

Impact case study (REF3)

Institution: University of Aberdeen		
Unit of Assessment: UoA1: Clinical Medicine		
Title of case study: Helping adults with obesity lose weight: providing a new evidence base and putting it into practice		
Period when the underpinning research was undertaken: 2004-2018		
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:
Alison Avenell	Professor in Health Services	1998 – present
Magaly Aceves-Martins	Research Fellow	2017 – present
Lorna Aucott	Lecturer in Health Sciences	2000 – present
Dr Charles Boachie	Research Fellow	2008 – 2014
Dwayne Boyers	Research Fellow	2010 – present
Marion Campbell	Professor in Health Sciences	1993 – present
David Cooper	Research Fellow	2006 – present
Adrian Grant	Professor in Health Services	1994 – 2012
Graeme MacLennan	Professor in Health Services	1998 – present
Amudha Poobalan	Snr Lecturer Public Health	2000 – 2014; 2016 – present
Clare Robertson	Research Fellow	2001 – present
Zöe Skea	Lecturer in Health Services	1999 – present
William Smith	Professor in Public Health	1994 – 2011 (Emeritus from 2011)
Edwin Van Tiljningen	Senior Lecturer Public Health	1999 – 2009
Period when the claimed impact occurred: November 2013 – present		
Is this case study continued from a case study submitted in 2014? No		
1. Summary of the impact (indicative maximum 100 words)		
<p>Worldwide, obesity is increasing with major impacts on health and quality of life. Without effective policies to prevent obesity, evidence is needed on the best (cost-)effective interventions to help adults wishing to lose weight. Research led by the University of Aberdeen has helped to fill this evidence gap with three major systematic reviews and health technology assessments: drug and lifestyle weight management programmes (WMPs); WMPs for men; WMPs for people with severe obesity (BMI $\geq 35\text{kg/m}^2$). This research has helped create a new evidence base for people with obesity, informing guidelines in the UK, India, the USA and New Zealand, and underpinned a popular, successful WMP in the UK.</p>		
2. Underpinning research (indicative maximum 500 words)		
<p>Obesity affects more than a quarter of adults in the UK, increasing the risk of cardiovascular disease, Type 2 diabetes, many cancers, disability, poorer quality of life, and premature mortality. Disease and disability risks are much higher for adults who are more obese, and for underserved groups. In order to provide the best weight management programmes (WMPs), the NHS, local authorities, and commercial organisations need evidence on the most (cost-) effective WMPs. From 2000-2018, researchers from the Health Services Research and Health Economic Research Units led work to develop that evidence.</p> <p>Between 2000 and 2001, the University of Aberdeen led a NIHR-commissioned systematic review of 81 randomised controlled trials (RCTs) and epidemiological evidence, and the first UK economic evaluation of lifestyle WMPs for adults with obesity. Findings included exercise and/or behaviour therapy added to diets improved long-term ($\geq 1\text{y}$) weight loss. Low-fat diets with exercise, or with exercise and behaviour therapy, prevented Type 2 diabetes and hypertension with comparable cost to drug treatments. Six journal publications also resulted from this report [R1].</p>		

Building on evidence from the first systematic review, the team initiated two further systematic reviews on adult weight management [R2, R3], in response to evidence gaps they identified with advisory groups. For the first of these systematic reviews, the Aberdeen team worked with the Men's Health Forums of the UK and the Republic of Ireland (leading national charities for men's health) to understand why men are much less likely than women to take part in WMPs, even though more men than women are overweight or obese in the UK. Using mixed-methods combining qualitative, quantitative and health economic evidence, the Aberdeen technology assessment was the first internationally to explore how to engage men with obesity with WMPs, contrasting engagement between men and women, and evaluating the (cost-)effectiveness of WMPs for men [R2].

To be most effective, WMPs for men needed to be different from those for women. Men preferred more factual information on how to lose weight and more emphasis on physical activity and healthy eating, rather than 'dieting', and WMPs that were delivered outside traditional healthcare settings, such as sports stadia. Men-only, group-based WMPs were also found to be beneficial, facilitating support for men with similar health issues and allowing shared experiences. Overall, weight reduction for men was best achieved and maintained with the combination of tailored advice for men that changed diet and physical activity (or a physical activity programme to attend), and behaviour change techniques, such as goal setting. Services most beneficial for men were also cost-effective, using NICE criteria [R2].

The third systematic review examined the evidence for the most (cost-)effective WMPs for adults with severe obesity (BMI $\geq 35\text{kg/m}^2$), including evaluating bariatric surgery. Using mixed-methods, including 131 RCTs, qualitative research and the microsimulation economic model used by NICE, researchers found that surgery had best weight loss outcomes and could be a good use of NHS resources, compared to no surgery or lifestyle WMPs. Of non-surgical approaches, very low-calorie diets (VLCDs) had best weight loss at 12 months, but it was unclear if this was sustained longer term. Most WMPs, including those with VLCDs, were a good use of NHS resources compared with no WMP and the costs associated with the health issues resulting from obesity. Tailoring of group-based approaches was best for adults with severe obesity, who tend to have more physical and mental health issues [R3].

3. References to the research (indicative maximum of six references)

[citation counts from Google Scholar – 16/2/2021]

The quality of the research is deemed to be at least of 2* quality as corroborated by the following Health Technology Assessments (with Google Scholar citations), funded by NHS and NIHR:

R1. A Avenell, J Broom, TJ Brown, A Poobalan, L Aucott, SC Stearns, WCS Smith, RT Jung, MK Campbell and AM Grant. Systematic review of the long-term effects and economic consequences of treatments for obesity and implications for health improvement. *Health Technol Assess* 2004;8(21); <https://doi.org/10.3310/hta8210> (**943**) *NHS Executive grant 2000-1, GBP143,285, (Avenell co-investigator), Sponsor University of Aberdeen. Systematic review of the long term outcomes of the treatments for obesity and implications for health improvement and the economic consequences for the NHS.*

R2. Robertson C, Archibald D, Avenell A, Douglas F, Hoddinott P, van Teijlingen E, Boyers D, Stewart F, Boachie C, Fioratou E, Wilkins D, Street T, Carroll P, Fowler C. Systematic reviews and integrated report on the quantitative, qualitative and economic evidence base for the management of obesity in men. *Health Technol Assess* 2014;18(35) *Health Technol Assess* 2014; <https://doi.org/10.3310/hta18350> (**186**) *NIHR HTA grant 2011-3, GBP244,217, (Avenell principal investigator), Sponsor University of Aberdeen. Systematic reviews and integrated report on the quantitative and qualitative evidence base for the management of obesity in adult men.*

R3. Avenell A, Robertson C, Skea Z, Jacobsen E, Boyers D, Cooper D, Aceves-Martins M, Retat L, Fraser C, Aveyard P, Stewart F, MacLennan G, Webber L, Corbould E, Xu B, Jaccard A, Boyle B, Duncan E, Shimonovich M, Bruin M. Bariatric surgery, lifestyle interventions and orlistat for severe obesity: the REBALANCE mixed-methods systematic review and economic evaluation. *Health Technol Assess.* 2018; 22(68):1-246.; <https://doi.org/10.3310/hta22680> (31) *NIHR HTA grant 2016-8, GBP556,128, (Avenell, principal investigator; MacLennan, Boyers, Skea, co-investigators), Sponsor University of Aberdeen. (REBALANCE) REview of Behaviour And Lifestyle interventions for severe obesity: AN evidenCE synthesis.*

4. Details of the impact (indicative maximum 750 words)

University of Aberdeen research has created a new evidence base to help people with obesity in the UK and internationally. Specifically, it has (i) informed health guidelines for WMPs for adults with obesity in the UK, India, the United States and New Zealand; and (ii) underpinned the development of a successful weight management programme in the UK.

(i) Informing health guidelines for the management of obesity-related illnesses

In the UK

The first systematic review [R1] provided four meta-analyses used by NICE since 2006 to inform guidance on weight management for adults with low-fat and 600kcal/d deficit diets [S1 p541], adding behavioural interventions to diets [S1, p562-4], adding physical activity to diets [S1, p580-3], and the weight loss drug orlistat [S1, p618-9]. NICE evidence was only partially updated in 2014, such that current 2014 NICE guidance on the above topics continues to utilise this evidence from 2006 given in *Appendix M* of its 2014 publication [S1].

University of Aberdeen research on WMPs for men created an evidence base which has been used by the Men's Health Forum and Public Health England, in their joint guidance document, 'How to make weight-loss services work for men' [S2i-ii]. Aimed at people developing WMPs, this 'How to Guide' summarises the Aberdeen-led research, so that programme developers are made aware what works and what doesn't. Martin Tod from the Men's Health Forum has confirmed that the guide has been used in designing weight management services [S3]. This was the first published guideline on weight management for men with obesity, nationally and internationally.

In India

Evidence from the first systematic review [R1] was used in the 2015 Indian clinical practice recommendations on management of Type 2 diabetes, as evidence supporting behavioural support for lifestyle change for obesity [S4i, pS17], stating '*Other important components of behavioural therapy embrace self-monitoring, goal setting and stimulus or cue control. Such strategies help in setting up realistic goals, guide patients in identifying stimulus that leads to excessive nutrient intake and eliminate them accordingly*'. The same guidance citing R1 was repeated in subsequent Indian diabetes' clinical practice recommendation updates, including in 2020 [S4ii].

In the United States

The November 2013 American Heart Association/ American College of Cardiology/ Obesity Society Guideline for the Management of Overweight and Obesity in Adults utilises the first systematic review and all six associated publications from that systematic review for its guidance [R1, references 36-40 and 54-55 in 2013 AHA report]. Guidance quotes benefits of weight loss, with or without orlistat, on fasting glucose, HbA1c, triglycerides, LDL cholesterol, blood pressure, prevention of Type 2 diabetes and reduction of premature mortality [S5].

The 2019 update of the US clinical practice guidelines for the perioperative nutrition, metabolic, and nonsurgical support of patients undergoing bariatric procedures clinical practice guidelines references the University of Aberdeen team's 2018 research [R3] for decisions on types of surgery. The research provides the cost-effectiveness evidence in support of Roux-en-Y gastric bypass surgery compared to non-surgical weight management. [S6, pO27-O28].

In New Zealand

The University of Aberdeen-led research has provided evidence to support national guidelines for adult WMPs in New Zealand in 2017. The evidence section on weight loss interventions for men with obesity relies on the team's research:

'A systematic review of evidence-based management strategies for obese men found that men preferred more factual information on how to lose weight and more emphasis on physical activity programmes than women did. They also preferred interventions delivered in social settings to those delivered in health-care settings (Robertson et al 2014 [R2], Robertson et al 2016). Robertson et al concluded that weight reduction for men is best achieved and maintained with the combination of a reducing diet, physical activity advice or a physical activity programme, and behaviour change techniques.' [S7, p11]

The document provides clinical guidance for health practitioners and others who provide advice on weight management for New Zealand adults, where 1-in-3 New Zealand adults is obese.

(ii) Underpinning the development of a successful weight management programme for men

In the UK, the University of Aberdeen-led systematic review [R2] and resulting guidance from Public Health England and the Men's Health Forum [S2i] has informed the development of the *MAN V FAT* weight management programme (<https://manvfat.com/about-man-v-fat/>). *MAN V FAT* was founded by Andrew Shanahan, specifically for men in 2014, with a crowdfunding campaign aimed at launching a digital magazine about men's weight and how to lose weight. The campaign attracted support from Jamie Oliver, the National Obesity Forum, Weight Concern and the British Dietetic Association, and was so successful that, along with the magazine, Shanahan also created a website and published a book to help men lose weight. In 2016, Shanahan launched *MAN V FAT Football*, which now has over 90 football leagues across the UK, all of which are Football Association affiliated, and a further 12 leagues – *MAN V FAT Soccer* – in Australia. Shanahan wrote in a 2015 media article that *'the really great thing about Avenell's research is that it has galvanised weight management teams across the country...Man V Fat began to work with ... Public Health England guidance to create a best practice weight management programme'* [S8].

The value of the research is further confirmed in correspondence with Andrew Shanahan, where he stated that *'the principles of MAN v FAT Football are underpinned by the research, which found that provision of suitable programmes was previously lacking'* [S9]. *MAN v FAT Football* is also accessible for free at a number of leagues in the UK due to localised public health funding. These include leagues in Westminster, Kensington, Strood, Lincoln, Boston, Hastings, Skegness, Eastbourne, Falmer, Basingstoke, Eastleigh, Andover and Aldershot. Collectively, the leagues have to date helped around 20,000 men lose weight and gain fitness. Over 90% of men lose weight on completion of their first season, with over 271,000lb lost to date.

5. Sources to corroborate the impact (indicative maximum of 10 references)

S1. National Institute for Health and Care Excellence (NICE). Obesity: identification, assessment and management. Clinical guideline CG189. London: NICE; 2014. Appendix m. <https://www.nice.org.uk/guidance/cg189/evidence/obesity-update-appendix-m-pdf-6960327447>, pages 541, 562-4, 580-3, 618-9.

S2. Men's Health Forum and Public Health England. How to make weight loss services work for men.

(i) https://www.menshealthforum.org.uk/sites/default/files/pdf/how_to_weight_final_lr_1.pdf

(ii) MHF web page describing Aberdeen review underpinning the How to...Guide:

<https://www.menshealthforum.org.uk/best-practice-weight-loss-programmes>

S3. Men's Health Forum Email communication.

S4. (i) Madhu SV, Saboo B, Makkar BM, et al. RSSDI clinical practice recommendations for management of type 2 diabetes mellitus, 2015. *Int J Diabetes Dev Ctries* 2015;35:S1-71. (ii) Chawla R, Madhu SV, Makkar BM, et al. RSSDI-ESI Clinical Practice Recommendations for the Management of Type 2 Diabetes Mellitus, 2020 *Indian J Endocrinol Metab.* 2020;24(1):1-122.

S5. 2013 Report on the Management of Overweight and Obesity in Adults: full panel report supplement. Management of Overweight and Obesity in Adults: Guidelines From the Expert Panel, 2013 (cardiosource.com)

S6. Mechanick JI, Apovian C, Brethauer S, et al. Clinical practice guidelines for the perioperative nutrition, metabolic, and nonsurgical support of patients undergoing bariatric procedures – 2019 update: cosponsored by American Association of Clinical Endocrinologists/American College of Endocrinology, The Obesity Society, American Society for Metabolic & Bariatric Surgery, Obesity Medicine Association, and American Society of Anesthesiologists. *Obesity* 2020;28(4):O1-O58.

S7. Ministry of Health. 2017. Clinical Guidelines for Weight Management in New Zealand Adults. Wellington: Ministry of Health.

S8. MAN V FAT founder article *At last, a prescription weight-loss service designed for men.* Daily Telegraph, 9/4/2015. <https://www.telegraph.co.uk/men/active/mens-health/11522080/At-last-a-prescription-weight-loss-service-designed-for-men.html>

S9. MAN V FAT founder Testimonial letter