Clinical Standard Operating Procedure (SOP)

MATERNAL CRITICAL CARE TRANSFERS

SETTING	Service-wide
FOR STAFF	All staff
PATIENTS	Antenatal (including intra-uterine transfer), peri-natal, post-natal patients

Introduction

For every 1,000 deliveries, 2.24 women require critical care admission in the United Kingdom[1] with 21% being antenatal, 46% on the day of birth and 23% in the following 6 days. The commonest reasons for admission are infection, haemorrhage and pre-eclampsia.

Following the development of the South West Maternal Medicine Network (SWMMN) and regional and national focus on increasing the number of neonates delivered in the most appropriate place of birth, it is anticipated that the volume of transfers of patients who are pregnant will increase. There are a number of reasons that a Retrieve transfer may be required:

- A critically ill woman who requires transfer for reasons other than her pregnancy (e.g. major trauma, neurosurgical event, etc).
- A critically ill woman who requires transfer for both herself and for Neonatal Intensive Care Unit (NICU) access for the neonate.
- A woman critically ill from pregnancy-related disease requiring tertiary care, such as peripartum cardiomyopathy, neurological event from preeclampsia/eclampsia
- A woman requiring escalation of care transfer following a major obstetric complication (e.g. post-partum haemorrhage) from a smaller obstetric unit

In addition, the following patients may require transfer, but are out of the scope of Retrieve:

- A well woman who requires transfer for Neonatal Intensive Care Unit (NICU) access for the neonate.

This SOP addresses the provision of care for those transfers within the Retrieve scope and describes specific management aspects for this patient group as they are not commonly encountered.

South West Maternal Medicine Network

The South West Maternal Medicine Network covers the same geography as Retrieve and co-ordinates and standardises care for pregnant women with pre-existing medical conditions or conditions that arise during pregnancy. Within its geographical footprint, around 45,000 live births occur per annum. The aim of the Network is to ensure equitable access, excellent experiences and optimal outcomes for women from all communities across the South West. Relevant aims include:

- To provide safe care as close to home as possible.
- To provide advice and planned intrapartum and postpartum care for women with medical conditions that arise during pregnancy.

- To provide local clinical leadership on the identification, referral, and management of women with medical conditions, including reviewing training, and clinical guidelines and referral pathways for all staff in contact with pregnant women across the footprint.

Geography

There are 12 delivery suites with ante/post-natal wards across the region. Given the specialist nature of care, critically ill women are often located in a high observation area within these rather than the local ICU. All relevant delivery suites (including contact details) are included in the Retrieve Hospital Directory. In line with usual Retrieve practice, ensure that you confirm the exact location in each of the referring and receiving hospitals.

The majority of patients requiring transfer will need to be moved to one of the three specialist centres that has an adjacent NICU: Derriford Hospital, Plymouth; St Michael's Hospital, Bristol; Southmead Hospital, Bristol (Note: maternal cardiac patients from Swindon may require transfer to the John Radcliffe in Oxford depending on where their care has been arranged). Very rarely, patients may require transfer outside of the South West to access quaternary care.

Education

Whilst obstetric transfers are rare, the Retrieve team are encouraged to be familiar with this patient group through their 'parent Trust' work as well as via Retrieve. A comprehensive summary of maternal critical care considerations was published in two parts in the British Journal of Anaesthesia Education in 2021 and is regarded as essential reading:

- **Part 1** – general principles of care, admission, physiological support, foetal medicine
- **Part 2** – pregnancy-specific conditions in patients admitted to critical care

Referrals

When dealing with referrals for obstetric patients, there are some additional factors that should be considered:

- The patient group is complex and often involves a number of members of the multi-disciplinary team across the referring and receiving hospitals. These may include obstetrics, neonatal intensive care, medicine (and sub-specialties), critical care and obstetric anaesthesia amongst others.
- In order that timely decisions are made, it may be necessary to facilitate a teleconference using the Retrieve system so that there is a rapidly-convened and succinct multi-disciplinary team discussion. The Retrieve Duty Consultant needs to arrange this (there can be up to 7 different individuals in the call) and should act as the 'chair' to ensure that the call is appropriately managed and efficiently conducted.
- Referrals may originate from delivery suites or similar locations and referring clinicians may be very unfamiliar with Retrieve. They may need additional guidance through the referral call as well as clear signposting to the Retrieve website and preparation checklist.

Specific considerations

The following is a list of factors specific to obstetric patients that should be considered during the referral conversation and ahead of transfer. Most can be dealt with rapidly and should not delay mobilisation. A checklist (Appendix 1) has been developed to aid both the referring hospital and Retrieve team in patient / equipment preparation.

- Location of patient and exact destination in the receiving hospital
- Ongoing treatment that may be less familiar to Retrieve team:
  - Steroids – betamethasone or dexamethasone (whichever is available in referring hospital)
  - Pre-eclampsia management with magnesium sulphate
  - Blood pressure management
- The chance of delivery prior to arrival in the receiving hospital (note: <50% of women requiring intra-uterine transfer deliver within 48 hours). If the risk is felt to be high (as determined by the referring obstetric team) then an escorting midwife is required – this should be an individual who is comfortable with home delivery, and is ideally transfer-trained, experienced and suitably equipped to manage neonatal resuscitation (if required). For any transfer of a woman in active labour, a midwife is required to join the transfer team. Suitable delivery equipment (delivery pack, cord clamp, clean towels etc) should be prepared.
- The requirement for obstetric-specific medications (e.g. uterotonics, high dose magnesium, etc) that may need to be sought from the referring hospital prior to departure.

Patients who may deteriorate and require intubation

Intubation and ventilation of obstetric patients is widely-recognised as a procedure associated with higher risks than the general population and with a greater chance of complications including failed intubation. Careful consideration should be given to those patients believed to be at high risk of requiring this and, if necessary, they should be intubated prior to transfer in an appropriate in-hospital location with local support (if available).

Maternal cardiac arrest

Cardiac arrest is fortunately rare but requires modifications to the Advanced Life Support approach. The Resuscitation Council UK Emergency Action Card for obstetric cardiac arrest is included in the Eolas App EAC section to aid familiarity, although it is accepted some elements do not apply in the transfer environment. The **pertinent points** are:

- Commence BLS and use standard hand position for CPR.
- If >20/40 or uterus palpable above umbilicus:
  - Manually displace uterus to the left to remove aortocaval compression.
- Place defibrillator pads in standard position, use standard energies.
- ~~Emergency hysterotomy should be performed with delivery occurring within 5 minutes of collapse (see paragraph below).~~

If the risk of cardiac arrest and emergency hysterotomy is considered to be moderately or highly likely, this should be discussed with the referring and receiving obstetricians and a plan agreed. This may require the addition of an appropriately trained obstetrician to the team or consideration of whether transfer is appropriate (considering risks and benefits). The individual needs to bring the appropriate equipment with them and the team should agree roles prior to departure.

~~In the event of unexpected maternal cardiac arrest, the Retrieve Duty Consultant is expected to perform an emergency hysterotomy in line with national guidelines (note: all Retrieve team members will receive specific training and education in this area).~~ Note (21/07/24): following review and extensive discussion within the Retrieve Duty Consultant team, it is acknowledged that resuscitative hysterotomy by the Retrieve team alone is currently not deliverable. Duty Consultants must make this clear to referring obstetricians and agree a pragmatic plan. Discussions with national organisations and the SWMMN will continue with the aim of seeking a resolution centred on patients and deliverable by Retrieve.

Preparation for transfer

Clinical advice should be offered, in line with usual Retrieve practice. For this patient group, this may best be delivered in the context of the multi-disciplinary teleconference. Specific emphasis should be made on patient preparation given the anticipated unfamiliarty of referring clinical staff. This should include:

- Signposting the maternity-specific preparation checklist at **www.retrieve.nhs.uk/refer.** The maternity elements of this are included in Appendix 1 of this document.
- Signposting the patient information leaflet at **www.retrieve.nhs.uk/patients** which may be of particular use to the patient and their next of kin.
- Emphasis on patient preparation including anti-emetic administration and consideration of appropriate analgesia (particuarly if in labour).
- Preparation of infusion(s) that need to continue and any emergency drugs, particularly if unfamiliar to Retrieve.
- Asking the referring hospital to make arrangements for the partner; Retrieve are unable to transport them and they will have to travel separately.

Transfer conduct

The Retrieve team should deliver usual care during transfer. There are few patient-specific considerations that are not disease-specific. These have been incorporated into a pre-transfer checklist that should be completed in addition to the usual checklist and are:

- Increased risk of nausea and vomiting – all awake patients should receive anti-emetics 30-60 minutes before departure and conveyed sitting up at least 30 degrees.
- Consider safety of any drugs being administered in the context of a pregnant or breastfeeding patient. The BNF is a useful resource for this and a Quick Reference Card has been produced for this purpose (see MyRetrievalService app).
- An obstetric patient >20/40 may suffer from aorto-caval compression when lying flat and this position should be avoided where possible. There are some options:
  - Sit the patient up, if able.
  - Consider left lateral tilt (pillows/bedding).
  - If immobilised (concurrent trauma), add left lateral tilt under vacuum mattress/scoop stretcher.
- A number of maternity-specific Emergency Action Cards have been produced and can be found in the MyRetrievalService app. These include:
  - Hypertension
  - Management of seizures in pregnancy
  - Delivery
  - Post-partum haemorrhage
  - Maternal cardiac arrest
- A maternal critical care Quick Reference Card has also been produced and includes normal physiological parameters for a pregnant patient, information on drug use for common

presentations and pointers for the management of maternal critical care patients with cardiac disease.

Working with neonatal teams (SoNAR)

In the South West, the SoNAR (Southwest Neonatal Advice and Retrieval) critical care transport service has bases in Bristol and Plymouth. On occasion, there may be the concurrent transfer of both mother and neonate or the requirement for intra-uterine transfer in a patient with high risk of delivery. These situations may require liaison between the services to ensure that mother and neonate are not separated (unless unavoidable) and to enable parallel and supportive decision-making. They can be contacted on 0117 342 5050 and in these situations, the Leadership SPOC may be useful to involve to help coordinate.

Document Change Control

Date of Version	Version Number	Lead for Revisions	Type of Revision	Description of Revision
02/24	1.0	Retrieve Clinical Director	New Document	

Document Governance

REFERENCES	
RELATED DOCUMENTS AND PAGES	1. Banerjee A, Cantellow S. Maternal critical care: parts I and II. BJA Education, 2021;21(4):140-147 and 2021;21(5):164-171 2. Care of the critically ill woman in childbirth; enhanced maternal care. RCoA, RCOG, ICS, FICM, *et al*, 2018. Available at: https://tinyurl.com/4ahsvfwc

AUTHORISING BODY	
SAFETY	
QUERIES AND CONTACT	Retrieve Leadership Team

Appendix 1 – Checklist: preparing for a maternal transfer

Use this checklist in addition to the main 'Preparing for a Retrieve transfer' one. *Consider printing this to aid preparation*		**Tick**
Patient Information	Maternity record	
	If pre-term birth predicted, complete periprem checklist and send copy with patient	
	Inform patient and partner of planned transfer. Signpost **www.retrieve.nhs.uk/patients** for more information	
Equipment	Delivery pack, cord clamp, neonatal mask for BVM to go with transfer team	
	If delivery anticipated, identify midwife to accompany patient (ideally transfer trained and experienced in delivery out of hospital)	
Drugs	Please give all patients an antiemetic (e.g. ondansetron 4mg IV) 30 minutes prior to the arrival of the transfer team If requested, please prepare the following for the Retrieve team: • Sytocinon 10IU • Magnesium sulphate • Hydralazine • Steroids (betamethasone or dexamethasone) • Tocolytics (if threatened pre-term labour ensure administration of nifedipine or atosiban as per regional guidelines)	

Appendix 2 – Checklist: Retrieve/transfer team pre-transfer

Documentation	You **must** record the following key information: • Obstetric reason(s) for transfer • Parity • Gestation • Recent EFW (estimated fetal weight) if known • Blood group / Rhesus status • Previous births (vaginal/LSCS) • Placental site • Other significant issues relating to pregnancy / delivery (e.g. significant abdominal surgery, uterine anomalies, Jehovah's Witness, etc)	
Equipment	Delivery pack, cord clamp, neonatal mask for BVM	
	If delivery anticipated, midwife to accompany patient	
	Sufficient bedding, inco pads and towels in the ambulance?	

Drugs	• Considering setting up Magnesium Sulphate prior to departure if concerns regarding seizures **or** if need for pre-term delivery (<30/40)
	  • Loading: 4g (8ml) $MgSO_4$ made up to 20ml with 0.9% sodium chloride. Give as slow bolus over 5-10 minutes.
	  • Maintenance: 10g (20ml) $MgSO_4$ made up to 50ml with 0.9% sodium chloride (concentration 0.2g/ml); give 5ml/hr (1g/hr).
	  • Further seizures: 2-4g (4-8ml) made up to 10ml; bolus 5-10 mins
	• Do you have sufficient $MgSO_4$ to deliver the above (and to start en-route if required)?	

Patient	Have anti-emetics been administered?	
	If >20/40 gestation, optimise position to minimise aorto-caval compression	
Advice	Do you have the contact details of CDS and receiving hospital obstetrician?	