Paediatric and Neonatal Safe Transfer and Retrieval
The Practical Approach

Advanced Life Support Group
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Over the last few years there has been a trend towards increased centralisation of secondary and tertiary paediatric services. A number of strong drivers lie behind this: the increasing complexity of the techniques available to support children when they are unwell, the need for expertise to be maintained in delivering such care to relatively low numbers of patients, and an ever increasing public expectation of what should be treated rather than palliated.

As a consequence of these demands there are now well over 10 000 interhospital transfers of unwell children and neonates every year in the UK. Most areas have specialised retrieval teams who will undertake these transfers wherever possible. However at the current time the transport service provision is both fragmented and heterogeneous in terms of the resources available. There are also a small proportion of children who, by virtue of their pathology, cannot wait for an offsite retrieval team to mobilise and undertake their transfer. Therefore it is not uncommon that non-specialist teams have to be mobilised by receiving hospitals to move their charges into receiving tertiary centres.

This book (and the associated course) has been developed to provide an introduction to the knowledge necessary to undertake the transfer of sick children and neonates. It is aimed both at those embarking on training in paediatric and neonatal transport and at those who might expect that they will have to undertake such transfers on an occasional basis. Although the focus is on interhospital transfers, the principles are also directly applicable every time a child is moved between clinical areas. There are inevitable discussions of clinical situations throughout the text; however, the focus is primarily on the logistics of the transfer process. Those whose primary requirement is to enhance their knowledge of resuscitation should direct their reading to the APLS and NLS textbooks and courses.

Paediatric and Neonatal Safe Transfer and Retrieval: The Practical Approach has been developed by a multiprofessional group from across the UK. A systematic approach is employed throughout that has been adapted from that used in the adult STaR course.

The book is divided into six parts. Part I provides an overview of the current delivery of children’s transport services and introduces the ACCEPT approach that is utilised throughout the text. Part II examines the component parts of ACCEPT in detail. The practical issues that are encountered during the transfer process from an equipment perspective, and from a clinical perspective, are discussed in Parts III and IV, respectively. Part V discusses particular situations and provides additional background information that is required to plan for special circumstances. The appendices in Part VI contain supporting information and provide sample checklists and sample documentation for those undertaking transfers.

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We would also like to acknowledge and thank Helen Carruthers, MMAA and Kate Wieteska for producing the excellent line drawings that illustrate the text.

To maintain consistency between ALSG courses PaNSTaR has been closely linked to STaR (Safe Transfer and Retrieval). The PaNSTaR working group would like to acknowledge that a number of chapters in this book are based on Safe Transfer and Retrieval: The Practical Approach, 2nd edition and the PaNSTaR editors would like to thank all the people involved with the second edition of STaR: in particular, Pete Driscoll, Kevin Mackway-Jones, Elaine Metcalfe and Peter Oakley, and with special thanks to Ian Macartney.

Finally, we would like to thank, in advance, those of you who will attend the PaNSTaR course; no doubt you will have much constructive criticism to offer.
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UPDATES
The material contained within this book is updated on a 4-yearly cycle. However, practice may change in the interim period. We will post any changes on the ALSG website, so we advise you to visit the website regularly to check for updates (www.alsg.org – click on updates). The website will provide you with a new page to download and replace the existing page in your book.

REFERENCES
To access references visit the ALSG website www.alsg.org – click on references.

TRANSFER SCENARIO BANK
This is a bank of worked ‘real life’ scenarios using the ACCEPT approach. This is an interactive site allowing sharing of transfer experiences and will be available via the ALSG website.

ON-LINE FEEDBACK
It is important to ALSG that the contact with our providers continues after a course is completed. We now contact everyone 6 months after their course has taken place, asking for on-line feedback on the course. This information is then used whenever the course is updated to ensure that the course provides optimum training for its participants.
PART I
Introduction
CHAPTER 1
Introduction

LEARNING OBJECTIVES
In this chapter you will learn about:
- Why unwell children are transferred between hospitals
- The issues that may adversely affect delivery of care

BACKGROUND
In children’s critical care alone there are in excess of 5500 neonatal intensive care unit (NICU) and 5000 paediatric ICU (PICU) transfers between hospitals in the UK every year. In addition to this, there are numerous HDU (high dependency unit) and non-urgent transfers between centres and countless thousands of intrahospital transfers undertaken by healthcare professionals every year. Each one of these transfers represents an episode of care that is associated with a period of increased risk for both the child and the clinical staff. These risks can at best be eliminated and at least be minimised through appropriate training.

The PaNSTaR manual, with its associated course, is aimed at a multidisciplinary audience and has been developed to provide a comprehensive introduction and overview of the process of transferring unwell neonates, infants and children. Its conception followed from the success of the adult STaR manual and course. The underpinning concepts, and in particular the ACCEPT principles, described herein, are essentially the same. However the practicalities of transferring unwell children are significantly different. It is an old adage, but in this area perhaps never more true – children are not small adults!

Throughout the text ‘child’ or ‘children’ should be taken to refer to the entire age range (neonate up to 16 years of age). Where appropriate more specific references to particular age groups will be made where practices vary according to age. ‘Neonates’ is used to refer to all preterm babies and also term babies who are less than 28 days old. ‘Infants’ refers to all those under 1 year. Parent refers to any person with parental responsibility.

In addition to the practical differences associated with transferring children, there has also been a cultural change that has occurred, in many centres, of
non-paediatricians distancing themselves from paediatric practice, triggered by
the centralisation of paediatric services. Many district general hospital (DGH)
practitioners, faced with a critically ill child, may now find themselves practising
at the edge of their comfort zone. This is perhaps particularly true if they have
to undertake a transfer.

Most NICUs and PICUs will have an associated retrieval team. However, most,
if not all, of these teams are not sufficiently resourced to be able to provide a
robust service 100% of the time. There will also be occasions, such as children
with surgically treatable lesions after a traumatic head injury, where current
practice would dictate that the referring hospital should undertake the transfer
in order to minimise the time to the start of neurosurgery. At the current time
these factors mean that referring centres may expect to carry out the transfer
for between 25 and 30% of the children whom they refer for urgent tertiary
care.

We anticipate that reading this manual and attending a PaNSTaR course
will provide you with the basic strategies and background that you need
to join a paediatric transfer team. It is important to note that proficiency
in this area comes only with the additional training and experience that
may be gained from working with practitioners already experienced in this
area.

THE APPROACH TO TRANSFER

Any transfer process may be broken down into three components:
1 The organisational and management strategy
2 The practical issues
3 The training required for appropriate use of the equipment on the
   transfer.

The course focus is on the transportation of children between hospitals. However,
the same approach can, and should, be applied to the transportation of unwell
children within hospitals.

The usual purpose of an interhospital transfer or retrieval is either to allow
the patient to be treated more effectively or to obtain additional diagnostic infor-
mation, in a geographically separate site. Transfer in itself does not constitute
therapy and represents a time of increased risk. It is therefore essential always to
consider the risks versus the benefits before undertaking a potentially hazardous
journey.

In the neonatal population babies may be transferred acutely because they
require ICU therapy that is not available at the referring NICU or SCBU (special
care baby unit). There are also a significant number of neonates who may
be moved for specialist examinations or opinions. Infants and older children
are primarily transferred when they are acutely unwell to a central PICU
or HDU. Some transfers will also occur for secondary or tertiary opinions,
but most of these patients will not present a significant clinical risk and will be
transported by their parents. In all the acute cases children may sometimes
have to be transferred significant distances, especially at busy times such
as midwinter, because beds may not be available in their nearest tertiary
centre.

Box 1.1 details the wide spectrum of clinical presentations that may be encoun-
tered. Diagnostic groups are in order, from most common to least common, based
on Paediatric Intensive Care Audit Network (PICANET) data. Within the groups
the top specific diagnoses are similarly listed.
CHAPTER 1 INTRODUCTION

The source of these patients also varies widely:

- Delivery suite
- Emergency department
- NICUs
- Adult ICUs
- Paediatric wards
- Operating theatres
- HDUs
- CCUs (critical care units).

Emergency departments are probably the most frequent starting place for the movement of PICU patients. Sometimes children are moved to local critical care facilities before transfer. Either way the adequacy of resuscitation and the degree of packaging that will have been undertaken, before the arrival of the transfer team, is highly variable. When dispatching a team to undertake this task it is

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**Box 1.1 Clinical conditions requiring transfer**

**Neonates**
- Extreme prematurity
- Hyaline membrane disease
- Congenital abnormalities:
  - cardiac
  - respiratory
  - surgical
- Hypoxic ischaemic encephalopathy
- Meconium aspiration syndrome

**Children**
- Cardiovascular:
  - ventricular septal defect
  - tetralogy of Fallot
  - transposition of the great arteries
- Respiratory:
  - bronchiolitis
  - pneumonia
  - respiratory failure secondary to chronic or acute neurological conditions
  - status asthmaticus
- Neurological: status epilepticus (usually respiratory failure secondary to treatment)
- Gastrointestinal
- Infection:
  - sepsis (non-specified)
  - meningococcal sepsis
- Trauma:
  - traumatic head injury
  - burns
- Haematological/Oncological
- Postoperative
- Metabolic:
  - DKA (diabetic ketoacidosis)
  - inborn errors of metabolism
- Substance abuse/poisoning/overdose
- Liver failure

The source of these patients also varies widely:

- Delivery suite
- Emergency department
- NICUs
- Adult ICUs
- Paediatric wards
- Operating theatres
- HDUs
- CCUs (critical care units).
always best to assume they will need to do everything and therefore must have the knowledge and skills to do so.

Transfers are not infrequently associated with adverse events, which may be recorded on transfer forms. Those seen most commonly are:

- No capnography available (when clinically indicated)
- Equipment failure
- Significant hypotension
- Significant hypoxia
- Inadequate resuscitation
- Significant tachycardia
- Mechanical ventilator not available
- Delay in getting ambulance
- Ambulance getting lost en route
- Cardiac arrest in ambulance.

The number of interhospital transfers continues to rise. This is perhaps stimulated by an increasing expectation on the part of both the general public and healthcare professionals.

**SUMMARY**

The course and this manual provides those who may be involved with the transfer of unwell children with a systematic approach to guide their work. It does not seek to teach or develop the clinical skills required to undertake such care but it does provide a structure that should help eliminate most of the non-clinical pitfalls. At the end of the day, there is no substitute for clinical experience, which may be gained by working with those experienced in this field.
CHAPTER 2
The structured approach to transfers

LEARNING OBJECTIVES
In this chapter you will learn about:
• The principles of the safe transfer or retrieval of critically ill children
• The systematic ACCEPT approach for managing such children

INTRODUCTION
The aim of a safe transfer policy is to ensure that child care is streamlined and of the highest standard. To achieve this, the right child has to be taken at the right time, by the right people, to the right place by the right form of transport, and receive the right care throughout. This requires a systematic approach that incorporates a high level of planning and preparation before the child is moved. One such approach is the ACCEPT method (Box 2.1), which is used in adults, it may also be used for paediatrics and neonates (Figure 2.1).

Box 2.1 The systematic approach to transfer of a child
A Assessment
C Control
C Communication
E Evaluation
P Preparation and packaging
T Transportation

Following ACCEPT ensures that appropriate assessments and procedures are carried out. This method also correctly emphasises the preparation that is required before the child is transported. The component parts of ACCEPT are outlined below. Subsequent chapters deal with each part in detail.
ACCEPt Model
Retrieval team does transfer

Assessment
What is wrong?
What do you need?
identify team:
Leader to delegate required tasks
Pre-transport advice
With retriever (plans for team)
With receiving unit
With ambulance
Agree if transfer is appropriate - when and how?

Consider PT on outbound leg
On arrival consider:
A
Handover
What has been done?
What needs to be done?
C
Team leader to delegate tasks
E
Is transfer still appropriate?

Transportation

Preparation, Packaging & Pre-departure checks

Handover
A
Is everything still OK?
Who is taking over?
What is wrong?
What has been done?
What needs doing?
C
Include relatives
E
Any problems?
P
Unpackage (leave notes etc.)
T
Safely back with equipment

Fig. 2.1 ACCEPt algorithm for use in paediatric and neonatal transfers.
ACCEPT Model

Referring team does transfer

Referring Unit → Assessment → Control → Communication → Evaluation → Pre-departure checks (team and equipment) → Transportation → Handover → Receiving Unit

Assessment:
- What is the problem?
- What is being done?
- What affect is it having?
- What is needed now?

Control:
- Identify team:
  - Leader to delegate required tasks
  - Pre-transport advice
- To all clinicians:
  - Who you are?
  - What is needed (from the listener)?
  - What are the (relevant) patient details?
  - What the problem is?
  - What has been done to address the problem?
  - What happened?

Communication:
- Agree if transfer is appropriate
- When and how?

Evaluation:
- Unpackage (leave notes etc)
- Safely back with equipment

Preparation, Packaging & Pre-departure checks (team and equipment):

Transportation:
- What might go wrong?

Handover:
- Is everything still OK?
- Who is taking over?
- What is wrong?
- What has been done?
- What needs doing?
- The history of the transfer and the evaluation
- Any problems?
- Unpackage (leave notes etc)
- Safely back with equipment

Fig. 2.1 (Continued)