G3	Standard	Theatre/ perioperative setting moving and handling

Systems are in place to cover all reasonably foreseeable handling and positioning situations in **theatres/ perioperative settings**.

Justification

Rationale

The constraints of the environment and the status of the patient impose specific challenges for patient handling and positioning in the perioperative setting that need to be addressed to protect both patient and staff. There is a risk of injury to the patient and staff from the patient handling manoeuvres (such as proning) that requires advanced handling skills and appropriate equipment.
The postures of the surgeons and theatre practitioners warrant special consideration.

Authorising Evidence

MHSWR (2000); MHOR (2004); PUWER (1998)

Links to other published standards & guidance

Association of Perioperative Practice (2007); CQC (2010); DOH (2009); DOH (2010) EFA/2010/008; DOH and Human Services (2010); HSE (2006[1]); MHRA (2008); MDA/2008/007; MHRA (2010) MDA/2010/002; NBE (2010); NHS Institute for Innovation and Improvement (2009); NICE (2003) CG2; NICE (2005) CG 29; NPSA (2008); NPSA (2011[1]); NPSA (2011[2]); Ruszala et al (2010)

Cross reference to other standards in this document

B7,9,10,13; D; F; G2,4-10,12,13-16,30,34,36,40; H; K3; L6-9

Appendices

4-22, 25-28

Verification Evidence

- requirements for compliance to achieve and maintain this standard

- An agreed approach, informed by evidence-based best practice, documented in the M&H policy, disseminated to all staff and embedded within theatres
- Risk assessments (for M&H) that are 'suitable and sufficient', robust and balanced
- Safe systems of work and standard operating procedures
- Individual person assessments where necessary – readily accessible and regularly reviewed
- Ergonomics is integral
- Information and communication systems – including documentation
- Competent, healthy staff, in sufficient numbers
- Training (theoretical and practical) and supervision
- Link workers are appointed, supported and active
- An environment conducive to good care (space, layout, etc.)
- Handling and other equipment that is suitable (fit for purpose) and readily available
- Investigation of and learning from adverse events, using root cause analysis to locate the cause and prevent a recurrence SFAIRP
- Monitoring, audit and review of the verification evidence
- Points learnt from audit, and accident/ incident investigations and reports are disseminated and discussed with staff, with subsequent learning
- Reporting of the status (level of compliance) to the organisation
- Action plans to correct any lack of compliance
- The culture is one of learning rather than 'blame and shame'
- Staff work within protocols and record as necessary
- Observation identifies optimum patient positioning for the operative procedure and that attention has been given to patient comfort, dignity and safety in all situations.

G3 Protocol – theatres/ perioperative setting moving and handling (M&H)

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This protocol attempts to cover issues that affect moving and handling/ patient positioning in the perioperative environment.

Different hospitals in various parts of the country may have different names for the horizontal lateral transfer of a supine patient onto and off the theatre table. Therefore to avoid confusion, in this section that transfer is called a 'SUPINE TRANSFER'.

1. Introduction and background

According to the Royal College of Surgeons (2008) there are approximately 2900 Operating Theatres in England. Surgery is one of the most important treatments offered by the NHS in secondary care within the UK. 4.2 million surgical operations are carried out every year in England, equating to one operation for every 12 people each year (Royal College of Surgeons, 2008).

Types of anaesthesia where M&H is an issue
General anaesthesia: This is mentioned because the patient will be unconscious and have received a muscle relaxant and staff will have to perform all the positioning/ transfers during, and for a period after, the procedure. Because of the muscle relaxant the patient's own body weight can cause dislocation of joints, the body is prone to slumping, rolling and potentially falling from the operating table. Staff members, who are not familiar with handling a patient under general anaesthesia need to develop the handling skills necessary to do so, especially when a patient has had an amputation and the weight of the patient and their centre of gravity has changed.

Regional anaesthesia with or without sedation: Examples include epidurals, spinals, plexus blocks or single nerve blocks. In this instance the patient is conscious and may be able to co-operate or may be sedated which will reduce their cooperation, therefore staff may have to perform positioning/ transfers during and after the procedure.

Local anaesthesia: Used to achieve loss of feeling to a specific area such as an arm; the patient will feel no pain, but can still feel pressure or movement. It is also used on specific nerve pathways (a nerve block).

The loss of pain sensation in the affected body part also poses a moving and handling risk as hands, for instance, can become trapped inadvertently by the patient or lines trapped and pulled out.

2. Management, organisation, supervision and support

Though the staffing structure may vary in different hospitals, it would be usual to find that the following would be applicable with some variation.

Each theatre team is usually led by a

- Sister or Specialty Manager (term may be used instead of Sister), who will be supported by
- Theatre practitioners ("Theatre practitioner" is a generic term which may be used for qualified theatre staff including Operating Department Practitioners (ODP) and Nurses)
- Support workers
- Anaesthetic practitioner (to support the anaesthetist).

The Anaesthetist usually takes the lead during the transfer and positioning of a patient.

In the recovery area patients are cared for on a one to one basis by a theatre practitioner, until the patient is ready to be transferred to their allocated ward. Staffing should reflect that these patients may require moving and handling (M&H), and need more than one member of staff and the use of M&H aids.

All theatre staff should receive theatre manual handling (MH) training relevant to their area of work.

("*Manual handling training is more effective if it is tailored to specific industry and task demands. Practical elements to the training can help to reinforce learning, particularly if tailored to individual job demands"* and familiar equipment relevant to their work is used [HSE, 2007].)

Staff should also be aware of current policies and protocols and should be provided with adequate guidance and supervision.

3. Staffing levels

Staffing levels vary depending on the size of the department and the number of theatres as well as the type of surgery carried out in the unit. It is essential that sufficient numbers of staff are available (CQC, 2010) for each theatre to ensure the safer handling and positioning of individual patients. An inadequate number of competent personnel can result in patient injury and may also put employees at risk of injury (The Association of Perioperative Practice [APP], 2007; p. 78). In some cases too many personnel will cause the same problem.

4. Staffing competencies (after Benner, as cited in Ruszala et al, 2010)

4.1 Novice: New students, health care assistants, porters, and qualified staff with little or no experience of working in theatre settings or of patient positioning in theatres.

4.2 Advanced beginner: Staff with some prior experience in perioperative work and knowledge of common surgical positions.

4.3 Competent: Theatre practitioners and health care support workers who have worked in the perioperative setting, have underpinning knowledge of the importance of safer patient positioning and awareness of potential complications. They promote safety (of both patient and staff) and safeguard the patient's well-being during their stay in the department. They should have been supervised and assessed as competent for perioperative handling and risk assessment.

4.4 Proficient: Theatre practitioners and health care support workers (M&H link workers/ key workers/ champions) who have received additional information, training, supervision and assessment of perioperative handling and patient positioning. They are able to deal with the 'slumping body' effect when they move, support or position the patient. They have developed these skills to the level of subconscious competence and are able to predict how a patient's body may react and need support when at rest or when being transferred or positioned for the operation.

5. Environment

The modern operating theatre dictates that there are varying amounts of accessory equipment required per case. This reduces the amount of space within the area imposing constraints on staff.

5.1 Equipment/ cables: The majority of equipment is electrical. The Department of Health and Human Services (2010) in their document called "Slip, Trip and Fall Prevention for Healthcare Workers" states that loose cords and cables stretched across pathways can cause a trip hazard and recommends that cables should be secured with a bevelled protective cover or retractable cable holder, to avoid staff trip accidents.

Where possible, electric leads should be suspended from the ceiling rather than having cables trailing on the floor as this also avoids trip accidents.

5.2 Overhead ceiling theatre light: Each operating room (OR) has an overhead ceiling theatre light. The height of the theatre light causes a problem for shorter staff members when adjustment is required and is more problematic during the operation due to access within the sterile field (see 12.4).

5.3 Theatre doors: Doors should be kept closed for fire/ infection control purposes and to maintain special air pressure inside the OR. Some fire doors are heavy and have to be pushed and supported open to allow access for patient trolleys/ beds (see 8.2.4). Anecdotally, a number of theatre staff have associated their musculoskeletal disorders to using heavy theatre doors.

5.4 Storage: There should be:-

- Adequate medium height shelves for theatre packs/ instrument trays
- Facilities to avoid low level/ above head height storage, unless for lighter packs/ trays (where possible the weight of instrument trays should be kept below 10kgs [Department of Health, 2009])

- Cupboards for fluids and medications
- Special areas for larger equipment such as stacking systems (trolleys with monitors and other equipment) and special theatre tables not in daily use
- Storage of g*as* cylinders that complies with EFA/2010/008 (Department of Health, 2010)
- A system to manage MH equipment such as transfer boards and slide sheets safely, and these should be stored in the immediate work area to encourage use.

5.5 Corridors and doors: Should be wide enough to allow for bed and equipment access and movement.

6. Communication and information systems regarding initial referral

6.1 Pre-assessment
Patients for planned surgery have a pre-assessment carried out by a competent member of staff prior to their admission. The preoperative assessment considers the clinical history of each patient. Particularly important issues are: The weight of the patient to ensure it is within the safe working load (SWL) of the equipment/ operating table; the patient's tolerance to the planned position/ the type of anaesthesia, if known, and any special tissue viability issues.
It is important that this information is known before any positioning takes place (APP, 2007; p. 77) – so that specialist advice may be sought.

6.2. Planning in the theatre for surgery
Based on the surgery and the pre-assessment, staff decide what, if any, special equipment is required for the operation/ patient positioning and support to provide better access to the surgical site or for pressure-relief. A pressure-redistributing mattress should be allocated to all individuals identified as being at risk of pressure ulcer development (EPUAP & NPUAP, 2009).

6.3 Planning for bariatric patient surgery
If a bariatric patient is having planned surgery, then the patient size and weight is discussed with the theatre team and arrangements for equipment/ staff are made. If the situation is in a small cottage hospital the patient would not fit their criteria and the patient would be sent to a major hospital. Emergency admissions also go to bigger hospitals equipped for bariatric/ larger cases.
A bariatric policy/ procedure is needed to highlight a 'pathway' for a bariatric patient's journey through the hospital, which includes equipment available and how to access the equipment that is not locally available but is likely to be needed and maybe hired (See G15).

6.4. Communication about transfer to the theatre
Theatre porters/ porters from the general portering pool should be contacted to collect the patient from the ward. Ward staff need to agree an appropriate means of transport for the patient.

7. Treatment planning

Based on communication about patients' special requirements the multidisciplinary theatre team will plan what is needed for each case. Bariatric surgery needs special considerations including the SWL and the width of the theatre table. Operating tables with SWL of 455kg with some extra width to accommodate the extra girth are available (Ogunnaike et al, 2002).

In some hospitals surgery for bariatric patients has been performed on the patient's bed or on two tables next to each other. This is not advisable when specialist equipment is available. Theatres need to be informed of special needs well in advance, so that necessary equipment, such as a bariatric operating table, can be hired if required.

Auditing the hiring of equipment would highlight a possible need to purchase a bariatric table/ any other equipment such as bariatric stirrups which would be beneficial to the department, rather than hiring.

8. and 10. Moving and handling tasks, methods, techniques and approaches

8.1 PATIENT TRANSFER TO THE THEATRE SUITE
Ward staff/ surgical waiting area staff advise if a patient is independently mobile and able to walk to theatre or not. Others at varying degrees of ability are either transferred in a wheelchair or on a trolley/ bed depending on hospital policy. Where a patient is already in a bed using his/her own bed for the transfer would save a supine transfer in the ward. However, the extra width of a hospital bed may cause problems in the congested theatre environment and during the supine transfer because of the extra reach or additional equipment required to deal with this.

8.1.1 *Walking* with an escort from the ward/ Day of Surgery Admission Unit (Introduction to the Productive Operating Theatre, 2009) - ward staff carrying appropriate bedding (pillow and slide sheets).

8.1.2 *Sitting in a wheelchair*, a porter pushes the wheelchair, a member of ward staff escorts the patient as above.

8.1.3 *Patient transferred lying on a bed/ trolley, staff pushing/ guiding the bed/ trolley*
All trolleys/ beds should be height adjustable for staff to adjust the height according to their own needs in order to avoid stooping (11.2). At least two staff are needed to push/ guide an occupied trolley/ bed, and for heavier patients more staff and/ or equipment may be required.

NOTE: For both the wheelchair and the bed/ trolley transfer, the environment and pushing and steering forces should be taken into account including either the use of equipment such as electric bed movers or extra staff.

8.2 TRANSFERING ONTO THE THEATRE TROLLEY/ OPERATING TABLE

8.2.1 Independently. If a patient walks to the theatre, s/he can position her/himself onto the trolley or theatre table if the height is appropriate with verbal encouragement.

8.2.2 Assisted. Those who are overweight or short in stature may require steps with a handle and some verbal encouragement/ guidance when they are getting onto/ off the trolley (see 12.3).
8.2.3 Via a supine transfer. All dependant/ anaesthetised patients or patients unable to weight bear are transferred horizontally from a trolley/ bed onto the theatre table using this method.

> *Equipment for supine transfer (11.3 and 11.4):* Local procedure will be followed. Either an inflatable system (as mentioned under equipment) or a slide board and slide sheets will be used:
> 8.2.3.a Inflatable system
> 8.2.3.b Two slide sheets and a slide board
> 8.2.3.c Three slide sheets and a slide board
> 8.2.3.d One 'special sheet' (e.g. 'flexislide'), one roller sheet and a slide board.

Traditionally the anaesthetist takes the lead with all transfers of anaesthetised patients and gives previously agreed commands (see section 2).
Evidence suggests that anaesthetists generally have not received MH training (Luntley et al, 1995) and organisations should seek to address training needs.
NOTE: There is a danger of surfaces coming apart during the transfers and the patient being in danger of falling between surfaces unless the operating table/ trolley/ bed brakes are maintained in good working order and applied (MHRA, 2008).

8.2.4 Pushing an anaesthetised patient on a trolley/ bed from one room to another in the theatres – e.g. from the anaesthetic room to the operating room.
The anaesthetist maintains the patient's airway, one/ two staff pushing/ guiding the trolley/ bed with another person holding the door open if appropriate.

8.3 PATIENT POSITIONING ON AN OPERATING TABLE FOR SURGERY
"*The operating surgeon is ultimately responsible for the safe positioning of the patient, and should take an active role in positioning of the patient to facilitate the operation*" (APP, 2007; p. 77). But, in actual working practice medical staff tend to be absent during the initial positioning, and the organisation should address this practice in order to reduce the risk for staff and patients.

8.3.1 General comments about patient positioning
"Safe and appropriate positioning requires teamwork, effective communication and anticipation of a patient's need. Coordinated, successful and competent positioning will maximise the safety of the patient, allow adequate exposure of the operative site, and will prevent unnecessary postoperative complications"
(APP, 2007; p. 77).

Each position carries some degree of risk, magnified in the anaesthetized patient who cannot make others aware of compromised positions. Accurate positioning of the patient on the operating table requires specific skills (as mentioned in section 1) – particularly when the patient has been anaesthetised. A patient under anaesthesia loses some or all of his protective reflexes and cannot adequately feel or express a painful sensation that would reveal a potential nerve injury (Knight and Mahajan, 2004).

8.3.2 *Risk of pressure ulcers*
All patient positions during surgery are associated with abnormal amounts of pressure on relatively small parts of the body surface. A reduction in perfusion can result in tissue ischaemia, tissue breakdown and development of a pressure ulcer. Dissipation of pressure is the main aim when preventing pressure ulcers. Careful positioning, padding, regular assessment and early postoperative mobilization will help to achieve this (Knight and Mahajan, 2004).

EPUAP & NPUAP (2009) also advise that a pressure relieving device is placed under patients' heels and that knees should be in slight flexion as hyperextension of the knee predisposes the individual to deep vein thrombosis due to obstruction of the popliteal vein. Padding should be used to protect boney prominences/ nerves/ blood vessels (Knight and Mahajan, 2004).

8.3.3 *Recommendation – "patients anaesthetised prior to positioning"*
It is recommended that patients are anaesthetised prior to positioning to facilitate airway management. Anaesthetised patients are only moved with the anaesthetist's permission as the anaesthetist is responsible for the patient's airway (APP, 2007; p. 78).

8.3.4 *Staff responsibilities and equipment*
The team leader/ scrub practitioner normally checks with the surgeon re the position and any positioning equipment required (Knight and Mahajan, 2004).

All members of staff should understand their individual roles and responsibilities in facilitating M&H. There should be enough staff and equipment to maintain the patient's correct body alignment; to support their extremities and joints and to ensure that all attachments such as catheters and drips are secured and safe, whilst the patient is moved. The function and position of all equipment is reassessed after repositioning.

Care should be taken to avoid friction burns and damage to tissues, eyes, ears and nerve endings (Knight and Mahajan, 2004).

8.3.5 Moving a patient up or down on the operating table - sliding rather than lifting, where possible
If a 'Gynaecology and Urology Slide (GUS)' is used, once the patient is correctly positioned it can be 'locked' into position and remain under the patient (see 11.7), but if slide sheets are used these must be removed.

8.3.6 *Handling of bariatric patients*
Bariatric handling in theatre is now routine in some gastric banding centres and becoming more common in general theatre, as a consequence of the increase in obesity in UK.

The key to safer handling starts with a suitable and sufficient patient pre-assessment, with particular attention given to the patient's level of functional mobility and in ascertaining an accurate patient weight. This assessment should be communicated to theatre at the point of planning for elective surgery, and should determine the appropriate theatre, transfer method and equipment.

Safe working loads (SWL) of operating tables
Unlike other patient support systems like beds, trolleys or treatment couches the safe working load of theatre operating tables is complex and dependent on a number of factors. With some operating tables the SWL halves if it is tilted, broken or the profile changed to any degree. Similarly turning the table top 180^0 in relation to the table base to achieve better access will also reduce the safe working load. Removing one section, adding accessories, and patient position all affect the SWL. Some manufacturers consider the centre of gravity of a patient when lying supine is at the umbilicus. They advise that this will change for patients of different morphologies and individual patient assessment is required. Therefore before transferring the patient onto the table it is necessary for theatre staff to appreciate fully the complexity of the SWL of the particular table they intend to use and consider individual patient morphology.

Transfer methods - (bariatric patient)
Independent transfers utilising the patients functional mobility to get directly onto the operating table can be considered, but only if the table can be set at an appropriate height without the need for a step.

For an independent supine transfer the brakes of both the operating table and the bed/ trolley should be on, however, independent supine transfers with bariatric patients can be very high risk. This is because a patient of, for instance, 254kg/ 40stone is required to exert a tremendous pushing force in bursts, to overcome inertia and move sideways. This lateral pushing force can cause a braked wheel to slide over the hard floor in theatre presenting a risk of the patient falling between the operating table and the trolley/ bed. Staff standing at either side of a bariatric patient transferring independently must also take great care that the patient does not grab or pull on them during the transfer as this could cause a musculoskeletal injury to the staff member.

Some centres may use inflatable hover systems for supine transfers, however, a transfer board and slide sheets can be used very effectively by 6 competent staff if they apply sound basic principles for safer handling. Consideration should also be given to the SWL of a transfer board which can be just 180 - 190kgs/ 28 – 30stone. A recent addition from 1st Call Mobility is the Latslide, which has no weight limit (SWL) as long as the gap between the two surfaces is less than 15cm. Staff could consider placing two regular transfer boards one on top of the other, to increase the SWL, but this should now be regarded as poor practice. Wide or bariatric slide sheets are better than standard width sheets as the latter can be insufficiently wide to allow staff to get a firm grip. Wider slide sheets also reduce the need to stretch across the operating table or bed.

8.4 SPECIFIC CONSIDERATIONS FOR SOME INDIVIDUAL POSITIONS

8.4.1 Dorsal recumbent position (supine)
To provide adequate abdominal exposure.
Comments about specific risks:

- Compression of the ulnar nerve at the level of the elbow against the operating table can be avoided if the patient's arms are positioned by their side or one arm abducted to improve venous access. Supination of the patient's forearm minimizes compression as does protecting elbows with pressure relieving devices - either foam or commercially prepared elbow pads.

- Injury to the brachial plexus can be caused by abducting/ extending the arms greater than 90^0.

- The occiput, sacrum and heels are at risk of pressure ulcers unless these areas are well padded. If heel pads are used, the knees should still maintain some degree of flexion to avoid a hyperextension injury (Pfiedler Enterprises, 2009; Knight and Mahajan, 2004) and ankles should be supported.

- Postoperative low back pain is associated with loss of the natural lumbar lordosis during supine surgery. An inflatable wedge or another suitable device should be considered for all patients to maintain lordosis (8.3.4). Also, knees and hips should be slightly flexed to reduce stress on the back and abdomen.

NOTE: Allowing the patient to place himself in a comfortable position prior to anaesthesia may prevent postoperative low back discomfort.

8.4.2 Lithotomy position
Used for urological, gynaecological and lower gastrointestinal surgery – often combined with head down tilt.
The lithotomy position involves:-

- The patient supine with perineum positioned at the lower end of the table
- Hips and knees flexed, legs apart, thighs abducted and externally rotated
- Strap-stirrups or boot-style stirrups to support legs and feet.

The supine patient is moved to the lower end of the table with slide sheets or a special 'gynaecology and urology slide' (called GUS) (see 11.7) is used - (see 8.3.5 removal of slide sheets); legs are supported; anterior superior iliac spine is positioned at the level of the break of table avoiding overhanging buttocks at the end of table.

The correct positioning of the patients legs for this surgery is important. (See 8.5.3 - positioning the patient's upper or lower limbs). 2 staff should work in unison, each holding a patient's leg before placing it in the stirrup - outside of the pole. (If the legs were placed inside the stirrup poles, compression of the aspect of the calf could damage the peroneal nerve, while compression along the medial calf can damage the saphenous nerve resulting in below the knee weakness postoperatively.)

Once the legs/ feet are in the stirrups, the thighs should not be flexed more than 90^0. Flexion of knees and hips to more than 90^0 should also be avoided to protect the sciatic and obturator nerves. The legs should be padded to avoid touching the stirrup poles and padding to posterior knees and ankles should be applied.

The end of the operating table is removed once the legs are in position (see 8.8.4.b).

Arms are positioned on arm boards or over the patient's abdomen.

Self-adjusting boots with 'fin extensions' are designed to help to reduce pressure under the popliteal fossa, calf and peroneous nerve (Anetic Aid, undated). Conventional lithotomy poles are still in use, but other equipment – power assisted leg holders some with floating boots which are self-adjustable - are available and these are adjusted when loaded (lift-assisted equipment) (see 12.8 for storage).

NOTE 1: See 8.3.5 – Removal of slide sheets to avoid the patient sliding/ falling off the table.
NOTE 2: At the beginning and end of surgery, the patient's legs are moved simultaneously and slowly to prevent pelvic injury, sudden hyperextension of the knees or overstretching of the nerves of the lumbosacral plexus.
NOTE 3: Resting the arms by the side of the patient could lead to crushed or even amputated digits when the leg section of the table is replaced or elevated at the end of the procedure (Knight and Mahajan, 2004).
NOTE 4: Compartment syndrome, although rare, is associated with prolonged surgical duration in the lithotomy position and could occur as a result of extreme knee flexion, or leg holders that lie underneath the calf decreasing arterial flow and venous return. Suspension leg holders are preferable to those that cradle the calf because the latter can transmit pressure to the muscle and fascia (Knight and Mahajan, 2004), or the use of power-assisted leg holders with self - adjusted floating boots would also minimize pressure on the calf (Anetic Aid, undated).

8.4.3 Lloyd-Davies position
Similar to lithotomy position.

8.4.4 Prone position
Prone positioning of a patient during anaesthesia is required to provide operative access for a wide variety of surgical procedures (spinal surgery, surgery for buttocks, natal clefts, heels and some varicose veins).
"*The successful outcome of surgery on the thoracic and lumber spine is largely dependent on the proper positioning of the patient before the operation begins*" (Singh, 1987). Therefore, staff are always careful in positioning the patient pre-operatively.

8.4.4.a *Complications/ risks from prone position*
Some complications/ risks associated with prone position (Manson, 2008; Edgecombe et al, 2008):

- Cardiopulmonary - pressure on the abdomen compresses the inferior vena cava (IVC).

- Respiratory – if abdominal compression occurs, high airway pressure and large tidal volume are needed to ventilate; although the prone position is known to improve ventilation/ perfusion matching and consequently improve oxygenation in surgical patients, the patient needs to be supported with abdomen free from pressure.
- Pressure on trachea - managing the airway becomes difficult – can result in cardiac arrest secondary to hypoxia.
- Neurological complications, if the head is not in a neutral position.
- Ischaemia of lower limbs due to pressure and peripheral nerve injury from compression of the femoral cutaneous nerve.
- Joint and bone pain or bone fractures from prolonged pressure on joints.
- Eye complications are rare, but include post-operative visual loss from pressure from the headrest or other support and corneal abrasion from incomplete closure of the eyes, drying of the eyes or foreign bodies.
- An anterior dislocation of the shoulder/s when arms are abducted and externally rotated.
- Obstructed venous drainage by incorrect knee or hip flexion, which allows pooling of blood in the dependant structures and reduces atrial filling and cardiac output.

8.4.4.b *Some pointers to avoid complications*
Many of the physiological changes that occur in the prone position can be minimized by careful positioning and, in particular, avoiding pressure on the abdomen. Therefore, the use of support (in the correct position) that minimizes intra-abdominal pressure is essential in order to reduce the risk of IVC obstruction.

Knight and Mahajan (2004) advise that:
- shoulders should have a small degree of anterior flexion, be slightly abducted and externally rotated to less than 90^0
- there should be no pressure on the axilla
- elbows should be padded.

The dorsum of the foot as well as knees, pelvic area, breasts, axilla, elbows and face are at risk of pressure necrosis unless care is taken to ensure that all these areas are properly supported and padded throughout the procedure (Knight and Mahajan, 2004).

8.4.4.c *Methods/ equipment for proning*
- The anaesthetist co-ordinates the move and is responsible for the patient's neck/ head and the airway (see section 2 and 8.3.3).
- The table and the trolley are 'locked' next to each other.
- The patient's arms are positioned securely at the sides of the body; lines and tubes positioned.

The equipment available:
1) ProTurn. A special proning device which incorporates slide sheets to position a patient from a trolley onto a Montreal mattress/ Toronto/ Wilson frame/ other supports or pillows. This also allows the readjustment of the patient's position by sliding them with incorporated slide sheets if required, whilst maintaining the patient's spinal alignment. ProTurn can also be used to turn the patient supine post-operatively.

2) Jackson Spinal Surgical Table. A modular operating table system which facilitates effective rotation of the patient and allows a 180^0 – 360^0 turn. The 360^0 rotational capability allows anterior and posterior spinal fusions to be done without repositioning of the patient. It also delivers periodic massage action and stimulates hip and thigh pressure points during surgery.

3) Anderlift. A stretcher with 2 canvases on a tubular frame, with turning capability that allows the member of staff to rotate the patient from supine on the stretcher to a prone position on the operating table.

4) Some units have developed their own methods using 3 large flat slide sheets. The patient is turned into a prone position on one surface (on a bed or trolley) with slide sheets and then transferred by sliding in the prone position to the operating table (Sharpe and Briody, 2009).

5) Traditional manual 'log roll method' to turn a supine patient from the trolley into a prone position on the operating table (sometimes called 'flip and catch' method). Staff, who are 'turners', turn the patient from the trolley side and the 'receivers' receive the patient on their outstretched arms from the opposite side of the operating table. One member of staff may be at the patient's feet. The patient is then lowered onto the Montreal mattress/ Toronto/ Wilson frame or pillows and the patient's position is readjusted by lifting if necessary to ensure the correct positioning on the support surface, maintaining the patients' spinal alignment. There is a high risk of injury using this method, particularly if the patient is heavy.

8.4.5 Jack-knife position

Similar to the prone position. It is used for rectal, adrenal and spinal surgery. Pillows are used to support the body and reduce the pressure on pelvis, spine, neck and abdomen. Hands and arms are supported on padded arm boards. To avoid slipping, operating table restraints should be applied.

8.4.6 *Lateral position*

Used for thoracic surgical procedures.
The operating table is adjusted gradually whilst spinal alignment is maintained. To secure the patient either special equipment or a padded restraint should be used.
This position is associated with the greatest number of ocular complications – primarily, corneal abrasions – which occur in equal frequency in both the dependent and non-dependent eyes.
The brachial plexus is at risk if the head and neck do not have sufficient lateral support. A roll traditionally supports the thorax. If positioning is inadequate, the neurovascular bundle can be compressed in the axilla. Even with adequate support, venous hypertension in the dependent arm is almost inevitable due to outflow obstruction.
Padding should be placed between the legs to prevent damage to both common peroneal and saphenous nerve (Pfiedler Enterprises, 2009).

8.4.7 *Trendelenburg (head down) position*

Head down tilt should be limited to a maximum of 20^0 - used for pelvic surgery and insertion of central venous pressure catheters.

NOTE: Trendelenburg can also be an emergency position. Staff must be warned of the high risk if slide sheets are in situ.

8.4.8 *Reverse Trendelenburg (head up) position*
Used for surgery to head and neck as it improves venous drainage; also used for surgery to the upper gastrointestinal track, gallbladder and for shoulder operations.
The patient should be well secured and a footplate used. A special non-slip mat is available to stop upper body or head, moving or sliding.

8.5 STATIC TASKS
Static postures should be risk assessed using a risk assessment tool such as OWAS (Karhu et al, 1977)/ REBA (Hignett & McAtamney, 2000) or RULA (McAtamney & Corlett, 1993). Measures should be taken to reduce risk where possible - for example the purchase of equipment, the provision of a member of staff who can take over for a short period, or stepping away from the table for a few minutes and stretching the muscles.
The Working Time Regulations (1998, amended 2003) and the importance of breaks must be taken into consideration.

8.5.1 Limb holding when plastering/ applying or changing dressings
Patients in these situations should be on a height adjustable surface. Where possible, static holding of limbs should be avoided and limb support devices should be used. The need for these should be risk assessed. (See 12.2).

8.5.2 Limb holding in preparation for surgery
As much of the leg/ arm as possible should be painted prior to elevation. Adjusting the height of the operating table will reduce neck extension/ shoulder flexion. Accurate positioning of the patient on the table is important – patient's legs to the end of the table to reduce reach distance and forward flexion – although this is not always achievable because the patient needs to be placed on the table appropriately if for instance the table is being broken.
Staff should:-

- stand as close to the table as possible to reduce trunk flexion
- maintain neutral neck position
- distribute weight evenly in the middle of their own base
- refrain from putting all body weight through one leg and also avoid working across midline/ out to one side
- move feet to maintain neutral alignment
- work with elbows close in to the side of body
- Using 2 members of staff for bilateral limb 'prep' would reduce the risk, and alternating of personnel for limb holding would also avoid overuse or repetitive strain injuries.

NOTE: Internal rotation of legs during prepping to prevent the leg from bending is more comfortable than external rotation.
The NHS Institute for Innovation and Improvement in 'The Introduction to the Productive Operating Theatre (2009)' slide 25, describes the following method for limb 'prep': *"Use of burn bag containing iodine to prep limb rapidly – 15 seconds"* to avoid static holding. (The original reference for the burns bag work sited in the above presentation originates from Shokrollahi, 2008.)

8.5.3 *Positioning of upper or lower limbs/ positioning the patient's legs onto the lithotomy poles/ Lloyd Davies Stirrups*

When positioning the patient's upper or lower limbs, the height of the table should be considered. Staff should have a stable but mobile base and use their body weight.

If staff need to work in unison, for example when positioning legs onto the conventional lithotomy poles/ Lloyd Davies Stirrups (see 8.4.2), where possible the two staff lifting the patient's legs should be of similar height and used to working together, in order to move the legs simultaneously using agreed commands.

If power assisted leg holders (some with floating boots) are in use, once the patient's feet are positioned into the boots, the intra-operative repositioning (horizontal and vertical adjustment) can be performed by one person using an ergonomic 'easy-to-squeeze' handle whilst standing at the end of the table. This simplified set up reduces staffing requirements as well as reducing risk of both staff and patient injuries (Anetic Aid, undated).

8.5.4 Manipulating limbs in orthopaedic surgery

The height of the surface should be adjusted to the surgeon's requirements. The surgeon should use his/her body weight (feet apart, one foot in front of the other, knees slightly bent) when pulling/ rotating the limb.

8.5.5 Standing for long periods when operating or assisting with an operation

Where possible staff should mark time/ move feet/ transfer weight from one foot to the other/ move onto tip toes then down periodically. Similarly alternate flexion/ extension of the back (pelvic tilt) reduces back discomfort.

8.5.6 *Prolonged forward flexion of the head when operating*

If possible staff should periodically straighten their head up, and 'tuck their chin in'. The height of the table should always be adjusted prior to the beginning of the procedure.

8.5.7 Static stooped posture, for example closing the chest in cardiac surgery

Adjusting the height of the table, rolling the shoulders and stretching out the back periodically to release tension should be considered.

8.5.8 Flexion of the back to enable vein harvesting of the lower limb when operating simultaneously with a cardiac surgeon

The possible use of a height-adjustable stool/ platform, particularly if one member of staff is much shorter/ taller than the other should be taken into account (12.4 and 12.14).

8.5.9 Standing whilst wearing a lead apron/ lead substitute apron (lighter than a lead apron) for radiation protection

The use of a two piece apron to distribute the weight more evenly should be an option or a belt/ other system to adjust around the waist and body should be provided to ensure a one piece apron does not hang loose. Both will offload some weight from shoulders to pelvis (see sec 12.8 for storage of aprons). Stooped posture whilst wearing an apron for radiation protection should be avoided where possible.

8.6 POST-OPERATIVE TASKS

8.6.1 Rolling/ turning a patient to inspect pressure areas/ reposition
Patients' pressure areas are inspected post-operatively in theatre and in the recovery by rolling (turning) the patient onto their side. Staff must ensure that the patient's limbs do not fall off the surface when they are turned.
All patients unable to move by themselves must be repositioned on the bed/ trolley every 2 to 3 hours post-operatively – alternating right side, back and left side, using a 30^0 tilt side lying position unless the surgeon has instructed otherwise (EPUAP & NPUAP, 2009).

8.6.2 Transfer from trolley to bed
If the patient is transferred onto a trolley in the OR, then the supine transfer to the bed takes place in recovery or on the ward, after the patient has regained consciousness.

If the patient was transferred to theatre on his/her own bed, s/he will be transferred onto it in the OR. However, as mentioned above (8.1) storage of the hospital bed may cause problems in the congested theatre environment, and with the supine transfer because of the extra reach required (therefore these patients need either a wider slide sheet or one with handles [11.3]).

Obese patients should be transferred onto their bed from the operating table in the OR. As long as suitable slide sheets and a transfer board are used 6 competent staff, one at the head and one at the foot and 4 to give and receive – i.e. two staff on either side - should be enough for this transfer, but if the theatres have less experienced staff then extra staff on both the giving and receiving side will reduce risk as long as they do not use too many staff which may also increase risks.

8.6.3 Sitting a patient up post-operatively on a trolley/ bed
All trolleys/ beds used for surgical patients should be height adjustable and have either a hydraulic or electric 'sit-up-function'.
- The patient should be moved supine up the trolley/bed with slide sheets
- The knee break (if available in the bed/ trolley) is applied
- The patient is moved to sitting using the 'sit-up-function'.

If the patient needs to sit up and constantly slides down, and the trolley has no 'knee break', a slight foot-up tilt of the trolley should be used, unless the patient's condition contra-indicates it.

8.6.4 Toileting in recovery
The task of positioning by rolling a patient onto a bedpan/ slipper pan will require at least two staff, unless the patient has recovered sufficiently and is able to bridge; the use of urinals (fe/male) would avoid the use of a bedpan/ slipper pan in most situations.

8.7 OTHER TASKS

8.7.1 *Managing a fallen person – patient/ staff*
Staff falls appear more common than patient falls in the perioperative environment.

Staff falls: Staff can faint, or fall as a result of tripping over cables, dropped instruments etc, or slip.
Falling/ fallen patients: Patient falls in a perioperative environment are rare, but if ambulant they can trip/ slip in the reception area/ anaesthetic room. They can also slide off the theatre table, if the table is tilted, particularly if the slide sheets were not removed or 'locked' (8.3.5), or during a supine transfer if the wheels of the two transfer surfaces were not locked properly (MHRA, 2008) as mentioned in 8.2.3. A bariatric patient may also fall between the two surfaces during an independent supine transfer if a tremendous pushing force required to overcome inertia causes a braked wheel to slide on the hard floor causing the two surfaces to separate (see 8.3.6).

Patients can also fall off a trolley/ bed post-operatively if restless, particularly if bedrails were used inappropriately.
Unless the person is able to get up unaided a hoist with appropriate sling should be used. Anaesthetised patients are likely to need a flat lifting sling/ scoop stretcher or a HoverJack (see 11.8). Post fall action should follow the advice from NPSA/2011[1] and 2011[2]/RRR001.

8.7.2 Handling a deceased patient
Local procedure should be followed. Handling techniques should be the same as in any other situation in the hospital.

8.7.3 Working at a computer workstation
Theatre staff, except those based in the office, do not spend long periods on a computer, but they should have a height adjustable stool in order to ensure an ergonomic working position. It is usually one person in each session who enters details onto the computer, so the workstation can be set for that person to use throughout the session.

8.8 LOAD HANDLING
8.8.1 Handling instruments/ instrument trays/ theatre packs
Staff should avoid carrying heavy items and use trolleys (12.6).

8.8.2 Moving/ changing oxygen and other gas cylinders
Larger cylinders should be transferred on special cylinder trolleys (12.9), or small alloy containers (cylinders) that are a fraction of the weight of the larger cylinders should be used.
Piped oxygen decreases the amount of cylinder handling, but each patient trolley needs an accessible portable oxygen cylinder. Cylinders should be stored as indicated by the Department of Health, Estates and Facilities Alert Ref: EFA/2010/008.

8.8.3 Handling boxes/ bags of fluids/ empting drainage bags
The principles of load handling apply.
Where possible equipment should be provided and used to prevent overreaching, lifting at arms' length or stooping (12.4; 12.6).

8.8.4 Moving theatre tables/ handling parts of operating tables
For safer practice, staff should ensure there is space to move. Theatre tables can be pushed, but other parts of the table not on wheels should be moved on a trolley if heavy.

8.8.4.a Setting up an operating table particularly an orthopaedic traction table
Staff who carry out this task must have been trained, supervised and be competent. The working height should be adjusted to the hip/ waist level. Two staff should work together if heavy parts need moving.

8.8.4.b Removal and reinsertion of the end of the theatre table for certain procedures e.g. gynaecological
Some table ends can be folded down (although if folded, the end could then be in the way of surgeon's knees), or removed (see 8.4.2). If heavy, there is a risk of musculoskeletal injury to staff unless a safe system of work is in place. In most cases, removing an end from an operating table will require staff to operate a release system and then take the weight of the end. Often two staff should be used.

Some tables have an option of a light-weight foot end, but this does not take the weight of a heavy patient's legs. The end is usually stored on the floor against the wall. A specially designed trolley is available for some table ends to avoid storage on the floor (12.8). Table ends should be reinserted by two staff.

8.9 Setting up other equipment such as stacks of monitors and x-ray equipment
These pieces of equipment are often on wheels and can be high, and/ or heavy. A risk assessment should be in place to determine the number of staff needed to move each piece of equipment. Basic load handling principles should be applied.

8.10 Handling and positioning of gel pads
Larger gel pads are heavy and 'wobbly' – a trolley should be used to transport them. Heavy gel pads should only be lifted/ carried for a minimal distance. The theatre table height should be at hip/waist level before a heavy gel pad is lifted onto/ off the table. Storage of the gel pads should also follow the same rules.

9. Moving and handling assessment

9.1 Risk assessments – moving and handling (M&H) assessments
All theatre departments should have their own risk assessments (MHSWR, 1999) including generic manual handling assessments. Management as a part of their supervisory role should ensure that generic risk assessments are carried out, that generic protocols/ standard operating procedures (SOPs) are in place, and that staff are aware of and follow these.

These assessments should embrace all handling and positioning tasks carried out by the multidisciplinary theatre team including postural tasks such as supporting patients' limbs (HSE, 2006—SIM 07/2006/05), or postures during surgery/ closing wounds and/ or surgeons manipulating limbs in orthopaedics. The generic risk assessments should identify the levels of risks and what is needed to reduce the risks, incorporating M&H, positioning and the use of equipment.

All high risk activity should be analysed, and any change to reduce the risk to a lower level should be considered and implemented if possible (HSE, 2004).

9.2 Risk register
The theatre risk register, where all foreseeable high risks are documented, should include M&H risks, evidence of actions taken and the plans to reduce the risks to the lowest level reasonably practicable with an agreed time table. The high risks that management cannot find ways to reduce, or where they have decided to accept the risks, and the reasons for the decisions should also be logged.

9.3 Patient's mobility assessment as a part of pre-assessment
An assessment of a patient's level of functional mobility is part of the pre-assessment and one criteria for consideration of suitability for day surgery or needing an in-patient bed.

9.4 Patient's moving and handling risk assessment/ handling plan on admission
The admitting ward carries out a M&H risk assessment and formulates a pre-operative handling plan for each patient unless the patient is fully mobile. The handling plan identifies if the patient is in pain, is co-operative and able to weight bear prior to surgery, and how the patient is be transported to the theatre (8.1), including the transfer onto a trolley (see sec 8.2.1/2/3 and 8.3.6 for transfer methods).

9.5 Dynamic risk assessment in theatre
Pre-operatively, theatre staff carry out dynamic ('on-the-spot') assessment of the patient based on the handover from the escorting staff and their own observations.

9.6 Generic protocols
Handling during surgery follows generic protocols unless the patient has exceptional requirements.

However, in all situations staff should be ready to carry out a dynamic ('on-the-spot') risk assessment. For example, there is a protocol for the number of staff required for a supine transfer of an average size patient. Based on the size and the condition of the patient, staff at the time of transfer, decide on the actual number of staff/ equipment needed.

9.7 Review of M&H risk assessments
The generic M&H assessments are reviewed periodically as indicated by local policy and after any incidents of injury/ near-miss involving a patient and/ or staff.

9.8 Reassessment in recovery
Recovery handling is based on dynamic risk assessments and generic protocols unless the patient has special requirements.

10. Methods, techniques and approaches

This has been combined with section 8.

11. Handling equipment

Whilst generic terms have been used for equipment, in some cases specific equipment is mentioned. The inclusion of a manufacturer does not represent an endorsement by the London Group of NBE. Other manufacturers may make similar or better products.

Staff must report any faulty/ damaged equipment, label it 'for repair' and immediately remove it from use.

Based on risk assessment every theatre department should have a suitable and sufficient amount of handling equipment available for staff to use. Each theatre should have its own supine transfer system for horizontal transfers and slide sheets unless these are brought in with the patient from the ward.

11.1 Operating (theatre) table
Ideally, the operating table should be electric; easily manageable; stable with good brakes; adjustable by either electro hydraulic or hand operated controls for height, tilt, head down/ up plus sitting and jack-knife positions; one half of the table should be removable; comfortable and radiolucent; adaptable with the possibility of attaching supports, rests and traction extensions (APP, 2007; p. 82). The table should be appropriate to the type of surgery, with a known SWL. There should be a bariatric operating table available (see 11.2 - bariatric transfer chair/ operating table). "*All controls, brakes and accessories on the operating table are checked daily before use, in order to ensure they are clean, in good repair and in working order. A modern operating table is a complex medical device, which must be serviced regularly under a planned preventative maintenance programme to ensure optimal patient safety during surgical interven*tion" (APP, 2007; p. 82). A record of maintenance should be available (PUWER, 1998).

The operating table mattresses should be cleaned and inspected regularly for any deterioration (damage/ torn covers) and contamination (MHRA, 2010). Mattresses should also be tested for any evidence of 'bottoming out'. Where this has occurred, patients' tissue viability will no longer be protected.

Pressure-redistributing mattresses should be used for all individuals identified prior to the surgery as being at risk of pressure ulcer development (EPUAP & NPUAP, 2009).

11.2 Theatre Trolleys
To reduce the need for MH and the risk of injury to staff, all trolleys should be height adjustable (as mentioned in 8.1.3); have x-ray facility; easily adjustable functions - particularly post-operatively for sitting the patient up or for the use of head down tilt; easily accessible oxygen cylinder (8.8.2); side rails that fold underneath the trolley in a way that there is no/ minimal gap between the trolley and bed/ theatre table when supine transfers are carried out. Positioning of the side rails should not allow unconscious patients' arms to fall off the trolley. All staff should be aware of the safe system of work, when informed that a heavier/ wider patient is due for surgery. Either a bariatric trolley or a bariatric bed and mattress should be used. A bariatric transfer chair which could be used

as an operating table is also available. The use of a bariatric bed avoids extra supine transfers (see 6.3 and G15).

All theatre trolleys should be maintained as required by PUWER (1998) and mattresses examined as indicated by the MDA/2010/002.
Trolley side rails should always be used when a patient is unconscious or sedated, to stop the patient falling off the trolley due to the narrow width of the trolley.

11.3 Supine transfer system for a horizontal patient transfer (see 8.2.3)
Each theatre should have its own supine transfer system and it should be one where staff do not have to overreach over the table/ bed. The HSE (2006[1]) in their research report (491) stated that "*lateral transfer of sedated/ anaesthetised patients was the most significant patient handling hazard in the operating theatres*" – this significant risk may include both turning patients into a lateral position (on their side) on the table/ trolley/ bed and supine transfers to and from the table.

It is preferable that inflatable transfer systems are used for supine transfers of all heavier patients. These are more comfortable for patients and have a higher SWL than most transfer boards. Examples of inflatable systems are:

- AirPal – Hillrom Medical/ Quintal Healthcare
- AirSlide – Mangar
- Hovermat - JC Medical/ Hospital Direct/ Poshchair
- Repose and Repose Companion – Frontier Medical.

Using an inflatable system reduces the number of theatre staff compared to the use of a slide board. Some inflatable systems can also provide assistance with proning, but it is necessary to check with the manufacturer.

11.4 Sheets (for example flexislides from Medical Innovations) used on the theatre table/ slide sheets
Historically canvasses were used on the theatre tables when poles and canvasses were used for lifting. Once poles were removed, some units replaced the canvasses with narrow "drawsheets", but the intended use of a "drawsheet" is not designed for M&H as canvasses were.
Supine transfers replaced the 'poles and canvas' lift. Overreaching started to cause shoulder/ back problems for staff when canvasses or other narrow sheets without handles were used for these transfers.
Flat slide sheets, either wide enough to avoid overreaching or with handles, make supine transfer safer.
Some wider slide sheets should be available for larger patients.
A hospital-wide business case needs to consider what is used on the theatre table/ for supine transfers of horizontal patients all over the organisation as there are washable and disposable sheets/ slide sheets available. The benefits and disadvantages to consider are:

- operating costs
- environmental waste issues to comply with ISO 14001 certification
- the functionality
- the access to in house laundry/ the local laundry system
- infection control.

Various manufacturers produce bed length slide boards, which are used in conjunction with bed length slide sheets for all adult transfers. If a slide board is used, the weight of the patient should be within the SWL of the board.

A mobiliser (supplied by Poshchair) is a supine transfer system especially for spinal patients.

11.5 Wheelchairs
A sufficient number of wheelchairs should be available, based on risk assessment, to transfer patients, where it is not appropriate for the patient to walk independently (8.1.2).
The wheelchairs should be regularly maintained and securely stored. Each wheelchair should be wiped down between patients to avoid hospital acquired infections (See G8).

11.6 Proning systems
As with all equipment, a proning system is only used following a risk assessment.
At the time of writing, we are aware of the following equipment available (see 8.4.4.c):-

a) ProTurn from Hospital Direct.
b) Anderlift from Europa Medical Services.
c) The "Jackson spinal surgical table" from Southwest Medical Corporation.
d) Slide sheets are also used to assist with proning, as can some inflatable transfer devices (check with the manufacturer); but staff have to be careful as movement may not be as well controlled.
e) A new proning system should be available soon from Quintal?

11.7 Devices to support a patient in a prone position on the operating table
A number of different devices are in use, examples include:-
a) Montreal mattress - a rectangular mattress with a central hollow to prevent compression of the abdomen
b) Wilson frame
c) Hastings frame also known as 'Toronto' or 'Canadian' frame
d) Heffington frame
e) Andrews Frame (Soundararajan and Cunliff, 2007).

11.8 Anti-slip pads/ sliding devices that can be locked e.g. 'Gynaecology and Urology Slide' (called GUS)
Some anti-slip pads which stop/ reduce movement are available. Also available are, sliding devices that allow sliding only one way, or some that can be 'locked' to prevent patients sliding down if a tilted position is required for the operation and after surgery, can be unlocked to slide the patient into a required position (8.3.5; 8.4.2). The use of these should be based on a risk assessment. These should be laundered between patients to comply with infection control requirements or disposable covers should be used.

11.9 Hoists and slings
There are usually no hoists or slings in theatres, but staff should be aware of where to access a hoist if required.

Due to the overhead lights and laminar flow ventilation systems it is not possible to have overhead tracking for a hoist in the OR.
Although all healthcare staff should be fully trained in the operation of a hoist, should one be required a member of staff from the area loaning the hoist needs to accompany it to assist with its use, as theatre staff do not routinely use hoists.

Our recommendation is that theatre staff should practice and revise hoisting on their MH updates.

NOTE: A hoist with a scoop stretcher or other equipment such as 'a HoverJack' should always be used even in the theatre environment if somebody (particularly if anaesthetised) has fallen down and is unable to get up by themselves (see 8.7.1).

The generic assessments must be in place and have easy to follow reminders on how to use the equipment, including the use of a hoist/ HoverJack if available. The moving and handling link workers should be regularly updated on their use to ensure staff are reminded how to use it. Each theatre unit needs to have their own system on what action to take if a hoist should be required; e.g. if borrowed:-

a) Where is it borrowed from?
b) Could a member of staff from that area supervise its use, or is there another member of staff they can call to assist.

12. Other equipment and furniture

12.1 Electric/ hydraulic drip stands are easy to lower/ elevate, facilitating easier changing of heavy irrigation fluid bags.

12.2 Limb supports should be available for orthopaedic theatres and theatres where limbs are 'prepped'.

12.3 Steps with handles are useful in each anaesthetic room for shorter ambulant patients to get onto the trolley (see 8.2.2) - not suitable for very heavy patients.

12.4 Steps/ step stools/ safety ladders to enable staff to access items from high shelves and for shorter staff to adjust overhead theatre lights. During the operation a preferred method to adjust the overhead theatre light is to give the surgeon a sterile light handle to adjust independently.

12.5 Anti-static platform on which shorter staff can stand if required for a procedure with taller staff, or for cases requiring 'overhead' tables. This is hazardous – the shorter member of staff could step off, other staff could trip over it. The clinical reasoning for its use should be clearly documented.

12.6 Instrument/ dressing trolleys should be available to transport equipment/ instrument trays/ theatre packs/ boxes of intravenous or irrigation fluids in a sufficient number and variety of heights to suit staff needs, based on a risk assessment.

12.7 Height adjustable equipment tables ('Mayo' tables) for instrument trays during surgery should be available.

12.8 Carts for storage of stirrups/ boots; trolleys for ends of operating tables; racks for storage of lead/ lead replacement aprons
The following are available:-

- Special 4-wheeled carts for storage and transport of stirrups, boots and clamps (especially heavy duty stirrups) to avoid staff carrying, as well as losing parts, as these are kept together.
- Special trolleys to prevent storage of table ends on the floor during procedures. These avoid lifting from the floor and reduce staff incidents where the end falls/ has fallen onto the floor (8.7.1).
- Mobile lead apron racks, these are preferable to wall mounted ones – can be moved where needed.

12.9 Oxygen/ gas cylinder trolleys to transport oxygen/ gas cylinders in the department securely, from the storage area to where the cylinder needs changing [DH (2010) EFA/2010/008] (as mentioned in 8.8.2).

12.10 Laundry bag holders should be on wheels and suitable for laundry bags used locally - either linen or plastic.

*12.11 Rubbish bins s*hould allow the removal of used bags without the need to lift above shoulder height.

12.12 Bowls/ bowl stands for used swabs should be at an appropriate level, where possible on a stand to avoid excessive stooping. However, for some operations e.g. vaginal surgery, the surgeons may need the bowls on the floor.

12.13 Pump stands to support various pumps and to keep the working environment safe by keeping leads in one area.

12.14 Stools for surgeons, anaesthetists and other staff. If a hand adjusted screw thread stool is used, the surgeon should adjust it before the operation, and then adjust the table height. Some foot adjustable stools have caused incidents when actuated by accident.

13. Risk Rating

To carry out a 'suitable and sufficient' assessment, each task should be evaluated as part of the assessment process, so that the level of risk is quantified. Such assessments should be used, wherever possible, in the design of a safe system of work, and in highlighting any residual risks.

Various systems exist, but it is suggested that the NHS risk management 5x5 matrix, with 0-25 scale, is used for an overall evaluation of risk (NPSA, 2008) (see CD1, appendix 9 in folder 5). It is in common use, simple to use with 5 levels of risk, determined by a calculation of the likelihood or probability of an adverse event occurring multiplied by the severity of consequences or impact should it occur.

Likelihood/Probability (0-5) x Severity of Consequences or Impact (0-5) = 0-25

The values below are based on this system. Calculations lead to the following possible scores or ratings: -

1 – 6 = Low; 8 – 12 = Medium; 15 – 16 = High; 20 = Very High; 25 = Extreme

These ratings can then be used to alert staff, to prioritise action and justify any necessary expenditure to make the situation safer, on the basis of reasonable practicability. Options can be evaluated by considering risks, costs, and actions planned or taken, to reduce the level of risk to the lowest level that is reasonably practicable, which can thus be demonstrated.

In theatres the postural risks for staff are likely to be as significant as those associated with M&H. For assessing postural risks and those associated with tasks other tools are available, such as RULA (Hignett S & McAtamney L, 2006), REBA (Hignett S & McAtamney L, 2000) and OWAS (Karhu et al, 1977). These not only look at postures but forces. REBA should be used to assess the risks resulting from the postures and awkward movements encountered whilst working in theatres.

For more information on risk rating, please refer to Brooks, A and Orchard, S (2011).

14. Alerting the moving and handling (M&H) team

This depends on the experience of theatre practitioners on duty at the time, and on the availability of equipment required. Should any problem be envisaged, or arise, such as the patient's weight being over the SWL of the operating table/ bed, staff should be aware of how to contact the M&H team.

15. Referral to and involvement of other specialists

Either a surgeon or a theatre practitioner should contact other specialists as appropriate.

16. Transport (internal and external)

16.1 Transfer to the theatre
This will follow local policy (8.1).

16.2 Transfers within the operating suite
See 8.2.4.

16.3 Transfer from recovery to the ward: A competent nurse from the ward/ recovery staff will accompany the patient observing the patient at all times. Depending on the patient's condition and the force needed to push/ steer the bed/ trolley, the number of portering staff to push the bed/ trolley varies.

(NOTE: Minimum of 2 staff are required to push/ guide an occupied bed/ trolley plus the accompanying nurse.) Some trusts will expect the accompanying nurse to be the second person to push the trolley/ bed and be positioned at the head end of the trolley/ bed – this is not recommended practice as the nurse cannot observe the patient and push the trolley/ bed or open doors.

17. Discharge and transfer planning

Local policy will set the criteria for admission/ recovery and discharge either as a day surgery case or as an in-patient.

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	HoverMat/ HoverJack	1. JC Medical - www.cjmedicl.com/patienttransfer.html 2. Hospital Direct – www.patient-handling.com 3. Poshchair - www.poshchair.co.uk/PressureRelief/Inflatable-Bed/
	Repose and Repose Companion	Frontier Medical - www.reposedirect.com
Patient transfer slide sheet	Flexislide	Medical Innovations www.mwdicalinnovations.co.uk/hospitals/
	Gynae and urology slide (GUS)	Hospital Direct - www.patient-handling.com
Transfer board	Latslide	1st Call Mobility - www.1stcallmobility.co.uk
Proning devices	Anderlift	Europa Medical – www.europamedical.co.uk
	Proturn	Hospital Direct - www.patient-handling.com
	Jackson Spinal Surgical Table	Southwest Medical Corporation – www.swmedical.com
Power assisted leg holders		Anetic Aid – www.aneticaid.co.uk

Summary/ Key Messages

- **The intention of the entire strategy and standards document is to contribute to the improvement of: -**
  - The quality of care - 'patient experience' (dignity, privacy and choice)
    - clinical outcomes
  - Patient/ person safety
  - Staff health, safety and wellbeing
  - Organisational performance – cost effectiveness and reputation, etc.

- **The standard for G3 is:**

Systems are in place to cover all reasonably foreseeable handling and positioning situations in theatres/ perioperative settings.

- **Skilful M&H is key**

- **Special points for G3 are: -**
  - **All theatre departments have their own generic M&H risk assessments of all M&H activities/positioning of patients and SOPs/ protocols are available for all staff**
  - **Theatres are informed pre-operatively of patients' specific M&H/ tissue viability needs so that appropriate equipment or staff will be available when the patient arrives for surgery**
  - **All staff carry out a dynamic ('on-the-spot') M&H/ prevention & management of pressure ulcers (PMPUs) risk assessment before any handling/ positioning of patients/ inanimate loads**
  - **Competency based M&H training based on operating theatre requirements is available as well as local supervision**