Response to NHS Chief Executive’s Open Call for Evidence and Ideas

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Submission of Anglia Ruskin University and its Partners\(^1\) to Sir Ian Carruthers on ‘Innovation in the NHS, Call for Evidence’ - how the adoption and diffusion of innovations can be accelerated across the NHS.

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\(^1\) Basildon & Thurrock University Hospitals NHS Foundation Trust, Colchester Hospital University NHS Foundation Trust, Mid Essex Hospital Services NHS Trust, NHS South East Essex, NHS North East Essex, NHS South West Essex, NHS Mid Essex, NHS West Essex, North Essex Partnership NHS Foundation Trust, Southend University Hospital NHS Foundation Trust, South Essex Partnership Foundation Trust, The Princess Alexandra NHS Trust, Nuffield Health, Ramsay Health Care, Chelmsford Medical Centre, the Royal Society for Public Health, Essex County Council, St. Francis Hospice, Farleigh Hospice, St. Luke’s Hospice and St. Helena Hospice\(^1\)
Executive Summary
The Challenge – Making Innovation Happen
With demands on the NHS increasing all the time, now more than ever innovation is critical to delivering both changes in clinical practice and advances in the latest technology. Furthermore high quality care has to be maintained but it needs to be delivered at a lower cost. To achieve this, system wide uptake of innovation is required, even if this is disruptive to existing clinical practice. This submission proposes an innovation architecture that will help make innovation happen.

Current State of MedTech Innovation
The current state of Medtech innovation characterises some of the wider challenges associated with innovation in the health sector. Despite the NHS being the largest healthcare employer in the world, it has not used its dominant market position to drive forward the innovations it needs from industry or gained the clinical/financial and user benefits that a major customer would expect. Of course, some of the elements for transforming the innovation landscape are already in place and a range of existing initiatives are addressing some of these challenges. However, several underlying weaknesses remain:

- a failure to systematically identify and address both inhibitors and accelerators of innovation particularly those at grass roots level;
- an innovation and IP system that does not embrace ‘open innovation’ models;
- a structure that is siloed both at local and national levels, with groups driving their own cost reduction and innovation agendas
- an imbalance in how the innovation process is understood, managed and driven – with this influenced by too many top down initiatives and not enough by commercial, user/consumer, academic and industry perspectives;
- overall a lack of translational infrastructure to facilitate the whole innovation process in Medtech. There is an absence of a single initiative that pulls some of these elements together, but which has been considered within other sectors following the Hauser and Dyson reports.

ARU and the PMI - a Partnership for Change
Anglia Ruskin University (ARU) has established the Postgraduate Medical Institute (PMI), a partnership between healthcare providers and the university sector based on the principle of facilitating local, grass root clinical and academic excellence. This bottom-up/pull approach supports three key strands of the PMI which are postgraduate medical education, research and innovation. In medical innovation ARU and its partners are now working up a venture which would address some of these weaknesses – through a MedTech campus model. This is designed to catalyse the MedTech innovation process, through a bottom up partnership with industry, the university, NHS, customers, government, NGO’s and Citizens.

The MedTech campus will be private sector led, adopting an open innovation model, with a near market/commercial focus from the outset. It will provide the translational infrastructure necessary to deliver large scale transformation of MedTech innovation.

Some Suggested Actions
- Identify accelerators of innovation and facilitate these.
- Make innovation part of the NHS system architecture at a local level and provide grass roots support/empowerment to deliver innovation
- Develop a national network of translational infrastructure to deliver rapid, scalable system wide MedTech innovation. This must be a private –public led approach and ensure that DoH and BIS thinking on this is joint and that major buy-in is secured from the private sector.
The Challenge – Making Innovation Happen

The current rate of increase in healthcare spending as a percentage of GDP cannot be maintained in the long run. Consequently healthcare systems will have to deliver high quality care for less. This will have to be achieved through system wide adoption of innovation.

One of the key challenges will be to get widespread uptake of innovations by clinicians, even when that involves changes to clinical practice. There is no choice; we have to make innovation happen. This submission describes the current MedTech landscape in the UK and suggests actions that can help deliver system wide transformation.

Current state of MedTech Innovation in the NHS and UK

Medical device developers in the public and private sectors continue to predominantly use a closed innovation model rather than ‘open innovation’ which is being embraced by many other industry sectors, for example IBM has recently made $3bn from opening up their patent book. This ‘innovation in isolation’ approach has been common practice for many years, but now more and more is recognised as having a diminishing role to play. The persistence of this approach is in part due to restrictive IP policies in both commercial and public sectors. If innovation is going to transform the medical device development sector the status quo is not sustainable.

The UK has not sufficiently capitalised on its strengths for medical device development and commercialisation; it has the largest single healthcare employer in the world and the second largest science capability, second only to the US. This failure is in part down to the critical gap between its clinical experience/research findings and the development of these into commercial propositions that can attract financing.

The UK medical device market is estimated to be worth £10bn per year with over 80% of products being manufactured abroad. The NHS is the main MedTech customer in the UK, but has not significantly used this dominant position to drive forward the innovations it needs from industry or gained the potential clinical, financial and user benefits that such a major customer should expect from this level of market share/power.

Previous top down approaches have delivered some successful device developments, but these remain small scale and have not achieved widespread adoption. Key reasons for this failure include lack of commercialisation skills, inadequate incentives to deliver, lack of clear alternatives other than bank/VC market/business angels – which are often difficult to access and no single focus in the UK where all the necessary infrastructure, equipment, skills and partners are in place to facilitate the innovation process.

In addition to this there are several issues facing the MedTech sector in the UK which place it at a disadvantage to other countries:

1) Lack of appropriate structure/management of deals to allow private investment funds to engage in a similar manner to that seen on the west coast of the USA, where deals typically go through seed corn / development / first / second round funding ensuring that the right management is in place to carry it and the right levels of equity are retained for the investors.

2) Unnecessary bureaucracy. For example the criteria for Investors claiming EIS relief on Investments into SME’s can be limiting – e.g. number of employees limited to 50 at the point of investment.
3) Lack of leading edge tax incentives. For example Southern Ireland offers a patent income tax exemption up to €5M, a stamp duty exemption for IP, R&D tax credits 20% non-capital, 100% capital, a corporation tax rate of 12.5% and qualifying R&D can take place in any EU member state.

To date the NHS has focused on a top down/push public sector approach to accelerating adoption and diffusion of innovation. This has met with some success, but not on the kind of scale that will have a significant impact across the healthcare system. Surprisingly there has been no national private sector led/facilitated approach to transforming innovation in the NHS.

With the changes proposed in the Health and Social Care Bill 2011, NHS clinical and innovation architecture will change. GP commissioning groups, supported by the National Commissioning Board are likely to act as local innovation hubs. This will bring a local cultural/structural support for innovation for the first time in many parts of the NHS. The challenge now is to capitalise on the new paradigm of grass roots innovation empowerment provided by the Bill.

**Inhibitors and Catalysts of Innovation in the NHS**

Many thousands of books, research papers and presentations have looked at the barriers to innovation in the health sector, but identification of these inhibitors has not delivered the transformation in innovation that might have been expected from such a body of work.

NHS and academic staff are not only skilled at identifying clinical areas that need new approaches and solutions but can often identify and overcome the local barriers to make the innovation happen. What is needed now is a system architecture that can facilitate/catalyse this grass roots innovation, similar to that seen in the MedTech industry. For example Medtronic have an innovation budget where employees with a new device idea are given seed funding and the time out of their normal duties to develop the innovation. They also have the necessary translational infrastructure to make the innovation happen. Empowering the NHS grass roots is the only sustainable way to deliver rapid, widespread adoption and diffusion of innovation across the system.

**ARU and the PMI - a partnership for change**

Anglia Ruskin University recognised that to drive change forward across the University and Healthcare sectors a new kind of partnership was needed. The underlying principle of this partnership would be a bottom up/pull approach where the university would facilitate local clinicians and academics to develop the changes in postgraduate medical education, medical research and medical innovation that those individuals/groups wanted to see. This approach of nurturing local expertise has led to the establishment of the Postgraduate Medical Institute (PMI). Through this facility clinicians from all the hospitals and primary healthcare groups in Essex as well as social care providers partner each other in driving forward excellence and change in these three key areas.

In research our mission is to improve health and social care through translational research in our core research centres. Our focus is on making a real difference to health and social care across local, national and international communities by exploiting close to market opportunities.

In postgraduate medical education we assist our partners to develop a range of education programmes from short courses to academic pathways at Masters and
Doctoral level. This is creating closer clinical networks both formal and informal across our county.

Progress in medical innovation is key to the future health of our nation and is one of the focal points for the PMI. We are not only systematically addressing cultural barriers to innovation in healthcare but are also creating a translational infrastructure through our MedTech campus that will be world leading in providing all the necessary elements for MedTech development to be present in one location.

In all these areas the PMI is particularly focussing on close to market, scalable opportunities, so that the benefits of our work can be delivered rapidly into both national and international markets. Our partnership approach across the healthcare providers in the county has proven effective in breaking down barriers between institutions that previously saw each other as adversaries. This is bringing benefits in terms of getting innovation adoption across the region.

Our underlying innovation vision is to be driven by the prospect of what is possible, provide quality at reduced cost and empower grass roots led innovation across the country.

Catalysing adoption and diffusion of MedTech Innovation

Innovation in the NHS – call for evidence, will gather contributions from across different sectors both in the UK and internationally. The systematic analysis of this data will provide a plan for delivering accelerated adoption and diffusion of innovation across the NHS. At a local level, we have already started identifying and addressing the barriers to innovation. The innovation progress made at Southend Hospital is a good example of how listening to what was going on at a local level and then facilitating that expertise, can create an innovation partnership with national and global impact.

Innovation at Southend Hospital and ARU:

Three years ago the Trust board at Southend Hospital agreed to establish an Innovation dept. Executive and Clinical leads for innovation were appointed and an innovation seed fund was created. The aim was to make the clinical innovation process realistic and easy to use for all Trust staff by facilitating the development of their ideas. This facilitation came in part through an analysis of the local behaviours and cultures that stood in the way of innovation and then putting systems in place to overcome these. An innovation development pathway was established and an Enterprise company, Enterprise Medical Ltd (EML), was spun out. Innovations are assessed between the innovation department and EML. Those with commercial potential are further developed by EML and those ideas of clinical benefit alone are taken forward by the innovation department. EML has now raised over £2m of private sector funding to deliver its first commercial innovation project; a new generation of endoscope reprocessing unit on the Trust site. It has already signed its first £3.5m contract to reprocess scopes and is in negotiations to provide this service to over 100 private sector hospitals across the UK (see http://www.enterprisemedical.co.uk).

Two years ago ARU through the PMI partnered Southend hospital in its innovation program. The Clinical lead for innovation was appointed as Director of Medical Innovation at the University and linkages across the counties healthcare providers are now being developed. One of the outputs from this is the creation of an Early Adopters Group. This is a group of leading consultants, GP’s and other healthcare workers across the county who are prepared to champion new innovations, identify and overcome barriers to implementation locally and work with the group to gain uptake across the region.
This partnership has allowed a focus on medical innovation to occur not through top-down dictates, but through grass roots-up ideas with facilitation through the Trust and the University. A further output of this collaboration is a vision to catalyse MedTech innovation is through a private sector led MedTech Campus.

**Identifying Innovation Catalysts**

Another important aspect of the ‘NHS Innovation call for evidence’ will be the identification of elements that have the ability catalyse innovation. These elements are not just passive barriers that are removed but are active ingredients that promote innovation. One such proposal is the Anglia Ruskin University MedTech campus.

**The Anglia Ruskin University MedTech Campus – a catalyst for medical Innovation**

This concept arose from partnerships that have been created through the PMI. We asked our partners and the MedTech industry how we could facilitate innovation in areas that they want to take forward. Healthcare partners wanted a place where all aspects of the MedTech development pathway could be facilitated, from idea protection, through funding, prototyping, trails, CE marking and selling a product into the market as well as support in establishing their own spin out companies. Industry wanted access to funding, expert opinion and customers. These grass root needs helped formulate the proposal for our MedTech campus.

The campus will be private sector led and provide a translational infrastructure that bridges the gap between NHS/academic centres, industry, customers, government, NGO's and Citizens. It will ‘pull innovations’ from all these sectors and accelerate their exploitation at scale. At its core will be an innovation centre providing business incubation, support services and lecturing/conferencing/networking capabilities. This will be surrounded by a MedTech business park containing office and manufacturing space, primary and secondary healthcare facilities and academic research institutes. This private sector led approach validates our vision that high quality innovation can be delivered at a lower cost.

There are several benefits of the MedTech campus over existing innovation architecture:

1) Rapid adoption and widespread use of new treatments and technologies facilitated through the MedTech campus will provide an incentive in the marketplace to develop the next generation of innovations, creating a virtuous circle.

2) Bringing all the necessary elements for MedTech innovation to one location will enhance collaboration, co-operation and integration allowing NHS staff to introduce and scale up new ideas and technologies.

3) Will provide a one stop shop approach to assessing and developing innovative technology, medical devices and care pathways.

4) Partnership with Global MedTech blue chip companies will allow ideas to be taken to scale, integrated and propagated across the global healthcare community.

5) Start-ups in the innovation centre will provide a flow of ideas to the larger companies and can tackle niche market opportunities more easily than the larger players.

6) It will have horizon scanning capabilities, scouring the globe for the latest MedTech innovation opportunities.
7) Create international linkages which will allow the development of MedTech to take place in the most suitable environment, which may be in a partner country.

8) Will create a reward structure for innovators and adopters – along commercial lines

9) The campus will give physical presence to the core of the networks that will be established with a full range of professional services and intermediaries working with the companies to help spot emerging opportunities.

10) Will establish an innovation framework with key outcome measures such as time to profitability, time to return of capital investment, quantified added value of proposed innovations. This will act as a common language for all the partners in the medtech campus

11) Allows us to learn from other sectors + countries e.g. industry, voluntary organisations and pull new ideas.

12) The MedTech campus will create leaders in innovation, diffusion and adoption through SME’s, Clinical partnerships and the Early Adopters Group. They will create short term wins, consolidate, anchor and mainstream change.

13) Provide a key location for global Medtech companies looking to establish a presence in the UK/Europe.

14) The MedTech campus will facilitate access to the market for products through the healthcare customer partnerships at the PMI and through including the latest technology innovations in our education programs both to the 8000 healthcare undergraduates at ARU and to the 10,000 healthcare workers across the county through the ARU Faculty of Health and Social Care and the PMI.

Suggested Actions –

We are driving forward a new culture and architecture for innovation at a local and regional level through the partnerships at the Postgraduate Medical Institute. The following suggested actions would not only enhance our grass root innovation activity but would also help facilitate and coordinate groups across the country to deliver adoption and diffusion of innovation at pace and scale.

Our three key suggested actions are:

- Identify accelerators of innovation and facilitate these.
- Make innovation part of the NHS system architecture at a local level and provide grass roots support/empowerment to deliver innovation
- Develop a national network of translational infrastructure to deliver rapid, scalable system wide MedTech innovation. This must be a private –public led approach and ensure that DoH and BIS thinking on this is joint and that major buy-in is secured from the private sector.

There are multiple smaller scale actions that arise from these three key areas, these include:

1) Reform of NHS IP and Innovation policies to allow adoption of an ‘Open Innovation’ culture.
2) Support changes in UK tax regulation for the medical device industry
3) Allow all publicly funded healthcare providers to spin out their own companies/enter into joint venture companies with others.
4) Create incentives (both financial and practical) to encourage adoption of new innovations, which will create a virtuous circle of more innovations.
5) Establish a private sector seed fund for NHS spin out companies
6) Use grass root generated centres of innovation/entrepreneurial excellence, as part of a mechanism to provide government and its institutions with leading edge innovation information.
7) An effective communication and marketing strategy needs to be co-ordinated across the NHS to allow local initiatives to be scaled up and national ones to be scaled appropriately for local application.
8) Create support networks both formal and informal e.g. support the creation of ‘Early Adopter Groups’ across local networks and facilitate their work.
9) Provide business guidance, mentoring and support for Trusts that want to spin out companies.
10) Allow products that are made as a result of NHS innovation to be branded as NHS and help establish products in the market by placing them on the NHS catalogue
11) Get buy-in from professional bodies, such as the royal colleges, from an early stage so that innovation and its adoption is included in their education programmes.

**Conclusion**

There is no choice; innovation has to be grass roots led to get ‘buy-in’, it has to be made part of the daily activity in the NHS and translational infrastructure that can facilitate the whole innovation process needs to be provided if new procedures and technologies are to be adopted rapidly across the whole healthcare system.
In the NHS the main barrier to innovation is not usually resistance from its staff or organisations, who broadly welcome the concept, but is more the failure to identify and address both inhibitors and accelerators of innovation in a systematic and culture wide manner, particularly at grass roots level. There is also a lack of translational infrastructure to facilitate the whole innovation process.

At a local level we have begun identifying specific barriers to innovation, these include:

1) Inadequate funding – seed funding to get innovation is almost exclusively taken from public sector sources. It is very limited, difficult to access and often over subscribed many times.

2) Risk avoidance – Innovative ideas are often dismissed as too risky, either clinically or financially.

3) Siloing – Once groups are established then tend to become self protecting / sustaining and resistant to change from outside.

4) Time commitments – NHS staff are often too busy delivering day to day service requirements to spend significant time innovating, which is not part of their job plan.

5) Incorrect measures – targets often measure the wrong thing. Commercial measures such as time to profit, or time to return of initial investment or added value would be more useful.

6) Inadequate data – quality data is key to making the case for an innovation. Gathering good information is often time consuming and difficult.

7) Little supportive system/cultural architecture – Many national or regional level innovation organisations/systems exist but little of this translates to a local working level. For example there is little business guidance, mentoring or support available for Trusts spinning out innovative companies.

8) Poor rewards/incentives – IP exploitation policies are seldom used by NHS Trusts because they are so stacked against the innovator few staff bother to take their idea through the innovation process from idea through to a service/device that is widely used across the NHS and beyond. In fact the majority of ideas that have gained world wide acclaim and usage have been taken by their inventors to the private sector at an early stage with the NHS receiving no benefit.

9) Lack of tools/capability – mechanisms and mentoring to allow clinicians and managers to deliver innovation are not in place.

10) A failure to provide a supportive leadership culture at a local level.

11) What translational infrastructure for MedTech Innovation there is in the UK is scattered around various public and private sector organisations. This is not co-ordinated and there is no ‘one stop shop’ in the UK to facilitate MedTech innovation.