women who have bleeding symptoms.

It is important to have some personal strategies to help manage your health care when you are using services outside the Haemophilia Treatment Centre.

These tips give examples of the strategies some Australian women with bleeding symptoms have used.



Tips...

“ I always take every opportunity to discuss my bleeding disorder with other health professionals as an opportunity to advocate, and raise awareness of women with bleeding disorders. They may not have known a lot about it before seeing you, so this your chance to help yourself, and the next girl! ”

“ Do your research and learn to advocate for yourself. There is a shocking amount of misinformation out there about bleeding disorders - especially in regard to how they affect women! Reach out and get to know other bleeder women through Facebook or your local Haemophilia organisation. ”

“ Keep it simple and provide details in writing. The name of your condition, what to do in an emergency, and medications you can't be given. Just as you would with an allergy or any medical condition. ”

- **Bring this booklet with you to any medical, health or dental appointments.** You can use it to help answer questions you might be asked. Your HTC might also have specific brochures you can take with you, for example, on surgery or dentistry if you have a bleeding disorder.
- **Make sure you know what type of bleeding disorder you have and how severe it is. If you are registered for the ABDR, ask the Haemophilia Treatment Centre to organise an ABDR patient card for you.** The ABDR patient card explains your diagnosis, what treatment you should be given and who should be contacted for further advice. Keep the card on you for quick reference.
- **Show your other doctors, dentist, and health care providers your ABDR patient card and ask them to liaise with your Haemophilia Treatment Centre.** This will help with getting appropriate treatment. It will also make it easier to obtain treatment if you need it when you are away from your usual hospital or Haemophilia Treatment Centre, for example, if you are travelling or have moved interstate or overseas.
- **Always inform your doctor, dentist or surgeon if you have a bleeding disorder before having any medical, dental or surgical procedures, no matter how minor.**
- **Before you have any procedures, contact your Haemophilia Treatment Centre and discuss the medical support you may need to prevent bleeding complications.** Where possible, plan this well ahead of time. The Haemophilia Treatment Centre team may also need to liaise with your surgical or dental team or other health professionals involved in your care to discuss the best approach for you individually and any pre- or post-treatment care you may need.
- **Before you start taking anything prescribed by your doctor, naturopath or other health practitioner check with them whether it is safe for someone with a bleeding disorder.** Some medicines, vitamins and supplements can interfere with blood clotting and healing, or can irritate your mucous membranes such as your nasal passages or stomach lining. This includes some herbal and homeopathic medicines and others available over-the-counter, such as aspirin and non-steroidal anti-inflammatory drugs like ibuprofen. Speak with your haematologist or your pharmacist about which medicines you need to be cautious with or avoid.

Talking to health professionals

What can you do to have the best result from your appointment?

- **Being prepared for your appointment** can help – for example, being informed about your bleeding disorder and the symptoms you experience that are relevant to your appointment. This may also involve knowing what you would like as an outcome of the appointment and being able to explain this clearly as well as being open to discussing a different outcome or way to achieve your goal. You may also like to bring a list of questions you have, points you want to discuss or symptoms you have been experiencing to help you remember to ask them in your appointment.
- **It might also help to have any letters explaining your diagnosis and the contact details of the Haemophilia Treatment Centre with you** so you can give them to the health professional and they can find out more information with your consent.
- You may want to **bring someone with you** such as a parent or support person to help you explain your bleeding disorder to health care workers such as doctors and dentists. The support person can also be a second pair of ears to help you remember what was said.
- Some young women say they find it very helpful to **stay calm** when they explain their bleeding disorder to health professionals. They also say it is important to try to **express yourself as clearly as** you can.

You are not alone

Women and girls and their parents often comment that it is helpful to talk to others in a similar situation and know that they are not alone, even though bleeding disorders may only affect them at certain times in their life.

“ There are many supporting groups available and there are many other women who understand your issues. ”

Haemophilia Foundations are a great way to connect with others and share experiences.

State and Territory Haemophilia Foundations have:

- Newsletters and web sites to update people with bleeding disorders and their partners, families, friends and carers
- Social activities where you can meet, talk about common experiences, and enjoy a meal or a day out, such as family camps, Christmas parties, women's groups and youth activities.

Haemophilia Foundation Australia also supports:

- A national website with information and personal stories for women with bleeding disorders
- Social media sites, such as Facebook, Twitter and Instagram
- A youth program (Youth Lead Connect) and a website (Factored In) for young people affected by bleeding disorders

For more information, visit:

- HFA website – www.haemophilia.org.au
- Factored In youth website – www.factoredin.org.au



Frequently asked Questions



Question

I have a bleeding disorder and I'm really scared by the amount of blood I lose in a period. Last time I went through 6 super tampons and pads in a day and I felt like I was going to be sick and I was really dizzy and tired.

When should I go to the emergency department in my hospital? When would I need a blood transfusion?

Answer

Having a very heavy period can be troubling and frustrating. It can be hard to manage the amount of bleeding, particularly if you have to change your tampons or pads very often or have flooding for days and you are not feeling well.

Understanding what is happening is important so that you know what to expect and when you should talk to your Haemophilia Treatment Centre or seek medical assistance.

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What is heavy bleeding?

- Soaking through a tampon and a pad around every two hours or more often, or needing to change protection during the night.
- Periods for longer than normal (longer than 8 days)
- Bleeding with clots bigger than a 50 cent piece
- Bleeding or spotting between periods.

Spotting can sometimes happen mid-cycle, at the same time every month, but in women with a bleeding disorder this can sometimes last several days and require pads or tampons. Keep a diary. It is also worthwhile having this checked by your local doctor. Sometimes there can be other causes that need to be checked and they may need to refer you to a gynaecologist.

- Flooding (soaking through tampon or pad through clothes or onto bedsheets)



Why am I feeling like this?

During your period, your hormone levels change and the prostaglandins and other special chemicals that tell your body to peel off the lining of your uterus and start the bleeding can affect how you feel. They can make you feel dizzy and faint, they can cause nausea (feeling like you are going to be sick), vomiting and diarrhoea, give you cramping pain, and make you feel like you don't have any energy and make you look pale.

It is unusual for a single heavy period to cause anaemia - usually it happens over months to years. If you often have heavy periods, the iron levels in your blood can gradually drop. This causes anaemia which in turn can make you look pale and feel really tired and dizzy and breathless, particularly if you are doing something a little bit strenuous like walking up stairs. It is very important to visit your GP - to have your blood and iron levels checked and to

replace the iron in your body. You also need to deal with the heavy menstrual bleeding which is causing your low iron levels.

You might be feeling alarmed at the amount of blood you are losing during a single heavy period but your body is able to quickly replace it. Throughout one heavy period, you could easily lose more than 80ml of blood (around a third of a cup)³ and sometimes much more over several days. That might seem like a lot but, if you are around 50-65kg, your body has around 4.5 - 5.5 litres of blood⁴ which it constantly replaces. By comparison, a blood donation usually takes about 10% of the donor's blood, or around 450 – 550 ml in one day.⁵



When should I seek help?

If you have very heavy bleeding, and ongoing and very noticeable symptoms of dizziness or extreme tiredness or breathlessness then it is important to seek medical help urgently.

Medical staff need to check for and treat anaemia and start medical treatment to slow the bleeding. You should seek advice from your Haemophilia Treatment Centre about the best place to go (such as which hospital) depending on your individual situation and where you live.

In some situations, this may need to be the Emergency Department. This is so that a quick medical assessment and blood tests can be done and treatment can be started in consultation with the Gynaecology and Haematology specialty doctors on call for the hospital. If you do need emergency treatment for extremely heavy periods it is important to let the Emergency Department doctor know about your bleeding

disorder and show them your ABDR treatment card so your haematologist is contacted for advice.

Most of the time however, heavy periods are not an emergency and can be managed at home. If you are feeling nauseous, fatigued or have cramping pain during your heavy period, it is important to look after yourself. Take the time to rest, drink plenty of water and take pain relief if you need it to feel more comfortable. Sometimes a hot water bottle can provide comfort for cramping pains.

If you are still bleeding heavily after 8 days, or if you are still feeling faint and dizzy or have no energy to the point where you can't do your normal daily activities (such as go to work or to school), and are still worried make an appointment with your GP. If you do faint and hit your head, make sure you are taken to hospital right away to check if there is bleeding inside your head that can put pressure on your brain.

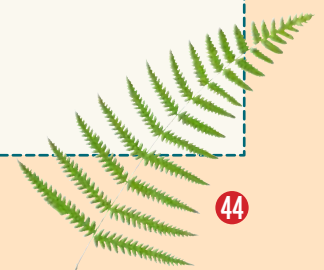
Who should I talk to?

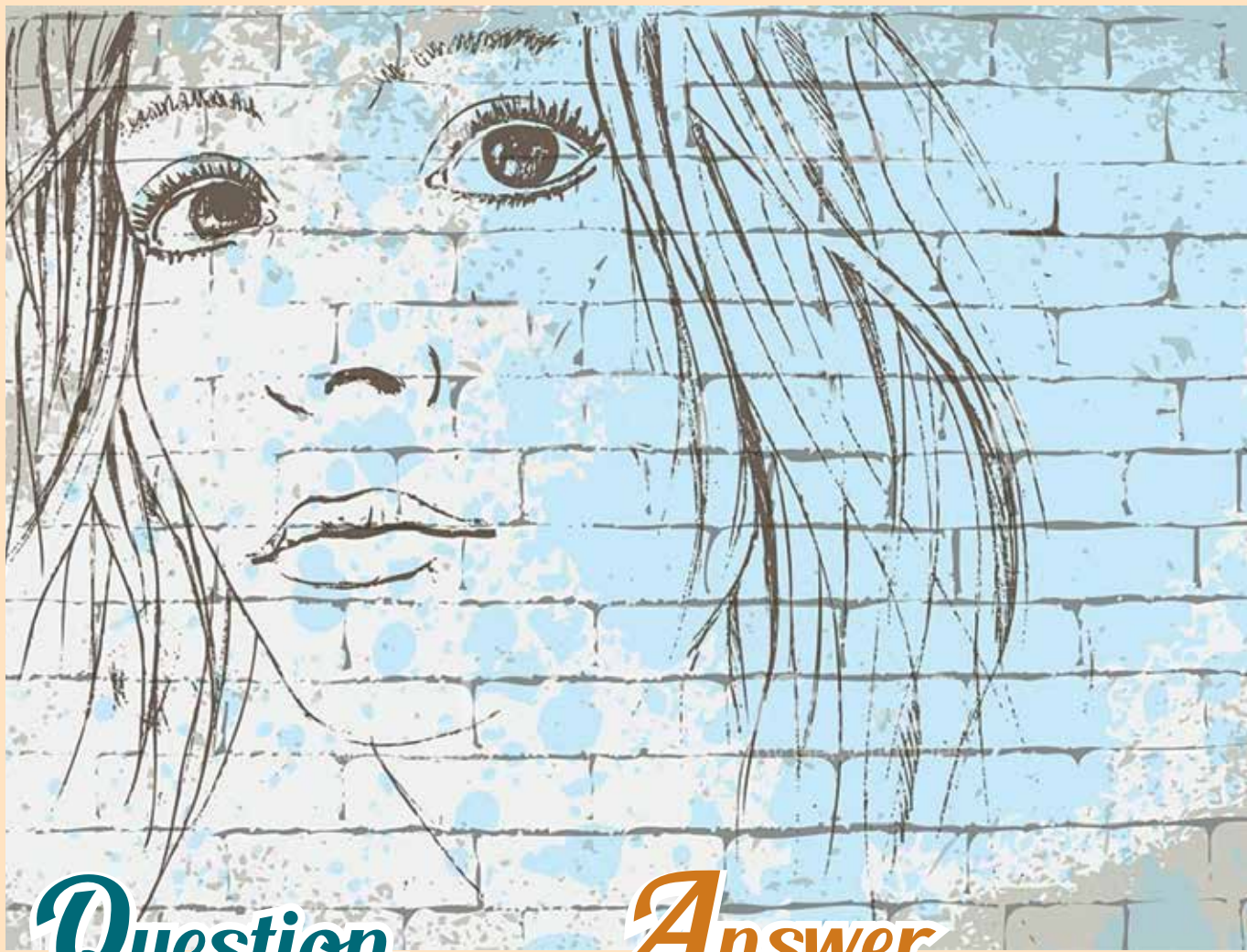
Seeing your GP can be a good place to start. They can take care of other aspects of your health including doing a general Women's Health check. If you are not already being managed by your Haemophilia Treatment Centre for heavy bleeding, talk to your doctor about making an appointment with them when you feel better.

Your Haemophilia Treatment Centre will discuss the bleeding symptoms with you, and may also want to test your blood to check your iron levels. If needed they can put some management strategies in place and may want to refer you to a gynaecologist for specialist care. Your gynaecologist will be part of your medical care team, and will work together with you and your haemophilia team to understand and manage your bleeding symptoms. Not all gynaecologists are familiar with treating people with mild bleeding disorders and sometimes it is necessary to change doctors to find one who will listen to your concerns.

Would I need a blood transfusion?

It is quite unusual to need a blood transfusion for heavy periods. Very occasionally it may be needed when girls with bleeding disorders start their periods for the first time (known as *the menarche*) or during the first 6 months after this. A transfusion might be given when a girl's menstrual bleeding (period) is extremely and persistently heavy, leading to very low red blood cell counts (low haemoglobin), and when it takes a while for the first line medical and hormonal treatment to stop the bleeding. Usually if a girl has anaemia due to low iron as a result of heavy periods, it is safely managed through treatment with iron replacement rather than a blood transfusion.





Question

I have read on the internet that my only option to control my bleeding issues is a hysterectomy. I don't want to do that, because I might want children one day. What are my other options? Who can I talk to?

Answer

Although there is some good information on the internet, there is also a lot of information that does not apply to young women with bleeding problems, is incorrect, or might not be relevant to your situation. It can often be hard to separate the good information from the not so good. It is important to talk to your haemophilia nurse or doctor at your Haemophilia Treatment Centre. They will be able to talk with you about your individual situation, tell you where to get the most up to date and accurate information and discuss the best treatment options for you.

Sometimes heavy periods can be a sign of a gynaecological (women's health) disorder. This may not be related to the bleeding disorder, but the bleeding disorder might make the heavy periods worse. With diagnosis and appropriate treatment, these bleeding problems can usually be reduced or managed. It is important that your gynaecological care is managed in a team, where the gynaecologist and your Haemophilia Treatment Centre discuss the treatment options with you.

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What options are there?

These days there are many treatment options available such as the simple non-hormonal method of tranexamic acid.

It is now known that there are no problems with using female hormones (either the combined contraceptive pill or other progesterone medications such as provera, or norethisterone) in a continuous way, to skip periods altogether. There is a hormone releasing IUD (intrauterine device that is placed inside the womb) that works well to reduce heavy bleeding and is often offered to young women once their body has matured. If you are concerned about skipping periods keep in mind that at certain times it is quite normal for women to go for many months without getting their period, such as during pregnancy and breastfeeding. In previous generations women who had 10 or 15 babies and who breastfed them all would have had less than 50 periods in their lifetime!

Generally, your medical care team will suggest trying all of the medication options before considering surgery such as hysterectomy (surgical removal of the uterus), or procedures such as endometrial ablation, where the lining of the uterus is removed to reduce heavy bleeding. After these kinds of procedures you will not be able to have children and these procedures are not usually recommended for young women who might want to have children in the future. It is also worth remembering that all operations, including hysterectomy, carry risks of bleeding complications.

Endometriosis

Girls and women with bleeding disorders have an increased chance of having a condition called endometriosis, where tissue similar to the lining of the uterus (womb) grows in the pelvis outside the uterus and can bleed during menstrual periods. Endometriosis can cause pain and period problems.

For more information about endometriosis, see page 7.

Do I need an operation?

Just because you have pain does not mean you need an operation. Most, if not all endometriosis can be prevented by reducing or stopping the bleeding altogether through effective treatment. Reducing the bleeding also gives your body the chance to absorb any bleeding outside the uterus (just like a bruise on your arm will be reabsorbed).

If reducing or stopping the bleeding results in the pain disappearing, you can avoid surgery and the risks with having an operation.

Having children

If you want to discuss your questions about having children, talk to your Haemophilia Treatment Centre team and your gynaecologist. They will also discuss with you if they believe you might benefit from seeing other specialists. You may also find it valuable to talk to a social worker, counsellor or psychologist at your HTC about your situation and your future plans. Your HTC can also refer you to a counsellor in the community if you prefer.



More Information

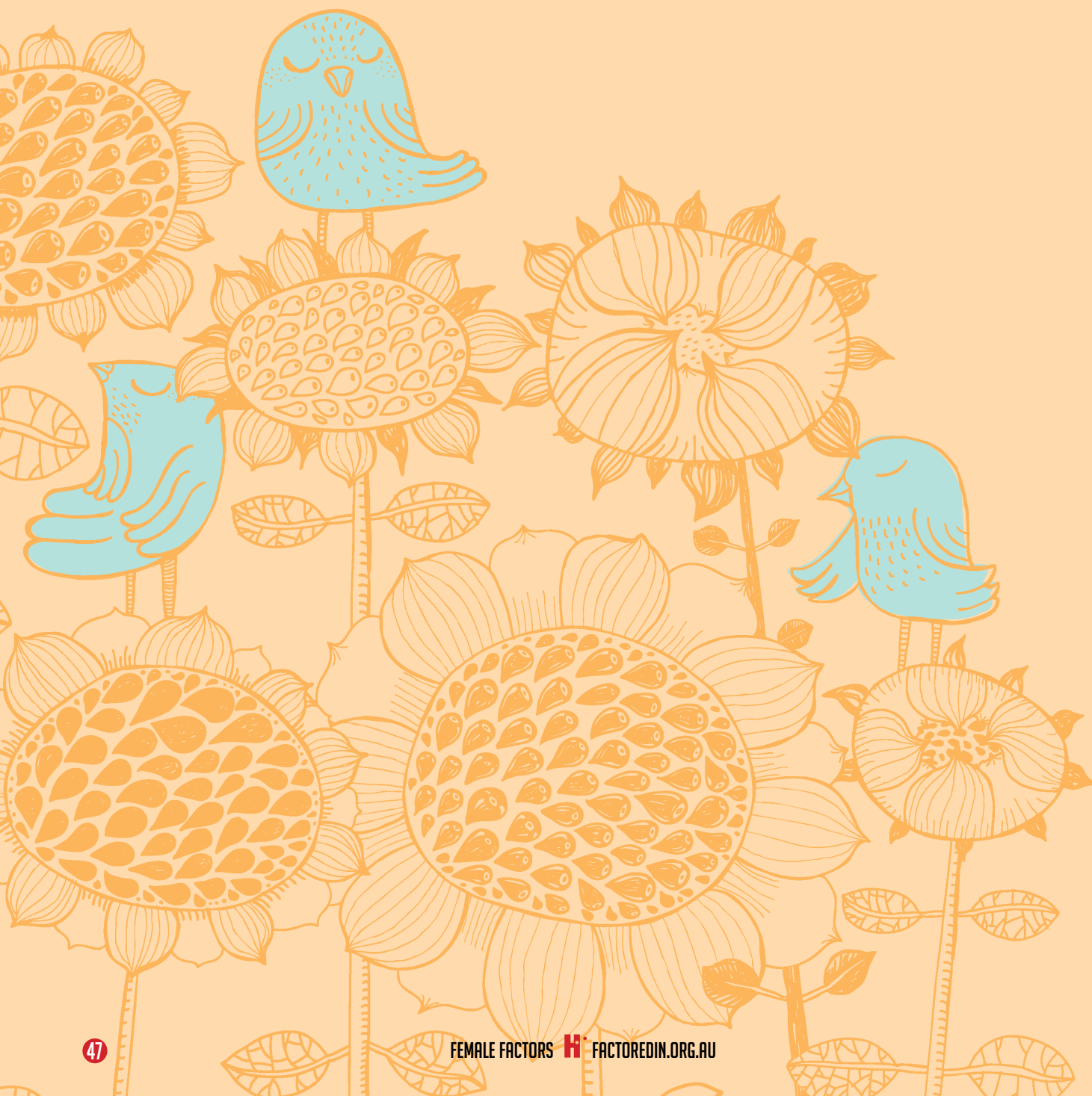
For more information about bleeding disorders,
or to find out how to get in touch with your local
Haemophilia Foundation or a specialist Haemophilia
Treatment Centre, contact:

Haemophilia Foundation Australia

P: 1800 807 173

E: hfaust@haemophilia.org.au

W: www.haemophilia.org.au



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Important Note: This booklet was developed by Haemophilia Foundation Australia for education and information purposes only and does not replace advice from a treating health professional. Always see your health care provider for assessment and advice about your individual health before taking action or relying on published information.

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