Innovative data science solutions for cancer data
Open consultation – invitation to respond

Key ideas:

Working with large complex, heterogeneous data sets in a safe environment
Not exclusive to those with experience in healthcare sector
Opportunity to apply knowledge and skills to making a real difference

Purpose

The purpose of this paper is to seek the view of various stakeholders to the proposed approach and desired outcomes from one work stream of the Scottish Funding Council (SFC) funded Cancer Innovation Challenge.

At a meeting in June 2016, the SFC and the Scottish Innovations Centres agreed that work should be put in hand to develop focused programme of innovation around the application of data science to cancer data sets. It is proposed to undertake a pre-commercial procurement – using the framework of the Innovate UK’s Small Business Research Initiatives (SBRI) - to commission partners to develop innovative data science approaches and solutions from cancer data sets.

Funding was awarded to The Data Lab Innovation Centre (based at the University of Edinburgh) on 2 December 2016 to deliver the Cancer Innovation Challenge and one of the work streams of the challenge is looking at how data science can be applied to cancer data sets. A project manager for the Challenge took up post on 1 February 2017.

The public launch of the Cancer Innovation Challenge took place on 24 March 2017 in a speech, #DataSavesLives: The future of healthcare innovation, from Chief Medical Officer Catherine Calderwood at the Data Summit. This consultation was also launched, opening a consultation period of two months.

Overview

Scotland is ‘awash’ with clinical data, yet current conventional methodology relies on the analysis of data relating to clinical episodes which can have occurred 2-3 years previously. Numerous barriers exist precluding the reporting of more timely information; these barriers include multiple
heterogeneous datasets held within multiple heterogeneous IT systems, as well as multiple organisational variances. Clinical and non-clinical leaders however are united in seeking a methodology which is nearer to ‘real time’ as well as a format to allow benchmarking from patient to patient up to nation to nation and all levels in between.

The Cancer Innovation Challenge seeks to contribute to the Innovative Healthcare Delivery Programme’s (IHDP) - one of the Challenge’s partners - vision to fundamentally change the way data and analytics are used to drive improvement in healthcare outcomes, by fostering new relationships between the NHS, industry, academia and the third sector. The IHDP brings together expertise in clinical practice, data science, research and education, unleashing innovation across multiple fronts and with a wide range of stakeholders. The Programme aims not only to deliver more timely and comprehensive access to existing data used for all aspects of clinical care, but also to establish the vehicle of an innovative Scottish Cancer Intelligence Framework (SCIF) with which to underpin ALL aspects of healthcare planning, management, delivery and, critically, outcomes. The successful delivery of SCIF depends on two elements: firstly, a systematic approach to the analysis, interrogation and sharing of the data and secondly, the production of said data in a timely and accurate way. Whilst the initial focus of the IHDP is within cancer care, the ultimate aim is to extend the methodology to other clinical areas.

Whilst the Framework to manage the interrogation of the data is developed and implemented, the Cancer Innovation Challenge proposes an Open Innovation opportunity to develop a Scottish solution to overcome some/all of these technical barriers.

Benefits

Scotland provides a unique test bed for exploration into innovative technological solutions to accessing large volumes of data pertaining to patients’ demographics as well as their pathways to diagnosis, treatment and long term follow up. The intelligent analysis of this wealth of information could be used to deliver benefit at several levels:

- Clinical benefit to individual patients, informing clinical decision making and prognostication
- Clinical benefit to populations, informing vital information on the efficacy of treatment options
- Resource utilisation, informing service delivery, service planning and service development
- Academic benefit of informing high quality research to inform efficacy of current and future treatments.
- Economic benefit of driving company growth and inward investment as the Scottish ecosystem leads to rapid commercialisation of medical technologies within a global market.

The Approach

The Cancer Innovation Challenge proposes an SBRI funding competition to commission partners to develop innovative data science approaches to Scottish cancer data sets. This provides an exciting Open Innovation opportunity connected to one of the NHS’s top priorities. There is clear evidence in place that the approach is likely to lead solutions the NHS can use, lead to company growth and facilitate academic achievement. (ref: D Connell 2010 Exploding the Myths of UK Innovation Policy)
**PROPOSED TIMELINE (PLEASE NOTE THAT THIS A DRAFT TIMELINE)**

- **Launch consultation**
  - 24 March 2017

- **Consultation Close**
  - 5 June 2017

- **Consultation review**
  - June 2017

- **Registration of interest**
  - 1 August 2017

- **Open funding call**
  - 3 July 2017

- **Open data dive with synthetic data**
  - June 2017

- **Call closes**
  - 14 August 2017

- **Cabaret of Dangerous Ideas event**
  - 19 August 2017

- **Application review process**
  - August/September 2017

- **Feasibility study start and SMB pitch**
  - January 2018

- **Feasibility study end**
  - October 2017

- **SMB review/decision**
  - End September 2017

- **SMB decision and Proof of concept/Prototyping phase start**
  - February 2018

- **Proof of concept/Prototyping phase end**
  - July/August 2018

- **Final presentations/pitch to SMB and/or variety of stakeholders**
  - September 2018
Responses

We would like to invite you to provide input into this funding call by responding to this document. Your input as practitioners and experts in the field is vital to ensuring that the outcomes from the project have the maximum potential to effect real world impact on cancer patient care and treatment in Scotland and beyond.

Responses should not be making a case for the benefits of data analysis.

The clinical data items to be included in this innovation have not, as yet, been agreed. This consultation is your opportunity to shape that decision-making process by proffering your ideas of specific clinical areas where progress is required.

Any proposed response to the call will need to be mindful of the following questions:

- What has been learned from other projects which have sought to analyse/access healthcare data?
- How do successful companies and organisations utilise data provided by clients and customers?
- What are the obstacles to the use by/within the NHS of clinical data? How might these barriers be overcome?
- Which cases should be put forward to test the solutions developed through this proposed SBRI? What examples are available of the quality deficits, inefficiency and waste in the current system which this proposed approach will address?
- What potential key benefits to patients and the NHS should be further highlighted as a priority for the call?
- What technological solutions or opportunities relevant to this challenge are available?
- What additional specific information about the objectives of the call would promote a worthwhile outcome without stifling innovation?
- Are there any other considerations that need to be stated explicitly in the call to promote a worthwhile outcome?
- How should the wording of the call be changed to maximise the potential for emergent impact and value?

Consultants on the Programme

The challenge is being developed with various clinicians, practitioners and academics. The clinical consultant on this work stream is Dr Hilary Dobson from the Innovative Healthcare Delivery Programme (IHDP) and the data consultant on this work stream is Prof Dave Robertson from the University of Edinburgh.

We welcome general responses or responses specific to the questions above. Any input into the call will be acknowledged on the project’s website unless you specifically wish to not have your name credited.

Please contact Steph Wright on steph.wright@thedatalab.com if you have any queries. Please submit your response online by 5 June 2017.
DRAFT CALL: Challenge – Innovative data science solutions for cancer data

The goal of this challenge is to create a data science approach or mechanism or tool which will enable:

• Timely access to data sets across various platforms
• Innovative analytic insights into cancer data sets
• Useful ways of visualising large amounts of data

The purpose of the innovation will be to fundamentally change the way data and analytics are used to drive improvement in healthcare outcomes in Scotland

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Background

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The more timely access of data already held in primary, secondary and research databases relating to patients’ demographics and pathways to diagnosis, treatment and follow up offers a real opportunity to map closely individual patients. The ability to identify, share and learn from variation in clinical practice will undoubtedly change treatments for patients in the future: as well as contributing significantly to overall clinical care and service planning, as progress towards ‘personalised medicine’ is made, it is vital first to collate variables unique to individual patients and
then apply these variables to the experiential learning from similar clinical cohorts. Data provides the key to unlock this process!

A solution is required that is well designed, simple and accurate within the confines of a modern healthcare system, respecting clinical confidentiality whilst providing a degree of accuracy which has the confidence of clinicians, patients and health service managers alike. Any solution must integrate with components of the NHS e-Health architecture. Critically, a key goal will be to provide a solution that can be implemented to benefit directly Scottish patients and the wider service.

Potential outcomes include proposals leading to generating unique analytical insights into care resourcing or useful ways of visualising large amounts of data on treatment plans or prescriptions or a myriad of other possibilities.

Who can apply?

This funding competition is not just for organisations already working in the healthcare sector. The Cancer Innovation Challenge is looking for innovation from any organisations with experience of working with large complex, heterogeneous data sets in a safe environment.

Organisations can carry out the project on their own or in a consortium with others.

The Cancer Innovation Challenge is an opportunity for you to make a real difference to the lives of cancer patients in Scotland and beyond.

The Cancer Innovation Challenge
The Cancer Innovation Challenge is a Scottish Funding Council funded Pre-Commercial Procurement (PCP) project led by The Data Lab Innovation Centre at the University of Edinburgh in partnership with Digital Health and Care Institute Scotland (DHI), Stratified Medicine Scotland (SMS), and NHS National Services Scotland. Partners include the Innovative Healthcare Delivery Programme (IHDP), Usher Institute and the NMAHP-RU at University of Stirling. Contracts will be awarded by The University of Edinburgh.

The funding competition process

This competition has 2 Phases. Up to £175,000 (inc VAT) is allocated for Phase 1, and up to £250,000 (inc VAT) for Phase 2:

- **Phase 1**: technical feasibility. Projects should last up to 3 months. Projects can range in size up to a total cost of £35,000 (inc VAT) each.
- **Phase 2**: development of proof concept and evaluation. Projects should last up to 6 months. Projects can range in size up to a total cost of £125,000 (inc VAT) each.

*The Data Lab, funded by the Scottish Funding Council, and in collaboration with DHI Scotland and Stratified Medicine Scotland reserve the right to adjust the provisional funding allocations between the Phases. The total funding available for the competition may be subject to change.*