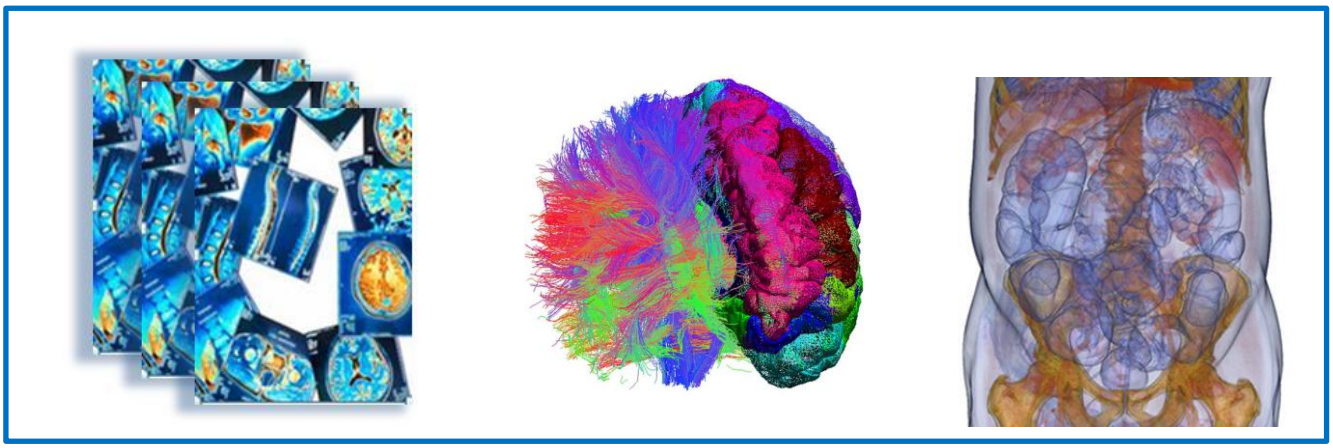

Medical Imaging – viewing, managing and analysing the wealth of data

SBRI Healthcare NHS England competition for development contracts

September 2014

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 (AHSN's) 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, including charities. 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.

The competition opens on 20th October 2014. The deadline for applications is 1200hrs on 9th December 2014.

Background

In preventive, as well as curative medicine, effective decisions depend on early and correct diagnosis. Though medical/clinical judgment maybe sufficient in treatment of many conditions, the use of diagnostic imaging services is paramount in confirming, correctly assessing and documenting the course of the disease, as well as in assessing response to treatment[1].

Since the first X-rays were taken more than a century ago, the ability to see inside the body has been central to the advance of medicine[2]. Medical imaging technology has evolved immensely, and is now an integral component of medical diagnosis and treatment. Patient care has been transformed by the improvements in diagnosis and treatment offered by modern-day medical imaging and by the avoidance of unnecessary procedures, exploratory surgery is almost obsolete[3].

Conditions that were previously treated with open surgery can now be treated with minimally invasive procedures (e.g. stenting) which rely on medical imaging for guidance. Examples of newer diagnostic techniques include functional imaging to map processes and activity in the brain and CT colonography screening for early bowel cancer, which can be used in cases where traditional colonoscopy is not suitable.

[1] http://www.who.int/diagnostic_imaging/en/
[2] http://www.nature.com/nature/outlook/medical-imaging/
[3] http://www.diagnosticimaging.com/healthcare-reform/technology-advances-medical-imaging

Challenges

As the use of imaging has increased, new challenges have been presented, particularly around the wealth of data that is being generated within and across hospitals in the UK and, indeed, globally. The harnessing of the vast potential of this data and the ability to see the 'bigger picture' associated with its value in clinical practice and wider research are potential opportunities for development.

1. **Larger datasets of imaging studies**
   Previously a CT/MRI scan would typically consist of 100-200 images, increasingly the output can be up to many thousand images. This presents problems with storing, managing and accessing the data across sites for diagnostic analysis.

   Opportunities:
   - Newer systems of storage and cross-site sharing of imaging and clinical data (which inform the analysis of cases via cross-site multidisciplinary team (MDT) meetings, often by conference call) including secure cloud storage.
   - Computer-aided diagnosis (CAD) to identify suspicious lesions and assist clinicians and/or MDT's in confidently making a decision.

2. **Research and development of imaging biomarkers**

   Image-derived data are beginning to be used as a research and clinical biomarker, where subtle changes are detectable by computerised means, but cannot be confirmed by eye[4].

   Use of this pool of image data could be a potent new tool to accelerate not only biomarker discovery but also therapy development[5].

   Opportunities:
   - Establishment of an open platform - ideally with a plugin software development kit (SDK) - to analyse clinical and research images at speed and in detail, without impacting on the performance of the IT infrastructure already in place.
   - Overcome common, and often serious, usability problems with some software packages for bio imaging. Solutions must be accessible and have real-world applicability.

3. **Combining Imaging and clinical data**
   Clinical data, including radiological reports, are often free-text, in a non-parameterised format, requiring not just digitization but semantic or other kinds of complex analysis.

   Opportunities:
   - Developing tools that allow the combination of imaging and clinical data, including not just digitization but complex parameterisation of the clinical component, both at the point-of-care, and from existing datasets. Structured reporting, to manage the combination of data on a large scale, will accelerate insight into early diagnosis, disease characteristics, progression and effective treatment.

[4] http://www.nature.com/nmeth/journal/v9/n7/full/nmeth.2073.html
[5] http://www.nature.com/nature/journal/v502/n7473_supp/full/502S95a.html

- Sharing of this clinical data across multiple sites (hospitals and community).

4. **Use of imaging during treatment**
   Many newer and minimally invasive treatments are reliant on imaging for guiding therapy (e.g. directing needles / catheters, monitoring the margins of treatment). Moreover, even traditional surgery often involves intraoperative review of medical imaging (e.g. to locate tumour deposits and preserve important adjacent anatomy)

   Opportunity:
   - Developing tools that allow practitioners to review medical imaging within a sterile environment, in a responsive and intuitive fashion.

5. **Gold standards to test novel imaging techniques**
   MRI machines are still being used primarily as very sophisticated and expensive 'cameras', and not as valuable research instrumentsTurning MRI scanners into scientific tools, providing quantitative measurements with precision and standard error values has been very challenging, especially for physiological parameters, such as perfusion, or subtle tissue microstructure, as inferred by diffusion imaging.

   Opportunity:
   - Producing MRI phantoms (artificial test subjects) to calibrate the readings of MRI machines and the images they produce is necessary to ensure readings can be standardised between hospitals.

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 development contracts placed will be for a maximum of 6 months and up to £100,000 (incl. VAT) per project.

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 the 11th and 13th of November in London and Leeds respectively. Please check the website for confirmation of dates and venues, information on how to register and details of the categories that will be presented at each event.

Please complete your forms using the online application process and submit them by 1200hrs on 9th December 2014.

Key dates

Competition launch	20 October 2014
Briefing events	11 & 13 November
Deadline for applications	09 December 2014
Assessment	January / February 2015
Contracts awarded	March 2015
Feedback provided by	April 2015

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