

Neonatal pre-transport stabilisation – caring for infants the STABLE way

High quality training of all staff involved in the resuscitation, stabilisation and transfer of sick babies, allows staff to work together to initiate intensive care from the minute the infant is born. The STABLE Programme provides a comprehensive guide to the stabilisation process, which complements the neonatal life support and transport courses currently available.

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Keywords

neonatal stabilisation; neonatal transport;
Managed Clinical Networks; outreach
education; morbidity; mortality

Key points

Chalmers S., Mears M. (2005) Neonatal pre-transport stabilisation – caring for infants the STABLE way. *Infant 1*(1): 34-37.

1. The centralisation of tertiary neonatal services and the development of managed clinical networks is set to change the face of neonatal services
2. Although *in utero* transport is undoubtedly the gold standard, inevitably there will continue to be a large number of infants requiring *ex utero* transport
3. Every baby deserves to receive level 3 stabilisation care, irrespective of when or where they are born. Network hub centres now have the responsibility to train all members of their network team, to give them the skill and confidence to initiate appropriate care from the minute that the baby is born.
4. The STABLE Programme provides staff with a comprehensive guide to the stabilisation process, which has the potential to impact on morbidity and mortality.

In recent times, neonatology has been exposed to a great deal of adverse coverage in the media. With increasing pressure on resources, it is becoming more difficult to find cots locally for babies requiring intensive care. This has resulted in babies and families having to travel long distances to gain access to the care facilities that they need. Following Department of Health recommendations, Managed Clinical Networks are emerging and are set to revolutionise the way in which we deliver neonatal care services. With increased investment, joint commissioning, shared guidelines and protocols, networks aim to deliver a more 'seamless' approach to care.

The provision of a dedicated neonatal transport service is an intrinsic part of a successful network. For units faced with the unexpected delivery of an extremely premature or sick baby, transport services facilitate movement around the network. The goal of all transport teams, wherever possible, is to move with a well stabilised infant. Pre-transport stabilisation helps to minimise the risk that adverse events will occur, which may contribute to morbidity or lead to mortality.

Neonatal transport

In the first week of life, one in 10 babies require admission to a neonatal unit¹. Most of these infants will require special care or short term intensive care and will be cared for in their local neonatal unit. Approximately 3% of infants will require more long term intensive care or specialist facilities and need to be cared for in a tertiary centre². Whilst *in-utero* transfer is undoubtedly the 'gold standard', for 1.3% of babies *ex-utero* transfer becomes a grave reality³. The unexpected delivery of an

extremely premature infant or a baby requiring specialist care or surgery, means that many critically ill infants will have to make the journey by land ambulance or aircraft, after they are born.

Neonatal transport is potentially hazardous for both infant and staff. During transport, the infant is exposed to many noxious stimuli including noise, vibration, acceleration/deceleration forces and temperature instability, all of which have the ability to destabilise an infant already struggling to maintain homeostasis. Research has shown *ex-utero* transport to be associated with an increase in morbidity and mortality^{4,5}. Outcome determinates include acidosis, carbon dioxide, blood pressure, glucose and temperature and it is vital that these parameters are kept as closely as possible within the range of 'normal' during the transport process, if adverse effects are to be minimised. For staff, the transport of a critically ill infant can be a daunting prospect. The transport environment is a far cry from the relative safety of a well equipped neonatal unit. With specialist equipment, reduced space and lighting, limited resources and manpower, it presents a unique challenge to staff.

Managed Clinical Networks – presenting new challenges

The media have not been slow to publicise cases where babies and parents have been separated and forced to travel long distances, when a staffed neonatal cot is simply not available in their local area. The emergence of Managed Clinical Networks and a centralisation of neonatal intensive care services, aim to address some of these issues. With massive investment to allow for expansion of cots and recruitment of

neonatal staff, it is hoped that in the future, networks will be able to provide appropriate care for 95% of babies born within their own network. The concept of a hub and spoke system combined with a dedicated neonatal transport service means that infants born within a network should have access to the level of care that they require, from the minute that they are born. However, not all infants will deliver in a centre with appropriate facilities and *ex-utero* transfer will always be a reality. If we are to be able to meet the challenge that intensive care is initiated from the minute that the infant is born, it is vital that staff from all units within the network have access to adequate support, training and resources. The hub centre is responsible for ensuring that such provision is made.

Whilst it has been shown that the centralisation of intensive care services leads to improved outcome⁶, the reorganisation of both intensive care and transport services remains a very controversial issue; with many staff fearing that they will lose valuable skills. The success of any network depends wholly on effective communication and an appreciation of the valuable contribution that every member of the team has to make. The pre-transport stabilisation of a critically ill infant is one area where this contribution cannot be underestimated.

Why is stabilisation important?

According to Karlsen⁷

“To optimise an infant’s outcome, it is the responsibility of the healthcare team to deliver the most comprehensive, anticipatory and appropriate care to sick neonates. To define morbidity (or that ‘thing’ that we try to avoid by administering comprehensive care), morbidity is usually considered a negative event that either resolves (eg a pneumothorax treated with chest tube placement) or persists as an ongoing problem or a sequelae for a period of time (eg blindness secondary to retinal detachment in a 25 week gestation infant). Not all morbidity or negative situations are preventable or predictable. At times, effects of the disease state itself may complicate care of the patient. However, if the disease is diagnosed and treated appropriately, morbidity may be reduced and patient outcome optimised”

Whilst it is not always possible to completely stabilise an infant’s condition without access to treatments such as high

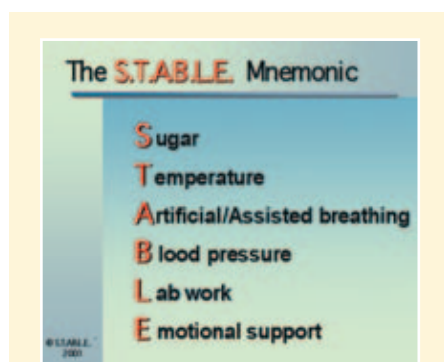


FIGURE 1 The six modules of the STABLE programme.



FIGURE 2 Airway, Breathing and Circulation always take precedence.

frequency oscillatory ventilation or ECMO, in most cases, stabilisation will lead to an improvement in the condition of the baby and prevent events from ‘spiralling out of control’. In a recent study, Bissaker et al⁸ researched the effect which pre-transport advice, stabilisation and the transport itself had on the respiratory status of infants being transported with respiratory distress syndrome. Results of the study concluded that a period of stabilisation at the referral unit was associated with a significant improvement in the condition of the infants studied.

Research publications such as the EPICure Study⁴ and Project 27/28⁹ have shown that with improved treatment options and training, we are now able to save much smaller and sicker babies. Project 27/28⁹ was a two year project spanning the period of 1998-2000. The aim was to identify patterns of practice or service provision that might contribute to the deaths of premature babies born at 27-28 weeks’ gestation, and from these, to make recommendations for future practice. Survival figures for this project were considerably higher than anticipated. In total 3522 babies were liveborn and of these, 88% were alive at day twenty eight. Whilst improved survival gives staff working within neonatal care greater

confidence in what they are doing, as reflective practitioners staff are always striving to ensure that the care they deliver is the best that it can be and that this increase in survival does not also lead to an increase in morbidity and adverse neuro-developmental outcome. The recommendations of the project included the need for better training with regards to intubation, early thermal care, surfactant administration, ventilation strategies and cardiovascular support – all of which are vital components of the stabilisation process. The authors’ interest in neonatal transport led to investigation of ways in which the knowledge and confidence of staff involved in stabilising sick babies could be improved.

What training is available?

Research showed that there were many excellent national and local courses which covered the resuscitation and transport process, but that there was not a course available which covered the stabilisation process in depth. In 2003, the authors came across the STABLE programme. Designed by Kristine Karlsen, an American ANNP with experience in neonatal transport, ECMO and outreach education, the STABLE programme took shape in the late 1980s. As part of her MSc research project, Kristine Karlsen developed the programme, giving staff a mnemonic based approach to neonatal stabilisation. She acknowledged that there are times when staff are faced with the unexpected delivery of a sick baby and ask the question ‘Where do I start?’. Divided into six modules (Sugar, Temperature, Airway and Ventilation, Blood Pressure, Lab Work and Emotional Support) the programme guides learners through the stabilisation process in a format which is easy to remember (FIGURE 1). Designed to follow on from the NLS/NRP course it is important to remember that the basics always come first and the mnemonic Airway, Breathing, Circulation always takes precedence (FIGURE 2).

In developing the programme, Kristine Karlsen reviewed literature which looked at-

- factors associated with a higher risk of mortality in transported infants
- pre-transport stabilisation activities for both the referring hospital and transport team
- perinatal education programmes available in the USA
- issues concerning neonatal stabilisation

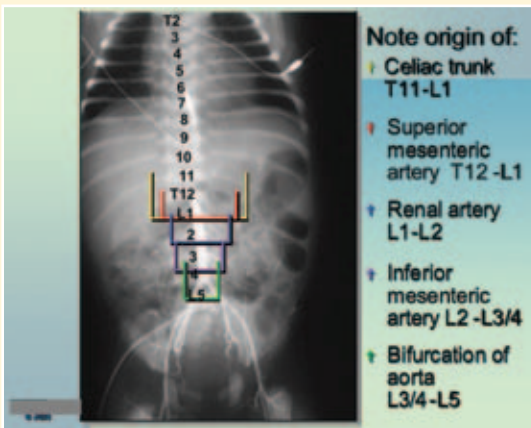


FIGURE 3 This is a contrast x-ray highlighting position of the celiac trunk, superior and inferior mesenteric arteries, renal artery and bifurcation of the aorta – important to remember when siting umbilical lines.

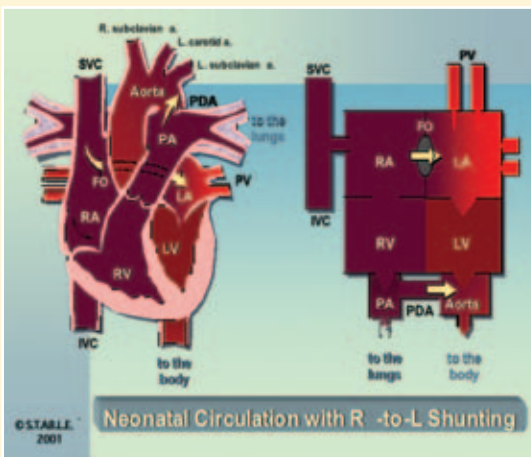
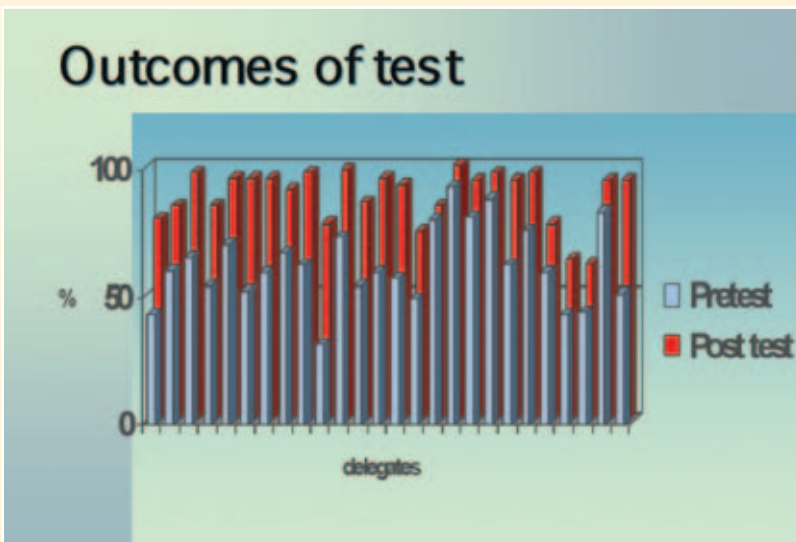


FIGURE 4 This shows pattern of blood flow through the heart with conditions causing right to left shunting eg PPHN.

FIGURE 5 Improvement in delegate pre and post test scores from first course (below).



- process of pre-transport neonatal stabilisation, which consistently recommends that comprehensive attention be given to the following areas to optimally prepare an infant for transport:-
- concept of thermoregulation and the prevention of cold stress
 - maintaining a normal acid-base balance
 - supporting ventilation
 - establishing IV access, monitoring and normalising the blood sugar
 - supporting the blood pressure and normalising heart rate
 - performing and interpreting lab investigations
 - obtaining and reviewing records and x-rays
 - educating and maintaining involvement of the family

With evidence-based theoretical explanation, practical scenarios and high quality graphics (**FIGURES 3 and 4**), the programme offers an in-depth approach to all aspects of neonatal stabilisation. The course is suitable for neonatal and paediatric nurses, paramedics, midwives, respiratory therapists and doctors of all levels. An additional cardiac module has recently been added and there are plans to incorporate a surgical module next year. The programme recently gained endorsement by the March of Dimes Foundation (United States equivalent of BLISS).

2004 – The STABLE programme comes to London!

In December 2003, both authors completed the lead instructor training course and have now run three very successful courses incorporating the STABLE programme in London and are looking to disseminate the course nationally. In addition to the programme, a number of scenario and skill stations to give the delegates ‘hands-on’ experience have been incorporated. The skill stations include neonatal intubation, basic and advanced life support, surfactant administration, umbilical catheterisation, neonatal x-ray interpretation and insertion of chest and pericardial drains.

Wessex recently became the first neonatal network to adopt the course, to provide its staff with formal neonatal stabilisation training. The course is assessed by means of a pre-test, which is sent out prior to delegates commencing the course and a post-test on completion of the course. Delegates need to achieve a

in referral hospitals, including interviews with transport team members and research into teaching and learning strategies

The first edition of the programme was released in the late 1980s. In the early 1990s the programme underwent major revision, research and testing with evolution to its present form today. Designed to help healthcare providers to

organise care during the post-resuscitation pre-transport stabilisation period, the programme has to date been attended by more than 80,000 learners and there are now 1700 instructors worldwide. The programme has been translated into four languages and boasts immense popularity in the USA, Canada, Eastern Europe and Ireland. The selection of the six modules is based on literature which encompasses the

post test score of more than 84% to receive an official STABLE Programme certificate.

The results from the three courses which have been run, have been extremely encouraging. With a wide range of delegates including neonatal nurses, midwives, SHOs, Registrars and Consultants, all 140 delegates have seen an improvement in test score on completion of the programme. With some score improvements exceeding 50%, the vast majority of delegates have reached the 84% pass mark and this increase in knowledge demonstrated can only have a positive impact on clinical practice (FIGURE 5). Post course evaluations have shown the course to be well received by delegates, with 100% of delegates reporting that they would recommend the course to their colleagues.

The STABLE programme – plans for the future...

A number of the unit's G-Grade nurses and Advanced Neonatal Nurse Practitioners have been trained to become support instructors and their help with dissemination of the programme has been invaluable. Once the learner programme has been disseminated to a good number of delegates, the plan is to arrange an Instructor course. This would enable experienced staff, who have completed the STABLE learner course, to become instructors. There are tentative plans to increase the course from a two day course to a three day course at the end of 2005, to incorporate the new STABLE cardiac module.

The authors believe that alongside the excellent neonatal life support and transport courses available, the STABLE programme offers the 'missing link' to staff caring for sick and premature babies. For networks, it offers a seamless approach to the stabilisation and transport process. With all staff working together using the same premise, all members of the team feel fully involved in the process from the outset. For staff, this can only lead to better working relationships, a sharing of ideas and improved job satisfaction. For parents, a high quality of care and good relationships between network units can make the transport process seem a lot less daunting. For infants, in addressing many of the key recommendations outlined in publications such as Project 27/28⁹, perhaps this is another step closer to improved outcome.

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Acknowledgements

The authors would like to extend thanks to Kristine Karlsen, Mary Puchalski and all at The STABLE Program for their continued support and for the use of the graphics supplied in this article. Thanks are also due to all of the support instructors, guest lecturers and company representatives, without whom dissemination of the course would not have been possible.

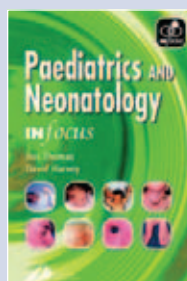
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Paediatrics and Neonatology in Focus

BOOK REVIEW

Authors: Dr Ros Thomas and Prof. David Harvey
 Published: November 2004
 Price: £14.99
 ISBN: 0 4430 7436 4
 Publisher: Elsevier
 Paperback



Infant readers can receive a 20% discount off *Paediatrics and Neonatology in Focus* by accessing www.infantgrapevine.co.uk and clicking on the link on the home page.

Dr Thomas and Professor Harvey have aimed to produce a concise text clearly integrated with high quality colour clinical photographs in paediatrics and neonatology, to be used as an essential resource for students and healthcare specialists in all fields of medicine. In many respects their aims have been more

than fulfilled. They have produced a superbly well-illustrated text with essential clinical information alongside. At the end of the text they have an extensive self-examination section with answers, which further contributes to the information given by the text. The book comes in a handy pocket size and is easy to read. The

text is however very succinct and thus it should be used alongside a larger text, but for clinical placements its illustrations make it a "must" to have in your pocket.

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