Institution: University of Oxford

Unit of Assessment: 2 – Public Health, Health Services and Primary Care

Title of case study: Improving weight management through increased access to evidence-based weight loss support

Period when the underpinning research was undertaken: 2012 – 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:
Prof Paul Aveyard	Professor	2012 – present
Dr Jamie Hartmann-Boyce	Lecturer	2012 – present
Prof Susan Jebb	Professor	2013 – present
Dr Nerys Astbury	Senior Researcher	May 2015 – 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 programme of clinical trials, systematic reviews, economic modelling and embedded qualitative research carried out by researchers at the University of Oxford has provided a robust evidence base for the development, provision and uptake of interventions to treat obesity, which affects more than a quarter of adults in the UK. The research has directly contributed to NICE and Public Health England guidance and led to change in Government policy on weight management and brief interventions leading to a change in the nature, and increased provision, of evidence-based weight loss support through the NHS. The research was cited in and directly informed the NHS Long-Term Plan to support a pilot rollout of total diet replacement programmes in the NHS to 5,000 people. The researchers also worked with the BBC to deliver programmes and associated resources that have engaged the public, providing a broader view of obesity and how they can manage their weight and weight loss.

2. Underpinning research

Effectiveness and evaluation of weight loss interventions in routine care

Prior to Aveyard and colleagues' research, trials had shown that behavioural interventions delivered in ideal circumstances achieved greater weight loss and prevented diabetes more than unaided efforts. University of Oxford researchers led by Aveyard and making up most of the core team worked with colleagues from the Universities of Cambridge and Durham to prepare systematic reviews for NICE in 2014. These examined how multicomponent behavioural weight management programmes are commissioned, run and viewed by users and health professionals. These studies showed for the first time that delivery of behavioural support from specially trained practice nurses led to no greater weight loss than unaided efforts but that referral to commercial weight management services was more effective than unaided efforts at one year [1]. The group also showed that interventions that incorporated specific energy prescriptions were associated with greater effectiveness than those that did not do so [2] and that interventions that combined diet and physical activity were more effective than either alone, as reported in the NICE Evidence Review [3]. The review also provided information about the interventions that people valued and how to commission these services [3]. Economic evaluation was embedded into a subsequent trial of a commercial weight management service jointly led by the University of Oxford and University of Cambridge teams, with Jebb developing the research questions and designing the trial, Aveyard contributing to the design of the protocol and both researchers drafting the paper. The trial found that a 12-week programme was more effective than self-help over two years and was cost-saving for the NHS [4].

Developing very brief opportunistic interventions for weight loss in primary care
Aveyard developed the idea and protocol for a University of Oxford-led clinical trial testing a new brief behavioural intervention to promote weight loss [5]. GPs intervened opportunistically to support people with obesity to lose weight, offering referral to a weight loss service that was proven effective (tier 2 weight management services and tested in these trials [4]). The trial showed that the intervention was popular with patients, with more than 8 in 10 saying it was appropriate and helpful and only 1 in 500 saying it was inappropriate and unhelpful. Crucially, the trial found that the brief intervention and referral to a weight management service led to significantly greater weight loss at one year than the advice to lose weight alone. Conversation analysis examined how GPs gave these brief interventions and was used to understand how the phrasing of particular consultations gave rise to resistance in patients or acceptance of the offer of referral to a weight management service and attendance at it.

Effectiveness and evaluation of total diet replacement programmes for intensive weight loss in primary care
In a 2016 systematic review carried out by Aveyard at Oxford with collaborators in Birmingham, it was found that specialist-delivered total diet replacement programmes led to long-term weight loss that was greater than specialist-delivered behavioural programmes and improved biomarkers of cardiovascular risk to a greater extent. However, it was unclear whether patients with less severe obesity would find these programmes acceptable or whether the programmes would be feasible, effective or safe in routine primary care. The DROPLET trial run exclusively by University of Oxford investigators in 2018 showed that these programmes retained their effect and provided greater weight loss for patients with obesity than generalist behavioural programmes [6]. It also showed that negative effects were mild, not affecting participants' ability to live a normal life, and that there was high adherence leading to a mean weight loss of over 10kg at one year. Subsequent modelling showed that this was cost-effective for the NHS, even under conservative assumptions about weight regain.

3. References to the research (Oxford authors in bold)

1. **Hartmann-Boyce J**, Johns D, **Jebb S**, Summerbell C, **Aveyard P** and **Behavioural Weight Management Review Group** (2014). Behavioural weight management programmes for adults assessed by trials conducted in everyday contexts: systematic review and meta-analysis. *Obesity Reviews* 15:920-932. Journal article, DOI: 10.1111/obr.12220.

2. **Hartmann-Boyce J**, Johns DJ, **Jebb SA**, **Aveyard P** and **Behavioural Weight Management Review Group** (2014). Effect of behavioural techniques and delivery mode on effectiveness of weight management: systematic review, meta-analysis, and meta-regression. *Obesity Reviews* 15:598-609. Journal article, DOI: 10.1111/obr.12165

3. Johns D, **Hartmann-Boyce J**, **Aveyard P**, **Lewis A, Jebb SA**, Phillips D, Ogden J, Summerbell C. (2014). Managing overweight and obese adults: evidence review 2. London, NICE. Report submitted to NICE, https://www.nice.org.uk/guidance/ph53/evidence/evidence-review-2-pdf-431707936.

4. Ahern AL, Wheeler GM, **Aveyard P**, Boyland EJ, Halford JCG, Mander APD, Woolston J, Thomson AM, Tsiountsioura M, Cole D, Mead BR, Irvine L, Turner D, Suhrcke M, Pimpin L, Retat L, Jaccard A, Webber L, Cohn SR, **Jebb SA** (2017). Extended and standard duration weight loss referrals for adults in primary care (WRAP): a pragmatic randomised controlled trial. *Lancet* 389, 2214-2225, Journal article, DOI: 10.1016/S0140-6736(17)30647-5.

5. **Aveyard P**, Lewis A**, Tearne S**, **Hood K**, **Christian-Brown A**, Adab P, **Begh R**, Jolly K, Daley A, Farley A, Lycett D, **Nickless A**, **Yu L-M**, Retat L, Webber L, Pimpin L, **Jebb SA** (2016). Screening and brief intervention for obesity in primary care: a parallel, two-arm, randomised trial. *Lancet* 388:2492-2500.
Journal article, DOI: 10.1016/S0140-6736(16)31893-1.

6. **Astbury N, Aveyard P, Nickless A, Hood K, Corfield K, Lowe R, Jebb SA** (2018). Doctor Referral of Overweight People to Low Energy total diet replacement Treatment (DROPLET): a pragmatic randomised controlled trial. *British Medical Journal* 362. Journal article, DOI: 10.1136/bmj.k3760

Peer-reviewed funding included two Medical Research Council grants:
(a) 'A randomised controlled trial to test the effectiveness of a brief intervention for weight management for obese adults in primary care' (MR/J000515/1, 2012 – 2016), awarded to the University of Oxford as lead organisation in the collaboration, with Aveyard and Lewis as joint Principal Investigators. Total award £724,566.

(b) 'A randomised controlled trial to test the clinical and cost-effectiveness of primary care referral to a commercial weight loss provider' (MR/J000493/1, 2012 – 2016), led by the MRC Centre Cambridge, with Aveyard and Jebb as Co-Investigators, for the WRAP trial. Total award £906,736 with £187,583 allocated to Oxford as collaborator.

4. Details of the impact

Impact on public policy and practitioners

a. Impact on weight management guidance and practice: The work described above [1-3] was the source of all 37 evidence statements on which the 2014 NICE Public Health Guidance 53 'Lifestyle Weight Management' was based [A]. The guidance, in the form of 17 recommendations, is for commissioners and providers of weight management programmes and health and social care professionals who refer people to these programmes. Six of the recommendations were directly drawn from the evidence reviews from the group. In particular, these reviews informed the key recommendations about the types of weight loss programmes that should be provided. The guidance recommends *'[commission and provide programmes that] address dietary intake, physical activity levels and behaviour change'* and *'Ensure specific dietary targets are agreed (for example, for a clear energy [calorie] intake or for a specific reduction in energy intake'* (Recommendations 9 and 11), which are specifically identified from the reviews of behavioural techniques and weight management.
In July 2020, the UK Prime Minister consulted directly with the team at the University of Oxford on strategies for his new policy paper on obesity, 'Tackling obesity; empowering adults and children to live healthier lives' [B,C]. This strategy outlines new measures to be taken to tackle obesity, prompted by the increased severity of COVID-19 in people with obesity. The policy includes plans to expand evidence-based services for weight management available for referral from primary care of the kind tested in the University of Oxford trials and reviews [1-4]. This accelerates plans in the 2019 NHS Long Term Plan to improve access to weight management interventions in primary care, which was based on evidence from these trials [D]. Justification of funding and programme rollout has been supported by evidence from the WRAP trial [4], as well as from the brief intervention trial [5], with the programme being adapted to the COVID pandemic by moving to digital interventions [D].

b. Impact on brief opportunistic interventions: As a result of the University of Oxford-based work on brief interventions [5] and subsequent conversation analysis of the GP consultation recordings, PHE approached Aveyard and colleagues to work with them to write guidelines in 2017 to support health and care professionals make brief opportunistic interventions in weight management in routine clinical care [E]. This trial is the only academic reference in that guidance which directly adopts the approach tested in the trial, while the phrases suggested for practitioners to use are taken directly from the findings of the conversation analysis work. Modelling of the cost-effectiveness of the intervention estimated that implementation would generate 5,000 additional quality-adjusted life years (QALY) annually while saving GBP9,000,000 per year for the NHS [F]. The research team also worked with the Royal College of GPs and Cancer Research UK to produce a course for GPs in 2017 on brief opportunistic interventions based on and citing the research evidence [G], which is referenced under 'further resources' in the PHE guidance. By December 2020 this had been accessed by 1,020 GPs. The

Government's 2020 obesity policy included plans to implement brief opportunistic interventions [5] in GPs' Quality and Outcomes Framework from April 2021.

c. Introducing diabetes remission programmes: The DROPLET trial of the effectiveness, safety and cost-effectiveness of total diet replacement (TDR) programmes [6] directly influenced NHS England to pilot these programmes in NHS settings for people with obesity and type 2 diabetes with the aim of achieving diabetes remission (an intention stated in the 2019 NHS Long-Term Plan) [D,H]. NHS England used data from this and another TDR trial, which applied population impact models to examine the costs, effects on weight loss and effects on incidence of disease, to justify and shape the national pilot programme of work. NHS England stated '*The DROPLET study undertaken by Jebb and Aveyard and their group, is one of two studies on which a national pilot programme of work is based, aiming to translate the study findings into routine NHS clinical practice'* [D]. The pilot, launched in September 2020 (postponed from April due to the COVID pandemic), is designed to assess total diet replacements in 5,000 people with recently diagnosed Type 2 diabetes. By December 2020, around 300 people had been referred into the programme [D].

Impact on health and the economy

Between the 2014 NICE guidance based on the University of Oxford research and 2019, 341,000 people attended tier 2 weight management services in England, which is an increase of 122,000 over the number expected if trends prior to 2014 had continued [I]. Based on modelling [4], this increase is estimated to have prevented 760 people developing diabetes, hypertension, and cardiovascular disease, leading to a gain of 785 QALYs, and saving GBP327,000 (at standard NICE discount rates) in England.

The programmes for total diet replacement commissioned by the NHS and based on DROPLET trial data were rolled out in September 2020 in a pilot for 5,000 NHS patients with goals including putting diabetes into remission [H]. Modelling of the cost-effectiveness of a total diet replacement programme estimates that this pilot alone may generate 300 quality adjusted life years gained, reducing net NHS costs by GBP6,700,000 over the lifetime of these 5,000 people [J].

Impact on the public

The expertise of the University of Oxford team on dietary and behavioural strategies for weight loss enabled them to advise, lead and play a prominent role in a 3-part BBC TV Horizon Special 'Right Diet' in 2015 [K]. The series examined how multiple factors including the science of weight gain, hormonal control of appetite and emotional aspects of food could be harnessed to aid weight loss and created empathy for people's struggles with their biology and psychological make-up. The University of Oxford researchers wrote a manual for the 75 volunteers in the programme who lost an average of 8kg each. 2,300,000 people watched the series in 2015, 8% of the audience share, with 1,200,000 using the website and iPlayer, the second highest viewing figures of that week. The researchers worked with the BBC to engage a wider audience through additional resources – taking questions about the right diet for people in a Q&A session after one of the episodes and developing an online self-help weight loss book that has been downloaded 50,000 times; an online test of which diet would suit which person taken by 1,400,000 people which was the BBC's record for this kind of engagement; and online recipes that would support the approach that had 162,000 downloads. 575,000 people engaged with the online BBC Magazine, and there were 467,300 tweets about the programme.

The University of Oxford researchers led on and appeared in a BBC1 science special, 'The Big Crash Diet Experiment', which was based directly on the DROPLET trial [6] and was viewed by 1,800,000 people in 2018. Working with the BBC, the researchers developed resources to engage a wider audience [K] - an online assessment to enable people to judge their suitability for this approach (taken by 159,000 people) and recipes to allow people to do take this approach at home (viewed by 45,000). 65,000 viewed the University's web pages providing support for people to follow a total diet replacement and for GPs in managing medication in patients using this approach.

5. Sources to corroborate the impact

A. Weight management: lifestyle services for overweight or obese adults. NICE public health guidance [PH53]. 28 May 2014. https://www.nice.org.uk/guidance/ph53
(i) Guidance on weight management programmes, https://www.nice.org.uk/guidance/ph53/resources/weight-management-lifestyle-services-for-overweight-or-obese-adults-pdf-1996416726469
(ii) Evidence statements. https://www.nice.org.uk/guidance/ph53/evidence/evidence-statements-pdf-431709229

B. UK Government Policy Paper. 27 July 2020. Tackling obesity: empowering adults and children to live healthier lives. https://www.gov.uk/government/publications/tackling-obesity-government-strategy/tackling-obesity-empowering-adults-and-children-to-live-healthier-lives

C. Letter from Director of Policy, No.10 Downing Street corroborating the role played by University of Oxford research in shaping policy paper on obesity.

D. Letter from National Clinical Director for Diabetes and Obesity, NHS England and NHS Improvement, corroborating impact of University of Oxford clinical trials

E. Joint PHE/Department of Health/University of Oxford guidance on brief interventions. Adults, 21 June 2017 https://www.gov.uk/government/publications/adult-weight-management-a-guide-to-brief-interventions;
Children, 3 October 2017 https://www.gov.uk/government/publications/child-weight-management-short-conversations-with-patients.

F. Journal article: Retat L. et al. (2019). Screening and brief intervention for obesity in primary care: cost-effectiveness analysis in the BWeL trial. *International Journal of Obesity* 43(10): 2066-2075. DOI: 10.1038/s41366-018-0295-7

G. Cancer Research UK and the Royal College of General Practitioners very brief advice module and associated training videos (VBA e-learning on cancer prevention related to obesity, smoking cessation and alcohol reduction) http://elearning.rcgp.org.uk/behaviourchange

H. NHS England commitment to total diet replacement pilots: 'Low calorie diets to treat obesity and Type 2 diabetes'. https://www.england.nhs.uk/diabetes/treatment-care/low-calorie-diets/. Accessed 18/12/2020.

I. Corroborator 1: Head of Partnerships, Slimming World; and Corroborator 2: Head of Health and Corporate Solutions, Weight Watchers, who may be contacted to confirm referral numbers

J. Journal article: Xin Y et al. (2020). Type 2 diabetes remission: 2 year within-trial and lifetime-horizon cost-effectiveness of the DiRECT/Counterweight-Plus weight management programme. *Diabetologia* 63, 2112-2122.
DOI: 10.1007/s00125-020-05224-2

K. Corroborator 3: Producer of the BBC programmes, who may be contacted to corroborate reach of the programmes.