

Institution: University of Glasgow
Unit of Assessment: Unit 1; Clinical Medicine
Title of case study: Promoting nutritional balance with the Eat Balanced pizza and Eatwell Everyday website
<p>1. Summary of the impact</p> <p>Chronic diseases associated with poor nutrition are on the rise; however, people increasingly eat nutritionally-deficient ready meals owing to their convenience. Researchers from the University of Glasgow took an innovative two-fold approach to tackling this worrying trend. First, they created a nutritionally-balanced frozen pizza in collaboration with local start-up company Eat Balanced. Second, they developed content for the Eatwell Everyday website, a government-funded resource that provides user-friendly nutritionally-balanced meal plans. These initiatives have attracted extensive media coverage, with an estimated global audience of about 93 million people. The Eatwell Everyday website has received 9,058 page visits since its launch in April 2013. The Eat Balanced pizza has won 10 business or product awards, has been endorsed by a leading sports nutritionist and is currently stocked by retail giants Sainsbury's, Asda and Ocado. More than 25,000 Eat Balanced pizzas have been sold in the UK since September 2012.</p>
<p>2. Underpinning research</p> <p>Diet-related chronic diseases, such as obesity and diabetes, cost the NHS more than £5 billion per year. National campaigns aim to promote a nutritionally-balanced diet, yet people continue to value the convenience of pre-packaged ready meals over healthy eating. University of Glasgow research, led by Professor Mike Lean and Dr Catherine Hankey, set out to change consumer behaviour by producing nutritionally-balanced meals and meal plans.</p> <p><i>The meal as the key component of dietary change</i></p> <p>Hankey and colleagues evaluated 98 individuals undergoing a 12-week rehabilitation programme after suffering a heart attack and found that these patients were more likely to respond to dietary alterations on a per-meal basis than to general advice about healthy eating (2004).¹ They also demonstrated that a programme of meal enrichment with energy-dense foodstuffs (such as cream or butter) resulted in significant weight gain and increased body mass index in a group of 41 older adults in residential care who were malnourished (2013).² The findings of these two research papers suggested that dietary change is implemented most effectively when the unit of modification is the meal and that meal-by-meal interventions are far more effective than general advice in two distinct populations (heart attack survivors and institutionalised older adults).</p> <p><i>Ready meals are not nutritionally balanced</i></p> <p>In 2012, Lean and colleagues analysed the nutritional value of four popular supermarket ready meals and found that none met accepted UK Department of Health standards, regardless of labelling line (for example, "standard", "economy", "healthy" or "finest").³ These standards, which are endorsed by the World Health Organization, advocate daily consumption of 2,000–2,500 calories for adults. This intake energy, in terms of macronutrients, ought to provide around 50% energy from carbohydrate, and no more than 35% of energy should come from total fat. This dietary composition will usually supply the recommended daily intakes for vitamins and minerals. The researchers found that many convenience products contained 100% of the recommended daily fat and salt intake in a single meal, making it impossible for consumers to eat a nutritionally-balanced diet.</p> <p><i>Eat Balanced pizza provides proof of concept for nutritionally-balanced meals</i></p> <p>Given the poor nutritional value of most ready meals, Lean and colleagues aimed to produce a ready meal that provides 30% of a person's daily energy intake, while incorporating all 27 essential nutrients in the recommended amounts. This approach reflected UK and European nutritional advice that total daily intake should be divided equally between three meals. Lean joined forces with Eat Balanced (a local start-up company) to produce a healthy frozen pizza as proof of concept</p>

that ready meals can be nutritionally balanced. This project was funded by a £5,000 grant to Lean and Eat Balanced by Encompass, a programme designed to stimulate academic and industrial engagement in Scotland and funded by the Universities of Glasgow, Strathclyde, Aberdeen and Stirling, along with support agencies in Scotland. Lean's team created a Margherita pizza with optimised proportions of dough base to topping and novel ingredients, such as seaweed (which is high in iron, zinc and vitamin B₁₂), to boost nutrient levels (2013).⁴ The final product was taste-tested in two urban areas of Scotland (Glasgow West End and Clydebank) from opposite ends of the socioeconomic spectrum. Factors evaluated in testing sessions included taste, appearance and willingness of adult testers to buy the pizza. In all, 77% of adults and 81% of children rated the nutritionally balanced Margherita pizza as "at least as good as their usual choice of pizza." The University of Glasgow researchers conducted the following aspects of the pizza development process: design, using an existing template;³ selection of key ingredients; computer-based nutrition analysis leading to the prototype pizza; recipe refinement; design of protocol for tasting sessions; taste testing in one of the two locations; and analysis of all taste test data.

Combining healthy meals to establish a nutritionally-balanced weekly diet

The Eat Balanced pizza confirmed that nutritional balance could be achieved on a per-meal basis using convenience foods. Following the success of this project, the Foods Standards Agency Scotland (FSAS) commissioned Hankey, Leslie and Lean to create an online menu to promote the concept of quick and healthy meals. The FSAS is the government body tasked with handling policy issues in Scotland relating to food standards, nutrition and diet. The online resource conceived by Hankey and colleagues provides recipes for three meals a day that are interchangeable to allow a mix-and-match approach while still ensuring nutritional balance over a seven-day period (2013).⁵ Nutritionally-equivalent substitutions are encouraged, allowing the menu to be extended indefinitely; in this scenario, the Eat Balanced pizza would be equivalent to one lunch or dinner. The meals require only basic cooking skills and incorporate popular affordable foodstuffs (fresh, frozen and tinned goods) that are readily available in UK supermarkets. Focus-group testing at four UK locations confirmed that consumers enjoyed the meals, found the menu plan "acceptable" to use and were able to prepare meals with their existing level of skill and available time (2013).⁶

Key University of Glasgow researchers: Mike Lean, Chair of Human Nutrition (1990–present); Catherine Hankey, Senior Lecturer in Human Nutrition (1992–present); Emilie Combet, Lecturer in Nutrition (2009–present); Wilma Leslie, Research Assistant (1997–present).

Key external collaborators: Donnie Maclean (Eat Balanced, Glasgow); Heather Peace and Fiona Comrie (FSAS, Aberdeen). Kantar Worldpanel and Scotland Ipsos MORI conducted market research for the weekly menu plan.

3. References to the research

1. Leslie, W. S. *et al.* [A transferable programme of nutritional counselling for rehabilitation following myocardial infarction: a randomised controlled study](#). *Eur. J. Clin. Nutr.* **58**: 778–786 (2004) doi:10.1038/sj.ejcn.1601876.
2. Leslie, W. S. *et al.* [Improving the dietary intake of under nourished older people in residential care homes using an energy-enriching food approach: a cluster randomised controlled study](#). *J. Hum. Nutr. Diet* **26**: 387–394 (2013) doi:10.1111/jhn.12020.
3. Celnik, D. *et al.* [Time-scarcity, ready-meals, ill-health and the obesity epidemic](#). *Trends Food Sci. Tech.* **27**: 4–11 (2012) doi:10.1016/j.tifs.2012.06.001.
4. Combet, E. *et al.* [Development of a nutritionally balanced pizza as a functional meal designed to meet published dietary guidelines](#). *Public Health Nutr.* (online ahead of print 28 October 2013) doi:10.1017/S1368980013002814.
5. Leslie, W. S. *et al.* [Designing the eatwell week: the application of eatwell plate advice to weekly food intake](#). *Public Health Nutr.* **16**: 795–802 (2013) doi:10.1017/S1368980012004193.
6. Leslie, W. S. *et al.* [What, not just salad and veg? Consumer testing of the eatwell week](#). *Public Health Nutr.* **28**: 1–7 (2013) doi:10.1017/S1368980013001663.

Grant funding:

FSAS. The Eatwell week: application of the Eatwell plate advice to weekly food intake (2009–2011;

£185,223). Awarded to University of Glasgow (C. R. Hankey, M. E. Lean, and W. S. Leslie).

4. Details of the impact

Time pressures, coupled with increased access to convenience foods, mean that busy people continue to buy ready meals. Approximately 270 million of these products were sold in the UK in 2012, demonstrating their hold over the nation's eating habits.

Researchers from the University of Glasgow have helped consumers to make straightforward choices between healthy and unhealthy convenience foods. Using an innovative dual approach, they developed the highly successful line of Eat Balanced pizzas,^a as well as a 7-day online menu plan that is available on the Eatwell Everyday website.^b These two complementary initiatives offer a fresh approach to tackling poor nutritional choices and have received extensive global media attention. Lean has also conveyed the concept of healthy fast food directly to consumers through his involvement in public engagement activities. For example, in June 2013, he was invited to speak at the York Festival of Ideas, a two-week cultural programme comprising more than 120 free events held across the city.

The Eat Balanced pizzas come to market

Pizza is a popular ready meal that is worth around £800 million annually in UK sales. The Eat Balanced pizzas are the direct result of collaboration between the University of Glasgow and Glasgow-based food company Eat Balanced. The CEO of Eat Balanced,^c Mr Donnie Maclean — whose business objective was to make it easier for people to achieve a balanced diet without compromising convenience and taste — explains how the partnership with the University of Glasgow came about: *“I ran various ideas past a few leading academics, but the one who was most engaged and shared my passion was Professor Lean. His wealth of experience with the balanced plate and many other publications were very relevant to what we wanted to achieve and meant that we quickly shared the same vision. When we experienced challenges, Mike always used his experience and wisdom to tackle the issue and find solutions.”* Bringing the Eat Balanced pizzas to market also involved other UK companies, including Cosmo's (a pizza manufacturer) and Seagreens[®] (who sourced the seaweed included in the pizza dough).

The Eat Balanced pizza range, which currently comprises cheese and tomato, spicy chicken, and ham and pineapple varieties,^a fills a gap in the market by providing a ready meal that is both quick to prepare or cook and healthy. More than 25,000 Eat Balanced pizzas have been sold in the UK since they went on sale in September 2012.^c The pizzas are stocked in Scottish stores by Sainsbury's and Asda and are available for home delivery by Ocado in England and Wales.^a Asda and Sainsbury's are the second and third largest supermarket chains in the UK by market share, respectively, while online grocery retailer Ocado makes more than 18,000 deliveries to British households daily.

The University of Glasgow concept of nutritionally balanced convenience meals has earned considerable media attention; consequently, the Eat Balanced pizza has achieved international recognition within an extremely short timeframe (around 18 months). The pizzas have featured in BBC Scotland News TV coverage (second most shared and third most read page on the whole BBC News website that day, and the most popular story in the Scotland section of the BBC website), the BBC Radio 4 Today Programme (interview with Lean) and the BBC Radio 2 Factoids show with Steve Wright. They have also been mentioned in articles published (either online, in print, or both) by Daily Mail, Guardian, Metro, Daily Record, The Scotsman, The Courier, Yahoo.com, New York Daily News, Times of India, Die Welt, Asian Correspondent, Canada TV News, Top News Arab Emirates, Huffington Post, and Gizmodo.^{a,d} The Eat Balanced pizzas also featured on primetime UK television when Maclean appeared in *The Entrepreneurs*, a two-part documentary following the fortunes of a group of Scottish new-start businesses that aired on BBC2 on 24th April and 1st May 2013 to an audience of about 24 million.

Eat Balanced has been recognised by several business organisations and has received a total of 10 awards.^a The pizzas were showcased in March 2012 at the Food & Drink Expo in Birmingham,

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UK. This exhibition is the largest food and drink trade show held annually in the UK, with around 550 exhibitors and 20,000 attendees, including buyers from major retailers and wholesale distributors. The Eat Balanced pizza range won the Best New Idea award at this event, an initiative designed to support the launch of new products.^{a,e} More than 50 exhibiting companies put their products forward in 2012 and visitors to the show voted for their favourite product. The manager of the show^a stated: "*Eat Balanced Pizzas are truly innovative and have the scope to make a huge impact on how consumers eat; we hope being named Food & Drink Expo's Best New Idea helps them achieve this.*" The pizza range also won the Best New Product award at the UK Best Business Awards (2012).^{a,f} These awards recognise business excellence and are open to private, public and third-sector organisations; four rounds of judging are conducted annually by 20 independent experts, with winners holding their title for 12 months. The winner of the Best New Product award is determined by factors such as product innovation, pricing, after-sales service, design and performance.

Credibility of meal-based balanced nutrition endorsed by leading experts

In addition to creating the Eat Balanced range of healthy pizzas, the University of Glasgow researchers have delivered practical targeted advice to further help the general public engage with nutritionally-balanced eating. The Eatwell Everyday website – which features the menu plan developed and tested at the University of Glasgow – was launched by the FSAS in Dundee on the 30th April 2013.^g This event, which focused on the science of nutrition, was opened by Michael Matheson MSP, the Scottish Government Minister for Public Health. In the first 3 months after its launch, the Eatwell Everyday website received 9,058 page views from 1,397 unique visitors in nine countries, including the UK, USA, India, and Australia.^h The user-friendly and common-sense nature of the Eatwell Everyday menu plan was highlighted by The Herald and Medical Xpress (with a combined potential audience of around 2.5 million).ⁱ

The Eat Balanced pizzas show solely green (low) and amber (medium) levels of fat and salt content on their food labels (in accordance with the June 2013 Department of Health front-of-pack nutrition labelling scheme). In February 2013, a representative from the Scottish National Rugby team announced that the Eat Balanced pizzas formed part of the preparatory diet of the players ahead of their winning Royal Bank of Scotland 6 Nations match against Italy.^{aj} The team's lead nutritionist stated: "*The Eat Balanced pizza is not only a great idea, it's a great product too and one which can easily be integrated into the player's nutrition plans. Typically pizza is seen as a guilty pleasure but the Eat Balanced pizza can be used as part of a fuelling or recovery strategy without the player being concerned about an excessive salt or fat intake.*"

5. Sources to corroborate the impact

- a. [Eat Balanced](#) website
- b. [Eatwell Everyday](#) website
- c. Statement from the CEO of Eat Balanced (available on request)
- d. [Media coverage](#) of the Eat Balanced pizzas; [The Entrepreneurs](#)
- e. Winner of the [Best New Idea award](#) at the [Food & Drink Expo](#) at Birmingham, UK, in March 2012 ([quote](#) from Eat Balanced website)
- f. Winner of the [Best New Product award](#) at the UK Best Business Awards, 2012
- g. [Launch](#) of the Eatwell Everyday website in March 2013
- h. Eatwell Everyday website usage (available on request)
- i. Media coverage of the Eatwell Everyday menu plan, 2012: [The Herald](#) and [Medical Xpress](#)
- j. [Press release](#) from the Scottish National Rugby team on 5th February 2013 ([quote](#) from Eat Balanced website)