Institution: University of Southampton		
Unit of Assessment: 02 Public Health, Health Services and Primary Care		
Title of case study: 02-02 POWeR - cost effective online support for weight management		
Period when the underpinning research was undertaken: 2010 – 2020		
Details of staff conducting the underpinning research from the submitting unit:		
Name(s):	**Role(s) (e.g. job title):**	**Period(s) employed by submitting HEI:**
Paul Little Michael Moore James Raftery	Professor of Primary Care Research Professor of Primary care Professor of Health Economics	February 1993 – present September 2004 – present May 2005 – present
Period when the claimed impact occurred: August 2013 – December 2020		
Is this case study continued from a case study submitted in 2014? N		

1. Summary of the impact

The obesity epidemic is a major health threat. Obesity is a major cause of serious illness and disability (e.g. diabetes, heart disease, cancer, stroke and depression) and the leading cause of preventable early death. Over one in four UK adults are obese and annual costs of obesity to the NHS exceeds GBP6 billion a year, but NHS staff do not have the resources to support long term weight loss programmes. To address this, Professor Paul Little and colleagues led the development and trialling of the 'POWeR' (Positive Online Weight Reduction) intervention to help users sustain weight loss. The research showed that POWeR helped users lose enough weight to significantly reduce their risk of diabetes and cardiovascular disease, and cost less than standard NHS care.

POWeR has been made directly available to over 2 million people in the community through partnerships with Local Health Authorities and the NHS. Additionally, a responsive web app version of POWeR was developed in partnership with the company 'Changing Health' to support further national and international dissemination. The POWeR app has been delivered to 4,000 patients as part of the NHS Diabetes Prevention Programme, which will be rolled out to a further 12,000 patients from 2020-2025. NHS England has adopted the POWeR web app as the weight management element of the National Diabetes Education Programme delivered to 4,000 patients. POWeR will continue to be rolled out through the NHS to 600,000 diabetic patients from 2020-2025.

2. Underpinning research

Since 2010, Professors Paul Little, Mike Moore and James Raftery have worked with Professor Lucy Yardley and colleagues from the School of Psychology (UOA 4) to develop and trial 'POWeR' (Positive Online Weight Reduction), a self-guided digital intervention to initiate and sustain weight loss and physical activity with only limited support from nurses. Clinical trials showed that POWeR helped people sustain weight loss for a year and cost less than standard NHS care. The team then carried out studies showing that POWeR might also be helpful for overweight members of the community in a digital only format reinforced through community (rather than nurse) support and/or an additional, supplementary app, and so could be made available to the general public at very low cost.

Little as CI, led a team including Moore and Yardley, which obtained initial funding from the NIHR from 2010-2012 to develop POWeR and carry out a small study to show that patients and NHS staff found POWeR engaging and practical (PB-PG-0808-17077) which was successful [**3.1**]. Little designed and managed the clinical trial, which involved 179 patients.

Little, Moore, Raftery and Yardley with Byrne (UOA1) obtained further funding from the NIHR for a full trial of whether it could sustain weight loss for a year (HTA/09/127/19). The trial, designed and managed by Little as CI, was carried out from 2012-2015 in 818 patients. It showed that POWeR+ (the final version of POWeR) helped users lose more weight than standard NHS care plus a booklet on healthy eating that had been shown to help people lose weight, cost less than standard care, and that primary care staff found it useful [**3.2**, **3.3**]. The conclusions for clinical

impact, published in Lancet: Diabetes & Endocrinology, were that: *'The weight loss achieved with POWeR+ was similar to that achieved with the best performing interventions evaluated in a primary care setting over a 12 month period, including those produced by face-to-face commercial programmes … the POWeR+ program could be feasibly used in most practices and could make a clinically important contribution to the management of obesity*.' [**3.2**]. Using POWeR+ with an average of just two brief phone calls or emails from the nurse, 32% of patients sustained clinically significant weight loss (at least 5% reduction in weight) at 12 months, compared to 19% who were given the leaflet; this level and duration of weight loss is considered clinically important because by reducing or delaying obesity it can reduce the risk of diabetes by up to 50% and also reduces the risk of cardiovascular disease.

POWeR was modified and tested for use by overweight people in the community and the workplace by Yardley and Little using funding from EPSRC (EP/I032673/1) to develop software to create apps (including a POWeR app) and analyse usage of digital interventions such as POWeR. The first study was carried out by Yardley, Little and Roderick (UOA1) from 2012-2013 in 786 participants recruited from the community and showed that those with access to online POWeR reported more weight loss compared to those with no access to POWeR [**3.4**]. A second study in 2014 with 942 participants recruited from workplaces across the UK showed that engagement with POWeR might be improved by including a POWeR app alongside the website and that those who used POWeR reported losing more weight. Our analyses of uptake and engagement with POWeR showed that it was accessible and engaging for men and women with higher and lower levels of education and was an attractive option for people who could not or did not want to attend face-to-face sessions and preferred to access weight management support independently at home [**3.2**, **3.6**].

POWeR has now been adapted and trialled for use by overweight members of the Royal Navy (with internal Ministry of Defence funding) and with NIHR funding with overweight mothers after giving birth (HTA/15/184/14). POWeR has also been adapted to help prevent or manage many different health conditions that may be either helped or prevented by weight loss or physical activity, including hypertension and asthma (RP-PG-1211-20001), diabetes (with University College London), dementia prevention (RP-PG-0615-20014) and recovery from cancer (RP-PG-0514-20001). Funding was also secured from Innovate UK (KTP010800) to work with 'Changing Health' to adapt POWeR for dissemination as a web app through the NHS.

3. References to the research

3.1 Yardley L, Ware L, Smith E, Williams S, Bradbury K, Arden-Close E, Mullee M, Moore M, Peacock J, Lean M, Margetts B, Byrne C, Hobbs R, Little P (2014). Randomised controlled feasibility trial of a web-based weight management intervention with nurse support for obese patients in primary care. International Journal of Behavioral Nutrition and Physical Activity, 11:67. https://doi.org/10.1186/1479-5868-11-67

3.2 Little P, Stuart B, Hobbs R, Kelly J, Smith E, Bradbury K, Hughes S, Smith P, Moore M, Lean M, Margetts B, Byrne C, Griffin S, Davoudianfar M, Hooper J, Yao G, Zhu S, Raftery J, Yardley L (2016). An internet-based intervention with brief nurse support to manage obesity in primary care (POWeR+): a pragmatic, parallel-group, randomised controlled trial. The Lancet: Diabetes & Endocrinology, 4:821-828. https://doi.org/10.1016/s2213-8587(16)30099-7

3.3 Smith E, Bradbury K, Scott L, Steele M, Little P, Yardley L (2017). Providing online weight management in Primary Care: a mixed methods process evaluation of healthcare practitioners' experiences of using and supporting patients using POWeR+. Implementation Science, 12:69. https://doi.org/10.1186/s13012-017-0596-6

3.4 Dennison L, Morrison L, Lloyd S, Phillips D, Stuart B, Williams S, Bradbury K, Roderick P, Murray E, Michie S, Little P, Yardley L (2014). Does brief telephone support improve engagement with a web based weight management intervention? Randomised controlled trial. Journal of Medical Internet Research Mar, 28;16. https://doi.org/10.2196/jmir.3199

3.5 Morrison LG, Hargood C, Lin SX, Dennison L, Joseph J, Hughes S, Michaelides DT, Johnston D, Johnston M, Michie S, Little P, Smith PWF, Weal M, Yardley L (2014). Understanding usage of a hybrid website and smartphone app for weight management: A

mixed methods study. Journal of Internet Medical Research, 16(10):e201. https://doi.org/10.2196/jmir.3579

3.6 Bradbury, K., Dennison, L., Little, P., & Yardley, L. (2015). Using mixed methods to develop and evaluate an online weight management intervention. British Journal of Health Psychology, 20:45-55. https://doi.org/10.1111/bjhp.12125

Grants:

G1 Pragmatic Obesity Web management for Efficient Routine practice (POWeR) NIHR RfPB PB-PG-0808-17077 GBP249,927

G2 Positive Online WEight Reduction (POWeR) HTA/09/127/19 GBP1,268,299

G3 EPSRC (EP/I032673/1)

4. Details of the impact

Details of target beneficiaries

Obesity is a major cause of serious illness and disability (e.g. diabetes, heart disease, cancer, stroke and depression) and the leading cause of preventable early death. Over one in four UK adults are obese and annual costs of obesity to the NHS exceed GBP6 billion a year. The vast majority of obese people are managed in primary care and in 2014 the UK National Institute for Clinical Excellence (NICE) recommended that primary care should provide dietary and physical activity interventions supported by intensive expert support. The evidence for this guidance was based on providing patients with 13 face-to-face sessions per year with an expert in skilled in supporting weight management, but primary care staff do not have the resources (skills, time or financial) to implement intensive obesity management programmes for such numbers. Therefore, the aim of the POWeR research programme was to develop an effective and practical intervention that could be used in primary care (and other contexts) to help obese adults gain the benefits of sustained weight loss while using less NHS resources.

How the research led to benefit

POWeR was designed as a digital intervention accompanied by just a few brief telephone or email support contacts from primary care staff, thus minimising the primary care resources needed and offering an alternative option for people who could not or did not want to attend face-to-face weight management support. Yardley and Little led the development of POWeR, pioneering a 'Person-Based Approach' that employed extensive user feedback to optimise POWeR so that it would be accessible and useful for patients from a wide range of backgrounds and for primary care staff [**3.3**]. The team's research [**3.1**, **3.2**, **3.4**-**3.6**] then demonstrated the benefits of POWeR for over 1,000 primary care patients and people in the community, who used POWeR in our studies to inform its development and investigate whether POWeR was feasible and effective. As POWeR was the first digital weight management intervention to be shown to be effective and cost-effective for a UK primary care population [**3.2**], it was selected for an 'NIHR signal' (published 9 May 2017); NIHR signals highlight NIHR-funded research with potential important NHS impact [**5.1**].

In order to disseminate POWeR to the public, POWeR was publicised through meetings with Public Health England and Department of Health, and presentations at relevant public health conferences. As a result of the interest generated, contract negotiations were completed to provide POWeR directly to two million people through local authorities and the NHS. Liaison with these external partners ensured a good understanding of their needs and appropriate modifications to customise POWeR were made, whilst developing protocols for quality assurance and accreditation. Procedures, protocols and contracts as required were put in place to support the dissemination of POWeR. End-users were monitored and data reports on usage were delivered to the external partners when required. This dissemination activity was secured by two rounds of ESRC Impact Acceleration funding (2015-2019). In order to put in place a sustainable basis for longer-term future implementation of POWeR, an Innovate UK grant (KTP010800) was secured with Changing Health, a SME providing digital interventions for diabetes management to the NHS. The purpose of this grant was to work with Changing Health to convert POWeR into a web app suitable for sustained dissemination throughout the UK and internationally.

Details of the nature of impact

In 2017 Hampshire County Council signed a 3-year contract to make POWeR available to 2 million people in the community [**5.2**-**5.4**]. In their testimonial, Hampshire County Council state the importance of an evidence-based approach and our partnership: "The POWeR programme has enabled us to offer our adult residents an evidence-based digital weight management programme. We have valued our partnership with the University of Southampton and we look forward to continuing to work with the team and learning about future upcoming projects." [**5.2**]. In 2018, Solent NHS trust signed a 3-year contract to make POWeR available to over 235,000 people through primary care [**5.5**]. Redcar and Cleveland Borough Council, the local health authority who partnered with our community roll-out study [**3.4**] signed a 3 year contract to make POWeR available to over 100,000 people (2018-2020) [**5.6**]. Redcar and Cleveland Borough Council highly value the impact POWeR brought to their community: "Our work with Professor Yardley's team has brought huge benefits to Redcar & Cleveland Borough Council and beyond. We have been able to offer our residents and others outside our borough, an effective online programme for weight loss, which has been an extremely valuable and cost-effective addition to our services." [**5.6**]

In 2018, University of Southampton signed an exclusive licensing contract with Changing Health to adapt and update POWeR for delivery through a responsive web app [**5.7**], bringing revenue for University of Southampton through royalty payments from Changing Health. The University of Southampton team worked with Changing Health for over a year to develop the web app and POWeR has been made available to patients through several programmes. In 2019, POWeR was delivered to 600 patients managing diabetes through the Manchester Diabetes Test Bed. From 2019-2020, POWeR was delivered to 300 people in the Netherlands through a weight management pilot programme with a European health insurer. Then through competitive tendering, Changing Health won contracts to deliver POWeR to 4,000 patients through 'Healthier You', the NHS Diabetes Prevention Programme, which is a joint commitment from NHS England, Public Health England and Diabetes UK. Contracts were won in the following areas: Hampshire and the Isle of Wight, Lancashire and South Cumbria, and the Black Country (Dudley, Sandwell, Walsall and Wolverhampton). Over 2020-2025, POWeR will be delivered to another 12,000 patients through the Healthier You programme. Finally, from 2020-2025, Changing Health will roll-out POWeR across the NHS to 600,000 patients as part of the National Diabetes Education Programme with NHS England. This programme provides education resources for a wide range of individuals and groups, including hard-to-reach populations [**5.8**].

5. Sources to corroborate the impact

5.1 NIHR signal: A supported web-based programme helps people lose weight in the short term, 9 May 2017 https://doi.org/10.3310/signal-000413

5.2 Letter from Senior Public Health Practitioner, Hampshire County Council.

5.3 Primary care pathway for weight management services (2018), Hampshire County Council.

5.4 Hampshire community self-referral: https://web.archive.org/web/20201209101041/https://www.hants.gov.uk/socialcareandhealth/publichealth/besizewise/

5.5 Solent NHS Trust: Southampton Healthy Living weight management website: https://web.archive.org/web/20190307184310/https://www.southamptonhealthyliving.org.uk/weight-management/powerplus/

5.6 Letter from Advanced Public Health Practitioner, Middlesbrough Council/Redcar & Cleveland Borough Council.

5.7 Website corroborating that the Changing Health weight loss web app is based on POWeR: https://web.archive.org/web/20200804223356/https://www.changinghealth.com/programmes/weight-loss/

5.8 Letter from Chief Executive Officer, Changing Health Ltd.