Institution: University of Southampton		
Unit of Assessment: 04 Psychology, Psychiatry and Neuroscience		
Title of case study: 04-09 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:**
Lucy Yardley	Professor of Health Psychology	September 1999 – present
Katherine Bradbury	Senior Research Fellow	February 2009 – present
Leanne Morrison	Lecturer Health Psychology	October 2011 – present
Laura Dennison	Lecturer Health Psychology	April 2007 – present
Judith Joseph	Senior Research Enterprise Fellow	May 2008 – present
Lisa Ware	Research Fellow	January 2011 – August 2012
Sarah Williams	Research Fellow	July 2009 – January 2012
Emily Arden Close	Lecturer	October 2011 – October 2014
Mary Steele	Research Fellow	April 2014 – present
Stephanie Hughes	Senior Research Assistant	February 2012 – present
Emily Smith	Research Fellow	July 2012 – April 2015
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 public 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 Lucy Yardley and colleagues at the University of Southampton developed 'POWeR' (Positive Online Weight Reduction) 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 web 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, Professor Lucy Yardley has worked with Professor Paul Little (Professor of Primary Care Research, UOA 2) and Dr Katherine Bradbury to develop '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. Three phases of research have underpinned the impact of POWeR:

<u>Development</u>

Yardley and Little obtained initial funding from the NIHR from 2010-2012 [**G1**] to develop POWeR, and worked with Bradbury, Ware, Smith, Williams and Arden Close on a small study that successfully demonstrated that POWeR is engaging and practical for patients and NHS staff [**3.1**].

Evaluation

Yardley and Little obtained further funding from the NIHR for a full trial of whether POWeR could sustain weight loss for a year [**G2**] (HTA/09/127/19). The trial was carried out between 2012 and2015 by Yardley, Little, Bradbury, Smith and Hughes in 818 patients. It demonstrated that POWeR+ (the final version of POWeR): 1) helped users lose more weight than standard NHS care plus a booklet on healthy eating that had been shown to help people lose weight, 2) cost less than standard care, and 3) was perceived to be useful by primary care staff [**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**]. By using POWeR+ with an average of just two brief phone calls or emails from a 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 reducing or delaying obesity can reduce the risk of diabetes by up to 50% and also reduces the risk of cardiovascular disease. 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**].

In parallel, POWeR was also modified and tested for use by overweight people in the community and the workplace by Yardley, Morrison, Dennison and Bradbury, using funding from the EPSRC [**G3**]. These modifications tested whether POWeR might also work in a digital only format, reinforced through support from trained community coaches and/or an additional supplementary app, which could then be made available to the general public at a lower cost. The first study was carried out from 2012-2013 in 786 participants recruited from the community and showed that those with access to POWeR reported more weight loss compared to those with no access to POWeR [**3.4**]. Additionally, a protocol was successfully developed and used to train community health coaches to provide brief remote support to POWeR users; this support was shown to encourage persistence with the POWeR intervention. A second in-depth longitudinal study in 13 adults was carried out in 2014 to develop and test proof of concept for a POWeR app, 'POWeR Tracker' by Yardley, Morrison and Dennison. It demonstrated that an app-based version of or supplement to POWeR can successfully prompt usage of POWeR without the need for additional human support [**3.5**]. A third study also carried out in 2014 with 942 participants recruited from workplaces across the UK confirmed that engagement with the web-based POWeR intervention was improved by providing access to a POWeR app and that those who used POWeR reported losing more weight.

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 other 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).

Dissemination

Yardley and Joseph obtained further funding from Innovate UK (KTP010800) to work with 'Changing Health' (a company that specialises in digital health programmes) to adapt POWeR for large-scale dissemination as a web app through the NHS, drawing on the knowledge accumulated from the prior research activity. The Changing Health CEO has provided a testimonial and stated the significance of this collaboration: "Our partnership with the LifeGuide team has been key to enabling us to disseminate a ground-breaking weight loss intervention with proven effectiveness, working with world-leading experts in the psychology of behaviour change." [**5.8**].

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

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. However, primary care staff cannot implement intensive obesity management programmes for such large 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 fewer NHS resources.

How the research led to benefit

POWeR was designed as a digital intervention accompanied by 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 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 psychology 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, Yardley and Joseph actively publicised POWeR through meetings with Public Health England and the 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. Joseph and Steele disseminated POWeR to the public through these external partners. Dissemination involved liaising with these partners to develop a good understanding of their needs and working with them to carry out the appropriate modifications to customise POWeR, whilst developing protocols for quality assurance and accreditation. Procedures, protocols and contracts were iteratively agreed and put in place as required to support the dissemination of POWeR. End-users were monitored and data reports on usage were delivered to external partners when required. Yardley, Joseph and Steele supported this vital dissemination activity by securing 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, Yardley and Joseph then obtained an Innovate UK grant (KTP010800) with Changing Health. 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 three-year contract to make POWeR available to two 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 three-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 collaborated on our community roll-out study [**3.4**] signed a two-year contract in 2018 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, the 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**]. Yardley and Joseph led this initiative which earns revenue for the 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 new 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 the next five years, 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.