**Graft versus host disease (GvHD)**

Information for young people with cancer, and parents of a child or young person with cancer, having a donor (allogeneic) stem cell transplant

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**What is GvHD?**

GvHD can occur following a donor stem cell transplant whether stem cells come from bone marrow, peripheral blood or umbilical cord blood.

The ‘graft’ is the donor cells and the ‘host’ is the transplant patient cells. In GvHD, the donor’s T-cells fight the patient’s organs and tissue, reducing their ability to carry out their normal function. This happens because the donated cells (the graft) see your body cells (the host) as foreign, and mount an attack which is called GvHD.

T-cells are white blood cells that distinguish ‘self’ (cells that should be in our bodies) from ‘non-self’ cells that should not be in our bodies, such as bacteria and viruses. Once the donated stem cells begin to grow in the patient’s body, the donor’s T-cells become very active and identify the body tissue as ‘non-self’.

**Who gets GvHD?**

It is difficult to predict before the transplant exactly who will get GvHD and to what extent. When donors are matched to patients, whether family members or not, work done in the laboratory aims to provide the best match possible. This work can attempt to predict the risk of GvHD and can enable us to choose the best available donor for the transplant.

It is worth remembering that many patients will develop a degree of GvHD. It is usually mild and can be treated but sometimes it can be serious.

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[www.cclg.org.uk](http://www.cclg.org.uk)
**Preventing/reducing GvHD**

A lot of work has been done by many people to select the best donor match for your transplant.

During and after the transplant, drugs are used to prevent or reduce and to treat GvHD if it occurs. These drugs help control the donor’s T-cell activity. This will be discussed by your SCT team. Please remember that for some people treatment of GvHD can take a long time but it is an extremely important part of your care.

The main medications used to prevent GvHD are called immunosuppressive drugs, in particular a drug called ciclosporin. There are several other treatments that may be used for treatment of GvHD if it becomes more complicated. Your SCT team will discuss the right treatment for you if you need it.

**Where can GvHD occur?**

GvHD can occur in any body part but the most common sites are:

- Skin
- Gut (gastro-intestinal tract)
- Liver

More than one body part can be affected.

**Grades of GvHD**

GvHD is measured in the following four grades:

- Grade 1 (mild)
- Grade 2 (moderate)
- Grade 3 (severe)
- Grade 4 (most severe)

**Types of GvHD**

There are two Types of GvHD

- Acute (aGvHD)
- Chronic (cGvHD)

This factsheet will describe each of these separately along with some less common sites.

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**Treatment for GvHD will be specific to your/your child’s requirements**

The goal will be to suppress your immune system without compromising the new donor cells.
Acute GvHD (aGvHD)
aGvHD most commonly occurs in the early post-transplant period.

aGvHD of the skin
Skin GvHD usually starts with a rash. It may be more obvious at certain times of the day. It often starts on the palms of the hands and soles of the feet. The hands and feet can become sensitive. The rash may spread, come and go, or disappear.

Diagnosing aGvHD of the skin
Often aGvHD of the skin can be diagnosed by looking at the rash. Sometimes your SCT team will ask a dermatologist (skin doctor) for advice, especially to rule out drug reactions or infections. A skin biopsy may be needed to confirm GvHD, an infection or drug reaction. A skin biopsy allows a small sample of tissue to be collected so it can be examined in the laboratory.

Treating aGvHD of the skin
Mild to moderate GvHD means the rash may cover up to 50% of the skin surface. The skin can become itchy. Treatment usually involves emollient creams (special moisturising creams), medication to control the itch and/or steroid cream. It may be necessary to add in low doses of steroids by mouth.

Moderate to very severe GvHD means the rash covers more than 50% of the skin surface. Treatment will involve a combination of intravenous steroid infusions, steroid creams and emollient creams.

Some GvHD is difficult to treat and you may require additional medications or treatment. If you require additional treatment, this will be discussed with you by your SCT team.

How can you help?
Your skin may feel uncomfortable and sensitive. You can help this by:
- wearing loose cotton clothing and using cotton bed linen
- avoiding highly perfumed washing powders and toiletries
- avoiding getting hot and sweaty
- using mild/non-perfumed soaps or emollient bath oils, and avoiding very hot showers or baths
- patting instead of rubbing the skin dry following washing
- keeping your skin well moisturised with emollient creams.
AGvHD of the gut

AGvHD of the gut usually starts with diarrhoea, feeling sick (nausea) and some stomach pain. Remember, however, these symptoms can also be caused by radiotherapy, chemotherapy, antibiotics or infection, so a specific diagnosis can sometimes be difficult. Small to large amounts of diarrhoea may be passed several times a day. Often the diarrhoea is very watery and green. Sometimes small amounts of blood are present in the diarrhoea. This is caused by the GvHD inflaming the bowel lining and making it delicate. You may experience stomach cramps and pain and sometimes nausea and vomiting with a loss of appetite, because attempting to eat often makes symptoms feel worse.

Diagnosing AGvHD of the gut

The symptoms of acute GvHD of the gut and the type of diarrhoea may be enough to make a diagnosis. Your SCT team may also want you to be assessed by a specialist stomach doctor (gastroenterologist). The gastroenterologist may want to view the inside of your bowel with a small camera (a procedure called an endoscopy) and take a biopsy of the bowel wall. This may give the team information about the cause of your stomach symptoms to confirm whether it is GvHD or an infection.

Treating AGvHD of the gut

Grade 1-2 will require low dose steroids (anti-inflammatory drugs) given by mouth or through a drip. Intravenous fluids may be required if the diarrhoea causes dehydration. Painkillers for tummy cramps and anti-sickness drugs may also be given.

Grade 2-4 will include all the above treatments plus steroids, through a drip in a higher dose and/or other immunosuppressive drugs.

Sometimes with GvHD the bowel will not tolerate food so you may not be able to eat, or even quite simply not feel like eating. In this case, feeding support may be given in one or two of the following ways:

- Naso-gastric feeding (NG feeding), where a tube is passed through the nose into the stomach, this is done while you are awake. Liquid food enters the stomach directly via the tube.

- Gastrostomy PEG – If you already have one of these this can be used instead of a nasogastric (NG) tube. A gastrostomy PEG is put in place under a general anaesthetic by inserting a special feeding tube through the abdominal wall into the stomach. This can be left in place for longer than an NG tube and would normally be planned before your transplant.
• If diarrhoea and vomiting are severe then you may need to be given nothing to eat or drink so that your gut can rest. You would then require parenteral nutrition (PN). PN is when nutrition is given directly into the bloodstream via your central line, allowing the gut to rest.

How can you help?
• Good personal hygiene, ensuring that your bottom is kept clean and dry.
• Use barrier creams around your bottom to prevent skin soreness and damage.
• It is difficult for you to look at your bottom. You will obviously know if it is sore, but the nurses will need to check to make sure that the skin is not broken, damaged or infected.
• Exposing any sore area to fresh air as much as possible can help.
• Carers should ensure they wear disposable gloves when dealing with diarrhoea and thoroughly wash their hands afterwards.
• Painkillers for tummy ache.
• Anti-sickness drugs to control nausea and vomiting.

Diagnosing aGvHD of the liver
The SCT team will monitor blood tests to see how well your liver is working. Results will change if liver GvHD happens. If they show that aGvHD of the liver may be occurring it may be necessary to ask a specialist liver doctor (hepatologist) to assess you. A liver scan may be done and rarely a liver biopsy may be taken.

Treating aGvHD of the liver
Treatment may include the following:
• low or high dose steroids or other immunosuppression drugs (as mentioned for gut GvHD) depending on the grade of aGvHD of the liver
• medication to help stop itching, which can be given either by mouth, or by injection or drip
• painkillers if required
• blood product support, such as blood and platelets transfusions
• medication to improve blood clotting.

aGvHD of the liver
GvHD of the liver affects the small ducts (tubes) that allow the flow of bile out of the liver. These ducts become inflamed leading to mild, moderate or severe damage. If you have early signs of aGvHD of the liver, this may only show up as slightly abnormal liver function blood tests. If acute liver GvHD progresses, other symptoms may include:
• jaundice (yellowing of the skin and eyes and darkening of the urine)
• itchy skin caused by the jaundice
• swollen stomach, and some discomfort or pain
• problems with blood clotting
The effect of GvHD on bone marrow function
Chronic GvHD and the immunosuppressive drug treatment used to treat it, means that you will be at risk of infections. Information on how infection can be prevented will be given to you by your SCT team.

You will continue on your preventative anti-infective medications to reduce the risk of you getting infections. Re-immunisation will be discussed with you at a later date.

Graft versus leukaemia effect
Although GvHD is seen as a complication of SCT if you have leukaemia or lymphoma, GvHD can be useful. As part of the process, donor T-cells may also recognise host blood cells, including leukaemia, lymphoma cells, and seek to destroy them. This is called a graft versus leukaemia or lymphoma effect (GvL).

Treatment used in SCT to prevent/treat GvHD
Treatment for GvHD can be very complex and require a combination of therapies. Your SCT team will discuss your individual treatment plans with you fully.

Chronic GvHD (cGvHD)
cGvHD can affect any organ or system. The most frequently affected areas are the skin, mouth, liver and eyes. It can also affect the tummy (gastrointestinal tract), lungs, muscles and joints (musculoskeletal system).

cGvHD is classified according to onset and severity and can:
- continue on from aGvHD
- start again after aGvHD has settled
- develop if there has been no aGvHD.

How is cGvHD diagnosed and treated?
cGvHD can affect more areas of the body than aGvHD. The most common are shown in the table opposite.

Treatment for cGvHD usually means continuing with ciclosporin or similar drugs such as tacrolimus, and often includes steroids. Your SCT team will explain to you how you will be treated if cGvHD develops.

Your SCT team will discuss and investigate all of these signs and symptoms if they should occur. It is important to remember that there can be other causes for these such as drug reactions, infection or even having dry eyes from total body irradiation (TBI).
## cGvHD symptoms and treatment

<table>
<thead>
<tr>
<th>Body system affected</th>
<th>Signs and symptoms</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Skin</strong></td>
<td>Appearance</td>
<td>Daily skin care with soap-free cleansers and regular emollient cream use, use of gentle shampoos, pain killers and physiotherapy</td>
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<tr>
<td></td>
<td>• Red/flushed (erythema)</td>
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<tr>
<td></td>
<td>• Dry/flaky, especially on knees, elbows and in skin creases</td>
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<tr>
<td></td>
<td>• Patchy in colour</td>
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<tr>
<td></td>
<td>• Patchy hair growth</td>
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<tr>
<td></td>
<td>• Hair and eyebrows may have streaks of white in them</td>
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<td></td>
<td>• Skin and joint tightening - restricted movement may be painful</td>
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<tr>
<td><strong>Mouth</strong></td>
<td>Appearance</td>
<td>Regular mouth care as recommended by the SCT team, a dentist will be involved in your care following SCT</td>
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<tr>
<td></td>
<td>• Dry mouth</td>
<td></td>
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<tr>
<td></td>
<td>• Difficulty in tasting foods</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Inside of the mouth looks white</td>
<td></td>
</tr>
<tr>
<td><strong>Gut (upper/lower)</strong></td>
<td>Appearance</td>
<td>Support with nutrition (NG or PEG feeds and/or PN), washing and using barrier creams after diarrhoea, to prevent skin breakdown and the risk of infection, pain killers for tummy pain</td>
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<tr>
<td></td>
<td>• Poor appetite or unable to eat</td>
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<td></td>
<td>• Difficulty in swallowing</td>
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<tr>
<td></td>
<td>• Diarrhoea</td>
<td></td>
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<tr>
<td></td>
<td>• Tummy pain and cramping</td>
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<tr>
<td></td>
<td>• Poor weight gain</td>
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<tr>
<td><strong>Lung</strong></td>
<td>Appearance</td>
<td>You/your child may be referred to a specialist lung/chest doctor</td>
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<td></td>
<td>• Difficulty in breathing following exercise</td>
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<td></td>
<td>• Wheezing</td>
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<tr>
<td><strong>Eye</strong></td>
<td>Appearance</td>
<td>Use of lubricants and possible referral to a gynaecologist</td>
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<tr>
<td></td>
<td>• Dryness</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Sore eyes</td>
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<tr>
<td><strong>Vaginal</strong></td>
<td>Appearance</td>
<td>This may require a circumcision</td>
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<td></td>
<td>• Dryness, itching and discomfort. May not become apparent until sexual activity commences. Can cause narrowing of the vaginal opening and pain or discomfort during intercourse</td>
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<tr>
<td><strong>Penis</strong></td>
<td>Appearance</td>
<td></td>
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<tr>
<td></td>
<td>• Phimosis - where the foreskin is tight and cannot retract (be moved) fully over the penis. Area may become swollen and infected.</td>
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</tbody>
</table>
Children’s Cancer and Leukaemia Group is a leading children’s cancer charity and the UK and Ireland’s professional association for those involved in the treatment and care of children with cancer. Each week in the UK and Ireland, more than 30 children are diagnosed. Two out of ten children will not survive their disease.

We bring together childhood cancer professionals to ensure all children receive the best possible treatment and care. We fund and support research into childhood cancers, and we help young patients and their families with our expert, high quality and award-winning information resources.

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If you have any comments on this factsheet, please contact us. CCLG publications on a variety of topics related to children’s cancer are available to order or download free of charge from our website.

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