Innovation in Digital Health and Care in Scotland

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Abstract. This paper describes a design led innovation initiative in Scotland involving the Scottish Access Collaborative and the Digital Health & Care Institute. The Cabinet Secretary for Health and Sport in Scotland launched the Scottish Access Collaborative in November of 2017. A key strand of the Collaborative's work is the delivery of the Specialty Sub-Group program, in which a range of experts in clinical specialties undertake a cycle of design led workshops. The Digital Health and Care Institute (DHI) was commissioned to design these workshops aimed at producing high level mapping of each clinical area and identifying clinically led and patient centered sustainable improvements. The findings from these workshops will form the basis of a specialty-led Access Collaborative program delivering solutions to help scheduled care services to sustainably meet the challenges of the future.

Keywords: Outpatients, Innovation, design led workshops.

1   Introduction

In the past half century spending on healthcare across virtually all countries regardless of how they are funded and organized has increased substantially [1]. However rising demand for these services will now take place in the environment of constrained public spending causing what the Christie Commission in Scotland described as the most serious challenge since the inception of the welfare state [2].

One of the challenges faced by those planning innovation in response to this challenge in health and social care is the complexity of the existing systems. Any health and social care system involves many institutions, professions and funding streams being brought together to cooperate in serving the individual when that person is at their most vulnerable. Historically these institutions which may be nationally, or locally organized have not developed such that they work together seamlessly digitally. IT systems have been procured without the requirement that they operate in an open manner and in many cases, this has resulted in challenges in digital communication both between functional areas and between geographical regions.

It is unsurprising, given the complexity of the systems and processes involved, that individuals working in this field can find it difficult to gain a high level understanding of the system as a whole. Misunderstandings and assumptions can grow and when

improvements are described they may be effective for the immediate context but have unintended impacts on other parts of the system.

Digital innovation has been offered as one response to the rising demand on services. On, April 25, 2018 the Scottish Government launched Scotland's Digital Health and Care Strategy - Enabling, Connecting and Empowering [3]. The Executive Summary of the strategy states that: "Digital technology is increasingly a part of our everyday lives. Digital has the opportunity to transform the way in which we interact with public services such as health and care, sustaining, reshaping and improving our health and care services for the future. Digital will be central in addressing the challenges and realizing the opportunities we face in health and social care, and in improving health and wellbeing, achieving tailored, person-centered care and improving outcomes. The new Strategy sets out the key priorities in achieving that ambition, and our intended collaborative work in delivering those objectives."

As one of a small number of innovation centers in Scotland, The Digital Health & Care Institute (DHI), has been funded with a specific remit in digital innovations in health and care.

2   The Digital Health and Care Institute

The DHI is a collaboration between the University of Strathclyde and the Glasgow School of Art and is funded by the Scottish Funding Council and Scottish Government. DHI supports innovation between academia, the public and third sectors and businesses in the area of health and care. The Glasgow School of Art brings design and innovation experience and research to the DHI. This approach is supported by Besset and Maher who argue that a potentially valuable toolkit in the development of radical service improvements in healthcare can be found in the field of design methods. "By their nature design tools are used to help articulate needs and give them shape and form; as such are critical to the front end of any innovation process"[4].

For a number of years design researchers have been working within DHI developing and researching Experience Labs as a participatory approach to harness the lived experience of participants in a creative environment and to co-create sustainable innovation in response to healthcare challenges [5]. The participatory design approach taken in the Experience Labs can be used to respond directly to the observation of McCarthy et al that to date patient experience has traditionally received less attention than performance and regulation constraints goals which has led to subpar results overall [6].

The need to innovate within healthcare is clear but the context from which we are starting is challenging and new approaches are required. The ongoing work within the Scottish Access Collaborative is using a design led approach to address just this challenge and create sustainable solutions.

3   The Scottish Access Collaborative

The Cabinet Secretary for Health and Sport launched the Scottish Access Collaborative in November of 2017 [7]. This will be closely aligned with the Regional Planning, Realistic Medicine , Elective Centers Programme and extant Performance Management and Clinical Priorities, Delivery Activities and Programs. In the complex landscape of healthcare planning and delivery the Access Collaborative will focus on developing collaborations which build on existing work streams and networks to sustainably balance demand and capacity. The Collaborative is led by Professor Derek Bell, Chair of the Academy of Medical Royal Colleges, and Paul Hawkins, Chief Executive of NHS Fife and is made up of a range of professional bodies including the Scottish Academy of Medical Royal Colleges, patient representatives and service leaders. The Collaborative has developed six fundamental principles which will shape and prioritize the way services are provided in the future The six key principles, agreed by the Collaborative Founding Group, that will form the basis for redesigned services and target resources to deliver the required and sustainable transformation of elective services in the future are:

1. Patients should not be asked to travel unless there is a clear clinical benefit, and that any changes should not increase the workload for primary, secondary or social care in an unplanned/unresourced way.
2. All referrals should either be vetted by a consultant/senior decision maker or processed via a system wide agreed pathway.
3. Referral pathways (including self-management) should be clear and published for all to see
4. Each hospital and referral system should have a joint and clear understanding of demand and capacity
5. Each local system should have a clear understanding of access to diagnostics as part of pathway management
6. Improved and published metrics including how we record and measure virtual/ tele-health / tech-enabled care [8].

A key strand of the Collaborative's work is the delivery of the Specialty Sub-Group program, in which a range of experts in clinical specialties undertake a cycle of design-led workshops with the support of the Digital Health and Care Institute.

Building on previous deliverables in the area of health and care innovation, the DHI has been commissioned to design workshops aimed at producing high level mapping for 12 clinical areas, identifying clinically led and patient centered sustainable improvements. The findings from these workshops will form the basis of a specialty-led Access Collaborative program delivering solutions to help scheduled care services to sustainably meet the challenges of the future.

4 Visualisation and Mapping

Design and design research has much to offer in both the understanding of complex systems and the visualizations of those systems [9],[10]. Visualisation of the system allows clear and unambiguous understanding of a system and the design team chose to develop a high level map with the workshop participants. This map acts as both tool within the workshop to illicit and agree process flow and an artifact from the workshop which will be used in the final report.

The team had a number of options open to them when considering mapping techniques. Commonly used tools include journey maps which depict the healthcare service from the perspective of the patient [11] and storyboards which use a series of images to represent user's interaction with a system have also been used [12]. In addition, software design tools such as Unified Modeling Language (UML) which have been used in visualizing and communicating the model of a healthcare information system from the user's perspective could also have been used [13]. The team were also building on the participatory design tools, experience and research developed in the course of the DHI Experience Labs [5].

There are also representations of pathways or decisions trees which are currently available at both national level in Scotland [14] and the UK [15]. In addition to these some clinical areas have developed their own, for example the area of dermatology has developed patient pathways [16] and third sector organizations such as Diabetes UK have also produced specialist pathways [17]. Differences in the audience and aim for these visualizations has resulted in a variation in the forms of representation and language.

An additional factor when considering the development of this map was the question of scale. As with conventional cartography, a decision has to be made as to what will be represented in any map and most importantly, what will not. If you are driving from London to Edinburgh and use a paper map you will need one which is small enough to comfortably open in the confines of a car but has all the major routes you need. The complexity of the healthcare processes means that process maps, if accurate for every step taken, can become so crowded that they become much harder to read. The purpose of and audience for the map is key in deciding what is represented and how it is represented.

5 Design-Led Workshops

The design team have developed a bespoke approach and set of tools for the design-led workshops that enabled all the relevant stakeholders to contribute their experiences of current services and ideas for the future.

Tools were designed to be used by the participants of the workshop, which included clinicians from primary and secondary care, hospital managers, patients and representatives from the 3rd sector from across Scotland. It was observed that the participants were describing regional variation in practice adding an additional challenge for the mapping.

In order to keep the visualization as simple as possible high level actions such as Consultation and Diagnostics were selected as the building blocks for the mapping. In this way the core action was mapped while allowing for variation in who (for example advanced nurse practitioner or consultant) carried out that action. This allowed for visual clarity in the steps which were common for all regions while still containing enough detail to identify and agree areas to focus on.

Having developed a method to map the steps in the process the team then faced the challenge of deciding whether to attempt a map covering all patients in a clinical area or to add a stratification or classification. Since this work is aimed at Outpatients only it was decided to begin with a step to identify common symptoms patients most commonly present with when being referred from primary care into secondary care while noting their importance. Selecting the symptoms rather than the diagnoses allowed us to map the patient journey which started with a particular symptom but may have led to one of a number of different diagnoses.

High level pathways were mapped for each symptom and focus areas were agreed and added to the map. Further discussion around these focus areas led to suggestions for sustainable improvement.

The SAC workshops will take place between March 2018 and March 2019 and will cover at 12 clinical areas including Cardiology, Urology, Gynecology, Respiratory, Gastroenterology, Dermatology, Ear Nose and Throat, Neurology and Chronic Pain. At the time of writing the Cardiology workshops have taken place and the report is available.

6   Cardiology Specialism

The participants of the Cardiology Specialty Sub-Group came from 14 different specialists areas and 6 different National Health Service (NHS) Board areas from across Scotland. Additional input was noted from the two northern NHS Board areas, giving the Sub-Group both a broad geographic and functional reach. The participants for the workshop represented patients, primary care, different clinical roles in secondary care, hospital managers and in later workshops, the third sector.

Following the method above, four symptoms were identified and the high level process map designed. These included palpitations, fainting, shortness of breath and chest pain. There was general agreement from the clinicians who carry out the vetting that these

were the most common symptoms. Attempts were made to cross check this with the data from the digital referral system however this did not record symptom information in a structured form. The participants in the workshop then agreed and recorded focus areas for each symptom. For example for chest pain it was recorded that some patients were being brought back for follow up appointments unnecessarily and there was a lack of referral guidance for General Practitioners when making a decision on whether to refer a patient for an ECG.

After moving on to the focus areas further actions were agreed and discussed further. Seven areas are described in the report. Of these areas it is expected that four of them will recur in other specialist clinical areas and three were specific to Cardiology. An example of one area which was identified and is now a stated aim for the Scottish Government is dedicated time and resource for enhanced vetting. In the case of this improvement one of the participants in the workshop could describe the benefits of this approach which had been implemented locally.

The Cardiology report which has been published and is available through the NHS [18]. The suggested improvements ranged from virtual consultations and push notifications of test results to diagnostic clusters, specialist nurse-led pathways and patient led follow-up. Across all symptoms dedicated time for vetting was seen as key to ensuring patients were offered appropriate pathways, reducing unnecessary referral into secondary care. There was agreement that the addition of guidance on referral criteria would reduce inappropriate referrals. The opportunity for a joint Cardiology and Respiratory pathway was noted, potentially reducing the time taken to find the correct pathway for patients with breathlessness. Supported patient led follow-up was identified as an improvement preventing patients returning unnecessarily for routine follow-up. Work to further scope these improvements will be undertaken in the coming months allowing a prioritization process to take place through the Access Collaborative.

Future work will involve national support to ensure the Cardiology community, along with primary care partners are supported to make the necessary changes to ensure efficient and effective patient pathways are achieved. It is envisaged that the work areas will be taken forward either through the Cardiology community itself or for broader issues which are not specialty specific, be achieved through the SAC Combined Action Group (CAG).

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