

Hospital:

Midlands Integrated Care Plan for the Referral and Consideration of Adult Deceased Organ and Tissue Donation
24 hr referral service
07659 137 821

HOSPITAL ADDRESSOGRAPH or
 Surname
 First Name
 Date of Birth
 NHS Number

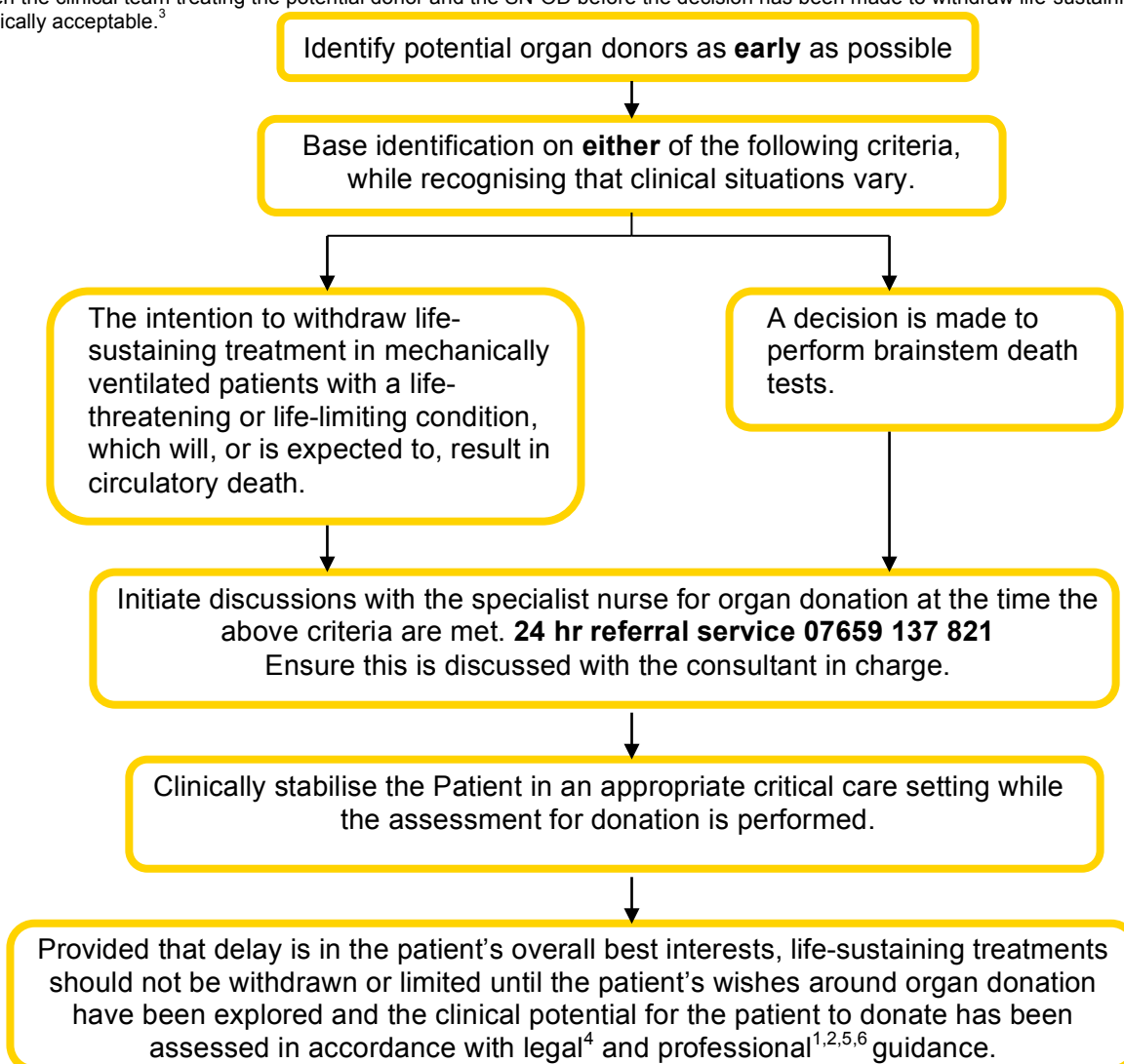
Objective of Care:

- To ensure all families are given the opportunity to consider organ and/or tissue donation where appropriate, in line with GMC (2011) guidance.¹
- To provide clinical guidelines for the management of Patientren who are potential organ and/or tissue donors.

Early identification of potential donors

Referral criteria as per NICE guidance (2011)² and local hospital policy

Contact between the clinical team treating the potential donor and the SN-OD before the decision has been made to withdraw life-sustaining treatment is ethically acceptable.³



The NICE criteria also recommend the use of clinical trigger factors, to prompt **Early Identification and Referral**, in patients who have had a catastrophic brain injury, defined as: the absence of one or more cranial nerve reflexes (eg one fixed pupil) **and** a Glasgow Coma Scale score of 4 or less that is not explained by sedation unless there is a clear reason why the above clinical triggers are not met.² NICE recognises that a proportion of the patients who are identified by these clinical triggers will survive.²

Guidance and Accountability Notes for Using this Care Plan:

- This Care Plan must be read in association with any local guidelines or policies. All drugs are the responsibility of the prescribing physician and must be checked against any local pharmacy guidance.
- This Care Plan forms part of the Patient’s record of care and is completed in addition to all other nursing and medical documentation. This Care Plan should be stored within the patient’s medical notes.
- Care Plans are heavily informed by clinical knowledge and expertise. They are designed to assist clinical judgement, not replace it.
- Patientren fulfilling the NICE (2011) ‘Early identification of potential donors’ referral criteria as given at the front of this document, should be placed on this Care Plan.
- If a care activity is not fully completed please give rationale in the Multi-Disciplinary Team (MDT) notes at the back of the document.
- This Care Plan will be audited by the Specialist Nurse for Organ Donation (SN-OD) within the Trust.

Supporting Documentation and Evidence Based Best Practice used within this Care Plan:

1. GMC (2010) “Treatment and care towards the end of life.” www.gmc-uk.org/guidance/ethical_guidance/end_of_life_care.asp
2. NICE (2011) “Organ Donation for Transplantation” <http://guidance.nice.org.uk/CG135>
3. UK DEC (2011) “An Ethical Framework for Controlled Donation after Circulatory Death” <http://aomrc.org.uk/component/content/article/38-general-news/286-an-ethical-framework-for-controlled-donation-after-circulatory-death-report.html>
4. Department of Health (2009) “Legal Issues Relevant to Non-heartbeating Organ Donation.” www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_108825
5. DCD consensus meeting report, available from www.ics.ac.uk/intensive_care_professional/standards_and_guidelines/dcd
6. Map of Medicine <http://organdonor.mapofmedicine.com/evidence/nhsbt/>
7. Report from the Organ Donation Taskforce (2008) “Organs for Transplant” http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_082122
8. Academy of Medical Royal Colleges (2008) “A Code of Practice for the Diagnosis and Confirmation of Death” <http://www.aomrc.org.uk/aomrc/admin/reports/docs/DofD-final.pdf>
9. HTA (2009) “Code of practice 2 - Donation of solid organs for transplantation” <http://www.hta.gov.uk/legislationpoliciesandcodesofpractice/codesofpractice/code2donationoforgans.cfm>
10. NHSBT (2013) “Donor Optimisation Guideline for the Management of the Brain-stem Dead Donor (Adult).” http://www.odt.nhs.uk/pdf/donor_optimisation_guideline.pdf

All staff recording in this document must complete the signature box below so that initials or signature only are needed throughout the Plan.

Print First Name and Surname	Role	Signature	Initial	Pager / Bleep, Location/Extension

Patient's Name:	NHS Number:
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Date	Activity Number	Activity
<p>Persons Responsible Dr / Nurse</p> <p>Achieved</p> <p><input type="checkbox"/></p> <p>Signature / Initial the Box</p>	<p>1</p>	<p>Potential Donor Identification</p> <p>Patient meets NICE, 'Early identification of potential donors' referral criteria.</p> <ul style="list-style-type: none">• Inform Consultant of planned referral to SN-OD• Discuss with SN-OD via 24 hour pager 07659137821 SN-OD spoken to: <ul style="list-style-type: none">- Ensure you have the patient's notes, including: NHS number/hospital number, date of birth, postcode, blood results and latest observations.- The SN-OD will check the Organ Donation Register and advise on the patient's status (or call 01179757580)- Member of SN-OD team will attend if agreed.

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Patient's Name:

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Date		Please follow the appropriate Potential Donor Care Plan below, as identified by the NICE 'Early identification of potential donors' referral criteria and as agreed by the SN-OD and Consultant (or most senior doctor if delegated).	
Time			
Persons Responsible Dr / Nurse / SNOD Achieved <input type="checkbox"/> Signature / Initial the Box	2	A decision is made to perform brainstem death tests (BSD). <input type="checkbox"/> Donation after Brainstem Death (DBD) may be possible. Go to page 5	The intention to withdraw life-sustaining treatment in patients with a life-threatening or life-limiting condition which will, or is expected to, result in circulatory death. <input type="checkbox"/> Donation after Circulatory Death (DCD) may be possible. Go to page 18
		Tissue Donation may be possible. <input type="checkbox"/> Go to page 25	No Donation possible. <input type="checkbox"/> Go to page 26
		Early Notification of Potential Donor, please re-refer when... (Please detail plan for re-referral below) <input type="checkbox"/>	Other. (Please document below) <input type="checkbox"/>
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Donation after Brainstem Death (DBD)

Date Time	Activity Number	Activity
Persons Responsible Dr / Nurse / SNOD Achieved <input type="checkbox"/> Signature / Initial the Box	DBD 1	Referral Check <ul style="list-style-type: none"> • A decision is made to perform brainstem death (BSD) tests. • Check SN-OD has been notified. – Member of SN-OD team will attend unit. • The SN-OD will advise on the patient's suitability for donation. If medically unsuitable for DBD, tissue donation may still be possible. Tissue services can be contacted on 07659180773 or via the SN-OD 07659137821. See Tissue Only Donation Pathway (page xxx). SN-OD should still attend the unit for BSD testing.

Date Time	DBD 2	Normal homeostasis is maintained until BSD testing is appropriate. (See Map of Medicine⁹) <ul style="list-style-type: none"> • Maintain mandatory and protective ventilation (Tidal Volume (VT) 6-8mls/kg), PaCO₂ 5.0-6.5 Kpa, and PaO₂ 8-14 Kpa or SaO₂ >95% on minimal FiO₂. • Maintain Mean Arterial Pressure (MAP) 60-80mmHg. Insert central line if not already insitu and prescribe inotropes. If central access is deemed inappropriate, start peripheral inotrope infusion. • Aim Na 130-155mmol/L and monitor for signs of Diabetes Insipidus (DI). If DI administer DDAVP (1-4 micrograms) and consider IV fluids (eg Compound Sodium Lactate (Hartmann's) solution, 5% glucose). – If there are any plans to carry out ancillary investigations or drug levels,⁵ explore early.
Persons Responsible Dr / Nurse / SNOD Achieved <input type="checkbox"/> Signature / Initial the Box		

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Date	DBD 3	Discussion with family regarding plan for BSD testing. (See Appendix 1)
Time		
Dr / Nurse		
Achieved		
<input type="checkbox"/>		
Signature / Initial the Box		
<ul style="list-style-type: none"> • Doctor, Nurse and SN-OD plan the discussion with the family in advance and prepare for BSD tests. • SN-OD (if present) is introduced self to family where appropriate and agreed with clinician. Example: “[SN-OD Name] is a specialist nurse who supports families in this situation.” – Discussion of donation is not initiated at this time unless initiated by the family. See Appendix 1. • BSD testing explained to family by Doctor and SN-OD. It is important the family understand that if brain stem death is confirmed their loved one is deceased. • Family offered the option to witness BSD testing if appropriate. • If BSD tests are not able to be performed, document the reasons. • If life-sustaining treatment is to be withdrawn, consider Donation after Circulatory Death (DCD) and start DCD pathway (page x). 		
NOTES / VARIANCE		

Date	DBD 4	Preparation for BSD testing Refer to BSD testing form (See Appendix 2)
Time		
Dr / Nurse / SN-OD		
Achieved		
<input type="checkbox"/>		
Signature / Initial the Box		
<ul style="list-style-type: none"> • Prepare Equipment – Pen torch – Gauze/cotton wool – 50ml bladder syringe – Ice cold water (100mls) – Otoscope with ear pieces – Yankauer sucker – Suction catheter + oxygen tubing / appropriate anaesthetic hand ventilation circuit (if PEEP required) – Blood gas syringes (pre and post apnoea test x2) – 		
Prepare the Patient		
<ul style="list-style-type: none"> • Pre-oxygenate on 100% FiO₂ and ensure normocarbida. – During the apnoea test the ventilator settings will need to be adjusted to ensure PaCO₂ >6.0 Kpa and pH < 7.4 		

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Date Time	DBD 5	1st and 2nd BSD test undertaken	
		Dr / Nurse / SN-OD Achieved <input type="checkbox"/> Signature / Initial the Box	See Appendix 2 for an abbreviated testing form, which has been endorsed for use by the National Organ Donation Committee, FICM and the ICS. This is designed for use by clinicians experienced in confirming death using neurological criteria. This version and a longer, fuller version can also be downloaded from www.ics.ac.uk or www.odt.nhs.uk <ul style="list-style-type: none"> • Please carry out a recruitment manoeuvre after each apnoea test.

Date Time	DBD 6	1st and 2nd Tests Consistent with BSD?	
		Dr / Nurse / SN-OD Achieved <input type="checkbox"/> Signature/ Initial the Box	Yes <ul style="list-style-type: none"> • Nurse, Doctor and SN-OD inform family the outcome of the BSD test, as per plan. • Family given time to accept the result. – Organ donation may be discussed at this stage if deemed appropriate (see below). No <ul style="list-style-type: none"> – If the plan is to retest at a later time, it is advised to start a new Deceased Donation Care Plan. – If retesting not planned, consider Donation after Circulatory Death (DCD) (page x).
		<input type="checkbox"/>	YES
		<input type="checkbox"/>	NO

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Contraindications to Deceased Organ Donation (tick if yes) (if yes go to DBD 9) <input style="float: right;" type="checkbox"/>
Reason for contraindication (decided through consultation with the SN-OD)

Date	DBD 7	Approach regarding organ donation (See Appendix 1)
Time		
Dr / Nurse / SN-OD		
<p style="text-align: center;">Achieved</p> <input style="width: 40px; height: 20px; margin: 5px auto;" type="checkbox"/> <p style="text-align: center;">Signature / Initial the Box</p>		

Planning
The SN-OD will check the Organ Donation Register and advise on the patient's status, if not done so already.

- A multi-disciplinary team should plan the approach. This may include local faith representative(s) where relevant.
- Clarify any coronial / legal or safeguarding issues.
- Identify key family members.
- Identify a setting suitable for private and compassionate discussion.

The approach

- Doctor, Nurse and SN-OD approach the family.
- Confirm understanding of the results of the brainstem death testing and that death has occurred, before discussing donation.
- Family given information on donation and allowed the opportunity to ask questions.
- SN-OD answers these and then leaves the family to discuss donation privately.
- SN-OD remains available to provide support to the staff.

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Date	DBD 8	Outcome of family decision
Time		
Dr / Nurse / SN-OD		
Achieved		<ul style="list-style-type: none"> • SN-OD and Nurse return to family (as agreed) to answer further questions and hear outcome of family decision. • Document outcome • If Patient's next of kin (person ranking highest in the qualifying relationship as given by the HTA 2004) agree to proceed with organ donation, SN-OD will take consent and undertake patient assessment with patient's family answering any outstanding questions.
<input type="checkbox"/>		
Signature/ Initial the Box		
NOTES / VARIANCE		

PLEASE CONTINUE BASED ON OUTCOME OF FAMILY DECISION				
Date	DBD 9	Proceeding with DBD	Tissue Only Donation Pathway	No Donation Pathway
Time				
SN-OD				
Achieved		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>		Continue	Go to page 25	Go to page 26
Signature/ Initial the Box				

Date	DBD 10	Consent and formal clarification of any outstanding coronial / legal or safeguarding issues.
Time		
Dr / Nurse / SN-OD		
Achieved		<ul style="list-style-type: none"> • Further discussion with family, Nurse and SN-OD. • Consent and patient assessment paperwork completed. • Consultant and/or SN-OD will seek approval from H.M. Coroner, if required and not previously clarified, and document any discussion in the medical notes.
<input type="checkbox"/>		
Signature/ Initial the Box		
NOTES / VARIANCE		

Patient's Name:	NHS Number:
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Date	DBD 11	Initial investigations Laboratory samples - SN-OD will advise on the quantity and blood bottles required. <i>To assess organ function</i> <ul style="list-style-type: none"> Send bloods for biochemistry (add amylase, magnesium, Gamma GT, AST and glucose) Send bloods for FBC and clotting Perform arterial blood gas (ABG). Firstly on current FiO₂, then pre-oxygenate on 100% O₂ for 20 minutes and repeat ABG. Repeat 2 hourly and give results to SN-OD. ABG should be performed with 5cm H₂O PEEP (if tolerated). <i>To identify suitable recipients</i> <ul style="list-style-type: none"> Request a Group and save (if not already available). Ask SN-OD if cross match is required. (<i>Hard copy will be required</i>) Additional blood samples for SN-OD, who will advise on quantity and will request and arrange transport to send to tissue typing and virology, (if not already taken).
Time		
Nurse / SN-OD		
Achieved		
<input type="checkbox"/>		
Signature/ Initial the Box		

Date	DBD 12	To assess cardiac and/or respiratory function (SN-OD will advise if not required) <ul style="list-style-type: none"> Request CXR and document findings. ECG performed post BSD confirmation and reported by a senior clinician. ECHO performed post BSD confirmation and findings documented. Cardiologist or Echo technician to clarify with SN-OD which measurements are required. SN-OD will mobilise SCOUT team if appropriate.
Time		
Dr / Nurse / SN-OD		
Achieved		
<input type="checkbox"/>		
Signature/ Initial the Box		

Date	DBD 13	SN-OD Activities <ul style="list-style-type: none"> Detailed physical examination completed by SN-OD with the support of the bedside nurse. Patient registered with ODT duty office as a donor. Organ/tissue matching commenced (minimum 4 hours, often 6+ hours). <ul style="list-style-type: none"> Positive virology may limit or exclude donation, SN-OD to advise. External Organ Retrieval Teams organised plus Local Theatres and Anaesthetist. <ul style="list-style-type: none"> SN-OD to keep family informed and supported.
Time		
SN-OD		
Achieved		
<input type="checkbox"/>		
Signature/ Initial the Box		

Proceed to Donor Optimisation

Patient's Name:

NHS Number:

DBD Donor Optimisation Extended Care Bundle

Priorities to address are

1. Assess fluid status and correct hypovolaemia with fluid boluses
2. Introduce vasopressin infusion where required introduce flow monitoring
3. Perform lung recruitment manoeuvres (e.g. following apnoea tests, disconnections, deterioration in oxygenation or suctioning)
4. Identify, arrest and reverse effects of *diabetes insipidus*
5. Administer methylprednisolone 15mg/kg (all donors)

Contact SN-OD if you need any advice or support

Y N/A

Cardiovascular (primary target MAP 60-80 mmHg)

- | | | |
|--|--------------------------|--------------------------|
| 1. Review intravascular fluid status and correct hypovolaemia with fluid boluses | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Commence cardiac output / flow monitoring | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Commence vasopressin (0.5 – 4 units/hour) where vasopressor required, wean or stop catecholamine pressors as able | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Introduce dopamine (preferred inotrope) or dobutamine if required | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Commence Liothyronine at 3 mcg/hour (+/- 4 mcg bolus)
(in cases of high vaso-active drug requirements or as directed by the cardiothoracic retrieval team) | <input type="checkbox"/> | <input type="checkbox"/> |

Respiratory (primary target PaO₂ ≥ 10 kPa, pH > 7.25)

- | | | |
|--|--------------------------|-------------------------------------|
| 1. Perform lung recruitment manoeuvres | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 2. Review ventilation, ensure lung protective strategy
(Tidal volumes 4 – 8ml/kg ideal body weight and optimum PEEP (5 – 10 cm H ₂ O)) | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3. Maintain regular chest physio incl. suctioning as per unit protocol | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 4. Maintain 30 – 45 degrees head of bed elevation | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 5. Ensure cuff of endotracheal tube is appropriately inflated | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 6. Patient positioning (side, back, side) as per unit protocol | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 7. Where available, and in the context of lung donation, perform bronchoscopy, bronchial lavage and - toilet for therapeutic purposes | <input type="checkbox"/> | <input type="checkbox"/> |

Signature _____

Print Name _____

DBD Donor Optimisation Extended Care Bundle

Summary of donor optimisation targets

- **PaO₂ ≥ 10 kPa (FiO₂ < 0.4 as able)**
- **PaCO₂ 5.0-6.5 kPa (or higher as long as pH > 7.25)**
- **MAP 60-80 mmHg**
- **CVP 4-10 mmHg**
- **Urine output 0.5-2.0 mls/kg/hr, appropriate for a**
- **BM 4-10 mmols/L**
- **Temperature 36-37.5 °C**

Contact SN-OD if you need any advice or support

	Y	N/A
Fluids and metabolic management		
1. Administer methylprednisolone (dose 15 mg/kg, max 1 g)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2. Review fluid administration. IV crystalloid maintenance fluid (or NG water where appropriate) to maintain Na ⁺ < 150 mmol/l	<input type="checkbox"/>	<input type="checkbox"/>
3. Maintain urine output between 0.5 – 2.0 ml/kg/hour (If > 4ml/kg/hr, consider <i>Diabetes insipidus</i> and treat promptly with vasopressin and/or DDAVP. Dose of DDAVP 1-4 micrograms, ivi titrated to effect)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4. Start insulin infusion to keep blood sugar at 4-10 mmol/l (minimum 1 unit/hr; add a glucose containing fluid if required to maintain blood sugar)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5. Continue NG feeding (unless SN-OD advises otherwise)	<input type="checkbox"/>	<input type="checkbox"/>
Thrombo-embolic prevention (as per usual age appropriate standard)		
1. Ensure anti-embolic stockings are in place (as applicable)	<input type="checkbox"/>	<input type="checkbox"/>
2. Ensure sequential compression devices are in place (as applicable)	<input type="checkbox"/>	<input type="checkbox"/>
3. Continue, or prescribe low molecular weight heparin (as applicable)	<input type="checkbox"/>	<input type="checkbox"/>
Lines, Monitoring and Investigations (if not already done)		
1. Insert arterial line: left side preferable (radial or brachial)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2. Insert CVC: right side preferable (int jugular or subclavian)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3. Continue hourly observations as per critical care policy	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4. Maintain normothermia using active warming where required	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5. Perform a 12-lead ECG (to exclude Q-waves)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6. Perform CXR (post recruitment procedure where possible)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7. Send Troponin level in all cardiac arrest cases (and follow-up sample where patient in ICU > 24 hours)	<input type="checkbox"/>	<input type="checkbox"/>
8. Where available, perform an Echocardiogram	<input type="checkbox"/>	<input type="checkbox"/>
9. Review and stop all unnecessary medications	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Date _____

Time _____

Patient's Name:

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Ventilation Notes

The focus of these therapies is to prevent aspiration and maintain respiratory function.

- Nurse in semi-recumbent position.
- Enteral feeding can continue unless advised by SN-OD to cease.
- Regular turning (minimum 4 hourly).
- Continue with chest physiotherapy (Physiotherapist or Dr to perform recruitment manoeuvre if appropriate and repeat as indicated).
- Regular suction (if purulent secretions send sample for MC&S)
- Protective ventilation (VT 6-8mls/kg)
- Maintain PaCO₂ 5.0-6.5 kPa (or higher as long as pH > 7.25)
- Maintain PaO₂ ≥ 10 kPa (FiO₂ < 0.4 as able)
- Continue DVT prophylaxis, if appropriate
- Review current prescribed medication

Cardiovascular Notes

The focus of these therapies is to maintain general organ perfusion, rather than a high MAP and CPP required for the treatment of brain injury. This change of goal often results in a rapid reduction in cardiovascular support.

To avoid pulmonary oedema and maintain cardiovascular stability

- Stop crystalloid infusion.
- If CVC and arterial line are not *in situ* please insert RIJ CVC and left radial arterial line.

High dose catecholamine infusions (particularly noradrenaline) are associated with poor heart function post transplant

- Wean noradrenaline / other inotropes to achieve MAP 60-80mmHg. If unable to reduce, commence vasopressin (see below). If no response on vasopressin at 4 units/hour speak to SN-OD.
- If MAP > 90 mmHg prescribe and titrate Glycerol Trinitrate infusion.
- Swan-Ganz catheter and cardiac output measurements only if monitoring already *in situ* or unless instituted by SCOUT team.

*If cardiothoracic organs are being donated, to improve cardiac stability and function consider the following, **as advised** by recipient team and as per local agreements*

- Prescribe and commence T3 (L-Tri-iodothyronine) at 3 mcg/hour or as directed by the cardiothoracic transplant team.
- Prescribe and commence Vasopressin at 0.5-4 units / hour, where vasopressor required.

Renal, Fluid, Endocrine and Electrolyte Notes

Maintain good urine output for the kidneys

- Urine output 0.5-2.0 mls/kg/hr

Diabetes Insipidus (DI) occurs commonly in BSD resulting in polyuria, which may result in fluid loss and electrolyte disturbances and hypovolemia.

If showing signs of DI (polyuria) treat with DDAVP 1 - 4 microgram bolus (repeated as required).

Monitor and correct Na, consider 5% glucose.

- Initiate or continue enteral feeding unless otherwise instructed by the SN-OD.

Fluid overload makes lung transplantation unlikely

- Fluid balance should be maintained using colloid bolus as indicated (monitoring CVP, urine output, fluid balance and blood pressure).

Endocrine goals

- Aim to keep blood glucose 4-10 mmol/l. Start insulin infusion, minimum 1 unit/hr; add glucose containing fluid if required to maintain blood sugar or as per local policy.
- Prescribe and administer IV Methylprednisolone 15mg/kg, maximum 1g.

Electrolyte goals

- Na 135-150 mmols/L (Na >150mmols/l can cause hepatic graft dysfunction)
- K 4.0 – 5.0 mmols/L
- Other electrolytes
 - Mg > 0.8 mmols/L
 - Ionised Ca²⁺ on Arterial Blood Gas 0.9 – 1.1 mmol/L or corrected Ca²⁺ 2.0-2.6 mmol/L
 - Phosphate >0.8 mmol/L

Temperature goals

- Temperature 36-37.5 °C (actively cool or warm as appropriate)

Prescribing guidelines

- **DDAVP 1-4 microgram bolus**
4 micrograms desmopressin (1-desamino-8-D-arginine vasopressin) made up to 4 mls with saline 0.9%. Administer intravenously as push 1-4 mls.
- **Liothyronine at 3 micrograms/hour**
T3 (L-Tri-iodothyronine) 20 micrograms made up to 20 mls with water for injection = 1 microgram/ml. Run 3 mls / hour.
- **Methylprednisolone 15 mg/kg, max 1g**
Add to 100 mls of saline 0.9% and infuse over 1 hour.
- **Vasopressin (0.5 – 4 units/hour)**
20 units vasopressin (pitipressin) made up to 40 mls with 5% glucose = 0.5 units/ml. Run 1-8 mls / hour.

All drugs are the responsibility of the prescribing physician and must be checked against any local pharmacy guidance.

Patient's Name:	NHS Number:
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Physiological Parameters / Goals

	O/A	+1 hr	+2 hrs	+3 hrs	+4 hrs	+6 hrs
PaO ₂ ≥ 10.0 kPa (FiO ₂ < 0.4 as able)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PaCO ₂ 5 – 6.5 kPa (or higher as long as pH > 7.25)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MAP 60 – 80 mmHg	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CVP 4 – 10 mmHg (secondary goal)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cardiac index > 2.1 l/min/m ²	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ScvO ₂ > 60 %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SVRI (secondary goal) 1800 – 2400 dynes*sec/cm ⁵ /m ²	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Temperature 36 – 37.5°C	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Blood glucose 4.0 – 10.0 mmol/l	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Urine output 0.5 – 2.0 ml/kg/hour	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Signature						
Print name						
Date						
Time						

Patient's Name:	NHS Number:
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Tick ✓ = achieved, x = not achieved

	+8 hrs	+10 hrs	+12 hrs	+14 hrs	+16 hrs	+18 hrs
PaO ₂ ≥ 10.0 kPa (FiO ₂ < 0.4 as able)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PaCO ₂ 5 – 6.5 kPa (or higher as long as pH > 7.25)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MAP 60 – 80 mmHg	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CVP 4 – 10 mmHg (secondary goal)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cardiac index > 2.1 l/min/m ²	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ScvO ₂ > 60 %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SVRI (secondary goal) 1800 – 2400 dynes*sec/cm ⁵ /m ²	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Temperature 36 – 37.5°C	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Blood glucose 4.0 – 10.0 mmol/l	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Urine output 0.5 – 2.0 ml/kg/hour	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Signature						
Print name						
Date						
Time						

Patient's Name:	NHS Number:
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Date	DBD 14	Mementos
Time		
Nurse / SN-OD		
Achieved		
<input type="checkbox"/>		
Signature/ Initial the Box		

- Mementos (handprints, and locks of hair offered). If requested these are facilitated by the Nurse and SN-OD at an appropriate time.

Date	DBD 15	Organ Retrieval
Time		
Nurse / SN-OD		
Achieved		
<input type="checkbox"/>		
Signature/ Initial the Box		

- Organ retrieval operation
- Last offices performed as per local policy.
- Family are given the option to return to see their loved one following the retrieval and participate in last offices.

Date	DBD 16	Final Activities
Time		
Nurse / SN-OD		
Achieved		
<input type="checkbox"/>		
Signature/ Initial the Box		

- Patient transferred to the mortuary.
- If tissues to be donated this will be facilitated in the mortuary as agreed.
- SN-OD will provide donation outcome information to staff and family as agreed.

Patient's Name:	NHS Number:
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Donation after Circulatory Death (DCD)

Date Time	Activity Number	Activity
Dr / Nurse Achieved <input style="width: 50px; height: 20px;" type="checkbox"/> Signature/ Initial the Box	DCD 1	The Withdrawal Decision <ul style="list-style-type: none"> The intention is to withdraw life-sustaining treatment in a patient with a life-threatening or life-limiting condition, which will, or is expected to, result in <i>imminent</i> circulatory death. The decision to withdraw life-sustaining treatment must be made by at least two consultant intensivists with consideration of the opinions of the entire team. Do not resuscitate order in place. Ensure parent team informed of withdrawal of life sustaining treatment decision and referral for potential DCD. Consultant intensivist has documented the above clearly in the patient's medical notes, including the planned method of withdrawal. UK DEC recommends that two senior doctors have made the decision to withdraw life sustain treatment.³

NOTES / VARIANCE

Patient's Name:	NHS Number:
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Date	DCD 2	Referral Check
Time		
Dr / Nurse / SN-OD		<ul style="list-style-type: none"> • Check SN-OD has been notified. • SN-OD will assess and advise on medical suitability for DCD. • The SN-OD will check the Organ Donation Register and advise on the patient's status. • If Patient is subject of a Patient protection investigation notify key professionals, as per local policy, at this stage. Document outcome in medical notes. • If suitable, SN-OD will attend. • If medically unsuitable for DCD, tissue donation may still be possible. Tissue services can be contacted on 07659180773 or via the SN-OD 07659137821. See Tissue Only Donation Pathway (page 20).
Achieved		
<input type="checkbox"/>		
Signature/ Initial the Box		

Contraindications to Deceased Organ Donation (tick if yes) (if yes go to DCD 6)	<input type="checkbox"/>
Reason for contraindication (decided through consultation with the SN-OD)	

Date	DCD 3	Family discussion regarding withdrawal decision (See Appendix 1)
Time		
Dr / Nurse / SN-OD		<ul style="list-style-type: none"> • SN-OD (if present) introduced to family where appropriate and agreed with clinician. • Consultant undertakes full explanation to the family of why the multidisciplinary team believe the withdrawal of life sustaining treatment is in the overall benefit of the Patient. • Consultant undertakes explanation of the withdrawal process. • If family is accepting and in agreement with the withdrawal of life sustaining treatment an approach regarding DCD may be made at this time (see below).
Achieved		
<input type="checkbox"/>		
Signature/ Initial the Box		
NOTES / VARIANCE		

Patient's Name:	NHS Number:
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Date	DCD 4	<p>Approach regarding organ donation (See Appendix 1)</p> <p>Planning (these activities are best explored before Activity Number DCD 3) The SN-OD will check the Organ Donation Register and advise on the patient's status, if not done so already.</p> <ul style="list-style-type: none"> • A multi-disciplinary team should plan the approach. This may include local faith representative(s) where relevant. • Clarify any coronial / legal or safeguarding issues. • Identify key family members. • Identify a setting suitable for private and compassionate discussion. <p>The approach</p> <ul style="list-style-type: none"> • Doctor, Nurse and SN-OD approach the family. • Confirm understanding and acceptance of the plan to withdraw life-sustaining treatment, before discussing donation. • Family given information on donation and allowed the opportunity to ask questions. • SN-OD answers these and then leaves the family to discuss donation privately. • SN-OD remains available to provide support to the staff.
Time		
Dr / Nurse / SN-OD		
<p>Achieved</p> <div style="border: 1px solid black; width: 40px; height: 20px; margin: 0 auto;"></div> <p>Signature/ Initial the Box</p>		

NOTES / VARIANCE

Date	DCD 5	<p>Outcome of family decision</p> <ul style="list-style-type: none"> • SN-OD and Nurse return to family (as agreed) to answer further questions and hear outcome of family decision. • Document outcome. • If patient's next of kin (person ranking highest in the qualifying relationship as given by the HTA 2004) agree to proceed with organ donation, SN-OD will take consent and undertake patient assessment with patient's family answering any outstanding questions.
Time		
Nurse / SN-OD		
<p>Achieved</p> <div style="border: 1px solid black; width: 40px; height: 20px; margin: 0 auto;"></div> <p>Signature/ Initial the Box</p>		

Patient's Name:

NHS Number:

PLEASE CONTINUE BASED ON OUTCOME OF FAMILY DECISION				
Date	DCD 6	Proceeding with DCD	Tissue Only Donation Pathway	No Donation Pathway
Time				
SN-OD				
Achieved				
<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Signature/ Initial the Box		Continue	Go to page 25	Go to page 26

Date	DCD 7	Consent and formal clarification of any outstanding coronial / legal or safeguarding issues.
Time		
Dr / Nurse / SN-OD		
Achieved		<ul style="list-style-type: none"> • Further discussion with family, Nurse and SN-OD • Consent and patient assessment paperwork completed. • Consultant and/or SN-OD will seek approval from H.M. Coroner, if required and not previously clarified, and document any discussion in the medical notes.
<input type="checkbox"/>		
Signature/ Initial the Box		
NOTES / VARIANCE		

Patient's Name:	NHS Number:
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Date	DCD 8	<p>New care plan and treatment goals</p> <ul style="list-style-type: none"> The patient will continue to be cared for as per local end of life guidance and in accordance with GMC guidance.¹ Treatment decisions must continue to be in the patient's best interests. In someone who wanted to be a donor actions to facilitate donation will usually be in the patient's best interests provided the actions do not cause harm or distress, or place them at significant risk of experiencing harm or distress.⁴ The end of life care plan for a patient on the DCD care plan should include a plan for how to proceed if the time to death following treatment withdrawal is incompatible with successful transplantation, and families and all staff (donor and retrieval teams) should be fully informed. SN-OD and Consultant agree physiologic goals and limits of pre-morbid interventions (e.g. inotropes & fluid for BP management, FiO₂). <p>Goals and Limits agreed:</p> <p>.....</p> <p>.....</p> <p>A useful guide to timelines and responsibilities of the team can be seen in Appendix 3.</p> <ul style="list-style-type: none"> Any request for further investigations on behalf of the retrieval team (e.g. ABG on 100% O₂, CXR) requires consultant approval (or most senior medical doctor if delegated) and possible further discussion with family. Bloods for tissue typing, virology and to accompany organs are taken (if not already taken). SN-OD will advise on the quantity and blood bottles required.
Time		
Dr / Nurse / SN-OD		
Achieved		
<input type="checkbox"/>		
Signature/ Initial the Box		

Date	DCD 9	<p>SN-OD Activities</p> <ul style="list-style-type: none"> Detailed physical examination completed by SN-OD with the support of the bedside nurse. Patient registered with ODT duty office as a donor. Organ/tissue matching commenced (minimum 4 hours, often 6+ hours). Positive virology may limit or exclude donation, SN-OD to advise. External Organ Retrieval Teams organised plus Local Theatres (No anaesthetist required unless lung donation). If consent has been given for lung donation, discuss process of retrieval with Consultant and Anaesthetist. Process to be followed according to guideline – Appendix 4. SN-OD to keep family informed and supported. Family are kept informed of provisional timings to enable them to prepare for treatment withdrawal.
Time		
SN-OD		
Achieved		
<input type="checkbox"/>		
Signature/ Initial the Box		

Patient's Name:	NHS Number:
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Date	DCD 10	Mementos
Time		
Nurse / SN-OD		
Achieved		
<input type="checkbox"/>		
Signature/ Initial the Box		

• Mementos (handprints, and locks of hair offered). If requested these are facilitated by the Nurse and SN-OD at an appropriate time.

Date	DCD 11	Withdrawal
Time		
Dr / Nurse / SN-OD		
Achieved		
<input type="checkbox"/>		
Signature/ Initial the Box		

• When retrieval team have arrived and are set up in theatre, the nominated medical personnel will prepare the family for treatment withdrawal.

• Comfort measures to be administered or continued as per usual practice, local end of life guidelines and in accordance with GMC guidance.¹

• Treatment withdrawn as per agreed plan.

Time:

Date..... Time.....

• SN-OD will notify retrieval team of exact time of withdrawal.

• Family kept updated and supported throughout by the bedside nurse and SN-OD.

• SN-OD will make discrete observations of patient monitors.

• Family will be informed when asystole occurs.

Date	DCD 12	Confirmation of Death
Time		
Dr / Nurse / SN-OD		
Achieved		
<input type="checkbox"/>		
Signature/ Initial the Box		

• Death will be diagnosed following 5 minutes of monitored asystole and in accordance to the AoMRC Code of Practice⁵ (see Appendix 5 for confirmation form).

Time of Death:

Date..... Time.....

– Prolonged time from withdrawal to asystole may preclude solid organ donation. SN-OD will advise on this.

• Following confirmation of death, the patient will immediately be transferred to theatre, as agreed with the family.

Patient's Name:	NHS Number:
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Date	DCD 13	Organ Retrieval
Time		
Dr / Nurse / SN-OD		
Achieved		
<input type="checkbox"/>		
Signature/ Initial the Box		

- Organ retrieval operation
- If lung DCD is intended see **Appendix 4**.
- Last offices performed as per local policy.
- Family are given the option to return to see their loved one following the retrieval and participate in last offices.

Date	DCD 14	If the time to death following treatment withdrawal is incompatible with successful transplantation
Time		
Dr / Nurse / SN-OD		
Achieved		
<input type="checkbox"/>		
Signature/ Initial the Box		

- Ensure the end of life management plan is carried out as previously agreed.
- Tissue donation may still be possible. See Tissue Only Donation Pathway (page 25).

Patient's Name:	NHS Number:
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Tissue Only Donation Pathway

Date Time	Activity Number	Activity
Date Time Dr / Nurse	TD 1	Time of Death: Date.....Time.....
Achieved <input type="checkbox"/> Signature/ Initial the Box		

Date Time Dr / Nurse / SN-OD	TD 2	<ul style="list-style-type: none"> Further discussion with family, Nurse and SN-OD Consent and patient assessment paperwork completed if appropriate by SN-OD Clarify any coronial / legal or safeguarding issues. Referral made by SN-OD or Nurse to Tissue Services 07659180773 and if appropriate, local Eye Retrieval Nurse
Achieved <input type="checkbox"/> Signature/ Initial the Box		

Date Time Dr / Nurse / SN-OD	TD 3	<ul style="list-style-type: none"> Mementos (handprints, and locks of hair offered). If requested these are facilitated by the Nurse and SN-OD at an appropriate time. Last Offices performed The deceased transferred to mortuary within 4 hours of death to enable tissue donation to occur. Time of Transfer: Date.....Time.....
Achieved <input type="checkbox"/> Signature/ Initial the Box		

Patient's Name:	NHS Number:
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NO Donation Pathway

Date Time	Activity Number	Activity
Date Time Dr / Nurse / SN-OD Achieved <input type="checkbox"/> Signature/ Initial the Box	ND 1	<ul style="list-style-type: none"> Family thanked for considering donation. Document outcome of discussion with family. If appropriate, inform local Eye Retrieval Nurse of family decision not to donate to prevent second contact.

Date Time Dr / Nurse / SN-OD Achieved <input type="checkbox"/> Signature/ Initial the Box	ND 2	<ul style="list-style-type: none"> Mementos (handprints, and locks of hair offered). If requested these are facilitated by the Nurse and SN-OD at an appropriate time. Life-sustaining treatment withdrawn. <p>SN-OD may remain present to support family and staff.</p>
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Date Time Dr / Nurse / SN-OD Achieved <input type="checkbox"/> Signature/ Initial the Box	ND 3	Last Offices performed as per local policy.
---	-----------------	---

Patient's Name:

NHS Number:

Date and Time	Activity Number	MDT Notes	Signature / Initial

GLOSSARY

ABG	Arterial Blood Gas
AoMRC	Academy of Medical Royal Colleges
AST	Aspartate aminotransferase
BM	Boehringer Mannheim test
BSD	Brain Stem Death
BP	Blood Pressure
Ca	Calcium
CJD	Creutzfeldt–Jakob Disease
CVC	Central Venous Catheter
CVP	Central Venous Pressure
CPP	Cerebral Perfusion Pressure
CXR	Chest X-Ray
DDAVP	Desmopressin
DCD	Donation after Circulatory Death
DI	Diabetes Insipidus
DVT	Deep Vein Thrombosis
ECG	Electrocardiogram
ECHO	Echocardiography
FBC	Full Blood Count
FiO₂	Fraction of Inspired Oxygen
GMC	General Medicine Council
GTN	Glyceryl Trinitrate
HTA	Human Tissue Authority
HTA (2004)	Human Tissue Act (2004)
HIV	Human Immunodeficiency Virus
K	Potassium
Kpa	Kilopascal
PaO₂	Partial Pressure of Oxygen
PaCO₂	Partial Pressure of Carbon Dioxide
PEEP	Positive End Expiratory Pressure
RIJ	Right Internal Jugular
MAP	Mean Arterial Pressure
MC&S	Microscopy, Culture and Sensitivity
MDT	Multi-disciplinary Team
Mg	Magnesium
mmHg	Millimetres of Mercury
Na	Sodium
NHSBT	NHS Blood and Transplant
NICE	National Institute for Health and Clinical Excellence
O₂	Oxygen
ODT	Organ Donation & Transplantation
SN-OD	Specialist Nurse-Organ Donation
SpO₂	Pulse Oximeter Oxygen Saturation
T3	Tri-iodothyronine
VT	Tidal Volume

Appendix 1: Approaching the families of potential donors – three stage process (NOTE – for publication hi res images)

Approaching the families of potential donors – three stage process

Planning Approach

Who

- **Consultant:** an identifiable consultant should lead all stages of the family approach
- **Bedside nurse:** is likely to be closest to the family and have the best knowledge of specific family issues and dynamics
- **SN-OD:** should **always** be involved at the planning stage, wherever possible in person but as a minimum, and in exceptional circumstances, by telephone.

Why

- Clarify clinical situation
- Seek evidence of prior consent – eg NHS Organ Donor Register (ODR)
- Identify the key family members by name
- Understand the important family issues
- Agree how the approach will be made and who will be involved
- Agree timing and setting, ensuring these are appropriate to family needs
- Involve others as required, eg faith leaders.

When and where

- In private and before meeting the family to confirm understanding and acceptance of loss.

Confirming Understanding and Acceptance

Initial meeting with the family

- Ensure key family members are present
- Consultant introduces all parties, including SN-OD as a member of the team
- Confirm/assess the family's understanding of the clinical situation
- Describe the clinical situation, using sympathetic yet nevertheless unambiguous language
- Confirm understanding:
 - **Brain-stem death:** Ensure the family understand that death has occurred. Spend time with the concept, using diagrams or scans if necessary.
 - **Withdrawal of life-sustaining treatment:** Ensure the family understand that death is judged to be inevitable.
- Give the family time to assimilate information and ask questions
- Specifically assess whether the family has understood the information they have received and accepted the inevitability of their loss. If not, **suggest a break in the conversation.**

Discussing Donation

Transition

- Only consider the transition to organ donation when it is clear that a family have accepted their loss and are ready to consider the next steps
- Decide in advance how the transition to donation will be made and which team member will introduce the possibility of donation
- Re-introduce SN-OD explaining their role in terms end of life options.

Discuss donation

- Re-confirm the family's understanding of the clinical situation
- Provide specific information to the family about organ donation, and answer any questions that they might have
- Avoid negative or apologetic language
- Avoid manipulative or coercive language
- Emphasise the benefits of transplantation – the ability to save lives
- **For patients on the ODR, or who have given their legal consent in other ways, eg donor card:** sensitively explain that consent for donation has already been given; do not mislead the family into believing that their consent is also required
- **For patients whose wishes are not known in advance:** use open questions (for example: How do you think your husband would feel about organ donation?') to ascertain patient's and family's wishes; pre-empt common anxieties (further surgery, delay in funeral arrangements etc); avoid styles that focus exclusively upon the wishes of the patient (because the law passes responsibility for decision making to the family when the patient's wishes are not known).

Explore an initial negative response

- Sensitively explore initial refusals, some of which can be the result of misunderstandings about various elements of the pathway.

```
graph TD; A[Planning] --> B[Confirming understanding and acceptance of loss]; B --> C[Discussing donation];
```

Planning

Confirming
understanding and
acceptance of loss

Discussing
donation

**Appendix 2: Diagnosis of Death Using Neurological Criteria
(BSD testing form) [NOTE – to have the latest version]**

This form is consistent with and should be used in conjunction with, the AoMRC (2008) *A Code of Practice for the Diagnosis and Confirmation of Death* and has been endorsed for use by the following institutions: Faculty of Intensive Care Medicine, Intensive Care Society and the National Organ Donation Committee.

HOSPITAL ADDRESSOGRAPH or

Surname
First Name
Date of Birth
NHS Number

Date and time:		Patient Location:		
Doctor One, Name and Designation		Doctor Two, Name and Designation		
Name.....		Name.....		
Signature.....		Signature.....		
Grade.....		Grade.....		
Evidence for Irreversible Brain Damage of known Aetiology				
Primary Diagnosis:.....				
Evidence for Irreversible Brain Damage of known Aetiology:				
.....				
.....				
Exclusion of Reversible Causes of Coma and Apnoea				
	1st Test Dr One	1st Test Dr Two	2nd Test Dr One	2nd Test Dr Two
Is the coma due to depressant drugs? Drug Levels (if taken):	Yes / No	Yes / No	Yes / No	Yes / No
Is the patient's body temperature $\leq 34^{\circ}\text{C}$?	Yes / No	Yes / No	Yes / No	Yes / No
Is the coma due to a circulatory, metabolic or endocrine disorder?	Yes / No	Yes / No	Yes / No	Yes / No
Is the apnoea due to neuromuscular blocking agents, other drugs or a non brain-stem cause (eg. cervical injury, profound neuromuscular weakness)?	Yes / No	Yes / No	Yes / No	Yes / No

Patient Name:

NHS Number:

Tests for Absence of Brain-Stem Function

Brain-Stem Reflexes

	1st Test Dr One Examining	1st Test Dr Two Observing	2nd Test Dr One Observing	2nd Test Dr Two Examining
Do the pupils react to light?	Yes / No	Yes / No	Yes / No	Yes / No
Is there any eye movement when each cornea is touched in turn?	Yes / No	Yes / No	Yes / No	Yes / No
Is there any eye movement during caloric testing in each ear?	Yes / No	Yes / No	Yes / No	Yes / No
Is there any motor response when supraorbital pressure is applied?	Yes / No	Yes / No	Yes / No	Yes / No
Is the gag reflex present?	Yes / No	Yes / No	Yes / No	Yes / No
Is the cough reflex present?	Yes / No	Yes / No	Yes / No	Yes / No

Apnoea Test

Arterial Blood Gas pre apnoea test: (Starting paCO ₂ should be > 6.0 KPa) (Starting pH should be <7.4)	1st Test Starting paCO ₂ : Starting pH:		2nd Test Starting paCO ₂ : Starting pH:	
Is there any spontaneous respiration within 5 (five) minutes following disconnection from the ventilator?	Yes / No	Yes / No	Yes / No	Yes / No
Arterial Blood Gas Result post apnoea test: (paCO ₂ rise should be > 0.5 KPa)	1st Test Final paCO ₂ :		2nd Test Final paCO ₂ :	

Ancillary Investigations Used to Confirm the Diagnosis

Is there a need for any ancillary investigations?	Yes / No	Yes / No
---	----------	----------

If yes please outline the results of these investigations:

Completion of Diagnosis

Are you satisfied that death has been confirmed following the irreversible cessation of brain-stem-function?	Yes / No	Yes / No
Legal time of death is when the 1 st Test indicates death due to the absence of brain-stem reflexes.	Date: Time: Dr One initials	Date: Time: Dr One initials
Death is confirmed following the 2 nd Test.	Dr Two initials	Dr Two initials

It remains the duty of the two doctors carrying out the testing to be satisfied with the aetiology, the exclusion of all potentially reversible causes, the clinical tests of brain-stem function and of any ancillary investigations so that each doctor may independently confirm death following irreversible cessation of brain-stem function.

Guidance Summary of the AoMRC Code of Practice

The diagnosis of death by neurological criteria should be made by at least two medical practitioners who have been registered for more than five years and are competent in the conduct and interpretation of brain-stem testing. At least one of the doctors must be a consultant. Testing should be performed completely and successfully on two occasions with both doctors present.

Evidence for Irreversible Brain Damage of Known Aetiology

- There should be no doubt that the patient's condition is due to irreversible brain damage of known aetiology.
- Occasionally it may take a period of continued clinical observation and investigation to be confident of the irreversible nature of the prognosis. The timing of the first test and the timing between the two tests should be adequate for the reassurance of all those directly concerned.
- It is suggested that there is a minimum of twenty-four hours, of continued clinical observation, in patients where anoxic damage following cardiorespiratory arrest, is the aetiology of the brain injury, and if treatment included induced hypothermia, the observation period should commence following re-warming to normothermia.

Patientren (one examining doctor should normally be a paediatrician or should have experience with Patientren and one of the doctors should not be primarily involved in the Patient's care)

- **Older than 2 months:** This guideline can be used in Patientren older than 2 months of age.
- **Between thirty seven weeks gestation to 2 months of age:** given the current state of knowledge, it is rarely possible to confidently diagnose brain-stem death in this age group.
- **Infants below 37 weeks gestation:** the concept of brain-stem death is inappropriate for infants in this age group.

Drugs

- The patient should not have received any drugs that might be contributing to the unconsciousness, apnoea and loss of brainstem reflexes (narcotics, hypnotics, sedatives or tranquillisers); nor should they have any residual effect from any neuromuscular blocking agents (atracurium, vecuronium or suxamethonium).
- Renal or hepatic failure may prolong metabolism / excretion of these drugs.
- Where there is any doubt specific drug levels should be carried out (midazolam should be less than < 10mcg/L, thiopentone <5mg/L), residual neuromuscular blockade should be tested for by peripheral nerve stimulation. Alternatively ancillary investigations may be used to confirm the clinical diagnosis.

Temperature, Circulatory, Metabolic or Endocrine Disorders

- If the core temperature is $\leq 34^{\circ}\text{C}$ brain stem testing cannot be carried out.
- Prior to testing the mean arterial pressure should be consistently >60mmHg (or age appropriate parameters for Patientren) with maintenance of normocarbia and avoidance of hypoxia, acidaemia or alkalaemia ($\text{PaCO}_2 < 6.0\text{KPa}$, $\text{PaO}_2 > 10\text{KPa}$ and $\text{pH } 7.35 - 7.45$).
- Serum Na^+ should be between 115-160mmol/L; Serum K^+ should be > 2mmol/L; Serum PO_4^{3-} and Mg^{2+} should not be profoundly elevated (>3.0mmol/L) or lowered (<0.5mmol/L) from normal.
- Blood glucose should be between 3.0-20mmol/L and should be tested prior to each brain-stem test.
- If there is any clinical reason to expect endocrine disturbances then it is obligatory to ensure appropriate hormonal assays are undertaken.

Brain Stem Reflexes

- Pupils should be fixed in diameter and unresponsive to light.
- There should be no corneal reflex (care should be taken to avoid damage to cornea).
- Nystagmus or any eye movement should not occur when each ear is instilled, over one minute, with 50mls of ice cold water, head 30°. Each ear drum should be clearly visualised before the test.
- There should be no motor response within the cranial nerve or somatic distribution in response to supraorbital pressure. Reflex limb and trunk movements (spinal reflexes) may still be present.
- There should be no gag reflex following stimulation to the posterior pharynx or cough reflex following suction catheter placed down the trachea to the carina.

Apnoea Test

- End tidal carbon dioxide can be used to guide the starting of each apnoea test but should not replace the pre and post arterial paCO_2 .
- Oxygenation and cardiovascular stability should be maintained through each apnoea test.
- **Ensure the $\text{paCO}_2 > 6.0 \text{ KPa}$ and the $\text{pH} < 7.4$.** In patients with chronic CO_2 retention, or those who have received intravenous bicarbonate, ensure the $\text{paCO}_2 > 6.5 \text{ KPa}$ and the $\text{pH} < 7.4$.
- Disconnect the patient from the ventilator and administer oxygen via a catheter in the trachea at a rate of $> 6 \text{ L/minute}$. If oxygenation is a problem consider the use of a CPAP circuit.
- There should be no spontaneous respiration within a minimum of 5 (five) minutes following disconnection from the ventilator.
- **Confirm that the PaCO_2 has increased from the starting level by more than 0.5 KPa .**
- At the conclusion of the apnoea test, manual recruitment manoeuvres should be carried out before resuming mechanical ventilation and ventilation parameters normalised.

Ancillary Investigations

- Ancillary investigations are **NOT** required for the diagnosis and confirmation of death using neurological criteria. Any ancillary or confirmatory investigation should be considered **ADDITIONAL** to the fullest clinical testing and examination to the best of the two doctors capabilities in the given circumstances.

Organ Donation

- National professional guidance advocates the confirmation of death by neurological criteria wherever this seems a likely diagnosis and regardless of the likelihood of organ donation.
- NICE guidance recommends that the specialist nurse for organ donation (SN-OD) should be notified at the point when the clinical team declare the intention to perform brain-stem death tests and this is supported by GMC guidance.

References

Academy of Medical Royal Colleges (2008) "A Code of Practice for the Diagnosis and Confirmation of Death" <http://www.aomrc.org.uk>

GMC (2010) "Treatment and care towards the end of life." www.gmc-uk.org/guidance/ethical_guidance/end_of_life_care.asp

Heran *et al* (2008) "A review of ancillary tests in evaluating brain death." *Can J Neurol Sci*; 35:409–19

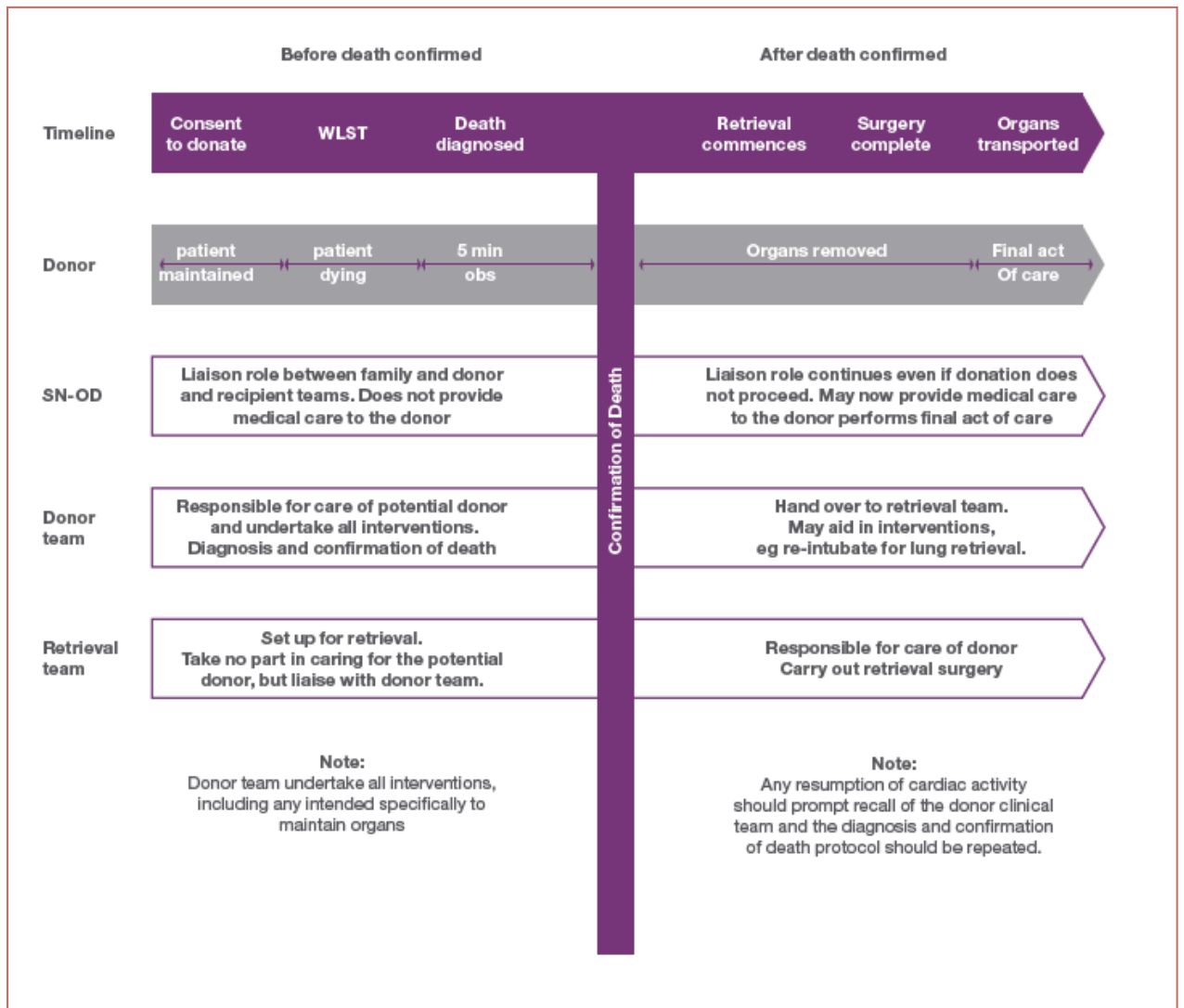
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Wijdicks E (2001) "The Diagnosis of Brain Death" *NEJM* 344:1215-21.

Appendix 3: Timelines and Responsibilities in Donation after Circulatory Death as per the UK Donation Ethics Committee⁴



**Appendix 4: Diagnosis of Death Using Circulatory Criteria
(DCD form)**

Lung Donation after Cardiac Death
Checklist for Lung Optimisation in Theatre

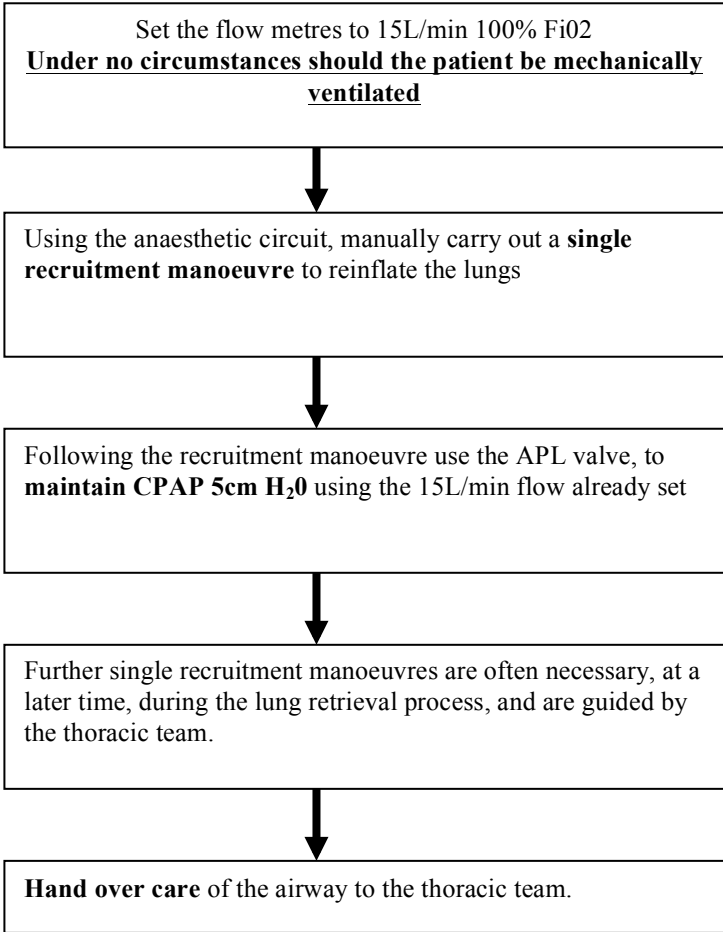
For completion in the operating theatre by the anaesthetist / thoracic surgeon / donor care physiologist

HOSPITAL ADDRESSOGRAPH or
Surname
First Name
Date of Birth
Hospital Number

Diagnosis of death has been confirmed and recorded in the patients notes

Secure the patient's airway with a cuffed endotracheal tube only in the operating theatre (if the patient has been extubated)

Ensure 10 minutes after circulatory arrest has occurred before optimising lungs:



Doctor / Donor Care Physiologist, Name and Designation
Name..... Signature.....
Grade..... Date and Time.....

**Appendix 5: Diagnosis of Death Using Circulatory Criteria
(DCD form)**

The Diagnosis of Death Following Cardiorespiratory Arrest

For Use in Adults & Patientren

Date and time.....

Doctor Name and Designation

Name.....

Signature.....

Grade.....

HOSPITAL ADDRESSOGRAPH or

Surname

First Name

Date of Birth

Hospital Number

Pre-Conditions to Diagnosis

- | | |
|--|-----|
| 1. Are you satisfied there is simultaneous apnoea and unconsciousness in the absence of circulation? | Y/N |
| 2. Are you satisfied there is no indication to commence / continue resuscitation? ¹ | Y/N |

Diagnosis

- | | |
|---|------------------|
| 3. Have you observed for a minimum of 5 (five) minutes to establish that irreversible cardiorespiratory arrest has occurred? ² | Y/N |
| 4. Is there absence of central pulse on palpation and absence of heart sounds on auscultation? | Y/N |
| 5. In certain hospital settings these criteria can be supplemented by reference to ancillary monitoring modalities: <ul style="list-style-type: none"> • Asystole on continuous ECG display • Absence of pulsatile flow using direct intra-arterial pressure monitoring • Absence of contractile activity using echocardiography If used do these modalities confirm an absence of the circulation? | Y / N / Not used |
| 6. Is there absence of the pupillary response to light? | Y/N |
| 7. Is there an absent corneal reflex? | Y/N |
| 8. Is there an absent motor response when supraorbital pressure is applied? | Y/N |

Completion of Diagnosis

Are you satisfied that death has been confirmed following cardiorespiratory arrest?	Yes / No
The time of death is recorded at the time at which these criteria are fulfilled.	Date: Time:
	Doctor's Initials
Is there an indication to refer this case to HM Coroner? Please elaborate if yes:	Y / N / Unsure
Is there an indication for a hospital post-mortem examination? Please elaborate if yes:	Y / N / Unsure
Please give the full name of the nurse present at the moment of death? Please give the full name of any other person present at the moment of death?	
Did any person present at the time of death express any concern regarding the cause of death?	Y / N / Don't Know

Notes

1. Contributory causes to the cardiorespiratory arrest (eg. hypothermia $\leq 34^{\circ}\text{C}$, endocrine, metabolic or biochemical abnormality) should be considered and treated, if appropriate, prior to diagnosing death.
2. Any spontaneous return of cardiac or respiratory activity during this period of observation should prompt a further five minutes observation from the next point of cardiorespiratory arrest.

Reference

Academy of Medical Royal Colleges (2008) "A Code of Practice for the Diagnosis and Confirmation of Death"
<http://www.aomrc.org.uk/aomrc/admin/reports/docs/DofD-final.pdf>