

Transfer Service Toolkits for Adult Critical Care to Support the National Transfer Services

June 2021



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The Toolkit

This document offers regions and those developing adult critical care transfer services a suite of tools to support implementation.

Additionally, there is a finance model, data pack of transfer activity for each region and an example business case for transfer services.

Toolkit 1 – Key elements of an adult critical care transfer service

This toolkit is intended to be of use to regions undertaking consultation, stakeholder engagement and business case development.

Commissioning and hosting	<ul style="list-style-type: none"> • Services should be commissioned at regional level and should align with patient pathways and Critical Care Networks • Services should consider alignment with existing neonatal and paediatric services and work to develop areas in which resources can be shared • Hosting should occur through an NHS Acute Trust with experience delivering adult critical care.
Stakeholders and users	<ul style="list-style-type: none"> • Services interact with regional networks for trauma, neurosurgery, burns, renal, stroke, vascular and other specialties. It should support and expand upon existing referral processes including electronic solutions and automatic acceptance policies • Services must provide timely and equitable access to all patients within scope and have escalation protocols for when patients cannot be transferred as well as agreed surge plans for pandemic or similar situations • Time-critical patients are in scope of services. Services must have formal agreements with NHS Ambulance Service Trusts to meet the needs of these patients if they cannot be transferred by the ACC transfer service.
Dedicated switchboard function	<ul style="list-style-type: none"> • Single point of access for all adult critical care transfers within a region • Efficient call handling and call conferencing • Call recording • Alignment with paediatric and neonatal services' resources should be considered as this may be more cost effective • Must have access to a directory of hospital and department contact details.
Co-ordinating consultant	<ul style="list-style-type: none"> • All referrals should include consultant discussion to confirm suitability for transfer as well as offering clinical and regional logistical advice • Remote clinical advice to the transferring teams • Should have access to regional dashboard of critical care bed capacity via DOS.
Transfer team staffing	<ul style="list-style-type: none"> • All staff must be qualified, trained and experienced as described in the National Model. Junior staff will require training and experience before a formal sign off process • Service has a named Lead Consultant and Lead Practitioner • Each operational shift must have: <ul style="list-style-type: none"> • Duty Consultant who is involved in every referral and should be available to accompany any transfer if required • Hub Coordinator whose role includes 24/7 call handling • Team Doctor / Advanced Critical Care Practitioner • Team Practitioner / Advanced Practitioner • Vehicle driver / technician

	<ul style="list-style-type: none"> • Seconded or permanent dedicated staff are required to deliver high standards of care, consistency of practice, efficiency and overall safety.
Education and training	<ul style="list-style-type: none"> • Services must collaborate with Critical Care Networks and regional providers of transfer training to coordinate and deliver standardised multidisciplinary transfer training across the region • Services must operate an outreach education and governance programme with all hospitals within their region.
Data collection & documentation	<ul style="list-style-type: none"> • Clinical observation and record keeping during transfer must be of the same high standard as that provided within Critical Care Units • Services should utilise an electronic database and must submit a minimum dataset for all adult critical care transfers performed in each region • Regular audit, reporting and clinical governance must occur • Incident reporting and investigation mechanisms must be in place • Quality indicators should be reported regionally and nationally.

Toolkit 2 – Datapoints and mandatory minimum data set

Adult critical care transfer services are required to collect data. There are two main purposes of this:

- To operate the service and provide high quality electronic patient records
- To report on quality and guide service evolution and development.

This toolkit covers four aspects of data collection and submission:

Type of data	Destination	Intended use
Operational data	Directory of Services (DoS)	Daily operational availability and activity monitoring
Quality indicators	NHS England QSIS	Monthly and annual dashboard
Patient level data	Destination to be determined	Integration with existing patient outcome audits

1) Core patient record

The following data will be collected for every transfer within the region regardless of the provider undertaking the transfer. A data subset will be submitted to ICNARC within 7 days of a transfer being completed (indicated by *).

Demographics	Name (or temporary identification if name not known) Date of birth (or approximate age if not known) * NHS number *
Additional demographics	Gender * Patient address * Height * Weight *
Next of kin	Next of kin Next of kin contact phone number
Referring hospital	Referring hospital name * Exact location of patient within hospital * Referrer name Referrer contact telephone number Responsible consultant name Responsible consultant specialty
Receiving hospital	Receiving hospital name * Exact destination of patient within hospital * Accepting specialty * Accepting specialty consultant name Accepting specialty contact name Accepting specialty contact telephone number Receiving ICU contact name Receiving ICU contact telephone number
Team details	Duty Consultant name Transfer Doctor name Transfer Doctor grade * Transfer Practitioner name Transfer Practitioner band *

Times and date	Date of transfer * Referral * Acceptance for transfer * Decision to dispatch transfer team * Mobile * Arrive referring hospital * Arrive patient bedside * Leave patient bedside * Depart referring hospital * Arrive receiving hospital * Depart receiving hospital * Clear (available for next transfer) *
Transfer details	Urgency (see standard definitions in toolkit) * <ul style="list-style-type: none"> • Time critical • Urgent • Planned Type of transfer (see standard definitions in toolkit) * <ul style="list-style-type: none"> • Escalation • Repatriation • Capacity
Clinical: details	Indication for transfer or diagnosis * Past medical history Medication – normal Medication – current Allergy status Infection status *
Clinical: parameters	Vital signs at the following key points of the patient journey: <ul style="list-style-type: none"> • Arrival at patient bedside * • Departure from referring hospital * • Arrival at receiving hospital * Vital signs (should be recorded in patient record with frequency appropriate to patient acuity and changes in clinical condition. Level 3 frequency every 5 minutes, Level 1 and 2 frequency minimum 15 minutes): <ul style="list-style-type: none"> • HR • BP • RR • SpO₂ • ETCO₂ (if ventilated) • GCS • Pupillary response (in neuro patients) • Temperature Ventilator settings Arterial blood gas (required if ventilated; frequency appropriate to patient acuity and changes in clinical condition)

Clinical: drugs	<p>Infusions</p> <p>Bolus drugs given</p>
Clinical: interventions	<p>All clinical interventions including:</p> <ul style="list-style-type: none"> • Airway procedures • Peripheral / intra-osseous / arterial / central access • Surgical interventions
Quality outcomes	<p>Checklist completion</p> <p>Patient follow-up</p> <p>Feedback sought</p> <p>Critical incidents</p> <ul style="list-style-type: none"> • Did a critical incident occur? * • Did patient harm occur as a result? * • What type of incident occurred (from defined list)? * <p>Delays</p> <ul style="list-style-type: none"> • Referral / acceptance delays • Communication • Patient status • Team unavailable • Equipment problems • Transport (traffic, vehicle breakdown, weather etc) • Bed availability <p>Transfer outcome (consistent with referapatient outcomes)</p> <ul style="list-style-type: none"> • Accepted – time-critical • Accepted – urgent • Accepted – planned • Advice-only • Other ACCTS completing transfer • Other non-ACCTS provider (paediatric transport, air ambulance, etc) completing transfer • Out of scope • Referring hospital team completing transfer – ACCTS unavailable • Referring hospital team completing transfer – local decision • Referring hospital team completing transfer – time critical (time advantage) • Transfer cancelled – bed availability • Transfer cancelled – clinical decision • Transfer cancelled – patient clinical status changed

2) Submission of patient level data for national audit and research purposes

In order to facilitate national audit and research, such as that provided for critical care by ICNARC, a mandatory minimum dataset will be developed for ACC transfer. Submission of

this MMDS will be required for each service with associated standards around timeliness and completeness of the submission and dataset.

It is intended that a single point of data entry will feed a national data platform as well as existing data collection bodies.

3) Mandatory daily submission to the regional / national data platforms

The following data must be submitted using the Directory of Services (DOS) and regional data platforms to provide real-time transfer activity. It is anticipated this data will be included in the aforementioned national data platform.

Descriptor	Definition	Frequency of reporting
Total number of transfer teams available	1 transfer team consists of 2 specialist critical care clinical members. Number available per 12 hour shift.	Twice daily
Number of teams capable of Level 3 transfer	A transfer team capable of Level 3 transfer is: a doctor in Intensive Care Medicine or Anaesthesia or Advanced Critical Care Practitioner (ACCP)(holding Faculty of Intensive Care Medicine ACCP membership) with appropriate critical care experience and training to clinically lead transfers. A second practitioner with appropriate critical care experience and training to carry out transfers available at all times.	Twice daily
Operational hours	Number of hours operational in next 24 (daytime / extended / 24 hours).	Daily
Total number of transfers completed in last 24 hours	Total number of critical care transfers completed (regardless of provider) that the ACCTS has triaged and coordinated in last 24 hours.	Daily
Number of escalation transfers in last 24 hours	Number of transfers classed as escalation: patients requiring specialist care not available in the referring hospital, including, but not limited to, burns, cardiac, interventional radiology, major trauma, neurosurgery, severe acute respiratory failure, stroke and vascular.	Daily
Number of repatriation transfers in last 24 hours	Number of transfers classed as repatriation: return patient closer to their home.	Daily
Number of capacity transfers in last 24 hours	Number of transfers classed as capacity: transfer from areas of high to low operational activity to ensure equity of access to high quality critical care.	Daily

4) National ACCTS standardised patient record form

This is in development to provide a standardised paper patient record form for transfers not undertaken by the commissioned ACC transfer service. The intention is to provide regions with standardised documentation that ensures the MMDS is collected and submitted for each of these transfers.

It is anticipated this will be available in summer 2021.

Toolkit 3 – Types of transfer, urgency and call prioritisation hierarchy

Adult critical care transfer services will transfer critically unwell patients requiring escalation to specialist centres, repatriation and movement for capacity reasons. The urgency with which these moves are required to take place varies depending upon the individual patient’s needs.

This toolkit defines the categories of urgency, provides timescales for each category and examples to aid regional discussions and agreements. It also includes a call prioritisation hierarchy to aid regional SOP development.

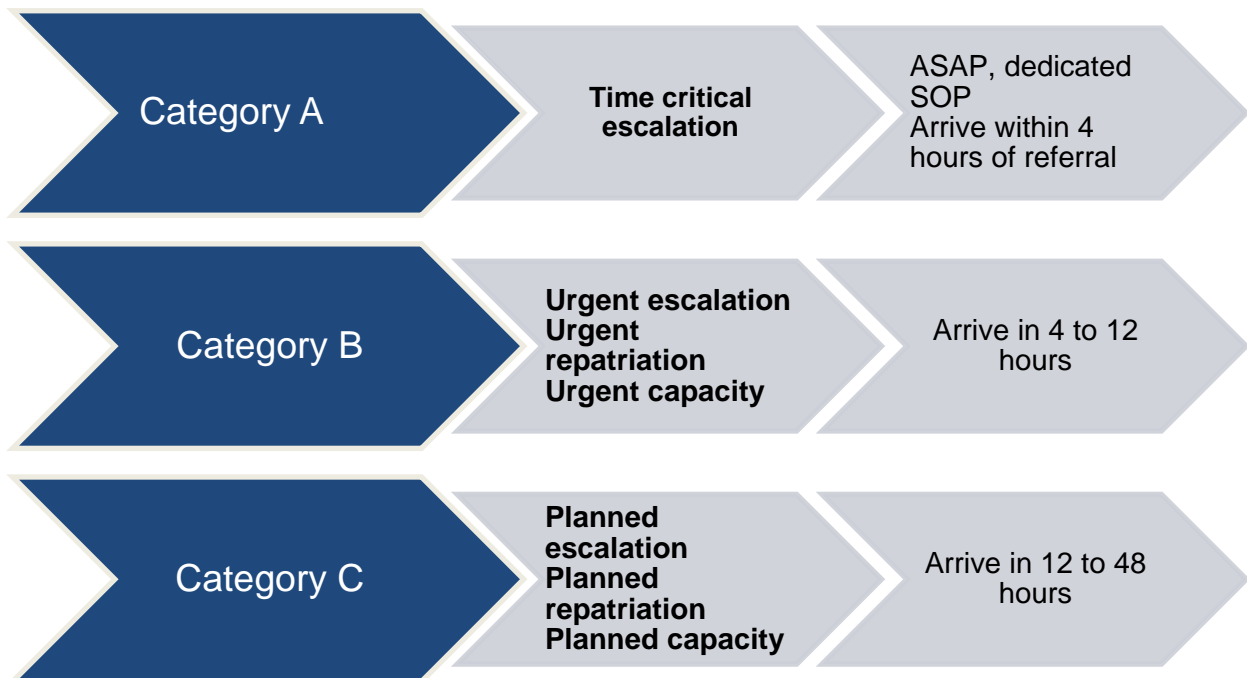
Urgency

	Definition	Timescale	National Framework for Inter-Facility Transfers Category
Time critical	A patient requiring transfer to specialist care for immediate (within 1 hour of arrival) life, limb or sight-saving intervention	As soon as possible Arrival in receiving hospital within 4 hours of referral	IFT category 2
Urgent	A patient requiring transfer for ongoing time-sensitive management	Arrival in receiving hospital in 4 to 12 hours	IFT category 3 and some 4
Planned	A patient requiring transfer for elective intervention or ongoing care	Arrival in receiving hospital in 12 to 48 hours	IFT category 4 and those outside the categorisation

Types of transfer and examples

	Escalation	Repatriation	Capacity
Definition	<p>Patients requiring treatment not available in the referring hospital, including (but not limited to) major trauma, neurosurgery, vascular, burns, interventional radiology, stroke and ECMO.</p> <p>A small but important number of these patients are time critical</p>	To maintain flow through the Network and return patients closer to their home and family	Non-clinical transfer from areas of high demand to areas of lower demand
Time critical	Extradural haematoma, stroke thrombectomy (obtunded or requiring blood pressure management), myocardial infarction (requiring vasoactive infusions)	-	-
Urgent	Subarachnoid haemorrhage, major trauma, aortic emergencies (contained rupture, dissection), burns	Restoration of capacity in specialist centre	Restoration of capacity in overwhelmed referring hospital
Planned	TIPPS, imaging, elective surgery	Transfer to a regionally agreed timeframe, within 48 hours	Elective transfer to create capacity for clinical reasons in referring hospital

Call prioritisation



Adult critical care transfer services must have a call prioritisation SOP and agreed response times against which reporting should occur.

Toolkit 4 – Scope of service example matrix

The following matrix is an example of how an ACC transfer service can determine referrals that are in and out of scope.

FROM↓ TO →	Critical Care L3	Critical Care L2	Critical Care L1	Ward L1	Ward L0	ED/Theatre
Critical Care L3		-	-	-	-	-
Critical Care L2			-	-	-	-
Critical Care L1					-	-
ED L3		-	-	-	-	
ED L2			-	-	-	
ED L1 – non-specified					-	
ED L1 – stroke	-	-				
ED L1 – trauma	-	-				
Ward L1	-	-				
Ward L0	-	-				

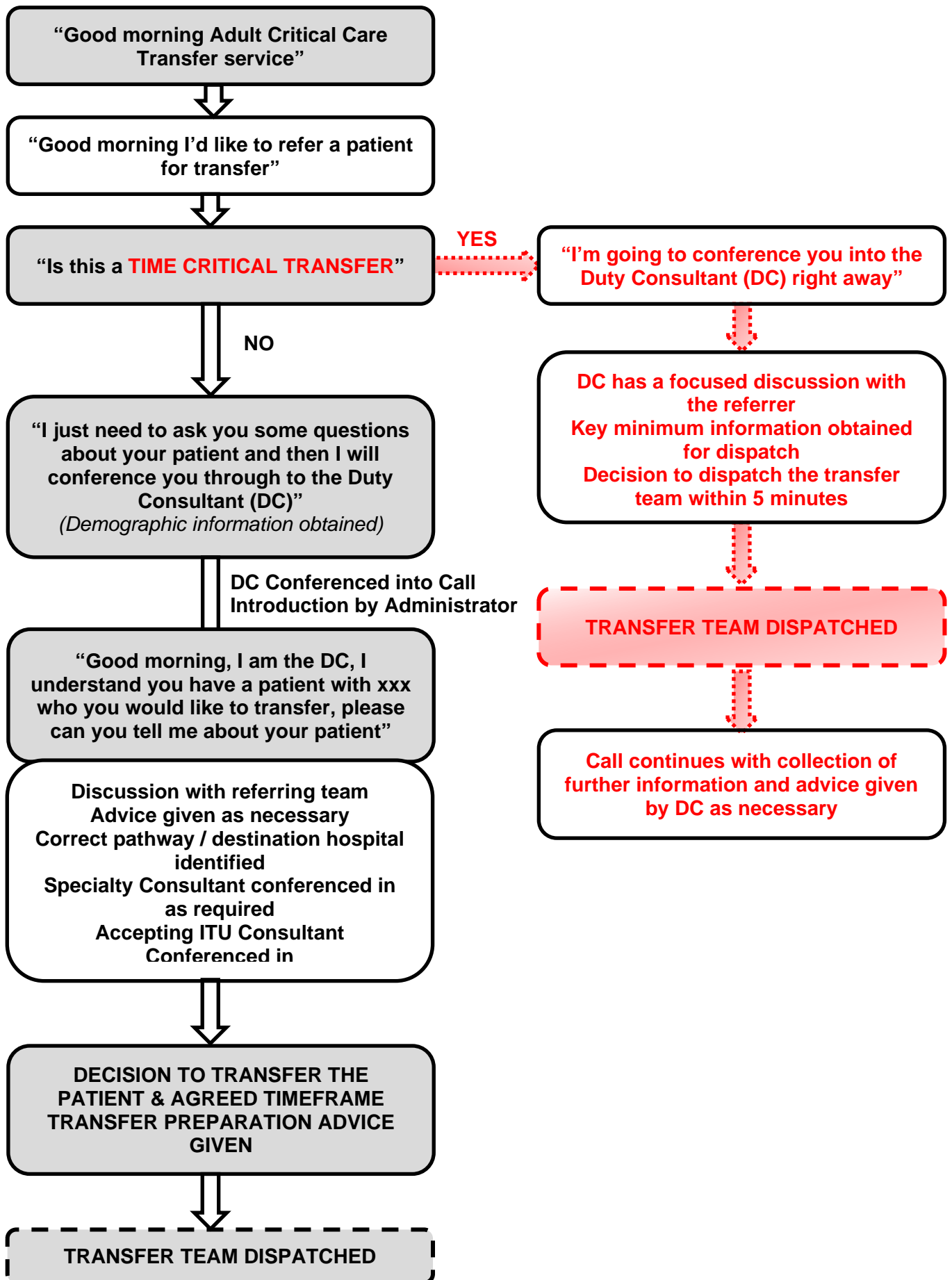
	Fully in scope – coordination, team, equipment, vehicle, etc all managed by CCRT service
	Partially in scope – active coordination for all patients – some patients may be fully in scope
	Partially in scope – coordination support available if needed
-	Unlikely to occur clinically
	Not in scope

Toolkit 5 – Call handling including example call taker script

The key components of an adult critical care transfer service telephony system should include:

- Dedicated non-geographic referral number such as 0300 xxx xxxx
- Computerised telephony system capable of multi-caller conferencing (minimum 8)
- Computerised telephony system capable of call recording and secure storage to an information governance compliant level
- Agreement and process within networks for specialty referrals, involving critically ill patients, to be channelled via the SPOC number
- Trained administrator available 24/7 who is able to take calls, familiar with critical care specialty and hospital specific referral pathways
- Standardised process for call handling which is communicated to service users
- An agreed call cascade process for the event of being unable to immediately contact the primary Duty Consultant (DC)
- Database containing key contact numbers
- Integration with electronic referral pathways and digital enablers as they are developed.

The diagram on the following page is a suggested call handling process demonstrating how time critical and non-time critical calls are identified and managed.



Toolkit 6 – Interactions and interdependencies with NHS Ambulance Service Trust(s)

ACC transfer services must have a formal written agreement with their regional NHS Ambulance Service Trust(s) covering the following areas:

- Call handling and triaging of all referrals for critical care transfer.
- How the NHS Ambulance Service Trust will be tasked to these transfers and the IFT category defined.
- Situations in which the NHS Ambulance Service Trust will undertake the critical care transfer (with an escorting medical team from the referring hospital) and the arrangements for repatriation of the team and equipment.

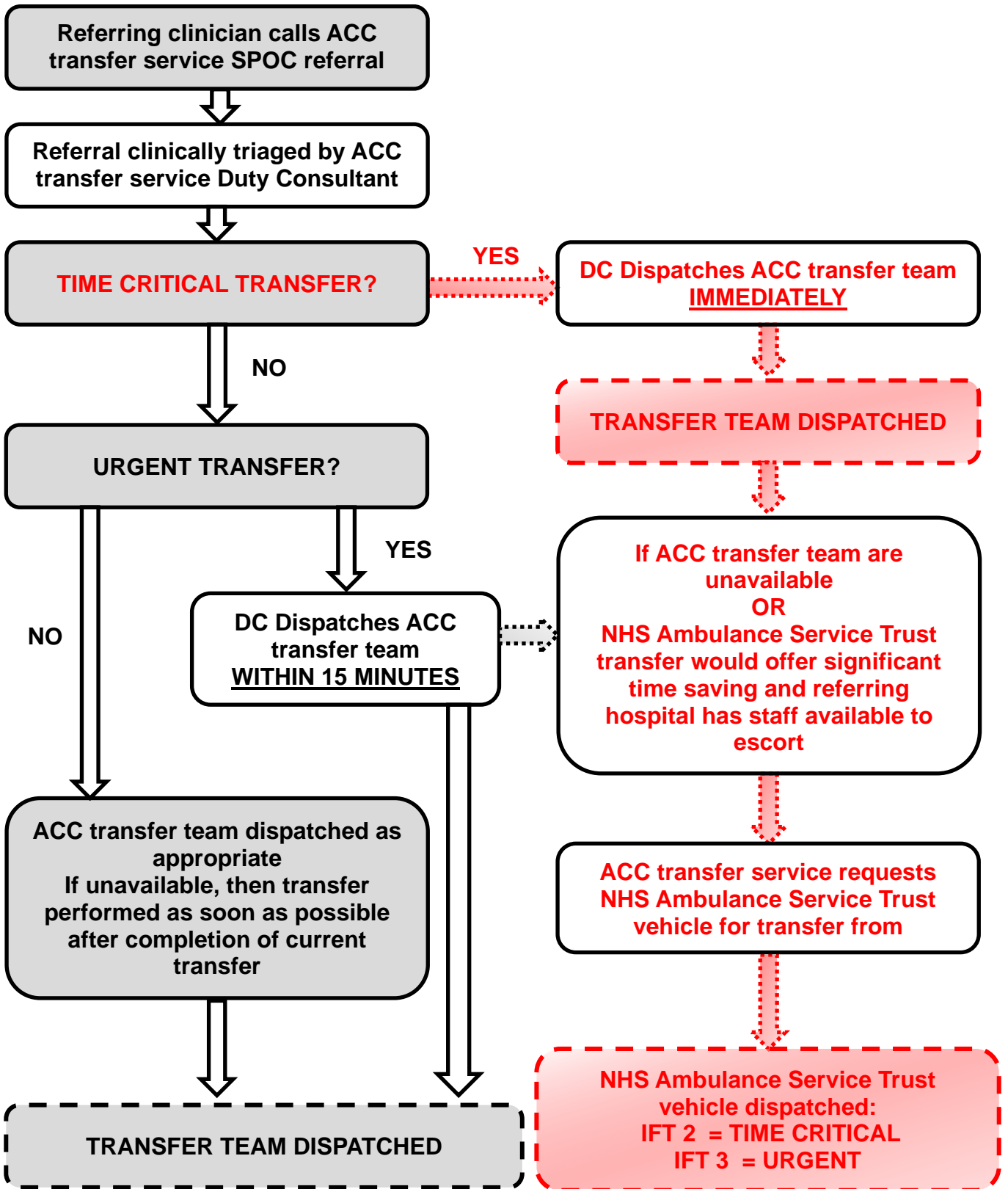
Call handling and tasking

- All referrals for adult critical care transfer should be made through a regional single point of access telephone number.
- It should be defined within the formal agreement how calls made to the NHS Ambulance Service Trust via 999 or other routes are redirected to the ACC transfer service.
- Calls will be triaged and prioritised by ACC transfer service consultants (see Toolkit 3 – Types of Transfer, Urgency and Call Prioritisation Hierarchy, Toolkit 5 – Call Handling).
- In the event that the ACC transfer service cannot respond to a time critical or urgent escalation of care (currently defined as NHS Framework for Inter-Facility Transfer IFT Categories 2 and 3), the formal agreement must describe how calls are redirected to the NHS Ambulance Service Trust. An example of this interdependency is shown in Figure 1.

NHS Ambulance Service Trust responsibilities

When the NHS Ambulance Service Trust undertakes a critical care transfer with an escorting medical team from the referring hospital:

- The NHS Ambulance Service Trust should make provision for the safe return of the transferring team and equipment including the transfer trolley. There must be a formal regional agreement for this.
- There is no expectation of care to be delivered by the ambulance crew, other than to ensure safe movement of the trolley and that the escorting medical team adhere to safety practices in the vehicle
- The NHS Ambulance Service Trust staff must provide guidance to the escorting medical team on the safe stowage of equipment in the vehicle.



Critical care transfer trolleys

When adult critical care transfers are undertaken by the referring hospital and NHS Ambulance Service Trust, dedicated critical care transfer trolleys should be used.

- Critical Care Operational Delivery Networks (CCODN) should consider introducing a standardised critical care transfer trolley design for all hospitals within their Network.
- The NHS Ambulance Service Trust and CCODNs should work collaboratively to ensure all critical care transfer trolleys are compatible with ambulance vehicles and remain so in the future.
- Trolleys within the CCODN must be serviced and maintained regularly as instructed by the trolley manufacturer. Regional records of this must be maintained and shared with the NHS Ambulance Service to ensure currency and compatibility with NHS Ambulance Service Trust fleet.
- Medical equipment used on these trolleys should be safely affixed following trolley manufacturer guidelines and maintained in line with local medical engineering policies.

Toolkit 7 – Example operational base specification

Adult critical care transfer services require an operational base. The following specification is generic and is applicable for services that are located within and outside NHS estates.

Location

The geographical location of an operational base should be chosen using available regional transfer data (understanding the flows of patients and most frequently visited hospitals) as well as region-specific information such as road networks, traffic knowledge, journey times, access and egress and ease of access for staff.

In some regions with a single 'hub and spoke' model of receiving and referring hospitals, it may be most appropriate to locate the service at or near to the hub. In other regions, it will be necessary to locate it elsewhere owing to the factors listed above. The service should aim to deliver as equitable a service as practicable to each of the referring hospitals.

NHS estate or third-party location

Where adult transfer services are located within an Acute NHS Trust, they must not function as part of a Critical Care Unit in terms of staffing, day-to-day function or interdependence. Staff must be independent and not have other clinical responsibilities whilst carrying out transfer shifts. If services are co-located, care must be taken to ensure bias does not occur towards the patients or function of that Critical Care Unit.

There are significant benefits of the above:

- Independence and clear provision of an 'all of Network' service not allied or biased towards a particular organisation or Critical Care Unit
- Dedicated staff ensuring high levels of training, competency, familiarity and experience
- Dedicated time when not transferring patients to ensure continued competency, undertake training and remain up to date
- Utilisation of time not transferring patients for service improvement and key functions of the service (including, but not limited to: database management, audit and service improvement, stores and equipment management, etc).

In some regions, a third-party commercial location may be optimal. These should be sought competitively and ideally working collaboratively with regional neonatal and paediatric teams to ensure value for money.

In regions where it is appropriate for the operational base to be located away from the host Acute Trust an options appraisal should be undertaken to assess co-location with other NHS and emergency services estates versus a commercial property to ensure value for money. Options to be explored should include:

- Existing neonatal and paediatric transfer service bases
- NHS Trusts who are not the Host
- NHS Ambulance Services Trust estates
- Facilities provided by private ambulance providers
- Fire and police service
- Highways Agency
- Air ambulance trusts
- Vacant or under-utilised County or Borough Council estates

When choosing a location/property, it may be acceptable to provide temporary accommodation that meets minimum crew comfort standards until the appropriateness of the location for patient access can be assessed.

Consideration should be given to public transport schedules and adequately lit and secure staff parking, especially where a base is located distant to the host Acute Trust.

Key requirements of an operational base

- Located in the appropriate place to deliver the clinical service, consider road links, traffic, frequency referral pathways
- Reliable utilities, including high-speed internet access and 4G/5G coverage
- Office space sufficient to accommodate shift staffing plus administrator and management team
 - Desks so that each shift member has one
 - Computers, telephones, printer
- Meeting room for daily handover, teaching, meetings with video conferencing facilities
- Storage room(s)
 - Sufficient size to store additional transfer trolley, equipment and consumables
 - Requires electrical sockets to charge equipment
 - Compliant with regulations for oxygen cylinder storage
 - Temperature control adequate for tolerances of items stored as well as a lockable refrigerator with cold chain logging
- Secure controlled drug storage compliant with current licences, health and safety and pharmacy regulations. If located outside of an NHS Estate a monitored alarm system will be required if the base is not occupied at all times
- Rest room(s) sufficient for the duty crew, including the regular presence of a person in training
- Sluice with access to running water for cleaning equipment, trolley and ambulance(s)
- Clothes washing facilities for staff to launder soiled uniforms or arrangements made for access to hospital scrub suits or commercial laundering
- Garage or outdoor parking for ambulance with shoreline for continuous charging of ambulance. A garage is preferable, as it allows shift checks, training, minor ambulance maintenance and equipment movement to occur regardless of weather conditions.
- Basic kitchen facilities (running water, sink, fridge, microwave, kettle)
- Access to staff changing, personal item storage, showering and toilet facilities.

Toolkit 8 – Ambulance vehicle specification and key considerations

This is a high-level summary of the critical care ambulance vehicle specification. For the full vehicle specification please see the attached Ambulance Vehicle Specification and Key Considerations document circulated with these papers.

<p>Ambulance</p>	<ul style="list-style-type: none"> • All ambulances must meet “Type C critical care ambulance” standards • The ambulances must be compliant with General Safety Regulations 2019 • All vehicles must have a weight capacity of no less than 5 tonnes • The ambulances must be converted by an organisation approved and certified by the chassis manufacturer • The service provider must provide “Box Type” ambulances • All vehicles must be bariatric compatible and capable of transporting a bariatric patient
<p>Seating/Stretcher and Manual Handling</p>	<ul style="list-style-type: none"> • All ambulances must be able to accommodate at least 5 people in a patient compartment at the rear of vehicle. They must have four adult seats with weight capacity of 90 kgs per seat and an additional space with weight capacity of 385 kgs to carry a patient and transfer trolley • The four seats in rear compartment must have additional padding. • All ambulances must have appropriate stretcher fitting and release mechanism. • All ambulances must include stretchers capable of accommodating a range of patients including bariatric patients. • All vehicles must be able to carry a bariatric stretcher in the fixed floor stretcher mountings without any equipment needing to be moved. • All ambulances must include a Winch with capacity to pull minimum of 413 kgs along with a karabiner to ensure straight pulling.
<p>Electrical Infrastructure</p>	<ul style="list-style-type: none"> • Before starting to build, the converter will carry out and provide a full and complete electrical calculation¹ and compare this to the alternator output over the entire engine rev range. The calculation must show the

	<p>vehicle equipment and control systems are adequate and suitably designed to maintain the batteries.</p> <ul style="list-style-type: none"> • All batteries must be protected against deteriorating below 11.7 Volts. • The vehicle shall be capable of powering a transportable patient transfer medical equipment system via a 12V DC and a 230V AC supply (i.e.: both alternatives shall be available). • All vehicles must include three unswitched 230V AC - 3 pin socket outlets in the patient compartment, (which must be labelled “for medical equipment only”), at locations to be agreed, each with an illuminated indicator for confirming AC supply availability, each capable of powering the transportable electromedical system. • All vehicles must include an inverter with at least a 2000W capacity, provided for the sole purpose of powering medical and communications equipment in the patient compartment. • All vehicles must have a Climate Control feature available in a driver cabin at the front and in a patient compartment at the rear. Air Conditioning and Heating facilities must be included in such feature. • Internal lighting, including trauma lights with dimming facility must be available in all vehicles. The lighting within the vehicles must comply with CEN lux requirements.
Technological Infrastructure	<ul style="list-style-type: none"> • All ambulances must have provision of WIFI within the vehicle and they must be able to connect to the internet and to other devices using the internet. For these reasons all ambulances must be able to connect with available WIFI networks and with the 4G and 5G networks. • All ambulances must have Satellite Navigation and Vehicle Tracking systems built in.
Equipment for Medicines Management	<ul style="list-style-type: none"> • All ambulances must have temperature-controlled drugs fridge. • All ambulances must include a “Safe” - suitable for secure storage of controlled drugs. Such safe must be lockable using either keys or digital keypads.
Facilities Relating to Medical Gases	<ul style="list-style-type: none"> • The medical gas pipeline system must conform to all applicable regulations and standards. • All ambulances must have pipes and outlets for Oxygen.

	<ul style="list-style-type: none"> • All ambulances must have pipes and outlets for Air. • All ambulances must have facility to store three Oxygen cylinders with size 'ZX'. • All ambulances must have facility to store two Oxygen cylinders with size 'CD'. • All ambulances must have facility to store two Air cylinders with size 'F'. • All ambulances must have facility to store one Nitrous Oxide cylinder with size 'D'.
Infection Prevention and Control	<ul style="list-style-type: none"> • Vehicles should be fitted with air exchange or air filtration systems in the patient compartment to ensure optimum air flow to manage potentially or confirmed infectious patients and ensure no cross contamination of the driver compartment.
Warranties	<ul style="list-style-type: none"> • All vehicles must have 5 years of Driveline warranty. • All vehicles must have 10 years of Corrosion warranty. The corrosion warranty must also include parts vehicles that are converted by the vehicle conversion company. • All vehicles must have conversion warranty. The converter must provide a comprehensive seven-year parts and labour warranty for the integrity and structure of the conversion, including specified and purchased items, with a written procedure for warranty claims and carrying out work. • All vehicles must have a minimum 5 years of warranty for electrical installations. • Vehicles should be designed and built to reduce CO2 emissions in line with any current national and NHS guidance.

Toolkit 9 – Transfer trolley specification and key considerations

1. Scope

This document is intended to provide guidance as to the type of critical care transfer trolley (CCTT) that should be utilised by Adult Critical Care transfers services. There is currently no legislation setting out the requirements for a critical care trolley as being in any way separate from a standard ambulance trolley (BS EN 1789:2020); however the same tenets around crash testing of accessory mounts should apply (typically 10G).

There are currently only a limited number of manufacturers of ambulance trolleys whose products are in use in the UK. They are:

- Ferno
- Paraid
- Strykerplus, Mefina, Technimount, Helimods, others

Only the first two produce dedicated critical care trolleys. The others work together with Stryker using a standard ambulance trolley and load-tested third party bespoke accessories.

A dedicated ‘critical care’ transfer trolley (CCTT) which is multi-role capable and provides resilience for different types and makes of medical device would be the optimal choice.

Regions should to undertake their own options appraisal, as to which configuration best suits their ACC transfer services’ needs.

The table below outlines a number of considerations which should be reviewed when selecting the base frame of the ambulance trolley. In addition, it is recognised that some Critical Care Operational Delivery Networks already have standardised trolleys. Toolkit 6 describes key interdependencies with NHS Ambulance Service Trusts and the use of CCTTs.

2.

	Fixed Height	Adjustable Height
Patient transfer	Could be too high for some staff	Suitable for all beds/procedure tables Level 1 / 2 patients may self-load
Equipment fixation	Pre-configured for chosen equipment All underneath patient	May require third party accessories Mix of equipment on bridge, ends and sides (may increase width)
Oxygen storage	Up to 2 x E size oxygen cylinders	Up to 2 x CD/ZD size oxygen cylinders
Power	Option for power inverter and/or switched power bar. Provides single power lead to vehicle or wall	Third party power bar. No known inverter systems. May require more than 1 power lead to vehicle
Screen visibility	Only visible from right side of patient	Visible from head and both sides

Equipment access	Good access from patient's right side	Long reach for equipment at foot end
Patient access	Need to stand for many interventions	Access from seated position
Patient position	Backrest to 75 degrees, knee bend and shock position	No shock position
Trolley height in transit	78cm plus mattress	36cm plus mattress
Centre of gravity	Always high, offset by critical care equipment	High on patient loading, increased by equipment on bridge. Low in transit
Vehicle load	Lift greatly preferred	Lift or ramp
Trolley fixation	Potential conflict with Carter ambulance and heater outflow	Widely interchangeable

3. Requirements

Whilst trolley design will be up to individual regions, the following is the minimum specification suggested:

1. All CCTTs should be bariatric capable which means
 - Able to accept a patient of at least 220kg (excluding any equipment)
 - Permanent or removable cot side/extensions to permit the load of a patient up to 1 metre in width as well as restraints straps of sufficient length across the chest, midpoint and legs
 - Possess the means whereby a winch can be affixed to assist in the safe load and unload of a patient
2. All trolleys should have permanent or removable fixation points, tested to 10G, for each of the following medical devices
 - Patient multi-parameter monitor/defibrillator
 - Transport ventilator
 - Up to 6 infusion pumps
 - Portable suction unit
 - Minimum 1 x E size oxygen cylinder (preferably 2)
 - Optional attachment for ECMO devices
 - Optional attachment for IABP devices
 - Optional attachment for Nitric Oxide delivery systems
3. All trolleys should have in addition:
 - Washable straps or harnesses
 - Brakes on all 4 wheels
 - Knee bend capability for comfort in conscious patients
 - A multi-plug adapter into which medical devices can be plugged, the trolley being able to be safely attached to a 240v mains supply (in hospital or via an inverter in an ambulance).
 - This system must safely charge all attached equipment to ensure adequate battery charge is maintained

Toolkit 10 – Example transfer equipment

Electronic equipment	<p>Transport ventilator capable of:</p> <ul style="list-style-type: none"> • Invasive ventilation: including pressure control, pressure support and volume control modes with accurate titration and reporting of tidal volume • Non-invasive modes including CPAP +/- High flow nasal oxygen • FiO₂ 0.21 to 1.0, variable PEEP
	<p>Multiparameter monitor capable of:</p> <ul style="list-style-type: none"> • ECG (including 12 lead capability) • Non-invasive blood pressure • Invasive blood pressure • Waveform capnography (ETCO₂) • SpO₂ • Temperature • Pacing and defibrillation
	Infusion pumps with charging and secure fixation system (4 to 6 combined with volumetric pumps)
	<p>Portable ultrasound device capable of:</p> <ul style="list-style-type: none"> • Vascular access • Focussed echocardiography • Lung ultrasound
	Hand-held blood gas analyser, cartridges
	Portable coagulation monitoring capable of ACT/INR monitoring
	Portable suction unit with viral filter
	Videolaryngoscope, appropriate blades
	Fluid warming device compatible with blood infusion
	External cooling/warming device
	Glucometer
	Mechanical chest compression device
	Optional: single-use bronchoscopes and control unit
	Optional: temporary pacemaker control box and pacing wire insertion pack
Equipment bags	See next page for suggested stock list
Communications	Mobile phones (1 per crew member) [or alternative Airwave/ESR]
	Tablet with internet access for electronic database, internet access, access to guidance/SOPs
Ambulance equipment	Sufficient oxygen (3 x HX/ZX and 3 x CD/ZD cylinders)
	Spinal immobilisation equipment including orthopaedic scoop, blocks and vacuum mattress
	Blankets

Waste and decontamination	Bins: sharps, clinical waste, standard waste
	Vomit bowls/bags
	Fluid containment bags, spill kit, disinfectant wipes
PPE	Gloves
	Goggles / face shield
	Masks – surgical fluid resistant, FFP3
	Aprons,
	Tyvek suits (more suitable for transfer environment than gowns)
	Shoe covers / wellington boots
Uniform	Waterproof/windproof and high visibility jackets/vests
	Individual issue boots or shoes with toe protection

Equipment bag suggested contents

	Item	Number
Airway	Facemask size 4, 5	1 of each
	Oropharyngeal airway size 2, 3, 4	1 of each
	Nasopharyngeal airway size 7	1
	Laryngoscope handle	2
	Mac 3 blade	2
	Mac 4 blade	2
	Adult Magills forceps	1
	Stylet size 4, 5	1 of each
	Bougie size 15	2
	i-gel sizes 3, 4, 5	1 of each
	Cuffed endotracheal tube sizes 5, 6, 7, 8	2 of each
	Scissors	1
	Aquagel	2
Ribbon tube tie	Roll	
Surgical cricothyroidotomy	Scalpel size 10 blade	1
	Tracheal dilators	1
	Cuffed endotracheal tube size 6	1
	Optional: tracheostomy size 7, 8, 9	1 of each
Breathing	Adult bag-valve-mask	1
	Mapleson C (Water's) circuit	1
	Ventilator tubing	2
	HME filter	2
	Reservoir bag facemask	1
	Face mask	1
	Nasal cannula	1
	Face mask nebuliser	1
	Green oxygen tubing	Length
Optional: closed suction sizes 12, 14	1 of each	

	Flexible suction catheter sizes 10, 14	2 of each
	Yankauer suction catheter	2
Vascular access	Central line insertion pack	1
	5 lumen central line	1
	Ultrasound probe cover	2
	Microclave bung	5
	Microclave single/double/triple as per protocol	As protocol
	Suture 1/0 straight needle	2
	Arterial line insertion pack	1
	Two types of arterial line	2 of each
	EZIO gun	1
	EZIO needle 25mm, 50mm	2 of each
	EZIO stabiliser dressing	1
	50ml Luer lock syringe	1
	3-way tap	1
	Cannula 14G, 16G, 18G, 20G, 22G	2 of each
	Disposable tourniquet	2
	Central line / arterial line dressing	2 of each
	Cannula dressing	4
	Sterets	5
GI	Nasogastric tube size 14Fr	1
	50ml enteral syringe	1
	Bile bag	1
	Litmus paper	1 pack
	Aquagel	2
Thoracostomy	Scalpel size 22 blade	2
	Spencer Wells 8" straight	2
	Chloraprep	1
	Gauze swab pack	1
PPE and procedure pack	Gown	1
	Chloraprep	2
	Sterile gloves small / medium / large	1 of each
	Surgical mask	1
	Theatre hat	1
Monitoring spares	ECG dots	1 pack
	NIBP cuff small adult, adult, large adult	1 of each
	Arterial line transducer set	1
	Core temperature probe	1
	Defibrillator pads	1
	Monitor printer paper	1
	Capnography sampling line	2

Infusion	Wide bore extension set	2
	Drug infusion line	4
	Blood giving set	2
	3 way taps	2
	Anti-syphon valves	4
	Dispensing pin	2
Syringes and needles	2ml syringe	2
	5ml syringe	5
	10ml syringe	5
	20ml syringe	5
	50ml Luer lock syringe	5
	Blue needle	10
	Green needle	10
	Red blunt needle	10
Miscellaneous	Gauze swabs	2
	Pen torch	1
	Head torches	1 per team member
	Coban tape	1 roll
	Transpore tape	1 roll
	Wide tape for immobilisation	1 roll
	Stethoscope	1
	Tympanic thermometer and probe covers	1 + 10
	Glucometer test strips and lancets	10 + 5

Toolkit 11 – Example drugs formulary

Drug	Presentation	Number in bag
Cardiac		
Adenosine	6mg in 2ml	4
Adrenaline 1:1,000	5mg in 5ml	4
Adrenaline 1:10,000	1mg in 10ml	4
Adrenaline 1:10,000	1mg in 10ml PFS	4
Amiodarone	150mg in 5ml	2
Amiodarone	300mg in 10ml PFS	1
Labetalol	200mg in 40ml	2
Metaraminol	10mg in 1ml	4
Noradrenaline	4mg in 4ml	4
Sedation, paralysis and analgesia		
Atracurium	50mg in 5ml	4
Fentanyl	500mcg in 10ml	2
Ketamine	200mg in 20ml	2
Midazolam	5mg in 5ml	2
Paracetamol	1g in 100ml	1
Propofol 2%	1g in 50ml	2
Rocuronium	50mg in 5ml	4
Electrolytes		
Calcium chloride 10%	1g in 10ml	2
Magnesium sulphate 50%	5g in 10ml	2
Others		
Carbetocin	100mcg in 1ml	1
Chlorphenamine	10mg in 1ml	1
Cyclizine	50mg in 1ml	1
Flumazenil	0.5mg in 5ml	1
Glucagon	1mg	2
Glucose 50%	25g in 50ml	1
Hydrocortisone	100mg	2
Insulin human (Actrapid)	100units in 1ml	1
Ipratropium bromide	250mcg in 1ml	2
Levetiracetam	500mg	4
Naloxone	400mcg in 1ml	2
Nimodipine	60mg tablet	2
Ondansetron	4mg in 2ml	2
Salbutamol Inh	5ml in 1mnl	4
Salbutamol IV	5mg in 5ml	1
Tranexamic acid	500mg in 5ml	2
Fluids		
5% dextrose	500ml	1
0.9% sodium chloride	10ml	5
0.9% sodium chloride	500ml	2
5% sodium chloride or Mannitol	500ml	1
Plasmalyte or Hartmanns	1000ml	2
Water for injection	10ml	5

Toolkit 12 – Electronic database and patient record software requirement specification (SRS) and key considerations

This toolkit is in development. It will include:

- Key considerations for regions in the development and implementation of an electronic database and patient record system for ACC transfer services
- Software Requirement Specification (SRS) for such systems
- Additional digital enablers that may be of value to ACC transfer services including, but not limited to:
 - Mobile applications that can store ACC transfer service documentation such as guidelines and standard operating procedures
 - Mobile applications that allow secure communication
 - Mobile applications that can store hospital information such as contact details and access/egress procedures
 - Electronic referral platforms such as those in use by some regions and by neurosurgical and ECMO services and how these may be of use to ACC transfer services
 - Enablers of the ‘connected patient’ so that telemedicine may occur from referral, during transfer and to handover.

Toolkit 13 – Example project team to develop and deliver a comprehensive Adult Critical Care (ACC) transfer service

This toolkit outlines a suggested project team for the development of a business case and the delivery of an established ACC Transfer Service within a region. This is based on experience within regions that have already set up these services and the intention is to provide a framework for guidance that can be adapted accordingly. The indicative time commitments and governance structures will necessarily vary by region and this should be taken as a guide only.

Stakeholder Engagement:

The project team will need to consult with and seek engagement from key stakeholders throughout the project. These will include (but not be limited to):

- NHS England / Improvement Specialised Commissioning and Clinical Commissioning Groups
- Senior Leadership Teams (CEO, COO, MD) of NHS Trusts
- Critical Care Network(s) and their respective transfer groups
- Clinical and nursing leads for critical care units
- Clinical and nursing leads, Network Managers for service user pathways e.g., Major Trauma, Neurosciences, Cardiac, Burns etc.
- Health Education England regional representatives including Heads of School and Training Programme Directors / Regional Advisors for Intensive Care Medicine, Anaesthesia, PHEM, EM
- NHS Digital
- NHS Trust IT reps
- NHS Ambulance Service Trust(s) and third-party providers

Proposed Project Team Composition:

(Assuming an initial time requirement with the option to release back to base employers as the ongoing need dictates)

Role	Role Description	Time Commitment
Senior Responsible Officer (SRO) <i>(Specialised Commissioning NHSE/I)</i>	<ul style="list-style-type: none"> - Overall responsibility for project delivery - Key leadership figure 	<ul style="list-style-type: none"> - As required
Project Manager <i>(Suitable individual identified from NHSE/I)</i>	<ul style="list-style-type: none"> - Joint responsibility for project delivery along with Clinical Lead - Responsible for producing the business case along with Clinical Lead - Provide commissioning input into project 	<ul style="list-style-type: none"> - 0.4 WTE / week as a minimum for 12 months - Significantly more may be required

<p>Clinical Lead <i>(Regional Critical Care Network transfer leads or alternative)</i></p>	<ul style="list-style-type: none"> - Provide overall clinical strategy, leadership and direction for the service - Ensure alignment with the National Model - Responsible for producing the business case along with Project Manager - Joint responsibility for project delivery along with Project Manager 	<ul style="list-style-type: none"> - 4 PA's / week for 12 months for delivery of the project - Reviewed annually
<p>Network Leads & Network Managers <i>(Network medical lead and network manager/director)</i></p>	<ul style="list-style-type: none"> - Provide Critical Care Network input into the project team - Review the business case prior to submission - Assist in identifying along with the Clinical Lead, suitable individuals as required to operationalise project delivery 	<ul style="list-style-type: none"> - As required
<p>Nursing / AHP Leads <i>(one to two senior nursing or AHP leads from regional paediatric/neonatal transfer service(s) or alternative locations)</i></p>	<ul style="list-style-type: none"> - Assist the clinical lead in providing clinical / nursing / AHP strategy and direction for the service - Ensure alignment with the national model and existing paediatric transfer services - Advise on alignment / amalgamation with regional paediatric transfer services long term 	<ul style="list-style-type: none"> - Seconded for 0.2 WTE each per week for 12 months
<p>Data Support <i>(Suitable individual identified from NHSE/I Digital team or host trust)</i></p>	<ul style="list-style-type: none"> - Assist with the development of the business case where necessary to be supported by data analysis - Assist the project team with the implementation of clinical informatics and data gathering software 	<ul style="list-style-type: none"> - 0.2 WTE per week for 12 months
<p>Finance Analyst / Workforce Lead <i>(Suitable individual identified from NHSE/I team or host trust)</i></p>	<ul style="list-style-type: none"> - Assist the project team with all aspects of workforce planning and costing for production of the business case 	<ul style="list-style-type: none"> - 0.2 WTE per week for 3 - 6 months

Frequency of Meetings and Governance Structure:

This will largely be dictated by the tasks needing completion and will vary but as a baseline 1-2 meetings per week will be required.

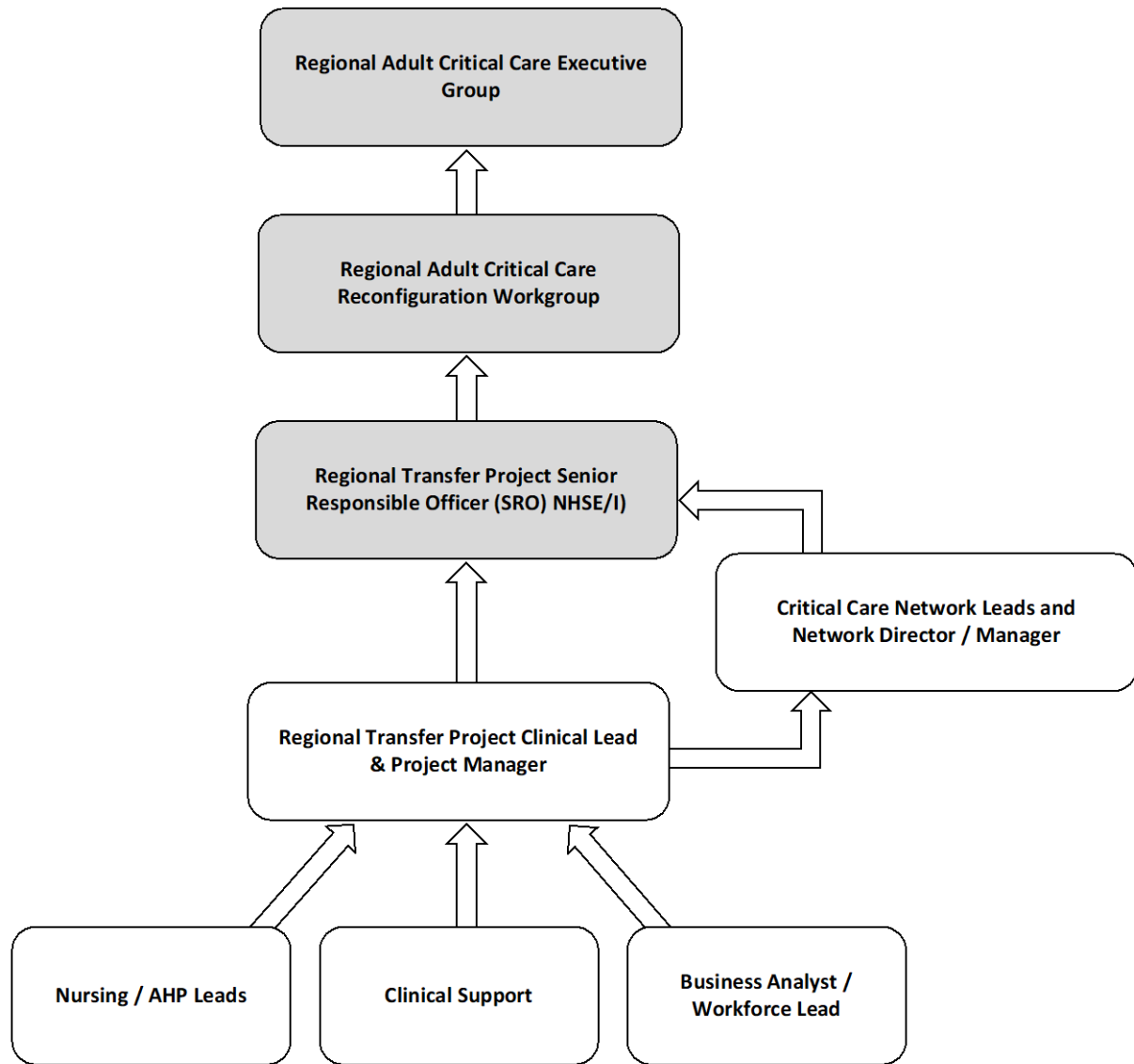
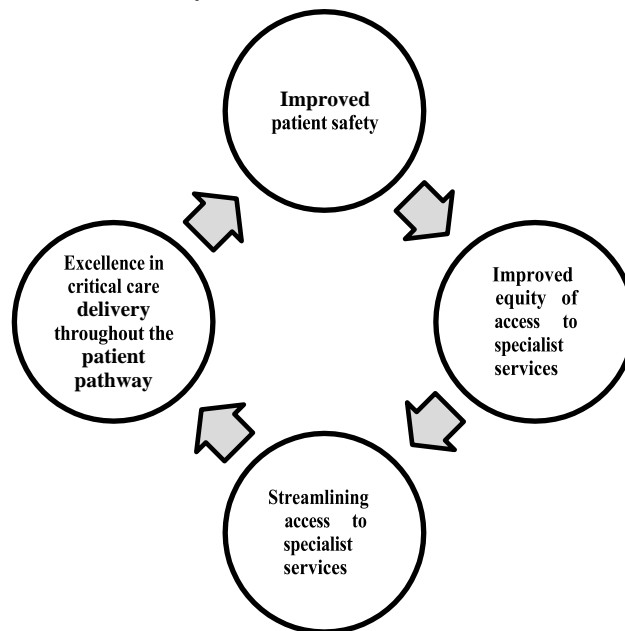


Fig 1. Transfer Project Group Governance Structure

Toolkit 14 – Governance

ACCTS must have robust clinical governance structures at their core to ensure maintenance of the four drivers for all patients.

Figure 2. Key drivers for the development of ACC transfer services



1.1 Key elements of clinical governance

Clinical governance processes, accountability and reporting must be tailored to the individual ACCTS, Critical Care Network and host NHS Acute Trust. The following key elements must be included:

- Clear organisational structure and lines of accountability
- Standard Operating Procedures (SOPs) for clinical care, strategic and operational aspects of the service and critical interdependencies with other organisations and services. These should be developed with the involvement of key stakeholders and service users
- Clinical governance that commences with an attempt to contact the transfer service and ends following complete handover in the receiving hospital
- Risk management policy
- Critical incident reporting and complaints policy, with a defined means to report outcomes to stakeholders
- Regular case review processes and mechanisms for sharing lessons learned within and across services
- Provision for delivery of ongoing training that is responsive to clinical governance lessons and evidence based clinical practice recommendations.

1.2 Critical Care Networks

ACCTS will have close strategic links to Critical Care Networks in order to ensure representation of their membership, provide expert advice to

commissioners and the host NHS Acute Trust and to inform the implementation and development of the service. Critical Care Networks have a key role in quality assuring ACCTS.

1.3 Host NHS Acute Trust

ACC transfer services require a host NHS Acute Trust with experience in delivering ACC services. This is in line with neonatal, paediatric and ECMO.

Overall clinical accountability is the responsibility of the host organisation and, ultimately to NHS England and Improvement. Exact lines of clinical accountability for the service, its staff and lead clinicians must be locally agreed and described in a principle SOP.

1.4 Partnership Board

Creation of a Partnership Board involving the host NHS Acute Trust should be considered to ensure the ACC transfer service is accountable. The purpose of this board is to provide oversight of the clinical and operational delivery of the service.

Membership of the Partnership Board should be defined locally but should include the Lead Consultant and Lead Practitioner from the ACCTS, representatives from the host NHS Acute Trust, Commissioners, NHS Ambulance Service Trust and formal patient representation. The board should have a formal structure and clear Terms of Reference, having the following outline remit:

- Monthly review of service activity and key performance indicators
- Monthly review of complaints and clinical incidents
- Review under-performance and approve improvement plans
- Approve major changes to clinical or operational practice and delivery including, but not limited to, clinical SOPs, operational SOPs, equipment, staffing models and communication systems
- Summarise and make requests to the External Clinical Advisory Group for independent review of any aspects of clinical care
- Monitor the financial management of the service.

1.5 External Clinical Advisory Group

The External Clinical Advisory Group supports the development of the service and ensures clinical, operational and strategic plans are aligned to ensure optimum provision of the service across the region. The membership of this group should include regional colleagues and networks including:

- Representatives from the Adult and Paediatric Critical Care Networks
- Representatives from referring and receiving NHS Acute Trusts
Representatives from relevant partner specialties and regional Operational Delivery
- Networks including burns, cardiac, major trauma, maternity,

neurosciences, stroke and vascular.

The main functions of this group include supporting the development of clinical SOPs by providing expert external input, refinement of regional guidelines for specialist referral pathways and independent clinical review of significant adverse events.

1.6 Example governance organogram

The following organogram demonstrates an example organisational structure and lines of accountability for an ACCTS with a Partnership Board and External Clinical Advisory Group. The exact configuration of this will be tailored to the individual region.

1.7 Peer review

External peer review processes are essential to the development, evolution and national implementation of ACCTS. A national programme of formal and informal peer review should be established to facilitate peer learning, sharing of best practice and ensure innovations, regional service and operational developments are widely adopted and integrated.

1.8 Adult Critical Care Transfer Group

A national Adult Critical Care Transfer Group (ACCTG) will be established to support the development and implementation of:

- Regional ACCTS
- A national network of ACCTS
- Mandatory data requirements
- Standardised processes and procedures
- National training and education for adult critical care transfer.

The ACCTG will have membership that includes:

- NHS England National Critical Care Transfer Lead(s) and commissioning representatives
- Regional ACCTS Lead Consultants, Lead Practitioners, Service Managers and commissioning representatives.

In the evolution of ACCTS, the ACCTG is anticipated to have a key role in supporting commissioning and project teams develop and implement regional services. Following this, the ACCTG will provide a national forum to support and oversee workstreams that may include standardised processes and procedures, training and education and data.

1.9 Reporting requirements

ACCTS must be transparent and accountable to internal, host NHS Acute Trust and external scrutiny. They must have processes to: Collect and report operational and clinical nationally mandated minimum data sets and clinical incident summaries for all referrals and transfers as described in contracts. This will include those undertaken by

referring hospital clinical teams or other providers (eg. air ambulance mutual aid)

- Record all clinical incidents, including them in transfer records and follow host Trust and regional processes for investigation, reporting and improvement
- Submit ACC research and audit data to support national analysis of transfer activity and ongoing research into ACC patient outcome
- Produce regular activity reports and an annual report for all stakeholders and service commissioners
- Report to the ACCTS Regional Partnership Board, or equivalent
- Produce an annual report to be shared with commissioners, service users and stakeholders.

2. Documentation

Clinical observation and record keeping during patient transfer must be of the same high standard as that provided within critical care units. This will be achieved by the following:

- All ACCTS should utilise an electronic database system to enable audit and review of patient transfers undertaken by the service. This must adhere to information governance requirements
- The mandatory minimum data set (see toolkit) must be submitted for all ACC transfers performed within each region. It is the responsibility of the ACC transfer service to receive, process and submit data on transfers undertaken by other providers (e.g. referring hospital, NHS Ambulance Service Trust, air ambulance, mutual aid) within their region. There must be agreed processes in each region to ensure that the ACC transfer service receives this information in a timely manner
- Use of an electronic patient record which allows automated recording and storage of patient monitoring and ventilator data is preferable and systems for this are available. Paper documentation should also exist for resilience purposes
- Utilisation of electronic applications that are beneficial for patient care or operational delivery, such as those containing hospital details, contact numbers, SOPs and guidelines should be considered.

3. Vehicles, equipment, safety and insurance

3.1 Summary

ACCTS will operate using road transport. Rarely, depending upon geography, regional requirements and for either clinical or logistical reasons, transfer by air may be required and the service must have policies and procedures in place to organise and govern this.

The provision of Aeromedical Transport must be consistent with Care Quality Commission (CQC), European Aero/Medical Institute (EURAMI) or Commission on Accreditation of Medical Transport Systems (CAMTS) standards, Health and safety at Work Act 1974 and Electricity at Work

Regulations 1989. Services must be able to demonstrate that they have the policies and procedures in place to achieve and maintain quality and reduce risk.

3.2 Ambulance providers

A contract for the provision of ambulance vehicles for transport must be in place. Vehicles used to transport patients must be constructed to manufacturers' recommendations and meet EU and UK legislation. They must also conform to current Motor Vehicle (Construction and Use) Regulations and other relevant Road Traffic and Road Safety Acts. The vehicle provider must operate to national standards. Exact service specifications will vary between regions depending upon need and must be negotiated at the time of tender.

Key considerations in vehicle and transport specification are included as a toolkit.

3.3 Insurance

The ACCTS must ensure that there is provision of insurance for personnel, equipment, public liability and other regionally determined elements.

4. Provider premises

ACCTS must be located to provide equitable access to all patients and all referring and receiving hospitals. In some regions this may require more than one operational base depending on the geography, road network and hospital distribution.

Toolkit 7 contains additional information about the basic specification of an operational base. The exact specification will depend upon team structure, number of operational teams working each shift and number of additional staff and resources that require space.

In some regions, there is an obvious 'hub and spoke' of specialist and referring hospitals, where it may prove time, resource and cost efficient to locate the operational base close to the hub. In many regions, road journey times, frequency of referrals and hospital distribution will necessitate a third-party location.

Where ACC transfer services are located within an Acute NHS Trust, they must not function as part of a critical care unit in terms of staffing, day-to-day function or interdependence. Staff must be independent and not have other clinical responsibilities whilst carrying out transfer shifts. If services are co-located, care must be taken to ensure bias does not occur towards the patients or function of that critical care unit.