



Delivering safe, high quality, cost effective child and maternal health care

SBRI Healthcare NHS England competition for development contracts

May 2014



**NORTH WEST COAST
ACADEMIC HEALTH
SCIENCE NETWORK**

Summary

A new national Small Business Research Initiative (SBRI) Healthcare competition is being launched by NHS England in partnership with the Academic Health Science Networks (AHSNs) to find innovative new products and services. The projects will be selected primarily on their potential value to the health service and on the improved outcomes delivered for patients.

The competition is open to single companies or organisations from the private, public and third sectors who will ultimately be capable of supplying the NHS with the resulting product or service on a commercial basis.

The competition will run in two phases:

- Phase 1 is intended to show the technical feasibility of the proposed concept. The development contracts placed will be for a maximum of 6 months and up to £100,000 (inc. VAT) per project
- Phase 2 contracts are intended to develop and evaluate prototypes or demonstration units from the more promising technologies in Phase 1. Only those projects that have completed Phase 1 successfully will be eligible for Phase 2.

Developments will be 100% funded and suppliers for each project will be selected by an open competition process and retain the intellectual property rights (IPR) generated from the project, with certain rights of use retained by the NHS.

This competition theme focuses on the challenges of delivering safe, high quality, cost effective child and maternal health care and is led by North West Coast AHSN

The competition opens on 19 May 2014. The deadline for applications is 1200hrs on 10 July 2014

Background & Challenges

1. Nocturnal Enuresis¹ (bed wetting)

Nocturnal enuresis, or bedwetting – defined as intermittent, involuntary voiding during sleep in the absence of physical disease in a child aged 5 years or more - is a relatively common problem in young children. It is estimated that approximately²:

- 1 in 12 children wet the bed regularly at four and a half years old (regularly is defined as at least twice a week)
- 1 in 40 children wet the bed regularly at seven and a half years old
- 1 in 65 children wet the bed regularly at nine and a half years old

About 1 in 100 people continue to wet the bed into adulthood, and bedwetting is slightly more common in boys than girls.

The causes of bedwetting are not fully understood. A number of different disturbances may be associated with bedwetting, such as sleep arousal difficulties, polyuria and bladder dysfunction. It often runs in families. The treatment of bedwetting has a positive effect on the self-esteem of children. Healthcare professionals should persist in offering treatment if the first-choice treatment is not successful. A number of treatments have been developed, ranging from educational, behavioural and psychological approaches through to the use of alarms or drug treatment. Using an alarm reduces bedwetting in about two thirds of children during treatment, and about half the children remain dry after stopping using the alarm. Alarms

¹ This part of the SBRI is concerned with assessment and management of bedwetting in children and young people, up to 19 years. It is not concerned with the causes or effects of urinary incontinence in adults and older people. The primary point of reference is NICE Clinical Guideline 111, Nocturnal Enuresis - The Management of Bedwetting in Children and Young People (NICE, 2010), to which the reader is referred.

² NHS Choices, 2014

are used every night until the child has had at least 14 consecutive dry nights. On average, 3-5 months are needed for this³ (Patient.co.uk, 2014).

Conventional alarm systems are based upon relatively crude moisture sensors and wired or wireless communications. The use of more sophisticated sensor technology, data collection and interpretation may be more effective in achieving the desired outcome of a “dry night”.

2. Non Invasive Monitoring in Babies and Children

In spite of a whole raft of initiatives and service provisions, hospital admission rates for children remain high. In any given year:

- Up to half of infants under 12 months and one quarter of older children will attend A&E,
- One in 11 children will be referred to a hospital outpatient clinic
- One in 10 to 15 children will be admitted to hospital,
- One in 1,000 children will require intensive care, and
- One in 10 babies born will be admitted to a neonatal unit, of which about 2% will need intensive care².

A 2013 study demonstrated that the emergency admission rate for children aged under 15 in England increased by 28% over the 1999-2010 decade, from 63 per 1000 population in 1999 to 81 per 1000 in 2010⁴. This equates to 739,000 children under 15 being admitted in 2010, as compared to 594,000 in 1999. The study notes that a persistent year-on-year increase is apparent from 2003 onwards, whilst a small decline in the rates of admissions lasting 1 day or more has been offset by a twofold increase in short-term admissions of less than 1 day. Admission rates for upper respiratory tract infections rose by 22%, lower respiratory tract infections by 40%, urinary tract infections by 43% and gastroenteritis by 31%, while admission rates for chronic conditions fell by 5.6%. Whatever causes might underlie this rise, it is clear that hospital admission continues to increase as a treatment mainstay for children.

Although it is impossible to state with certainty how many “episodes” of monitoring this gives rise to, it is certain that all children presenting at and/or admitted to hospital will undergo either individual or continuous physiological monitoring which frequently includes the provision of blood samples. Whilst conferring a significant diagnostic advantage, taking blood samples from children is not without risk:-

- The single withdrawal of e.g. 20mls of blood from a neonate - whose circulating volume might be 330 mls - represents 6% of their total volume, in a highly vulnerable individual. Multiple withdrawals in the same day have the capacity to significantly and dangerously deplete the circulating volume,
- Withdrawal of blood from an infant, whether by needle or cannula carries risks of infection, bruising, injury and pain,
- Witnessing a child in pain is itself distressing for parents and other carers. We have little idea of the short and longer term effects on the infant.

This call is based on non-invasive monitoring. The clinical sub-set is paediatric cardiac surgery, where it is proposed that the development of a core technology for non-invasive monitoring could give rise to implantable or wearable sensors with the capacity to monitor key clinical parameters on a continuous basis. This would draw together a number of existing or developing technologies.

³ Patient.co.uk

⁴ Gill et al, Arch Dis Child 2013; 98: 328-334

A sensor could be implanted at the time the cardiac surgery occurs, and creates the possibility of both near patient and remote monitoring by telemetry, on both a continuous and intermittent basis. This technology would have enormous benefits for children who have undergone cardiac surgery, and, it is likely, would be transferable to the adult setting. Similarly, although the technology is aimed at children who have undergone cardiac surgery, of interest are devices with the potential to modify the core innovation for use in other clinical settings.

For the continuous measurement of the parameters normally obtained during an Arterial Blood Gas sample, the key parameters which the sensor would need to detect are as follows:-

- | | | |
|---------------------|------------------|---------------|
| • pO ₂ , | • pH | • Sat, |
| • pCO ₂ | • Ca | • Hb, |
| • BH | • K | • Hct, |
| • HCO ₃ | • Na | • Temperature |
| • Lactate | • O ₂ | |

As well as developing an integrated monitoring solution, the technology also needs to have the ability to create or drive the production of clinical data in digital format, to enable the continuous monitoring of the parameters, and to enable the incorporation of data into electronic patient records, patient trend data etc. Currently haemodynamic parameters tend to be obtained and recorded from patients via a display in a bed side monitor. A nurse will also record this information in written format on a paper chart, usually every hour. This activity can equate to around 1,200 entries per day per patient. If information regarding say X rays, echo or lab results need to be reviewed, they may be displayed in a different area in a different monitor linked to a PC. It will take around 6 – 12 clicks to get to the information, which also depends on the “speed” of the PC. It would be useful to incorporate an adjunctive technology to display the information from monitors and other sources in real time.

Key policy documents

- “Enuresis – suspected” Map of Medicine (2012) (*This can be accessed via NHS Choices Website*)
- “The Management of Bedwetting in Children and Young People” - NICE Clinical Guideline 111 - Nocturnal Enuresis - (NICE, 2010) (*This can be access via NICE website*)
- Clinical trials for Bedwetting - Information provided by WHO International Clinical Trials Registry (2104) - (*This can be accessed via NHS Choices Website*)
- Gill., J et al. (2013) “Increase in Emergency admissions to hospital for children aged under 15 in England, 1999–2010: national database analysis” (Arch Dis Child 2013; **98** :328-334).
- “Pocket Book of Hospital care for Children: Guidelines for the Management of Common Childhood Illnesses” (WHO, 2013)
- Getting the Right Start: National Service Framework for Children - Standard for Hospital Services (DH, 2013)

Application process

This competition is part of the Small Business Research Initiative (SBRI) programme which aims to bring novel solutions to Government departments’ issues by engaging with innovative companies that would not be reached in other ways:

- It enables Government departments and public sector agencies to procure new technologies faster and with managed risk;

- It provides vital funding for a critical stage of technology development through demonstration and trial – especially for early-stage companies.

The SBRI scheme is particularly suited to small and medium-sized businesses, as the contracts are of relatively small value and operate on short timescales for Government departments.

It is an opportunity for new companies to engage a public sector customer pre-procurement. The intellectual property rights are retained by the company, with certain rights of use retained by the NHS and Department of Health.

The competition is designed to show the technical feasibility of the proposed concept, and the Phase 1 feasibility contracts placed will be for a maximum of 6 months and up to £100,000 (incl. VAT) per project. It is envisaged that a competition for Phase 2 Development contracts will be run during 2014.

The application process is managed on behalf of NHS England by the Eastern Academic Health Science Network through its delivery agent Health Enterprise East. All applications should be made using the application forms which can be accessed through the website www.sbrihealthcare.co.uk.

Briefing events for businesses interested in finding out more about the competition will be held on 03 June (Birmingham) and 09 June (Daresbury, Cheshire). Please check the website for confirmation of venues and to register attendance.

Please complete your forms using the online application process and submit them by 1200hrs on 10 July 2014.

Key dates

Competition launch	19 May 2014
Briefing events	03 & 09 June 2014
Deadline for applications	Noon 10 July 2014
Assessment	August – September 2014
Contracts awarded	October 2014

More information

For more information on this competition, visit:

www.sbrihealthcare.co.uk

For any enquiries, e-mail:

sbrienquiries@hee.co.uk

For more information about the SBRI programme, visit:

www.innovateuk.org/SBRI



www.sbrihealthcare.co.uk



The SBRI Healthcare programme is directed by the Eastern Academic Health Science Network on behalf of NHS England and managed by Health Enterprise East.