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# Is the Health App Challenge approach of patient-led application conception, development, and review worthwhile?

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## KEYWORDS

Mobile application;  
Internet application;  
Diabetes;  
Weight loss surgery;  
Patient-led;  
User-centred design

## Abstract

**Objectives:** A Health App Challenge, supporting young people with diabetes to develop and review their own Internet applications (apps) had previously been shown feasible. We aimed to clarify whether such patient-developed apps fill ‘app gaps’ and can be sustained, and if the approach can be generalized to other conditions. We asked, ‘Is it worth trying to run further Health App Challenges or elements of Health App Challenges?’

**Methods:** Two Health App Challenges, one for diabetes and one for weight loss surgery, were run simultaneously. Each Challenge (i) invited patient review of existing apps, (ii) supported patient-led teams to design and/or develop their own apps for better health self-management and (iii) invited patient review of the patient-designed or developed apps.

**Results:** In the diabetes Challenge, 130 patient reviews were written for existing apps, five designs for new apps submitted and reviewed 17 times. Participants took account of the reviews and designs appeared to fill ‘app gaps’ in the market, but the designs were not developed as apps. In the bariatric Challenge, only 13 reviews were given for existing apps and no designs or developed apps were submitted.

**Conclusions:** Supporting patients to develop apps using this approach is not sustainable. However, a website where health apps and websites can be reviewed and prototype designs submitted would be worthwhile, at least for conditions with high prevalence such as diabetes. It remains unclear whether condition specific health charities could take the role of sustaining such review websites.

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## Introduction

A 2012 estimate put the number of health-related apps as at least 40,000 [1] and in September 2015 the number was

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estimated as more than 165,000 although it was claimed that consumers are interested in relatively few of them [2]. Terry reports a study by US company IMS that showed 12% of mHealth apps accounted for 90% of consumer downloads, and 36 apps generate nearly half of all downloads; 40% of apps have fewer than 5000 downloads. Various studies have shown benefits associated with patients using apps including improved adherence [3], knowledge [4], and patient-professional communication [5]. Patients of course use apps that suit their needs and developers must have patient input to identify their preferences [6]. However, some developers only include patients at the prototype stage or later, rather than at ideas conception [7]. This can potentially result in costly and ineffective products.

Alongside this explosion in available apps we explored the role of patients in app development. Patients in the 'driving seat' can lead to better engagement and motivation in self-management behaviours [8]. The Diabetes App Challenge 2012 (DAC2012) [9] tested the idea that supporting patients to develop apps themselves may give the resulting products greater authenticity and relevance. DAC2012 was a competition inviting teams, including at least one young person with diabetes (YPD), to design and develop apps for use by other YPD to help prepare for their consultations with diabetes specialists. Registrants were supported via email and discussion forum. After app development, other YPD were invited to trial the apps and review their experiences. Six teams developed and submitted apps; 63% of the YPD who completed reviews found the apps useful and 55% would use them again.

Sustaining this patient-led approach was not addressed in DAC2012. Ways were needed to help patients to maintain their apps. Furthermore, DAC2012 only demonstrated feasibility of app development by patients for one age group, condition, and purpose. Health charities support patients in their own care [10] so might help run future Challenges, trialling them for other conditions and age groups to test generalizability.

Although DAC2012 produced some new functionality, four of the six apps offered functionality (data logging and help with calculating insulin doses) available in existing apps. YPD may have ideas to improve existing apps but also may lack knowledge of existing apps (and so 'reinvent the wheel'). Patients may also be limited to develop new apps that are within their technical skills rather than the 'app of their dreams'.

We concluded that it was feasible to run Challenges but that they should: (i) include a review stage to ensure that patients reviewed existing apps before developing new ones; and (ii) include submission of ideas for app design for subsequent professional implementation to remove potential technical skills imitations of patient designers. Furthermore, we needed to; (iii) test the generalizability of the 'app challenge' model to other conditions; and (iv) explore the involvement of health charities to sustain the apps developed.

The Health App Challenge 2014 (HAC2014) aimed to build upon the DAC2012, running two parallel health app challenges, one for diabetes (DAC) and one for patients pre/post weight loss surgery (Bariatric App Challenge, BAC). Our research question asked, 'Is it worth trying to run further Health App Challenges or elements of Health App Challenges? Although we did not set a target cost effectiveness ratio for apps produced and used for a given cost of running a Challenge, we expected at least to mirror the output of DAC2012.

## Methods

### Design

The HAC2014 project supported patients to design, develop and review health apps for their health condition. Two Challenges were run simultaneously, for patients with diabetes and for patients' pre/post weight loss surgery. Each Challenge comprised three stages: (1) online patient reviews of existing health apps, (2) support for patients to submit design entries and/or completed apps, and (3) online patient reviews of submitted designs or developments (Fig. 1). The Challenges were run via the project website ([www.healthappchallenge.org.uk](http://www.healthappchallenge.org.uk)) with communication and support between project team and participants by email.

### Definition of 'app'

Throughout HAC2014 we used a broad definition of 'apps', including

- (i) applications designed and published specifically for target mobile platforms, e.g. for iPhone on iOS through iTunes or Android phone through Google Play;

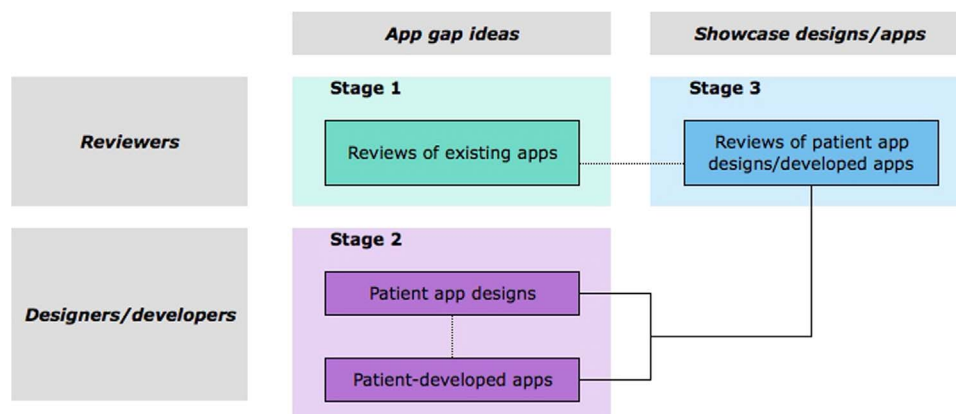


Fig. 1 Health App Challenge participation model.

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