Embrace Magnetic Resonance Imaging (MRI) Guideline

Reference: 1481v3

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Purpose

Guidance on transferring patients for Magnetic Resonance Imaging (MRI)

Intended Audience

All staff who work at Embrace Transport Service

1. Background

- Embrace will be referred patients who require transfer to Sheffield Children's Hospital for MRI
- MRI is a specialist area which requires knowledge and skills to make it safe for patients and staff.

2. What is a MRI scan?

Unlike x-rays or computed tomography (CT) scans, MRI does not use ionizing radiation. Instead MRI uses an extremely powerful static magnetic field, rapidly changing gradient magnetic fields, and radiofrequency electromagnetic impulses to produce detailed anatomic or functional images of the brain and other soft tissues of the body[1].

3. Indications for MRI at SCH

Patients will be referred to SCH for MRI because of the need for their specialist scanning capabilities or to benefit from specialist paediatric anaesthetic support. Always consider if a transfer for MRI is required, it may be possible for the scan to be completed at the referring unit, especially if a general anaesthetic is not required.

4. Patient categories

Patients fall into two categories:

1. No anaesthetic required – able to lie still enough to allow the MRI scan to take place with sufficient quality
2. General anaesthetic required

Patients in category 2 require the presence of a consultant in paediatric anaesthesia and an ODP.

If in doubt about the need for the presence of an anaesthetist and/or an ODP, please request review of the case by the Embrace consultant on call.

4. Definitions

The defined terms in this guideline are summarised here:

MR controlled area – an enclosed area which has restricted access and is signed at all entrances

MR conditional – an item which has been demonstrated to pose no known hazards in a specified MR environment with specified conditions of use

MR safe – an item which poses no hazards in all MR environments

MR unsafe – an item which is known to pose hazards in all MR environments

MR authorised person – a suitable trained member of staff authorised to have free access to the *MR controlled area*

MR operator – a *MR authorised person* who is also entitled to operate the MRI equipment. At SCH this is the MRI radiographer.

5. Hazards in MRI

No short term or long term adverse effects from MRI at field strengths and durations used clinically have been identified[2].

However, during MRI individuals being scanned and those in the immediate vicinity of the equipment can be exposed to the following hazards[3]:

- Static magnetic field
- Time-varying magnetic field gradients
- Radiofrequency magnetic fields
- Acoustic noise
- Exposure to MRI during pregnancy

MR safety marking

An item marked as '*MR safe*' in green poses no known hazard in all MR environments. These items can be taken into the *MR controlled area*.

An item marked as '*MR conditional*' in yellow has been demonstrated to pose no known hazards in a specified MR environment with specified conditions of use. These items should not be taken into the *MR controlled area* without discussion with the *MR operator.*

An item marked '*MR unsafe*' in red is known to pose hazards in all MR environments. These items MUST NOT be taken into the *MR controlled area under any circumstances.*

Unmarked items must not be taken into the *MR controlled area* without the express permission of the *MR operator.*

Please note that items marked as *MR safe* or *MR conditional* can still cause image artefact.

Static magnetic field

Safety issues to consider with a strong static magnetic field are:

- Biological effects. Some evidence of cardiovascular changes within the normal range but no serious adverse health effects.

- Projectile effects. The effect of the strong magnet on ferrous (metal) objects is a serious concern. Ferromagnetic materials will experience an attractive force when placed in the magnetic field and can become projectiles. A patient fatality has occurred when a patient was hit on the head with an oxygen cylinder. This risk is only minimised by the strict and careful management of the MR unit.

No equipment should be taken into the MR controlled area unless it is clearly and suitably labelled.

- Compatibility of implantable medical devices. As well as an attractive force, ferromagnetic objects will also experience a torque that will try and align that object along magnetic field lines. This force can be up to 90 times stronger than the attractive force when the implant is at the centre of the imaging volume. The combination of attractive and torque forces can cause tissue damage and/or damage to the medical implantable device itself. Examples of implantable medical devices include stents, clips, prostheses, pacemakers and neuro-stimulators. The so-called Lenz effect can also cause artificial heart valves to malfunction.

The risk is particularly high with implanted pacemakers. There have been a number of deaths following the scanning of patients with implantable pacemakers and this is a total contraindication to MRI. A screening form should be completed and the presence of any implanted devices discussed with the MR operator.

- Compatibility of peripheral equipment. The magnetic field can affect monitoring equipment that has ferromagnetic components. Firstly the function of this equipment may be affected, and secondly they have the potential to become a projectile hazard.

Only monitoring equipment intended for use in an MR controlled area should be used. Accessories to monitoring equipment should also be checked for compatibility, e.g. ECG leads and electrodes.

Time-varying magnetic field gradients

- Biological effects. There have been reported incidents of patients experiencing peripheral nerve stimulation whilst undergoing MR examinations. This is a temporary effect and only lasts for the duration of the procedure.

Radio-frequency magnetic fields

Thermal heating leading to:

- Heat stress. Absorption of energy from radio-frequency fields used in MR results in the increased oscillation of molecules and the generation of heat. This can be significant in some patients.

- Burns. Burns are the most reported MRI adverse incident in England. There have been many reports to the MHRA of burns that have occurred when the arms or the legs have been positioned in such a way as to create a conductive loop pathway. Contact burns can occur by contact with metal objects such as metal in clothing, coils, coil leads, ECG connectors and oxygen saturation probes. There may also be an association with zinc oxide (metanium) nappy cream, tattoos, hair dye and make-up.

Foam pads, 1-2 cm thick should be used to insulate the patient from cables, the bore and between limbs.

Acoustic noise

- MR machines are noisy. The level of acoustic noise at the location of the patient can reach an unacceptable or even dangerous level.

The use of earplugs, ear defenders or other means of hearing protection is essential.

Groups of particular concern are paediatric and neonatal patients, the fetus, unconscious patients and those with pre-existing conditions such as tinnitus, recruitment or hypersensitivity.

Exposure of MRI during pregnancy

Pregnant staff should not enter the MR controlled area whilst the scanner is in operation because of the risks associated with magnetic fields and acoustic noise. For higher strength magnets (3T), pregnant staff are advised not to enter the MR controlled area at any time.

6. Babies having MRI scans at Sheffield Children's Hospital[4, 5]

Organisation

- Complete the 'Embrace MRI Checklist' (**appendix 1**).
- The Embrace consultant will decide if the baby requires a 'feed and wrap' scan or a scan with general anaesthetic
- This decision may require discussion with the on-call anaesthetist at SCH.
- MRI scans will be booked with the MRI unit (ext. 17768).
- Confirm which scanner is being used (1.5T MRI in radiology or 3T MRI in theatres)
- All scans requiring a general anaesthetic must be discussed with the on-call consultant anaesthetist at SCH and booked into an MRI slot with a consultant anaesthetist and ODP present. Dependent on child may require a double slot – eg 1.5kg babies or less
- For babies not requiring a general anaesthetic, consider requesting the assistance of an ODP if the transport team are unfamiliar with the MR environment.
- There is an anaesthetic area where we can wait if there is a queue. Wall power and gases (air and oxygen) are available there.
- Ring the department (ext. 17768) before leaving the referring unit.
- Ensure that the relevant consent and MRI screening forms have been completed for the patient by the referring clinician (**appendix 2**).
- For patients requiring a general anaesthetic ensure parents have received SC(NHS)FT Information Leaflets 164 and 220 (**appendix 3**).
- All staff who may require entry to the MR controlled area will need to fill in an MRI screening form (**appendix 4**).

Preparation of patient

- The baby should be dressed in clothes free of metal poppers ideally. This is essential for body scans. Cardigans with plastic buttons are useful.
- Remember a hat.

- The scan room has to be cool in order to keep the magnets at optimum working temperature. It is not possible to turn the heating up. Care should be made to ensure the baby is dressed warmly and wrapped in an MR safe blanket.
- Transwarmer mattresses are *MRI safe* but use of these should always be discussed with the MR operator before taking it into the MR controlled area. It is essential to position the metal disc in the Transwarmer away from the area being scanned. Use a Transwarmer mattress for all but the biggest and oldest babies and wrap the baby up in a warm *MR safe* blanket from the incubator.
- If ECG monitoring is required, the baby will need *MR safe* ECG electrodes.
- NeoFit ETT securing devices are *MR conditional* and do not need to be changed to tapes. MR image quality may be compromised if the area of interest is in the exact same area or relatively close to the position of the NeoFit. Inform the radiographer that a NeoFit is in place. Neofit devices are conditional but give huge artefact on very small babies so if at all possible use tape
- The Hamilton ventilators are *MR unsafe* and the patient will need to be transferred to the Dameca MRI 508 ventilator. This has a minimum tidal volume of 20ml which limits its use in pre-term babies. Discuss this with the anaesthetist when booking.
- Infusions that can safely be stopped should be disconnected and the line flushed.
- Essential infusions will need to be run through 600cm extension lines (lines can be combined to reach this length) so they can be attached to pumps outside the MR controlled area. An alternative is the Braun *MR safe* infusion pumps although there is only one set available across both scanners and there isn't much space for it in the 1.5T scanner. The Braun pumps need non-pressure disc lines. For patients with multiple infusions discuss this detail with the anaesthetist when booking.
- Use earplugs (if they fit) with ear defenders over the top.
- For non-sedation, non-general anaesthetic scans the baby will need to be quiet and still. A last minute feed if clinically appropriate may help. However, remember that this will mean that they cannot be converted to a general anaesthetic scan for 4-6 hours if they fail to lie still. Remember to take a dummy. Best discuss whether to try non-GA scan without feeding the child, in case change to GA scan before leaving referring site.
- Babies requiring a general anaesthetic will need to be fasted according to the standard SC(NHS)FT protocol:
- http://nww.sch.nhs.uk/documents/3-clinical-guidelines/139-pre-operative-starvation

<u>Preparation of staff</u>

- Ensure that you have been screened for entry into the MR controlled area by a MRI radiographer.
- Follow the instructions of the MRI radiographer at all times.
- Never enter the MR controlled area without completing a screening form and receiving permission from a MRI radiographer.
- Remove all ferromagnetic items from your person before entering the MR controlled area.
- If in doubt ask the MRI radiographer.

Procedure

- The baby will be transferred onto the MRI trolley outside the MR controlled area.
- The transport incubator should be plugged into sockets in the waiting area outside.
- The procedure itself takes 20-45 minutes and setting up beforehand can take 10-15 minutes.
- Foam pads, 1-2 cm thick, should be used to insulate the patient from cables, the scanner bore and between limbs.
- If the baby is ventilated, the Hamilton ventilators are *MR unsafe* and will need to be disconnected outside the MR controlled area.
- The baby will need to tolerate a short period of apnoea during the move into the MR controlled area. If they are too unstable to tolerate this then re-consider if the MR scan is appropriate.
- Wall oxygen, air and suction are available in the MR controlled area.
- The transport monitor is *MR unsafe* and must not be taken into the MR controlled area.
- There is a *MR* conditional monitor in the MR controlled area which can record saturations, NIBP and IBP's, respiratory rate, ECG, gas monitoring (CO_2 and anaesthetic gases) and peripheral temperature. The temperature probe is delicate. Please ask the ODP and be careful with it.
- Attach essential infusions to the pumps outside the MR controlled area using the prepared 600cm extension sets (as above) or the *MR* conditional Braun pumps.
- There is a slave monitor screen in the control room. If the patient is stable and monitored you can observe from there.
- At the end of the procedure reverse the above. Don't unwrap the baby in the MR controlled area but pick them up, mattress, blanket and all, and put them into the transport incubator where you can unwrap them. Take special care not to take any equipment into the MR controlled area which is *MR unsafe*.
- The baby can be stabilised in the anaesthetic area before transferring back to the ambulance.

Resuscitation

- Clinical deterioration needing significant intervention requires transfer of patient to the anaesthetic area by the SCH team.
- Call 2222 to summon the cardiac arrest team. State 'cardiac arrest in Radiology MRI' or 'cardiac arrest in Theatre MRI'.
- Members of the resuscitation team are not allowed to enter the MR controlled area. Please assist the MR team in ensuring that they do not enter.

7. References

1) Ensuring safety for infants undergoing magnetic resonance imaging. Stokowski LA. *Adv neo care* 2005;5(1):14-27
2) Safety of strong magnetic fields. Schenck JF. *J Magn Reson Imaging* 2000;12:2-19
3) Device bulletin: safety guidelines for magnetic resonance imaging equipment in clinical use. MHRA December 2007
4) Diffusion weighted MRI scans at RIE. Southeast Scotland Neonatal Transport Service guideline 2006

5) http://www.aagbi.org/publications/guidelines/docs/magnetic_resonance_unit_2010.pdf
6) http://nww.sch.nhs.uk/documents/3-clinical-guidelines/139-pre-operative-starvation

8. Appendices

1) Embrace MRI Checklist
2) Consent and Screening Forms
3) SC(NHS)FT Information Leaflets
4) Staff/Visitor's MRI Screening Form

Appendix 1:

Embrace MRI checklist

MRI booking confirmed with MRI department (ext. 17768) ☐

MRI scan requiring general anaesthetic discussed with consultant anaesthetist ☐

MRI scan not requiring general anaesthetic discussed with ODP if team un-familiar with the MR environment ☐

Fasting guidance followed ☐

Patient dressed in warm clothes (not knitted wool) free of metal poppers (for body scans) ☐

MR safe blanket and hat available ☐

Earplugs available ☐

SC(NHS)FT Information Leaflets 164 and 220 provided for MRI scan requiring a general anaesthetic ☐

Consent completed for MRI scan requiring a general anaesthetic ☐

MRI screening form completed for all patients ☐

MRI screening form completed for staff requiring entry to MR controlled area ☐

Ring MRI department (ext. 17768) before leaving the referring unit ☐

Patient's name:……..

Embrace number:……...

Date:…….

Name:……...

Signature……..

Appendix 2: Consent and screening forms

Parental/Patient agreement to MRI investigation of a child or young person under general anaesthetic

Name of Patient: **Hospital Number:**

Statement of health professional (to be filled in by health professional with appropriate knowledge of proposed investigation, as specified in consent policy)

I have explained the following about MRI:

The intended benefits….....…

……..

Risks: there are no known risks arising from an MRI scan. Metallic implants will be checked for safety before your child enters the magnetic field (see leaflet 164).

The procedure will involve a general anaesthetic.

Signed: ……..... Date ……

Name (PRINT) ……. Job title ……..

Statement of interpreter (where appropriate)

I have interpreted the information above to the child and his/her parent(s) to the best of my ability and in a way in which I believe they can understand.

Signed: ……..... Date ……

Name (PRINT) ……....

Statement of parent/guardian

I agree to my child undergoing an MRI under general anaesthetic.

I understand that my child and I will have the opportunity to discuss the details of anaesthesia with an anaesthetist before the procedure.

Signature: ……. Date ……

Name (PRINT) …… Relationship to child ……..

Child's agreement to investigation (if child wishes to sign)

Name …….. Signature: …….. Date ……...

Confirmation of consent (to be completed by a health professional when a child is admitted for the scan, if the parent/child have signed the form in advance)

On behalf of the team treating the patient, I have confirmed with the child and his/her parent(s) that they have no further questions and wish the procedure to go ahead.

Signed: …… Date ……

Name (PRINT) …… Job title ……...

THE UNIVERSITY OF SHEFFIELD ACADEMIC DEPARTMENT OF RADIOLOGY

Magnetic Resonance Imaging Unit at the Royal Hallamshire Hospital

PATIENT & VOLUNTEER SCREENING FORM

Please complete this form prior to having your scan. Please circle the appropriate answer.

Surname _____

First names _____

Date of Birth _____

Address _____

Home Tel _____ Work Tel _____

Have you ever had any surgery to your heart or chest e.g. cardiac pacemaker, replacement valves, stents or filters inserted?	Yes	No
Have you ever had any operation to your brain, e.g. aneurysm clips or shunts inserted?	Yes	No
Have you **EVER** had any metal fragments in your eyes?	Yes	No
Are you or could you be pregnant?	Yes	No
Do you have an electronic or breast implant in your body?	Yes	No
Have you had any surgery of any type in the last 2 months?	Yes	No

**YOU MUST RING THE UNIT IF YOU HAVE ANSWERED 'YES' TO ANY OF THE ABOVE QUESTIONS.
FAILURE TO DO SO MAY MEAN THAT YOU CANNOT BE SCANNED.
TELEPHONE NO. 0114 271 3584**

Do you suffer from any heart disease or rhythm disorder?	Yes	No
Do you have any hearing problems, e.g. tinnitus?	Yes	No
Do you have any kidney problems?	Yes	No
Do you wear any removable metal dental work?	Yes	No
Do you suffer from epilepsy or diabetes?	Yes	No
Do you have any allergies?	Yes	No
Do you have any other metallic object in your body, e.g. metal fragments or surgical clips?	Yes	No

If so, please specify: _____

Please remove all credit cards and loose metallic objects, e.g. watches, wallets, keys, money, glasses, jewellery (including body piercing), hearing aids, hair clips and skin patches.
Lockers for your valuables are provided in the waiting area.

How much do you weigh? _____

If you have read and understood the above restrictions please sign below.

Signature _____ Date _____

or signature of consenting adult

Appendix 3: SC(NHS)FT Information Leaflets

Information Leaflet number: 164 (21/04/11)
Author/Contact: Val Bateman

Sheffield Children's NHS
NHS Foundation Trust

MY CHILD IS HAVING AN MRI UNDER A GENERAL ANAESTHETIC

What do the letters MRI stand for?
Magnetic Resonance Imaging.

What is an MRI?
An MRI is a scan, which provides very clear, detailed pictures of the brain or other parts of the body, to investigate you/your child's problem.

What happens during an MRI?
Your child is transferred from the trolley where they went to sleep, onto the scanner couch, which is then moved into position so your child lies partially in the scanner whilst the scans are carried out.

Is it safe?
There are no known side effects associated with MRI.
It uses a very strong magnet to take the pictures and this is why we ask you to fill in a questionnaire about your child to ensure that they have no metal implants in their body which could be affected by the magnet. This is also why your child should wear loose clothes without any metal fastenings e.g. zips, poppers.

Does it hurt?
The scanning is not painful but the scanner is very noisy during the scanning process.

Are there any alternatives?
A CT scan (a type of x-ray) may be used, but the pictures from this may not be as good as from an MRI and CT scan involves radiation.

Why does my child need to have an Anaesthetic?
We need your child to lie still whilst the scan is completed, and young children may not be able to do this.

How long will it take?
This varies and depends on which part of the body is to be scanned. Generally the scan will take about 30-40 minutes.
For more detailed images, it may take longer.
When the scan is completed your child will be taken to the recovery area to rest and recover from any. Your child will be allowed to rest and sleep until ready to return to the ward. The children are usually away from the ward for approximately one to one and a half hours, but this varies with each child.

Where is the MRI scanner?
The MRI scanner is located in the X-Ray department on B floor, Sheffield Children's NHS Trust, Western Bank, Sheffield.

Will I be able to stay with my child?
You will be able to accompany your child to the X-Ray department, but only one member of the family will be allowed into the anaesthetic area. You will be unable to stay with your child during the scanning procedure.

When can my child have something to eat and drink?
When your child returns to the ward, if they wish, they can have a drink. Sometimes the children are still sleepy, and a drink and something to eat, will be given whenever they are fully awake.

When will we be able to go home?
When your child has had something to eat and drink. Approximately 2 hours from returning to the ward, again each child is different. Some children like to sleep; others wake and are ready to go home earlier. Your child will be assessed by a nurse prior to being discharged.

When will I get the results of the MRI?
The results of the scan will be sent to the Consultant who referred your child for the scan. These usually take 2 weeks to arrive.

When can my child go back to school?
Usually the next day.

If you need further information or clarification speak to the MRI department by contacting the switchboard (0114 27 17000)

Information Leaflet number: 220 (KG/rb/17/02/11)
Author: Christine Kirton

Sheffield Children's NHS
NHS Foundation Trust

Useful organisations
Action for Sick Children
c/o National Children's Bureau
8 Wakley Street
London EC1V 7QE
Telephone: 020 7843 6444
Website: www.actionforsickchildren.org

This is a children's healthcare charity, specially formed to ensure that sick children always receive the highest standard of care. They have a series of information booklets specifically to help parents cope with, and prepare for, different aspects of children's healthcare.

YOUR CHILD'S GENERAL ANAESTHETIC

What is anaesthesia?

The word 'anaesthesia' means 'loss of sensation'.

- A general anaesthetic ensures that your child is unconscious and free of pain during a test (investigation) or operation
- General anaesthesia is a state of controlled unconsciousness and freedom from pain
- Anaesthetics are the drugs (gases and injections) that are used to start and maintain anaesthesia
- Anaesthetists are specialist doctors who are responsible for the wellbeing of your child throughout surgery

Anaesthetists are also closely involved with your child's pain relief after surgery.

Choice

It is often possible for you and your child to choose how the anaesthetic and other medicines are given. Sometimes there are medical reasons why things have to be done in a certain way – these will be explained to you.

Nothing will happen unless you understand and agree with what has been planned.

Your wishes and those of your child are very important.

We want to work with you to provide the best possible care for your child and family.

What can I do to prepare my child?

There are many things that you can do to prepare your child for coming into hospital.

All children (except infants too young to understand) should be told:

- That they are going into hospital
- That they will be having an operation or investigation
- Some basic information about what will happen to them when they are in hospital

Everything should be explained to your child in a way that he/she can understand. The wards have play staff who can give explanations and encourage discussion through play.

When should I start preparing my child?

Children between two and three years of age should be told two to three days before and again on the day of admission.

Children between four and seven years of age should be told four to seven days before the day of admission.

Older children will usually be involved in making decisions about the operation or investigation and discussion can take place a few weeks before the day of admission. If you would like to visit the ward before the day of the operation please telephone the ward to arrange this.

2

When will we be ready to go home?

Most children have their investigations or operations carried out as 'day stay' patients and go home on the same day. They may experience some pain or discomfort on the first day or so. It is good to be prepared by having pain relieving medication at home (e.g. Paracetamol and ibuprofen syrup).

Occasionally children may feel sick after they have left hospital, or even vomit. This sometimes happens in the car on the way home.

Sometimes children do not sleep well after a stay in hospital. Their behaviour might be a little bit more clingy or difficult than before. This is a normal reaction to a stay in hospital, and will usually return to normal within three to four weeks.

If you have any concerns about your child when you get home you should contact the hospital using the telephone number provided.

What are the side effects and complications?

In modern anaesthesia, serious problems are uncommon.

Risk cannot be removed completely, but modern equipment, training and drugs have made it a much safer procedure in recent years.

Most children recover quickly and are soon back to normal after their operation and anaesthetic. Some children may suffer side effects like sickness or a sore throat. These usually last only a short time and there are medicines available to treat them if necessary.

The exact likelihood of complications depends on your child's medical condition and on the nature of the surgery and anaesthesia your child needs. The anaesthetist can discuss this with you in detail at the pre-operative visit.

For a child in good health having minor surgery:

- 1 child in 10 (like one person in a large family) might experience a headache, sore throat, sickness or dizziness.
- 1 child in 100 (like one person in a street) might be mildly allergic to one of the drugs that has been given.
- 1 child in 20,000 (like one person in a small town) might develop a serious reaction (allergy) to the anaesthetic.

Throughout the whole of life, an individual is at least 100 times more likely to suffer serious injury or death in a road traffic accident than as a result of anaesthesia.

Questions you may like to ask the anaesthetist

- Who will give my child's anaesthetic?
- What type of anaesthetic do you recommend?
- Have you often used this type of anaesthetic?
- What are the risks of this type of anaesthetic?
- Does my child have any special risks?
- How will my child feel afterwards?

7

Will I not be able to give anything to eat or drink? – (fasting, 'Nil by mouth')

The hospital should give you clear instructions about fasting. It is important for your child to follow these.

If there is food or liquid in your child's stomach during the anaesthetic, it could come up into the back of the throat and damage his or her lungs.

Will Premedication be given?

Premedication (a premed) is the name for drugs which are sometimes given before an anaesthetic, although today they are given less often.

Some premeds help your child to relax, and some are related to the kind of surgery he or she will be having.

Not every child needs a premed. Depending on the kind of surgery and your child's condition, you will often be able to help decide, with the anaesthetist, whether your child needs a premed or not.

If your child does need a premed, this will usually be given as a liquid. Very occasionally an injection is needed.

Premeds are given some time before the anaesthetic.

The drugs used can be:

- **Sedatives** to ease your child's anxiety
- **Pain relieving** drugs such as paracetamol that can help at the end of the procedure
- **Medications to protect your child** from side effects of the anaesthetic (for example, nausea)
- **An extra dose of treatment** for illnesses like asthma

What is 'Magic Cream'?

It is a local anaesthetic cream that can be put on the hand or arm before injections so that they do not hurt. It works well for nine out of ten children.

This cream is also called EMLA or Ametop.

What happens when going to theatre?

For some operations your child may be able to wear his or her own clothes to the operating theatre, but if not, the ward will provide a gown to wear.

Your child will be able to keep underwear on, to come to theatre.

Your child may travel to the anaesthetic room in a bed, on a trolley, walking or being carried.

Anaesthetic room – the room next to the operating theatre where anaesthetics are usually administered.

Operating theatre – the room where surgery is performed. If your child is very small, or is having certain kinds of surgery, it may be safer to give the anaesthetic in the operating theatre rather than in the anaesthetic room.

Will my child be given pain relief?

Pain relieving drugs are given during the anaesthetic to ensure that your child is as comfortable as possible after surgery. The type and strength of pain relief given will depend on the procedure.

You will have a chance to discuss and help plan the kind of pain relief (analgesia) your child will get after their operation.

How is pain relief given?

- **Syrups and tablets** – just like at home.
- **Melts** – medicines that 'melt in your mouth' – these are especially suitable for older children.
- **Suppositories** – some pain relieving medicines like paracetamol can be given rectally (into the bottom). These are often given while your child is anaesthetised and last for several hours. Suppositories are very helpful when children cannot take medicines by mouth or are feeling sick.
- **Local anaesthetics** – these are injected near the nerves around the operation site to numb the area. The injections are given while your child is anaesthetised and the pain relief lasts for several hours.
- **Strong pain relieving drugs** – such as morphine can be given in the following ways along with other drugs.

Some common terms used with medicines

- **IV – intravenous** – when drugs are given into a vein through a cannula.
- **IM – intramuscular** – when drugs are given by injection into the muscles of the bottom or upper arm.
- **S/C – subcutaneous** – when drugs are given just under the skin, either as a 'one off' or through a cannula
- **Infusion** – when drugs are administered continuously, usually by a special pump.
- **PCA – Patient Controlled Analgesia** – an infusion of pain relieving drugs controlled by a pump with a button which your child can push when extra doses are needed.
- **Epidural** – an injection or infusion of local anaesthetic around the spine – used after major surgery.
- **Caudal** – an injection of local anaesthetic near the nerves as they leave the spine, similar to an epidural, commonly used for surgery of the legs or lower abdomen.

Post Anaesthetic Care Unit (PACU)
Recovery room – A place near the operating theatre where children go after surgery until the effects of the anaesthetic drugs wear off.

What happens in the anaesthetic room?
A nurse from the ward will accompany one parent to the anaesthetic room. Your child will be able to take a toy or comforter.

If you wish, you will usually be welcome to stay with your child until he or she is unconscious. However, there are a few circumstances when this will not be possible. It might be possible to give the anaesthetic while your child is sitting on your lap. Your child can either have an anaesthetic gas to breathe or an injection through a cannula.

Some children prefer gas and some prefer injections.

If both methods are safe for your child, you may be able to choose which is used.

Anaesthetic gases smell similar to felt-tip pens.
The anaesthetist generally cups a hand over the child's nose and mouth or uses a face-mask to give the anaesthetic gas.

If the anaesthetic is given by gas, it will take a little while for your child to be anaesthetised. He or she may become restless as the gases take effect. This is normal.

If an injection is used, your child will normally become unconscious very quickly indeed. Some parents may find this frightening.

What is a cannula?

It is a thin plastic tube that is placed under the skin, usually on the back of the hand. A needle is used to put the cannula in, but is then immediately removed.

A cannula can be left in place for hours or days so that drugs and fluids can be given without the need for further injections. Sometimes blood samples can be taken through a cannula.

What happens next?

Your child will be taken into the operating theatre to have the operation or investigation.

The anaesthetist will monitor your child's blood pressure, pulse, temperature and breathing closely throughout the procedure, ensuring that he or she is safe and fully unconscious. Anaesthetic gases and/or drugs given into a vein will be used to keep your child anaesthetised.

What happens after surgery?

Most children go to the Post Anaesthetic Care Unit.

Each child is cared for by a specialist nurse until he or she has regained consciousness and is comfortable enough to return to the ward. You can be with your child in the recovery room as he or she wakes up.

Some children may need to go to the Intensive Care Unit after their operation. This will be discussed with you beforehand if it is planned.

What should I tell my child?

- Explain that the operation or investigation will help your child to get better.
- Use simple words your child understands.
- Do encourage your child to talk about the operation and ask questions. Books, games and stories can help.
- Tell your child about timing – when he or she will have the operation or investigation and how long their stay in hospital will be.

If your child will be staying in hospital overnight, let him or her know if you will be able to stay too. Most wards provide a folding bed next to your child's bed. Some provide accommodation for parents away from the ward.

If it is not possible for you to stay with your child, it is important that you explain to him or her when you will be able to visit.

Your child can help pack his or her own bag and decide which nightclothes and toys to bring.

Please let us know in advance any special requirements your child has and we will do whatever we can to help.

Please phone the hospital if your child develops a cough or cold, or has contact with chicken pox shortly before the day of the operation or investigation.

What happens on the day of admission?

A pre-operative visit
An anaesthetist will visit you on the ward before the procedure to discuss your child's anaesthetic. It is very important that you remain in the hospital to meet them.

The anaesthetist needs to find out about your child's general health, previous experiences of anaesthesia, any medicines your child is taking and any allergies he or she might have. They will want to know if problems with anaesthetics run in the family.

This is a good time to talk about any previous experiences your child has had with injections or hospitals, or any particular concerns you have about this hospital visit.

You may find it helpful to make a list of questions you want to ask.

For practical reasons, the anaesthetist who comes to see you on the ward may not always be the same one who gives your child's anaesthetic, but the information you give them will be passed on.

Why may the operation or investigation be delayed?

Occasionally the anaesthetist may learn something about your child that means it would be safer not to do the procedure on that day.

This could happen if your child has a bad cold, has a rash or has eaten food too recently.

Sheffield Children's NHS
NHS Foundation Trust

Appendix 4:

Staff / Visitor's Screening Form

Name:_____ Date:_____

Have you ever had any surgery to your heart? YES/NO

Have you ever had any operations to your brain? YES/NO

Have you ever had any metal fragments in your eyes? YES/NO

Do you have any electronic implants in your body? YES/NO

Have you had any surgery in the 2 months? YES/NO

Do you have any metallic implants or any other metallic objects other than those mentioned above? YES/NO

If so, please specify_____

LADIES ONLY:
Could you be pregnant? YES/NO

PLEASE NOTE: If you have answered yes to any of the above questions, you may not be allowed into the MRI scanning area

Members of staff / visitors MUST remove bleeps, watches, hearing aids, credit cards, mobile phones and any loose metallic objects such as keys, scissors or money.

If you understand these restrictions, please sign below:

Signature:_____

Relationship to the patient:_____

Name of patient:_____