

Embrace five years on – where are we now?

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In December 2009 Embrace started life as the first and only combined neonatal and paediatric transport service in the UK. Its conception began two years earlier with much planning to merge the four existing unit-based neonatal and paediatric transport services in Leeds and Sheffield.

The concept of a team that could safely and efficiently move not only extremely premature babies but also children up to 16 years old was not universally accepted initially, but over the last five years views have changed and early sceptics are now great believers and supporters of our service.



Embrace was commissioned to organise and implement transfers of infants and children within Yorkshire and the Humber. Its development involved not only the leads of the four regional teams, but also stakeholders, commissioners and deanery representation.

Our model of a combined paediatric and neonatal transport service has now been replicated by several other services in the UK. Our call conferencing system, which allows up to 30 participants to be in a call, is also being used by other services.

Embrace is located in an industrial estate close to the M1 with easy access to the M62, providing good coverage and quick access to our referring units.

We are hosted by Sheffield Children's NHS Foundation Trust, and form part of the Surgery and Critical Care Division.

Activity

While developing Embrace, predicting activity was crucial for workforce planning. Activity data from the four regional teams was combined: an estimate figure of 1,950 transfers per year was used to plan the service workforce needs.

Due to this large predicted number of transfers, the new service had a phased implementation. It was recognised that the neonatal workload would exceed the paediatric demand and with that in mind, paediatric transfers started in December 2009. This allowed the logistical and operational set-up of the new service to be rolled out before the large number of neonatal referrals started. Transfers were facilitated through Embrace using our call handlers, nursing staff, vehicles and drivers but

frequently, due to the initially small number of medical staff, we relied on medical input from the regional paediatric intensive care units, while the two regional neonatal transport teams continued to operate.

Our first neonatal transfer was on 6 April 2010 and the era of a combined paediatric and neonatal service began. By August 2010, there were five paediatric trainees and five consultants, allowing Embrace to operate 24 hours a day.

Vital statistics

The youngest patient we have moved was a baby born at 23 weeks and two days weighing 430g. The oldest patient we have moved is a 19-year-old with a neuromuscular condition who was in the process of transitioning to adult services.

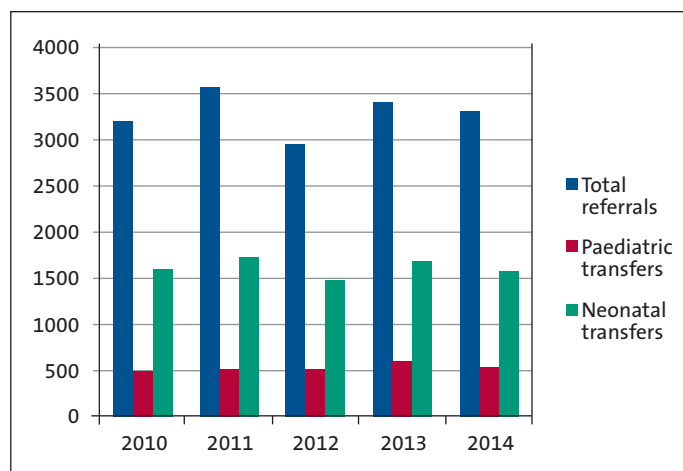


FIGURE 1 Embrace referrals and transfers.



The Embrace headquarters.



Embrace equipment.

From December 2009 to December 2014 we had 15,224 referrals and carried out 9,972 transfers: 2,426 paediatric and 7,546 neonatal (**FIGURE 1**). At the time of writing this article, we had performed 11,030 transfers, crossing the 10,000 transfer milestone on the 6 November 2014.

In this time we have travelled 855,000 miles in the UK. The furthest patient transferred was from Thessaloniki, Greece, to Sheffield Children's Hospital (4,348 kms), and the longest road transfer was 363 miles: Kirkcaldy in Scotland to Peterborough.

The highest number of referrals on one day that we have received is 26 and the highest number of transfers we have performed in one 24-hour period is 15. On average we do 5.71 transfers per day (range 0-15); average neonatal transfers 4.25 per day (range from 0-13) and 1.46 paediatric transfers per day (range 0-8).

From a neonatal transfer point of view, Embrace is one of the three busiest services in the UK. We have four dedicated ambulances and one fast response car with a team of dedicated drivers ensuring that we provide good activation and response times. Embrace has:

- four incubators on trolleys
- three other trolleys for either paediatric transfers or babies in pods
- three nitric oxide systems
- one Tecotherm cooling mattress
- two flight compatible systems for fixed-wing or rotary transfers.

As well as being commissioned for neonatal and paediatric transfers, a large workload for our administration team is facilitating *in utero* transfers, finding a suitable maternal bed and appropriate neonatal cot.

Although the numbers are small in comparison to the transfer number, the time taken to locate a cot can be significant – the average time taken for this process is 109 minutes. This has had a huge impact on clinical staff in referring delivery suites who can focus on clinical care, while the Embrace administration team finds the most appropriate bed for mother and baby. It is, however, not uncommon for maternity units to decide to keep a mother in their local unit after many phone calls have been made (**FIGURE 2**).

In utero transfers allow premature babies to be delivered in the right centre for their postnatal care. In 2014, only six infants at a gestation $\leq 26^{+6}$ weeks were delivered in a level 1 or level 2 unit and required a postnatal transfer.

As well as undertaking transfers, the medical team at Embrace is involved in referrals that do not ultimately require a transfer after stabilisation advice is provided to the referring unit. We provide a single point of telephone contact for referring clinicians, with access to immediate specialist clinical advice. This leads to the regional intensive care beds being used for critically sick infants and children who require an uplift in care. **FIGURE 3** highlights how Embrace is used with regard to specialist advice provision for referring units.

The variety of clinical conditions being referred to Embrace is vast (**FIGURE 4**). Our training and education programme has developed over the past five years with our educators and simulation fellows managing a detailed competency framework for all our staff. Regular simulations based on case reviews, incident reporting and current topics are carried out to ensure knowledge and skills in the 'high-risk, low-frequency' events that

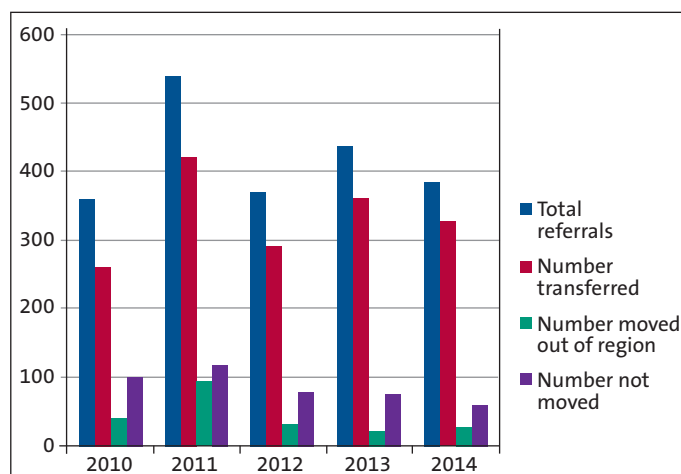


FIGURE 2 Number of *in utero* referrals.

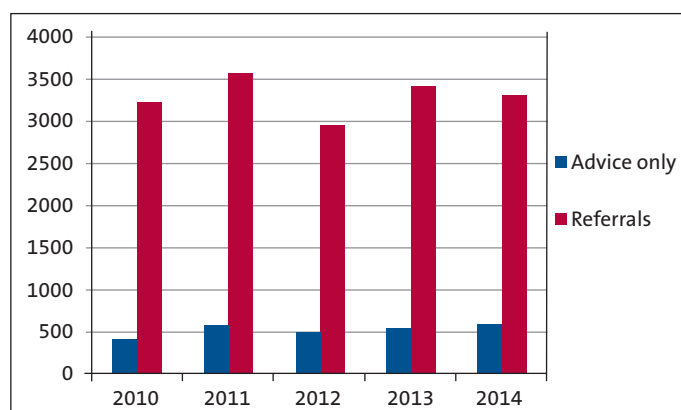


FIGURE 3 Number of advice calls and no transfer.

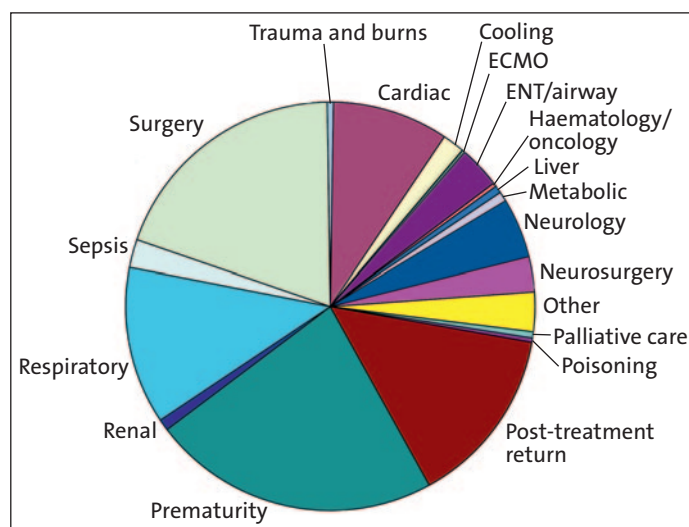


FIGURE 4 Embrace transfers by clinical category. Key: ECMO = extra corporeal membrane oxygenation, ENT = ear, nose and throat.

we manage. We have several specialist groups within Embrace focussing on palliative care, air transfers, health and wellbeing, trauma and cardiology to name but a few.

A large part of work is repatriation after an uplift in care allowing infants to be cared for in the right place by the right team, following the neonatal service specifications. Our administrators call every neonatal unit and paediatric intensive care unit in the region every day to check cot availability to ensure efficient patient flows and effective use of tertiary cots/beds.

Staffing

We have been extremely lucky over the last five years to build a consistent workforce in all staff groups. We began with two consultants, three higher specialist trainees, two advanced nurse practitioners (ANPs) and 22 whole time equivalent (WTE) nurses. The team of ANPs has developed and grown from two to seven qualified with the aim to increase to eight. Our nursing staff numbers are:

- one lead nurse
- two educators (1.5 WTE)
- 5.5 WTE senior nurses
- 12.5 WTE band 6 nurses.

We have paediatric trainees rotating through from the deanery for six-month placements and we pride ourselves in a thorough, intense induction programme working through transport competencies. In the last five years we have built up a reputation of being a good place to work, reflected in the number of trainees who request a placement with us. They are of varied background: paediatrics, anaesthetics, emergency medicine and pre-hospital emergency medicine.

Our driving team has remained constant with 11 members. We are supported by a team of eight call handlers run by an administration manager. Over the last 5½ years we have had a 93.6% staff retention rate and the main grounds for leaving the service has been geographical relocation for personal reasons.

CAMTS accreditation

In July 2014 it was a great achievement for the Embrace team to be awarded with full accreditation for critical care transport by ground, fixed wing and rotary wing by CAMTS (Commission on Accreditation of Medical Transport Systems: 'dedicated to improving the quality of patient care and safety of the transport environment for services providing rotorwing, fixed wing and ground transport system'). Embrace joins a small group of only seven other transport services outside the 162 teams in northern America with this accreditation, after two years of hard work and preparation from the whole team and our partners (Yorkshire Air Ambulance, Yorkshire Ambulance Services, The Children's Air Ambulance and CEGA Air Ambulance). Our entire transport process and service was scrutinised in terms of safety, quality and governance, reviewing all our procedures, policies and guidelines (www.camts.org).



A neonatal trolley with nitric oxide system.



Embrace transport nurse repatriating a patient by air.

Air transport

Early on in the service development, it became clear that a regional transport team needs a national reach and long ambulance journeys by road were not clinically appropriate.

The development of air transport at Embrace was fully integrated into our CAMTS accreditation application.

TABLE 1 shows the number of flights performed by Embrace. Ian Braithwaite, Senior Transport Nurse, has been pivotal in developing this service. Our simulation programme involves air training, along with regular training provided by Yorkshire Air Ambulance, The Children's Air Ambulance and CEGA Air Ambulance. We host monthly clinical governance meetings with our air partners, reviewing utilisation, key performance indicators, safety and quality.

Flights	
Rotary wing	77
Fixed wing	29
Total flight transfers	106

TABLE 1 Embrace flights.

Governance

Embrace has a robust quality management process with monthly safety, clinical governance and guideline meetings. We have developed a trigger list, which prompts a detailed consultant-led case review. Every hospital in the region has a link Embrace consultant who attends audit, morbidity and mortality meetings as well as participating in outreach education.

We have developed key performance indicators focusing on quality, which are reviewed at stakeholder management meetings. Our data are submitted to national neonatal and paediatric groups, allowing benchmarking to maintain standards.

Future developments in the next five years

A new database is being developed that will enable us to submit data to national and international groups allowing comparison to other large transport services.

The three-year cycle of CAMTS re-accreditation will help ensure a continued focus on safety and the quality for the service.

For more information or to visit Embrace, please contact catherine.harrison@sch.nhs.uk (Neonatal Lead) or suzanne.rennie@sch.nhs.uk (Lead Nurse)