

Critical Care Tertiary Referral Networks (Paediatrics)

Summary This Policy Directive relates to critically ill children requiring inter-hospital transfer and should be read in conjunction with policy PD2005_157 Emergency Paediatric Referrals

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NSW CRITICAL CARE TERTIARY REFERRAL NETWORKS (PAEDIATRICS)

PURPOSE

This Policy Directive relates to critically ill children requiring inter-hospital transfer and should be read in conjunction with [PD2005_157](#) Emergency Paediatric Referrals – Policy.

Pursuing 'best practice' paediatric care across NSW requires services to embrace an integrated model of care that recognises the need for effectively linked and networked services across primary (role delineation 1-3), secondary (role delineation 3-4) and tertiary (role delineation 5-6) levels of care, as described in the NSW Health Guide to Role Delineation of Health Services - 2002.

This Policy Directive defines the linkages between referring hospitals and specialist Children's Hospitals, taking into account unit capacity; specialist service requirements; and, established paediatric clinical referral relationships.

MANDATORY REQUIREMENTS

Each Health Service is required to make certain that there are escalation plans in place to ensure the appropriate accommodation of a sick or injured child. In the first instance, local escalation plans should promote a tiered network of services within the Health Service and relevant Child Health Network. In circumstances where, owing to periods of very high demand, there may be no appropriate beds available within the Network, there should be procedures for Clinicians to seek advice and/or support beyond their designated Network.

Local escalation plans should include direction for clinicians regarding review of all inpatients to determine whether a transfer of patients within a facility, or across facilities, would improve access to required beds. Where, after timely exploration of local resources, it is determined that Area or Network service provision is not possible, it is expected that clinicians will escalate their concerns to the regional specialist paediatric service or, if intensive care is required, involve NETS, and involve the Newborn and Paediatric Emergency Transport Service (NETS - NSW) where advice or transfer is required.

IMPLEMENTATION

In situations where it is declared that **no paediatric intensive care beds** are temporarily available and tertiary care is necessary, the Default Paediatric Intensive Care Policy may be invoked. This step is taken only **after** thorough assessment of statewide Paediatric Intensive Care capacity and where inter-state transfer is being contemplated. Inter-state transfer may be the option of choice. However, if inter-state transfer is not a viable option for the child, the Default Paediatric Intensive Care Policy may be invoked.

Every hospital is linked with a nominated tertiary hospital paediatric intensive care which is networked to a group of referring hospitals to provide critical care for their patients. When the default system is activated, the tertiary referral hospital designated as being responsible for the referring hospital in which the patient is located must accept the patient.

REVISION HISTORY

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June 2010 (PD2010_030)	Deputy Director-General Strategic Development	New Policy

ATTACHMENTS

1. NSW Critical Care Tertiary Referral Networks (Paediatrics): Procedures.

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1 INTRODUCTION

Owing to the level of complexity and specialist service requirements, paediatric intensive care and/or high dependency services are not available in all Area Health Services (AHS's). These are offered through a network to ensure access for all residents of NSW. Statewide networks were developed in 2002 when the three Child Health Networks were established. Each Network comprises the Area Health Service Partners, and each Network is linked with a Paediatric Tertiary Referral Hospital.

Paediatric intensive care services operate in this statewide network, with Paediatric Intensive Care Units (PICUs) located at The Children's Hospital Westmead, Sydney Children's Hospital and John Hunter Children's Hospital, supported by the Newborn and paediatric Emergency Transport Service (NETS - NSW). Day to day coordination is undertaken between the service providers with strategic direction provided through the Paediatric Intensive Care Advisory Committee.

This Policy Directive relates to critically ill children requiring inter-hospital transfer and should be read in conjunction with PD2005_157 Emergency Paediatric Referrals - Policy

Pursuing 'best practice' paediatric care across NSW requires services to embrace an integrated model of care that recognises the need for effectively linked and networked services across primary (role delineation 1-3), secondary (role delineation 3-4) and tertiary (role delineation 5-6) levels of care, as described in the NSW Health Guide to Role Delineation of Health Services - 2002.

This Policy Directive does not replace the requirement of all Area Health Services to establish and maintain tiered networks to ensure the provision of timely access to higher levels of paediatric support for children as the need arises.

This Policy Directive defines the linkages between referring hospitals and specialist Children's Hospitals, taking into account unit capacity; specialist service requirements; and, established paediatric clinical referral relationships.

Operating in tandem with the NSW Critical Care Tertiary Referral Networks (Paediatrics) there are clinical super-specialty referral networks which are also defined within this policy directive and include the:

1. NSW Severe Burn Injury Service (Paediatric)
2. NSW Major Trauma Referrals (Paediatrics)
3. NSW Spinal Service Plan

Each AHS is required to make certain that there are escalation plans in place to ensure the appropriate accommodation of a sick or injured child. In the first instance, local escalation plans should promote a tiered network of services within the Area Health Service and relevant Child Health Network. In circumstances where, owing to periods of very high demand, there may be no appropriate beds available within the

Network, there should be procedures for Clinicians to seek advice and/or support beyond their designated Network.

Local escalation plans should include direction for clinicians regarding review of all inpatients to determine whether a transfer of patients within a facility, or across facilities, would improve access to required beds. Where, after timely exploration of local resources, it is determined that Area or Network service provision is not possible, it is expected that clinicians will escalate their concerns to the regional specialist paediatric service or, if intensive care is required, involve NETS, and involve the Newborn and paediatric Emergency Transport Service (NETS - NSW) where advice or transfer is required.

NETS provides statewide coordination of neonatal and paediatric retrieval. Children living near NSW borders may be appropriately referred to the adjoining state. This practice is supported by NSW Health. Patient transport will be arranged by the referring facility with relevant Ambulance services or through NETS.

To Contact NETS
Call: 1300 36 2500
Press 1 for emergency retrieval
Press 4 for elective referral

The NSW Critical Care Tertiary Referral Networks (Paediatric) are supported by NETS; the Paediatric Intensive Care Advisory Group (PICAG); the Perinatal and Paediatric Resources System; evidence-based practice and policy and guideline development, along with statewide education resources.

It is expected that AHSs ensure the provision of clinical support, cooperation and appropriate education between units using current clinical and education staff. Appendix 1 of this Policy Directive details the Guidelines for the Stabilisation of Patients Prior to Medical Retrieval.

2 PAEDIATRIC INTENSIVE CARE TERTIARY REFERRAL NETWORKS & THE CHILD HEALTH NETWORKS

Patients requiring Paediatric Intensive Care are referred to these units based on clinical requirements and bed availability. Children with severe burn injury are referred to The Children's Hospital at Westmead (CHW). Cardiac surgery is available at both CHW and Sydney Children's Hospital (SCH). Children with major trauma may be referred to one of the three Tertiary paediatric Hospitals (that is, CHW, SCH or John Hunter Children's Hospital (JHCH). Children with spinal injuries may be referred to relevant statewide services at either CHW or SCH. The information below describes the Child Health Network:

The Northern Child Health Network

Principal Referral Hospital: John Hunter Children's Hospital

- **Hunter New England Area Health Service**
- North Coast Area Health Service
- North of Grafton will usually refer to Brisbane owing to proximity
- Private hospitals and day-surgery facilities in the above geographical regions

The Greater Eastern and Southern Child Health Network

Principal Referral Hospital: Sydney Children's Hospital

- Greater Southern Area Health Service
- Northern Sydney Central Coast (Manly, Mona Vale, Royal North Shore Hospitals)
- South Eastern Sydney Illawarra Area Health Service
- Sydney South West Area Health Service (Balmain, Bankstown, Bowral, Camden, Campbelltown, Canterbury, Royal Prince Alfred)
- Australian Capital Territory (ACT)
- Private hospitals and day-surgery facilities in the above geographical regions
- Referrals from Greater Southern Area Health Service may go to Victoria owing to proximity

The Western Child Health Network

Principal Referral Hospital: Children's Hospital at Westmead

- **Greater West Area Health Service**
- Sydney South West Area Health Service (Liverpool, Fairfield, Concord)
- **Sydney West Area Health Service**
- Northern Sydney Central Coast Area Health Service (Gosford, Hornsby, Ryde, Wyong)
- The Southern and Western sectors of Greater Western may refer to Adelaide owing to proximity
- Border regions of this Network may refer to Adelaide owing to proximity
- Private hospitals and day-surgery facilities in the above geographical regions

3 CLINICAL APPROPRIATENESS

In specific cases, the referring consultant, medical retrieval consultant and the receiving consultant may decide to refer a patient to a hospital outside of the usual network arrangements, as this may be considered more clinically appropriate for the patient's definitive care.

4 NEWBORN AND PAEDIATRIC EMERGENCY TRANSPORT SERVICE (NETS - NSW)

NETS operates 24-hours a day, 7 days a week, providing an advice and coordination service. They are the major provider of neonatal and paediatric retrievals. NETS services include:

- Clinical advice from a critical care medical retrieval consultant;
- A “one phone call” referral which uses conference call facilities;
- Mobilisation of an appropriate retrieval team or ambulance escort;
- Support to hospitals having difficulties referring high risk obstetric patients;
- Support for Ambulance Service dealing with pre-hospital emergencies;
- Liaison with interstate high risk obstetric, neonatal and paediatric emergency transport services.
- Assistance with Intensive Care support when usual neonatal and paediatric hospital intensive care beds are unavailable;
- Assistance with any emergency where routine patterns of referral are unavailable or delayed.
- Statewide Neonatal and Paediatric (SNaP) Bed – this is a mobile solution whereby NETS mobilise a NETS nurse with equipment to a paediatric or neonatal unit for a short period of time (up to 48 hours) when there is no further capacity within the State (see page 8 for a broader definition of the SNaP Bed).

4.1 OPERATIONAL PRINCIPLES

The core responsibilities of NETS are described in Table 1. The key principles of NETS operation are:

1. Statewide coordination of neonatal and paediatric retrieval services, using teams based in Sydney (paediatric and newborn), Canberra (newborn) and Newcastle (newborn) and in collaboration with specialist Paediatric Retrieval Services located at:
 - Newcastle
 - Victoria (Melbourne – NETS for newborns and PETS for children)
 - Queensland (Brisbane – hospital-based services coordinated by QNETS);
 - South Australia (Adelaide Women’s and Children and Flinders Medical Centre); and
 - Regional adult retrieval services in Canberra, Orange, Tamworth, Lismore, Sydney and Wollongong.
2. Single point of access for referring hospitals (public and private) anywhere in NSW. All paediatric critical care transfer requests, or consultation where a critical care transfer is contemplated, must be made through NETS.

3. Use of conference call facilities to:
 - bring the referring clinician in direct contact with the medical retrieval consultant, preferred referral consultant, Pregnancy Advice Line Consultant, and other clinicians as appropriate. The patients IMMEDIATE treatment requirements are the highest priority.
 - consult with various teams, coordination centres, ambulance services and vehicle operators.
 - facilitate full use of local resources in referring hospitals; to ensure that patients are not unnecessarily moved.
4. NETS will **facilitate** the bed-finding process for critically ill or high risk patients to more complex or definitive care. NETS does not locate beds for patients being electively transferred between hospitals.
5. Where there is variance in view regarding the clinical appropriateness of a medical retrieval, **the final decision will be made by the NETS medical retrieval consultant** following a conference call with the referring clinician and receiving medical consultant. For other transfers, the responsibility for determining the appropriateness and safety of the transport plan lies with the referring clinician and accepting clinician in conjunction with the ambulance service.
6. If a medical retrieval is planned, NETS will determine the most appropriate transport vehicle to effect the retrieval

TABLE 1 – Summary of NETS core roles

NETS 1300 36 2500
www.nets.health.nsw.gov.au

- Clinical Co-ordination
- Teleconferencing
- Connection with tertiary specialist(s) for advice
- Arrange Medical Retrieval
- Advice on appropriate non-NETS escort
- Problem solving (including critical care beds)
- Advice for Clinicians uncertain about the process
- Ensuring retrieval is not an alternative to effective local care
- Reporting systems “failures”

5 WHICH CHILDREN MAY NEED MEDICAL RETRIEVAL TO A PAEDIATRIC ICU?

It is impossible to provide an exhaustive list of potential referrals to a tertiary facility; Table 2 offers cues that may facilitate clinical decision-making. **Any** of the conditions in Table 2 are likely to require consultation regarding patient management and or transfer:

TABLE 2 - Conditions Requiring Consultation Regarding Management and/or Transfer

Airway	<ul style="list-style-type: none"> • All intubated patients • Actual or threatened airway obstruction
Breathing	<ul style="list-style-type: none"> • Respiratory distress, persistent beyond 4 hours • Apnoea • Cyanosis, despite oxygen therapy • Oxygen requirement > 40%
Circulation	<ul style="list-style-type: none"> • Shock • Significant blood loss • Heart failure or arrhythmia
Disability	<ul style="list-style-type: none"> • Intractable Seizures • Surgical conditions requiring specialty surgery • Severe Burns - greater than 10% body surface burnt; genital region burnt; palms of hands, soles of feet or joints involved in burns; inhalation likely • Major Trauma • Spinal Injury

Early Notification will enable Early Assistance.
In a time-critical emergency, notification can occur prior to full patient assessment and investigation
NETS: 1300 36 2500
www.nets.health.nsw.gov.au

6 CLINICAL SUPER-SPECIALTY REFERRAL NETWORKS

Several statewide clinical super-specialty networks operate in tandem with the NSW Tertiary Referral Networks (Paediatrics).

These networks are largely determined by the location of the clinical super-specialty services, and in some cases, the imperative to achieve early clinical intervention such as for those patients with major trauma.

The following clinical super-specialty referral networks that may be required for children:

1. NSW Severe Burn Injury Service Referral Network (Paediatric)

The Children's Hospital at Westmead is the designated Centre for severe burns for children (up to the 16th birthday). Transfer of patients with severe burns are facilitated by NETS.

2. NSW Major Trauma Services (Paediatric)

Each of the Children's Hospital's is a designated paediatric major trauma service. Paediatric trauma referral networks are aligned in accordance with the Child Health Networks.

The majority of paediatric trauma cases presenting to hospital emergency departments will have minor to moderate injury and can be managed appropriately at the nearest hospital.

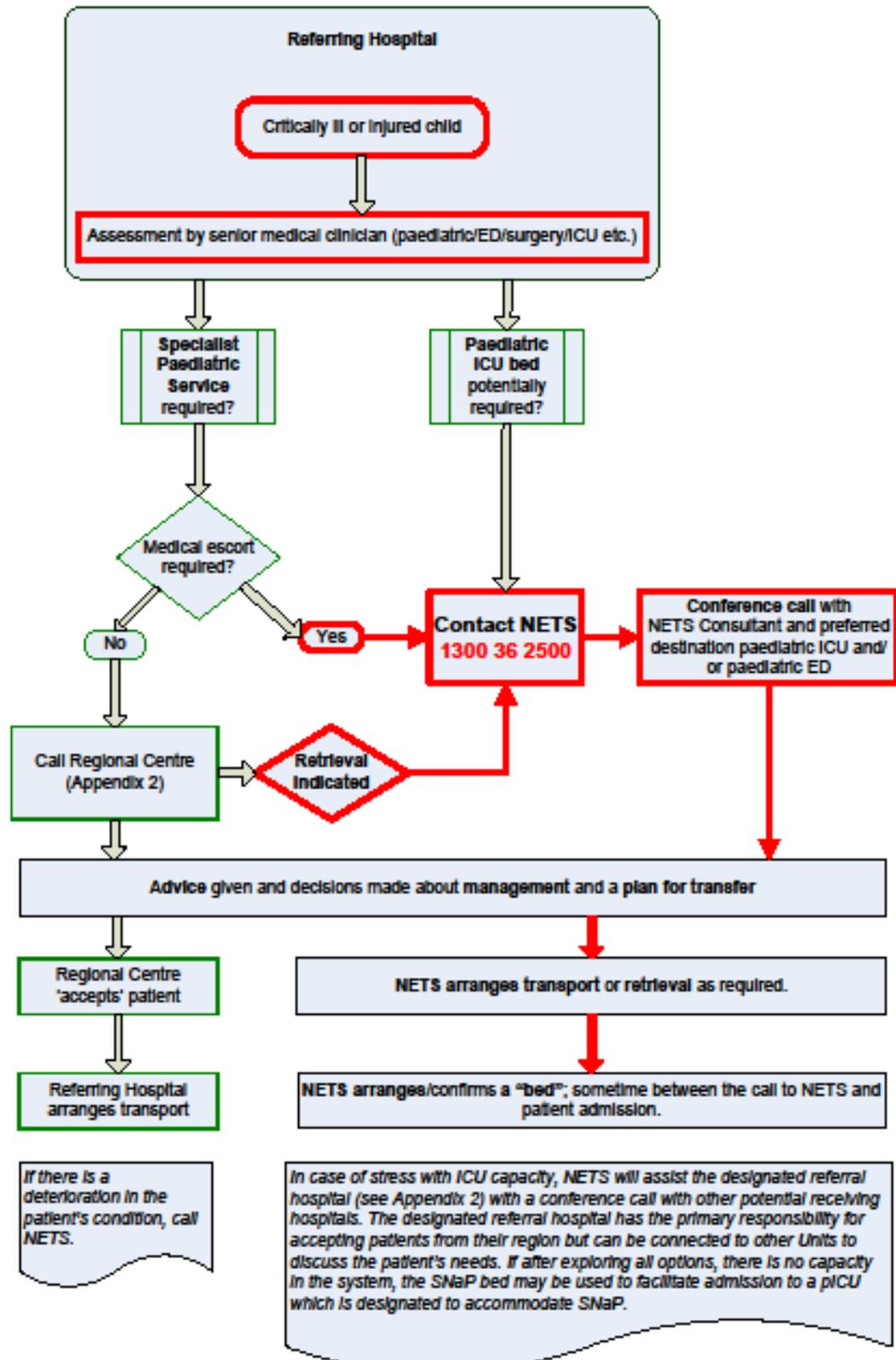
Children with major trauma should be managed at a paediatric major trauma service. Children aged up to their 16th birthday fitting criteria as per the pre-hospital 'MIST' Protocol T1 (with due consideration given to paediatric physiological changes) should be considered for direct transfer to a paediatric major trauma service.

3. Spinal Services

NSW State Spinal Cord Injury Service (Paediatric) Both the Children's Hospital at Westmead and the Sydney Children's Hospital are designated referral centres for spinal cord injury up to the 16th birthday. Referral networks are aligned in accordance with the Child Health Networks for major trauma.

Paediatric patients who have sustained a spinal cord injury with neurological deficit are to be transferred to a designated referral centre at the earliest opportunity once medically stable. Transfer of paediatric patients with spinal cord injury with neurological deficit is facilitated by NETS.

NSW STATEWIDE ICU TRANSFER PATHWAY PAEDIATRICS



In situations where it is declared that **no paediatric intensive care beds** are temporarily available and tertiary care is necessary, the Default Paediatric Intensive Care Policy may be invoked. This step is taken only **after** thorough assessment of statewide Paediatric Intensive Care capacity and where inter-state transfer is being contemplated. Inter-state transfer may be the option of choice. However, if inter-state transfer is not a viable option for the child, the Default Paediatric Intensive Care Policy may be invoked.

Every hospital is linked with a nominated tertiary hospital paediatric intensive care which is networked to a group of referring hospitals to provide critical care for their patients. This Child Health Network Matrix has been developed following consultation with Area Health Services; the NETS; and other key stakeholders and is attached to this policy (attachment 3).

When the default system is activated, the tertiary referral hospital designated as being responsible for the referring hospital in which the patient is located must accept the patient.

Where the condition of a child is critical and requires immediate emergency treatment, the default referral hospital has a responsibility to accept a call from the referring hospital, offer clinical advice and, ultimately, accept the patient. Should the default referral hospital have difficulty in accepting the patient, this should not prevent initiation of transportation; including the timely dispatch of a retrieval team or other appropriate ambulance team. It is the responsibility of the default referral hospital to seek an alternative destination; should this be necessary. If no other destination is possible, the default referral hospital must accept the patient.

No patient should be refused admission without discussion involving the senior specialist at the default referral hospital. NETS can provide clinical conference facilities to assist this process but clinical leadership of the process rests with the tertiary hospital involved. Discussions with NETS regarding the need for urgent transfer of a child to the default facility may also lead to initiation of the SNAP bed (Statewide Neonatal and Paediatric bed) – a mobile intensive care bed initiated and staffed by NETS as a short-term solution to a temporary lack of paediatric/neonatal intensive care resources.

7 APPENDIX 1 Guidelines for Facilities for the Stabilisation of Patients prior to Medical Retrieval

These Guidelines are issued to assist Hospitals using a medical retrieval team to transfer a patient requiring intensive care. It sets out the resources that are required for the safe and efficient stabilisation of patients of all ages. These resources are required at those hospitals at or above role delineation Level 2 for Maternity Services (newborn infants) and at or above Level 1 for all other age-groups.

These Guidelines are designed to assist referring hospitals offer optimal care using the combined resources of the referring hospital and the retrieval team to manage, stabilise and prepare patients for transport.

The Guidelines were developed by NETS in collaboration with the Medical Retrieval Unit, regional advisory/retrieval services and referring hospitals.

Background

Guidelines were first issued in 1997 for newborn patients to promote an effective mechanism for the stabilisation prior to transfer, from referring hospitals. It was recognised that the scope of these Guidelines needed to be expanded to offer advice encompassing all age groups and include new aspects of clinical networking such as telemedicine. Accordingly, this document covers all age groups.

Communication

Acute patient transfer is regularly complicated by communication errors. The facilities for communication by telephone and other media should be readily accessible and permit timely, accurate and constructive communication. A telephone which the referring clinician can directly call a tertiary centre or retrieval service is essential. It should be usable from the bedside, from the charts or images but flexibly move to a quieter area if required.

Space

It is acknowledged that not all hospitals will be able to immediately provide the physical space specified in this Guideline. Hospitals are advised that, if there is currently no suitable space within the ED, ICU, children's ward or neonatal nursery, alternative resuscitation areas can be provided in an appropriate area. However, when a hospital is being refurbished or rebuilt, the requirements listed in this circular should be followed and reference made to the functional space requirements contained in the current "Health Facility Guideline".

Where specific essential equipment items listed below are not available at present, provision should be made to include these items in forward planning cycles as soon as possible.

Ventilatory Support

Facilities that have medical officers formally trained in managing ventilated patients may have ventilators capable of supporting Adults, Children, Infants and Neonates — depending on caseload of patients requiring ventilatory support. Where such ventilators are available, they must be complemented by the capacity to measure airway pressure, expiratory tidal or minute ventilation, and end tidal CO₂ (or skin CO₂ monitoring).

Medical Imaging facilities

If medical imaging facilities are available in the referring facility, an X-Ray viewing box or Picture Archiving and Communication System (PACS) system must be in a location that allows use without losing visual contact with the patient. In addition, diagnostic images of the patient must be available to accompany the patient to their destination hospital without delay.

Pathology Services

If Pathology Services are available in the referring facility, a viewing system to check pathology results must be in a location that allows access without losing visual contact with the patient.

Access by the mother to her newborn

After resuscitation of a newborn and prior to transport, it should be possible for the NETS Infant Transport Module to be wheeled to the mother's bedside (or vice versa). Sufficient room is required for the mother to be able to see and touch her baby in the NETS transport system from her bed, where necessary.

8 APPENDIX 2 Requirements for Stabilisation of Patients Prior to Medical Retrieval

Essential Facilities
<ul style="list-style-type: none"> • An area or room that can be dedicated to the patient for retrieval and the workings of the Team (minimum size 21m² child/adult; 15m² for a newborn). This area may be created from existing areas for those occasions when a medical retrieval team is present, for instance, by temporarily combining two patient care areas into one. • Easy, uncluttered access for a stretcher or hospital trolleys used by the retrieval team (size 900mm x 2000mm) for hospital entry to patient care area without obstruction to other functions. • Procedure light (angle-poise type) • Resuscitation trolley with appropriate drugs and equipment for those age-groups being treated • Infant resuscitation trolley (open care system for body weight < 5kg): <ul style="list-style-type: none"> ○ Integrated overhead lighting ○ Variable radiant heat source ○ Swing-away hinge for overhead modules for mobile x-ray access ○ Space available for retrieval team module to be positioned adjacent and at right angles ○ Polyethylene wrap for very preterm infants (< 28 weeks gestation) • Panel fixtures: <ul style="list-style-type: none"> ○ Oxygen x 2 (reticulated preferred, cylinder supply will suffice in some locations) ○ Medical Air x 2 (reticulated preferred, cylinder supply will suffice in some locations) ○ Suction x 2 (one regulated for low/controlled suction, one high flow (reticulated supply and second high flow preferred)) ○ Body-protected GPOs x 10 (2 for retrieval team use, 8 for referring hospital equipment) • Height adjustable trolley to facilitate the loading and unloading of the patient/transport stretcher/medical equipment • Counter, bench top or table (min. 550 x 1200mm) for additional treatment equipment • Wash sink, soap dispenser, paper towel and alcohol/chlorhexidine hand rub dispenser • Waste receptacle of large capacity with large aperture orifice; positioned close to resuscitation area • Sharps disposal container, preferably mobile • Procedure trolley (900mm x 450mm minimum) • Ice packs for therapeutic cooling • Telephone: <ul style="list-style-type: none"> ○ Capable of direct call to relevant retrieval services (without using an operator) ○ Handset usable at the bedside of the patient (may use cordless technology) ○ Programmed for 1-key dialling to Regional Advisory/Retrieval Service, NETS, MRU ○ Capable of direct in-dial with that number displayed on handset prominent • Facsimile machine: <ul style="list-style-type: none"> ○ In a location that allows use without losing visual contact with the patient ○ Programmed for 1-key dialling to Regional Advisory/Retrieval Service, NETS, MRU ○ Capable of direct in-dial with that number displayed on device prominently • Photocopier with contrast and brightness adjustment • Digital camera for clinical photography (including simple connection to computer for file transfer)
Desirable Facilities
<ul style="list-style-type: none"> • Lighting to meet standards of operating theatre, with adjustable intensity • Infant resuscitation trolley (open care system for body weight < 5kg): <ul style="list-style-type: none"> ○ In built frame for X-Ray plate positioning without disturbing the patient for contact-less imaging • Computer: <ul style="list-style-type: none"> ○ In a location that allows use without losing visual contact with the patient ○ That allows access to clinical email services ○ That allows access to approved clinical web-based services (eg. CIAP, NETS, etc.) ○ That allows electronic transmission of digital images ○ That allows rapid access to relevant policies and procedures for care and retrieval • Capacity to export clinical data from local information systems to retrieval coordination centres and/or receiving hospitals • Capability of continuously monitoring a patient's ECG, pulse oximetry and automated non-invasive blood pressure measurements • Interview room readily accessible to resuscitation area, for family conferences